Existing Conditions

Wake County CRT Corridor

Wake TRANSIT

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1 Introduction

This Existing Conditions and Constraints Report is part of a series of reports initiating the Wake Transit Plan Bus Rapid Transit (BRT) and Commuter Rail Transit (CRT) Major Investment Study (MIS). Implementing a CRT project connecting Raleigh and Durham was one of the key elements of enhancing urban mobility identified in the Wake Transit Plan, approved in 2016. This report summarizes the travel market analysis and existing conditions along the CRT corridor identified in the Wake County Transit Plan. The information in this report provides a baseline that will help define the Purpose and Need for the project and ultimately guide the evaluation and selection of a Locally Preferred Alternative for the corridor.

This report is divided into the following sections:

- Section 2 documents previous commuter rail-related studies and plans happening in the region;
- Section 3 describes the existing and future population and employment projections, travel market demand analyses and findings;
- Section 4 analyzes the existing and future corridor transit service and findings;
- Section 5 describes the existing and forecast traffic along major corridors;
- Section 6 gives a high-level overview of environmental and social features in the CRT corridor.

1.1 WAKE AND DURHAM COUNTY TRANSIT HISTORY

The Triangle has been one of the fastest growing regions in the United States in the past, and the growth is expected to remain strong over the next several decades. Over a million people are projected to live in Wake and Durham counties over the next 25 years. Each day, over 60 new residents will call Wake County home, while Durham County will add about 17 new residents daily.

This growth brings new jobs and opportunities, but also more traffic on already congested roadways, especially those crossing county boundaries, e.g., I-40, US-70, NC 147, NC 54. The transit plans of Wake County (2016) and Durham County (2017), complementary to each other, were built to deliver exceptional public transportation services to all communities that would support economic growth, improve travel options beyond those congested roadways, and better connect people and opportunities.

Expanding the transit system is a strategy that offers long-term benefits. High quality transit services encourage people who value transit to locate near good transit services. Over time, this increases the "fit" between the transit system and the population, leading to increased ridership growth and housing, offices, and retail environments that provide the full range of lifestyle options the market demands. Enhanced transit can also help Wake County remain competitive in a global economy by making it easier for employees to get to their jobs, thus helping businesses attract and retain talent.

The Wake County Transit Plan, approved in November 2016, includes an investment of $2.3 billion in the first 10 years of implementation to improve local transit options. A combination of local, regional, state and federal funding as well as farebox revenue will be needed to help pay for the improvements recommended in the Wake County Transit Plan. The primary funding will come from a voter-approved half-cent sales tax advisory referendum, also approved in November 2016. Other local funding will include increased county and regional vehicle registration fees. The Durham County Transit Plan was approved in April 2017, would be funded through "Tax District Revenues", for the local share of the planned projects and services. The recommendations of both transit plans will provide people more viable options to get around their community, expands access and opportunities, and helps connect more people to jobs, schools and entertainment.

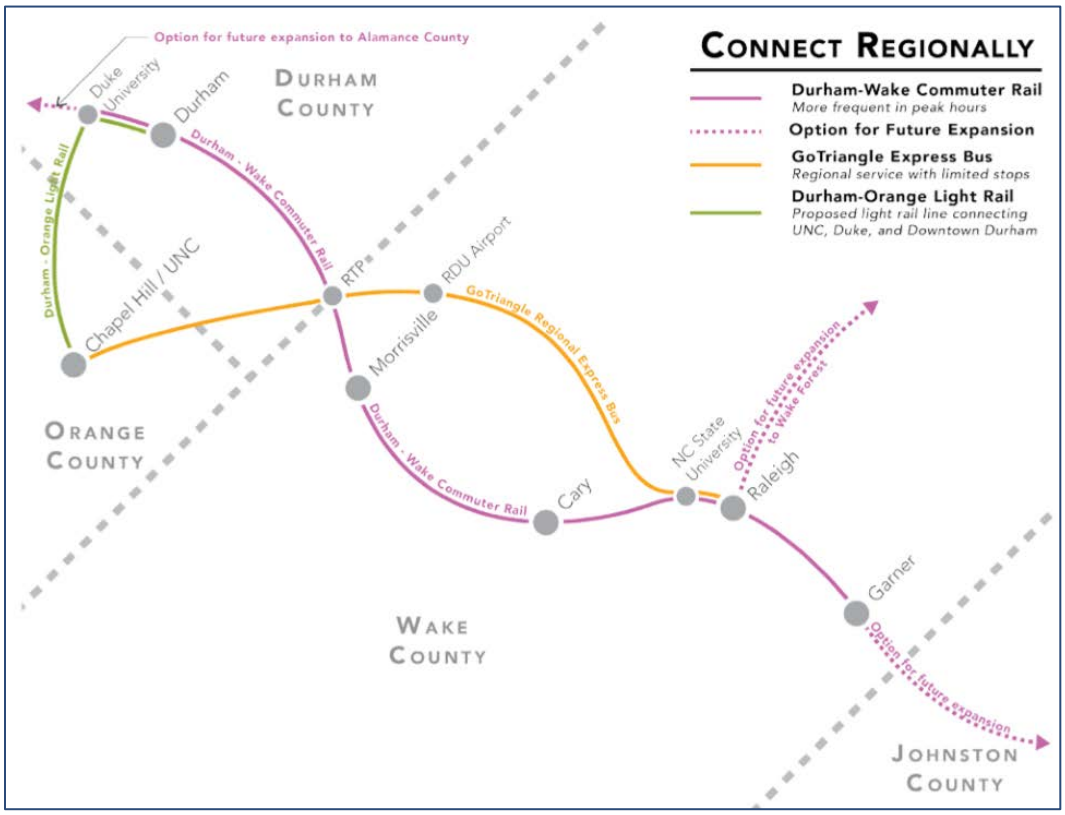
Big Moves of Wake Transit Plan

The Wake Transit Plan[1] envisioned four "big moves" to enhance transit, which include:

- Big Move 1: Connect Regionally (Figure 1)
- Big Move 2: Connect All Wake County Communities
- Big Move 3: Frequent, Reliable Urban Mobility
- Big Move 4: Enhanced Access to Transit

[1] Wake Transit Plan: A Wake County Transit Investment Strategy Report, November 2016.

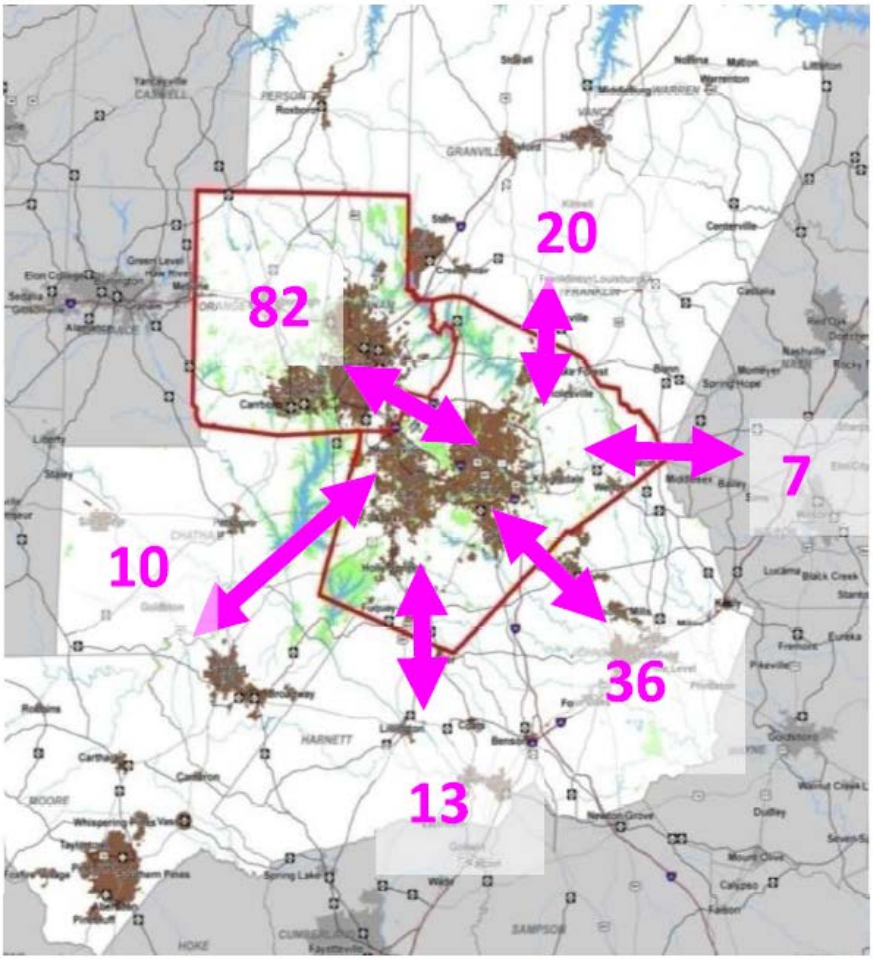
Figure 1: Big Moves: Connect Regionally



1.2 CRT CORRIDOR

Much of the Triangle Region is characterized by rapidly growing population and economy, which is coupled with large cross-county commuting flows in the region and a steady increase in highway congestion. It is estimated that there are 82,000 people who commute each day between Wake County and Durham/Orange Counties (see Figure 2). According to Texas Transportation Institute, Raleigh-Durham is currently ranked as the 35th most congested metropolitan area in the US, with 35 hours of highway delay per traveler per year. The most heavily traveled roadway in this corridor is the section of I-40 near the Wake County-Durham County line, the border between two Metropolitan Planning Organizations. With today's traffic, a trip between Durham and Raleigh during PM Peak using NC 147 and I-40 will typically take between 35 minutes to 1 hour and 20 minutes, based on an online mapping tool.

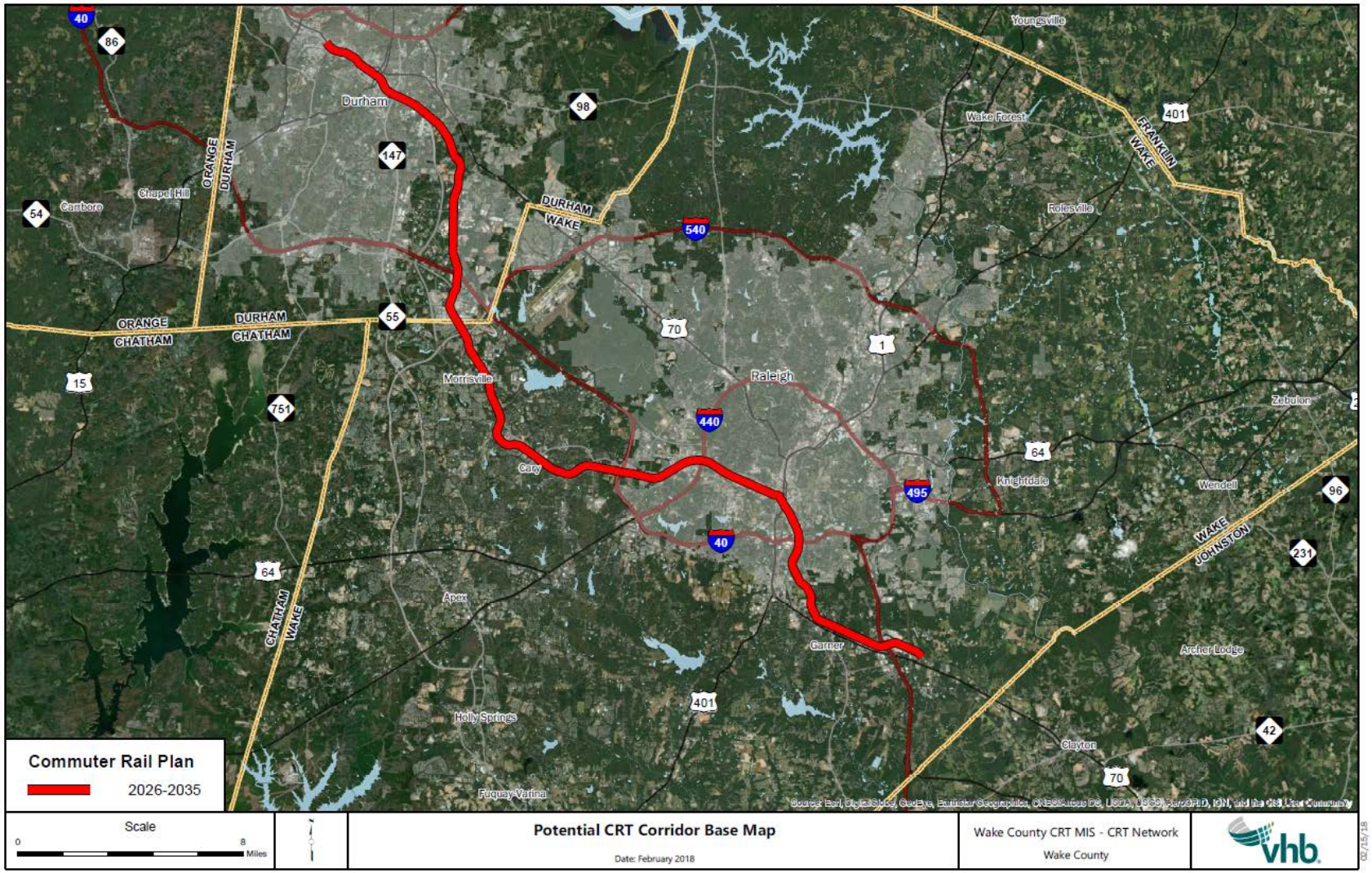
Figure 2: Daily Commuting Flows (in thousands of commuters)



Source: 2045 MTP (CAMPO and DCHC MPO)

The Wake-Durham Commuter Rail project will provide the region a more consistent, reliable alternative to the congestion of the CRT corridor. The 37-mile commuter rail service will run between Garner, downtown Raleigh, NC State University, Cary, Morrisville, RTP and Durham within the existing Norfolk Southern Railroad corridor (owned by NCRR Company), by adding additional tracks and facilities (Figure 3). The rail project proposes eight trains in each peak period, two mid-day, and two in the evening, in each direction (8-2-8-2).

Figure 3: Proposed Wake-Durham CRT Corridor



2 Review of Past Studies in the Area and Findings

The following studies were examined in the study area:

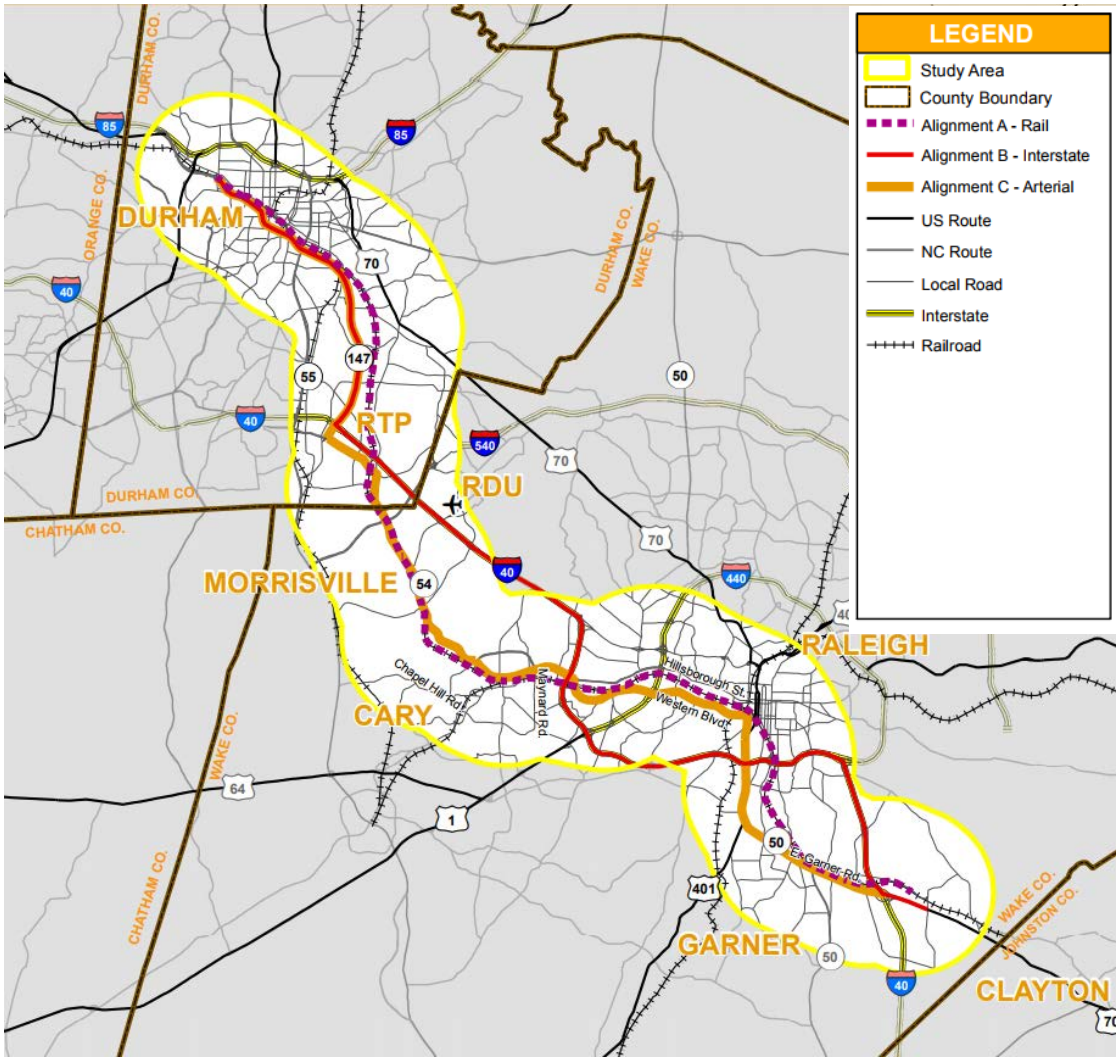
- Durham-Wake County Corridor Alternative Analysis (2011)
  - GoTriangle
- Wake Forest to Raleigh Commuter Rail Conceptual Infrastructure Analysis (2017)
  - NCDOT Rail Division and GoTriangle
- NCRR Shared Corridor Commuter Rail Capacity Study – Greensboro to Goldsboro, NC (2008)
  - North Carolina Railroad Company
- NCRR Commuter Rail Ridership & Market Study (2010)
  - North Carolina Railroad Company
- Traveling to Work in Wake: Exploring the Commuter Rail Option (2016)
  - NCDOT Rail Division and NC State University Center For Urban Affairs & Community Services
- Durham County Transit Plan (2017)
  - Durham County
- Wake County Transit Plan (2016)
  - Wake County
- NSR/TTA/NCRR Commuter Rail Service Study (2015)
  - Norfolk Southern Railway, GoTriangle, and North Carolina Railroad

Durham-Wake County Corridor Alternatives Analysis (2011)

The Durham-Wake County Corridor Alternatives Analysis evaluated the feasibility of commuter rail against other fixed-guideway alternatives to connect Durham and Wake counties. One of the proposed alignments is a 37-mile segment of the North Carolina Railroad (NCRR) corridor from Duke Medical Center in Durham through Research Triangle Park, Cary, Raleigh, and Garner to the Wake-Johnston County Line. Other proposed alignments utilize a combination of interstate and arterial roadway segments to connect Durham and Garner. A map of the alignments is provided in Figure 4.

The viability of BRT, light rail transit (LRT), and commuter rail transit (CRT) were evaluated for each alignment. CRT along the NCRR corridor alignment was chosen to advance as the Build Alternative for further evaluation. This finding is consistent with recommendations from previous studies to use the NCRR alignment for regional transit service.

Figure 4: Durham-Wake County Conceptual Alignments



Wake Forest to Raleigh Commuter Rail Conceptual Infrastructure Analysis (2017)

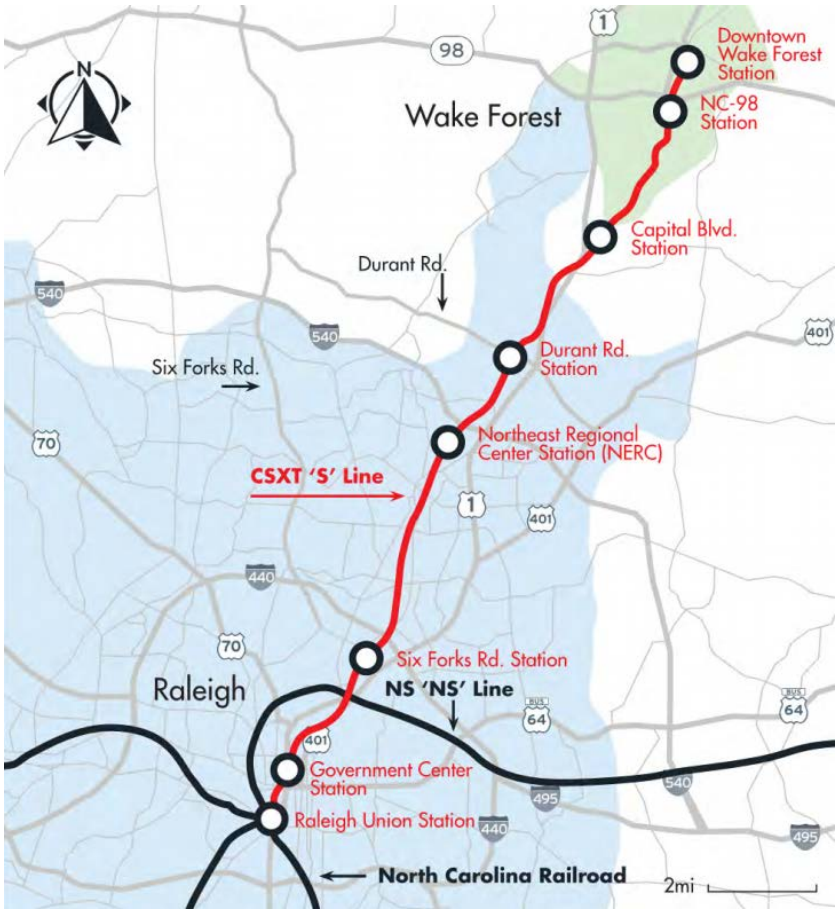
The Wake Forest to Raleigh Commuter Rail Conceptual Infrastructure Analysis determines the potential scope and cost of infrastructure improvements that could support a commuter rail service on an existing rail line between Wake Forest and Raleigh. While the rail line is owned and operated by CSX Transportation, GoTriangle currently owns property along a portion of the east side of the corridor.

Two commuter train service scenarios are evaluated in this study. One scenario includes 20 daily round trips and the other includes 10 daily round trips. Between downtown Wake Forest and Raleigh Union Station, the estimated scheduled travel time is 34 minutes traveling southbound and 35 minutes traveling northbound. The potential station locations are shown in Figure 5.

This study proposes that the commuter tracks follow CSX tracks through the CSX Raleigh Yard rather than building a new elevated rail corridor into downtown Raleigh, as proposed under a previous study.

The study concludes that a commuter rail service between Wake Forest and Raleigh on the CSXT rail line is possible but will require a significant amount of new infrastructure to operate reliably. The estimated cost of infrastructure improvements ranges from $373.4 million to $435.7 million. Recommended next steps include additional studies to refine station locations, confirm feasibility, scope, and the cost of service.

Figure 5: Potential Station Locations



Shared Corridor Commuter Rail Capacity Study – Greensboro to Goldsboro, NC (2008)

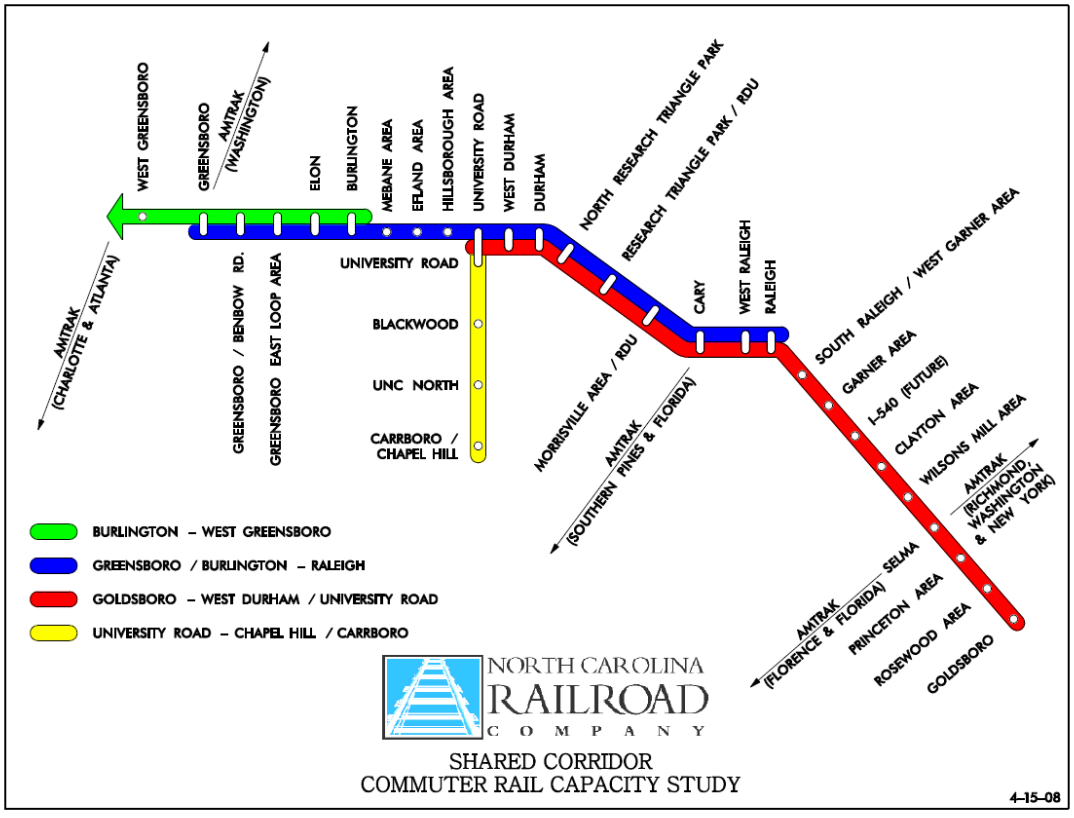
The North Carolina Railroad Shared Corridor Commuter Rail Capacity Study evaluated four corridors for commuter rail service between Greensboro and Goldsboro. They were Burlington to Greensboro (NCRR "H" Line), Burlington to Durham/Raleigh (NCRR "H" Line), Goldsboro to Raleigh/Durham (NCRR "H" Line), and Hillsborough to Carrboro/ Chapel Hill (NS "J" Line), as shown in Figure 6. The study assumed an operating scenario of four peak hour trains in the

morning, one mid-day round trip, and four peak hour trains in the afternoon. Aspects of the capacity study included:

- Development of station areas and commuter train schedules
- Rail Traffic Controller Modeling to determine effects on train performance and to evaluate alternative infrastructure scenarios
- Infrastructure improvements required to alleviate capacity constraints
- Conceptual level cost estimates

The study concluded that it would be possible to design and construct infrastructure improvements that would allow for commuter rail to operate with freight and Amtrak service along the NCRR corridor.

Figure 6: Shared Use Corridor Commuter Rail Capacity Study



Commuter Rail Ridership & Market Study (2010)

The North Carolina Railroad Commuter Rail Ridership & Market Study analyzed a 143-mile stretch of the NCRR-owned corridor between Greensboro and Goldsboro. This study was a result of the Shared Corridor Commuter Rail Capacity Study (2008) which recommended that a ridership forecasting study be conducted as the next step in assessing demand along the NCRR corridor. To evaluate ridership a regional demand model was developed for the region, which was based off the Triangle Regional Model (TRM),

the Piedmont Triad Regional Model (PTRM), and the Goldsboro Travel Demand Model (GTDM). The study developed ridership forecasts for the future years of 2012, 2017, and 2022.

One of the conclusions of the study was that ridership along the corridor is largely dependent on the extent and quality of bus service connecting to the commuter rail. Additionally, ridership will depend on service characteristics. The study noted that significantly higher ridership can be obtained with lower fares, at the expense of gross revenue according to the sensitivity analysis.

Traveling to Work in Wake: Exploring the Commuter Rail Option (2016)

The Traveling to Work in Wake: Exploring the Commuter Rail Option Study examines the viability of commuter rail in Wake County. The report explores socio-economic, transportation, and land use data to present information on the catchment areas of potential commuter rail stations. The study notes population growth, urban sprawl, crossover employment, and traffic density as key characteristics of the study area.

The report also delves into travel mode choice and influences on transit use, including: individual tastes & preferences, neighborhood characteristics, nature of trip, and transit trip characteristics. The study concluded that land use shifts to multi-use and transit-oriented development will likely support the move to alternative forms of transportation.

Durham County Transit Plan (2017)

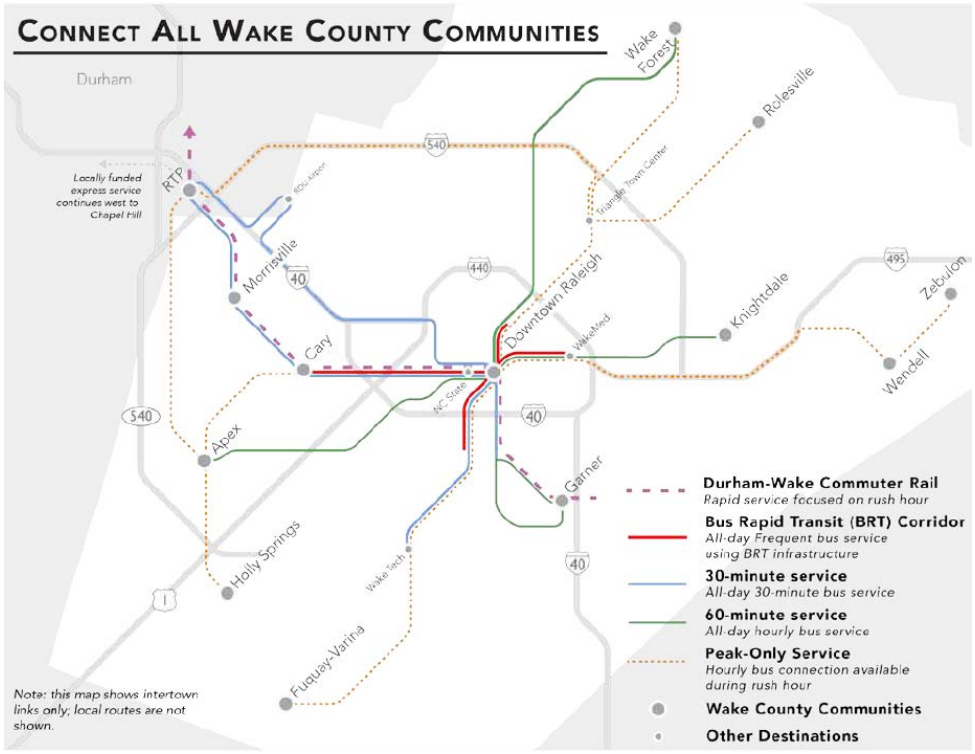
The 2017 Durham County Transit Plan updates the 2011 Bus and Rail Investment Plan adopted by Durham County, DCHC MPO, and GoTriangle. The plan notes that a local funding amount for the Wake-Durham CRT project has yet to be determined, however Durham County anticipates working with state governments, RTP, and others, to develop a full funding plan for CRT. The plan is supportive of the Wake-Durham CRT and states “Durham County leaders consider implementation of the Wake-Durham Commuter Rail Transit Project vital to this vision and to our future transportation system in Durham and the Triangle region”.

Wake County Transit Plan (2016)

The Wake County Transit Plan calls for major improvements in four key areas, which are defined as the “Four Big Moves”. The proposed plan will connect twelve municipalities and other major destinations, as shown in Figure 7. The plan funds the Wake County share of a new 37-mile commuter rail along the NCRR corridor between Garner and West Durham. The plan recommends eight trains in each peak with two mid-day and two in the evening, in each direction (8-2-8-2). Commuter Rail capital expenditures funded through 2027 were estimated to be $886,500,000 and it is assumed that, through a regional partnership by extending the line into neighboring counties, the project would successfully compete for 50% federal funding (estimated at $443.3 million, the Wake County share included in the Financial Plan).

The entire Wake Transit Plan is estimated to cost about $2.3 billion over the first 10 years, using a combination of local, state, and federal dollars. The main funding source is the local half-cent sales tax Wake County voters approved in November 2016.

Figure 7: Wake County Transit Plan Overview



NSR/TTA/NCRR Commuter Rail Service Study (2015)

The purpose of the NSR/TTA/NCRR Commuter Rail Service Study was to provide input to Norfolk Southern Railroad and others concerning potential infrastructure needs that would be necessary to support the operation of the defined Commuter Rail Service Scenarios over portions of the NCRR's H-Line while preserving the efficiency and reliability of intercity passenger service and NSR freight service, as measured against the 2020 Base Case and, in one selected scenario, the 2035 Base Case. The study analyzed various scenarios based on the number of commuter trains to be operated and by length of commuter service territory, with end points of either Mebane or West Durham, on the western end, and either Greenfield or Selma, on the eastern end.

For the Study, the Rail Traffic Controller (RTC) model, a computer simulation model, was used to evaluate the railroad line capacity. The capacity modeling study analyzed the need for double-tracking and the installation of crossovers, however the study did not look at grade crossing closures or separations. The RTC operational results for each scenario were expressed in minutes of delay per 100 train miles.

3 Travel Market Analysis

3.1 INTRODUCTION

This chapter provides an overview of current and projected socio-demographics and travel patterns within the CRT corridor. It focuses on how the communities along the corridor are expected to evolve over the next several decades and the implications that existing and future trends will have on transportation demand and mobility.

Understanding both existing and projected future travel demand is essential for planning and designing major transit investments that are appropriately matched to the demand potential. Transit suitability is also included to illustrate the potential usage of transit by people.

The future travel demand within the CRT corridors is reviewed and analyzed in this chapter. One of the most important factors in selecting corridors for major transit investments is the travel demand market served by the corridor. Existing traffic in the CRT corridor, along with the demand presented by the Triangle Regional Travel Demand Model (TRMv6) is used to identify the potential for transit demand.

3.2 POPULATION AND EMPLOYMENT

The Triangle Region continues to experience rapid population growth combined with sustained regional employment growth. Figure 8 illustrates the population and employment for the Triangle Region and Wake County for 2013 and 2045[2]. Home to 1.7 million people in 2013, the Triangle Region is expected to reach up to 2.9 million in 2045. As noted in the 2045 MTP[3], this growth trend is consistent with a larger national trend, where two-thirds of all population growth is predicted to occur in "megaregions", of which the fastest-growing are in sunbelt areas like the Triangle.

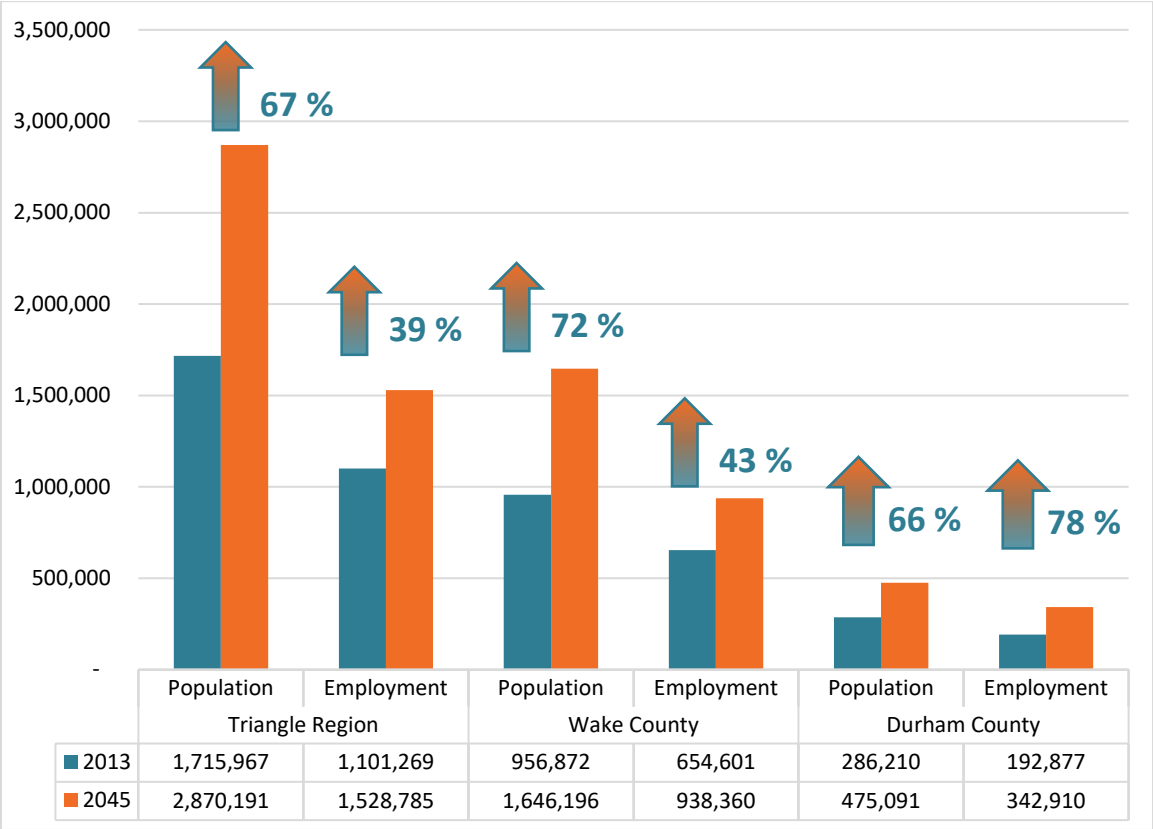
The Triangle Region is home to major universities and their associated medical centers, Research Triangle Park, and the North Carolina State Government. By 2045, Region's economy will remain resilient and the size of the Region's economy is substantial. Compared to the regional growth (67%) between 2013 and 2045, population in Wake County is projected to grow by 72% (689,000), while population in Durham County is expected to increase by 66% (190,000). The projected population growth in these two Counties would account for 76% of the total regional population growth. The Region's economic position is forecasted to remain robust through 2045 with the addition of approximately 430,000 jobs. The fastest job growth is expected to occur in the Wake County area, adding 284,000 jobs (i.e., 66% of the Region's total

[2] TRMv6 -Model base year is 2013 and forecast year is 2045.

[3] 2045 Metropolitan Transportation Plan, CAMPO and DCHC-MPO.

employment growth), followed by Durham County with a new addition of 150,000 jobs (i.e., 35% of the total employment growth).

Figure 8: Socio-Economic Data from TRMv6



	Triangle Region		Wake County		Durham County	
	Population	Employment	Population	Employment	Population	Employment
2013	1,715,967	1,101,269	956,872	654,601	286,210	192,877
2045	2,870,191	1,528,785	1,646,196	938,360	475,091	342,910

Source: TRMv6 socio-economic data (December 2017)

Much of the Triangle Region is characterized by rapidly growing population and economy, with a propensity to disperse growth outwards, which often leads to longer traveling distances. According to a national study, the Triangle area is ranked as the 3rd most sprawling among the 83 regions studied, based on measures of density, land use mix, road connectivity and "centeredness".

The forecasted population change and employment change (2013-2045) are illustrated in Figure 9 and 10, which also suggest that much of this future growth will continue to extend outwards from the urbanized area. Along the CRT corridor, some fast growth areas include central Durham, Research Triangle Park, Morrisville, West Cary, Downtown Cary, NC State University, Raleigh CBD, East Raleigh, Garner and Clayton.

Figure 9: Population Change (2013 – 2045)

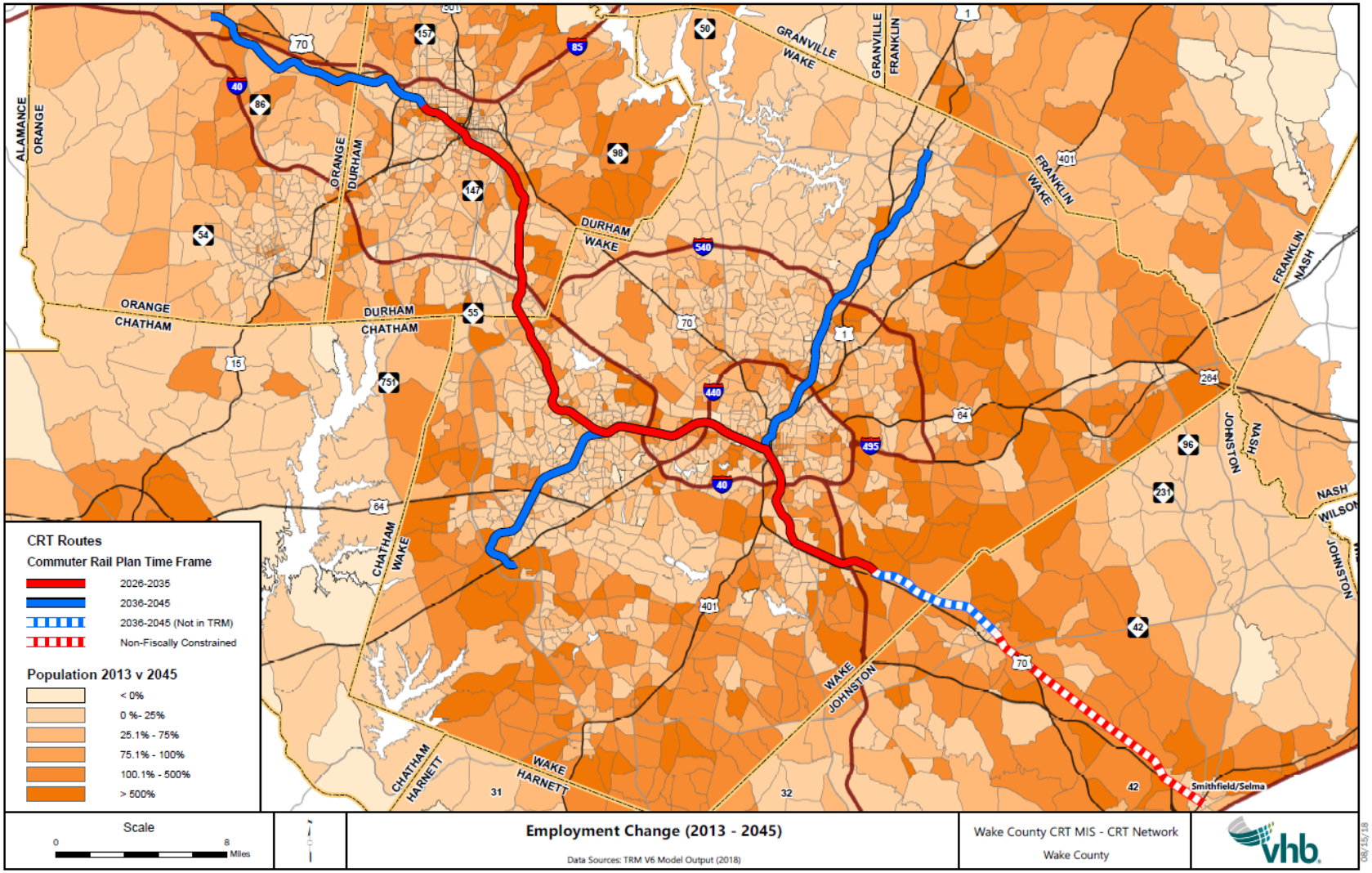
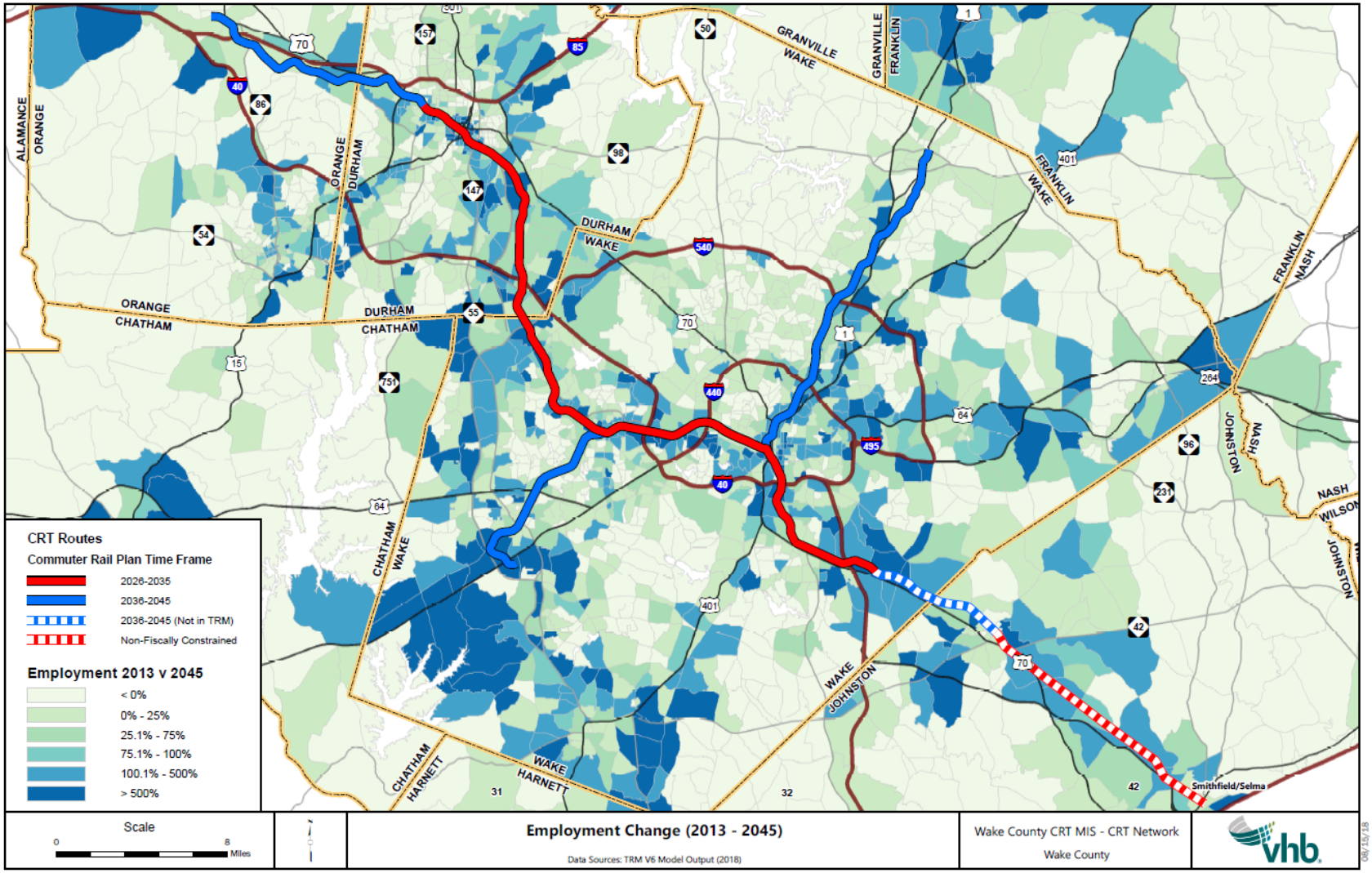


Figure 10: Employment Change (2013 to 2045)

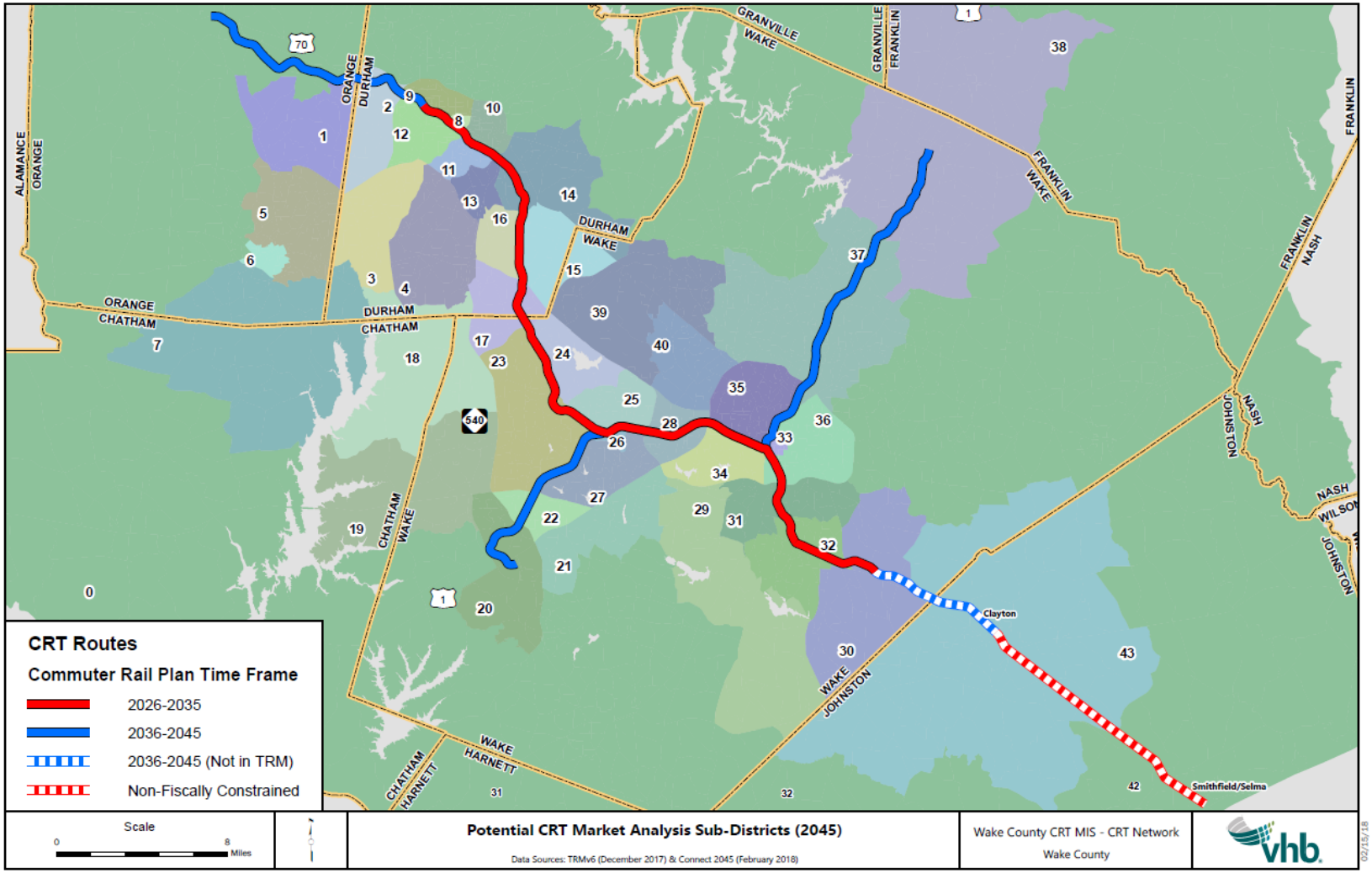


3.3 POTENTIAL TRAVEL MARKET

TRMv6 was used to understand how future growth in the region impacts transportation facilities and services. Transit services operated by GoRaleigh, GoDurham, Chapel Hill Transit, GoTriangle, GoCary, Wolfline, and Duke Transit are all represented in the model. The model can help identify the travel patterns and the potential for transit demand, but not for specific ridership estimates. In future tasks, estimates of future ridership will be built off the planned frequent service network.

The 2045 total daily person trip data (auto and transit trips) was obtained from the TRMv6 for the Region, Wake County, Durham County and Orange County. The modeled area covers approximately 2,800 traffic analysis zones with trip statistics of mode, trip purposes, and origin/destination zone. All the traffic analysis zones within the CRT corridor was further grouped into a total of 40 sub-districts (see Figure 11). Daily person trips between sub-districts were then aggregated to analyze the potential market demand.

Figure 11: Potential CRT Market Analysis Sub-Districts (2045)



Desire line maps were created to show the potential travel market for Downtowns of Raleigh/Durham/Chapel Hill versus non-downtowns, home-based work (HBW) and non-HBW trips. For clarity's sake, minor travel patterns (the daily trips less than a certain threshold) were not shown.

1) The potential total travel demand between downtowns of Raleigh/Durham/Chapel Hill and the rest sub-districts (<500 daily trips were not shown); The major travel patterns demonstrated here include: North Raleigh-Raleigh Downtown-Garner, Durham-North Durham, and Chapel Hill to South Durham (Figure 12).

2) The potential total travel demand among the non-downtown sub-districts (<1,000 daily trips were not shown); The major travel patterns illustrated include: Durham-North Durham, Cary-Research Triangle Park-Durham, Raleigh-Cary, Raleigh-Garner-Clayton, and Raleigh-Wake Forest (Figure 13).

3) Total HBW and non-HBW in the direction of highest demand between all sub-districts (<1,000 daily HBW trips and <5,000 daily non-HBW trips were not shown); both HBW and non-HBW trips primarily travel from the suburban to the urbanized areas (Figure 14 and 15).

Figure 12: Potential CRT Market Analysis (Downtowns Demand)

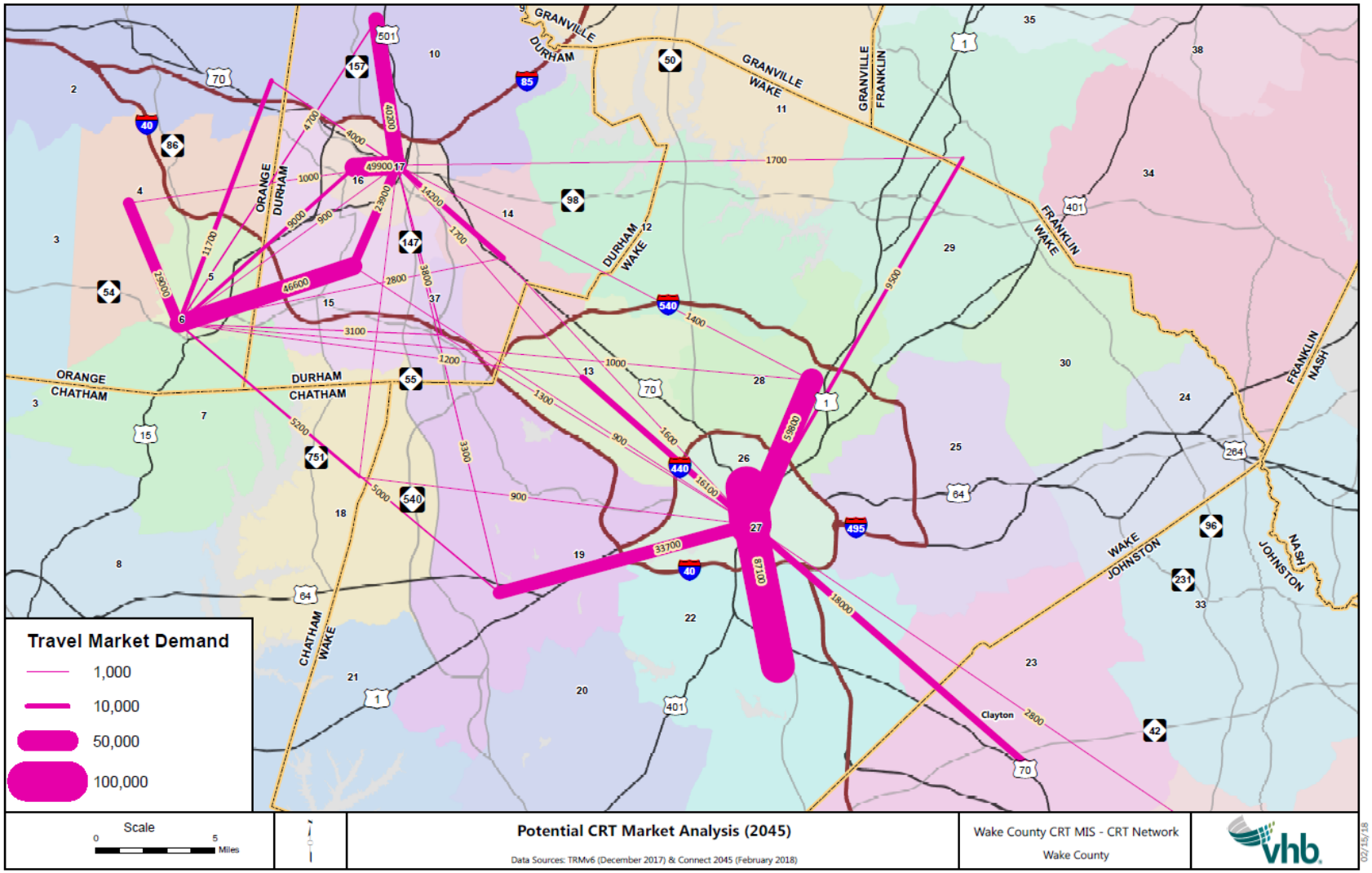


Figure 13: Potential CRT Travel Market Analysis (Downtowns Excluded)

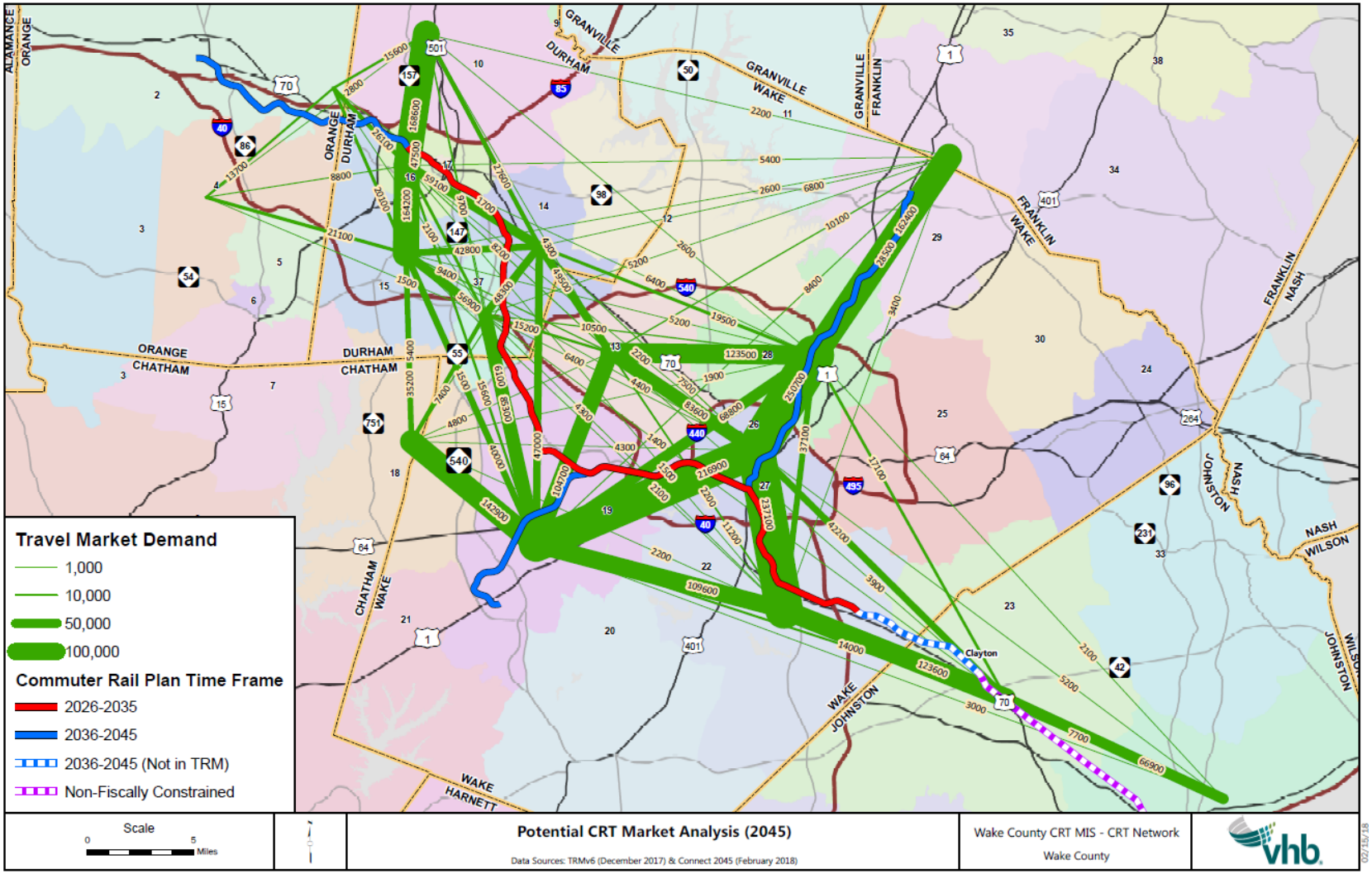


Figure 14: Potential Travel Market (HBW and the Direction of Highest Demand)

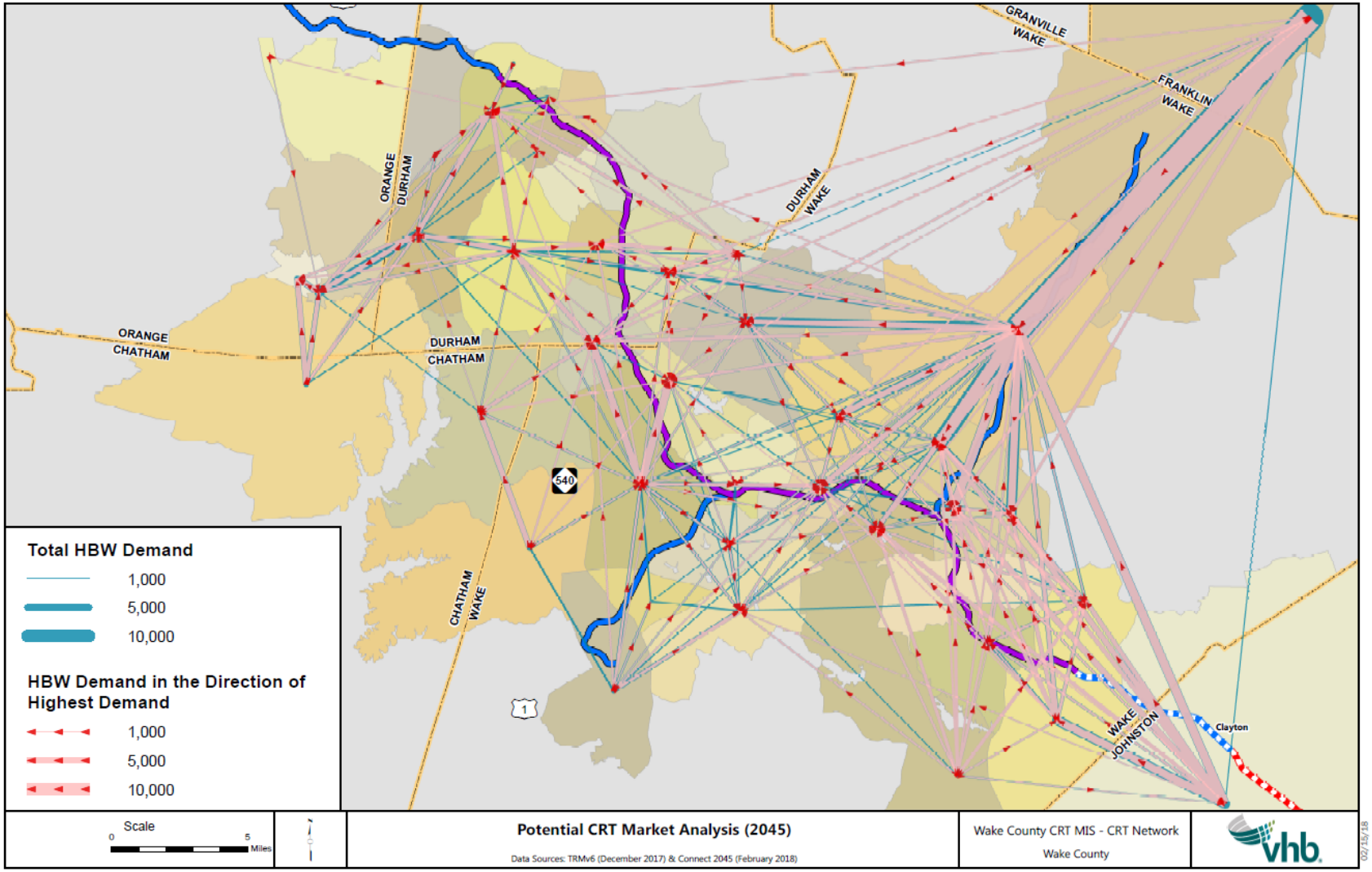
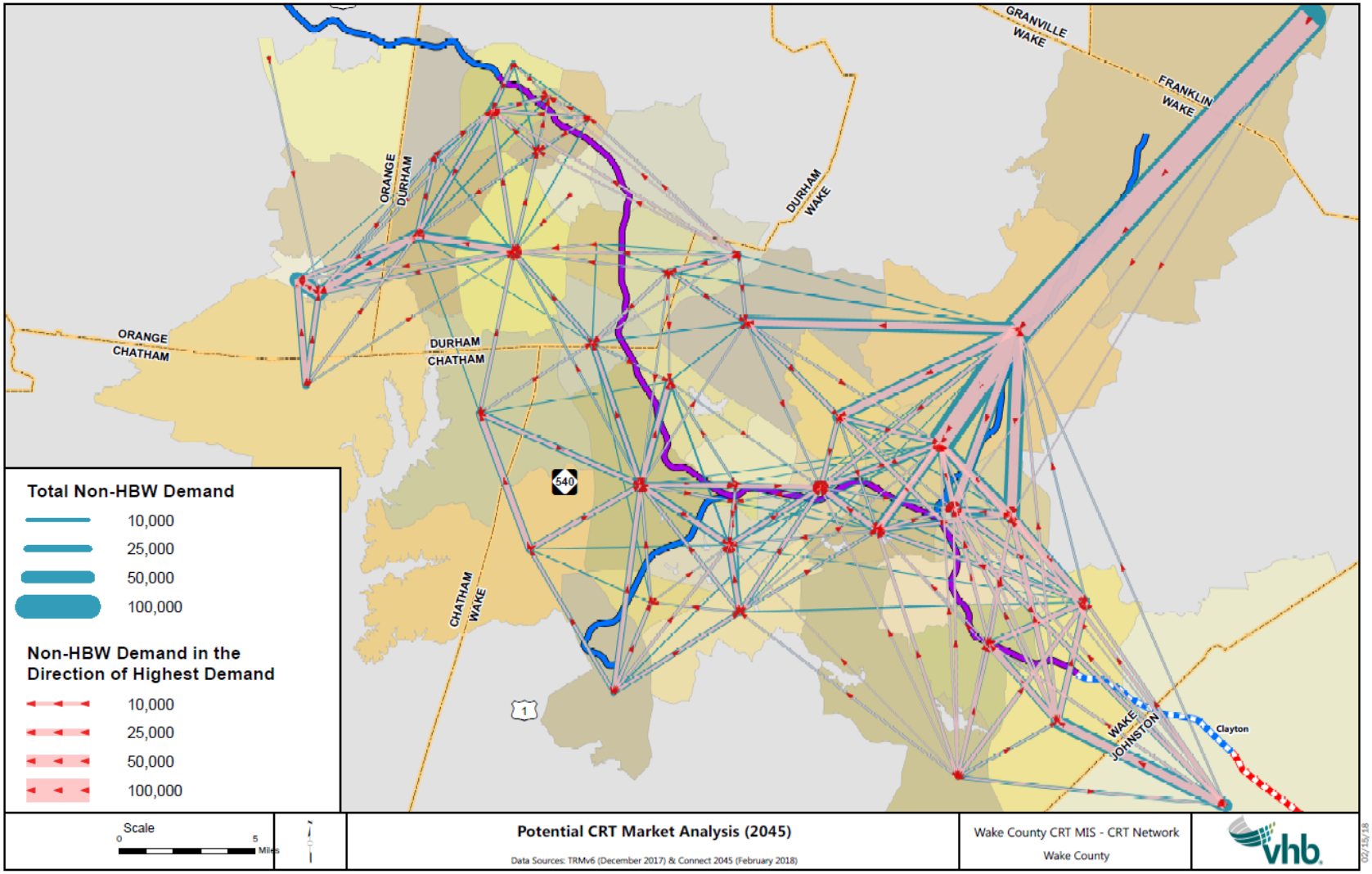


Figure 15: Potential Travel Market (Non-HBW and the Direction of Highest Demand)



To better understand the future travel demand in the proposed CRT corridor, the travel demand market study is reviewed and analyzed for some major production/attraction zones along the corridor. These include South Durham, Research Triangle Park, West Cary, downtown Cary, West Raleigh, NC State University, Downtown Raleigh East Raleigh, North Raleigh and Johnston County (Figure 16-25). Each figure depicts the 2040 total daily person trips from/to each of the above major sub-district to the rest of the region.

Figure 16: Potential CRT Market Analysis (South Durham)

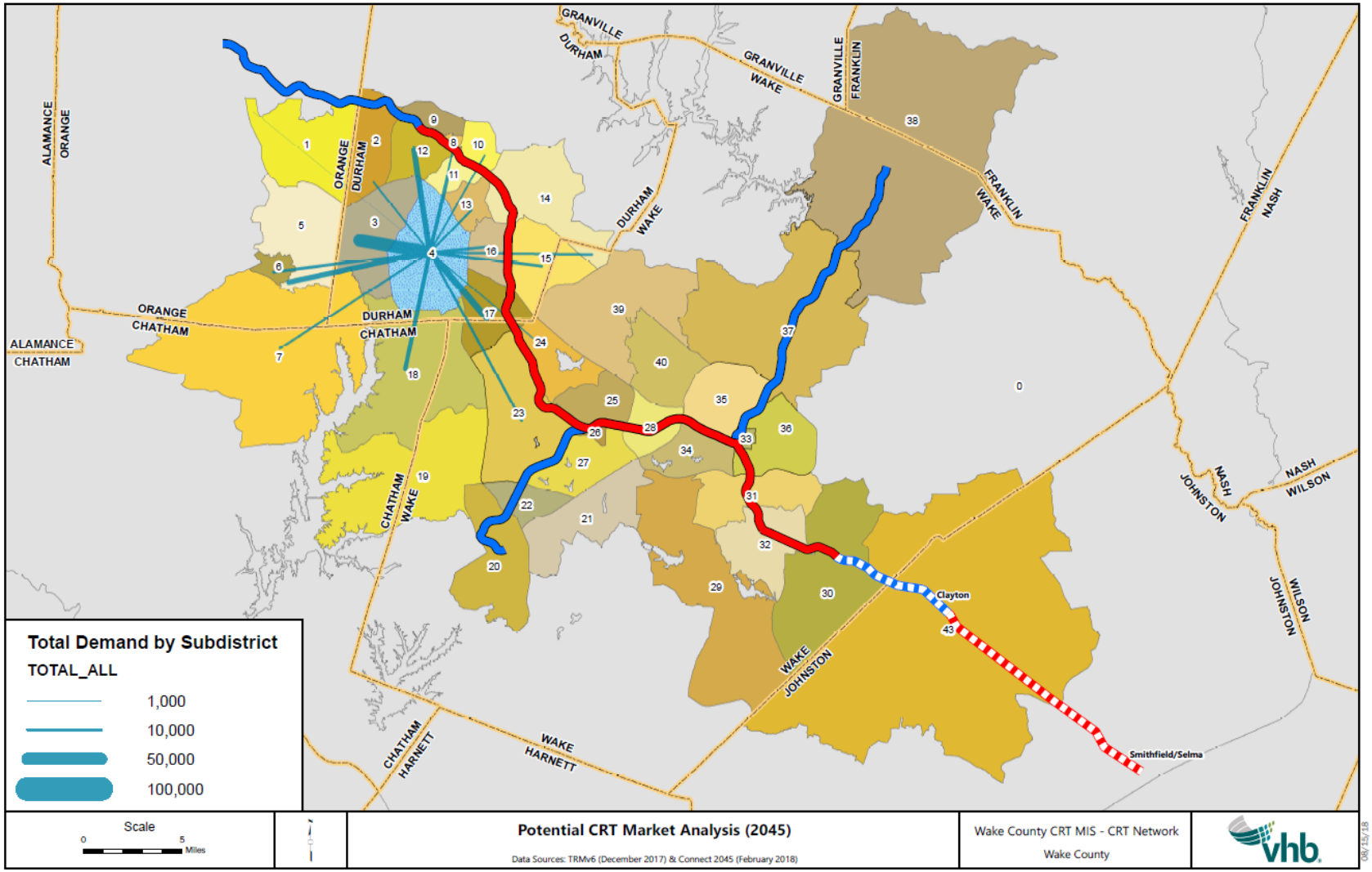


Figure 17: Potential CRT Market Analysis (RTP)

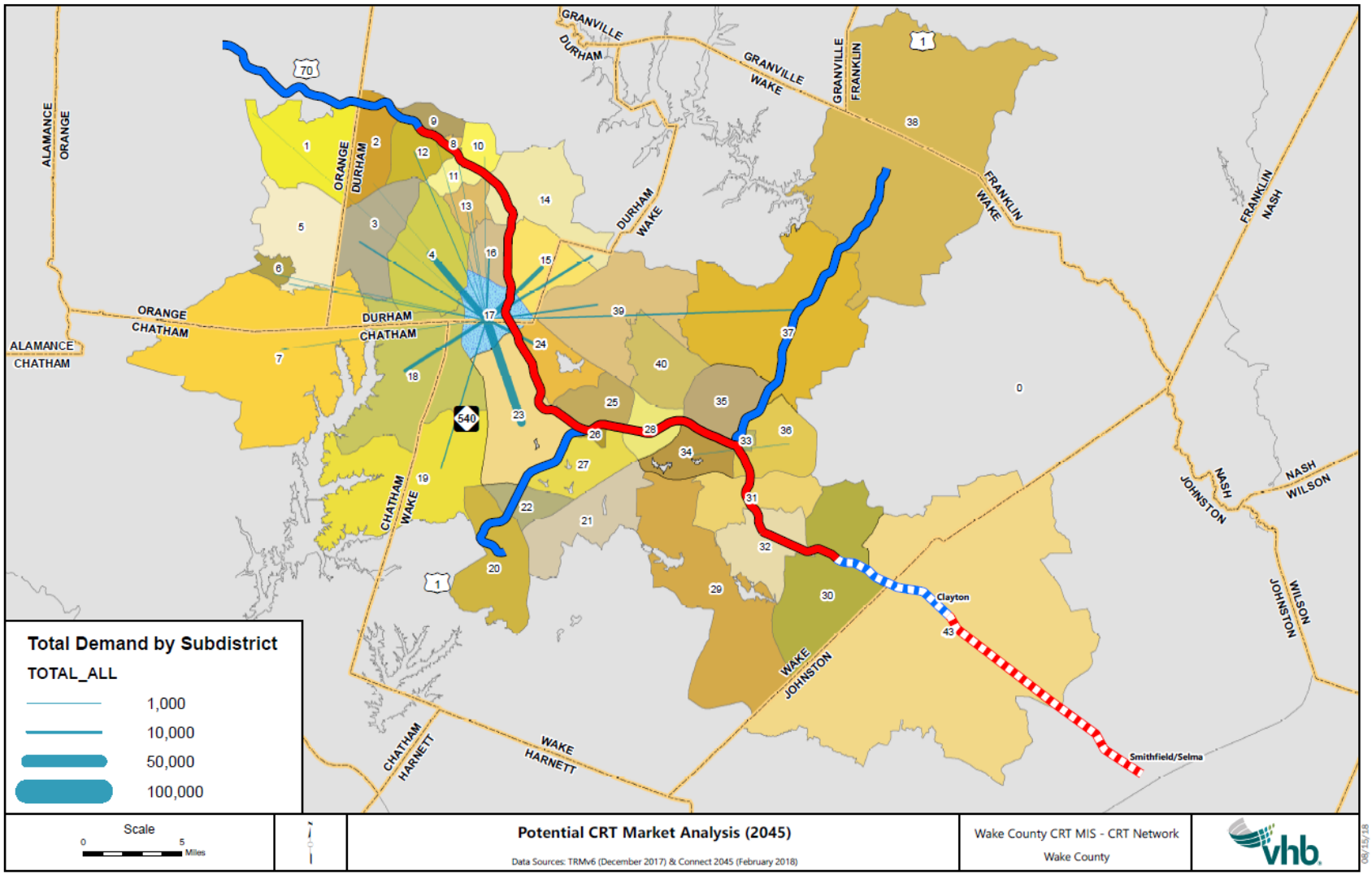


Figure 18: Potential CRT Market Analysis (NC State University)

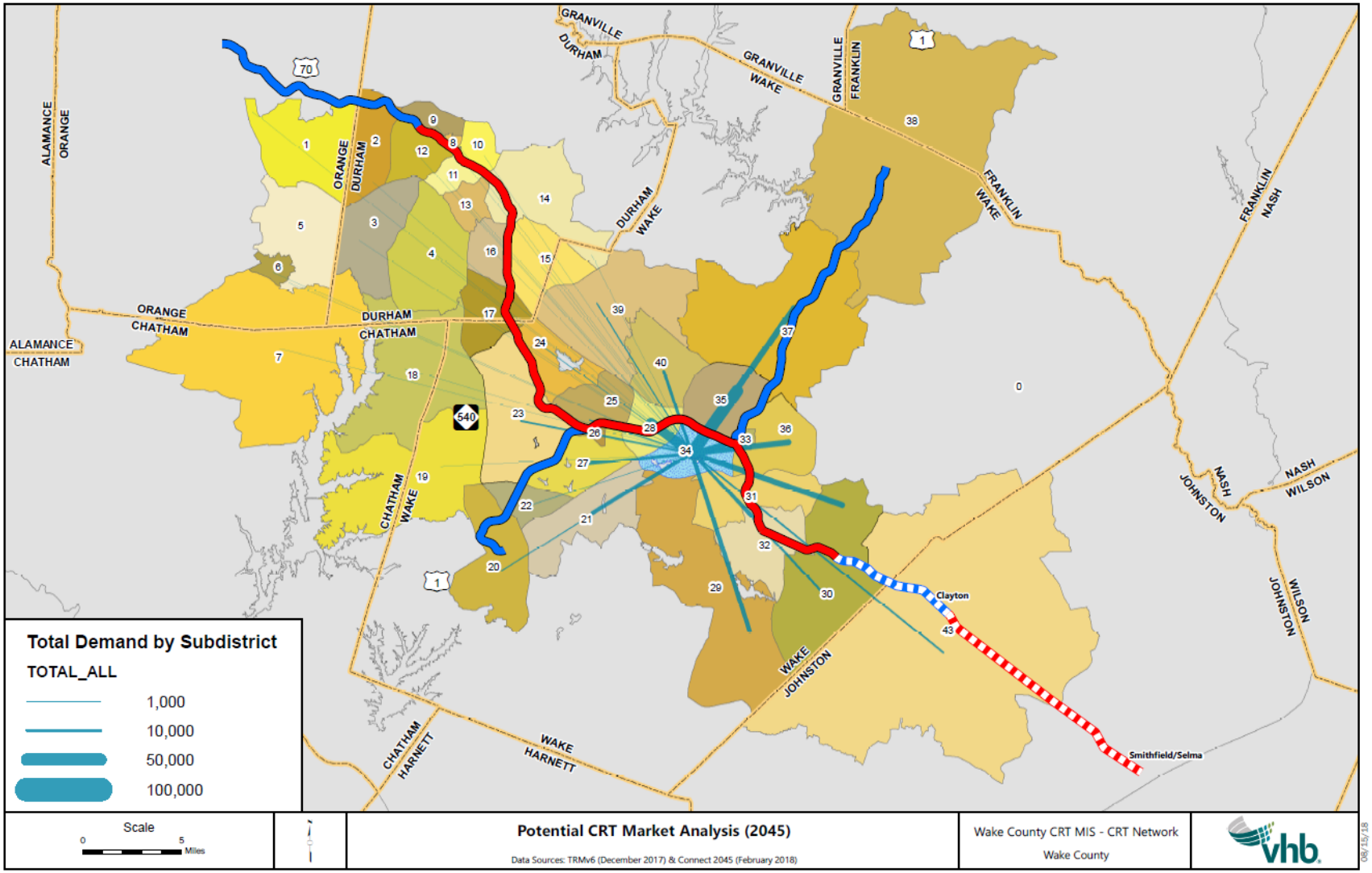


Figure 19: Potential CRT Market Analysis (Downtown Cary)

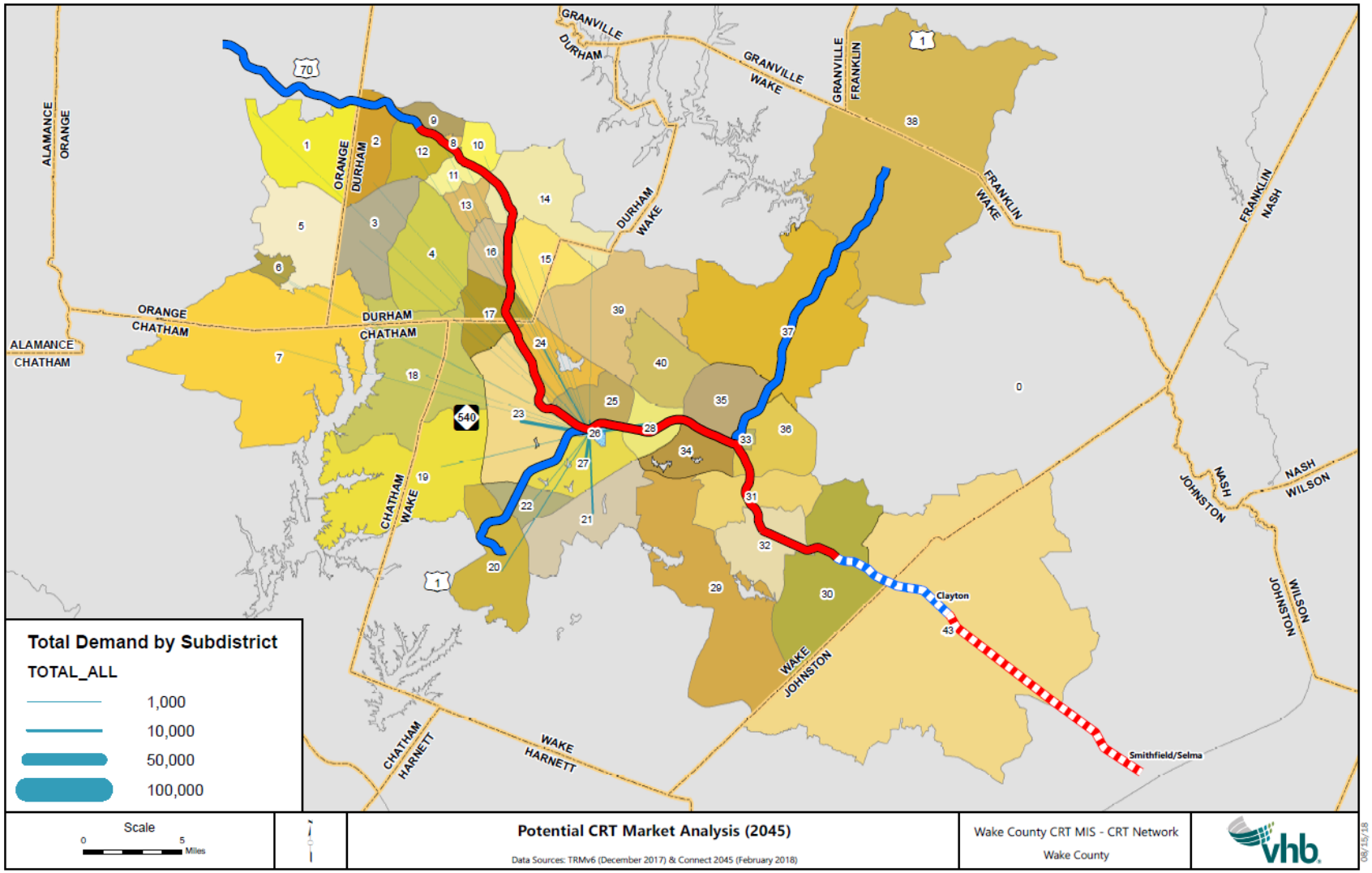


Figure 20: Potential CRT Market Analysis (West Raleigh)

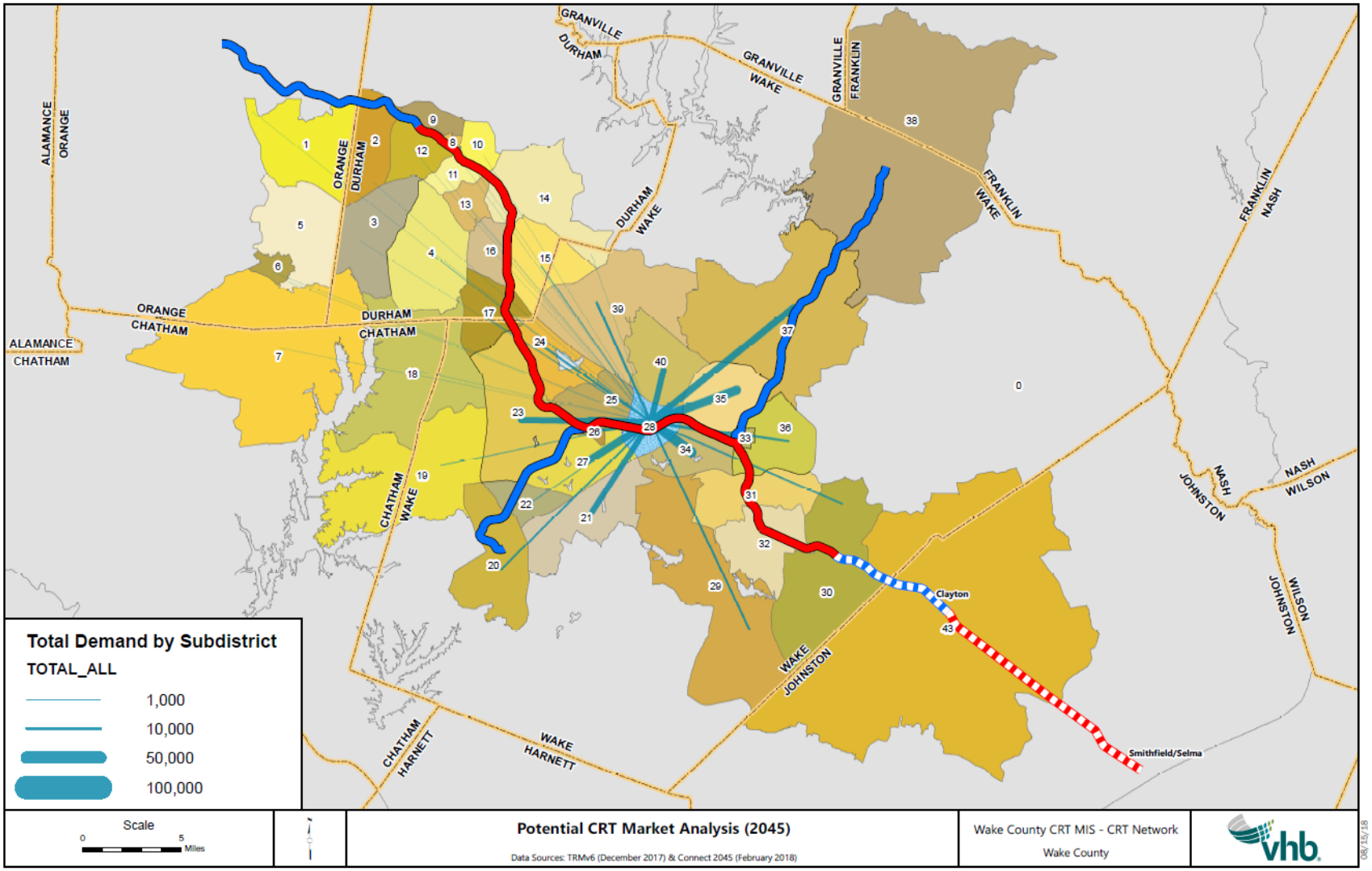


Figure 21: Potential CRT Market Analysis (NC State University)

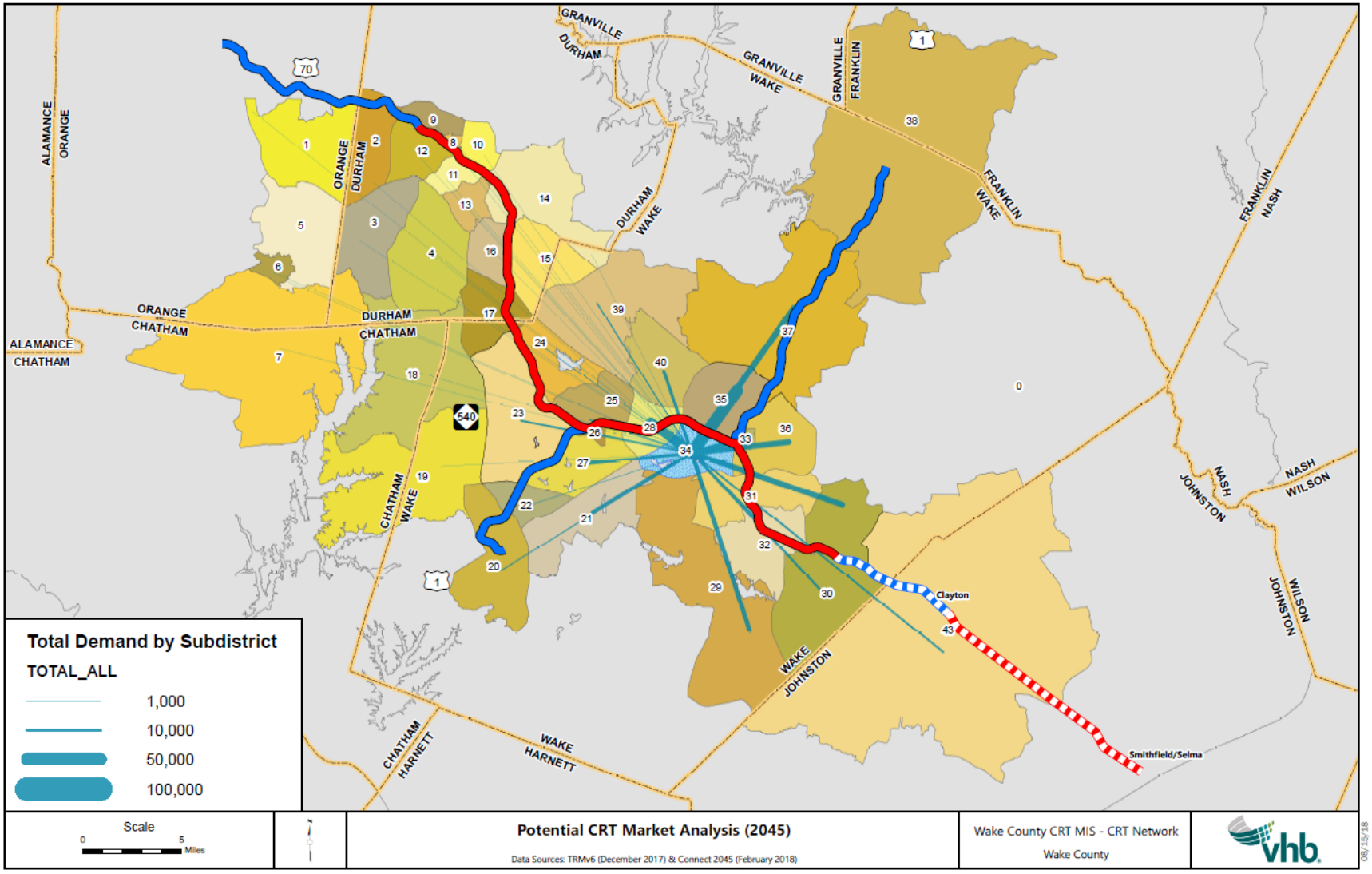


Figure 22: Potential CRT Market Analysis (Downtown Raleigh)

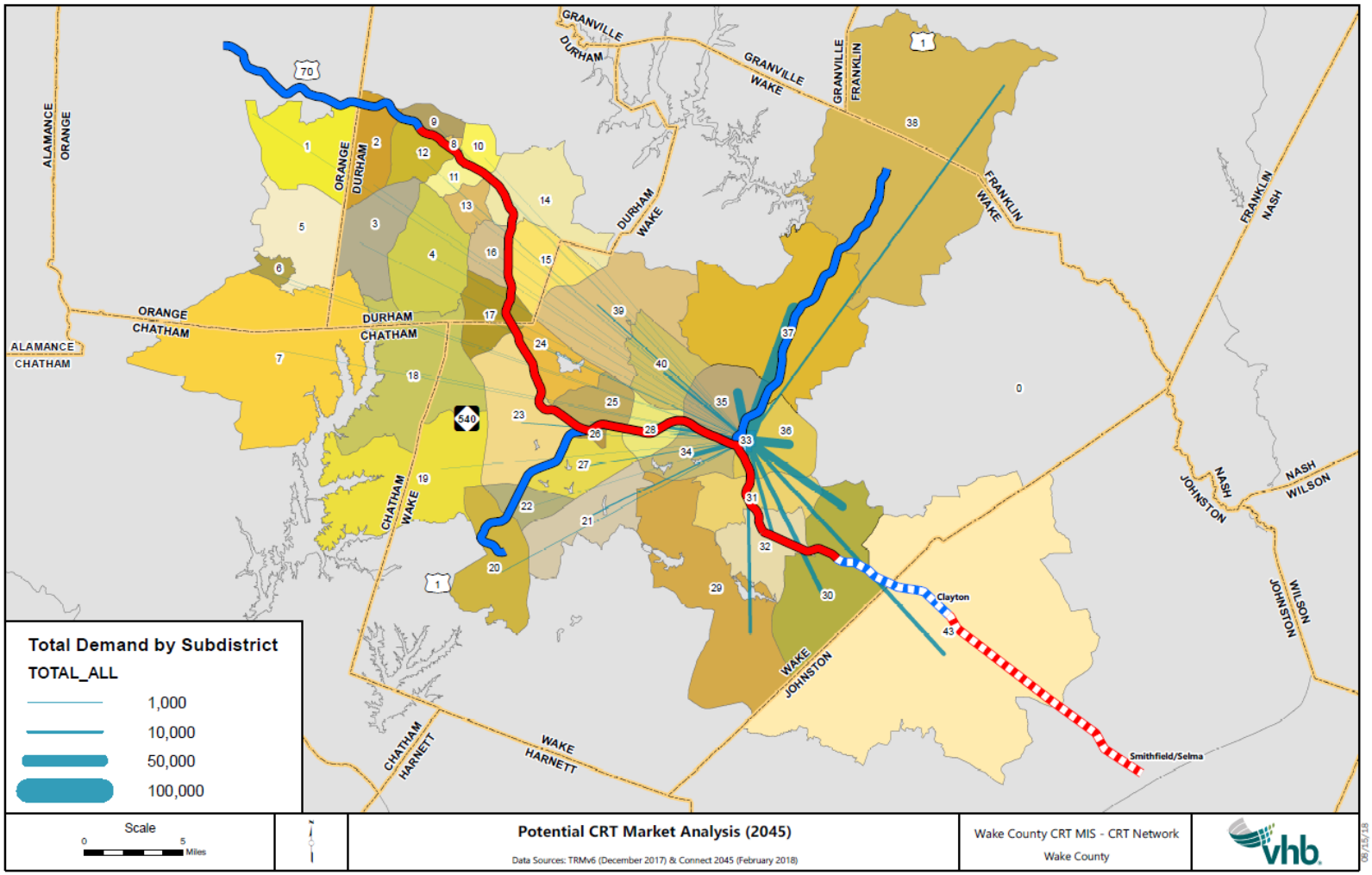


Figure 23: Potential CRT Market Analysis (East Raleigh)

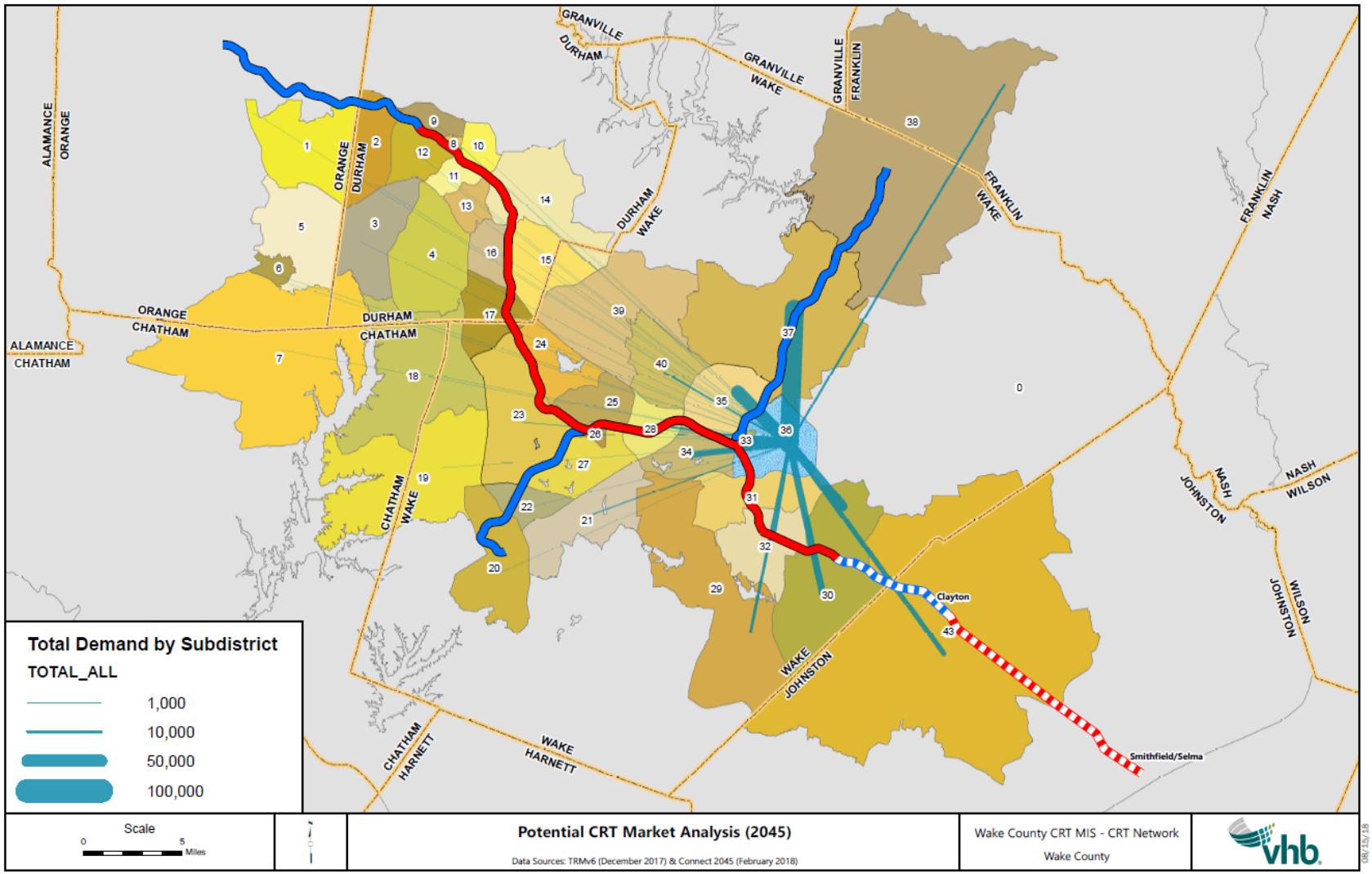


Figure 24: Potential CRT Market Analysis (North Raleigh)

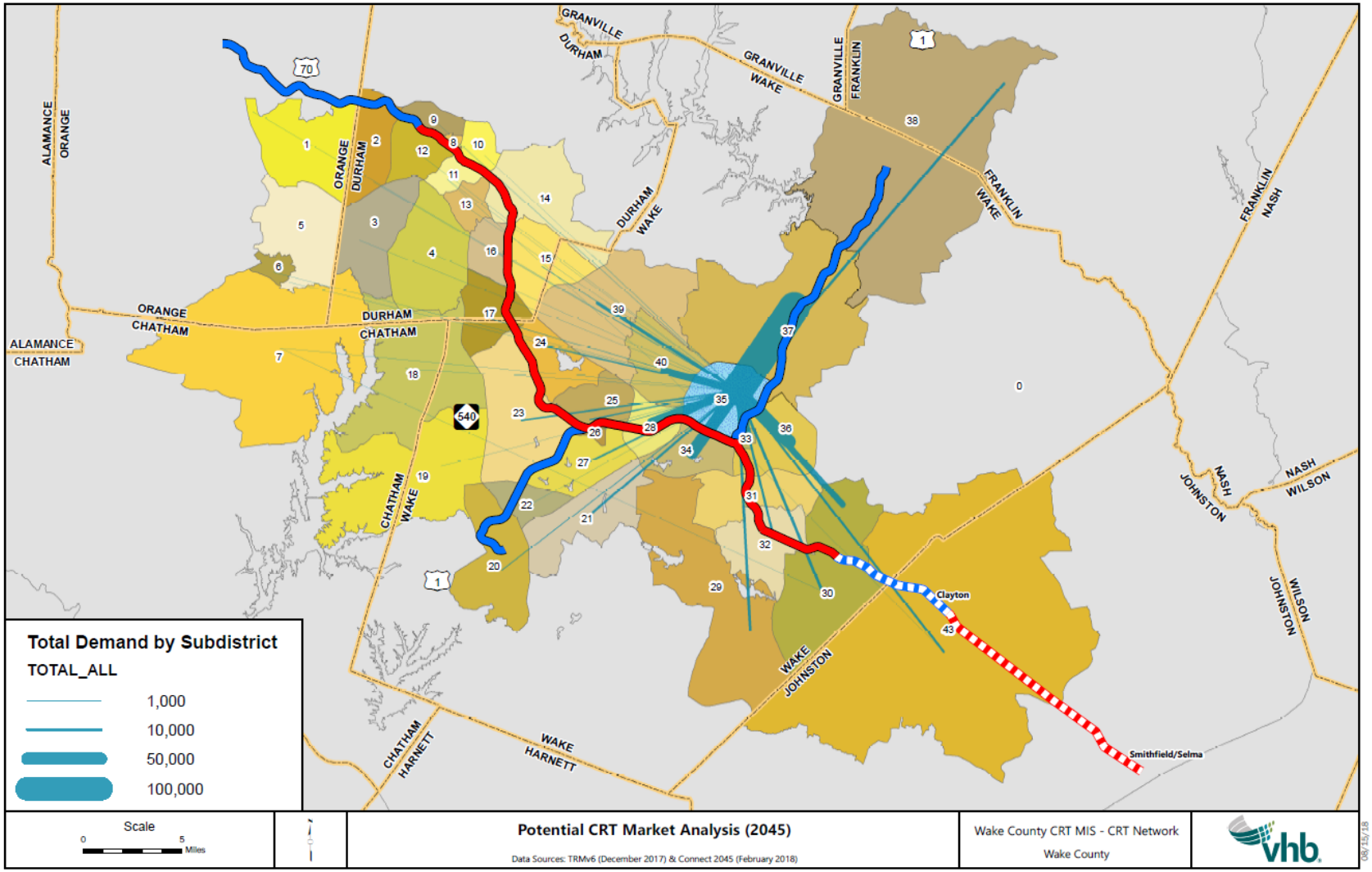
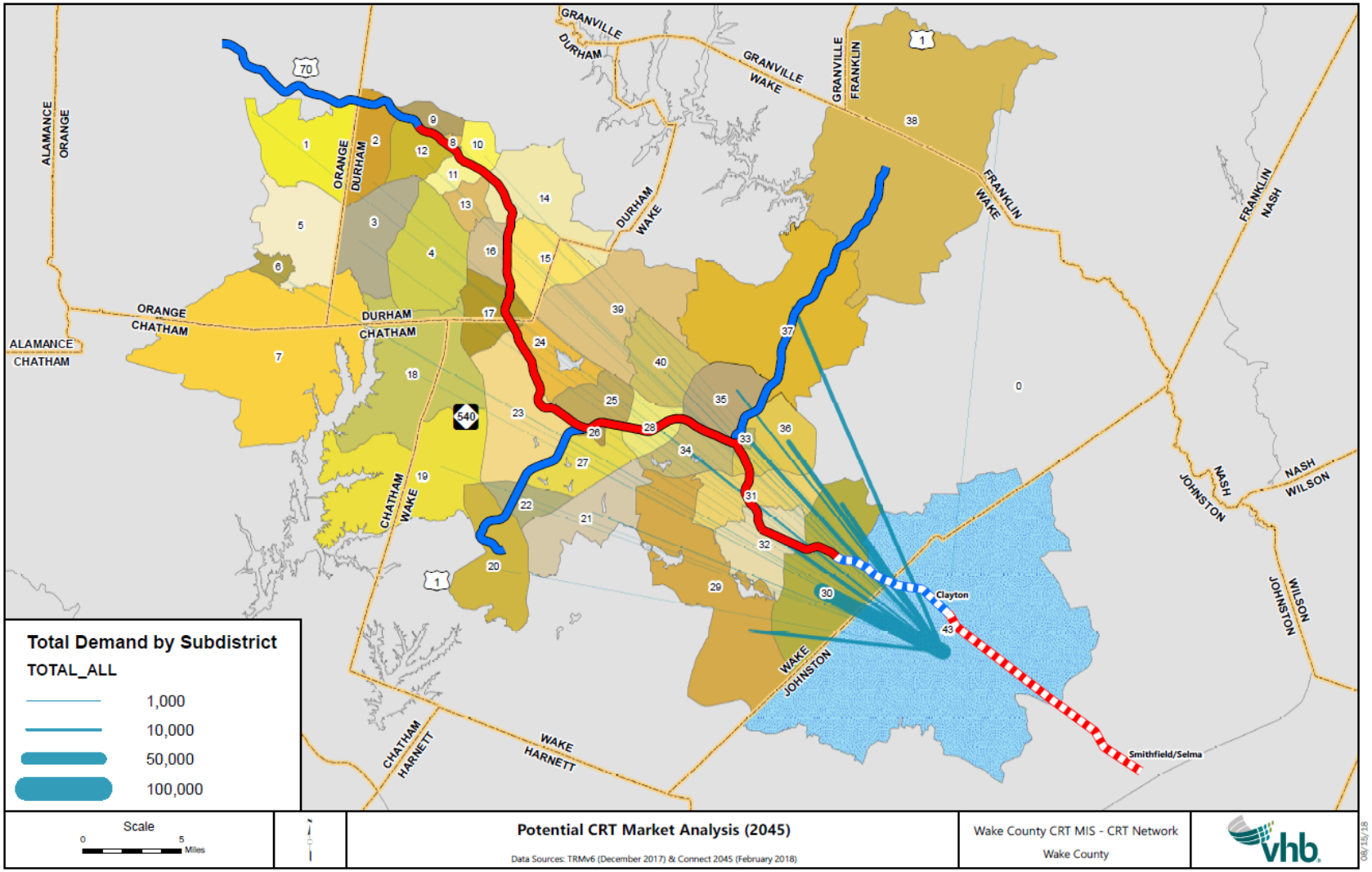


Figure 25: Potential CRT Market Analysis (Johnston and External)



3.4 SUMMARY OF FINDINGS

Much of the Triangle Region is characterized by rapidly growing population and economy, with a trend of dispersing growth outwards, which is often linked to longer traveling distances and congestion.

This section provides a summary of both the existing and projected population and employment along with the future travel demand along the CRT corridor. From 2013 through 2045, much of the future forecasted population and employment growth will continue to extend outwards from the urbanized area. However, within the CRT corridor, some fast-growing clustered areas include central Durham, Research Triangle Park, Cedar Fork, Medfield, Cary, NCSU, Raleigh CBD, St. Mary's, and Clayton.

The forecasted daily trips in 2045 from the TRMv6 were aggregated into 40 sub-districts, and major travel patterns between these sub-districts identified include: Chapel Hill-Durham-North Durham, Cary-Research Triangle Park-Durham, Raleigh-Cary, Raleigh-Garner-Clayton, and Raleigh-Neuse-Wake Forest. With the computer rail available, it is expected a significant share of these travelers will divert from their current travel modes-particular from auto for long-distance trips. Also, the 2045 MTP stated that about 1/4 to 1/3 of households today would prefer to live in a compact, walkable neighborhood with a mix of activities, where can be effectively served by transit. This would suggest that by 2045, as many as one million Triangle residents would select a compact, walkable, mixed-use neighborhood if that option is available for them.

4 Existing and Future Corridor Transit Service

Providing safe and reliable transit service is essential to improving a region's quality of life by connecting people and places. This chapter provides an overview of the regional transit riders and their trip characteristics as identified from a recent regional on-board fixed route transit survey (2015). Then, the existing transit ridership along the CRT corridor is compiled to understand how many people are currently riding buses within the CRT corridor. The future transit corridors as adopted in the 2045 MTP are included to help shed light on the transit services to be provided to the region, and the transit suitability map would identify areas with high transit needs and transit support demand for the future.

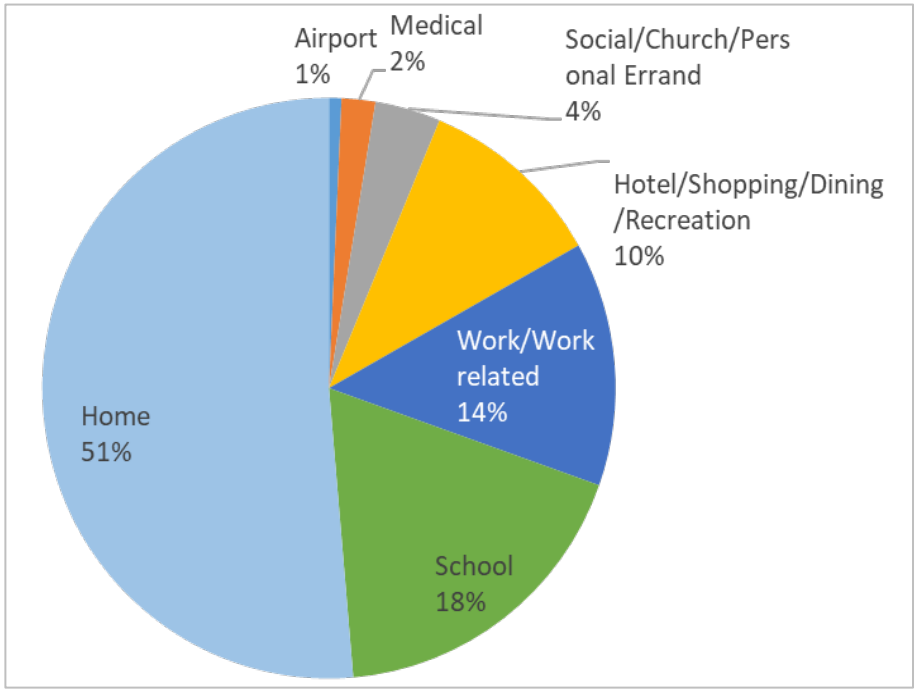
4.1 RIDER DEMOGRAPHICS AND TRIP CHARACTERISTICS

In 2015, a regional on-board fixed route transit survey was conducted by Transit providers in Wake County, including GoRaleigh, GoTriangle, Cary Transit (C-Tran), and the North Carolina State University Wolfline. The survey has provided further insights into the regional transit riders' travel, demographic, and attitudinal characteristics. Some of the key findings[4] are described below:

- Bus transit has been a vital form of transportation: Riders use buses to get to their daily destinations including work, school and home (Figure 26), and 41% of all bus riders have no working vehicles available to their household (Figure 27). Further, 39% of riders earned less than $15,000 (in 2014) (Figure 28) and 78% of riders earned less than 150% of the federal poverty level. Also, close to half of all riders have been riding the transit systems for three or more years (45%), and 55% of riders are 1~2 years or less than 1 year of riding the system. The balance of long-standing riders and newly-established riders will help build a sustainable ridership base for the future.

[4] Wake County Transit Systems Customer Survey Summary Report, 2016

Figure 26: Types of Origins and Destinations before Getting on the Bus (Left) and after Getting off the Last Bus (Right)



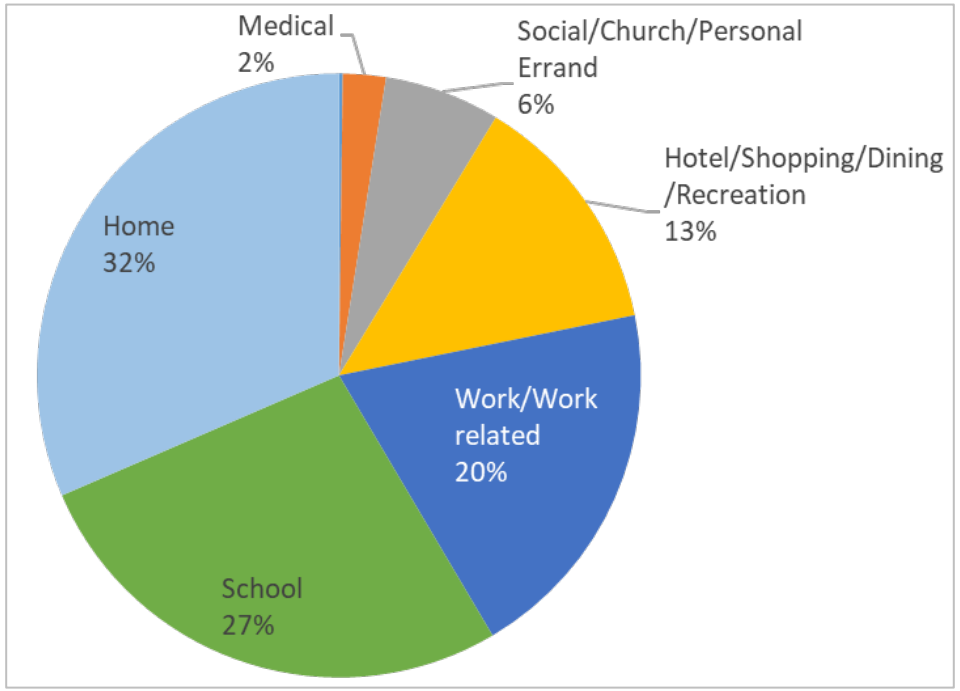


Figure 27: Household Vehicle Availability

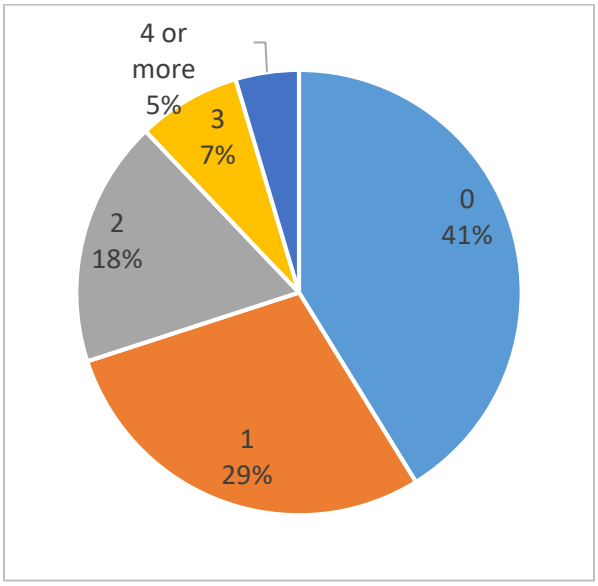
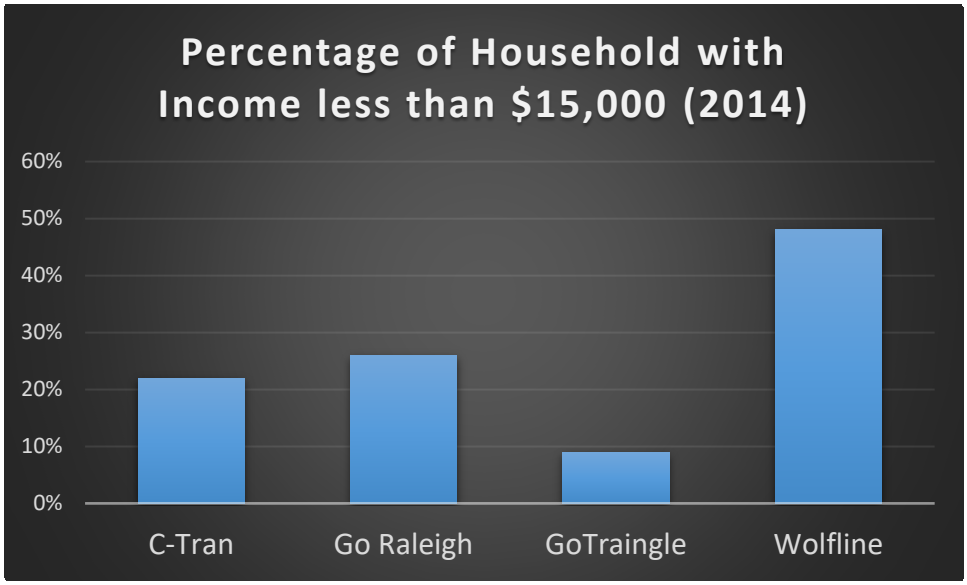


Figure 28: Annual Household Income (<$15,000) for Riders by Transit System



- Bus transit serves a diverse population: 45% of riders are African-American, followed by White (38%), and 8% of riders are Hispanic/Latino (Figure 29). Asian-American (7%), and 44% of riders are 18-25 years old, followed by the group of 25-34 years (23%). There is only 5% of riders under age 18 or over age 65. Compared to other systems, Wolfline has the highest percentage of riders 18-24 years (78%) (Figure 30).

Figure 29: Bus Riders by Race/Ethnicity

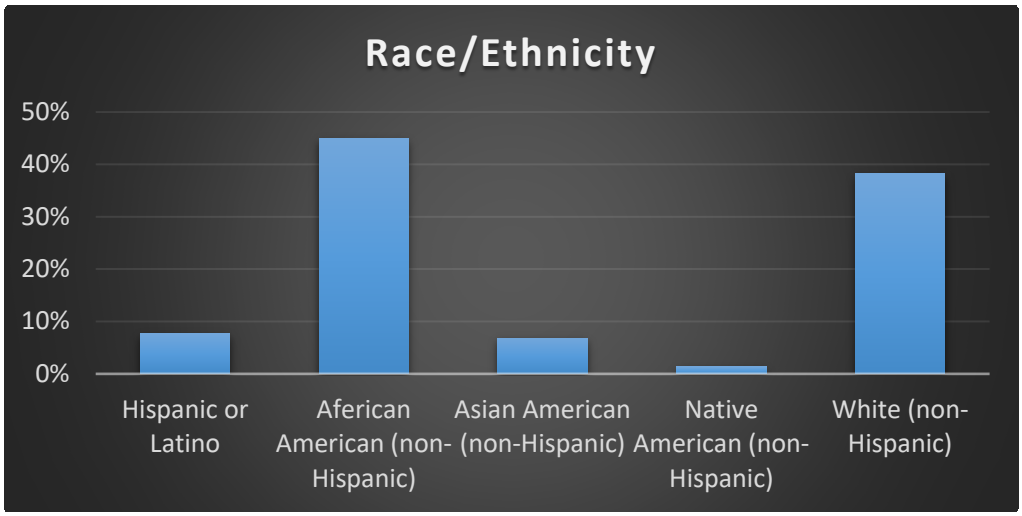
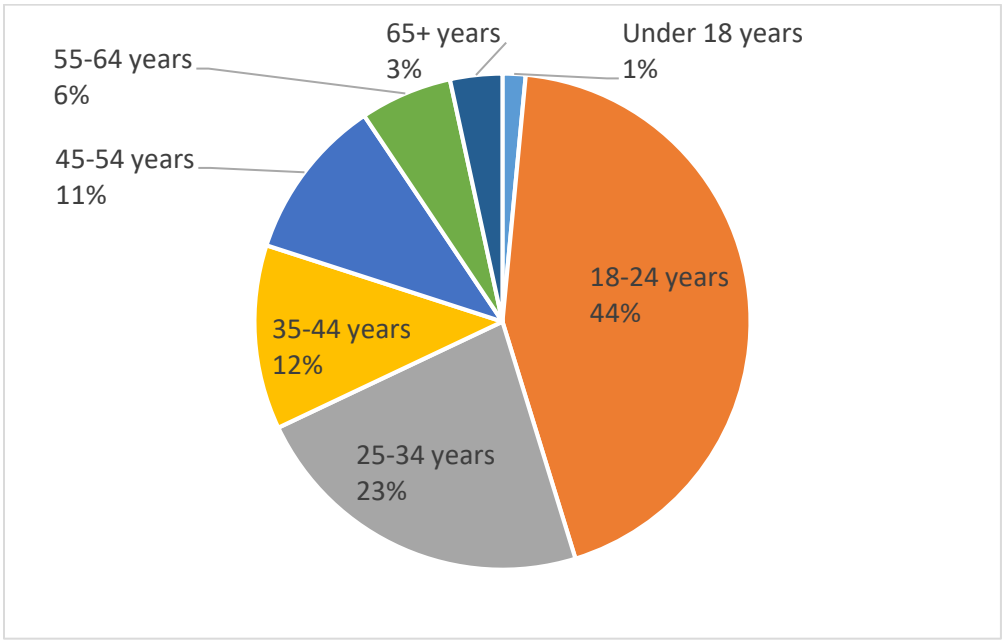


Figure 30: Bus Riders by Age Group



- Riders are satisfied with the current transit services: About 75% of riders indicate they are either satisfied or very satisfied with the on-time performance of buses, compared to the 67% satisfaction rate of service frequency. Other aspects of service such as safety, courtesy of drivers, easy-to-understand route information, cost, and cleanliness and comfort of buses even received over 80% satisfaction rate. Some aspects of service received higher percentages of riders being either dissatisfied, or very dissatisfied, including weekend service and bus stop amenities.

4.2 EXISTING TRANSIT RIDERSHIP WITHIN THE CORRIDOR

The bus routes that currently serve the full or part of the CRT corridor include:

Route 100: Raleigh-Airport-RTC (full)

Route 105: Raleigh-RTC (full)

Route 300: RTC-Cary-Raleigh (full)

Route 700: Durham-RTC (full)

DRX: Durham-Raleigh Express (full)

Route 301: Cary-Raleigh

Route 305: Lake Pine-Cary-Raleigh

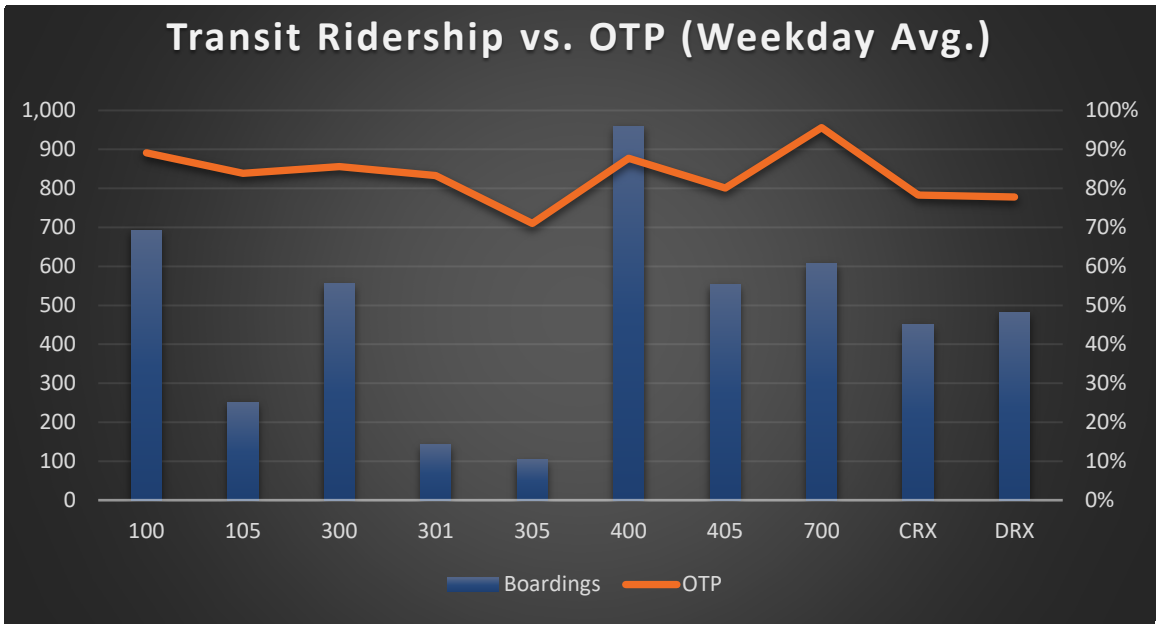
Route 400: Durham-Chapel Hill

Route 405: Durham-Chapel Hill-Carrboro

CRX: Chapel Hill-Raleigh Express

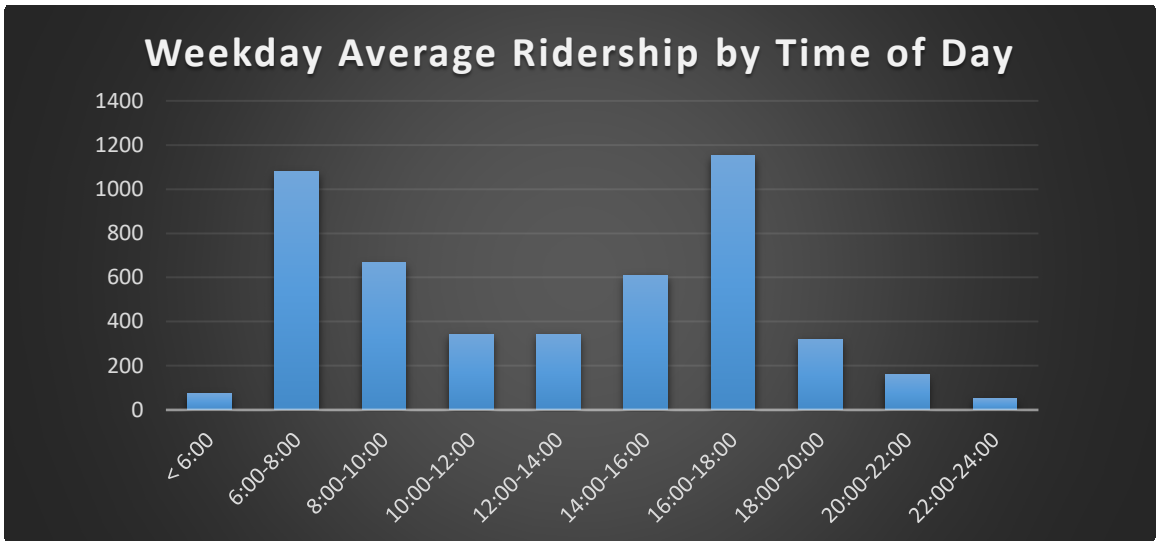
The daily ridership and on-time performance by route are shown in Figure 31. There are a total of 4,800 daily bus riders of the above routes on an average weekday, and the average On-time performance is 83% with Route 305 being lowest (71%) and Route 700 being the highest (96%).

Figure 31: Transit Ridership and On-Time-Performance by Route



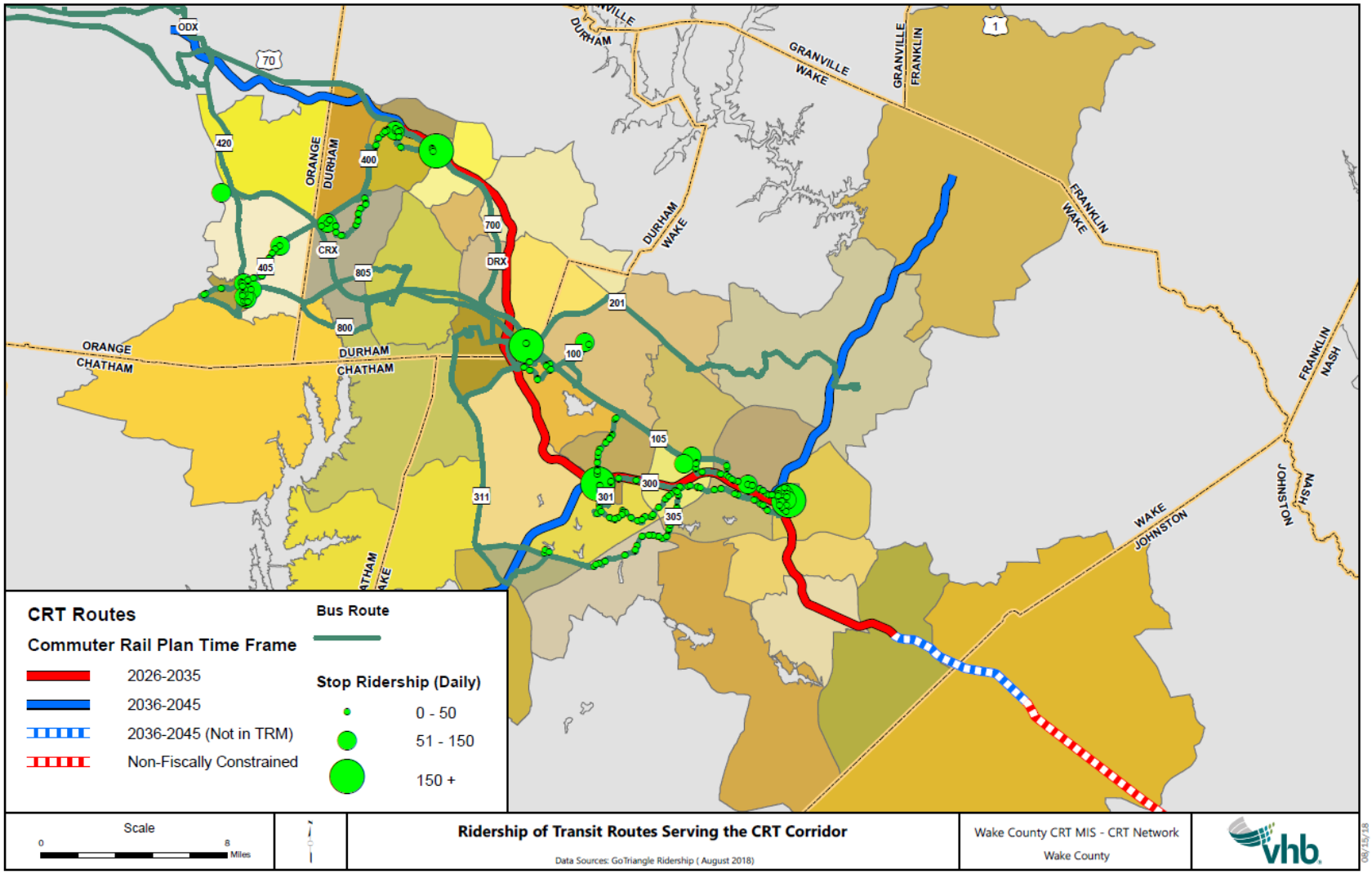
Ridership by time of day shows the highest of boardings occur during the AM and PM peak commuting hours, but there is also significant use of transit during off peak hours, which demonstrates the need for the midday and evening commuter rail service (Figure 32).

Figure 32: Transit Ridership by Time of Day



Ridership by stops is shown in Figure 33. The stops with higher boardings are not surprisingly, Durham Station, Regional Transit Center, GoRaleigh Station, Cary Train Station, Chapel Hill Downtown, North Carolina Station, and District Drive Park-and-Ride.

Figure 33: Transit Ridership by Stops



4.3 FUTURE TRANSIT SERVICE

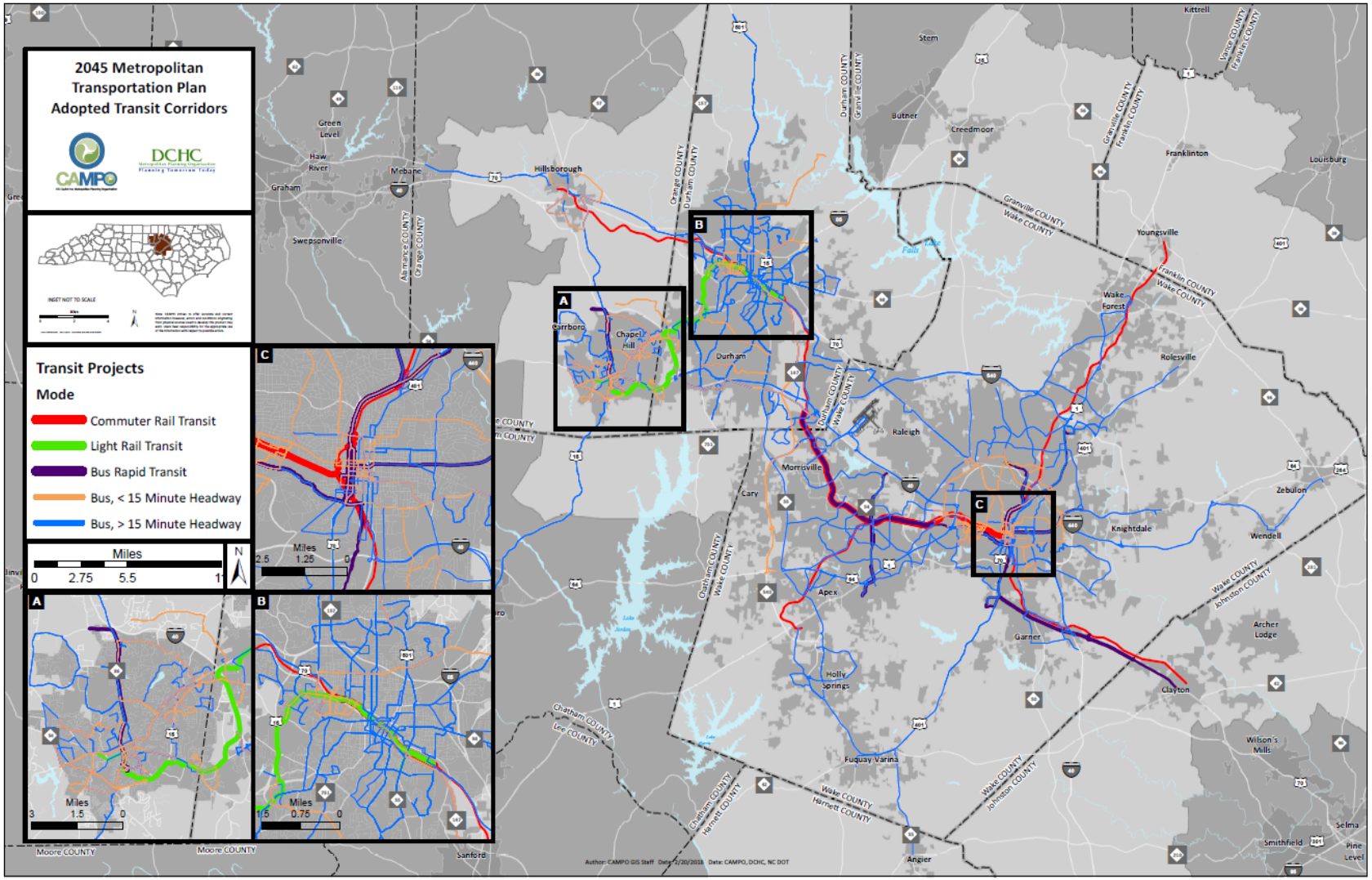
Anticipating greater demand for transit, a variety of premium transit planning efforts will provide dedicated transit corridors in Durham, Orange, and Wake County. The adopted high-capacity transit corridors in the Triangle region are illustrated in the 2045 MTP (Figure 34).

The Durham-Wake Commuter Rail is a key investment of Wake Transit Plan's Big Move 1 - Connect Regionally. The proposed commuter rail alignment (37-mile) will offer a congestion-free alternative for riders from Garner, Raleigh, NCSU, Cary, Morrisville, RTP, Durham, and Duke, commuting to jobs, education and health care. The commuter rail plan is proposing to provide more reliable 45 minutes or better service for travelers between Durham and Raleigh, as compared to their typical peak travel time ranging between 35 minutes to 1 hour and 20 minutes using NC 147 and I-40.

The other transit plans included in the 2045 MTP include the 17.7-mile Light rail transit (LRT), Bus rapid transit (BRT), as well as project plans to increase the bus service frequency and coverage. The LRT connecting Durham and Chapel Hill is projected to provide over 26,000 trips a day when complete in 2028[5].

[5] Durham County Transit Plan, Progress Report FY2017

Figure 34: 2045 Metropolitan Transportation Plan Adopted Transit Corridors

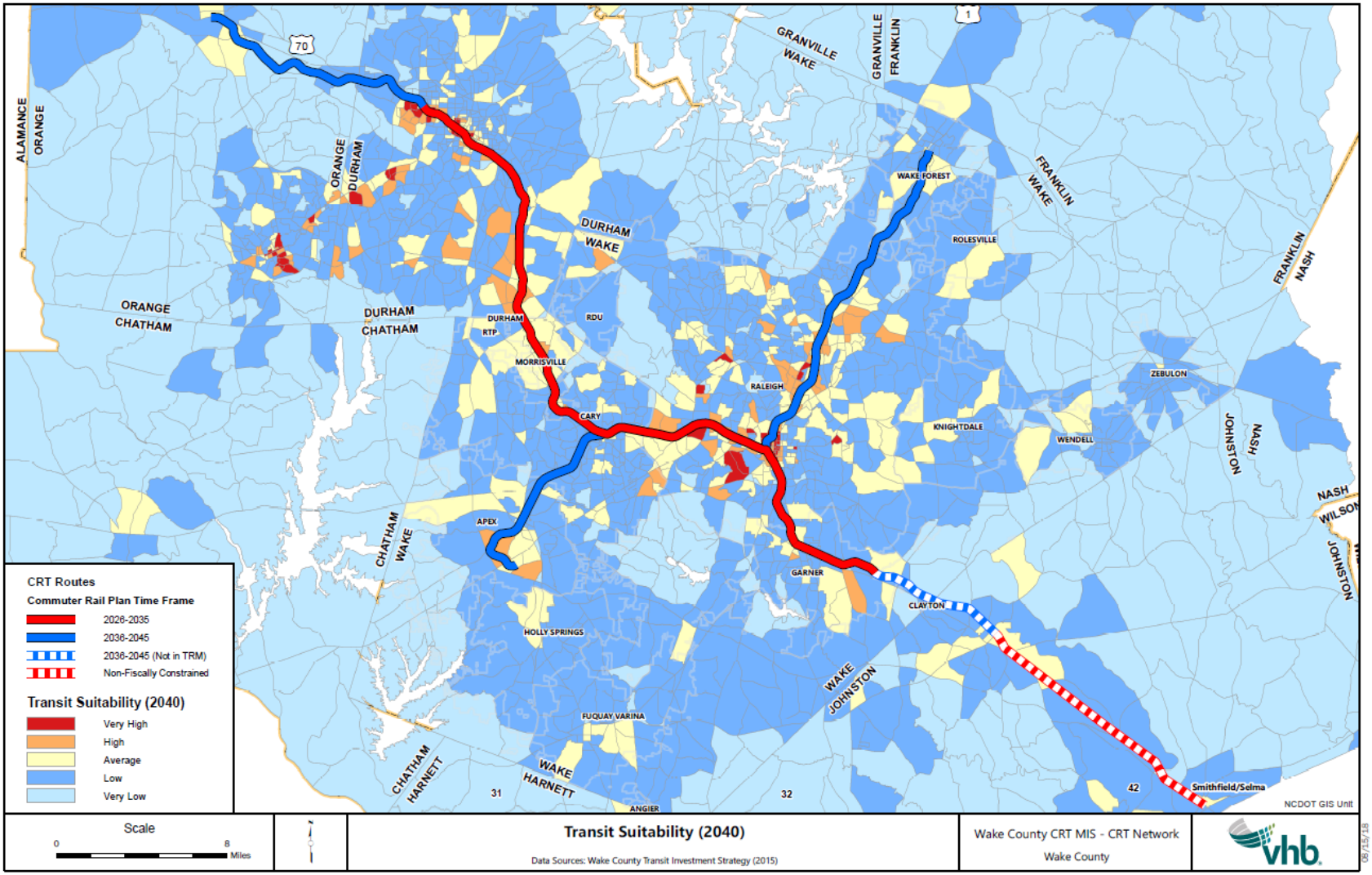


Transit Suitability

Transit planning should not only consider where we are, but also look ahead to where the region will be by considering anticipated future patterns of transit-conducive development. Accordingly, a transit suitability map was created in the 2045 MTP to show the areas in the region most suitable for transit investment. The analysis was conducted by looking at both 2010 and projected 2040 conditions for population density, employment density, zero-car households, income, and major activity centers. It also took into account the roadway congestion (volume-to-capacity ratio), current trip frequency and design of land uses. An index (0-10) for each of these factors was developed and weighted to come up with a composite score for each TAZ. The composite scores were then statistically (mean/standard deviation) grouped into five categories, from “very low” to “very high”.

As illustrated in red and orange of Figure 35, the concentration of residents with the highest propensity to use transit service in 2040 are: Downtown Chapel Hill, Apex, Northeast Raleigh, and areas along the CRT corridor including Downtowns Durham, Research Triangle Park, Morrisville, Cary, NC State University, Downtown Raleigh, and Garner.

Figure 35: Transit Suitability Map



4.4 SUMMARY OF FINDINGS

Public transit has been a vital transportation mode in the region especially for riders with no available vehicles, low-income households and minorities to get to their daily work/school/home destinations.

The high concentrations of the current bus usage along the CRT corridor are major regional activity centers - Durham Station, Regional Transit Center, GoRaleigh Station, Cary Train Station, Chapel Hill Downtown, and North Carolina Station, and District Drive Park-and-Ride. Riders are generally satisfied with the current transit services.

A variety of premium transit planning efforts will provide dedicated transit corridors in Durham, Orange, and Wake County to support the rapidly population and employment growth. The transit suitability analysis showed some concentrations of residents with the highest propensity to use transit service along the CRT corridor and other transit corridors in the region, which would help build a sustainable ridership base for the future.

5 Existing and Forecasted Traffic Along Major Corridors

The Wake County Transit Plan has placed a priority on transit service in major corridors throughout the County. An important step in the evaluation of commuter rail is analyzing the existing and forecasted traffic volumes along major roadways in the region. Figure 36 shows the locations where the traffic volume data were collected. Table 2 below shows traffic data expressed as AADT (Annual Average Daily Traffic) along major corridors in our region. The existing traffic volumes were taken from NCDOT published traffic counts using data collected in 2015. The 2040 traffic volumes were collected from traffic forecasts performed in the study area.

5.1 DATA COLLECTION

The AADT data collect points were mapped in Figure 36.

Figure 36: Daily Traffic Collection Locations

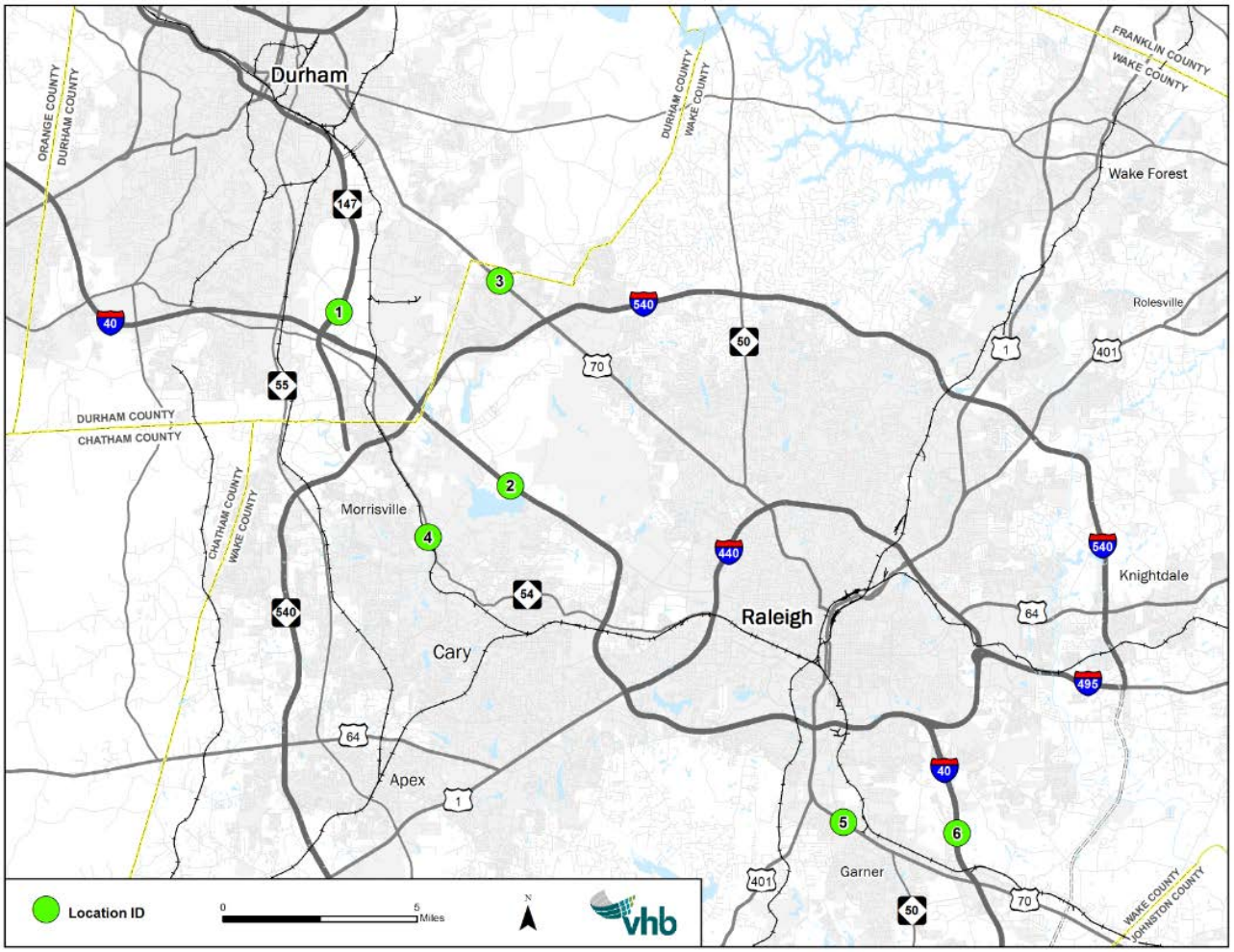


Table 1: Annual Average Daily Traffic (2015 and 2040) for Major Corridors

ID	Roadway Section	AADT (Annual Average Daily Traffic)		Compound Annual Growth Rate
		Existing (2015)[1]	Forecasted (2040)	
1	NC 147, North of I-40	64,000	109,400[2]	2.17%
2	I-40, between Aviation Parkway and Harrison Avenue	167,000	235,400[2]	1.38%
3	US 70 (Glenwood Avenue), West of T.W. Alexander Drive	31,000	63,500[3]	2.91%
4	NC 54, North of Aviation Parkway	16,000	22,100[4]	1.30%
5	US 70, East of Timber Drive	32,000	49,800[5]	1.78%
6	I-40, North of US 70 Business	105,000	132,100[2]	0.92%

[1]NCDOT AADT Web Map

[2]FS-1205A Traffic Forecast

[3]U-5720 Traffic Forecast

[4]FS-1005B Traffic Forecast

[5]U-5744 Traffic Forecast

5.2 SUMMARY OF FINDINGS

Growth in traffic volumes along major corridors within the triangle are representative of the overall growth of the region. Compound annual growth rates at study roadways ranged from 0.92% to 2.91%.

6 High-level Environmental Review

6.1 INTRODUCTION

A high-level environmental review was completed of the proposed commuter rail line to identify potential significant environmental constraints in the study area. The proposed commuter rail uses the existing rail line from west Durham to southeast Garner, NC. The environmental screening criteria will assist in assessing challenging areas of the proposed commuter rail corridor. This section also includes a review of existing demographics along the rail line. The findings of the high-level environmental review for the commuter rail are discussed in further detail below.

6.2 METHODOLOGY

For the purposes of this high-level environmental review, a geographical information systems (GIS) level analysis was performed using a variety of publicly available datasets from federal, state, and local resource agencies. Every effort was made to ensure that the most appropriate and recent datasets were included. GIS-based maps were produced to illustrate the environmental constraints titled "Environmental Screening" maps, and the environmental baseline conditions were summarized

The demographic maps for this project identify minority, Hispanic populations, poverty, LEP-Spanish, and zero car household percentages for the defined project and overall region.

The Environmental Screening maps for this project identify EMS stations, fire stations, police departments, hospitals, libraries, parks, government office, museums, schools, colleges/universities, cemeteries, places of worship, gas stations, utility lines, hazardous waste/substance disposal sites (active and inactive), landfills (active and historical), waste water treatment plants, brownfield sites, historic districts/sites, hiking and biking trails, waterways/floodplains, wetlands, state land, and public open spaces/managed natural areas within the study area. Due to the nature of the proposed commuter rail using the existing tracks, the study area includes 300 feet from centerline of railroad tracks.

6.3 FINDINGS

Demographics of the Commuter Rail Corridor

The demographic maps for this project identify minority, Hispanic populations, poverty, LEP-Spanish, and zero car household percentages for the defined project and overall region (see Figures 37-41).

Census data indicates most of the areas adjacent to the existing rail line are greater than 50.1% minority neighborhoods. Neighborhoods with greater than 15.1% Hispanic populations are found throughout Durham and east of the rail line in Cary, Raleigh, and Garner. Regions of 20-80% poverty are in Durham and Raleigh. One area with greater than 80.1% poverty is identified in Durham, on the northwest side of the study area. Greater than 15.1% Limited English Proficiency (LEP) Spanish populations are found along the rail line throughout Durham and east of the study area in Cary and Raleigh. The southern tip of the study area, in Garner, is 15.1-25% Spanish populations. In downtown Durham, 20-50% of households with zero cars can be found adjacent to the study area. Through downtown Raleigh, pockets of 20-50% and greater than 50% of households with zero cars are found along the study area.

Downtown Durham and Raleigh contain demographics that may indicate a notable environmental justice (EJ) presence within the study area, which would require additional evaluation and outreach efforts during the design phase.

Figure 37: Minority Screening

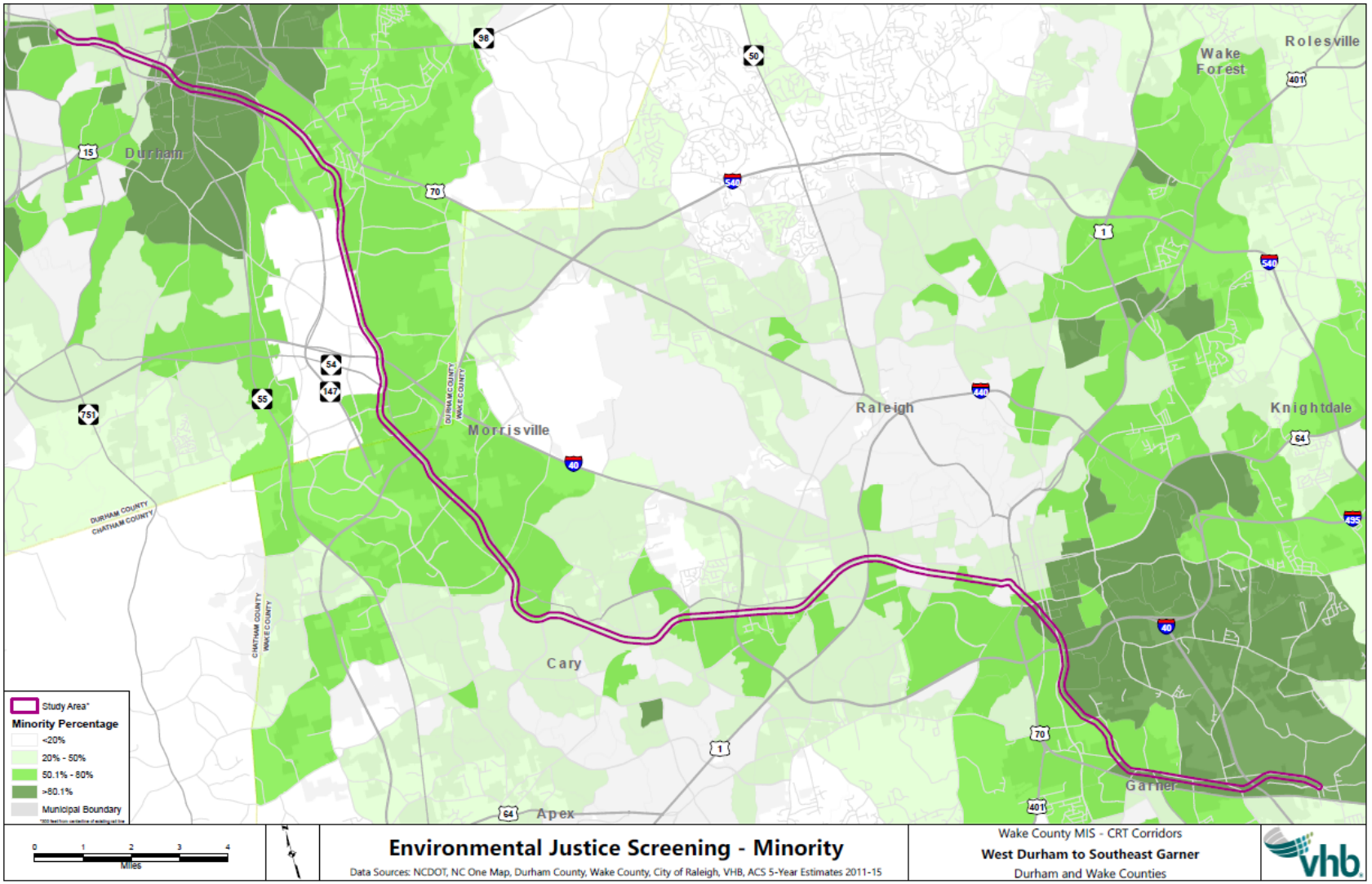


Figure 38: Hispanic Screening

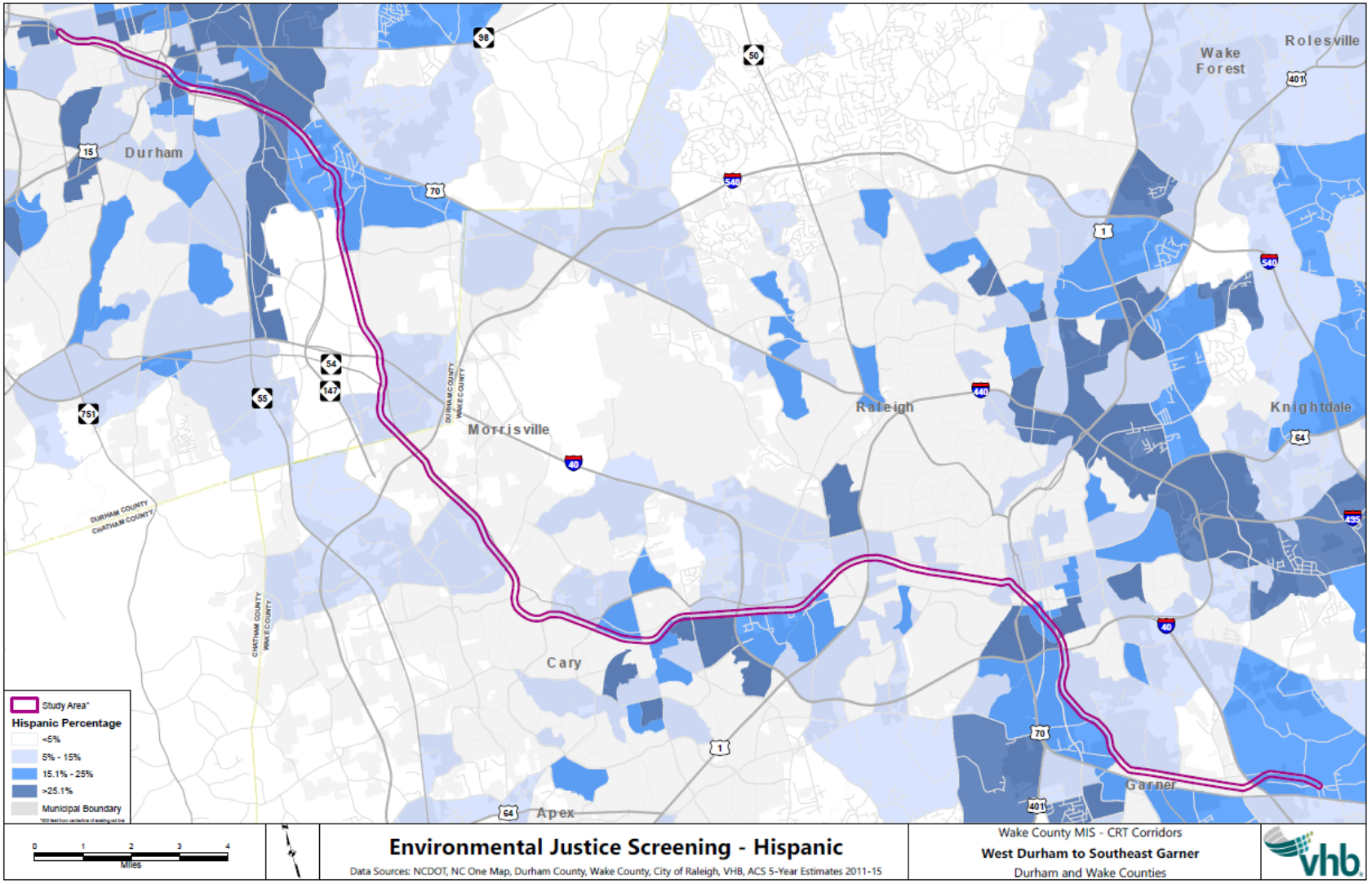


Figure 39: Poverty Screening

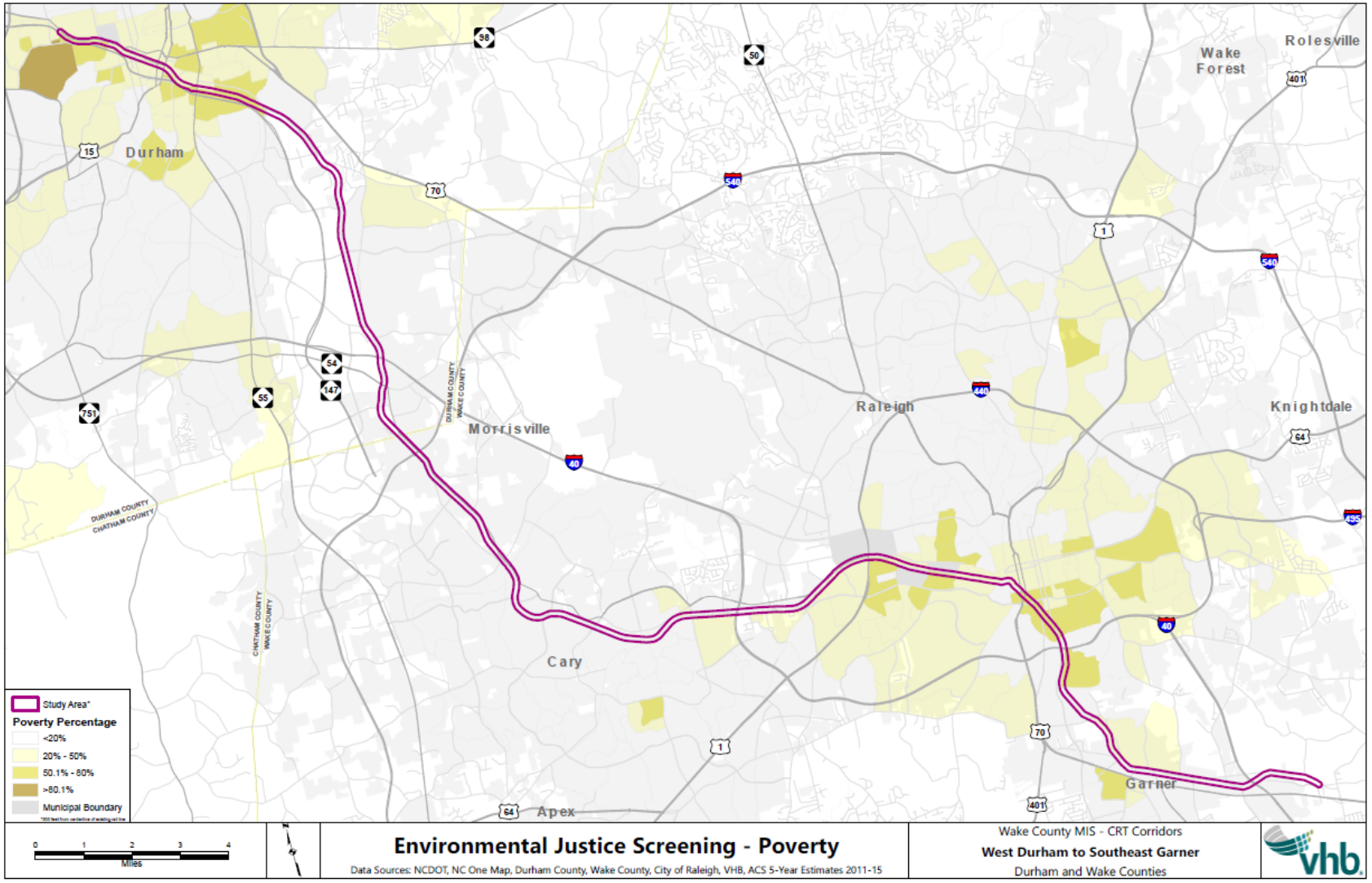


Figure 40: LEP Spanish Screening

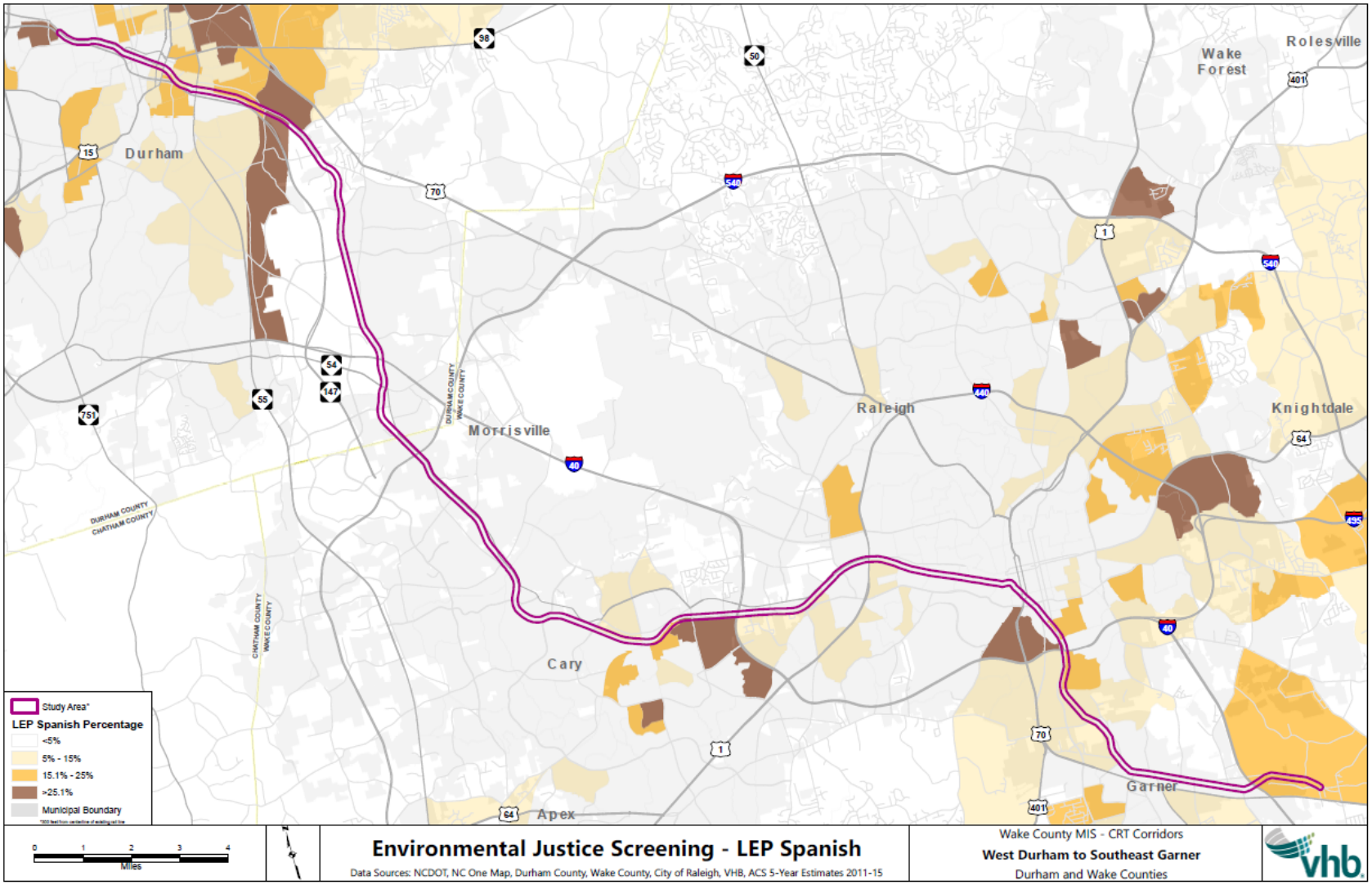
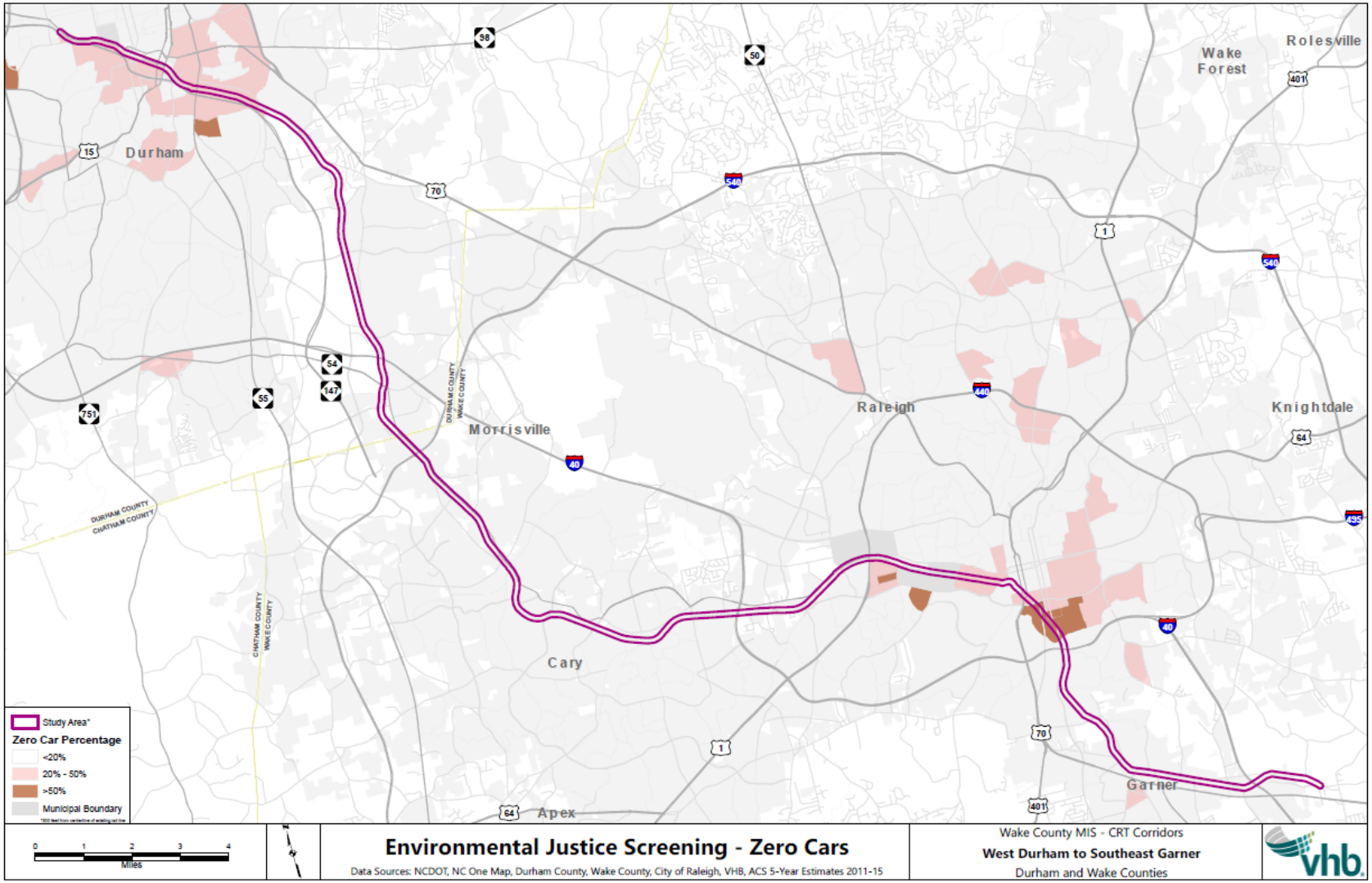


Figure 41: Zero-Car Household Screening



Environmental Screening Findings

West Durham

The northern portion of the commuter rail (West Durham) is characterized primarily with commercial uses and passes through downtown Durham (Figure 42). Duke University abuts either side of the northwest end of this portion of the commuter rail. Churches, government offices, schools, and gas stations are the most common community resources found in this portion of the study area. There are also adjacent historic districts/sites, hazardous waste/disposal sites, and a brownfield site. There are urban bike routes that cross the tracks and run along the roads nearby. Two existing regional trails cross or start at the commuter rail tracks—the Downtown Trail begins at West Trinity Avenue, crosses the rail tracks between Ramseur Street and West Pettigrew Street, and ends Jackie Robinson Drive[6]; the American Tobacco Trail begins where the Downtown Trail ends[7]. Both trails accommodate cyclists and pedestrians. Several National Register historic resources are found adjacent to the study area, including, but not limited to—Durham Historic Districts, Bright Leaf Historic District, American Tobacco Company Manufacturing Plant, and several warehouses. The commuter rail has one stream crossing over the Northeast creek.

Southeast Durham to Morrisville

This portion of the commuter rail is mostly undeveloped with a few private research properties (Figure 43). Only a few community resources are located along this portion of the study area, including a gas station, school, and a national bike route that crosses the southern part of this portion. There is one area of this section that passes through an identified hazardous substance disposal site.

Morrisville to Cary

This section of the commuter rail is characterized by commercial uses with some residential establishments (Figure 44). This section includes gas stations, a school, few hazardous substance disposal sites/waste sites (active/inactive), some historic districts/sites, a brownfield, parks, historic landfill, EMS, and a few bike routes. The middle of this section includes a stream crossing with associated floodways and wetlands.

Cary to Raleigh

This section of the commuter rail passes through downtown Raleigh and is characterized primarily by urban development (Figure 45). Parks, managed areas, schools, and museums are the most common community resources found along this portion. Numerous resources are adjacent to the commuter rail line, including historic districts/sites, hazardous waste/disposal sites, brownfield sites, utilities, and gas stations.

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[6] http://www.bikewalkdurham.org/bikewalkdurham/dost/TrailWebPages/DowntownTr.html

[7] http://www.bikewalkdurham.org/bikewalkdurham/dost/TrailWebPages/ATTNorthTr.html

Raleigh to Garner

This section of the commuter rail traverses from Raleigh to Garner and is characterized by commercial and residential pockets (Figure 46). State land and churches are the most common community resources found along this portion. The northwest area of this section (near Raleigh) includes a stream crossing with associated floodways and wetlands. Historic districts/sites are present in this section in downtown Garner.

Figure 42: West Durham – Environmental Screening

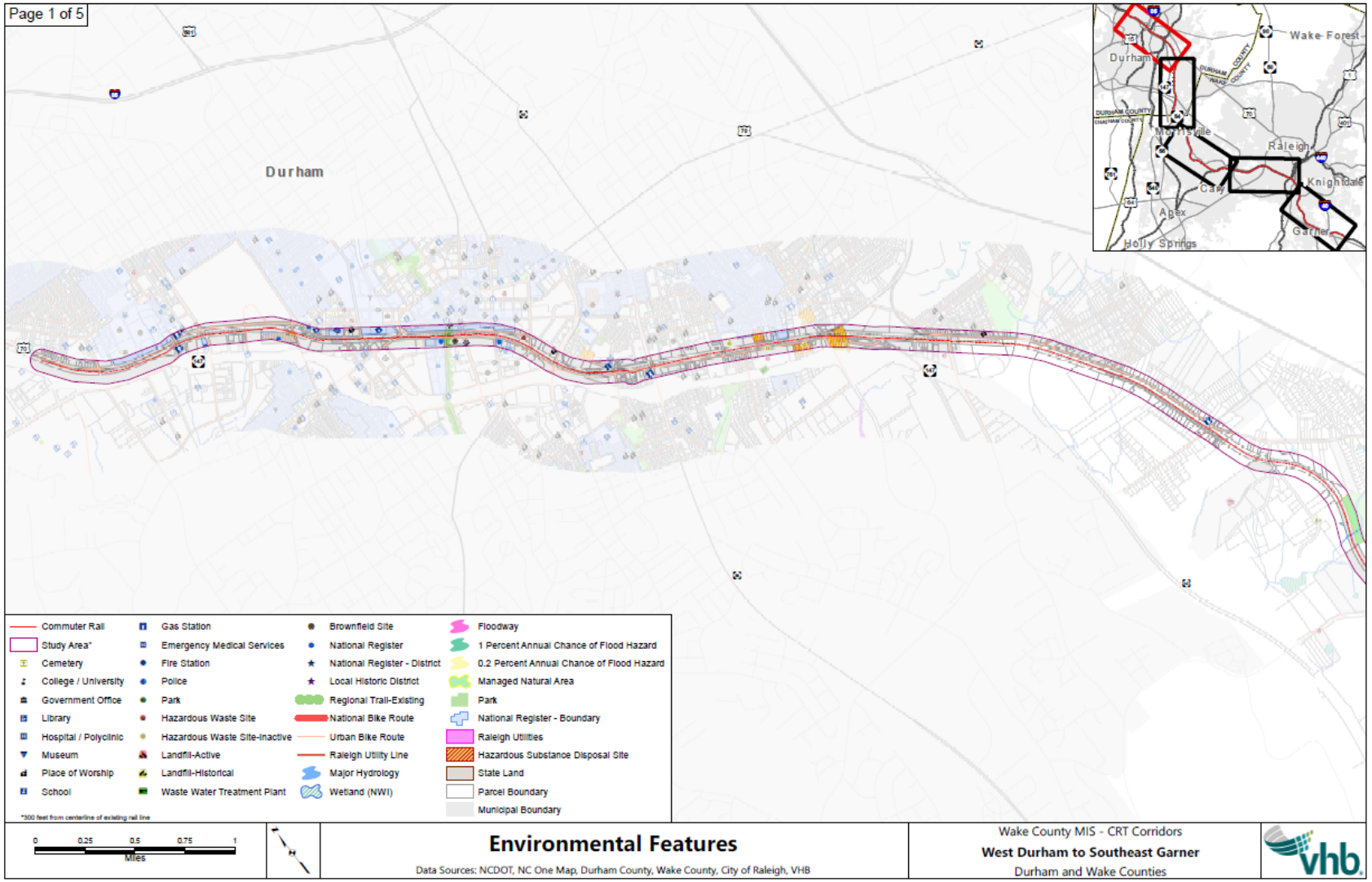

Figure 43: Southeast Durham to Morrisville – Environmental Screening

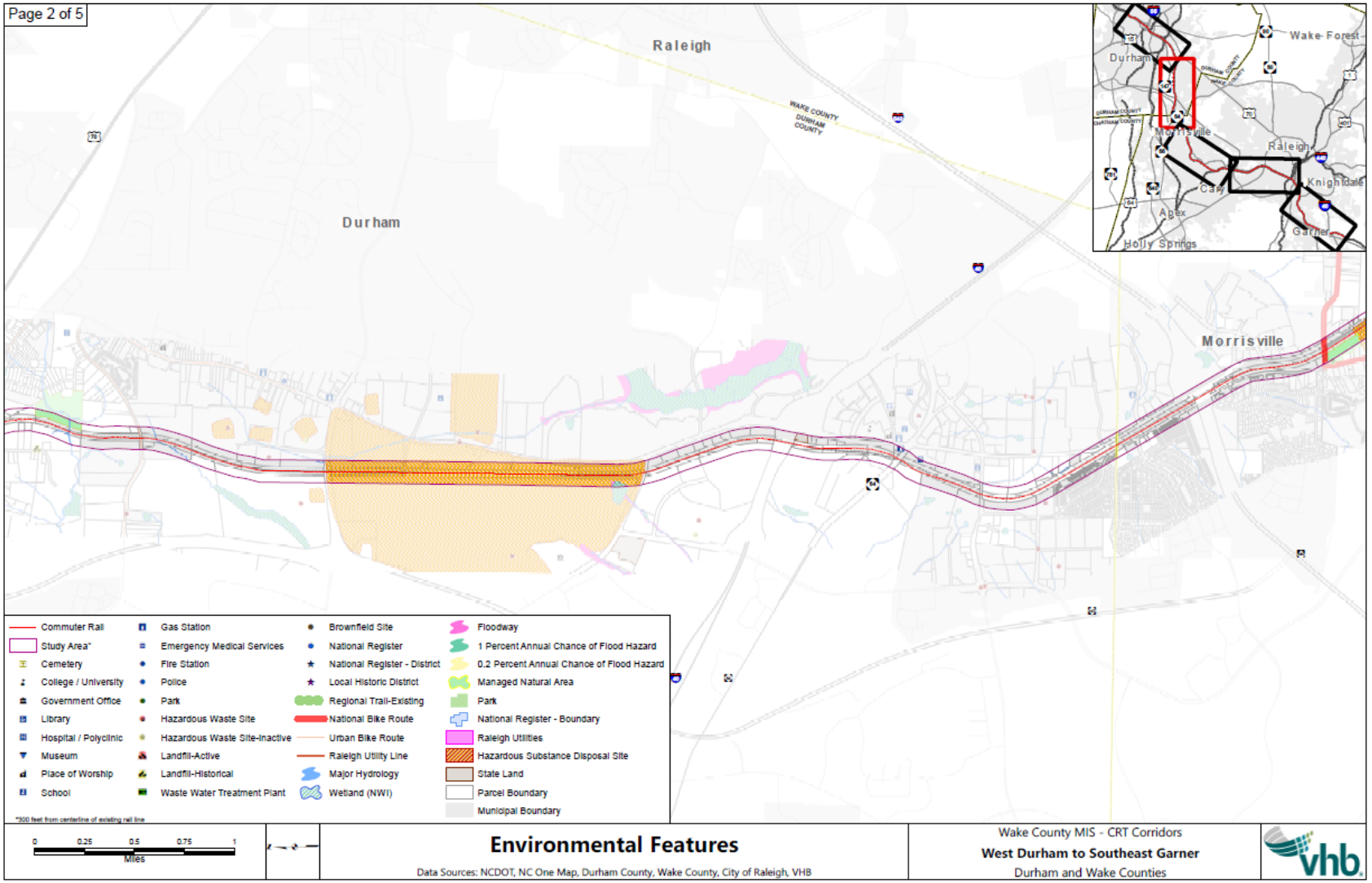

Figure 44: Morrisville to Cary – Environmental Screening

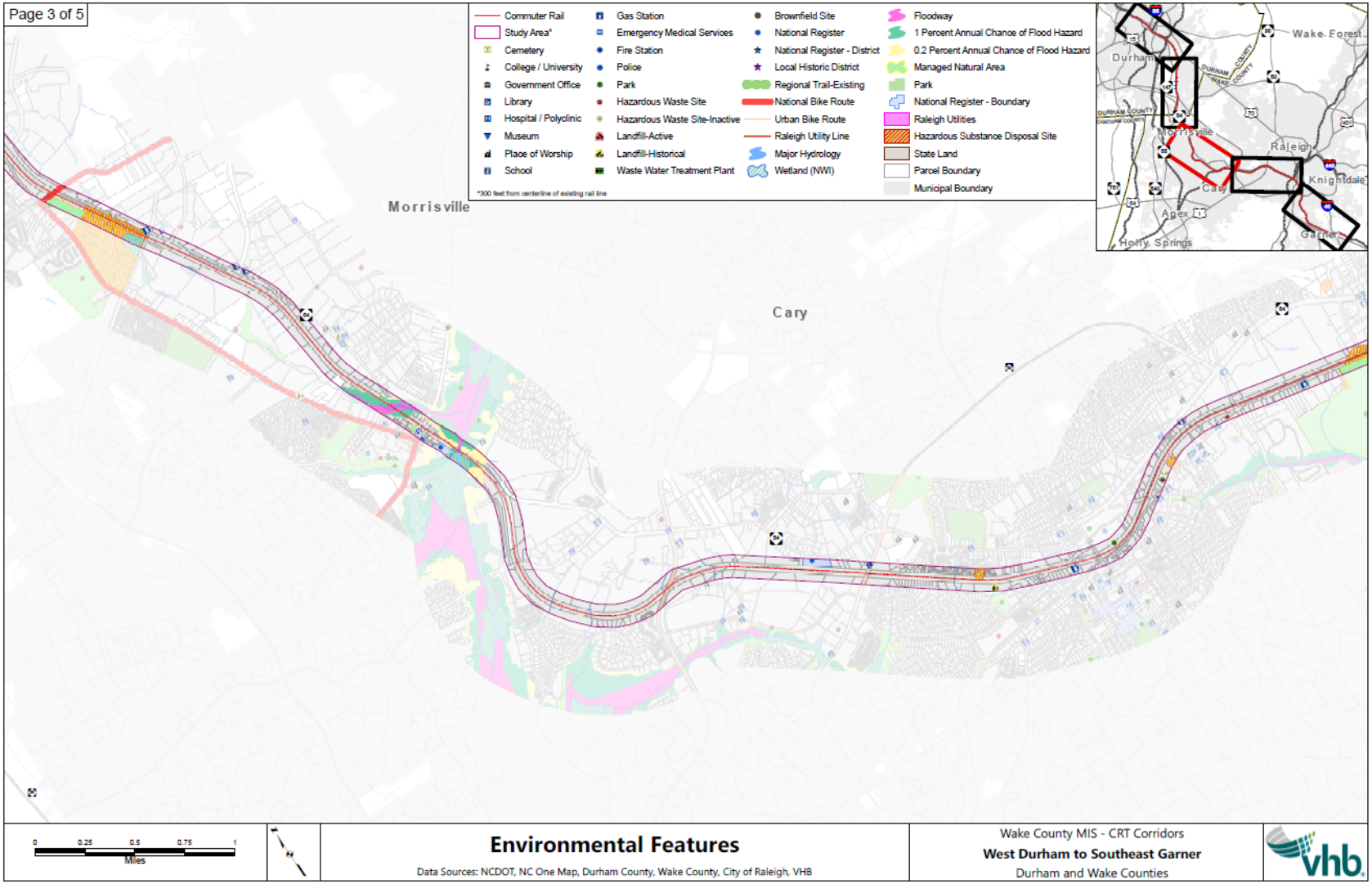

Figure 45: Cary to Raleigh – Environmental Screening

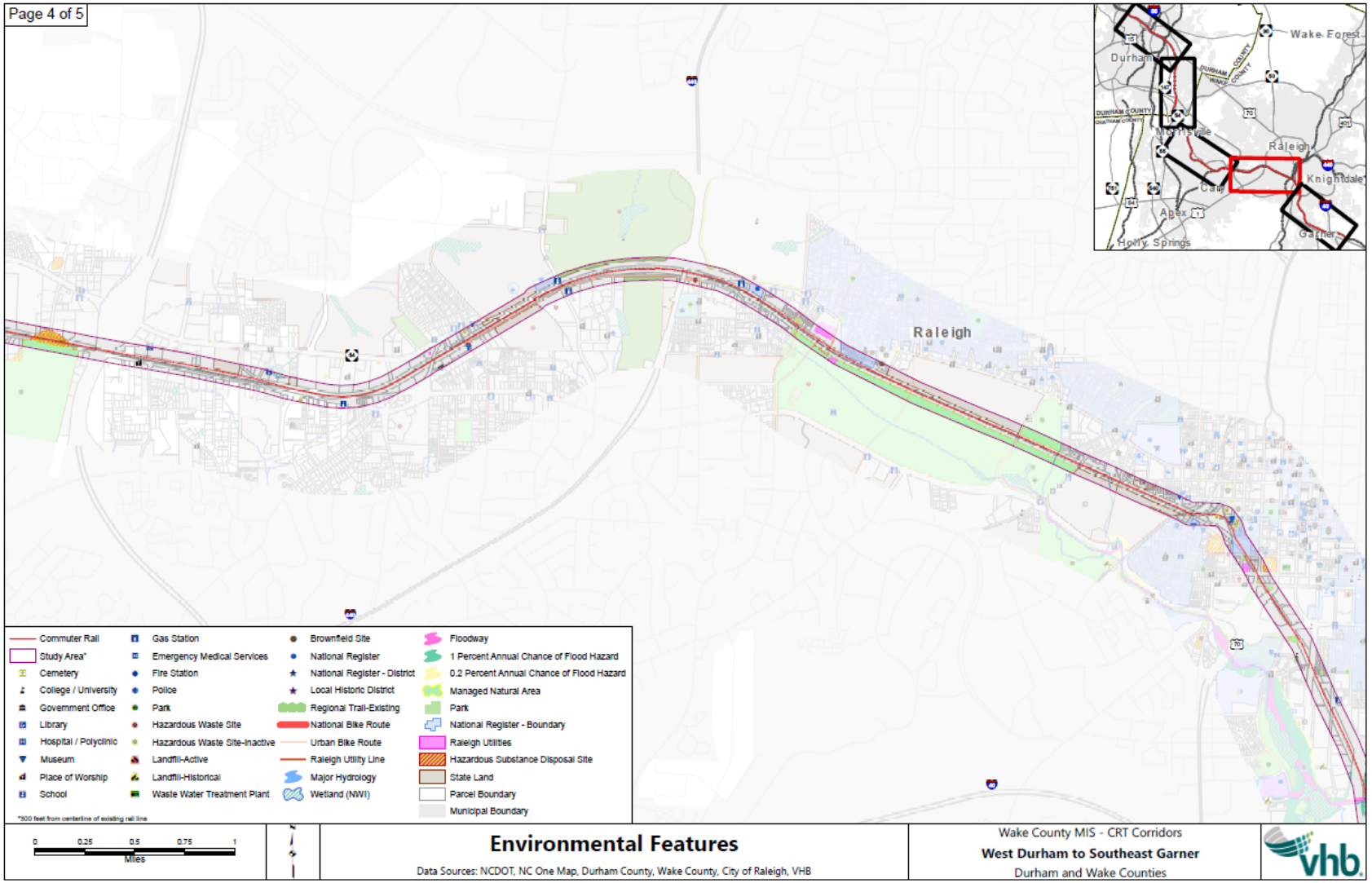

Figure 46: Raleigh to Garner – Environmental Screening