PLAN CHATTANOOGA

One Chattanooga: Transit for All

Appendix A: Existing Conditions Memo

Prepared March 2025

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Introduction

Chattanooga Area Regional Transportation Authority (CARTA) is the public transit system that serves the City of Chattanooga in Hamilton County, Tennessee. In coordination with the Chattanooga-Hamilton County Regional Planning Agency (RPA) and its efforts on Plan Chattanooga, CARTA is currently working to improve its public transit services to better meet the needs of existing and new riders. As part of this process, CARTA is evaluating existing transit services to identify potential service improvements that align with the following goals:

- Provide high quality mobility options to all Chattanoogans, whether they rely on transit, own a vehicle, or are visiting
- Provide a seamless system of integrated mobility options, including fixed route transit, microtransit, walking, cycling, parking for private vehicles, and other micromobility options
- Identify a web-based network that recognizes changing travel patterns in the region and builds on high capacity transit corridors

This Existing Conditions Report provides an overview of CARTA's existing services, fare structure, and fleet and facilities. It also evaluates the performance of CARTA's existing services and compares to other peer transit agencies and assesses transit market potential. This report forms the basis for the identification of public transportation gaps and needs within the service area. The next step is to develop specific service recommendations to meet those needs. Service recommendations will then be prioritized and organized into an implementation plan for a revised transit network. Stakeholders, such as the Tennessee Department of Transportation and the University of Tennessee at Chattanooga, will be engaged throughout the process.

Existing Services

Service Area

CARTA operates 15 fixed routes (three of which are shuttles), paratransit, and on-demand service in the City of Chattanooga, Hamilton County, and surrounding areas. The fixed route service area includes approximately 180,000 people over 300 square miles. CARTA's existing routes and service area are shown in Figure 1 and Figure 2 on the following pages.

Figure 1: CARTA Existing Routes

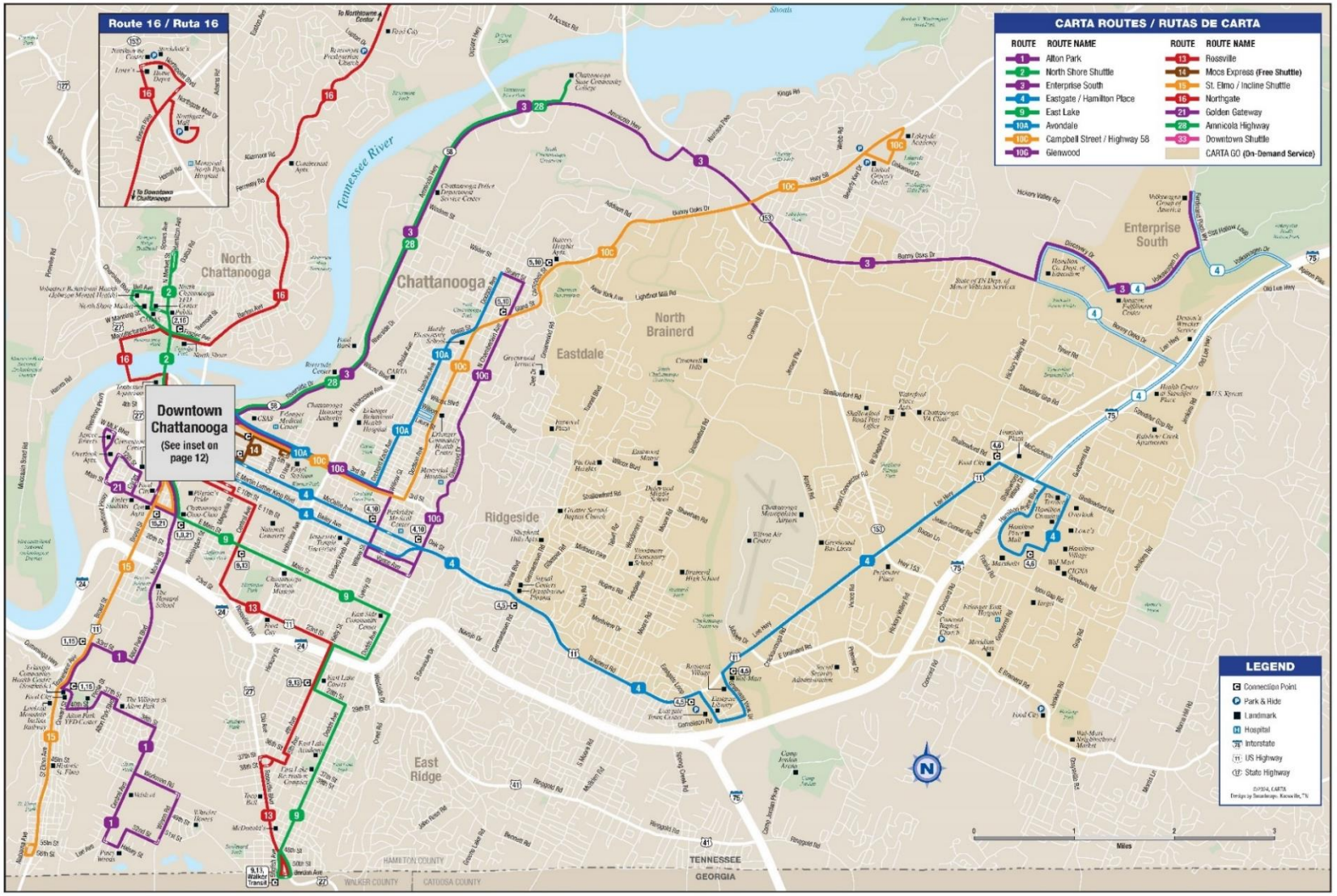


Figure 2: CARTA Existing Routes, Downtown Chattanooga Inset

Service Types

Fixed Route

CARTA's fixed route system, which includes 15 routes, follows a hub-and-spoke model that centers around downtown Chattanooga. Fixed route service is provided between the hours of 4:20 a.m. to 12:45 a.m., depending on the route. Routes are not in service on New Year's Day, Easter, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. On Martin Luther King Jr. Day and Memorial Day, buses run on a Saturday schedule.

In addition to 12 regular fixed routes, CARTA operates three shuttle routes:

- The **Downtown Shuttle** provides convenient access to downtown attractions, the convention center, shopping, hotels, and employment sites in the downtown area.
- The **North Shore Shuttle** provides service between downtown Chattanooga and the North Shore neighborhood. Points of interest along the route include Shuttle Park North, Tennessee Aquarium, North Shore, Publix, North Chattanooga Youth and Family Development Center, CADAS, North Shore Market, and Volunteer Behavioral Health.
- The **St. Elmo/Incline Shuttle** provides service from downtown to the southern border between Tennessee and Georgia by way of St. Elmo Ave/Highway 17. Points of interest along the route include Historic St. Elmo, Lookout Mountain Incline Railway, Food City, Alton Park Youth and Family Development Center, Pilgrim's Pride, and the convention center.

The Mocs Express is also a free shuttle route for the University of Tennessee at Chattanooga but is not considered one of CARTA's shuttles for this analysis. Fixed route service profiles are summarized in Table 1 below.

Table 1: CARTA Fixed Route Service Profiles

Route Number	Route Name	Weekday Service Period	Weekday Peak Frequency	Saturday Service Period	Saturday Peak Frequency	Sunday Service Period	Sunday Peak Frequency
1	Alton Park	4:50 a.m. – 12:45 a.m.	30 minutes	4:50 a.m. – 12:35 a.m.	30 minutes	8:50 a.m. – 9:10 p.m.	70 minutes
2	North Shore Shuttle	6:50 a.m. – 6:10 p.m.	30 minutes	9:50 a.m. – 6:10 p.m.	30 minutes	-	-
3	Enterprise South	4:40 a.m. – 7:05 p.m.	40 minutes	4:45 a.m. – 7:20 p.m.	Varies	-	-
4	Eastgate/ Hamilton Place	4:20 a.m. – 12:25 a.m.	15 minutes	4:50 a.m. – 12:40 a.m.	30 minutes	9:10 a.m. – 8:10 p.m.	Varies
9	East Lake	4:50 a.m. – 10:45 p.m.	30 minutes	4:50 a.m. – 11 p.m.	40 minutes	8:50 a.m. – 7:50 p.m.	70 minutes
10A	East Chattanooga - Avondale	4:50 a.m. – 12:45 a.m.	70 minutes	4:45 a.m. – 12:40 a.m.	70 minutes	9:35 a.m. – 9 p.m.	Varies
10C	East Chattanooga - Campbell Street	4:45 a.m. – 8:15 p.m.	Varies	-	-	-	-
10G	East Chattanooga - Glenwood	5:05 a.m. – 12:15 a.m.	Varies	5:25 a.m. – 12 a.m.	70 minutes	8:45 a.m. – 8:10 p.m.	Varies
13	Rossville	4:50 a.m. – 7:15 p.m.	35 minutes	-	-	-	-
14	Mocs Express	7:30 a.m. – 8:30 p.m. *	7 minutes	12 p.m. – 12:07 a.m.	17 minutes	-	-

Route Number	Route Name	Weekday Service Period	Weekday Peak Frequency	Saturday Service Period	Saturday Peak Frequency	Sunday Service Period	Sunday Peak Frequency
15	St. Elmo / Incline Shuttle	8 a.m. – 8:30 p.m.	50 minutes	8 a.m. – 8:30 p.m.	50 minutes	8 a.m. – 8:30 p.m.	50 minutes
16	Northgate	4:45 a.m. – 11 p.m.	40 minutes	4:45 a.m. – 11:15 p.m.	40 minutes	8:45 a.m. – 8:00 p.m.	70 minutes
21	Golden Gateway	5:50 a.m. – 9:50 p.m.	20 minutes	5:50 a.m. – 9:05 p.m.	45 minutes	9:20 a.m. – 7:55 p.m.	Varies
28	Amnicola Highway	5:50 a.m. – 7:15 p.m.	40 minutes	-	-	-	-
33	Downtown Shuttle	6:30 a.m. – 11 p.m.	10 minutes	9:30 a.m. – 11 p.m.	10 minutes	9:30 a.m. – 8:30 p.m.	10 minutes

*Service runs until 12:22 a.m. on Thursdays and Fridays with a frequency of 17 minutes

Paratransit

CARTA Care-A-Van is a curb-to-curb service for riders within ¾ of a mile of any CARTA fixed routes who, due to injury, illness, or functional incapacity of a temporary or permanent nature, are unable to use CARTA's fixed route transit vehicles. Service is available Monday through Friday from 4:40 a.m. to 12:45 a.m., Saturday from 5:30 a.m. to 12:45 a.m., and Sunday from 8 a.m. to 9 p.m. Care-A-Van does not operate on Easter or Christmas Day.

CARTA Go

CARTA Go, CARTA's on-demand/microtransit service, is a shared ride service that operates within and around the Cromwell, East Brainerd, Eastdale, and North Brainerd communities and allows easy connections to Route 4 (Eastgate/Hamilton Place). CARTA Go is available Monday through Saturday from 5 a.m. to 8 p.m. except on New Year's Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

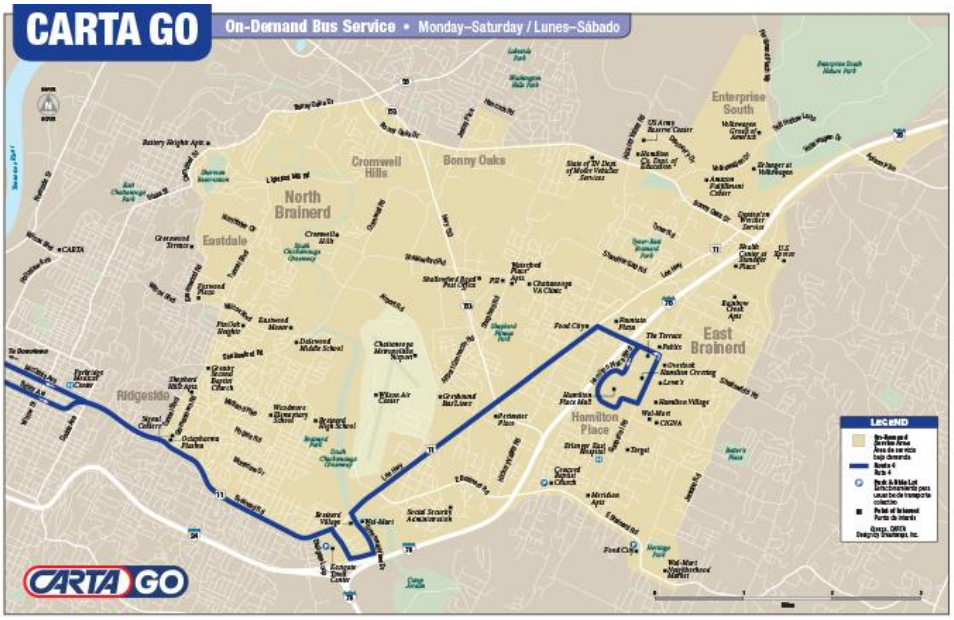


Figure 3: CARTA Go Zone

Popular destinations include Hamilton Place Mall, Walmart (Gunbarrel Road and Greenway View Drive), Chattanooga VA Clinic, Volkswagen Chattanooga, State of Tennessee Department of Motor Vehicle Services (DMV), Social Security Administration, Erlanger East Hospital, the Amazon Fulfillment Center, and the Heath Center at Standifer Place.

CARTA Go is run on a platform managed by Via and all drivers have a tablet in their vehicles. The platform handles the booking, pick-up and drop-off schedule, and routing. Riders book a ride over the phone or by using an app. Riders are given a 30-minute window for their pick-up and can be

picked up at any time during this window. A maximum of three vehicles operate in the zone at a time, with usually only two operating midday. Anecdotally, the service is in high demand from riders.

Incline Railway

CARTA operates a funicular (cable railway) up Lookout Mountain from St. Elmo. As the Incline is primarily targeted at tourists and not used for regular commuting, it is not included in this study.

Fare Policy and Technology

CARTA offers a number of different fare and pass options, see Table 2 and Table 3 below.

Table 2: CARTA Fares

Fare Type	Fee
One Way Cash Fare	
Adult	$1.50
Senior Citizens (Ages 65+), Persons with a Disability, and Students (through Grade 12)	$0.75
Child (5 & under) with paying passenger, University of Tennessee – Chattanooga (UTC) Students (with UTC ID)	FREE
Downtown Shuttle	FREE
Care-A-Van Fare	
One Way	$2.50
Round Trip	$5.00

Table 3: CARTA Unlimited Ride Passes

Pass Type	Regular Fee	Reduced Fee (Senior Citizens, Persons with a Disability, and Students)
24 Hour	$6.00 ($4.00 to refill)	$2.00
7 Day	$15.00	$7.50
31 Day	$50.00	$25.00

Fares can be purchased on the bus using exact change. Cash fares are deposited in the coin and/or dollar bill slot on the fare box. All passes are available for purchase at the Chattanooga Parking Authority (CPA) on Market Street and at the CARTA administrative office at 1617 Wilcox Boulevard. The 24 Hour Unlimited Ride Pass is available for purchase on the bus and the 31 Day Unlimited Ride Pass is available for purchase at the following branches of First Bank: 319 Manufacturers Road, 1959 Northpoint Boulevard, and 7442 Shallowford Road. All passes can be recharged on the bus once they expire.

A CARTA Special Fare I.D. Card or CARTA Student Buy Pass (for Grades 6 –12) is required to receive a reduced fare. The CARTA Special Fare I.D. Card or CARTA Student Buy Pass can be issued to eligible customers for $2.00 at the Chattanooga Parking Authority or the CARTA administrative office on weekdays from 8 a.m. to 5 p.m. The cards can be used as I.D. when paying for a fare or pass, or as a 24 Hour Unlimited Ride Pass that can be recharged on any bus.

In December 2024, CARTA introduced mobile ticketing through Token Transit. Riders can use the Token Transit app to purchase fares instead of using cash. One-way, 24-hour, 7-day, and 31-day passes can all be purchased on the app and there is no additional charge. Token Transit can be used on all fixed route, CARTA Go, and Care-A-Van services.

Fleet and Facilities

Reviewing CARTA's current inventory of fleet and facilities can better inform decisions on future fleet improvements or replacements as these assets age. CARTA's current fleet and facility information includes the following: service/vehicle fleet, operations center, park-and-ride facilities, and parking garages/lots.

Service Fleet

CARTA's fleet consists of 30 all-electric buses and 45 diesel or diesel-hybrid buses for fixed route service as well as 37 gasoline vehicles for paratransit and on-demand service. Table 4 displays a full fleet inventory including vehicle type, age, and quantity.

Table 4: CARTA Fleet Inventory (as of October 2024)

Vehicle Type	Year	Quantity
All-Electric		
AVS 22' Electric	1995	2
AVS 22' Electric	2018	3
E-Bus 22' Electric	2013	5

Vehicle Type	Year	Quantity
E-Bus 22' Electric	2014	3
BYD K9S Electric	2016	3
BYD K7 Electric	2021	4
Gillig Electric	2023	5
E-Bus Electric Trolley	2010	5
Diesel/Diesel-Hybrid		
Gillig 30' HF Diesel – INCLINE	1998	1
Gillig 30' HF Diesel	2002	5
Gillig HF Diesel	2006	6
Gillig 37' LF Diesel	2009	1
Gillig 35' LF Diesel	2014	3
Gillig 35' LF Diesel (Refurbished)	2002	24
Gillig 37' LF Hybrid	2009	1
Gillig 35' LF Hybrid	2014	4
Gasoline		
Ford E450 Gasoline OBDII	2016	2
Ford E450 Gasoline OBDII	2017	4
Ford E450 Gasoline OBDII	2019	23*
Ford Cutaway	n.d.	8

*Year not listed for 22 of these vehicles; 2019 listed as the model year for one of this vehicle type and was assumed to be the same for the remaining 22.

CARTA Operations Center

The fleet, except for shuttles, operate out of the joint CARTA administrative offices and operations and maintenance facility at 1617 Wilcox Boulevard. The shuttles operate out of Shuttle Park South at 1362 Market Street.

Park-and-Ride Facilities

CARTA's service connects with the following Park-and-Ride facilities:

- Eastgate Town Center
- Northgate Mall
- Northtowne Center
- Rivermont Presbyterian Church
- Highway 58 and Oak Hill
- United Grocery Outlet (4758 Highway 58)

Parking Facilities

CARTA acts as the city's parking authority (Chattanooga Parking Authority [CPA]) and operates several garages and lots throughout Chattanooga:

- CARTA Shuttle Park North – connects to Routes 2, 4, 14, 33
- CARTA Shuttle Park South – connects to Routes 1, 9, 14, 15, 33
- CARTA North Shore – connects to Routes 2 and 16
- Coolidge Park Lot
- Theatre Center Lot
- Renaissance Park Lot
- Riverfront Lot
- Incline Lot – connects to Route 15

The parking facilities are concentrated around downtown Chattanooga and the North Shore. CPA also manages metered on-street parking in downtown Chattanooga.

Previous Studies

Several studies have been completed in the last decade that make recommendations for CARTA on fixed route service, microtransit, transit centers, and parking. These studies provide a basis for the analysis and subsequent recommendations in this transit plan. The primary outcomes of these studies are summarized below.

Multimodal Transportation Center Study (2015)

This study identifies three potential sites for a transit center near downtown Chattanooga. Engagement revealed a lot of energy and support for a transit center in downtown, with interest in connecting it to a future light rail (LRT) corridor. The study recommended that the transit center should include up to 24 bus berths to serve both CARTA buses and intercity/private bus lines. The three sites identified in the study are:

- 1305 Broad Street: In a central location with access to destinations, jobs, and diverse populations. The site is large enough to accommodate the transit center and Transit-Oriented Development (TOD), and a connection to future LRT.
- 2516 Chestnut Street: Located in an area planned for mixed-use development but is outside the downtown core. There is space to accommodate the transit center and TOD, as well as a future LRT connection. The site would feature reuse of an existing building.
- 1300 Market Street: Located in the middle of the Choo Choo development and adjacent to the CARTA South garage. This investment would enhance placemaking in a space that is a gap along Market Street.

The locations identified in the 2015 study will inform any exploration of a transit center location in this transit plan.

Downtown Chattanooga Parking Study (2018)

CARTA/CPA and the River City Company worked with consultants to prepare a parking study for downtown Chattanooga. This analysis was conducted pre-COVID and parking patterns have likely changed as employers shifted to remote work. However, this study provides insight into where there is typically greater demand for parking, and thus a need for improved shuttle and fixed route connections to more efficiently move people into and through the downtown. Key findings from this study include:

- Parking use tends to be less than what would be expected given the type and amount of land uses in greater downtown Chattanooga.
- “Management first, then build with strategy.” CPA should implement pricing and regulation adjustments, particularly for on-street parking, before constructing new facilities.
- Shared parking facilities would be very beneficial. These would reduce the need for parking spaces for individual organizations. Parking demand from land uses in downtown fluctuates significantly by time of day, suggesting that each use does not need its own dedicated supply of parking.
- There is a distinction between parking and available parking. Downtown Chattanooga has a lot of parking, but two-thirds of it is not available and accessible to the public, leading to a perception that parking is scarce.

The findings from this study indicate that Chattanooga might benefit from improved connectivity between destinations and parking facilities with greater capacity and availability. The existing shuttles could be rerouted to help achieve this goal.

Chattanooga Draft Recommended Transit Network (2020)

This study was completed in January 2020 by Jarrett Walker + Associates for CARTA. Prior to the development of a draft transit network, the study team completed an existing conditions analysis and stakeholder engagement that informed the recommendations. The study makes recommendations for a short-term and long-term network, as well as a recommendation to expand Shuttle Park North into a Downtown Transit Center.

The analysis in this study is pre-COVID; the pandemic has changed the way people travel around the region with many employers shifting to remote work. The recommendations in this study should be understood in that context.

- Short-term Network (see Figure 4 and Figure 5)
    - Minor routing changes to maintain existing coverage and focus on increasing ridership.
    - Limit duplication of the network.
    - Eliminate Downtown Shuttle and replace with Routes S1 and S9. Replace associated vehicles.
    - More consistent spans of service and weekend service improvements.
    - Pulse Routes 2, 3, 10, 11, 13, 16, and 18 (plus Route 15 during rush hour) at Shuttle Park North.
    - Physical improvements to Shuttle Park North: add floating boarding island on Broad Street, restripe W 3rd Street, move amenities in Breezeway to allow for more bus bays, and determine if additional ventilation is needed for diesel.
- Long-term Network (see Figure 6 and Figure 7)
    - Modestly extend coverage to areas with anticipated growth and increase frequency on routes with strong ridership.
    - Modify network to a frequent grid (15-minute frequencies) with connections at the locations where Routes S1, S9, 4, and 8 intersect in addition to the Downtown Transit Center pulses.
    - Extend shuttle to the Incline.
    - Improvements to Shuttle Park South.
    - Provide dedicated lanes and transit signal priority (TSP) on high frequency routes.

While these recommendations were made pre-COVID, some are still relevant to the current system. For example, more consistent spans of service and pulsing routes at a downtown transit

center are good ideas to make transfers between routes easier for riders. Transfers remain one of the major challenges CARTA's riders face today.

Figure 4: 2020 Transit Study Short-term Network Recommendations

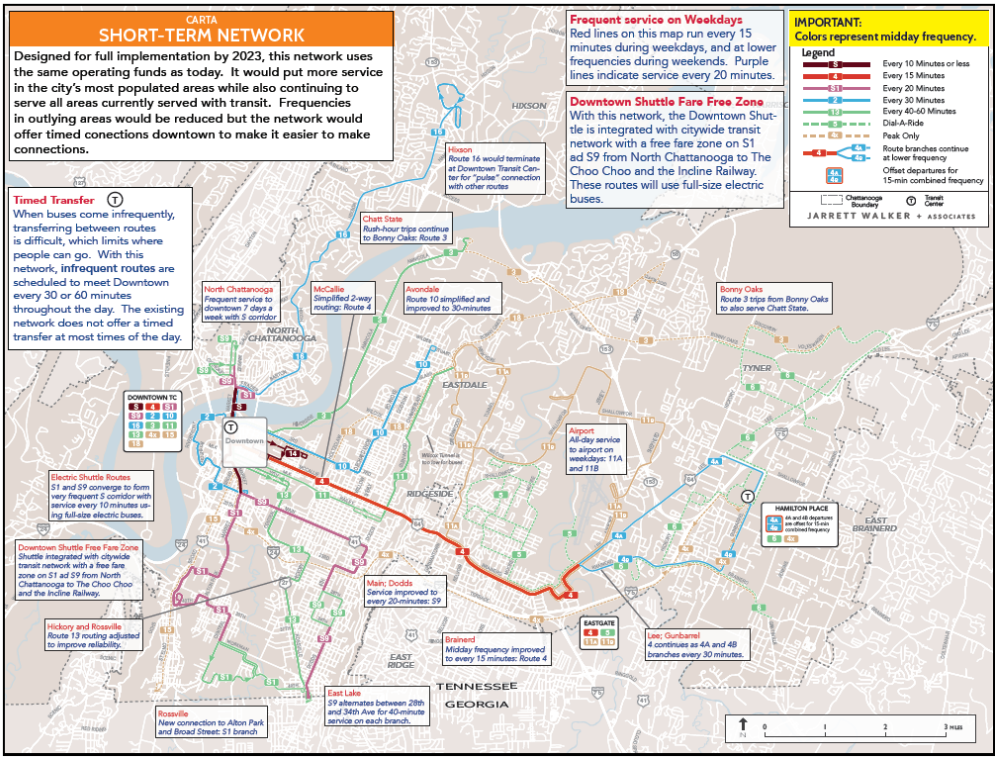


Figure 5: 2020 Transit Study Short-term Network Recommendations for Downtown

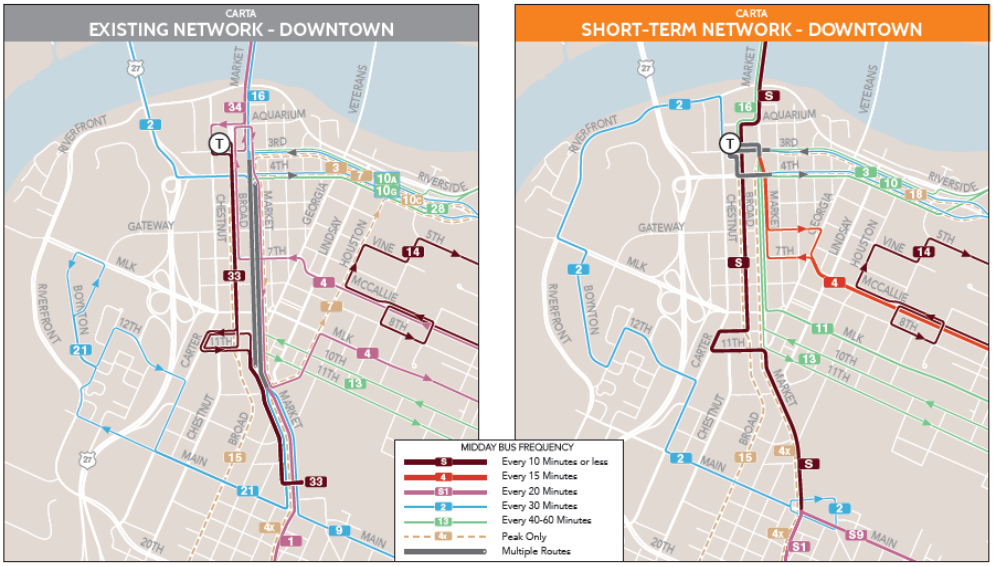


Figure 6: 2020 Transit Study Long-term Network Recommendations

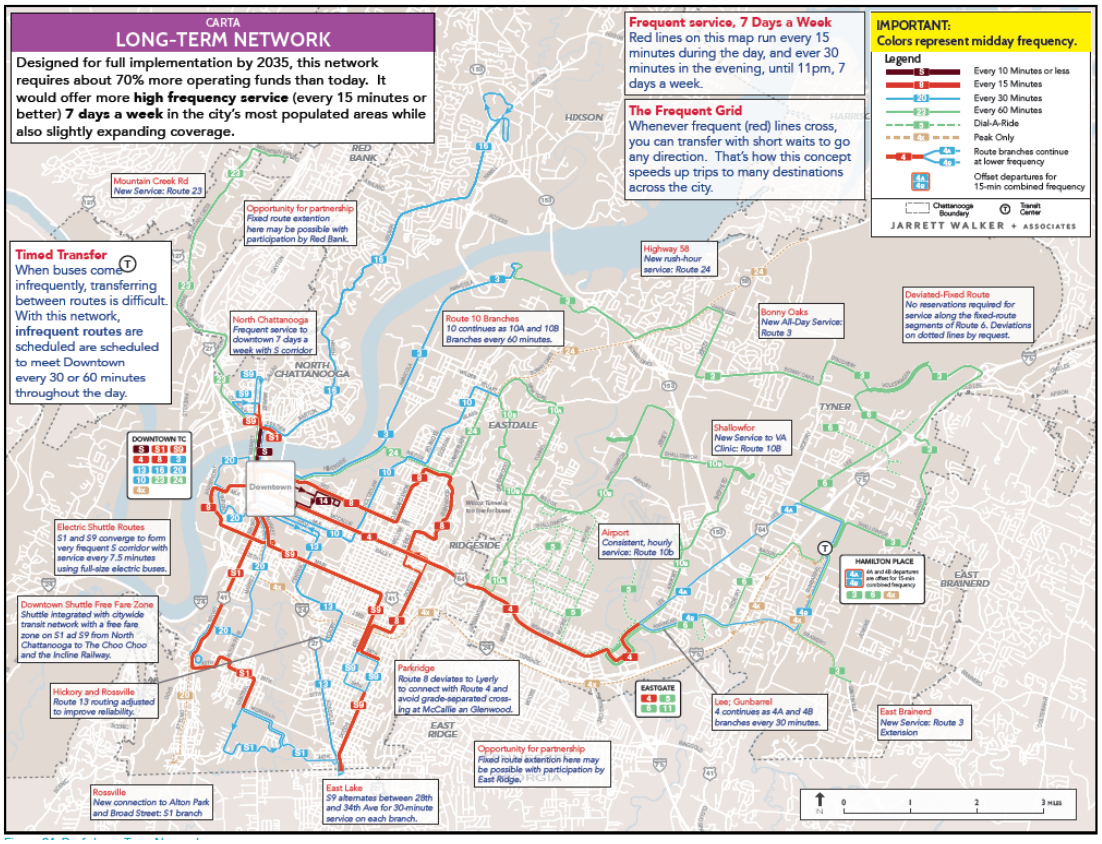
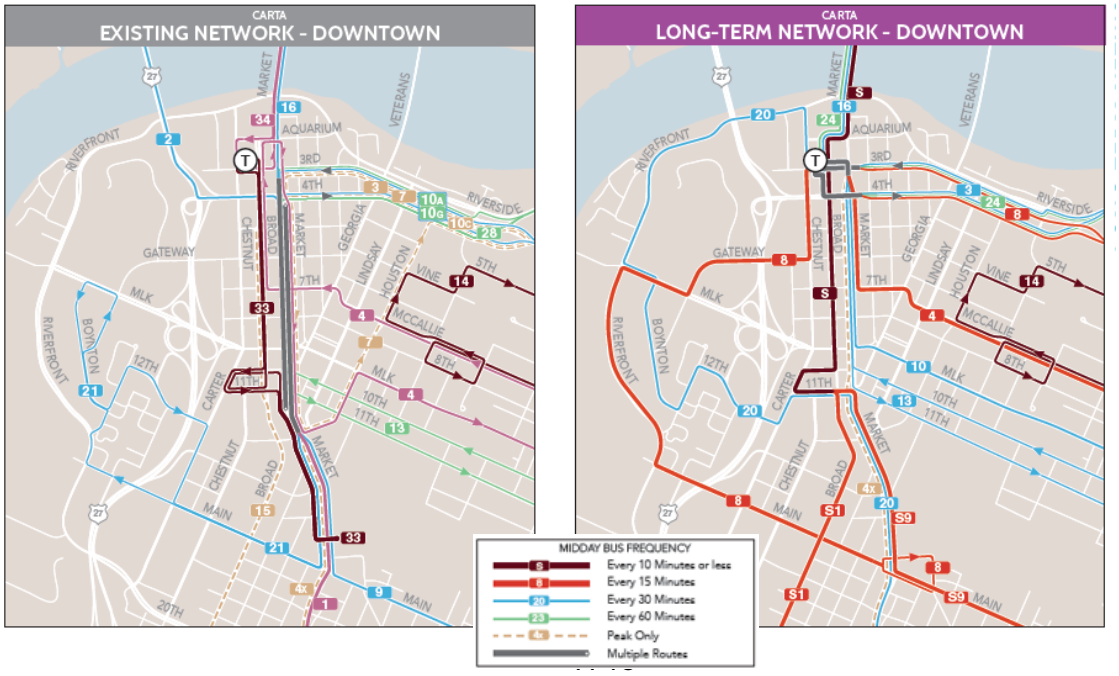


Figure 7: 2020 Transit Study Long-term Network Recommendations for Downtown



On-Demand Transit Study (2023)

Via completed a study of potential microtransit zones in October 2023 for CARTA. Along with some operational recommendations, the study identified six potential microtransit zones, four of which were recommended for advanced analysis and eventual implementation. The four recommended zones are similar in terms of productivity, ridership, and operating cost. Changes recommended in this study to the existing CARTA system include incorporation of Red Bank into the service area and consolidation of Routes 3, 28, and the 10s into one high-frequency route.

- Potential zones:
    - Lookout Valley (not recommended)
    - Amnicola + Highway 58
    - East Brainerd
    - Hixson
    - Mountain Creek + Red Bank
    - Mountain Creek (not recommended)

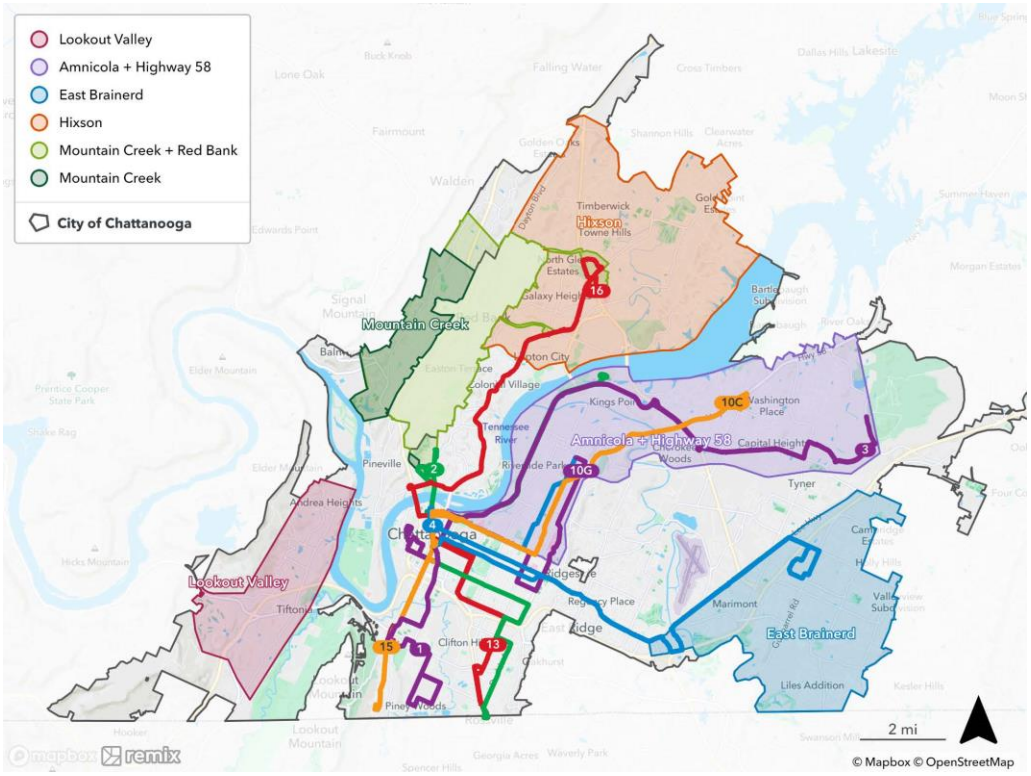


Figure 8: Potential Microtransit Zones Identified in 2023 Study with Existing Routes

When looking at the potential microtransit zones overlaid on major trip flows (see analysis in Figure 9), patterns that reflect the need for microtransit versus fixed route service emerge. Short trips throughout downtown Chattanooga, along the Route 2 and 21 alignments, and around Hamilton Place could be completed by microtransit; however, the more linear trip patterns support extensions of fixed route service.

The potential microtransit zones identified by Via are also quite geographically large. While this is beneficial in terms of coverage, large microtransit zones create challenges with on-time performance and operational issues for drivers. Shrinking these zones to concentrate on areas with clear trip flows and fixed route activity, such as the area around Amnicola Highway, would be more efficient.

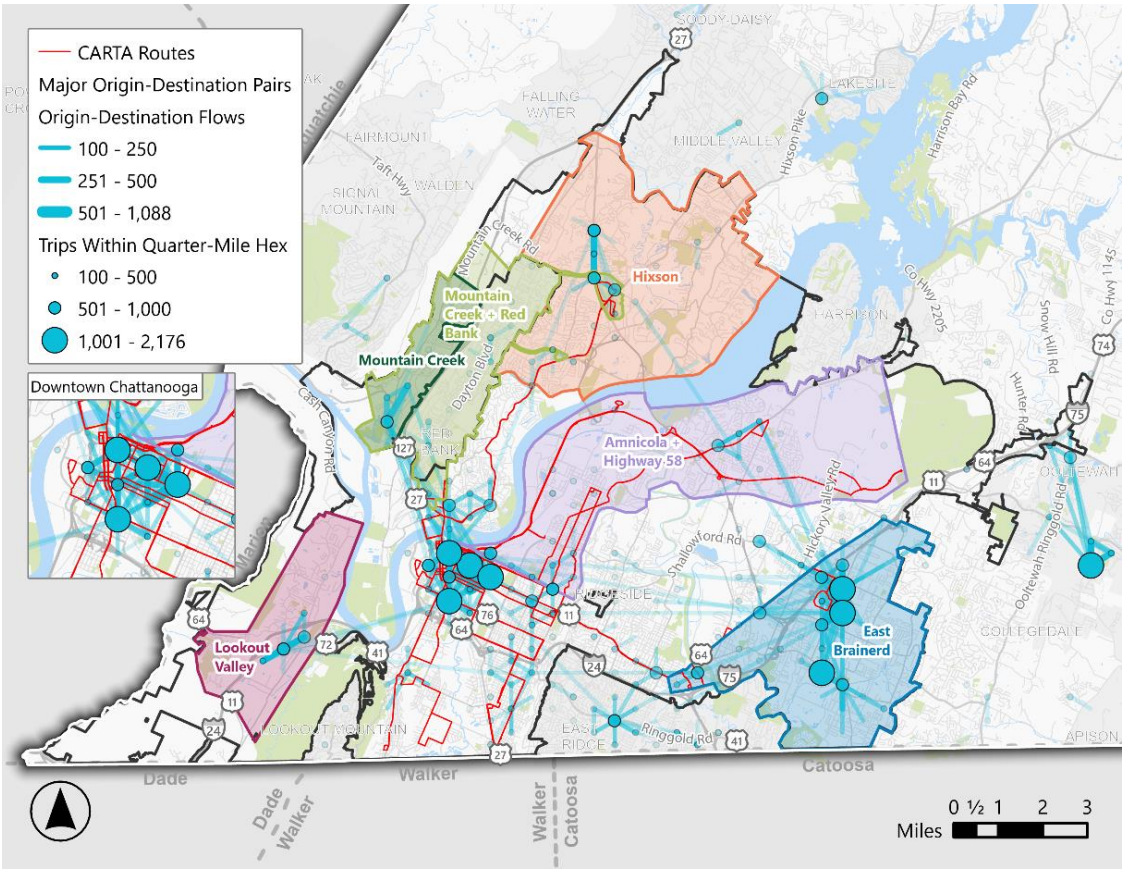


Figure 9: Major Trip Flows Overlaid with Potential Microtransit Zones

Operator Interview Findings

The Study team met with CARTA operators in October 2024 at the Wilcox Boulevard facility and Shuttle Park South to gather their input on routing, service challenges, and microtransit service. Key findings from these interviews are summarized below.

- Transfers are difficult to make with current scheduling.
- Schedules do not always line up with shift changes at major employers.
- CARTA Go platform is glitchy and pick-up scheduling is not intuitive.
- The CARTA Go zone is too large, demand is too high, and traffic delays make it difficult to keep on schedule.
- Schedules are tight for operators and there is not adequate time for breaks or places to layover.
- The Route 10 deviations are confusing for riders.
- Safety concerns with outdated vehicles and responses from dispatch for reroutes.
- Significant split shifts (3+ hours) are tough for operators.
- Shuttle operators are generally pleased with their routes and schedules.

Service Evaluation

Trend Analysis

Data obtained from the Federal Transit Administration (FTA) National Transit Database (NTD) for FY 2018 to 2022 was used to examine three types of performance measures: general service, service productivity, and cost efficiency measures.

Fixed Route

CARTA's performance measures for fixed route bus service are summarized in Table 5 and displayed in Figure 11 through Figure 16. The following sections elaborate on the performance measures that were evaluated and summarizes the findings for CARTA's fixed route service.

General Service Measures

- **Passenger Trips (or Ridership)**: the total number of boardings. CARTA's passenger trips decreased by 49% from FY 2018 to FY 2022.
- **Revenue Hours**: the total number of hours a bus is providing service. CARTA's revenue hours decreased by 21% from FY 2018 to FY 2022.
- **Revenue Miles:** the total number of miles a bus drives to provide service. CARTA's revenue miles decreased by 21% from FY 2018 to FY 2022.
- **Operating Expenses**: total dollar amount spent on operating expenses (including labor, equipment, and overhead). CARTA's operating expenses increased by only 4% from FY 2018 to FY 2022.
- **Fare Revenue**: total amount of fare revenue collected by CARTA. CARTA's fare revenue decreased by 30% from FY 2018 to FY 2022.

From 2018 to 2022, CARTA saw a decrease in ridership by over 1 million trips. However, due to the COVID-19 pandemic, there was a general steep decline in transit ridership in 2020 and 2021 across the country. Revenue hours and revenue miles also dropped in 2020 and 2021 in response to the pandemic but rebounded slightly in 2022 as transit service resumed normal operations.

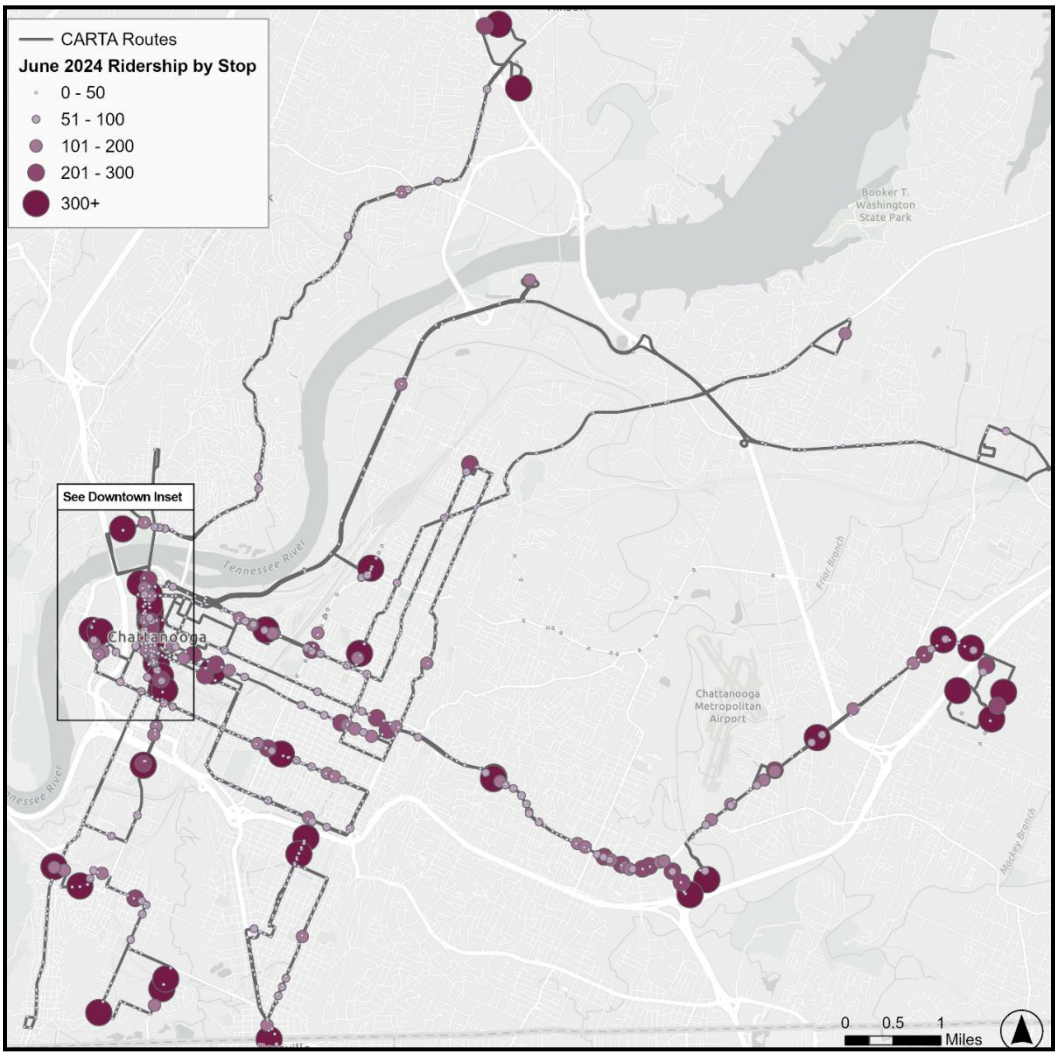


Figure 10: June 2024 Ridership by Stop

Figure 10 depicts June 2024 ridership by stop for the CARTA system. Ridership is consistently high along Route 4 and in downtown Chattanooga. Other high-ridership areas include the northern terminus of Route 16, the West Side/Golden Gateway (Route 21), St. Elmo (Routes 1 and 15), East Lake (Routes 9 and 13), and the UTC campus area (Routes 14 and 10). Routes 3, 10C, 10G, and 28 see very little ridership throughout their routes and Route 16 sees few riders for most of its extent, with significant ridership at its northern terminus. Route 15 sees little ridership activity beyond the Incline.

Service Productivity Measures

- **Passenger Trips per Revenue Hour**: average ratio of total passenger trips per revenue hour. CARTA's passenger trips per revenue hour decreased by 35% from FY 2018 to FY 2022.
- **Passenger Trips per Revenue Mile**: average ratio of total passenger trips per revenue mile. CARTA's passenger trips per revenue mile decreased by 36% from FY 2018 to FY 2022.

Due to decreased ridership, revenue hours, and revenue miles, passenger trips per revenue hour and passenger trips per revenue mile also saw a decrease from 2018 to 2022.

Cost Efficiency Measures

- **Operating Expense per Passenger Trip:** total dollar amount spent on an average individual passenger trip. CARTA's operating expense per passenger trip increased by 105% from FY 2018 to FY 2022.
- **Operating Expense per Revenue Hour:** total dollar amount spent on an average revenue hour. CARTA's operating expense per revenue hour increased by 34% from FY 2018 to FY 2022.
- **Operating Expense per Revenue Mile:** total dollar amount spent on an average revenue mile. CARTA's operating expense per revenue mile increased by 32% from FY 2018 to FY 2022.
- **Farebox Recovery:** ratio of total operating expenses met by passenger fare revenues. CARTA's farebox recovery decreased by 33% from FY 2018 to FY 2022.

CARTA's operating expenses remained fairly consistent from 2018 to 2022, increasing by only 4%; however, as a result of decreased ridership, revenue hours, and revenue miles, the operating expense per trip, hour, and mile increased during this time. Farebox recovery also decreased during this period.

Table 5: CARTA Performance Measures for Fixed Route Bus Service (FY 2018 – FY 2022)

Performance Measure	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Percent Change (FY 2018 to FY 2022)
General Service Measures						
Passenger Trips	2,243,901	2,095,796	1,766,095	1,182,866	1,137,199	-49%
Revenue Hours	183,642	176,500	158,323	121,141	142,732	-22%
Revenue Miles	2,274,191	2,244,107	2,016,077	1,558,715	1,787,764	-21%
Operating Expenses	$15,771,651	$16,631,235	$16,425,193	$15,570,593	$16,369,480	4%
Fare Revenue	$1,840,486	$1,814,660	$1,457,002	$533,944	$1,285,314	-30%
Service Productivity Measures						
Passenger Trips per Revenue Hour	12.2	11.9	11.2	9.8	8.0	-35%
Passenger Trips per Revenue Mile	1.0	0.9	0.9	0.8	0.6	-36%
Cost Efficiency Measures						
Operating Expense per Passenger Trip	$7.03	$7.94	$9.30	$13.16	$14.39	105%
Operating Expense per Revenue Hour	$85.88	$94.23	$103.74	$128.53	$114.69	34%
Operating Expense per Revenue Mile	$6.94	$7.41	$8.15	$9.99	$9.16	32%
Farebox Recovery	12%	11%	8.9%	3.4%	7.9%	-33%

Figure 11: CARTA's Passenger Trips from FY 2018 to 2022

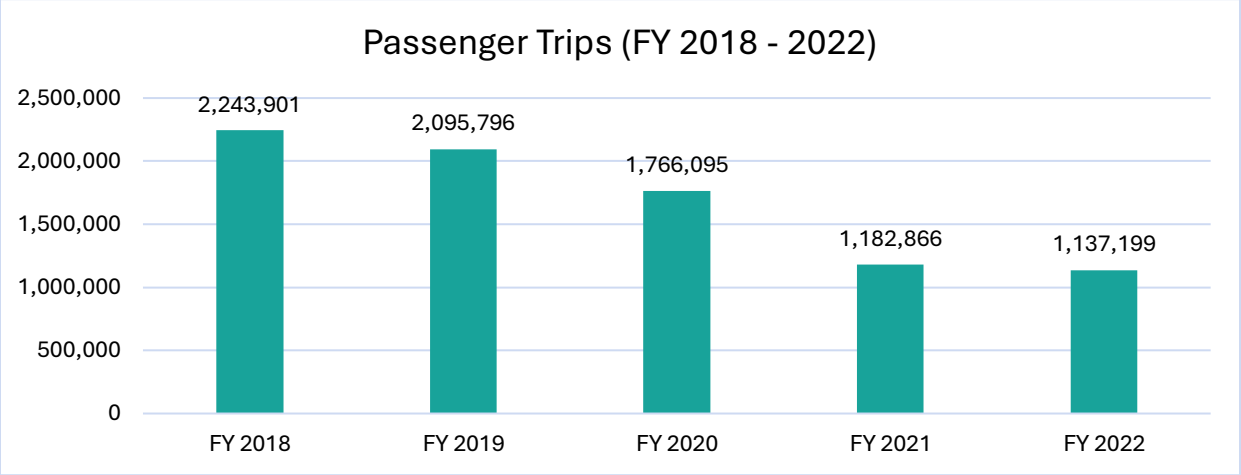


Figure 12: CARTA's Revenue Hour from FY 2018 to 2022

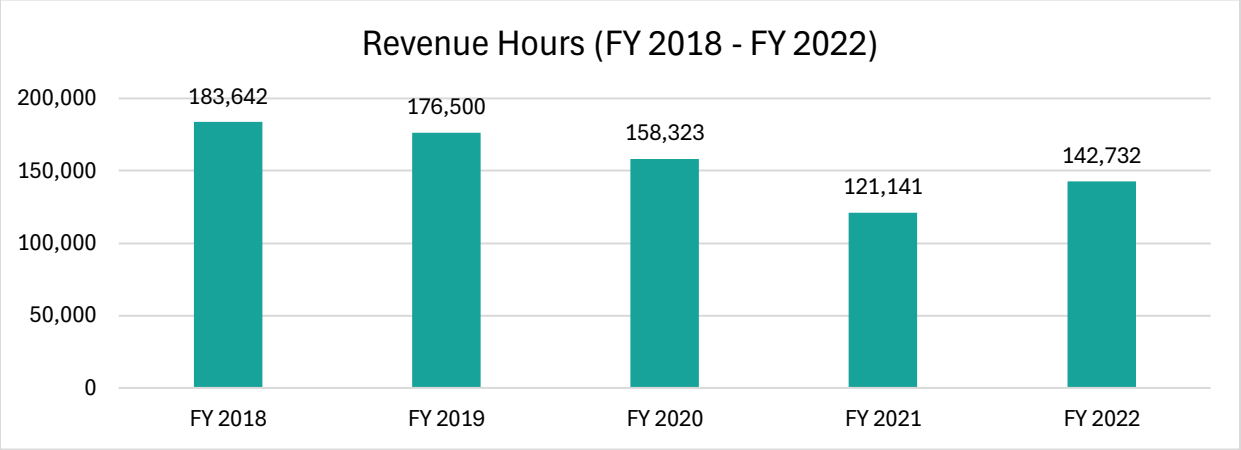


Figure 13: CARTA's Revenue Miles from FY 2018 to 2022

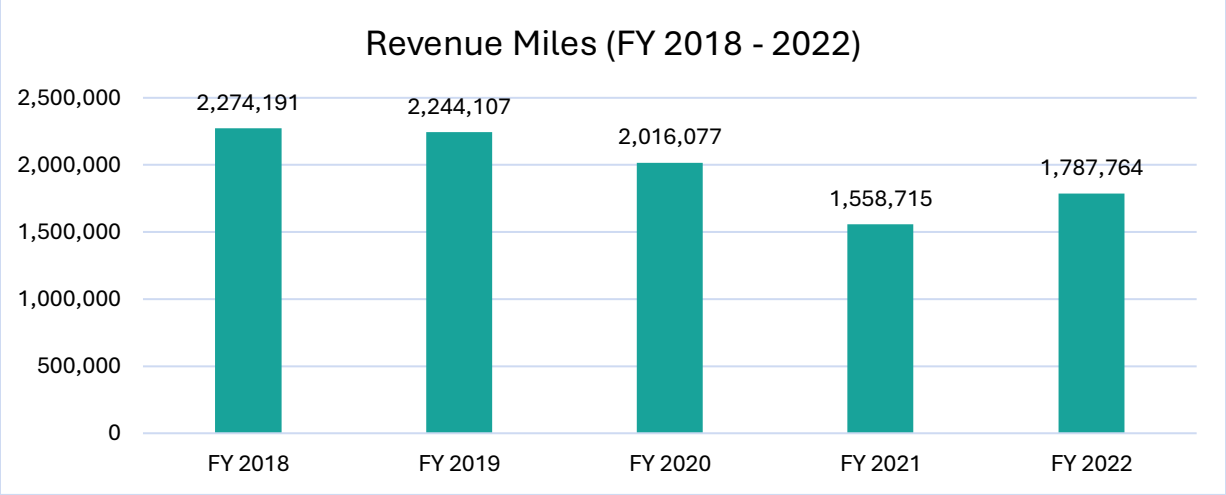


Figure 14: CARTA's Operating Expenses from FY 2018 to 2022

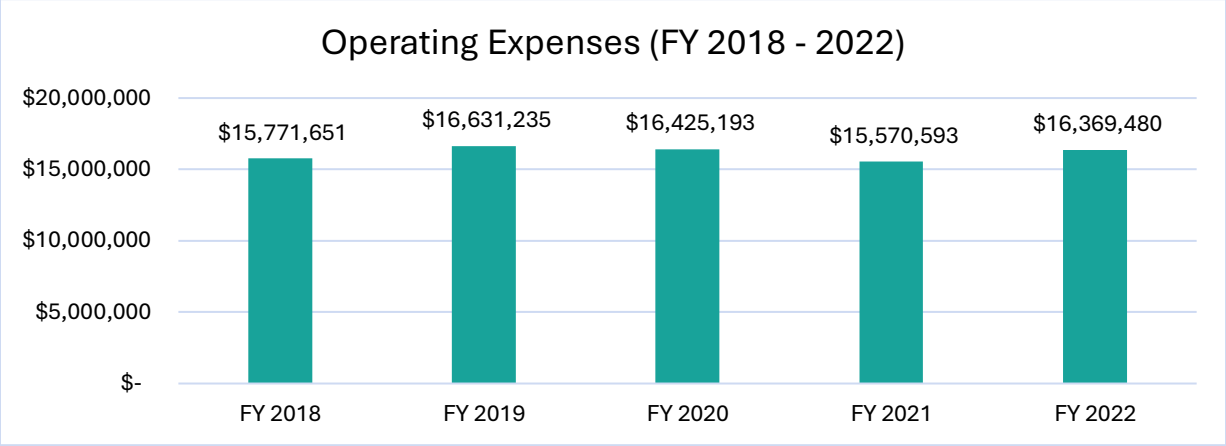


Figure 15: CARTA's Fare Revenue from FY 2018 to 2022

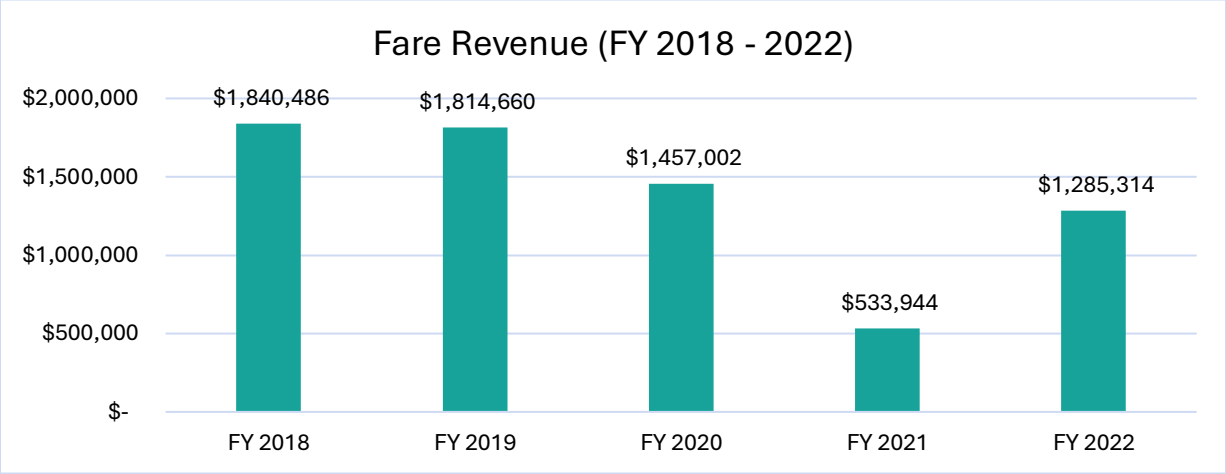
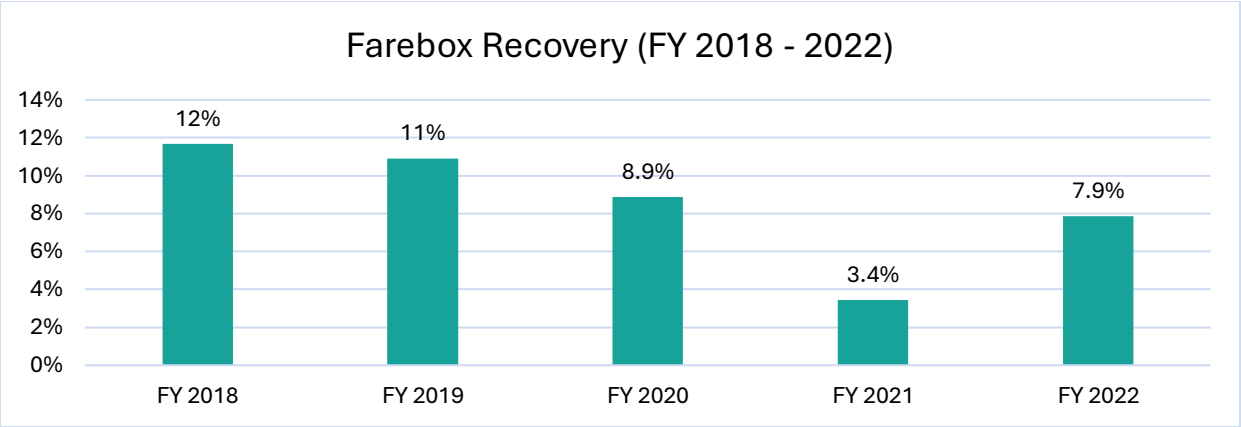


Figure 16: CARTA's Farebox Recovery from FY 2018 to 2022



Key performance measures are broken out by route in Table 6 on the following page.

Table 6: CARTA Fixed Route Performance Measures by Route (2023)

Route Number	Route Name	Passenger Trips	Passenger Trips per Revenue Hour	Passenger Trips per Revenue Mile	Operating Expense per Passenger Trip	Operating Expense per Revenue Hour	Operating Expense per Revenue Mile
1	Alton Park	114,290	10.9	0.89	$6.21	$68.00	$5.50
2	North Shore Shuttle	28,662	4.6	0.64	$14.80	$68.00	$9.46
3	Enterprise South	12,328	4.1	0.14	$16.60	$68.00	$2.33
4	Eastgate/ Hamilton Place	337,727	11.1	0.74	$6.11	$68.00	$4.53
9	East Lake	91,579	11.1	0.81	$6.10	$68.00	$4.93
10 (A, C, & G)	East Chattanooga – Avondale/Campbell/Glenwood	122,225	8.5	0.61	$7.96	$68.00	$4.89
13	Rossville	39,607	11.0	0.83	$6.18	$68.00	$5.15
14	Mocs Express*	24,218	-	-	-	-	-
15	St. Elmo / Incline Shuttle	23,054	5.1	0.44	$13.27	$68.00	$5.78
16	Northgate	62,828	7.7	0.38	$8.83	$68.00	$3.37
21	Golden Gateway	70,682	17.4	1.46	$3.90	$68.00	$5.68
28	Amnicola Highway	10,788	3.4	0.22	$20.17	$68.00	$4.49
33	Downtown Shuttle	255,841	8.2	0.85	$8.32	$68.00	$7.08

*Revenue data not available for Mocs Express.

Route 4 (Eastgate/Hamilton Place) has the highest ridership by a large margin. Other higher ridership routes include Route 1 (Alton Park), Route 10 (East Chattanooga), and Route 33 (Downtown Shuttle). Route 28 (Amnicola Highway) has the lowest ridership, followed by Route 3 (Enterprise South), Route 15 (St. Elmo/Incline Shuttle), and Route 14 (Mocs Express). Route 21 (Golden Gateway) provides the most passenger trips per revenue hour and per revenue mile. Other routes with higher passenger trips per revenue hour and per revenue mile include Route 1 (Alton Park), Route 4 (Eastgate/Hamilton Place), Route 9 (East Lake), and Route 13 (Rossville). The operating expense per passenger trip varies greatly from $3.90 (Route 21) to $20.17 (Route 28), depending on the route. Operating expense per revenue hour is assumed at $68 for every route. Operating expense per revenue mile also varies widely from $3.37 (Route 16) to $9.46 (Route 2), depending on the route.

Paratransit

CARTA's performance measures for paratransit service are summarized in Table 7 below.

Table 7: CARTA Performance Measures for Paratransit Service (FY 2018 – FY 2022)

Performance Measure	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Percent Change (FY 2018 to FY 2022)
General Service Measures						
Passenger Trips	61,402	56,064	52,880	49,418	50,610	-18%
Revenue Hours	33,661	34,954	33,101	33,722	37,540	12%
Revenue Miles	452,051	464,276	402,782	339,850	442,670	-2%
Operating Expenses	$2,170,401	$2,496,147	$2,563,546	$2,685,456	$3,077,323	42%
Fare Revenue	$124,620	$135,474	$124,986	$35,435	$107,973	-13%
Service Productivity Measures						
Passenger Trips per Revenue Hour	1.8	1.6	1.6	1.5	1.3	-26%
Passenger Trips per Revenue Mile	0.1	0.1	0.1	0.1	0.1	-16%

Performance Measure	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Percent Change (FY 2018 to FY 2022)
Cost Efficiency Measures						
Operating Expense per Passenger Trip	$35.35	$44.52	$48.48	$54.34	$60.80	72%
Operating Expense per Revenue Hour	$64.48	$71.41	$77.45	$79.64	$81.97	27%
Operating Expense per Revenue Mile	$4.80	$5.38	$6.36	$7.90	$6.95	45%
Farebox Recovery	6%	5%	4.9%	1.3%	3.5%	-39%

Overall, paratransit service performance fluctuated less than fixed route service from FY 2018 to 2022, suggesting that paratransit service was not impacted by the COVID-19 pandemic to the same extent as fixed route. During this period, paratransit passenger trips decreased by 18%, with slight decreases each year, except from 2021 to 2022 which increased by approximately 1,000. However, the general service measure that saw the most change during this period was operating expense which increased by 42%. As a result of both of these changes, operating expense per passenger trip increased by 72% during this period. Farebox recovery also saw a significant decrease by almost 40%.

Peer Review

The following section analyzes two peer transit agencies— GoDurham and Memphis Area Transit Authority (MATA)— to assess the efficiency and effectiveness of CARTA's operations as compared to the other two agencies. These peer agencies were chosen because they have a similar route layout to CARTA: radial routes converging at a central core. Table 8 summarizes key characteristics of both of these peer agencies as compared to CARTA. CARTA's service area population falls between that of GoDurham and MATA. While CARTA's service area size is similar to MATA, it is significantly larger than GoDurham; therefore, the population density of GoDurham is higher.

Table 8: CARTA Service Characteristics Compared to Peer Agencies

Service Characteristic	CARTA	GoDurham	MATA
Service Area Population	181,370	283,506	690,943
Service Area Size (Square Miles)	289	93	291
Service Area Population Density	1,380	3,048	2,374
Flat Fare	$1.50	$1.00*	$1.00**

*GoDurham is fare free through June 2025.
**MATA enacted temporary $1.00 fares beginning June 21, 2020, due to the COVID-19 pandemic.

The same performance measures discussed in the previous section were evaluated for each of the peer agencies (see Table 9). These comparisons examined fixed route service characteristics only, as fixed route service represents the majority of trips. CARTA and its peer agencies were compared using FY 2022 data, which represents the most readily available data from NTD.

Table 9: Performance Measures Peer Review (FY 2022)

Performance Measure	CARTA	GoDurham	MATA
General Service Measures			
Passenger Trips	1,137,199	4,744,135	2,485,053
Revenue Hours	142,732	175,007	261,127
Revenue Miles	1,787,764	2,313,822	4,204,626
Operating Expenses	$16,369,480	$24,978,493	$46,506,412
Fare Revenue	$1,285,314	$0.00*	$1,545,252
Service Productivity Measures			
Passenger Trips per Revenue Hour	8.0	27.1	9.5
Passenger Trips per Revenue Mile	0.6	2.1	0.6
Cost Efficiency Measures			
Operating Expense per Passenger Trip	$14.39	$5.27	$18.71
Operating Expense per Revenue Hour	$114.69	$142.73	$178.10

Performance Measure	CARTA	GoDurham	MATA
Operating Expense per Revenue Mile	$9.16	$10.80	$11.06
Farebox Recovery	7.9%	0%	3.3%

*GoDurham is fare free until June 2025.

Compared to CARTA, both GoDurham and MATA provided a greater level of service in 2022— more passenger trips, revenue hours, and revenue miles— with MATA being the most comparable. The operating expenses for both agencies were also higher than CARTA; however, in this case, GoDurham is the most comparable to CARTA. MATA's operating expenses were around 3.5 times greater than that of CARTA.

In terms of service productivity measures, CARTA performed similarly to MATA in 2022. The passenger trips per revenue hour and passenger trips per revenue mile were significantly higher for GoDurham.

Comparing the cost efficiency among agencies, CARTA's operating expense per passenger trip fell between that of GoDurham and MATA. CARTA's operating expense per revenue hour was lower than both peers. Operating expense per revenue mile was comparable for all agencies. CARTA's farebox recovery was significantly higher than both GoDurham and MATA; however, GoDurham was fare free during the entire year.

Service Evaluation Conclusion

This analysis assesses CARTA's existing service and facilities, including route and systemwide performance, fleet and facilities, and fare policy and technology. In addition, the report compares CARTA's existing performance to two peer transit agencies. A market trend analysis, which dives into the CARTA service area population and trip patterns, was completed in conjunction with this analysis and is documented in the next section. The main takeaways from this analysis are summarized below.

- **Route effectiveness and efficiency:** Routes 3 and 28 see relatively low ridership and operating expenses per passenger trip that approach paratransit levels; this is indicative of an unproductive fixed route that may be better served by microtransit. Most other routes are acceptable in terms of efficiency, but some may benefit from minor routing and span/frequency changes.
- **Fleet and facilities:** Most of CARTA's fleet is in need of replacement. Many vehicles are beyond or approaching their Useful Life Benchmark (ULB). Older vehicles require more frequent and intensive maintenance, driving up costs. Additionally, CARTA runs the risk of losing its ability to maintain the current level of service if vehicles must be retired. CARTA's

parking and other facilities are in relatively good condition. Shuttle Park South is at the end of its life as a maintenance facility and is in need of a reconfiguration or relocation of maintenance and electric vehicle charging infrastructure.

- **Systemwide performance:** In general, CARTA has seen a decrease in fixed route ridership from FY 2018 to 2022. However, some of this decline can be attributed to the COVID-19 pandemic and the general decrease in transit ridership across the country during that time. CARTA's fixed route improvements should focus on promoting transit ridership and serving communities that could benefit from new or improved service.
- **Peer review:** In 2022, GoDurham provided only 23% (revenue hours) to 29% (revenue miles) more service compared to CARTA, yet GoDurham's passenger trips per revenue hour were almost 240% higher than CARTA's. This may suggest that CARTA should prioritize route/service efficiency enhancements to help promote ridership so that resources are used more efficiently and effectively. In terms of farebox recovery, CARTA's was higher than both peer agencies in 2022; however, GoDurham was fare-free during that time and MATA offered temporary $1.00 fares.

Transit Market Analysis

Transit use depends in large part on population and employment density. Some populations are more likely to use transit than others based on specific demographic and socioeconomic factors. High-density neighborhoods often have more multi-family housing, smaller lot sizes, and less space dedicated to parking that all encourage transit use. The closer destinations are to each other, the more useful transit, as well as other alternate modes of transportation such as walking and biking, become to people living and working in each area. The following sections analyze these factors to determine needs and gaps in CARTA's fixed route service.

Population and Employment

According to the 2023 American Community Survey (ACS) 5-Year Estimates, the population of Hamilton County is 378,864. The population density and employment density in areas currently serviced by CARTA is shown in Figure 17 and Figure 18 below. CARTA routes were split by headway times, and existing population and employment along with future dwelling units and employment were calculated within a quarter mile of the CARTA routes as shown in Table 10. More dense areas are concentrated in Ridgeside, Highland Park, downtown, and East Lake.

The demographic analysis that follows includes core transit ridership characteristics that tend to indicate higher propensity for riding transit. Table 11 lists these demographics along with their percentage of the total population in the service area.

Table 10: Population and Employment Within a Quarter Mile of CARTA Routes

CARTA Route Headway	Existing within a ¼ mile		Future within a ¼ mile	
	Population	Employment	Dwelling Units	Employment
<15 minutes	9,100	4,500	5,300	38,100
15-30 minutes	29,800	14,600	20,100	63,600
>30 minutes	49,400	22,500	34,100	100,200

Table 11: Demographics and Associated Percent of Total

Demographic	CARTA Service Area	
	Percentage	Population
BIPOC Individuals	48.5%	77,073
Hispanic Individuals	9.1%	14,508
Low-Income Population	56.8%	90,322
Transit Dependent Age Population	36.4%	57,928
Total Service Area Population	-	158,983[1]
Zero-Vehicle Households	56.1%	37,578
Households with disability	27.4%	18,312
Total Service Area Households	-	66,985

[1] This value is calculated by summing the population within census block groups that intersect with fixed routes. This differs from the service area population provided by the Federal Transit Administration National Transit Database which calculates the population within ¾ mile of fixed routes.

Figure 17: Population Density

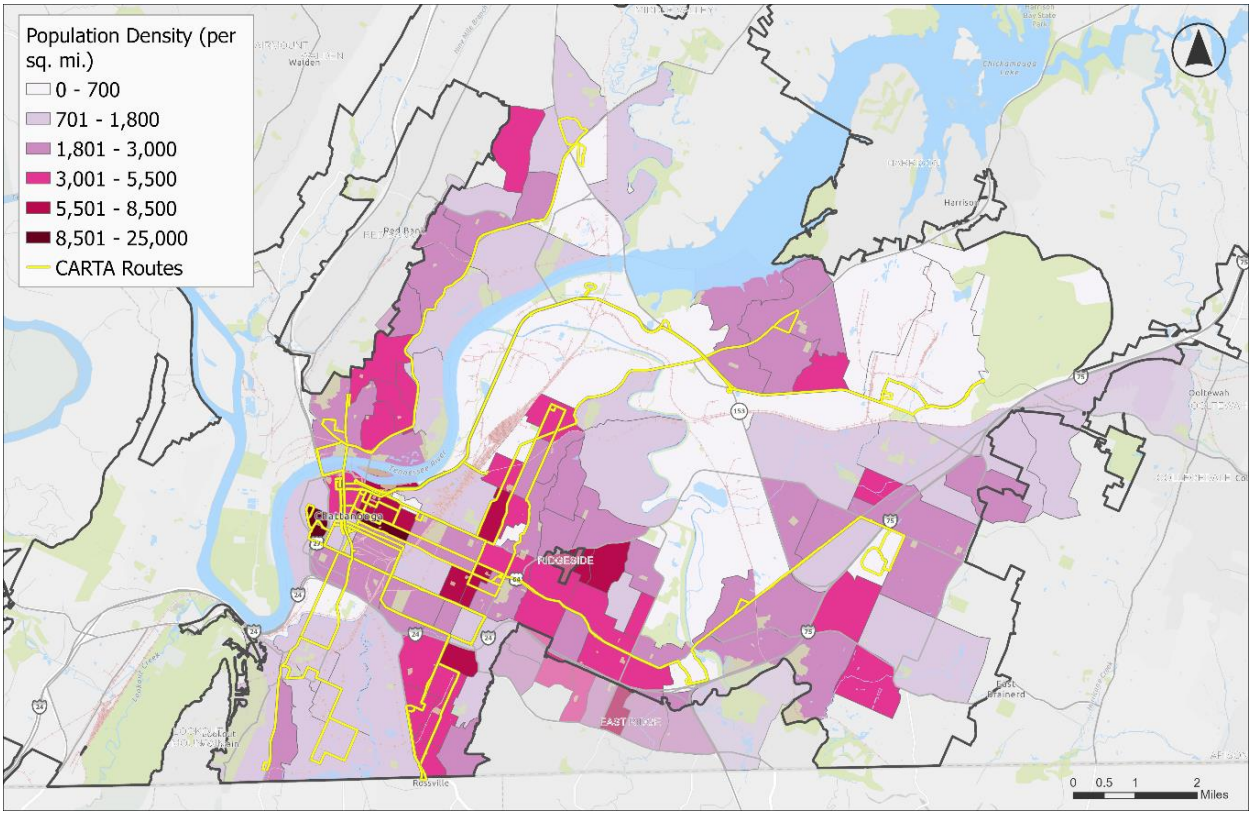
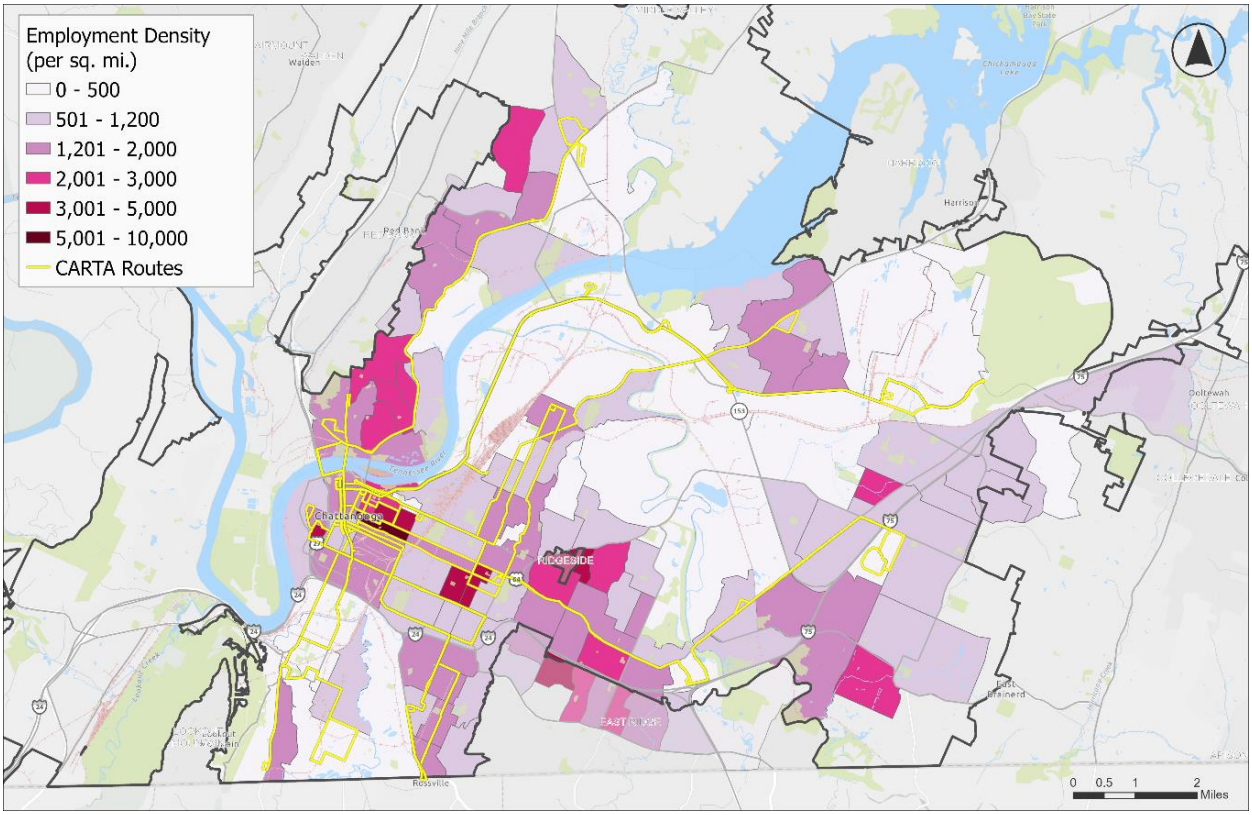


Figure 18: Employment Density



Source: US Census 2017-2021 5-yr Estimate

Target Populations

Minority Populations

Minority populations refer to certain racial and ethnic groups that are not White/Caucasian. The US Census differentiates some racial and ethnic categories from each other. Specifically, identifying as Hispanic or Latino is distinguished from racial classifications, even though identifying as Hispanic or Latino may also be considered identification with a minority population in the US. Figure 19 and Figure 20 show the distribution of Black, Indigenous, and People of Color (BIPOC) and Hispanic individuals throughout the service area.

Figure 19: Black, Indigenous, and People of Color Population

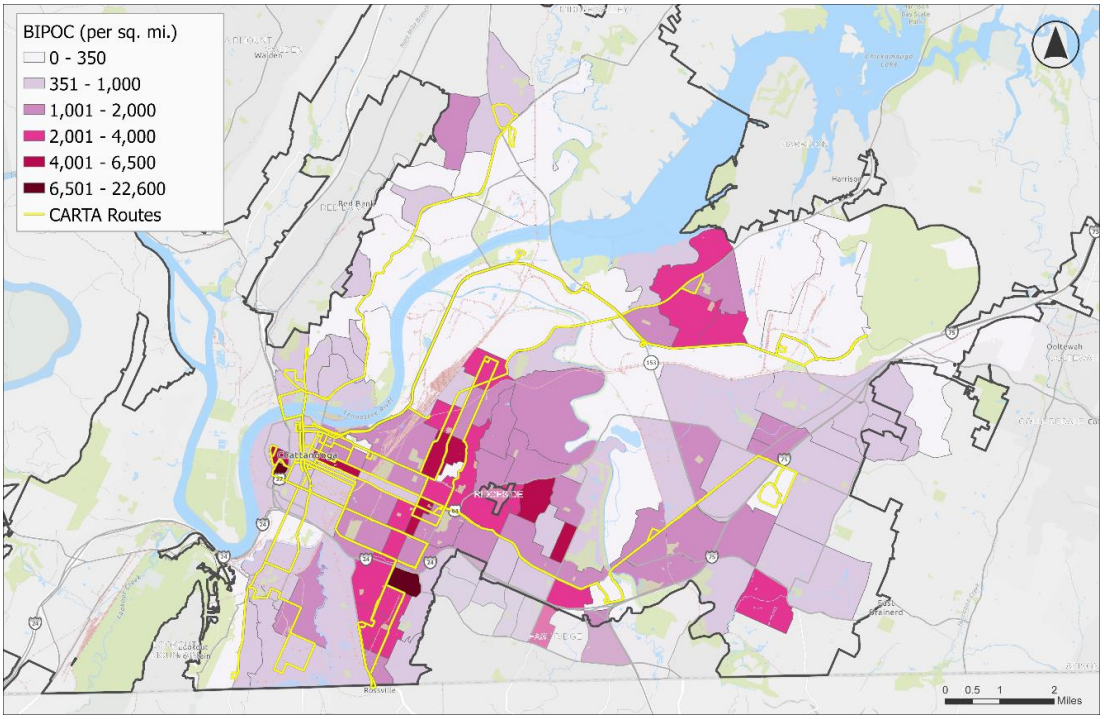
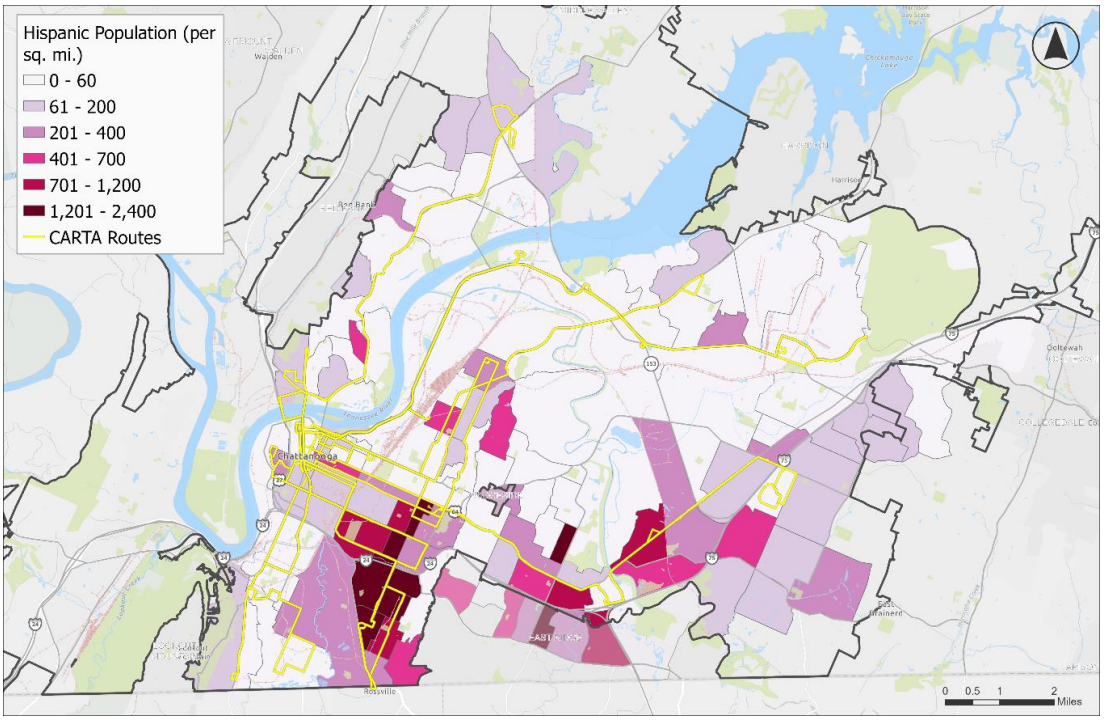


Figure 20: Hispanic Population

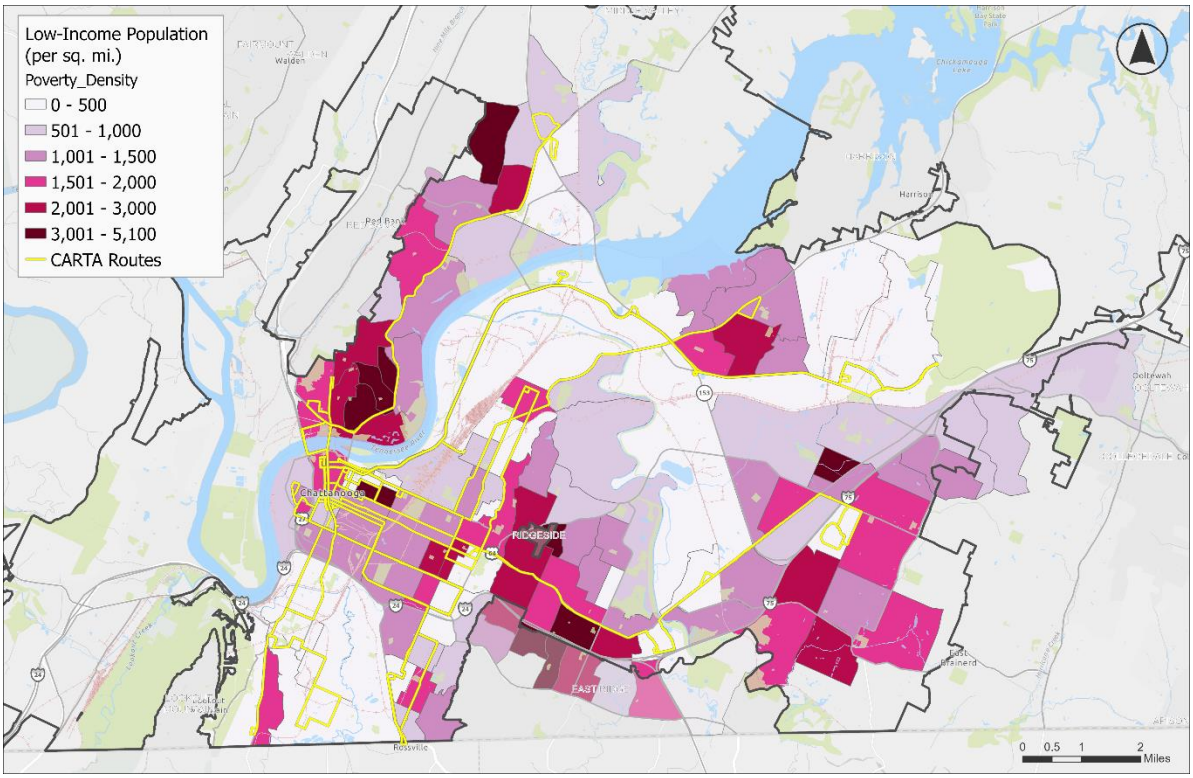


Source: US Census 2017-2021 5-yr Estimate

Low-Income

Poverty is a strong indicator of transit propensity. Automobiles are expensive to own and operate, and these costs represent a larger relative share of a low-income household's expenses. Low-income individuals are classified as those with an income at least twice the poverty level. Figure 21 shows the distribution of low-income population throughout the service area.

Figure 21: Low-Income Population

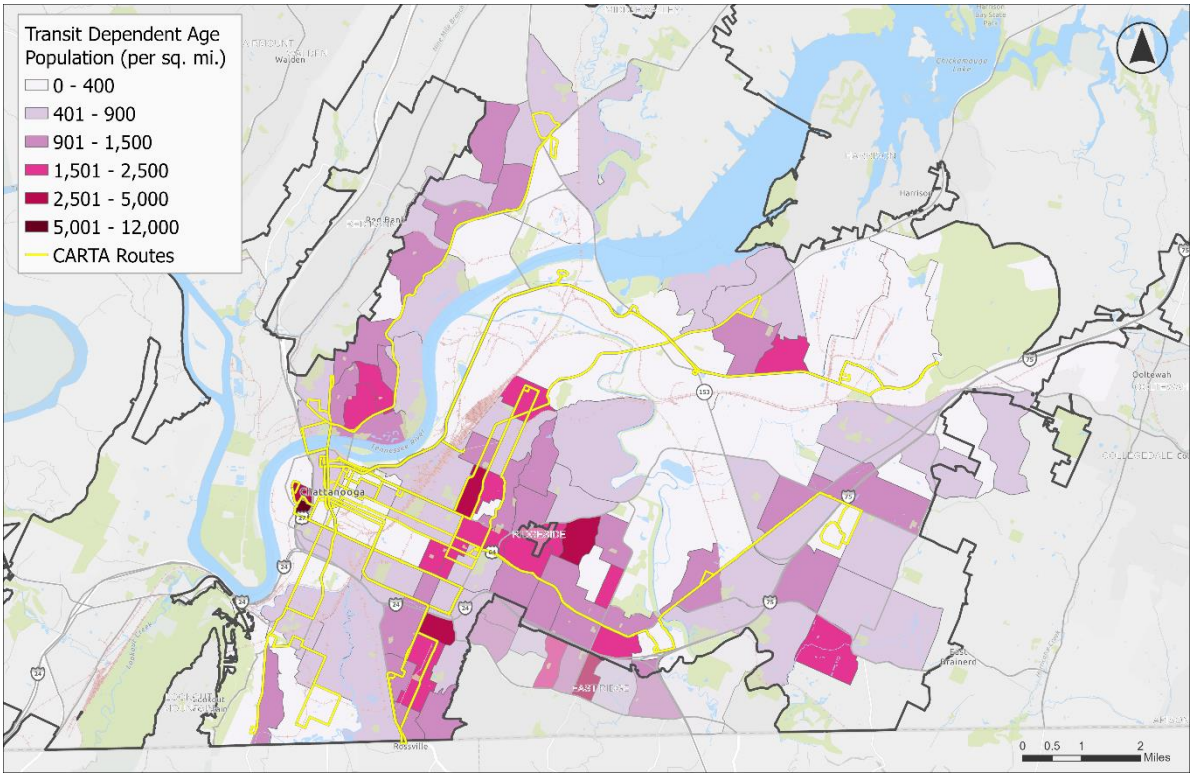


Source: US Census 2017-2021 5-yr Estimate

Age Distribution

Age is an important factor affecting transit use. Individuals over the age of 65 and under the age of 18 are less likely to have access to a personal vehicle, either because they are unable to drive for physical or legal reasons or have other mobility-related issues that make automobile travel more onerous. As a result, these two groups are more likely to use public transit. Figure 22 shows the distribution of these age groups throughout the service area.

Figure 22: Transit Dependent Age Individuals (Population aged under 18 or seniors aged 65 and older)

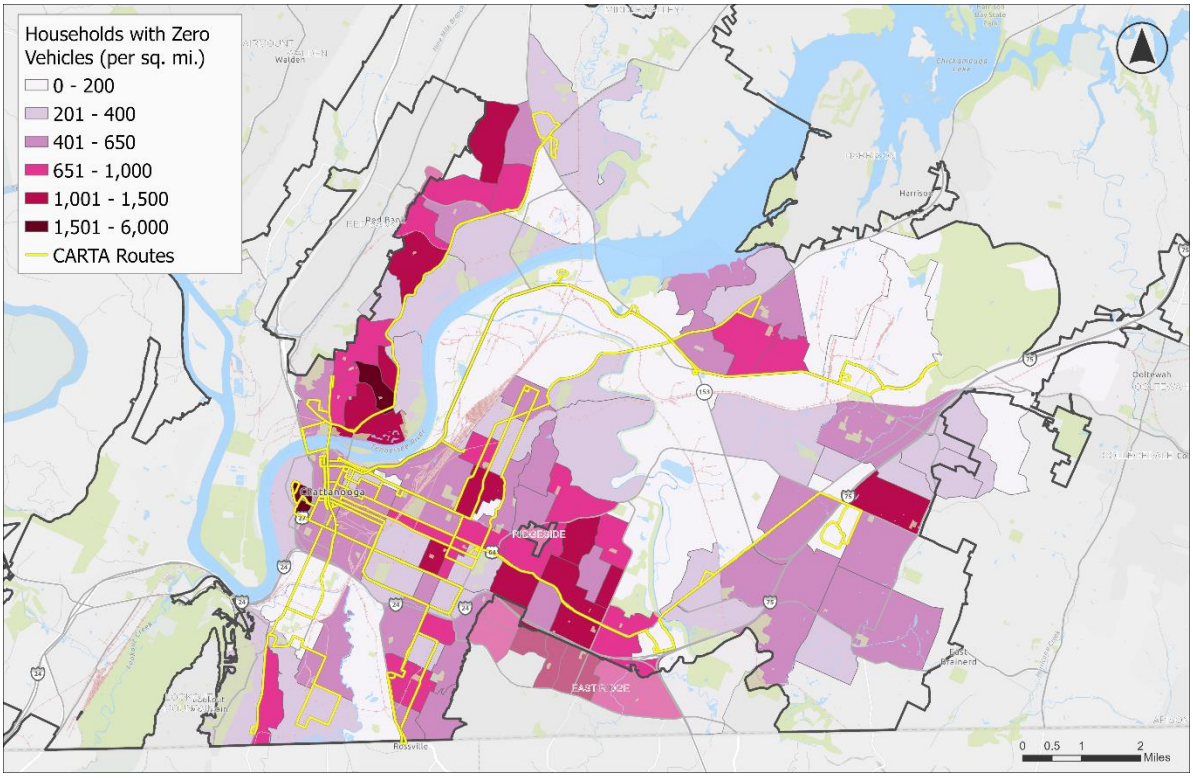


Source: US Census 2017-2021 5-yr Estimate

No-Vehicle Households

Access to an automobile by individuals within a household is also a strong indicator of transit propensity. Households that do not own an automobile either due to the financial burden or by personal choice rely heavily on public transit as a lifeline to accessing essential needs and maintaining connections to society. Figure 23 shows the distribution of zero-vehicle households throughout the service area.

Figure 23: Households with Zero Vehicles

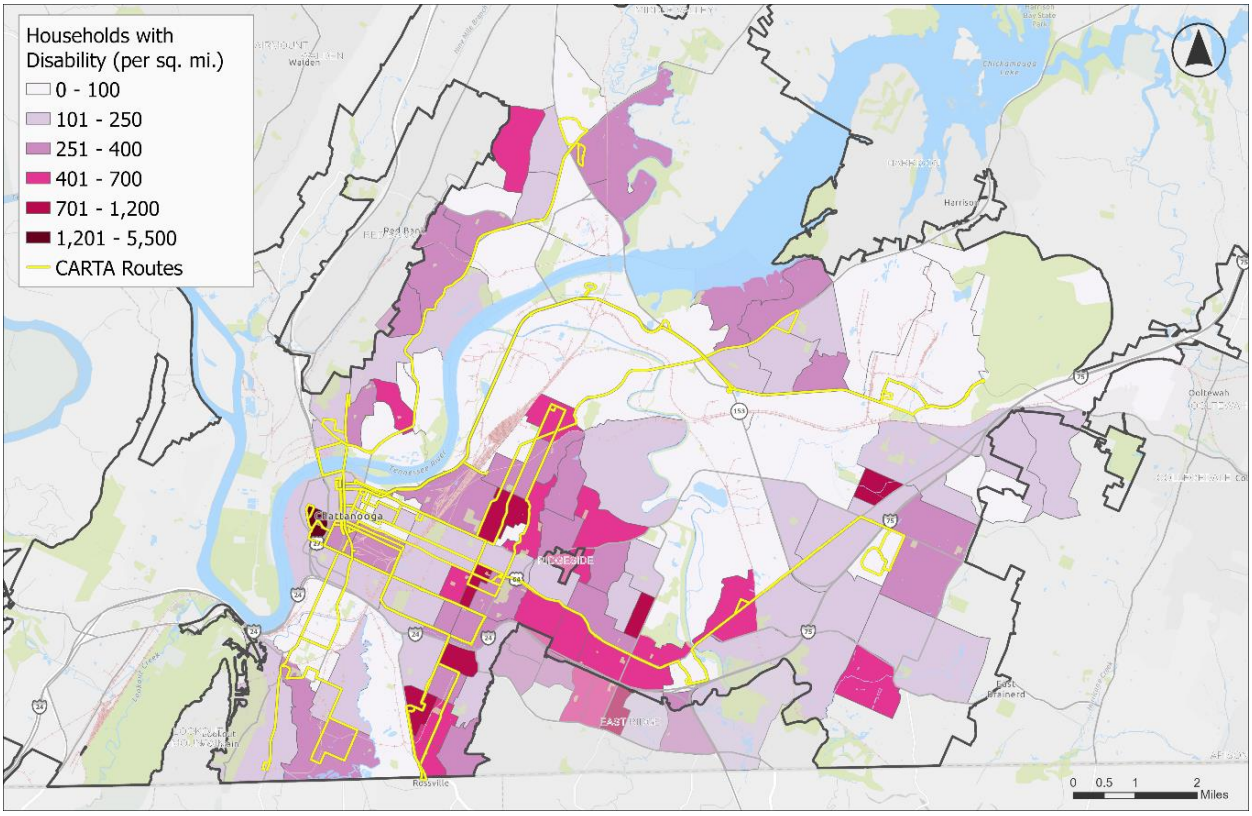


Source: US Census 2017-2021 5-yr Estimate

Persons with Disabilities

Individuals with disabilities may rely heavily on public transit as their primary mode of transportation. For individuals with disabilities, public transit provides access to essential services, such as healthcare appointments, employment opportunities, educational institutions, and social engagements. The absence of personal transportation options intensifies their dependence on public transit to meet their mobility needs and maintain their independence. Figure 24 shows the distribution of households including a person with a disability.

Figure 24: Households with Disability



Source: US Census 2017-2021 5-yr Estimate

Transit Propensity

Combining the characteristics discussed above identifies areas where demographic and socioeconomic factors indicate a higher propensity, or likelihood, to use transit compared to other areas. Areas with a high propensity score are more likely to be reliant on transit and therefore should be prioritized during service planning. For each socioeconomic factor, transit propensity scores were identified depending on the range of data for that factor. After scoring each Census block group in the above categories, the scores are weighted and combined to calculate each block group's transit propensity. Table 12 details the scores for each socioeconomic factor, and Table 13 includes the weights used for each category.

Table 12: Socioeconomic Factors and Scoring Value

Socioeconomic Factor	Density (Count/sq mi)				
Population	<600	601-1,200	1,201-2,400	2,401-4,800	>4,800
Employment					
BIPOC					
Hispanic	<60	61-120	121-240	241-480	>480
Low-Income Household Density	<60	61-140	141-700	701-1,500	>1,500
Households with Zero Vehicles					
Households with at least one reported disability					
Transit Dependent Age Individuals	<60	61-360	361-1,200	1,201-2,500	>2,500
Transit Propensity Score	5	10	15	20	25

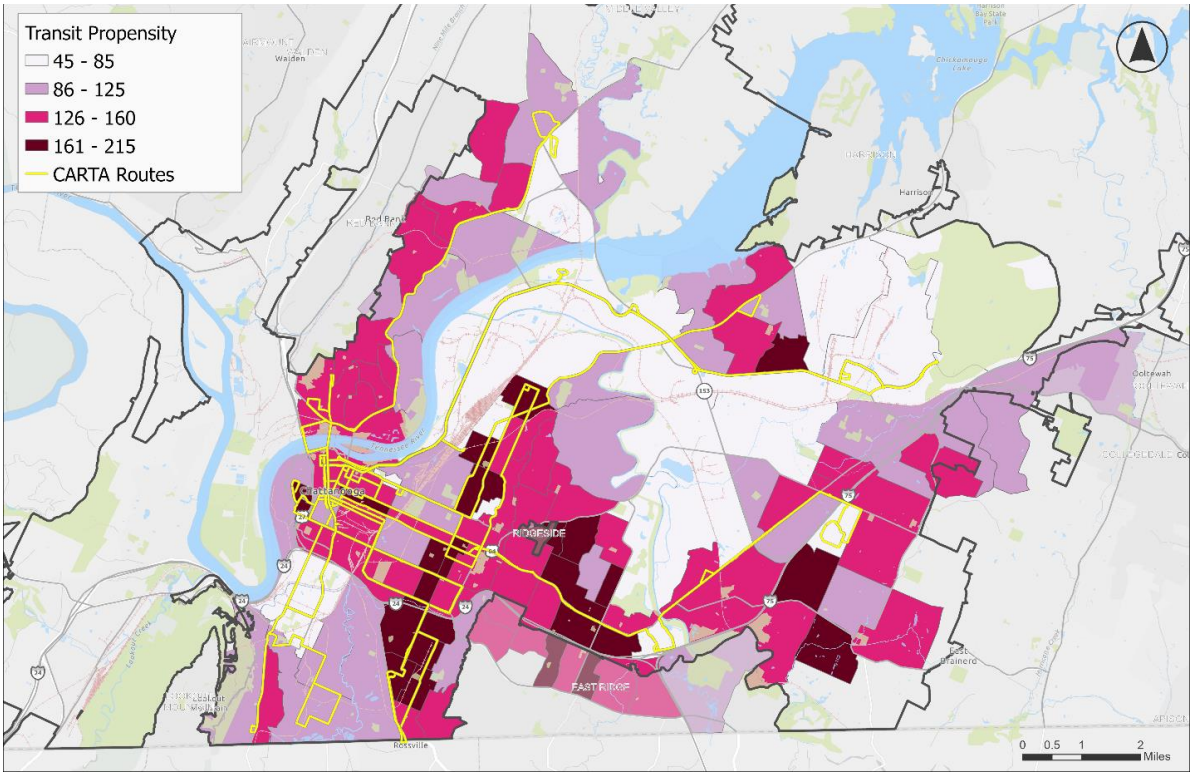
Table 13: Socioeconomic Category and Weighted Value

Category	Weight
Population Density	2
Employment Density	1
BIPOC	1
Hispanic	1
Low-Income Households	1

Category	Weight
Households with Zero Vehicles	1
Households with at least one reported disability	1
Transit Dependent Age Individuals	1

The Transit Propensity analysis is mapped in Figure 25. Most of the block groups with the highest index values are in the Brainerd, Highland Park, or East Lake area. Areas with moderate to high transit propensity which could benefit from transit that are not currently served include the block groups east of Brainerd and the areas around Woodmore, Hamilton Place, and the North Shore.

Figure 25: Transit Propensity



Source: US Census 2017-2021 5-yr Estimate

Future Land Use and Development

This analysis relies on future land use, job allocations, and dwelling unit allocations developed as part of Plan Chattanooga.

Future Land Use

Plan Chattanooga includes the identification of Place Types, which are the intended future character of areas in Chattanooga. Plan Hamilton has similar designations for the greater county,

but are not included in this report at this time. Both Plan Chattanooga and Plan Hamilton are in development as of the writing of this report. Place Type designations are from October 2024.

Figure 26 depicts all Place Types and Figure 27 depicts "transit supportive" Place Types. Transit supportive land uses are characterized by denser residential and commercial uses, mixed uses, and destinations that could be major transit trip generators like campuses and the airport. CARTA's fixed routes currently serve most of the transit supportive Place Types in Chattanooga; however, there are some areas that are not currently served and may benefit from transit connections:

- North Shore to Mountain Creek, along US 27 and US 127
- Red Bank, along Dayton Boulevard
- East Ridge, along Ringgold Road
- Mark Twain, along Wilcox Boulevard and Shallowford Road
- Cannondale/East Brainerd, along Gunbarrel Road and Brainerd Road
- Tyner, along US 64 and Bonny Oaks Drive
- Lookout Valley, along US 41

Figure 26: Place Types from Plan Chattanooga

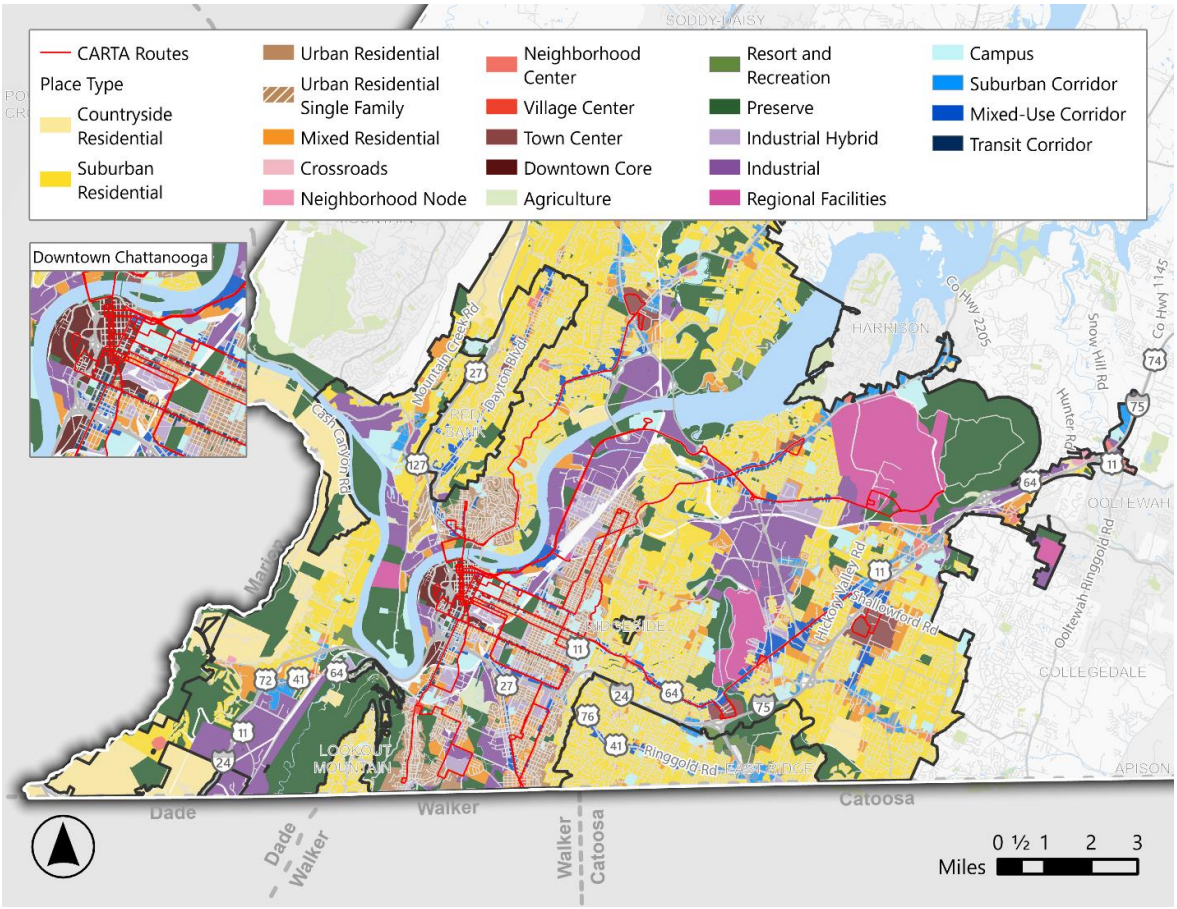
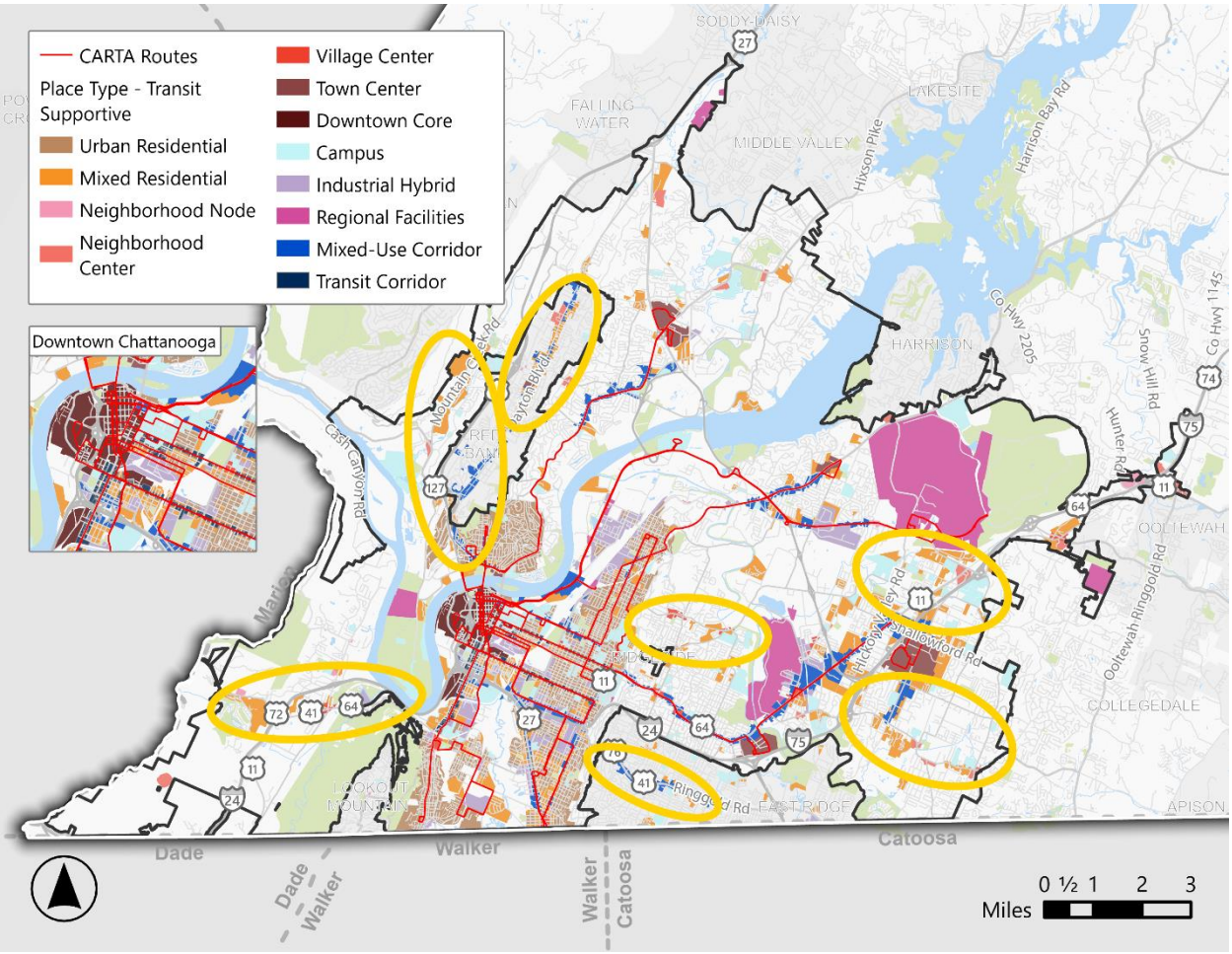


Figure 27: Transit Supportive Place Types from Plan Chattanooga (Potential Markets Highlighted)



Future Population and Employment

The growth allocations for jobs and dwelling units developed for Plan Chattanooga indicate where future development may occur within Hamilton County. These areas would likely be strong transit markets.

The project team for Plan Chattanooga analyzed the existing land use, vacant land, and redevelopable land to establish the base year data and future growth expectations. This work served as the starting point for the buildout analysis and growth allocations in Plan Chattanooga (horizon year 2045). Plan Chattanooga identifies three scenarios: Current Trend, Focus on the Urban Area, and Jobs-Housing Balance. The Focus on the Urban Area scenario allocations are presented in this report and were developed for the entirety of Hamilton County. The allocations are presented as the sum of existing and new jobs or dwelling units per 15-acre hexagon in the maps below.

Observations on the job and dwelling unit allocations are:

- Downtown Chattanooga, particularly in the Golden Gateway area, sees a concentration of more future jobs and dwelling units.
- Outside of downtown Chattanooga/Golden Gateway, job allocations are highest near the University of Tennessee at Chattanooga (UTC), CHI Memorial Hospital, Hamilton Place, and Tyner.
- Future jobs allocations tend to be concentrated along major corridors, such as Brainerd Road (US 64), Bonny Oaks Drive, Gunbarrel Road, Highway 153, Highway 58, and Dodds Avenue. Most of these corridors are currently served by CARTA fixed routes; some locations along Bonny Oaks Drive are not.
- Some areas with future job concentrations, such as Lookout Valley, Shepherd, Ooltewah, and Collegedale, are not currently served by CARTA's fixed routes.
- Areas with higher future dwelling units tend to be more dispersed than future job allocations. There are concentrations of more dwelling units in Avondale, East Lake, East Brainerd, Northgate, Twin Brook, East Ridge, Lakeshore, Mountain Creek, Lookout Valley, and near the Highway 153/US 27 interchange.
- Most areas with higher future dwelling units are served by CARTA's fixed routes, except for East Brainerd, Cannondale, East Ridge, Mountain Creek, Lookout Valley, and near the Highway 153/US 27 interchange.

Figure 28: Plan Chattanooga & Hamilton County Job Allocations (Focus on Urban Area Scenario)

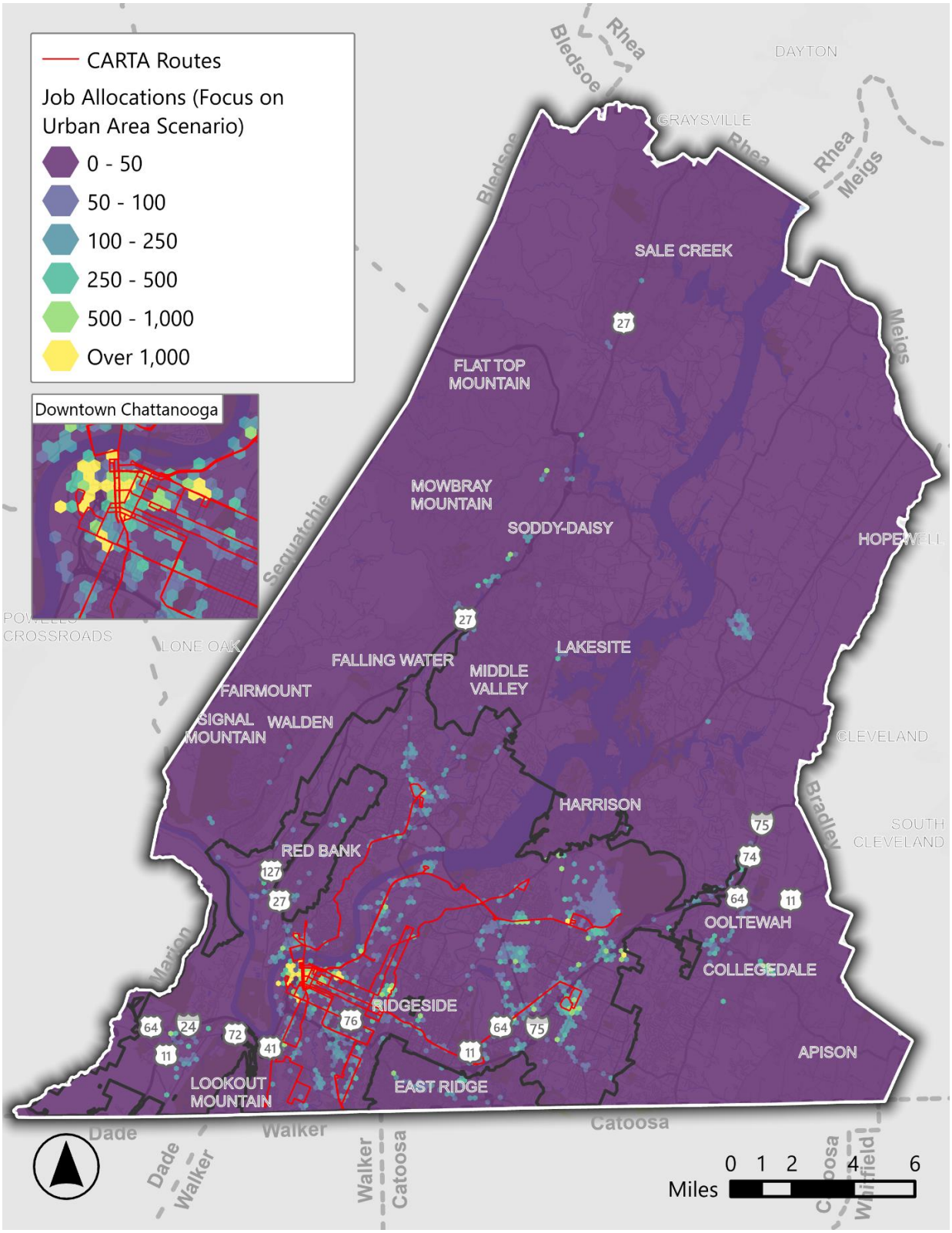
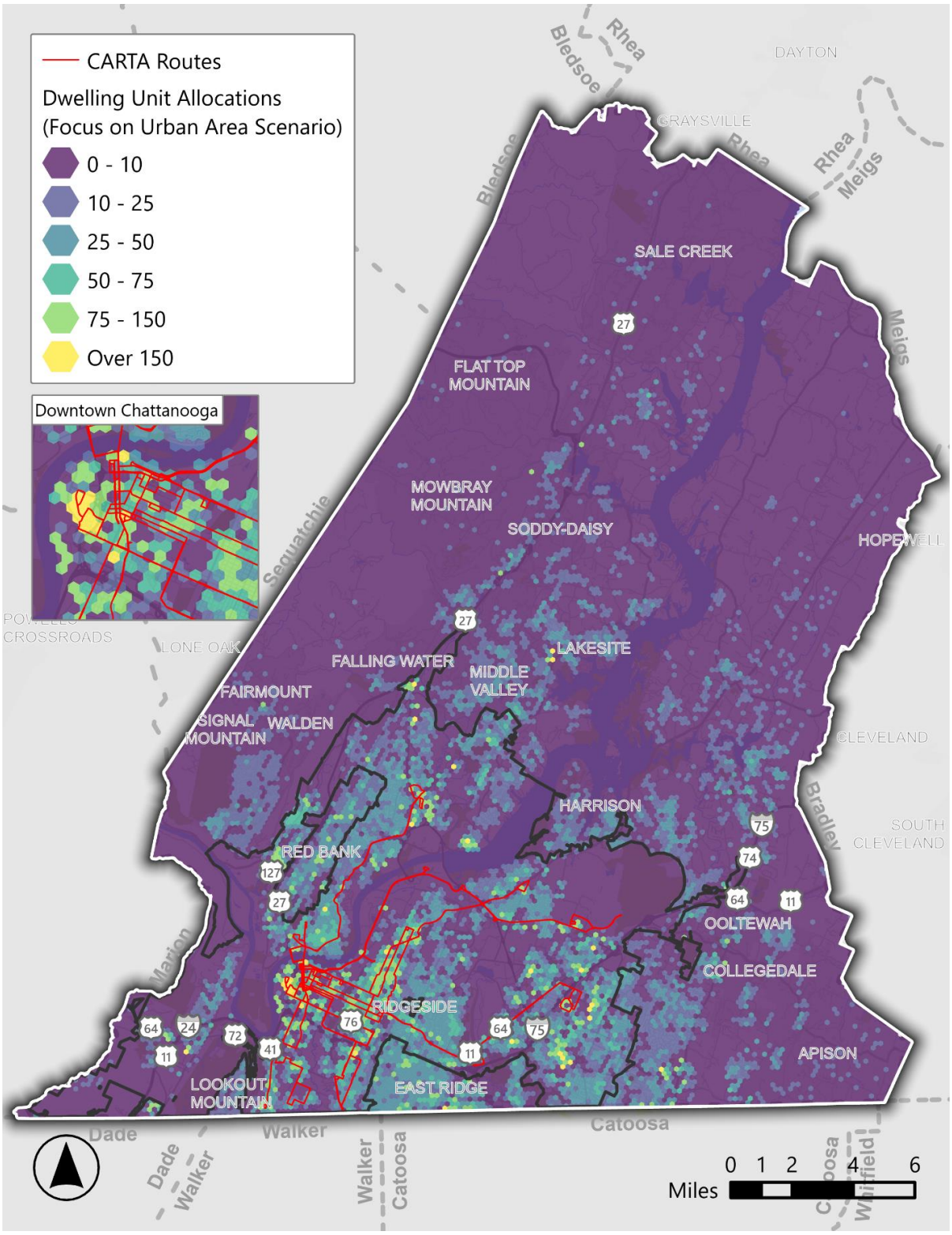


Figure 29: Plan Chattanooga & Hamilton County Dwelling Unit Allocations (Focus on Urban Area Scenario)



Commute Patterns

Methodology

The intent of this analysis is to identify the major origin-destination pairs and primary trip purposes within the study area. This analysis uses Replica as the primary source for origin-destination and travel demographics data. It is a third-party dataset that uses cellphone, GPS, and other anonymized location-based sources such as credit card transactions to estimate travel demand. The most recent trip data available is sourced for Thursdays and Saturdays in Fall 2023 and is validated against real-world conditions.

Replica provides anonymized data on trip takers including household income; age; race and ethnicity; approximate home, work, and school location; and employment. Additionally, the data detail enables a categorical breakdown of trips by purpose, length, duration, mode taken, and start and end times.

The study area (Hamilton County) was divided into quarter-mile hexagons to provide a spatially consistent and granular break down of travel patterns across the county. The full trip dataset includes trips from outside of Hamilton County; however, these trips are not displayed on the maps below.

Trip Patterns in Hamilton County

The following charts summarize trip patterns, such as duration, distance, and mode, for Hamilton County. According to Replica, there were approximately 1.45 million trips on the modeled weekday in Hamilton County.

Trip Duration and Distance

Figure 30 depicts trip durations in minutes for Hamilton County. Average trip duration in the study area was 27.4 minutes and the median was 19 minutes. The majority of trips (29.6%) were between 20 and 40 minutes long. Approximately 25% of trips took less than 10 minutes.

Figure 31 depicts trip distance in miles for Hamilton County. Average trip distance in the study area on the modeled day was 11.2 miles and the median distance was 5.8 miles. Most trips (23.4%) were between 8 and 16 miles long, followed closely by trips that were between 4 and 8 miles (21.9%).

Figure 30: Trip Duration in Minutes

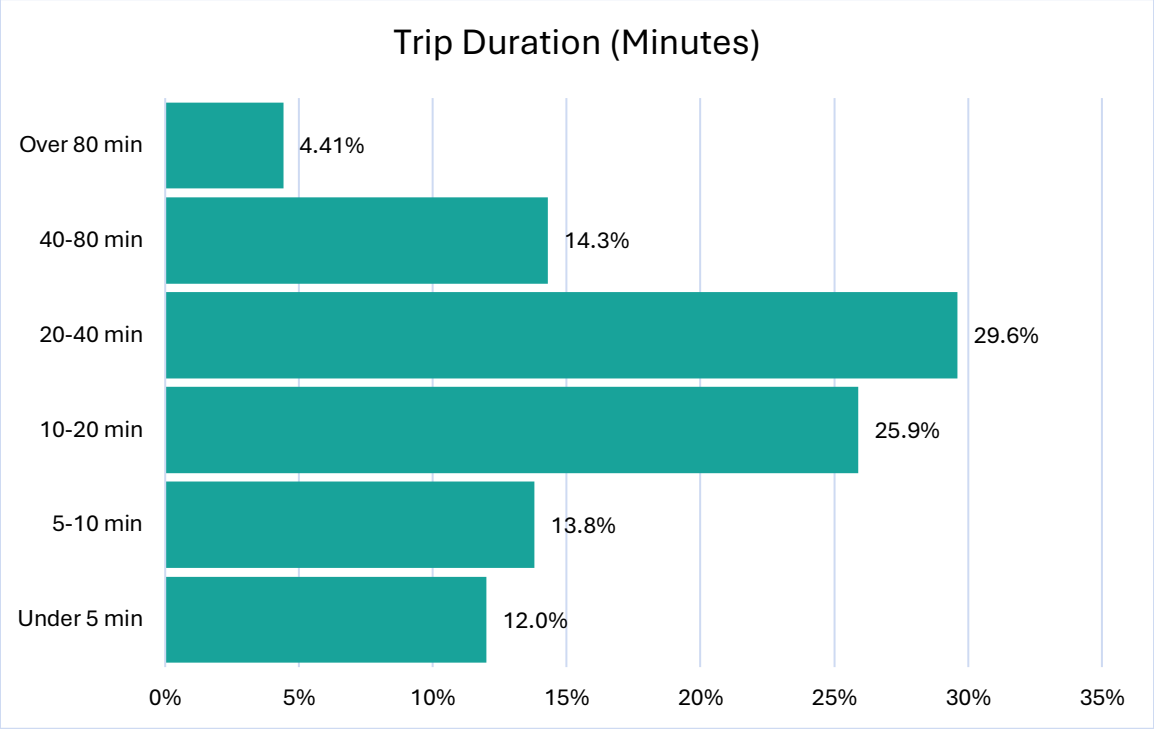
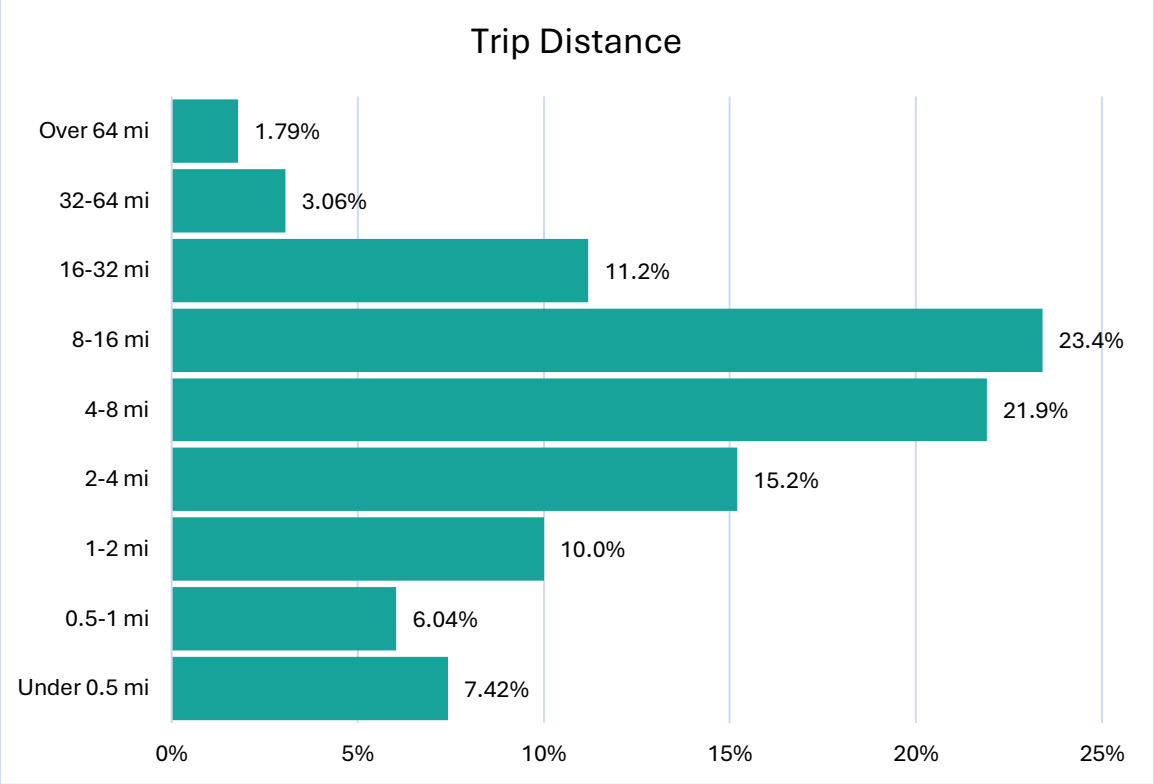


Figure 31: Trip Distance in Miles



Trip Starting Hour and Purpose

Figure 32: Trips by Starting Hour

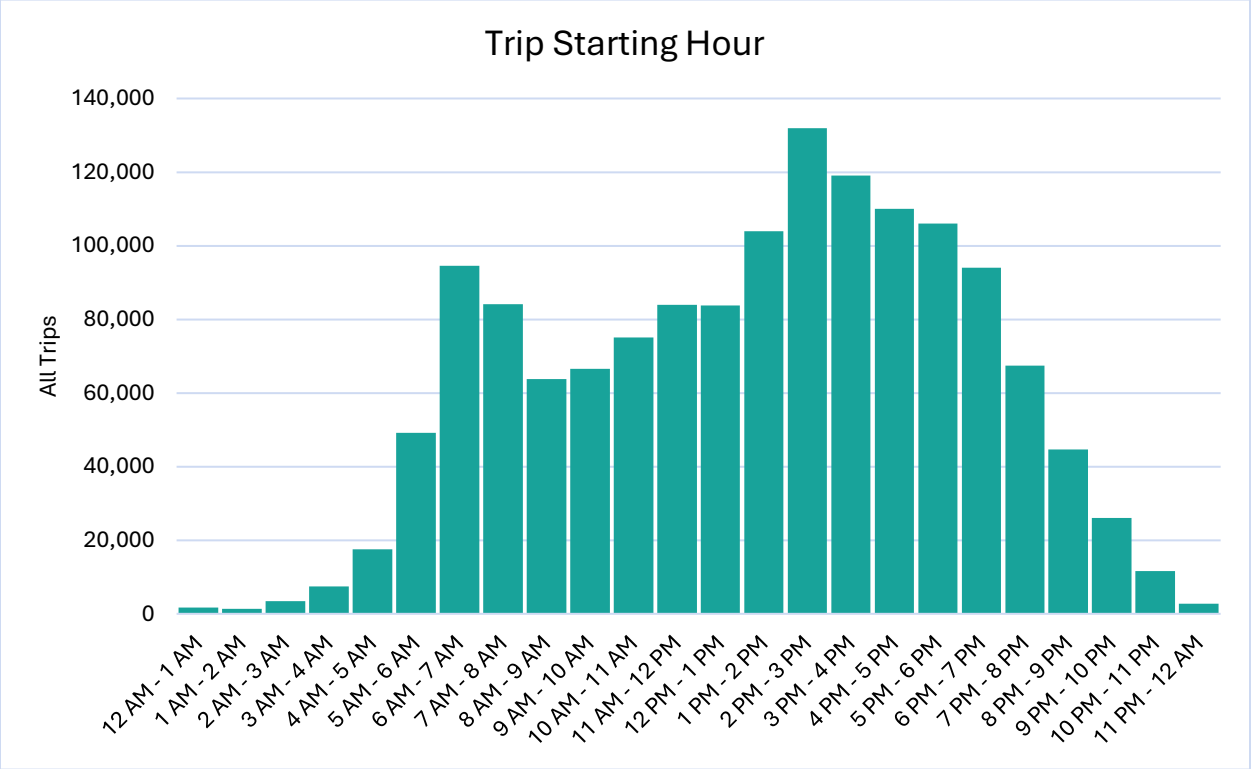


Figure 32 displays trips in Hamilton County by their starting hour. Most trips in the study area occur in the late afternoon and evening, peaking between 2 and 3 p.m. There is also a peak in the morning between 6 and 7 a.m. These peaks correspond to typical work and school commute times. The greater trip activity in the evening, however, might suggest that people are more frequently traveling for purposes outside of work (such as eating and shopping).

Figure 33 shows trips in Hamilton County by their purpose. Aside from trips returning home, the most frequent trip purposes were shopping (18.2%) and work (13.1%). The low proportion of work trips may be explained by the high proportion of people who are unemployed, under 16, or not in the labor force (e.g., retired; see Figure 34).

Figure 33: Trips by Purpose

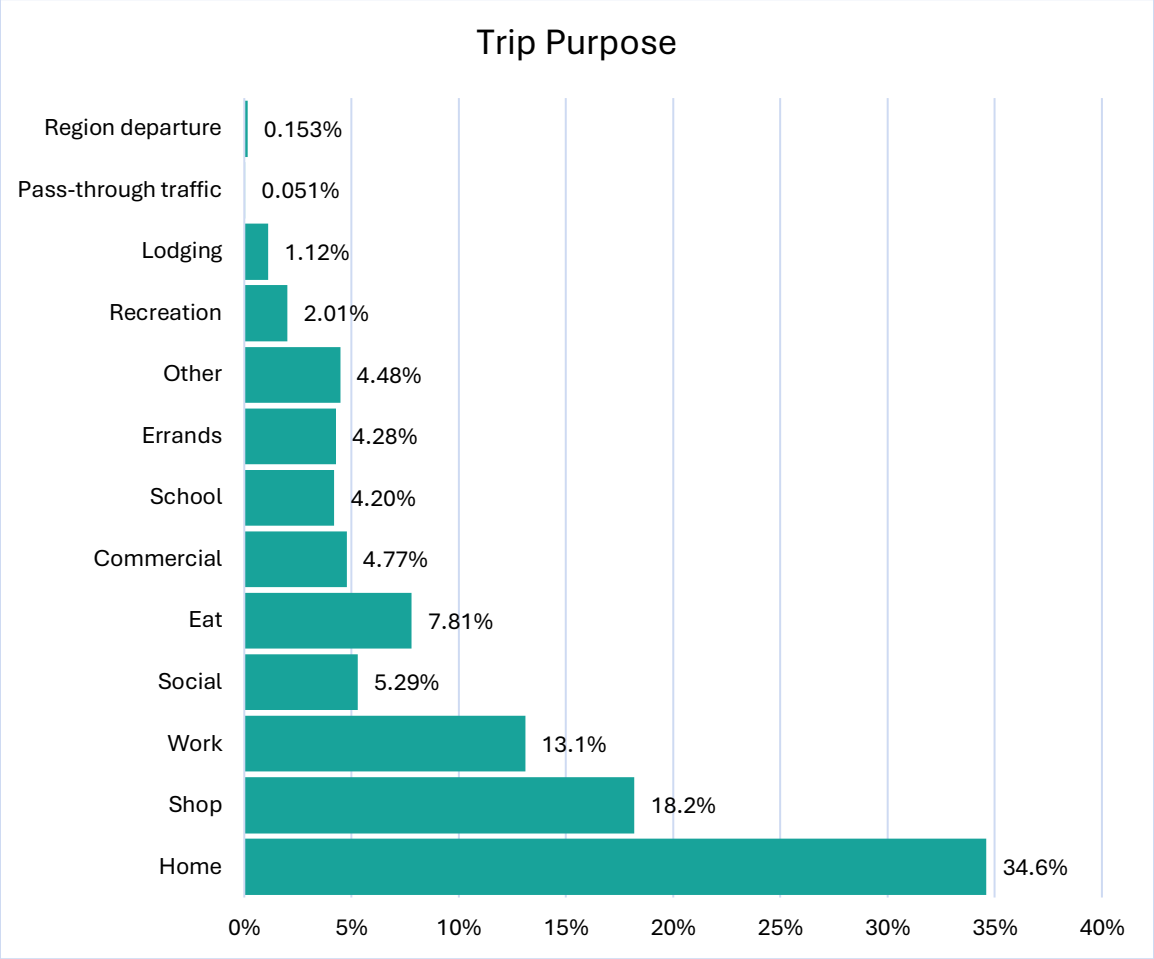
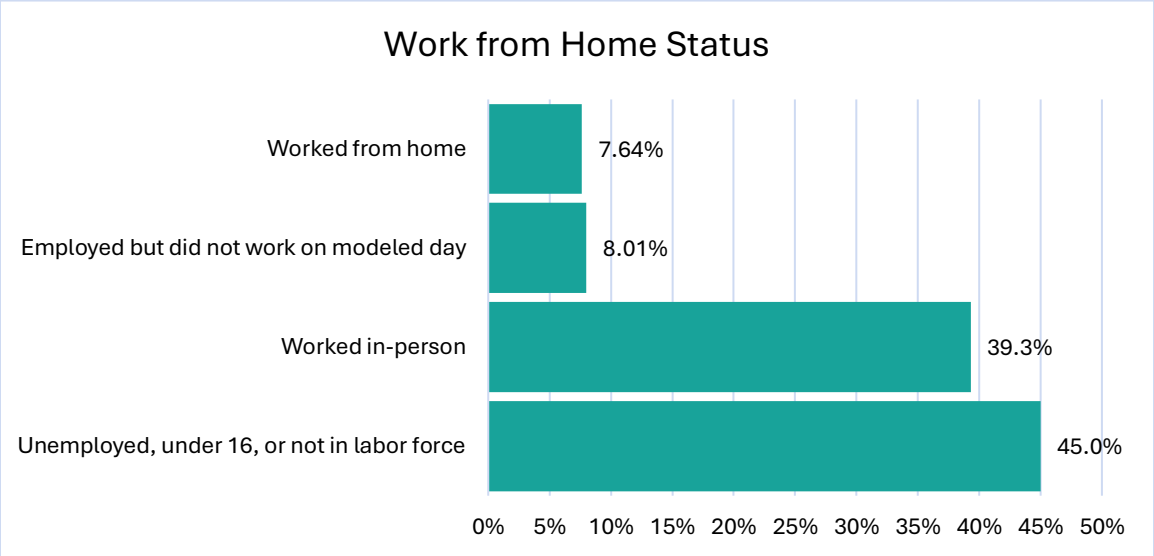


Figure 34: Trip Takers by Work from Home Status



Trip Mode

Figure 35: Trips by Primary Mode

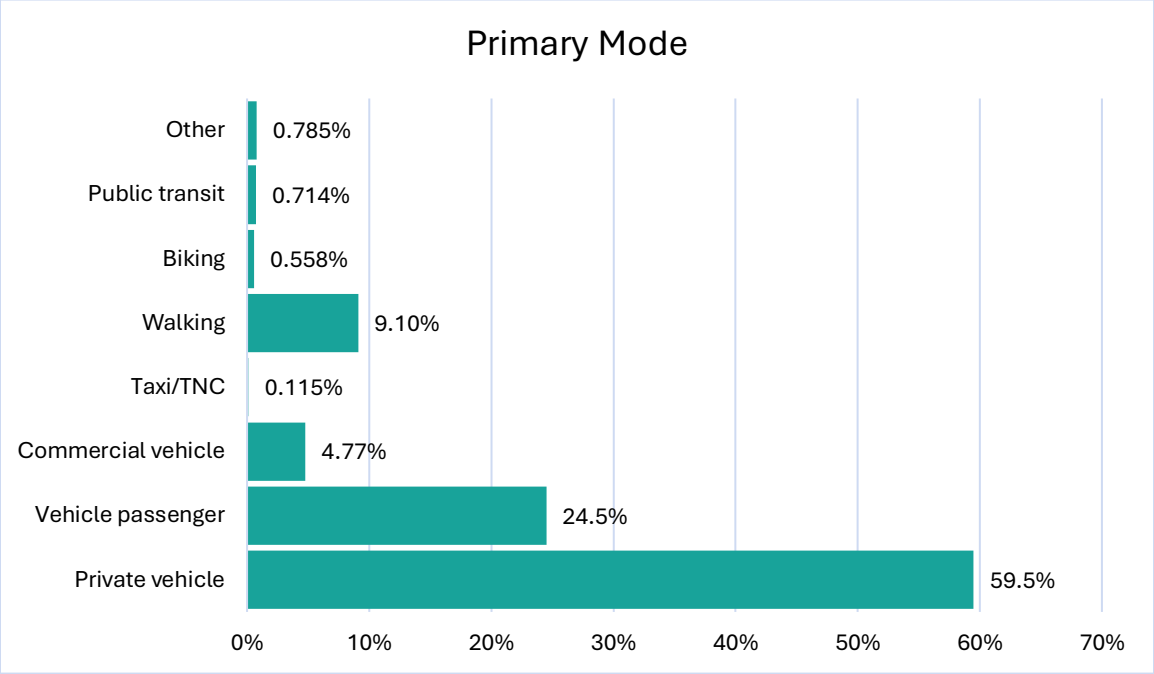


Figure 35 depicts trips in Hamilton County by their primary mode. Nearly 60% of trips in the study area were taken with a private vehicle, and an additional 30% were taken as either a vehicle passenger, in a commercial vehicle (freight), or in a taxi/TNC (e.g., Uber, Lyft). Transit trips made up less than 1% of trips on the modeled day.

Trip Generation Maps

The following trip generation maps (Figure 36 through Figure 39) display the trip generation of quarter-mile hexagons in Hamilton County. As each hexagon is geographically the same size, trips are presented as a count, ranging from low (purple) to medium (orange) to high (yellow) intensity. Each figure represents a different time period and origin/destination trip generation. CARTA's fixed transit routes are shown on each map as well.

Trip activity within Hamilton County is concentrated in several locations, including:

- High-intensity (greater than 10,000 trips) weekday and weekend trip activity is concentrated in downtown Chattanooga, especially near the University of Tennessee at Chattanooga (UTC), and Hamilton Place. There is weekend trip activity greater than 10,000 trips concentrated near Northgate as well.
- Moderate-intensity (between 1,001 and 10,000 trips) weekday and weekend trip activity is concentrated in Highland Park, East Ridge, Cannondale, North Shore, Lookout Valley, and

Mountain Creek. Of these areas, CARTA currently only serves Highland Park and North Shore.

- There are pockets of moderate-intensity trip activity near Ooltewah/Southern Adventist University (SAU), Lakesite, and Soddy-Daisy.
- Along Routes 4, 10C, and 16 are concentrations of high- and moderate-intensity trip activity. Trip activity tends to be higher at the termini of these routes, which are where major commercial destinations are sited. There are also park-and-rides at the termini of these routes.
- Concentrations of high- and moderate-intensity trip activity tend to be near areas with commercial destinations, such as malls or big box stores. These locations tend to be served by CARTA's fixed routes.
- Weekday trip activity is more dispersed than weekend trip activity; higher-intensity weekend trip activity tends to be more concentrated along a few corridors, rather than spreading into neighborhoods.

Figure 36: Weekday Trips by Origin

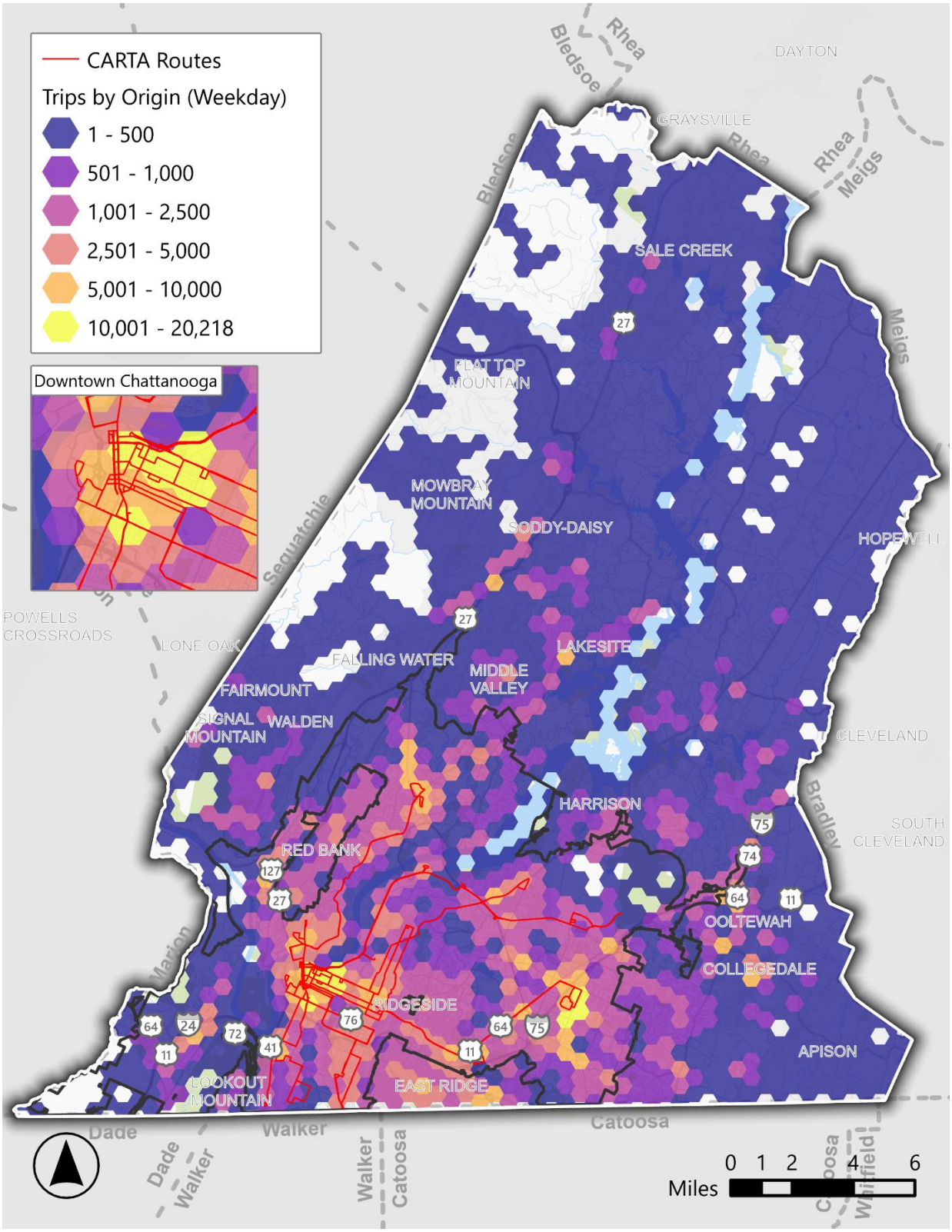


Figure 37: Weekday Trips by Destination

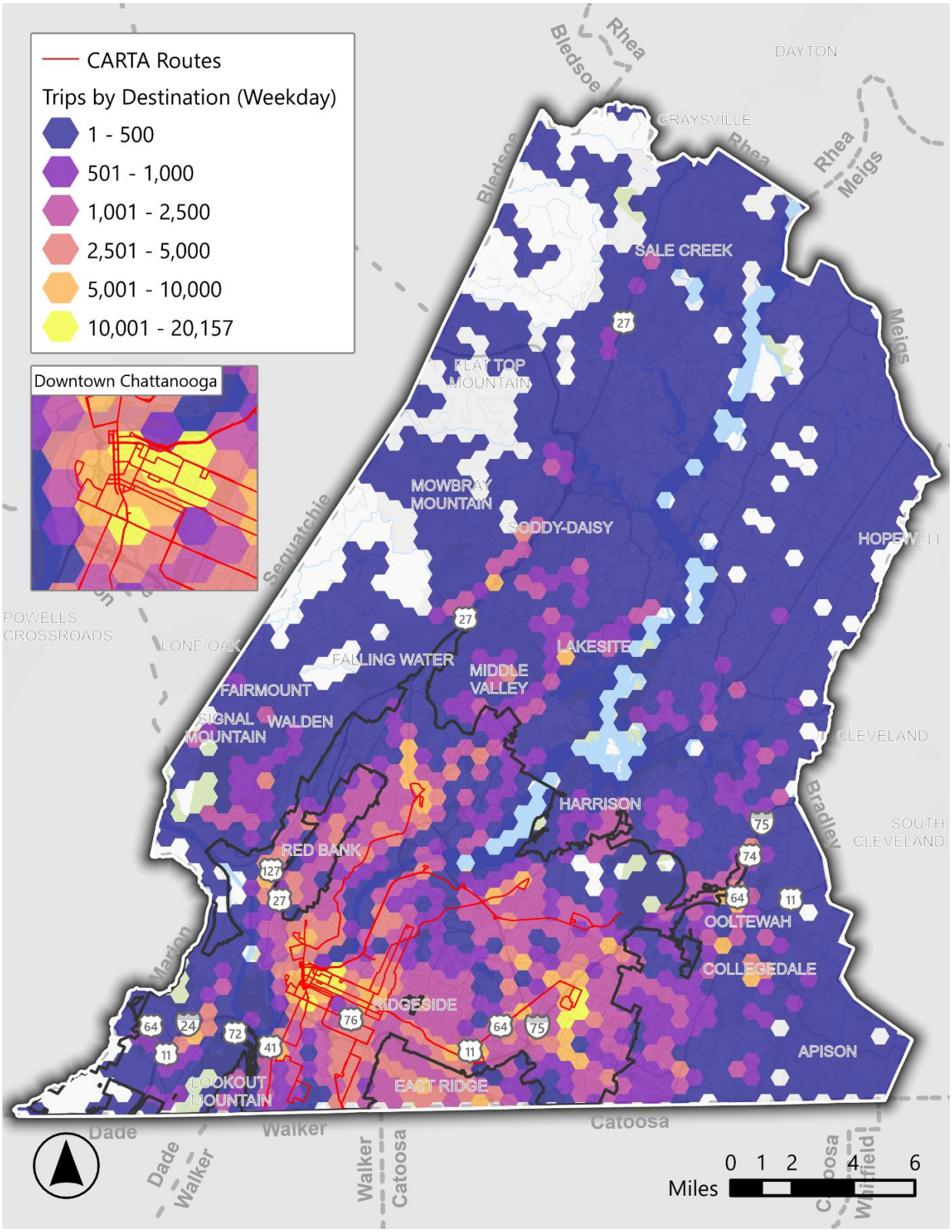


Figure 38: Weekend Trips by Origin

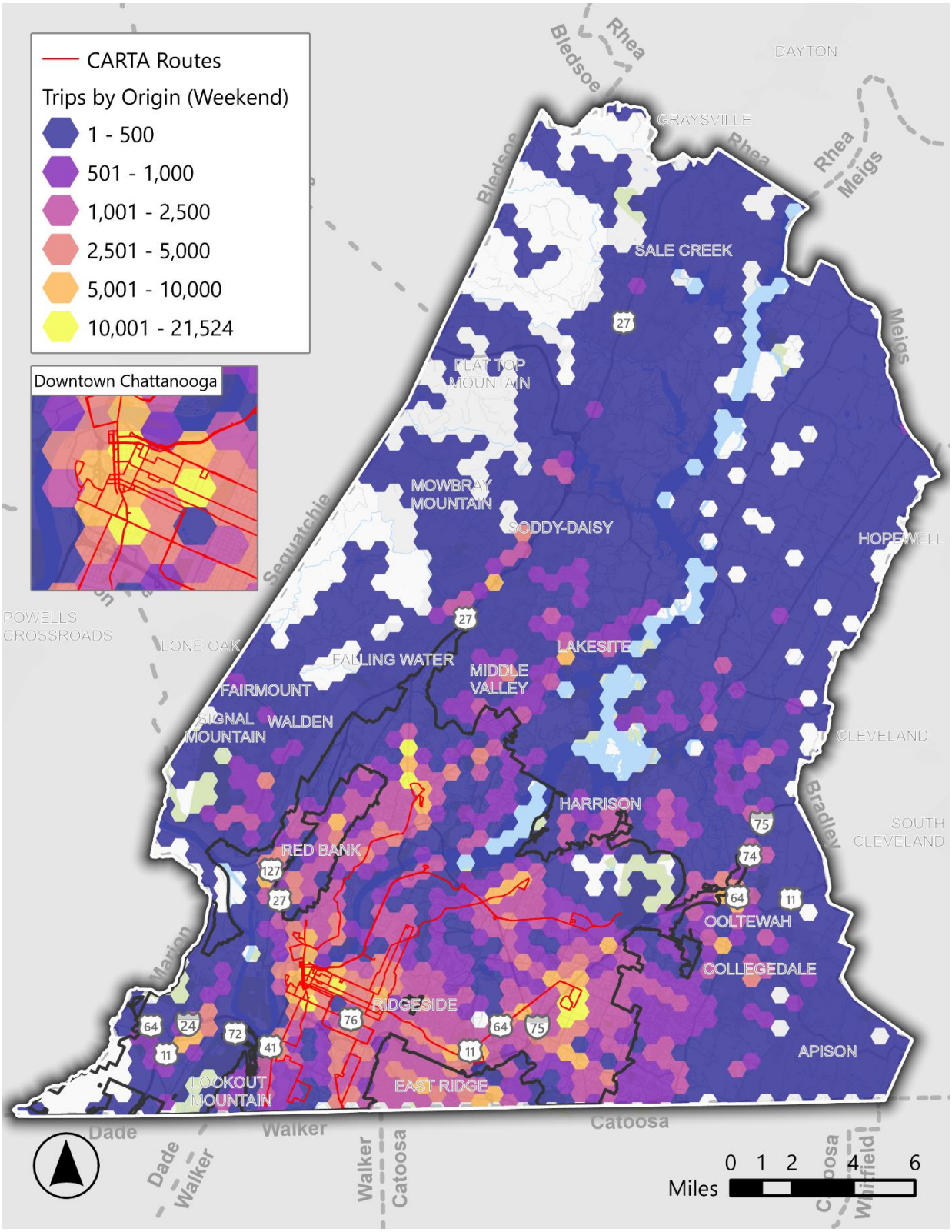
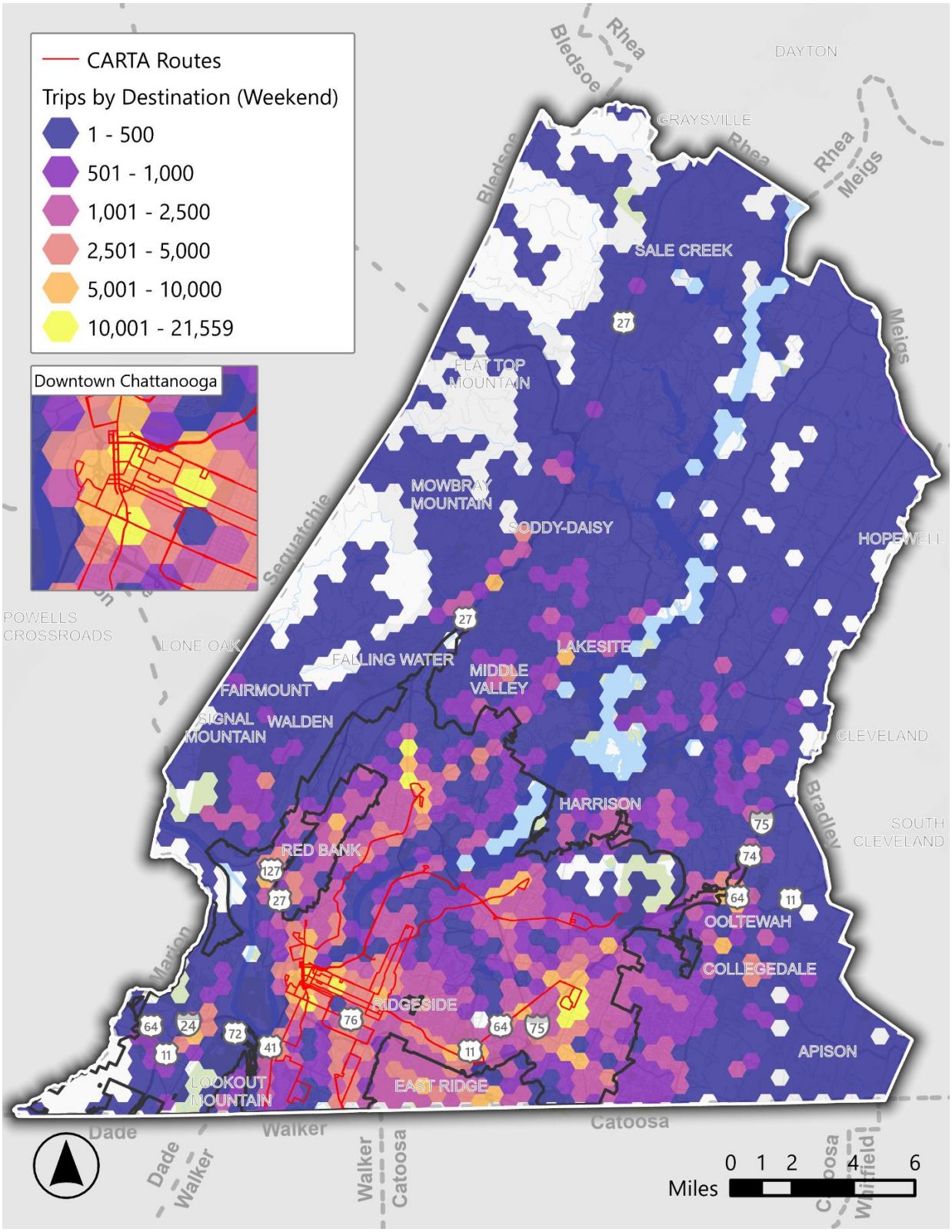


Figure 39: Weekend Trips by Destination



Origin-Destination Maps

This section includes select maps showing where trip flows for all purposes and work purposes exist.[2] Each map has nodes organized by quarter-mile hexagons whose size represents the magnitude of trips starting and ending within each hexagon. The size of the lines between nodes represents the magnitude of travel flow. In the maps below, "major" origin-destination pairs are flows with more than 100 total trips or more than 50 work trips.

General observations about origin-destination pairs in Hamilton County include:

- While many trips end or begin in downtown Chattanooga, including a significant number of trips within downtown Chattanooga, other major origin-destination pairs have emerged:
    - East Ridge and Hamilton Place
    - East Brainerd and Hamilton Place
    - Brainerd Hills and Hamilton Place
    - Hamilton Place and Washington Hills
    - Hamilton Place and Northgate
    - SAU/McKee Foods and Ooltewah
- Of the above major origin-destination pairs, CARTA currently does not have fixed route service between East Ridge and Hamilton Place, East Brainerd and Hamilton Place, Hamilton Place and Washington Hills, Hamilton Place and Northgate, and SAU/McKee Foods and Ooltewah. These trip flows do not correspond with CARTA's existing hub-and-spoke fixed route system, indicating a need for more web-like connections between these locations.
- Many trips are completed within short distances. Shorter trips are concentrated around Hamilton Place, Northgate, Mountain Creek, Lookout Valley, North Shore, SAU, and downtown Chattanooga. CARTA currently does not operate fixed-route service in many of these areas. However, this trend of shorter trips suggests that microtransit/micromobility may serve these areas well.
    - Most of these areas overlap with the potential microtransit zones identified in the study completed by Via.
- There is significant trip flow between downtown Chattanooga and the Hamilton Place area. These trips are likely taken along the US 64 corridor, which is served by Route 4, or I-24/75 due to the geographic barrier of Missionary Ridge.

[2] Weekday travel data was used for these maps and only nodes/lines with a minimum of five trips are shown. Trips that begin or end in Georgia are excluded from this origin-destination analysis, as Georgia is located in a different Replica region than Tennessee.

- There is significant trip flow between downtown Chattanooga and the North Shore area, up into Mountain Creek. Routes 2 and 16 currently serve the North Shore area, but do not extend northwest to Mountain Creek.
- There is some concentration of trip flow along US 27 near Soddy-Daisy. This area has several big box stores, businesses, and other commercial activity generators.
- Lakesite, particularly near the intersection of Daisy Dallas Road and Hixson Pike, is the origin or destination for many trips to/from the surrounding neighborhoods.
- Work trip flows are mostly between downtown Chattanooga, especially UTC and the Riverfront, and outlying neighborhoods such as North Shore, Hamilton Place, and East Ridge. However, there are some work trips flows outside of downtown:
    - Hamilton Place and Shepherd
    - SAU/McKee Foods and Ooltewah
    - UTC and SAU and their adjacent neighborhoods
    - Short trips within the Hamilton Place/Cannondale area
    - Short trips within Lookout Valley area
- Of the above major origin-destination pairs for work trips, CARTA currently does not serve Hamilton Place and Shepherd, SAU/McKee Foods and Ooltewah, Hamilton Place/Cannondale, and Lookout Valley.

Figure 40: Origin-Destination Pairs for All Trip Purposes

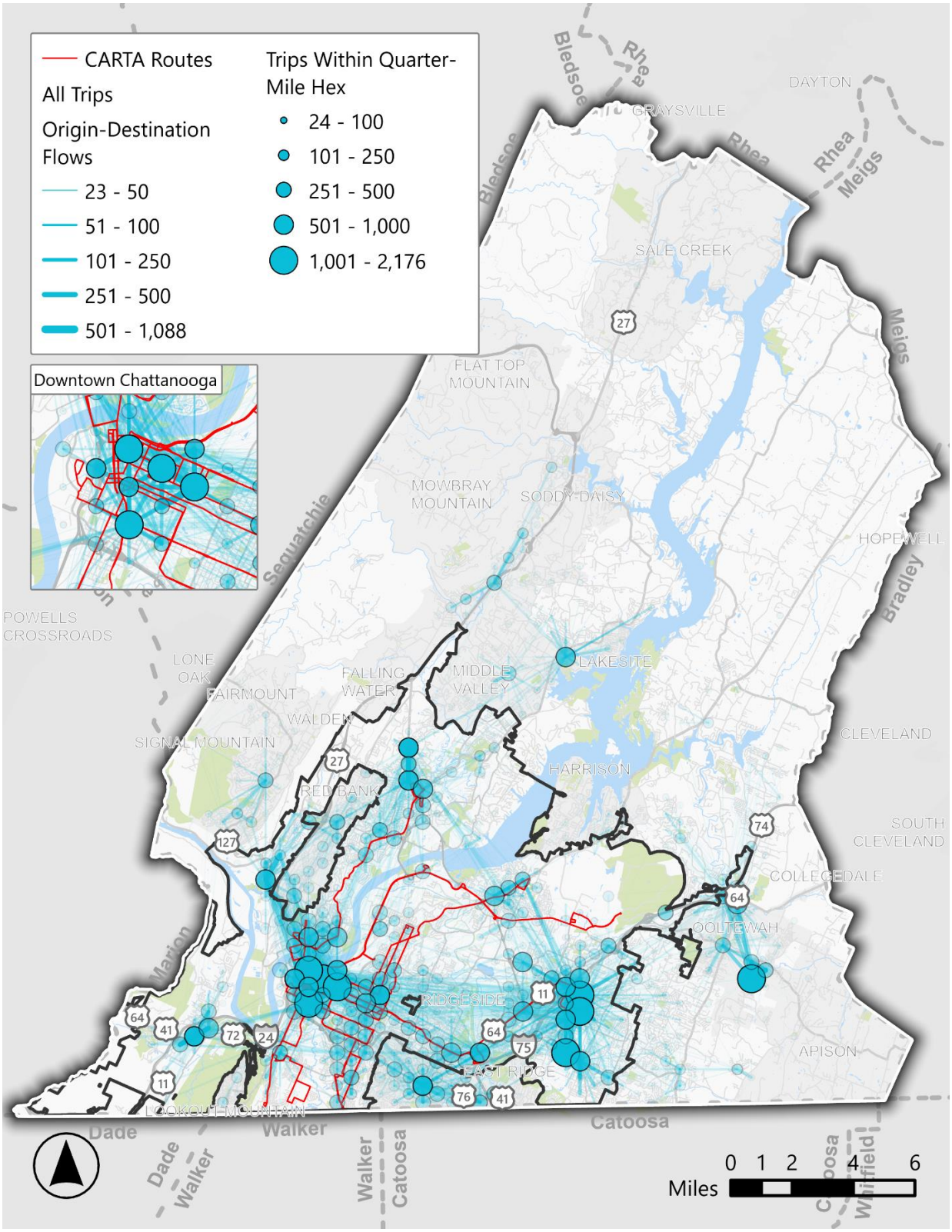


Figure 41: Major Origin-Destination Pairs with Potential New Connections Highlighted

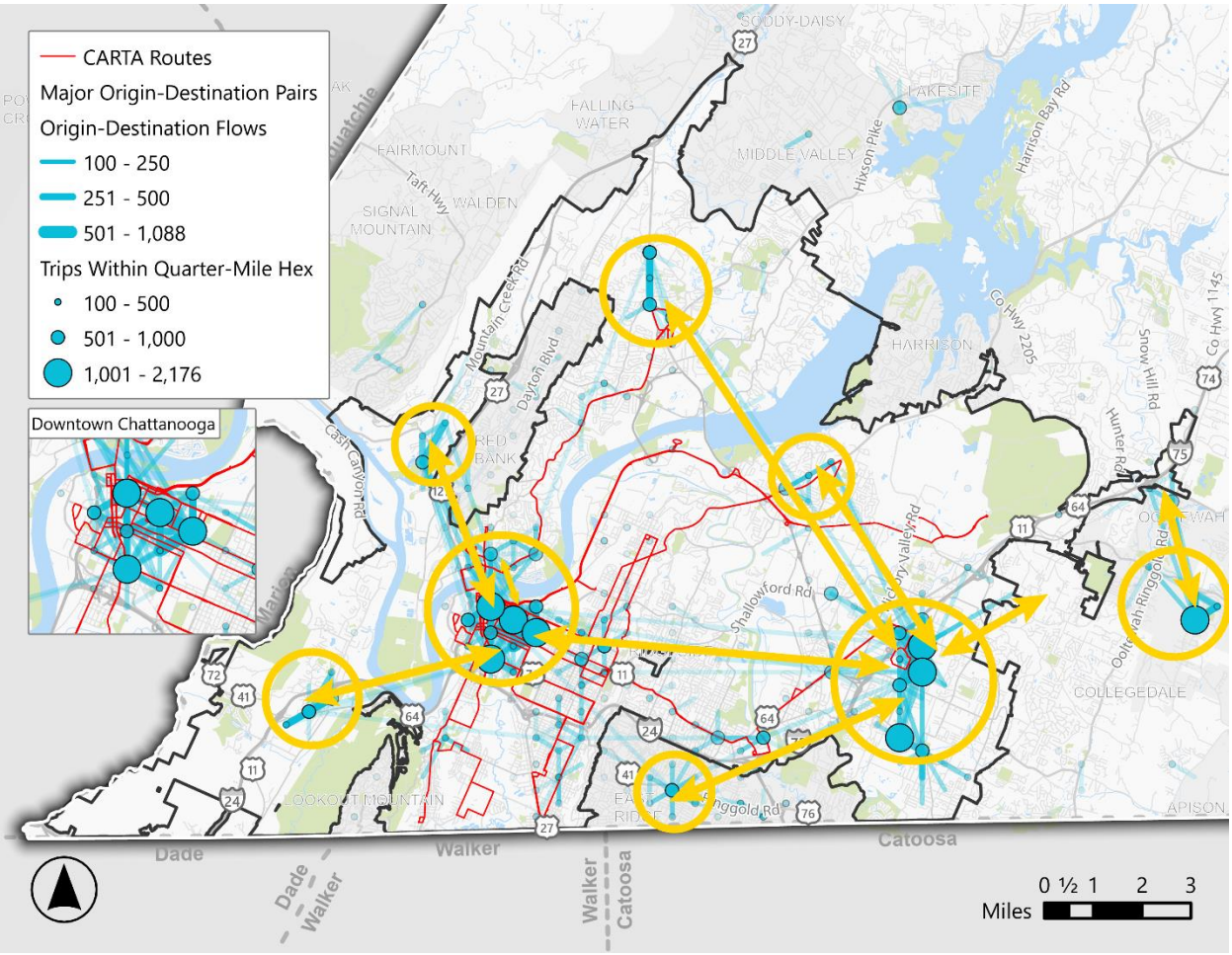


Figure 42: Origin-Destination Pairs for Work Trips

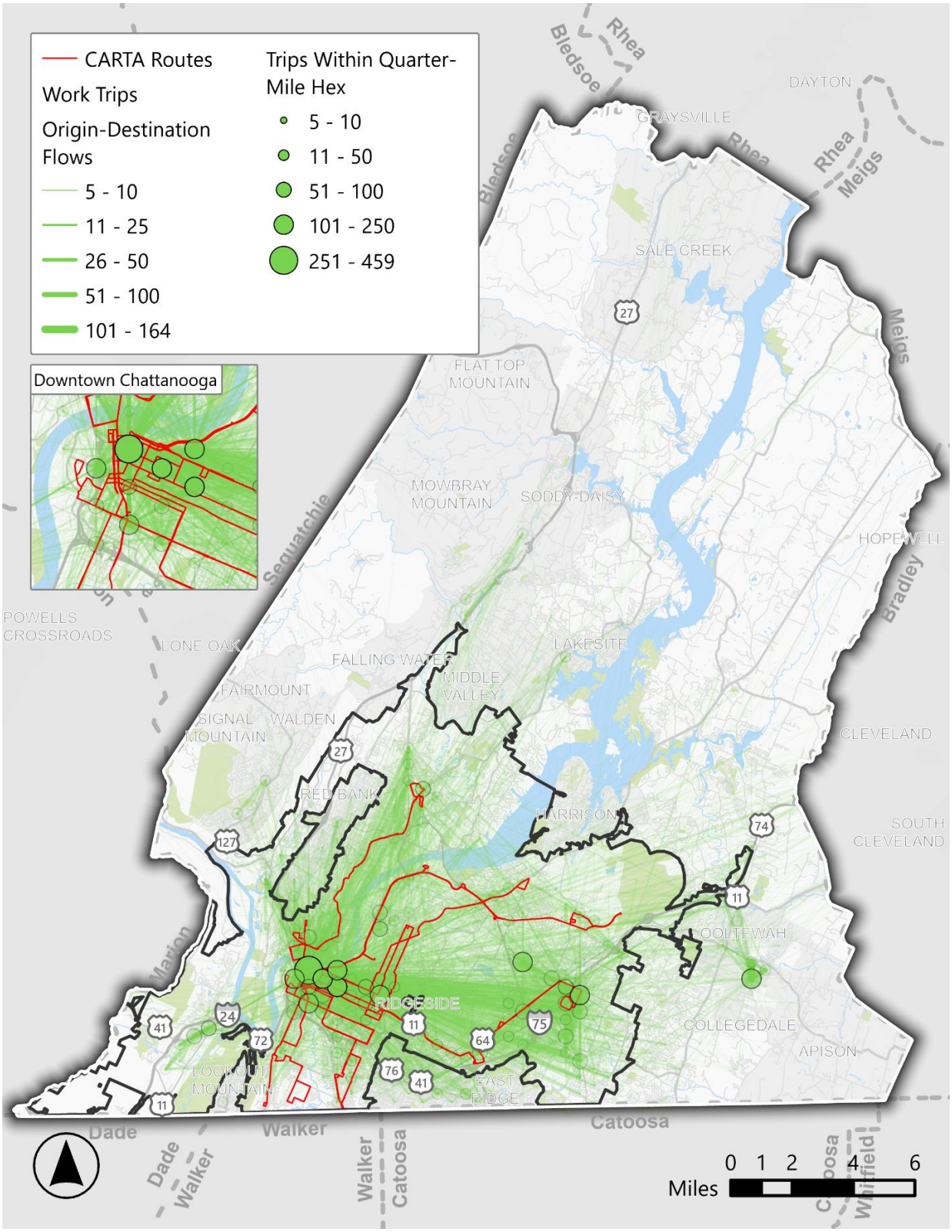
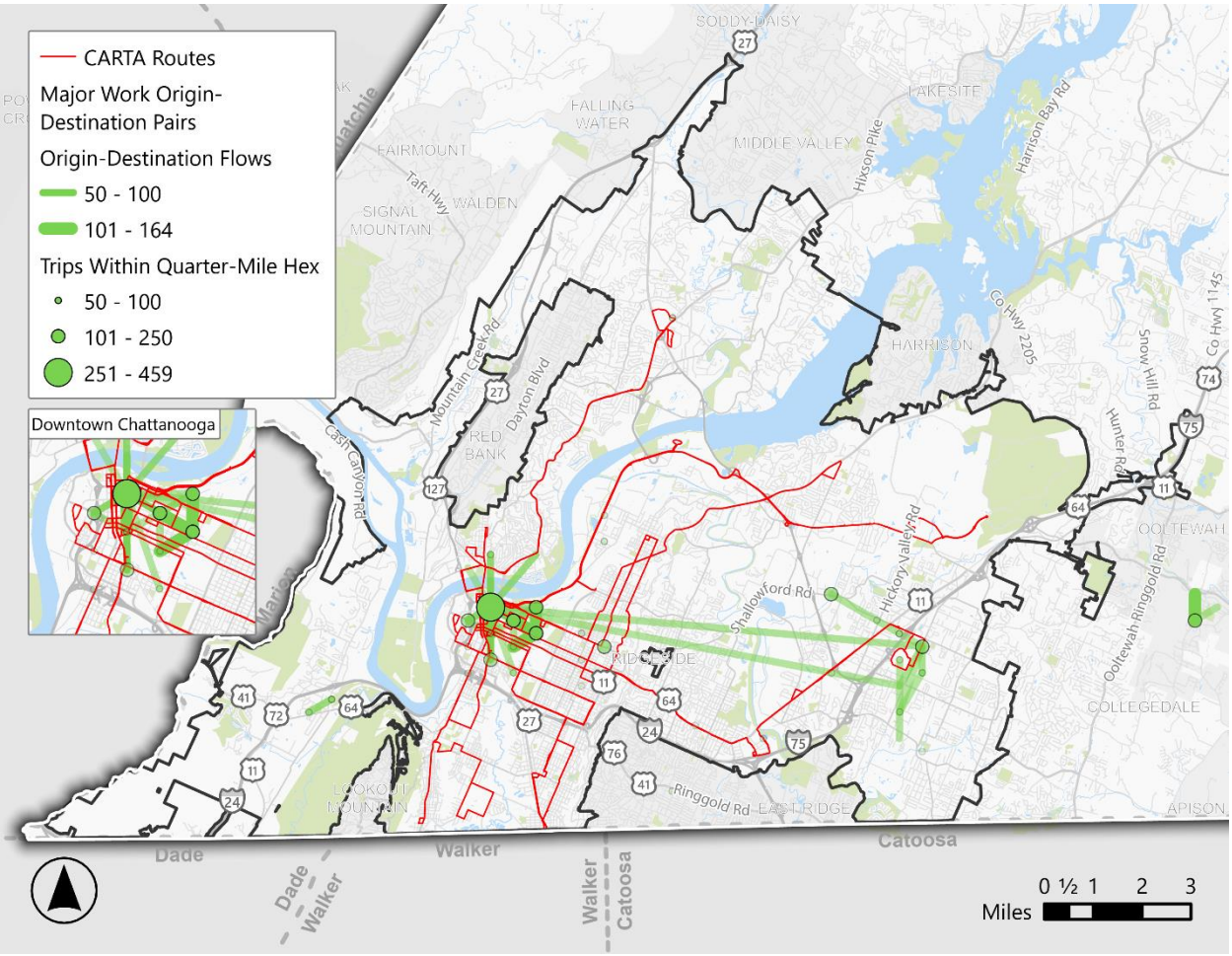


Figure 43: Major Origin-Destination Pairs for Work Trips



Market Analysis Conclusion

Key takeaways from the Transit Market Analysis are summarized below.

Population and Transit Propensity

- Approximately 50% of the population residing in the areas served by CARTA belong to minority groups. This indicates a significant level of diversity within these communities.
- More than half of the households in these areas lack access to a personal vehicle, highlighting their reliance on alternative modes of transportation. This suggests a high demand for reliable and accessible public transportation options.

- The downtown, North Shore, and Brainerd areas exhibit the highest population and employment densities. These locations likely serve as key hubs for economic activity and transportation needs.
- Low-income individuals are dispersed throughout the service area, rather than being concentrated in a specific locality. This implies that there is a widespread need for affordable transportation options across different neighborhoods.
- The dependency on transit based on age appears to be concentrated in the Brainerd and Ashwood areas. This suggests that these communities may have a higher proportion of residents who rely on public transportation due to age-related factors.
- Block groups around Brainerd and East Lake demonstrate the highest transit propensity scoring. This indicates a greater likelihood of residents in these areas utilizing public transportation services.
- Block groups east of Brainerd, as well as the Woodmore and Hamilton Place areas, show moderate to high transit propensity but do not currently have direct CARTA routes. This suggests a potential opportunity for CARTA to expand its services to better serve these communities with higher transit demand.

Future Land Use and Development

- Most areas of future transit supportive land uses are currently served by CARTA's fixed routes. However, there are some areas with future transit supportive land that are not currently served and could benefit from transit connections, including Lookout Valley, North Shore to Mountain Creek, Red Bank, East Ridge, Mark Twain, Cannondale/East Brainerd, and Tyner.
- Future job allocations tend to be more concentrated along major corridors, such as Brainerd Road (US 64), Bonny Oaks Drive, Gunbarrel Road, Highway 153, Highway 58, and Dodds Avenue. Many of these corridors are currently served by CARTA's fixed routes.

Commute Patterns and Trip Flow

- High-intensity trip activity is concentrated in downtown Chattanooga and Hamilton Place, and there is a high degree of trip flow between these two areas. These trips are likely taken along the US 64 corridor, which is served by Route 4, or I-24/75 due to the geographic barrier of Missionary Ridge.
- Other areas with notable trip activity and flow include North Shore, Northgate, Washington Hills, Mountain Creek, Lookout Valley, East Ridge, and Soddy-Daisy. Trip activity in these areas is typically concentrated around commercial nodes.
- Trip generation patterns are relatively consistent between weekdays and weekends. Weekend trip activity tends to be slightly more concentrated along certain corridors than weekday activity, which is more dispersed.

- There is significant trip activity along and at the termini of Routes 4, 10C, and 16. These routes terminate in areas with high commercial activity, and some have park-and-ride facilities.
    - Notably, there is high trip activity extending about one mile north from the Route 16 terminus at Northgate along Highway 153.
- Many trips are completed within short distances, particularly near Hamilton Place, Northgate, Mountain Creek, Lookout Valley, North Shore, SAU, and downtown Chattanooga. CARTA currently does not operate fixed-route service in many of these areas. However, this trend of shorter trips suggests that microtransit/micromobility may serve these areas well. Via's On-Demand Transit Study identified potential microtransit zones that overlap with most of these areas.
  CARTA currently does not have fixed route service between some major origin-destination pairs: East Ridge and Hamilton Place, East Brainerd and Hamilton Place, Hamilton Place and Washington Hills, and SAU/McKee Foods and Ooltewah. These trip flows do not correspond with CARTA's existing hub-and-spoke fixed route system, indicating a need for more web-like connections between these locations.
- According to trip data, potential transit markets that are not currently served by CARTA's fixed routes include: Lookout Valley, Shepherd, East Ridge, and Cannondale.