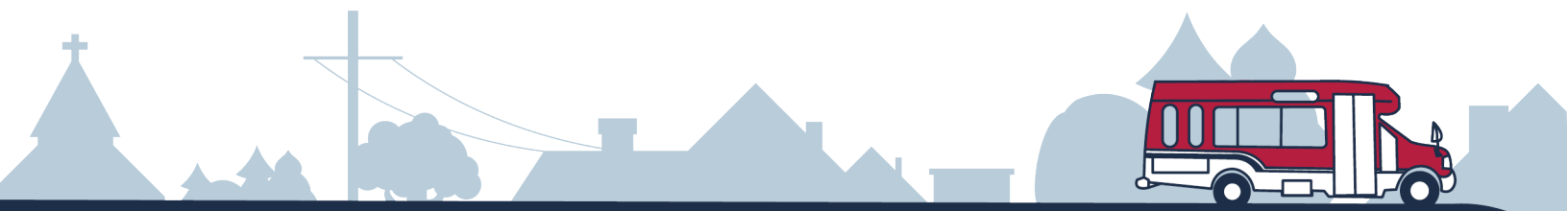
FY2025 – FY 2034

Radford Transit

Transit Strategic Plan

Final – May 2024



Transit Strategic Plan Contents

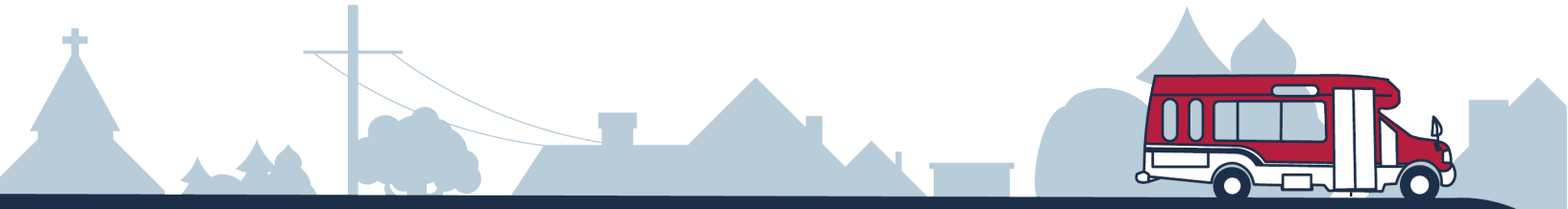
FY2025 – FY 2034

Radford Transit

Transit Strategic Plan

Chapter 1

Final – May 2024



Contents

1 System Overview and Strategic Vision

1.1 System Overview

This chapter provides a high-level overview of Radford Transit and the agency's strategic priorities.

1.1.1 Services Provided and Areas Served

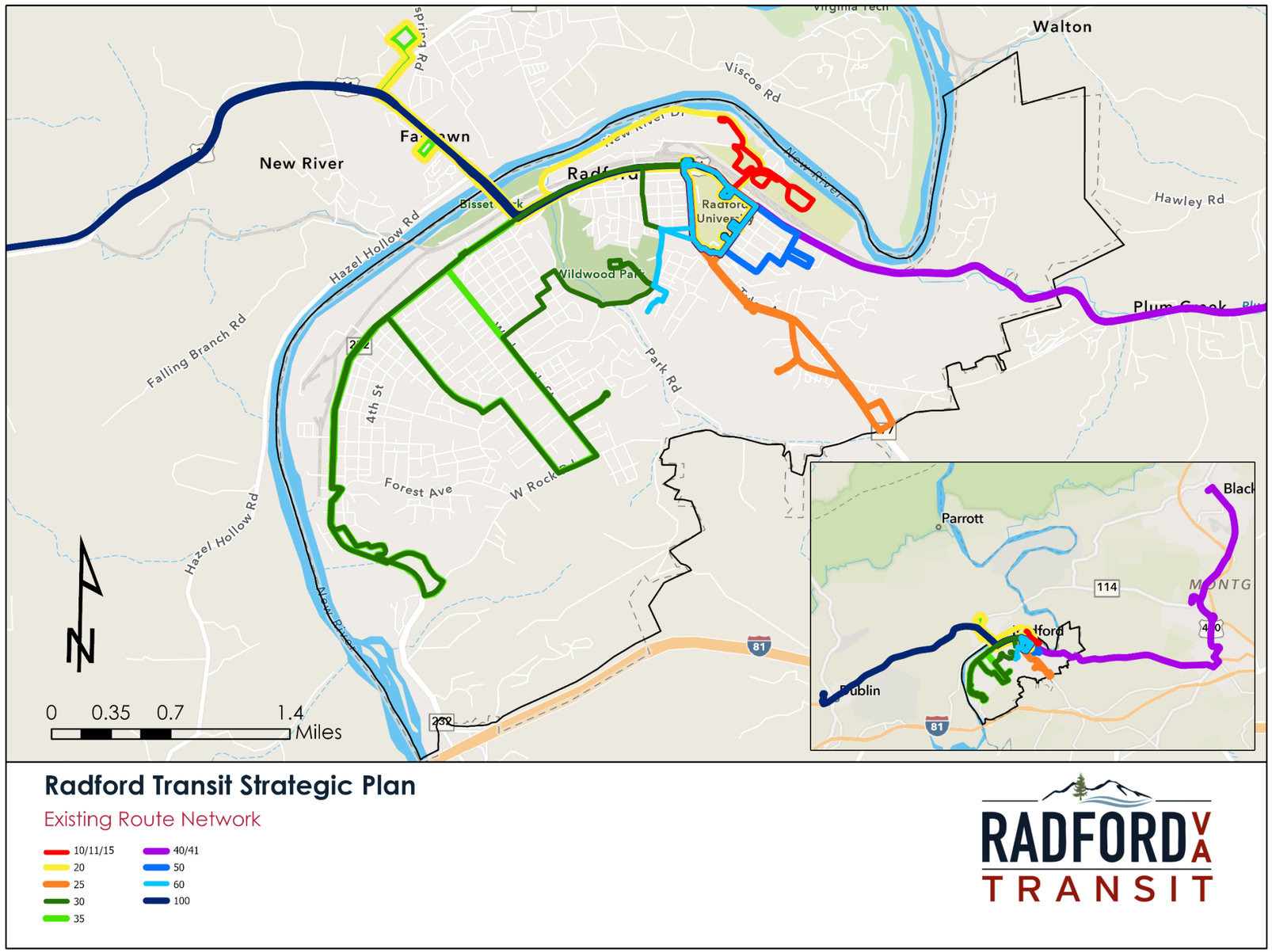
Radford Transit provides fixed-route transit service to a ten square-mile area within the New River Valley region. Radford Transit runs service within the City of Radford and into the neighboring jurisdictions of Pulaski County, Montgomery County, the Town of Blacksburg, and the Town of Christiansburg. Radford Transit operates a total of 12 fixed routes. **Table 1-1** lists Radford Transit's fixed-route service. Deviations are available up to three fourths (¾) of a mile of a stop and must be requested 24 hours in advance.

Radford Transit provides service year-round, but service is reduced during the months when Radford University is not in session. The reduced service, referred to as a "City Service," occurs from May through August and during Radford University's winter break.

Table 1-1: Existing Radford Transit Service

Route	Route Name	Area Served	Major Origin-Destination	Days of Operation	Span	Frequency
10	University Express	Regular Service	Radford University – Radford University Sports District – The Hub	Monday-Friday; Sunday	7:10 a.m.—10:40 p.m. (M-F) 5:40 p.m.—11:40 p.m. (Sun)	30 minutes
11	New River Circulator	Regular Service	Radford University – Radford University Sports District – The Hub	Monday-Friday	7:25 a.m.—6:45 p.m.	30 minutes
15	Highlander Circular (City Only) Or University Express	Regular Service; City Service	Radford University – Radford University Sports District – The Hub	Monday-Saturday	7:10 a.m.—7:50 p.m. (M-F, City Only) 10:10 a.m.—7:50 p.m. (Sat, City Only) 10:30 p.m.—2:40 p.m. (Fri) 10:10 a.m.—2:40 p.m. (Sat)	30 minutes
20	New River Rapid	Regular Service; City Service	Radford University – The Hub – Fairlawn Walmart	Monday-Saturday	7:00 a.m.—7:30 p.m. (City Only) 7:00 a.m.—9:30 p.m.	60 minutes
25	New River Rapid	Regular Service; City Service	The Hub – Ridgewood	Monday-Saturday	7:15 a.m.—7:45 p.m. (M-F) 10:30 a.m.—7:45 p.m. (Sat)	30 minutes
30	Cross City	Regular Service; City Service	The Hub – Rec Center – Jeffries Drive	Monday-Saturday	6:50 a.m.—7:50 p.m. (M-F) 9:50 a.m.—7:50 p.m. (Sat)	60 minutes
35	Cross City	Regular Service; City Service	Riverview Park – City Hall - Fairlawn Walmart	Monday-Saturday	7:05 a.m.—8:05 p.m. (M-F) 10:05 a.m.—8:05 p.m. (Sat)	60 minutes
40	NRV Connect	Regular Service; City Service	The Hub – NRV Mall – Virginia Tech Squires Center	Monday-Saturday	6:50 a.m.—8:50 p.m. (M-F) 10:50 a.m.—9:50 p.m. (Sat) 8:50 p.m.—12:50 p.m. (Fri-Sat Late Night) 6:50 a.m.—6:50 p.m. (M-F, City Only) 10:50 a.m.—6:50 p.m. (Sat, City Only)	120 minutes
41	NRV Connect	Regular Service; City Service	The Hub – NRV Mall – Virginia Tech Squires Center	Monday-Saturday	7:50 a.m.—9:50 p.m. (M-F) 9:50 a.m.—8:50 p.m. (Sat) 8:50 p.m.—1:50 p.m. (Fri-Sat Late Night) 6:50 a.m.—6:50 p.m. (M-F, City Only) 10:50 a.m.—6:50 p.m. (Sat, City Only)	120 minutes
50	Highlander Circular	Regular Service	Radford University – The Hub – Burlington Lot	Monday-Friday	7:00 a.m.—10:40 p.m.	20 minutes
60	South Beech Express	Regular Service	The Hub – Copper Beech – Fairfax Station	Monday-Friday	7:20 a.m.—10:50 p.m.	30 minutes
100	NRCC Connector	Regular Service	Radford University – The Hub – New River Community College	Monday-Friday	8:15 a.m.—5:30 p.m.	60 minutes

Figure 1-1: Map of Radford Transit's Routes



1.1.2 Current and Recent Radford Transit Initiatives

Service Partnerships

Radford University

Radford University is a founding stakeholder in the creation of Radford Transit, and the University jointly administers Radford Transit with the City of Radford. Radford University pays for the routes which primarily service the University and locations primarily visited by university students and staff. Additionally, prior to the implementation of system-wide zero fare in 2020, Radford University students, faculty, and staff could ride Radford Transit for free with a valid university ID card.

Radford Transit provides a connection between the City of Radford and the New River Community College (NRCC) Dublin campus. This transportation is a part of the NRCC/Radford University Bridge Program, which is an opportunity offered to select Radford University freshman applicants who do not meet Radford University's standard admission criteria. Participating students take courses at NRCC Dublin for their first year, while living, dining, and engaging in a robust student life at Radford University. This connection is fully funded by Radford University.

Service Initiatives

Fare-free Service

Radford Transit suspended fare payments on all routes in response to the Covid-19 pandemic. As of Spring 2023, fare payments remained suspended, and Radford Transit plans on making fare-free service permanent. Before the suspension of fares, the general public fare was $1.00 while adults 65 years and older; persons with disabilities; Medicare card holders; children 12 years and younger; and Radford University students, faculty, and staff all could ride Radford Transit for free.

New Operations and Maintenance Facility

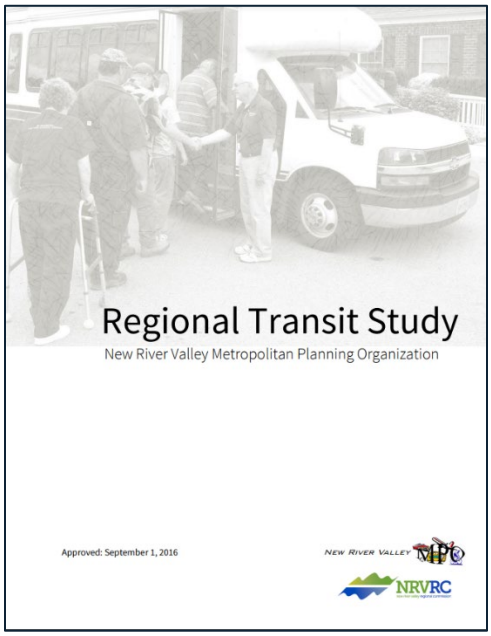
Radford Transit is currently in the process of planning and constructing a new operations and maintenance facility. Radford Transit's fleet facility was formerly on Corporate Drive in the Southwestern corner of the city limits, co-located with the then-operator's facility (New River Valley Community Services). As a result of the change in operators, the fleet now operates out of a temporary location at 1422 W Main Street, Radford, Virginia 24141.

The location of the new facility has not yet been determined, but the potential locations under consideration are closer to the center of the city, reducing non-revenue service miles traveled. The new facility also will allow for Radford Transit to increase their capacity as well as provide space for alternative fueling infrastructure. A facility study is underway, with anticipated activities resulting in an estimated completion of the new facility between 2025-2028.

Transit Ridership Incentive Program Regional Routes Grant

Radford Transit received a FY23 Transit Ridership Incentive Program (TRIP) Regional Connectivity grant from the Virginia Department of Rail and Public Transportation (DRPT). The TRIP grant will provide $653,963 over three years to increase service of Radford Transit's Routes 40 and 41, which connect Radford to Christiansburg and Blacksburg. Routes 40 and 41 will have increased service hours, more frequent service, and run year-round.

Service Coordination



The New River Valley Regional Transit Coordinating Council (RTCC) enables dialog among the region's transit providers and provides a stronger multi-jurisdictional/multi-system perspective. A Regional Transit Study completed in 2016 recommended enhanced coordination at high-volume and overlapping stops which are served by numerous routes. Many overlap areas were identified in the vicinity of Christiansburg and Blacksburg where Radford Transit (Routes 40 and 41) and Blacksburg Transit (BT) service overlap. Specific areas included the New River Valley (NRV) Mall, Aquatics Center (Christiansburg), Squires Student Center (Virginia Tech), and Blacksburg Municipal Building. Strategies were identified to better align schedules for easy transfers, co-brand the stops, and provide some passenger amenities. A listing of all key providers that interface with Radford Transit is included below and shown in **Figure 1-2.**

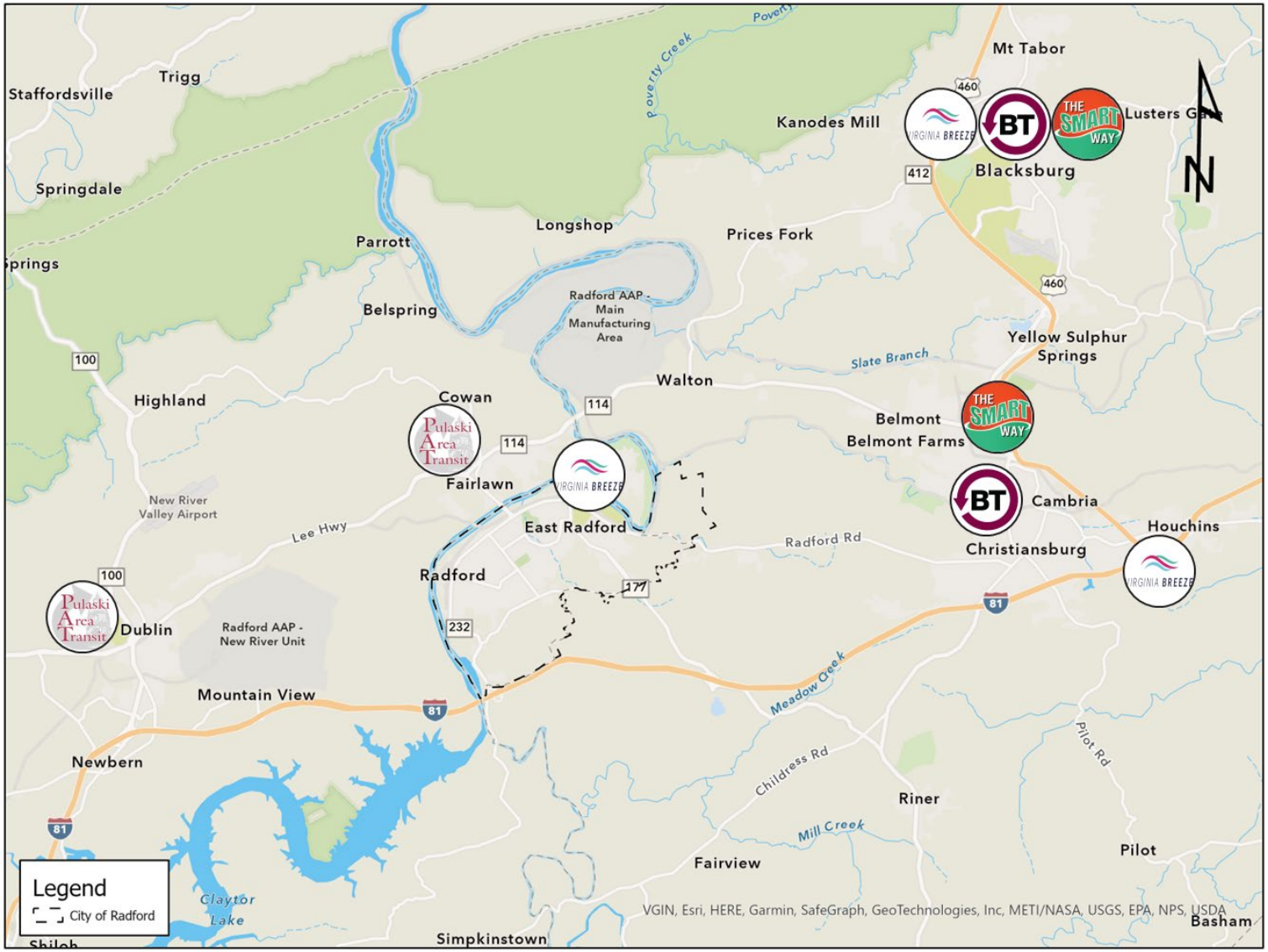
Blacksburg Transit (BT)

BT serves the towns of Blacksburg and Christiansburg. While BT primarily connects major residential areas to the Virginia Tech campus and commercial areas, the system also provides connecting service to Christiansburg as well. Radford Transit Routes 40 and 41 connect with BT in Christiansburg at Regal Cinemas and at the New River Valley Mall. Radford Transit also connects with BT in Blacksburg at Virginia Tech's Squires Center.

Virginia Breeze

Virginia Breeze provides intercity bus service throughout Virginia. The service is funded by the Virginia Department of Rail and Public Transit and operated by Megabus. The City of Radford is directly served by the Highlands Rhythm line which runs from Bristol to Washington, D.C. The Highlands Rhythm stops at Radford University's parking lot JJ and operates one northbound and one southbound trip daily. Virginia Breeze's Valley Flyer line also operates near the City of Radford and runs buses from Blacksburg to Washington D.C. While the Valley Flyer line does not have a stop in Radford, Valley Flyer's southern terminus is at Virginia Tech's Squires Student Center which Radford Transit's Route 41 directly serves. The Valley Flyer also runs one northbound and one southbound bus daily.

Figure 1-2: Radford Transit Connections to Other Transit Services



Pulaski Area Transit (PAT)

PAT provides service connecting Pulaski, Dublin, and Fairlawn with one extended run to the New River Mall in Christiansburg. Radford Transit Route 20 meets this service at the Kroger and Walmart in Fairlawn. Radford Transit NRCC Connector Route also meets PAT at the New River Valley Community College in Dublin.

PAT service operates on Monday–Friday to the Fairlawn location with a total of three daily round trips. In addition to the communities served, this connection also provides Radford Transit riders access to the New River Community College in Dublin. PAT fares for this service are $2.00.

Smart Way

Smart Way Bus (operated by Valley Metro under the Greater Roanoke Transit Company, GRTC) provides commuter bus service between Roanoke and the New River Valley. Smart Way Bus's southern terminus is Virginia Tech's Squires Student Center, and the northern terminus is Roanoke's Third Street Station. The bus also connects riders with the Roanoke-Blacksburg Regional Airport and Roanoke's Amtrak Station. While Smart Way Bus does not have a stop in Radford, Smart Way's southern terminus is at Virginia Tech's Squires Student Center which Radford Transit's Route 41 directly serves. Smart Way also runs one northbound and one southbound bus daily.

AMTRAK

AMTRAK is a national passenger rail service offering multiple routes across the country. The Commonwealth of Virginia announced the construction of a station in Christiansburg with the intention of servicing the station through the extension of the Northeast Regional route. The Northeast Regional currently operates between Roanoke, Virginia and Boston, Massachusetts or Springfield, Massachusetts. The final location for the station has not been announced as of Spring 2024, but the station will likely be in the vicinity of the Christiansburg mall. This area is currently served by Radford Transit Routes 40 and 41.

1.2 Strategic Vision

Radford Transit's strategic vision was developed based on input from City of Radford staff, Radford University staff, and with consideration for input from stakeholders including community members, human and social services providers, strategic partners, and community representatives. Visioning activities were conducted in Spring 2023 and resulted in the goals documented in the section below.

Key themes that were discussed as part of the visioning process included **the need to provide service coverage** to the majority of the Radford community (both the city and university riders), but a **focus on frequency for university riders**.

As with previously described initiatives, the community values **service throughout the week, particularly on Saturdays**. This includes a desire for transit service that covers non-traditional hours such as early morning and late evening periods for service industry or other shift-based occupations.

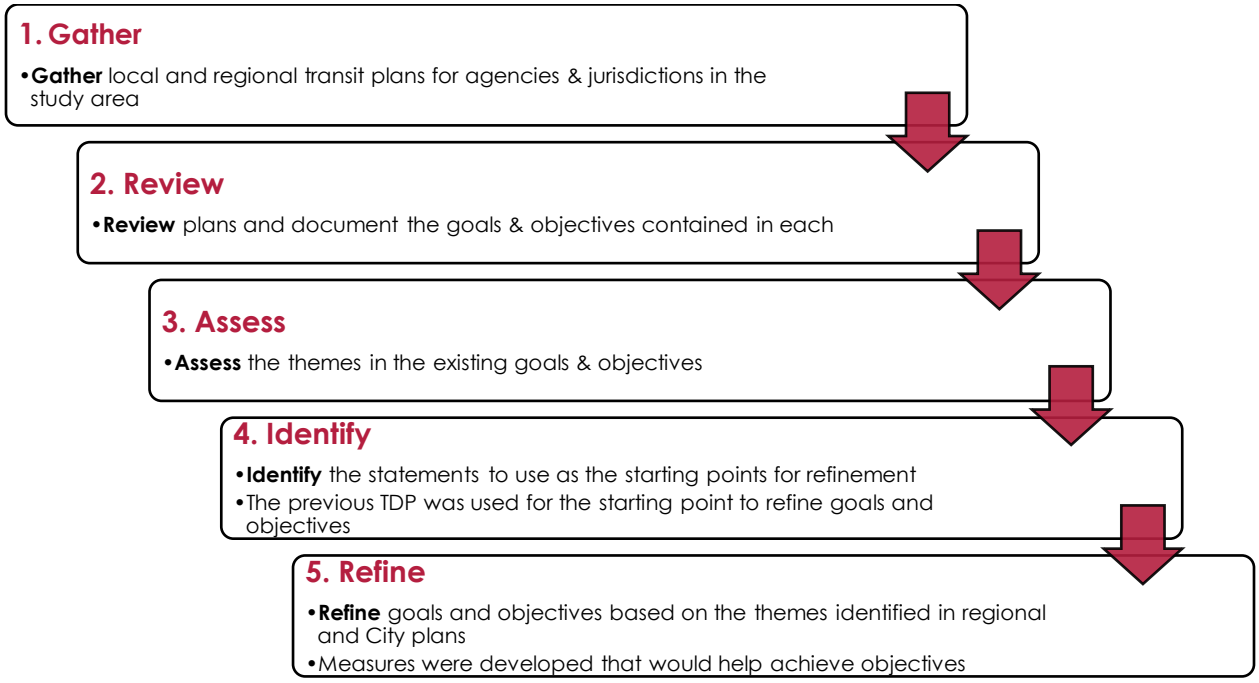
Stakeholders and community leaders agreed that a key component of Radford Transit is to **serve need-based trips** such as those for seniors, zero-car households, and those with mobility impairments. There was also discussion of **prioritizing service for low-income persons** to increase access to economic opportunity.

1.2.1 Goals and Objectives

Development Process

Radford Transit's goals set in Radford Transit's previous Transit Development Plan (TDP) were re-evaluated as part of the TSP process. The previous TDP goals were reviewed alongside goals from previous City of Radford and regional plans[1], and supplemented with input gathered during public and stakeholder engagement efforts. This information was reviewed, compared, and documented to identify shared priorities across the region that would be relevant to Radford Transit. Based on the resulting common themes, a series of proposed goals and objectives were developed together with actionable measures. The previous TDP was used as the starting point for refining goals and objectives. **Figure 1-3** describes the process for the development of Goals and Objectives.

Figure 1-3: Goals and Objectives Development Process



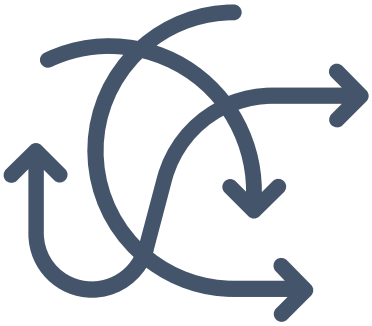
[1] *Plans consulted for existing policy included the Radford Transit's Transit Development Plan (TDP) FY 2019-2028, City of Radford Comprehensive Plan (2017), New River Valley Metropolitan Planning Organization 2045 Long-Range Transportation Plan (2020), and New River Valley Multimodal Plan (2021).*

Goals

Based on the process described above, four primary goals were developed to guide Radford Transit's future service and operations:

1. Provide safe, reliable, and effective service that improves Radford's quality of life
2. Cooperate and coordinate with regional partners to increase Radford Transit's role in regional connectivity
3. Foster connections with the Radford community and local stakeholders
4. Ensure effective and efficient service through operational adaptation

Provide safe, reliable, and effective service that improves Radford's quality of life



Cooperate and coordinate with regional partners to increase Radford Transit's role in regional connectivity

Foster connections with the Radford community and local stakeholders

Ensure effective and efficient service through operational adaptation

Objectives

Goal 1: Provide safe, reliable, and effective service that improves Radford's quality of life.

This goal focuses on maintaining or enhancing the quality of service provided by Radford Transit through monitoring, customer service, and effective scheduling.

Table 1-2: List of Objectives and Measures for Goal 1

Objective	Measure
Provide excellent customer service through timely service, well-trained drivers, and comfortable accommodations.	Track and increase the number of positive customer service interactions and reduce number of complaints.
	Track requests for enhanced stop amenities and integrate into an annual service planning activity.
Maintain efficient scheduling and routing practices to ensure as short a wait time for riders as possible.	Review service coordination with connecting transit agencies once per year and adjust route schedules concurrently with changes.
	Review on-time performance quarterly to ensure effective system transfers.

Goal 2: Cooperate and coordinate with regional partners to fulfil Radford Transit's role in regional connectivity.

Goal two focuses on defining the role of Radford Transit within the New River Valley region and improving system connections outside the municipal limits of the City of Radford.

Table 1-3: List of Objectives and Measures for Goal 2

Objective	Measure
Prioritize connections to other local communities.	Improve connection to Blacksburg through more frequent service and/or more direct connections.
	Maintain transfer connection to PAT.
	Maintain transfer connection to NRCC.
	Maintain community access to Fairlawn.
Partner with other organizations for regional connections.	Create a connection to the planned Amtrak station in Christiansburg.
	Align service schedules to regional buses including the Virginia Breeze and Smart Way.

Goal 3: Foster connections with the Radford community and local stakeholders.

The third goal of Radford transit is a focus on the presence of Radford Transit community-wide. This includes the reinforcement of Radford Transit not only as a Radford University service, but one for all persons in and around the city.

Table 1-4: List of Objectives and Measures for Goal 3

Objective	Measure
Increase awareness of Radford Transit with City of Radford citizens and Radford University students.	Integrate an education component on Radford Transit in Radford University's freshman introduction class.
	Improve communication with riders via technology applications, website enhancements, social media presence, and call center information dissemination.
	Deliver a rebranding project by Fall 2025 to reintroduce Radford Transit as a community service (not only a University service).
Streamline system information to increase comprehension.	Restructure the route naming convention to increase comprehension among riders.
	Consolidate and relink digital system information including system website, route maps, and real-time information.

Goal 4: Ensure effective and efficient service through operational adaptation.

Goal four focuses on the system performance measures and using creativity and innovation to deliver quality service to the community.

Table 1-5: List of Objectives and Measures for Goal 4

Objective	Measure
Maintain an internal performance monitoring program by route.	Maintain or improve route metrics compiled for passengers per hour, passengers per mile, operating expense per passenger trip, and operating expense per capita.
Include more wholistic performance metrics when evaluating the system overall or an individual route's performance.	Evaluate ridership as a result of regional connections.
	Quantify the number of need-based trips accessible to and provided by each route.
Adapt Radford Transit to a changing technological environment.	Consider and evaluate alternative transit service delivery methods such as demand-responsive service or microtransit.

1.2.2 Service Design Standards

Service design standards are benchmarks against which a system and its routes are developed and evaluated to determine if existing services should be modified. Service design standards function as an input to the planning process and address items such as scheduling and route planning, service reliability, system efficiency, safety and security, customer service, multimodal connectivity, and regulatory compliance. When Radford Transit is considering service changes, these service standards presented below will be considered to the extent possible within funding constraints.

Radford Transit's service design standards are included below in **Table 1-6**. All service standards are described for fixed-route service.

Table 1-6: Radford Transit Service Design Standards

Service Element	Service Design Standard
Hours of Operations	RU Service Span Monday-Thursday: 7:00am-10:00pm Friday: 7am-2:50am Saturday: 10:00am-2:50am Sunday: 6:00pm-12:00am City Service Span Weekdays: 6:00am-10:00 pm Saturday: 10:00am-8:00pm
Frequency of Service	RU Service Frequency 15 minutes City Service Frequency 60 minutes NRV Connect (Routes 40/41) 120 minutes
Loading Standards	Standees for short periods acceptable, but up to 25% of total passenger load
Passenger Stops	Core area stops from 5-7 per mile; fringe area stops from 4-5 per mile, based on land uses
Bus Shelters and Benches	Bus stops with more than 50 passenger boardings daily should have a bus shelter
	Benches should be provided at bus stops with more than 25 passengers per day
System Connectivity	Provide connection and transfer to regional bus and train service at least once per day.

1.2.3 Performance Standards

Performance standards are metrics developed to create a consistent evaluation for transit service and provide insight into how services should be modified and implemented. Performance Standards differ from Service Design Standards as they quantify how system services are performing and are an output of service provision.

The following statistics are monitored by Radford Transit and are required for reporting to DRPT for inputs into annual formula funding applications. Performance monitoring of the service with respect to these standards should be done annually at minimum. All performance standards are described for fixed-route service.

Radford Transit's performance standards are included below in **Table 1-7.**

Table 1-7: Radford Transit Service Performance Standards

Performance Element	Performance Metric
System Ridership	Track route- and stop-level ridership to observe monthly trends
	Track the number of need-based trips relative to need-based population
Passenger Productivity	Review and modify, if possible, services that exhibit productivity less than 60% of the system average
Cost Effectiveness	Review and modify, if possible, services that exhibit higher cost than 60% of the system average
Schedule Adherence	95% on-time service (0-5 minutes late) – No trips leaving early
Load Factor	Maintain a load factor of no more than 1.25 during peak service periods Maintain a 1.0 load factor at all other times
Service Reliability	Maintain fewer than 6,500 miles between service road calls
	Follow State sponsored TAM Plan/targets
	Less than 5 percent missed trips due to operational failures
	No more than 20 percent of fleet exceeding the FTA ULB for its vehicle classification
Customer Service	Less than 20 customer complaints per 100,000 boardings by mode
	Schedules, maps, signage, and website current and accurate
	Revenue equipment and facilities kept in clean and good condition

Radford Transit has outlined a set of safety performance targets in their Public Transit Agency Safety Plan (PTASP) in accordance with Federal Transit Administration regulations. Radford Transit collaborates with the PTAB every six months and conducts an evaluation of how well the agency has adhered to safety performance metrics in compliance with the requirements of the National Public Transportation Safety Plan. In the agency's most recent Transit Safety Plan, the following measurable safety performance targets were established as a benchmark for the overall safety performance of the agency.

The safety performance targets listed in **Table 1-8** serve as benchmarks to evaluate the overall safety performance of the agency.

Table 1-8: Radford Transit Safety Performance Targets

Safety Standard	Fixed-Route Measure
Fatalities (total number of reportable fatalities per year)	**0**
Fatalities (rate per total vehicle revenue miles by mode)	**0**
Injuries (total number of reportable injuries per year)	**1**
Injuries (rate per total vehicle revenue miles by mode)	Less than .5 injuries per 100,000 vehicle revenue miles
Safety events (total number of safety events per year)	**3**
Safety events (rate per total vehicle revenue miles by mode)	Less than 1 reportable event per 100,000 vehicle revenue miles
Distance between Major Failures	10,000 miles
Distance between Minor Failures	3,200 miles

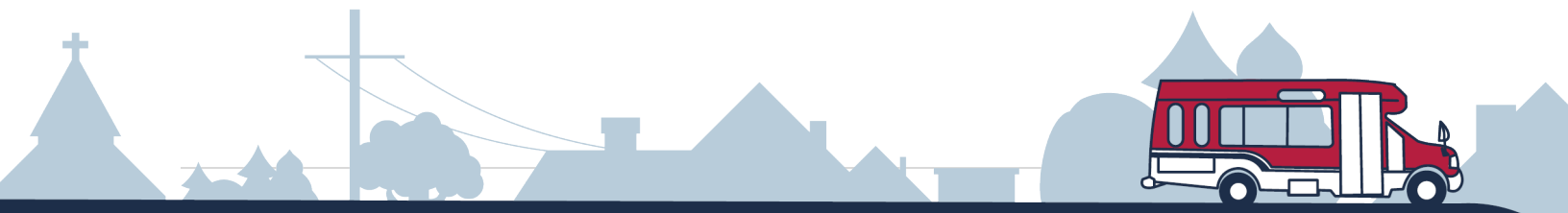
FY2024 – FY2034

Radford Transit

Transit Strategic Plan

Chapter 2

Final – May 2024



Contents

2 System Performance and Operations Analysis

The system performance and operations analysis portion of the Transit Strategic Plan (TSP) provides both quantitative and qualitative evaluation of the existing Radford Transit service and operating environment. Chapter 2 highlights the following topics related to system performance and operations:

- **System and Service Data** – Introduction to the service area with summary-level statistics, service design standards, survey results, and a summary of stakeholder input.
- **Evaluation of Transit Market Demand and Underserved Areas** – In-depth analysis of various factors that influence the demand for transit, such as land use, jobs, population, and the sociodemographic variables associated with ridership. Transit supply and demand is analyzed to identify areas with a combination of high activity and needs and low levels of transit service.
- **Performance Evaluation** – Analysis of ridership and performance metrics at the system level, route level, and stop level. An evaluation of peers, route deviations, accessibility, and safety is also included.
- **Operating and Network Efficiency Evaluation** – Evaluation of the service network using efficiency metrics that assess frequency, span, speed, and reliability of the transit system.
- **Analysis of Opportunities to Collaborate with Other Transit Providers** – Identification of opportunities for Radford Transit to improve connections with nearby transit providers.

Section 2.1 focuses on system and service data. Each subsequent section of Chapter 2 concludes by identifying opportunities for improvement. The service changes that address the opportunities for improvement will be provided in Chapter 3: Planned Improvements and Modifications.

2.1 Systems and Service Data

Current Fiscal Year Data

Radford Transit covers the City of Radford and runs service into surrounding counties and jurisdictions including Pulaski County, Montgomery County, and the towns of Christiansburg and Blacksburg in Montgomery County. Radford Transit has a service area population of 18,545 and service area of 10 square miles, equating to a population density of 1,855 people per square mile [1].

The data presented in this section is primarily from Fiscal Year 2021, unless otherwise noted, which was the latest available data at the time of the analysis.

[1] NTD, 2021. Radford Transit Agency Profile. Accessed at 30200 2021 Agency Profile (dot.gov)

Table 2-1: Existing Service Summary

Category	System total	Source
Service Area (square miles)	10	NTD (2021)
Population	18,545	NTD (2021)
Density (people/square miles)	1,855	NTD (2021)
Operating Cost	$1,667,074	NTD (2021)
Ridership	127,045	Passio (2022)
Revenue Hours	26,506.58	Passio (2022)
Revenue Miles	315,428.51	Passio (2022)
Vehicles Operating in Peak Service	14	Passio (2022)
Vehicles Available for Peak Service	23	Passio (2022)

Radford Transit operates seven days a week. Service levels for each day of the week are shown below in **Table 2-2** Radford Transit has a total of 12 active routes. For regular service, 11 routes operate Monday through Friday, seven (7) routes operate on Saturday, and one (1) operates on Sunday. For city service (service provided when Radford University is not in session), six (6) routes operate on Monday through Friday and on Saturday, and no routes operate on Sunday. The most frequent route is Route 50, which operates 20-minute headways. Some routes operate in tandem to increase the frequency of transit service to specific locations. Routes 10 and 11, both running on 30-minute headways, align to provide 15-minute headways for a circulator service for Radford University (RU), and Routes 40 and 41, both running on 120-minute headways, sync to provide 60-minute headways from Radford to Blacksburg and Christiansburg.

Table 2-2: Level of Regular Service by Day of Week (Spring 2023)

Day of Week	Total Trips	Number of Routes in Operation	Headways
Regular Service			
Monday–Friday	335	11	1 route operates every 20 minutes 4 routes operate every 30 minutes 4 routes operate every 60 minutes 2 routes operate every 120 minutes
Saturday	178	7	2 routes operate every 30 minutes 3 routes operate every 60 minutes 2 routes operate every 120 minutes
Sunday	16	1	1 route operates every 30 minutes
City Service			
Monday–Friday	206	6	2 routes operate every 30 minutes 3 routes operate every 60 minutes 1 route operate every 120 minutes
Saturday	173	6	2 routes operate every 30 minutes 3 routes operate every 60 minutes 1 route operates every 120 minutes
Sunday	0	0	No routes in operation

Existing Service Design Standards

Route Design Standards

Radford Transit does not have an officially adopted set of route design standards, but Radford Transit routes tend to follow three distinct route design trends. University routes are characterized by high frequency, higher stop density, and tend to cover shorter distances. City routes have a lower stops density and focus on a high service coverage throughout the city. Regional connector routes, such as Routes 40, 41, and 100, typically have a lower stop density and focus on connecting riders to key locations at advantageous times to transfer onto other transit services such as Blacksburg Transit. Service standards which influence route design standards are presented in Section 1.2.2. Service Design Standards.

Schedule Standards

Radford Transit does not have an officially adopted set of schedule standards. Radford Transit service is available between the hours of 6:30 a.m. and 8:30 p.m., but specific route times vary (e.g., a route begins service at 8:30 a.m. and ends service at 4:20 p.m.). **Table 2-3** shows the start and end times of each route in service in March 2023.

Table 2-3: Radford Transit Route Schedules (Spring 2023)

Route	Regular Service		City Service	
	Start Time	End Time	Start Time	End Time
Weekday Service				
10	7:10 a.m.	10:40 p.m.	N/a	N/a
11	7:25 a.m.	6:45 p.m.	N/a	N/a
15	N/a	N/a	7:10 a.m.	7:50 p.m.
20	7:00 a.m.	9:30 p.m.	7:00 a.m.	7:30 p.m.
25	7:15 a.m.	7:45 p.m.	7:15 a.m.	7:45 p.m.
30	6:50 a.m.	7:50 p.m.	6:50 a.m.	7:50 p.m.
35	7:05 a.m.	8:05 p.m.	7:05 a.m.	8:05 p.m.
40	6:50 a.m.	8:50 p.m.	6:50 a.m.	6:50 p.m.
41	7:50 a.m.	9:50 p.m.	N/a	N/a
50	7:00 a.m.	10:40 p.m.	N/a	N/a
60	7:20 a.m.	10:50 p.m.	N/a	N/a
100	8:30 a.m.	5:30 p.m.	N/a	N/a
Saturday Service				
15	10:10 a.m.	2:40 a.m.	10:10 a.m.	7:50 p.m.
20	10:00 a.m.	9:30 p.m.	10:00 a.m.	7:30 p.m.
25	10:30 a.m.	7:45 p.m.	10:30 a.m.	7:45 p.m.
30	9:50 a.m.	7:50 p.m.	9:50 a.m.	7:50 p.m.
35	10:05 a.m.	8:05 p.m.	10:05 a.m.	8:05 p.m.
40	10:50 a.m.	9:50 p.m.	10:50 a.m.	6:50 p.m.
41	9:50 a.m.	8:50 p.m.	N/a	N/a
Sunday Service				
10	5:40 p.m.	11:40 p.m.	N/a	N/a
Late Night Service (Friday and Saturday)				
15	10:30 p.m.	2:40 a.m.	N/a	N/a
40	10:50 p.m.	12:50 a.m.	N/a	N/a
41	9:50 p.m.	1:50 a.m.	N/a	N/a

Survey Results

Online and Paper Survey

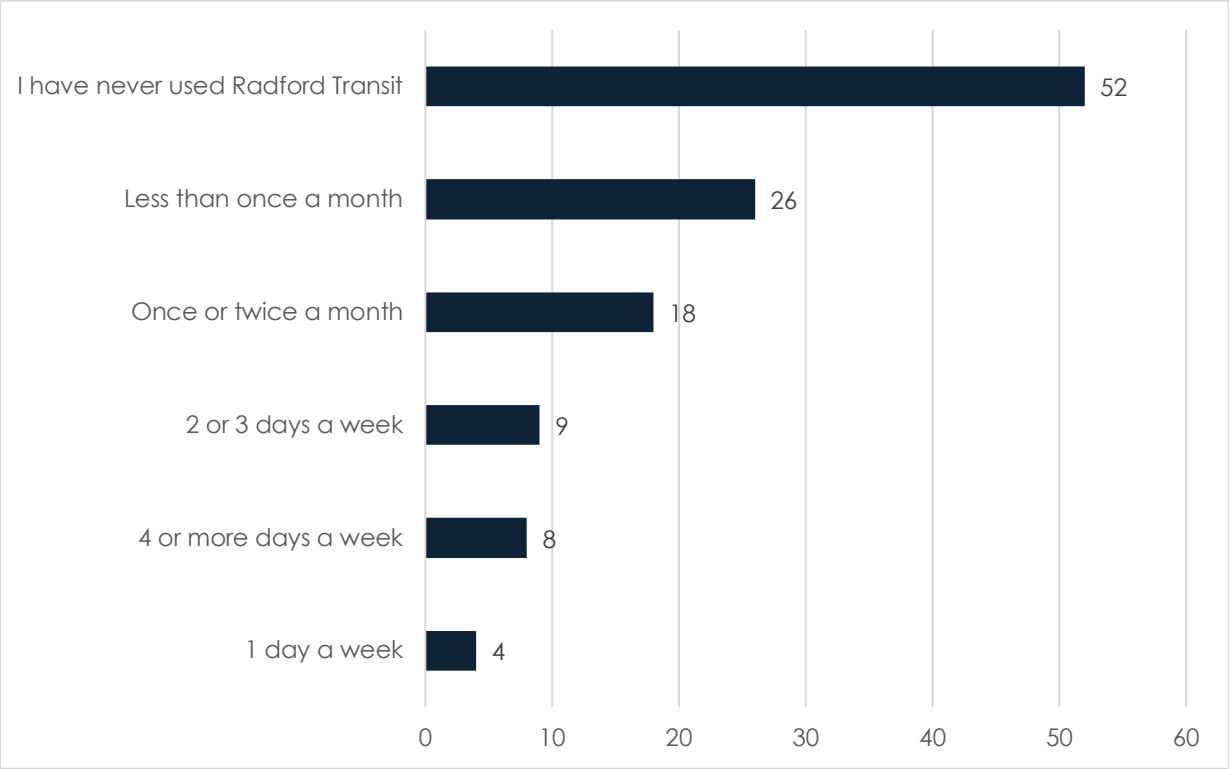
As part of the first phase of engagement for the TSP, a public survey was conducted to guide the TSP process and inform the development of recommendations. The survey collected information on existing travel patterns, impressions of the service, and demographic data from both current customers and non-users of the service. Surveys were administered online using a web-based public engagement tool called Social Pinpoint and through a paper version which was distributed at key destinations. Flyers and social media graphics were provided to Radford Transit and posted on the Radford Transit website and distributed through social media channels. RT staff shared these graphics with staff at RU to distribute to their networks. The survey was open for four weeks between April 28, 2023, and May 19, 2023, and collected a total of 119 responses.

Results from the survey were used to discern general trends, but the results were not given significant weight for determining service changes, nor were they used to serve as official data sources. The number of responses the survey received—119 responses—is not enough to be considered statistically significant for the region and its population of over 18,000. A response-weighting formula was not developed for this survey; therefore, the survey results are only representative of the population that responded, and not of Radford or the New River Valley region. A large effort was conducted in obtaining feedback from RU students, staff, and faculty. RU members were willing participants in the survey. As a result, the survey responses skew towards the perspectives of people affiliated with the RU to a higher degree than the broader region.

Transit Use

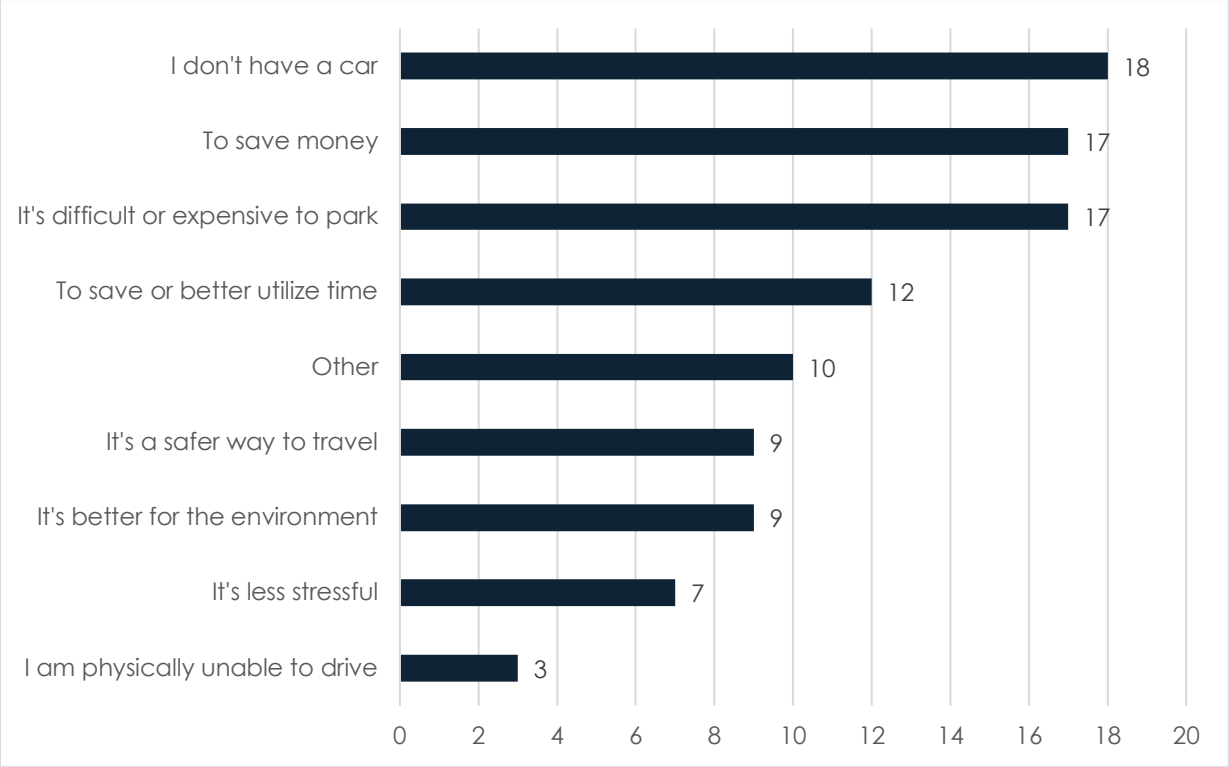
Approximately 44 percent (44%) of respondents indicated they have never used Radford Transit, while 18 percent (18%) said they use the service weekly. The results identify differences in frequency of use, reasons for riding, origins and destinations, and socioeconomic backgrounds among frequent riders, less-frequent riders, and non-riders. The frequency of system use is shown in **Figure 2-1**.

Figure 2-1: How Often Do You Use Radford Transit's Services?



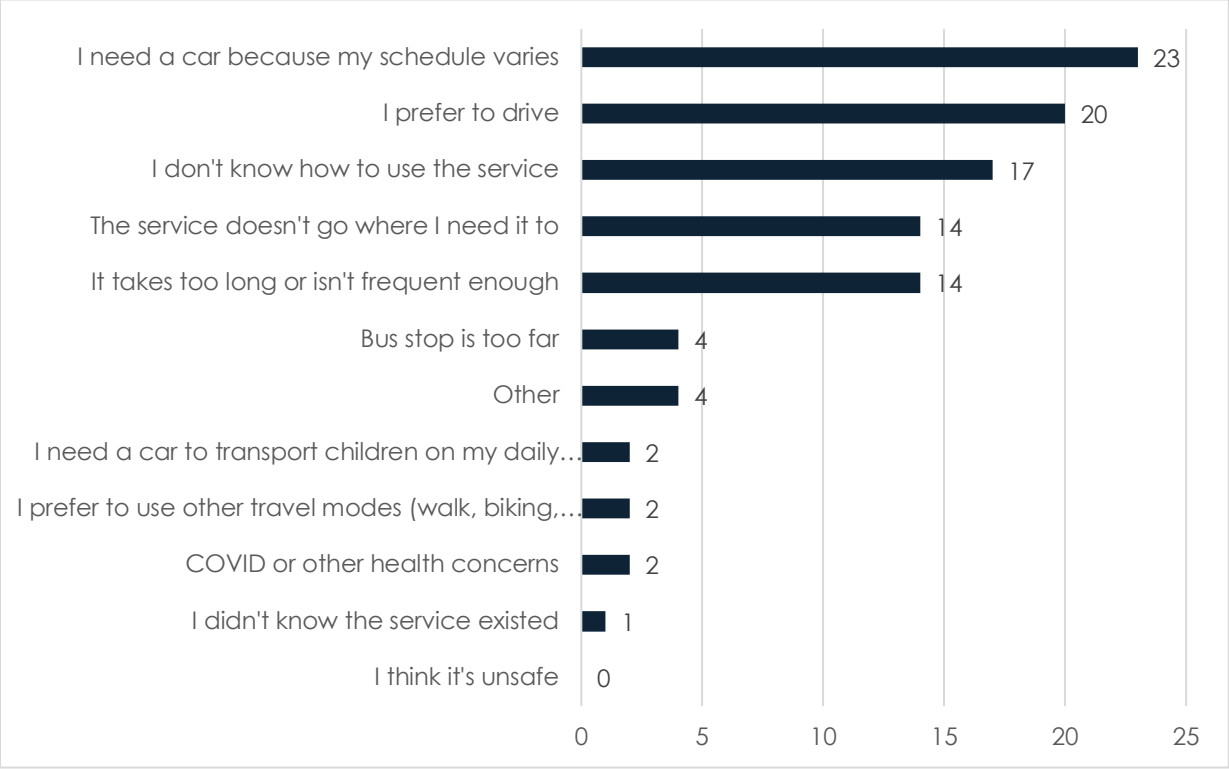
A total of 67 participants identified their main reasons for using Radford Transit and had the option to select multiple options as shown in **Figure 2-2**. Ten (10) respondents (nine percent) (9%) also selected the "Other" option and left comments which identified services to get around campus, useful for events, a way to avoid weather when walking, and for when they do not have access to their car; from sharing with a household member or if it is at the mechanics.

Figure 2-2: What is Your Main Reason for Using Radford Transit?



A total of 53 participants identified why they do not use Radford Transit services and had the option to select multiple choices as shown in **Figure 2-3**. Four (4) respondents had other reasons for not using services such as limited access to service schedules, commuting from a regional location, or the service is not available when they need it.

Figure 2-3: Why Have You Not Used Radford Transit Services (Select All That Apply)?



Demographics

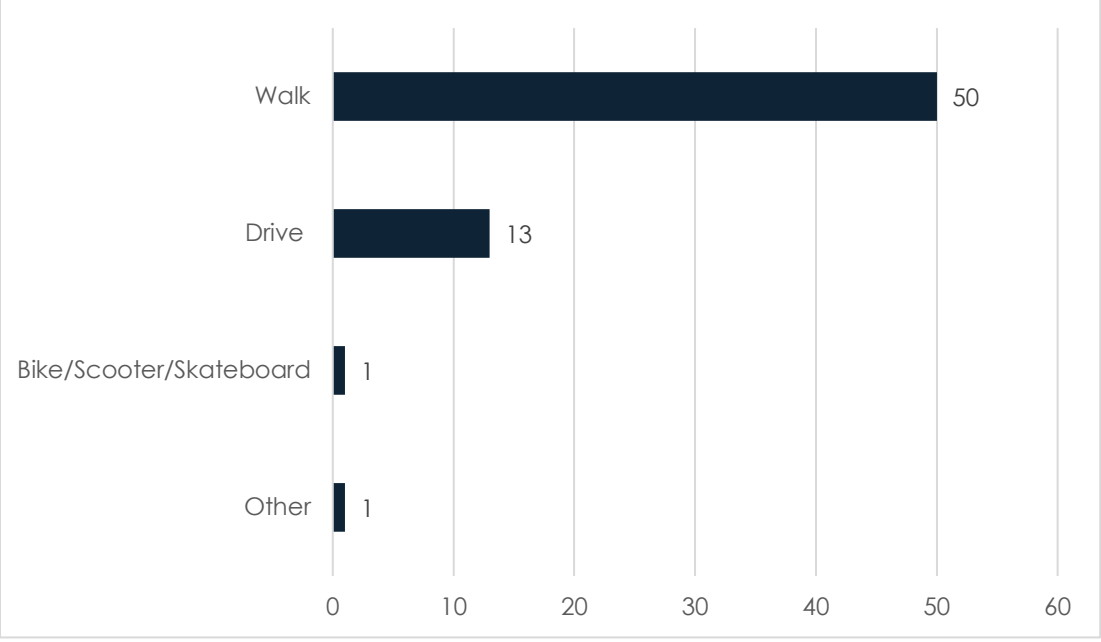
Survey respondents reported the following demographic information:

- 45 percent (45%) of respondents indicated that they were between the ages of 18 and 25 years old.
- 75 percent (75%) of respondents identified as female.
- 78 percent (78%) of respondents identified as white or European. Black/African American and Hispanic/Latino were the second largest racial/ethnicity groups with each group garnering 10 percent (10%) of respondents, respectively.
- 82 percent (82%) of respondents reported an affiliation with Radford University. Of the group of respondents that had an affiliation with Radford University, 45 percent (45%) were undergraduate students, 27 percent (27%) were faculty, 19 percent (19%) were staff, and seven percent (7%) were graduate students.
- 21 percent (21%) of respondents identified as having a disability or being chronically ill.
- 33 percent (33%) of respondents reported having one car, while 11 percent (11%) reported of having no car at all.
- 79 percent (79%) of respondents have a child under the age of 18 living in their household.

Access Mode

Transit users surveyed indicated how they accessed a Radford Transit Station, as shown in **Figure 2-4**. The majority of respondents walk to their bus stop, while a significant amount drive. Only two (2) respondents reported accessing a Radford Transit stop by a mode other than walking or driving.

Figure 2-4: How Do You Get to the Bus Stop to Start/End Your Trip (Select One)?



Trip Origins and Destinations

Survey participants were prompted to mark notable origins and destinations where they frequently travel or desire to travel between. Participants were also asked to comment on how access to transit service between chosen locations affects their travel behavior.

Home Locations

Participants were asked to identify where they currently live in the region. 19 participants marked their home locations within the Radford area. The following maps show the regional and local home locations of participants.

Of those 19 participants, 11 participants identified their home location within the city of Radford. While three (3) participants commented that they live near bus stops, they are unable to rely on the bus system due to inaccurate bus schedules.

Most participants that live outside of Radford live within the Blacksburg-Christiansburg area. One (1) participant did, however, mark their home within Wytheville and commented they commute to RU for work. Within the Blacksburg-Christiansburg area, eight (8) participants identified where they currently live. Four (4) participants commented they live in the Blacksburg-Christiansburg area and commute to work or school in Radford. Two (2) participants commented they drive to Radford because bus services do not run early enough for their schedule.

Figure 2-5: Mapping Results of Respondents' Regional Home Locations

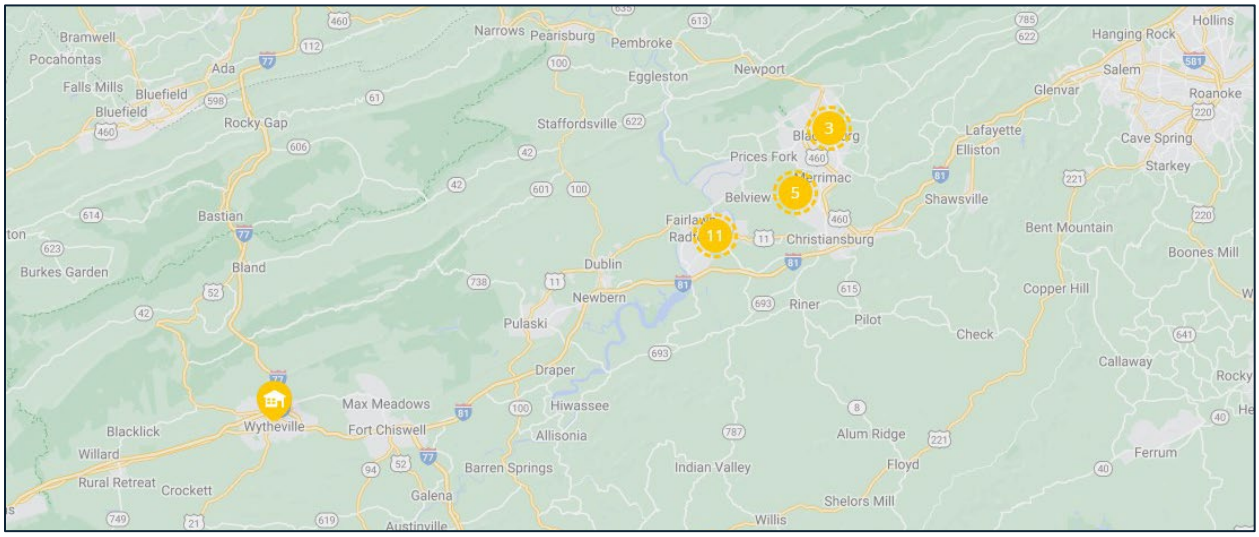


Figure 2-6: Mapping Results of Respondents' Radford Home Locations

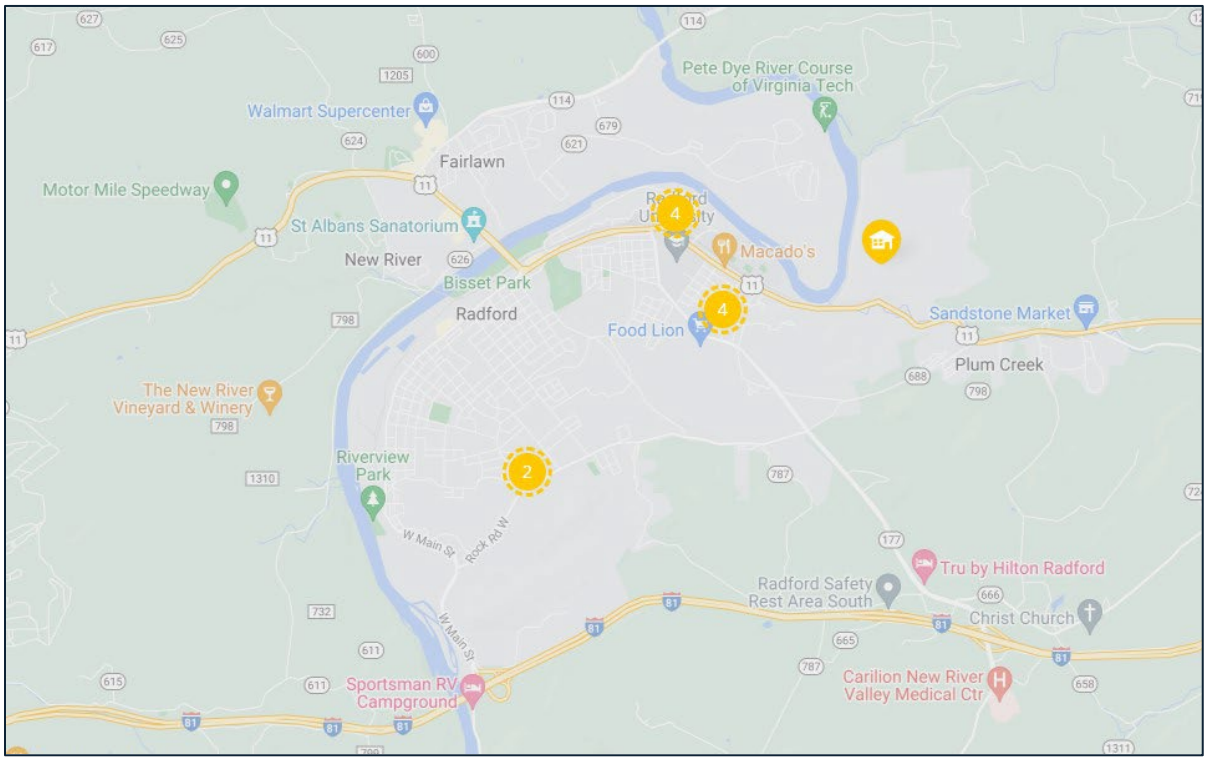
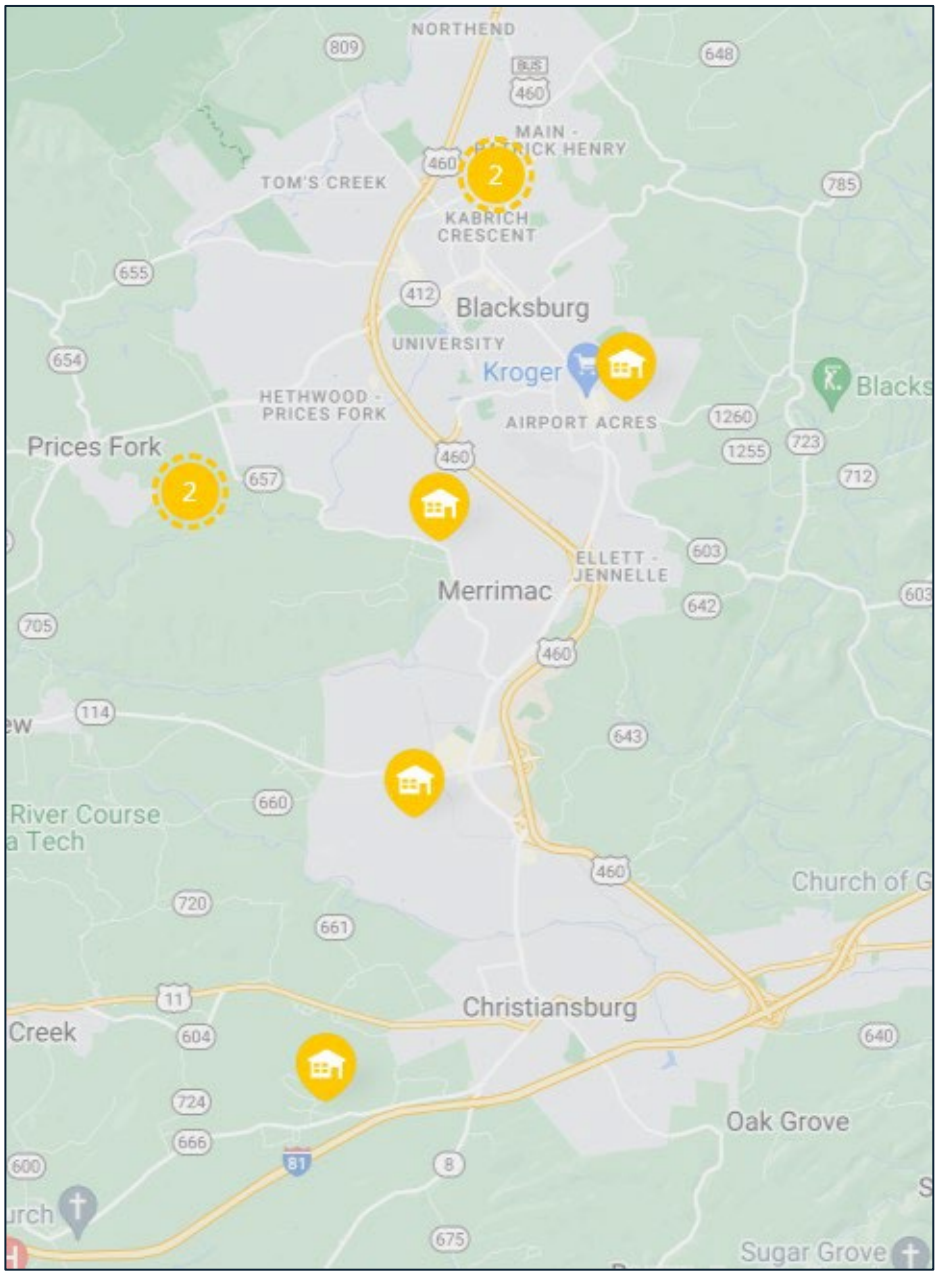


Figure 2-7: Mapping Locations of Respondent's Blacksburg-Christiansburg Home Locations



Daily Needs

14 daily need locations were identified in the Radford area. Daily needs include office visits, shopping trips, grocery shopping trips, or other similar purposes. Maps depicting participants daily needs markers across the region and in the City of Radford are indicated in **Figure 2-8** and **Figure 2-9** respectively.

Three (3) participants identified Daily Need locations outside of Radford. One (1) participant commented "I commute from Radford to Tech just about everyday" and received two (2) upvotes. Another participant commented they wanted a wider service area, especially in Christiansburg. The participant who placed a marker in Dublin said, "Some of the only necessities like dry cleaning are located here. There needs to be a bus stop location in more areas here."

Within Radford, participants identified where they shop for groceries, pick up medications, and eat at restaurants. Four (4) participants upvoted getting their prescription from CVS near Wildwood Park. Six participants identified Walmart as the primary place they shop for food and other items (two (2) marked the location and four (4) upvoted one marker). One (1) participant identified where they park to access RU's main campus.

Figure 2-8: Mapping Results of Regional Daily Needs Locations

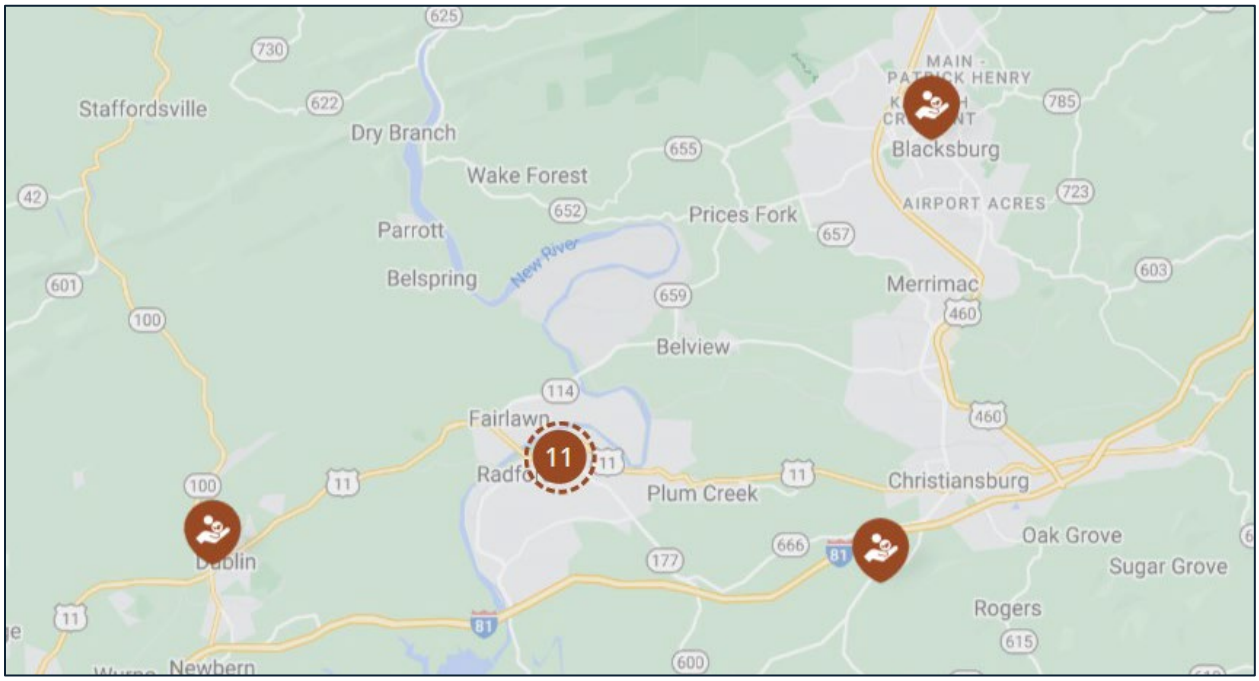
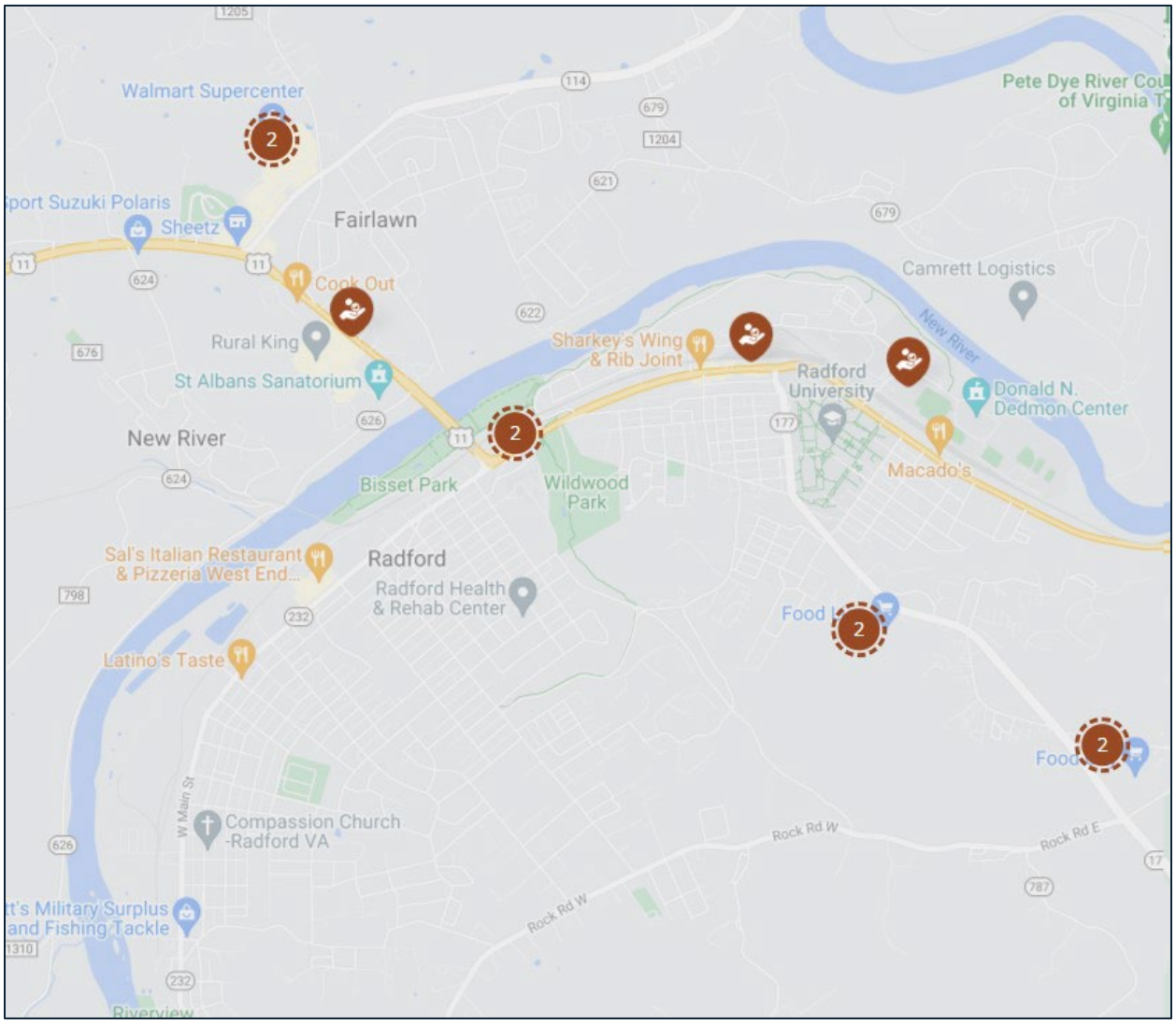


Figure 2-9: Mapping Results of Respondents' Radford Daily Needs



Work

Most participants identified locations within Radford as where they commute to work. Eight (8) participants identified work locations outside of Radford. Four (4) participants identified locations in Roanoke where they work for Radford University-Carilion. One participant commented, "Radford Transit routes from RU-Radford (RUR) to RU-Carillion (RUC) are necessary. At minimum an early a.m. commute from RUR and from RUC to RUR as well as a p.m. route from RUR to RUC and from RUC to RUR."

Two (2) participants identified Blacksburg and Merrimac as the location of their workplaces. One (1) participant said they work at Virginia Tech and have an irregular work schedule with usual transportation needs. This makes it difficult to plan regular use of transit services. Another participant commented needing an early morning pick up from New River Community College to arrive to work on time.

18 workplaces were marked within Radford. Participants that lived within Radford commented on themes such as:

- Usefulness of NRCC and regional connection buses
- Need for more trips in evenings
- Need for more promotion of regional route in Pulaski and neighboring areas

Four (4) other participants commented they drive to work most often because they need to arrive earlier in the morning than services are available.

Figure 2-10: Mapping Results of Respondents' Regional Work Locations

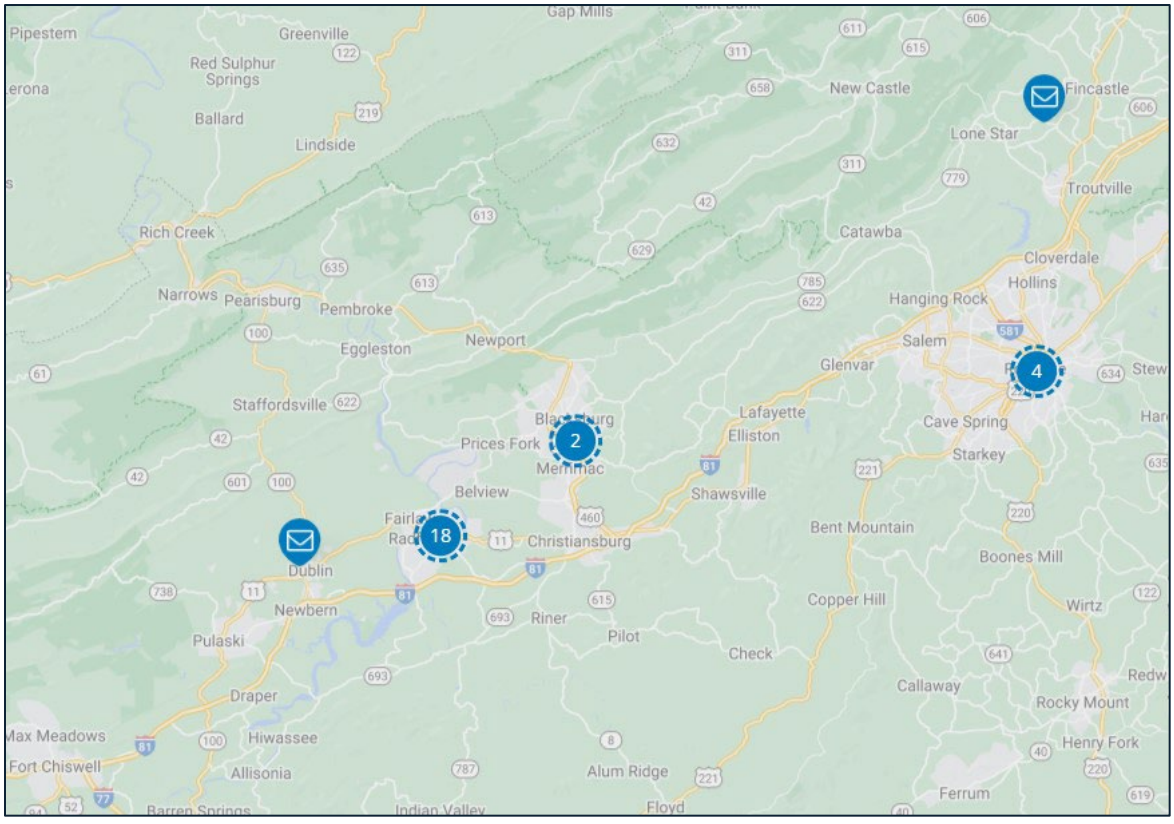
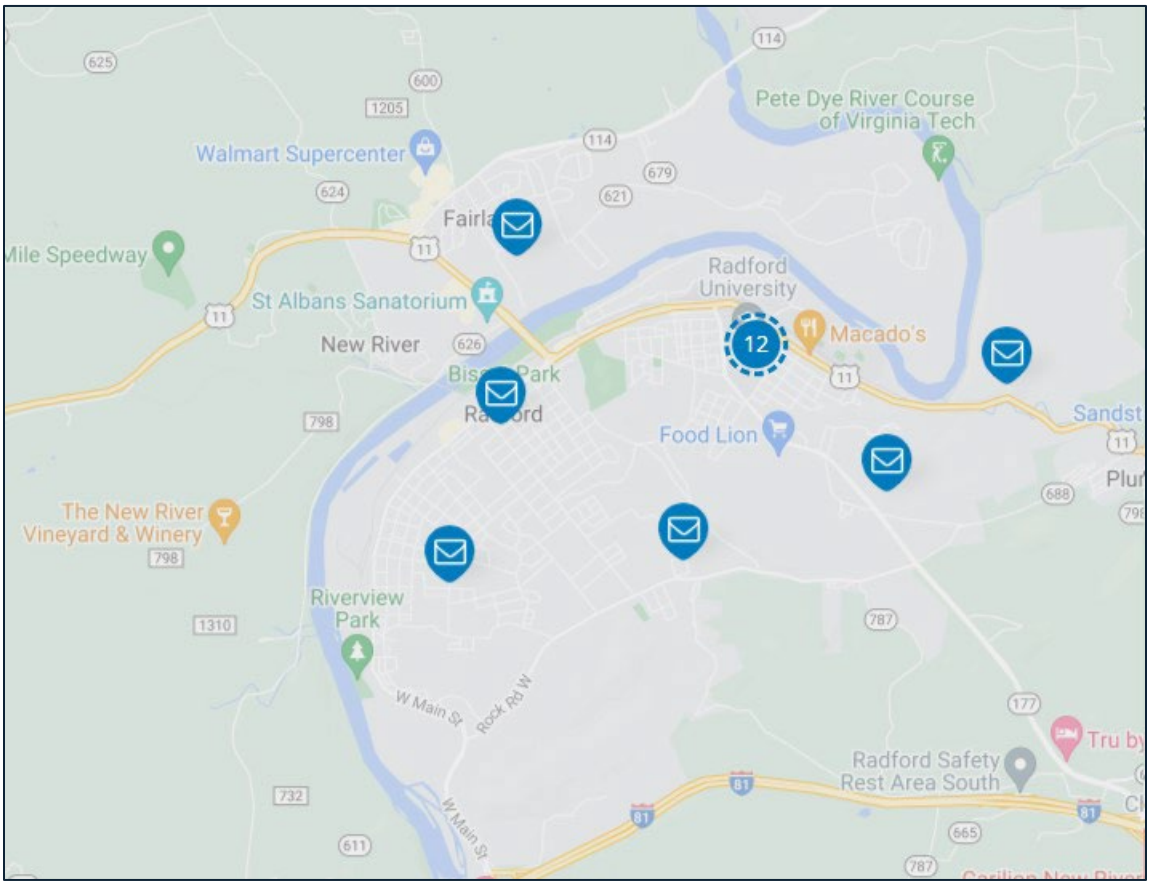


Figure 2-11: Mapping Locations of Respondents' Radford Work Locations



Desired Destinations

Participants were asked to identify locations in the region and locally where they would like additional bus stops. A total of 20 locations were identified.

11 locations were identified as desired destinations for a transit stop outside of Radford. Two (2) participants identified the Uptown Christiansburg shopping mall as an important commuter destination. One (1) comment for the location requested earlier pick-up times and the other hoped the current Radford Transit stop stays. One (1) participant in Christiansburg marked the Lewis Gal Hospital-Montgomery as a desired destination. Two (2) participants identified shopping locations in the Blacksburg-Christiansburg area where they would like Radford Transit stops. One (1) participant identified Virginia Tech as a regional destination stop and commented, "I liked it better when Radford transit stopped at VT because I am not familiar with Virginia Tech's transit system. It seems like much more of a hassle but that's just an opinion. Perhaps BT could stop at Radford to make it easier for people trying to come to VT or for those trying to come to RU."

Nine (9) desired destination locations were identified within the City of Radford. Four (4) marked locations are for better food and food services access. Two medical locations (Community Health Center for the New River Valley and Carilion New River Valley Medical Center) were identified by participants. One (1) participant identified

Kollmorgen and commented, "A lot of people work here and it's not the easiest to walk to."

Figure 2-12: Mapping Locations of Respondents' Regional Desired Transit Locations

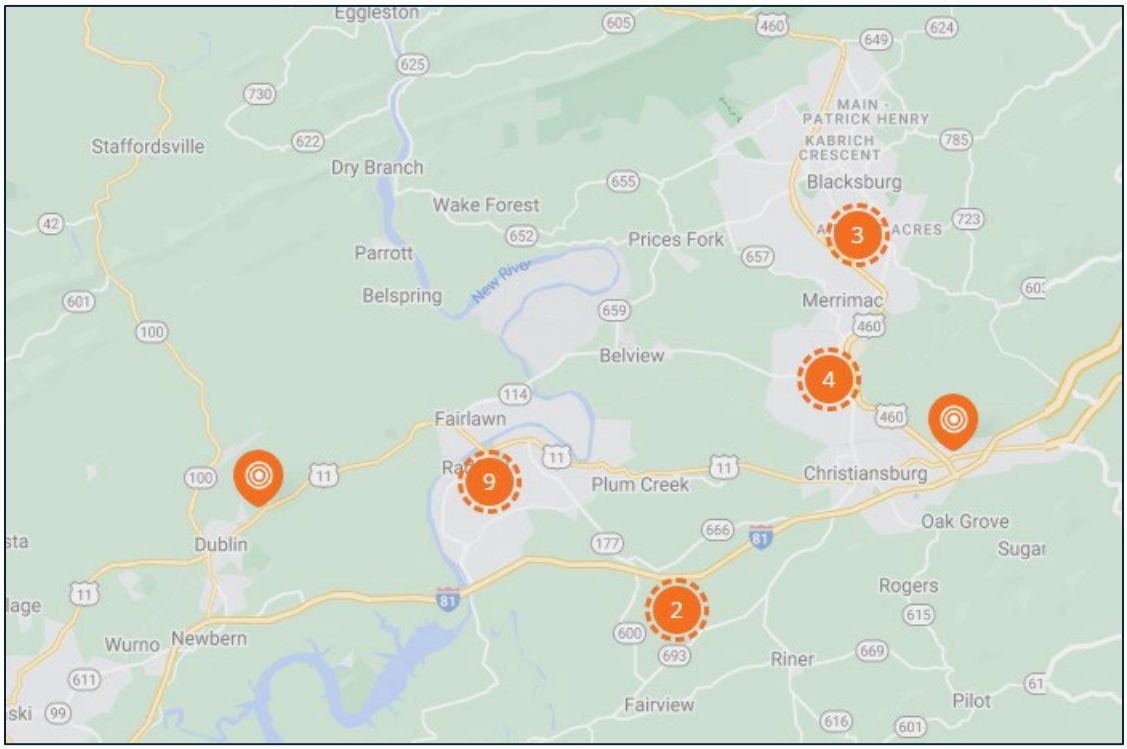
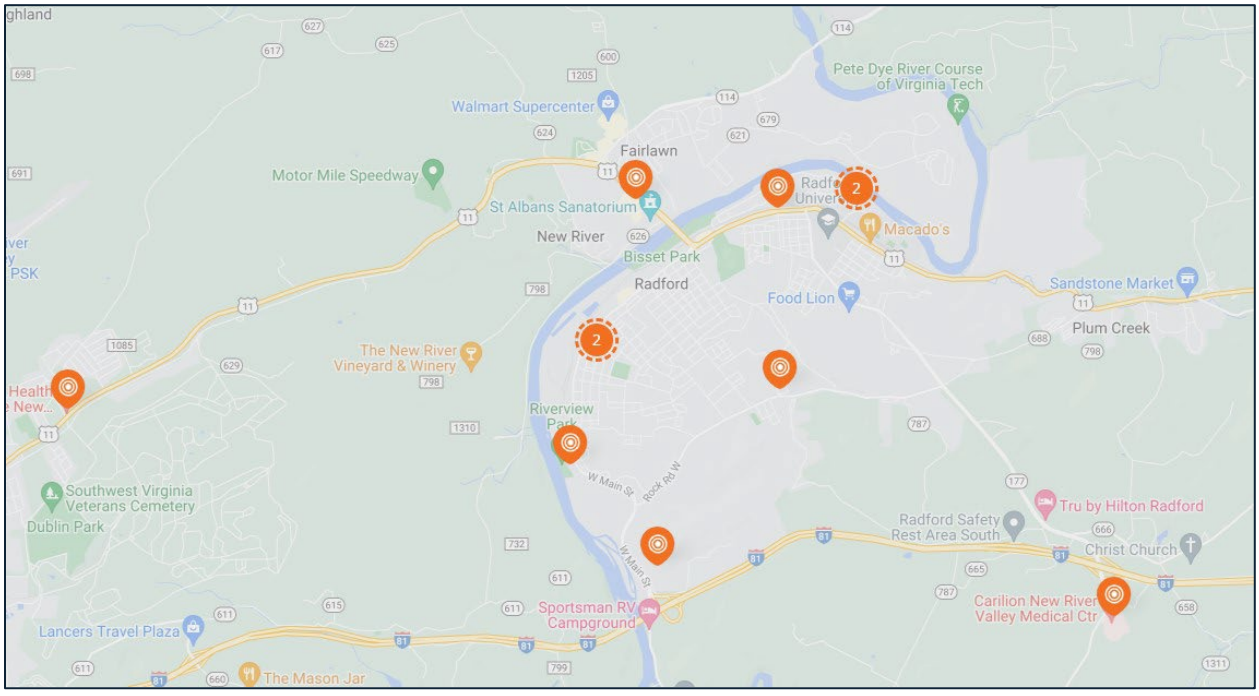


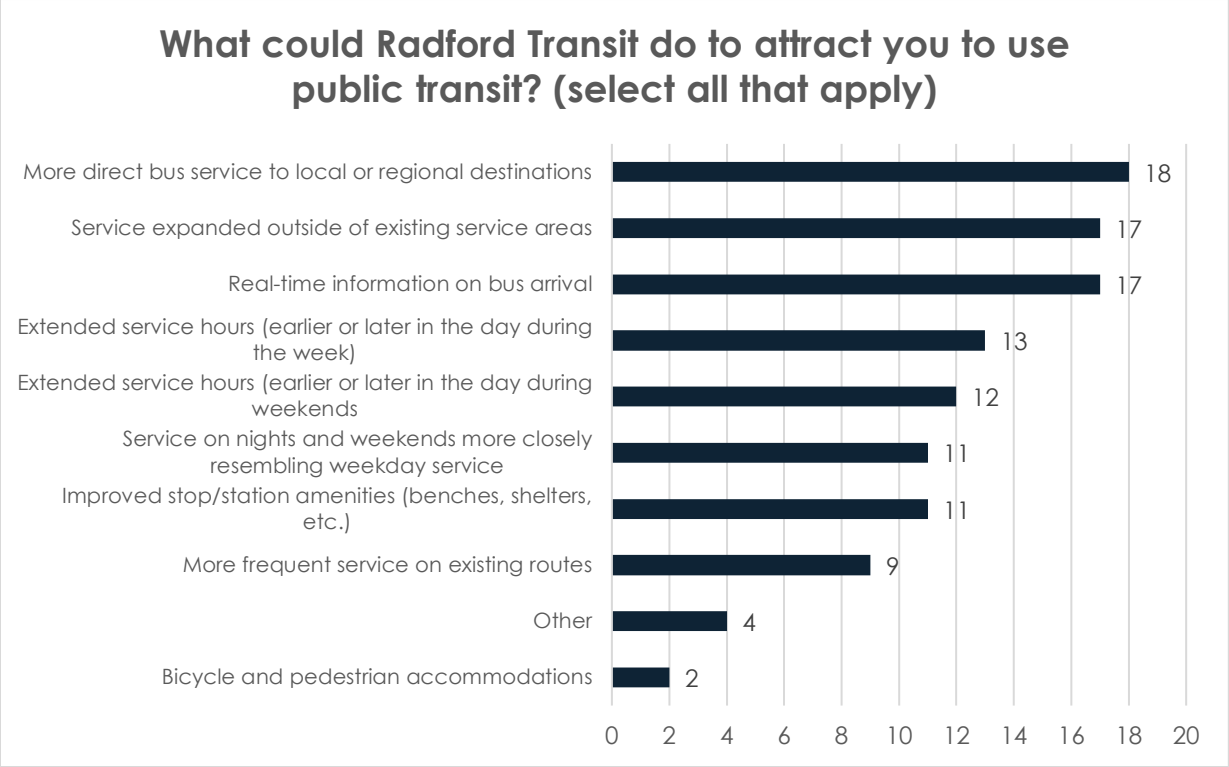
Figure 2-13: Mapping Results of Respondents' Radford Desired Transit Locations



Transit Improvements

118 responses were received from 45 participants about what Radford Transit could do to attract them to use public transit. Participants had the option to select more than one (1) option and provide other comments. "Other" responses included more bicycle and pedestrian accommodation, detailed instructions on how to use services, and better access to route schedules.

Figure 2-14: Factors Increasing Attractiveness of Public Transit



Survey takers were provided a list of six (6) potential improvements to Radford Transit's service and amenities. Survey participants were prompted to select three improvements and rank them from first to third in their preferred order of importance. Key takeaways are:

- Respondents highly valued "more frequent service on existing routes", "more direct bus service to local destinations", and "real-time information on bus arrival."
- A moderate number of respondents valued the improvements of extending service hours on weekdays and weekends.
- Few respondents valued the improvements "stop/station amenities" and "bike and pedestrian accommodations."

Figure 2-15: Potential Areas of Improvement

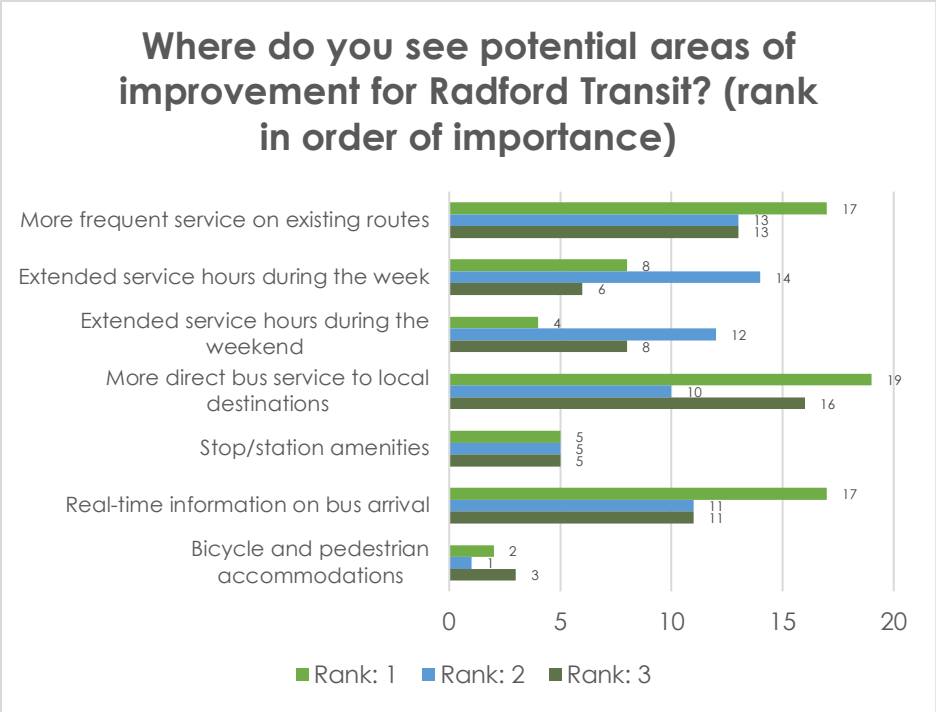
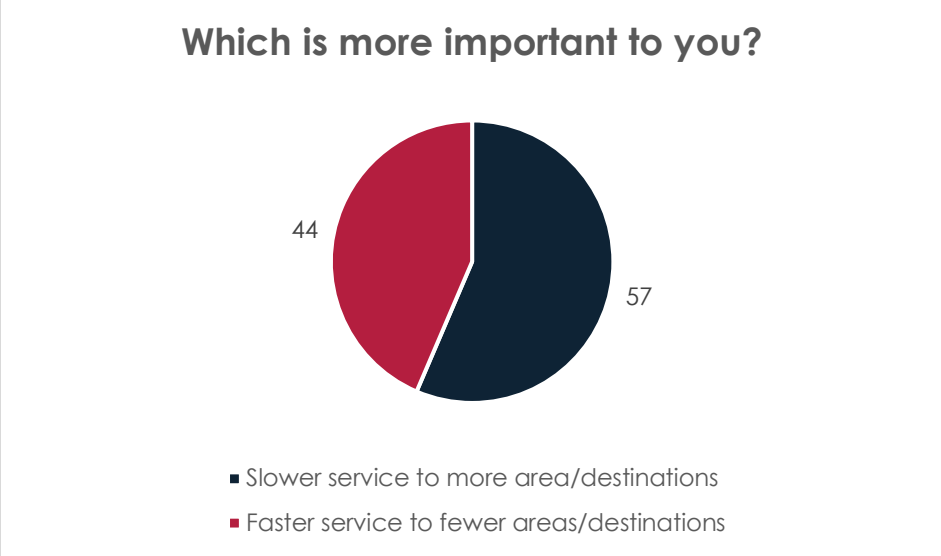


Figure 2-16 shows the results of the question probing the preferences of respondents on the coverage vs frequency conflict. Respondents showed a slight preference (55 percent) (55%) towards a slower service that connects to more areas/destinations.

Figure 2-16: Tradeoff Between System Coverage and Frequency



Support for Transit

Stakeholder Coordination

An initial workshop was conducted with key city and regional stakeholders throughout the visioning and goal setting portion of the TSP. Approximately 20 stakeholders participated in this workshop and were affiliated with the following group/organizations:

- Radford Transit
- City of Radford City Council
- Radford University
- New River Valley Regional Commission
- RTW Management
- City of Radford Chamber of Commerce
- Blacksburg Transit
- Virginia Department of Rail and Public Transportation
- Virginia Department of Health
- New River Valley Agency on Aging
- Montgomery County NAACP
- Prince Williams Reality
- New River Community Action
- CMG Leasing
- Onward New River Valley
- New River Valley Senior Services

This stakeholder engagement was conducted to better understand the use of and support for transit in the community and identify unmet needs. Several key qualitative themes emerged from the perspectives and perceptions shared during the stakeholder interviews and discussions, which are listed below.

Where are we today?

- **Captured Riders:** The system serves students and provides transportation for people without other options
- **Limited Frequency:** The service schedule and frequency is limited
- **Excellent Customer Service:** The community perceived drivers to be of good quality with an excellent safety record and personal service
- **Fare Free:** There is the perception that zero-fare service works well

Where do we want to be tomorrow?

- **Greater Regional Connectivity:** Stakeholders identified an opportunity to improve regional connections (NRV Mall/Amtrak site, 118 Park and Ride)
- **More Efficiency Routing:** Network Stakeholders acknowledged a need for better east/west connections across the City of Radford
- **Improved Passenger Amenities:** Stakeholder noted stops could be improved to be more comfortable and accessible for people to wait
- **Increased Network Legibility:** Stakeholders express their difficulty in route planning and found Radford Transit's network's naming convention confusing
- **Marketing:** Radford Transit needs to increase their exposure and communicate the benefits of their system among both RU students and the local residents
- **Adaptable:** Radford Transit should be nimble and adaptable to the changing demographics and needs of the city, the university, and the region

Two additional follow-up workshops were held throughout the TSP's development. The second, held in Fall 2023, focused on presenting findings from existing conditions and preliminary recommendations. The third, in Spring 2024, focused on draft recommendations and discussed implementation. Overall, the key stakeholders expressed support for the recommendations. Points of emphasis included regional coordination, importance to transportation for individuals with disabilities, connections to and from campus, connections to the hospital and healthcare, and a desire to simplify the numbering and naming of the routes.

Continued coordination with the stakeholders will be critical as the proposed changes move forward to implementation.

Regional Plans

The New River Valley Metropolitan Planning Organization (NRV MPO), the MPO that covers the City of Radford, has expressed support for transit in their most recent long range transportation plan. The NRV MPO stated that transit is vital to the New River Valley region in:

- Providing safe and secure transportation
- Increasing access to jobs, services, and opportunities
- Decreasing congestion
- Supporting a robust and diverse economy
- Creating a healthy local and global environment

The City of Radford has also stated their support for Radford Transit and other alternative modes of transportation in their most recent update of their comprehensive plan. The City of Radford has expressed their intentions and desires to expand their transit and multimodal networks to reduce congestions and support key demographics such as the elderly, RU students, and transit-dependent populations.

2.2 Evaluation of Transit Market Demand and Underserved Areas

This section of the report provides an overview of the market for transit riders in the City of Radford and surrounding counties of Montgomery, Pulaski, and Giles. While the City of Radford is the main locality of focus, the surrounding counties were also included because of their close proximity to and interaction with the city. Demographic, socioeconomic, residential, and employment data is used to better understand the transit market. This data combined indicates where transit service may be most effective or needed currently, but also helps to forecast where transit service may be successful or needed in the future.

2.2.1 Transit Demand and Market Demographics

Land Use

Land use plays a critical role in shaping the long-term success of transit systems. Often organizations other than transit agencies hold the responsibility and authority of integrating land use and transit system. However, when a local government can both control their land use and design a transit system framework to adapt to future growth, there are opportunities to maximize the benefits to residents through transit-supportive land use and coordinated service.

Current and future land use within the City of Radford is documented in the 2017 Comprehensive Plan, which details the various development focus areas that can be used to shape future transit service. Traditionally, transit service was best suited to locations with higher residential density and major employment centers in order to service residents' commuting needs during peak travel times. However, emerging post-pandemic trip trends have shown increased transportation needs to commercial and retail shopping destinations throughout the day and into the off-peak periods, making planning transit service around more diverse land use critical to serving the emerging non-commuting needs of riders.

Figure 2-17 shows the overall existing land use as of 2017 according to the latest City of Radford Comprehensive Plan update conducted in cooperation with the New River Valley Regional Commission (NRVRC). The majority of current land use is allocated for residential purposes at 49 percent, while 21 percent is zoned as open space, eight percent as industrial or commercial, and seven percent for business. Major employment, retail and institutional land use is concentrated on Main Street extending from Pendleton Street in the east to RU and Jefferson Street in the west. Additional multi-family and commercial land is also situated on Tyler Avenue and W Rock Road. The majority of land use away from the major travel corridors is currently zoned as low-density residential, institutional land, or schools, some of which may be served by fixed-route transit.

Figure 2-17: City of Radford 2017 Existing Land Use

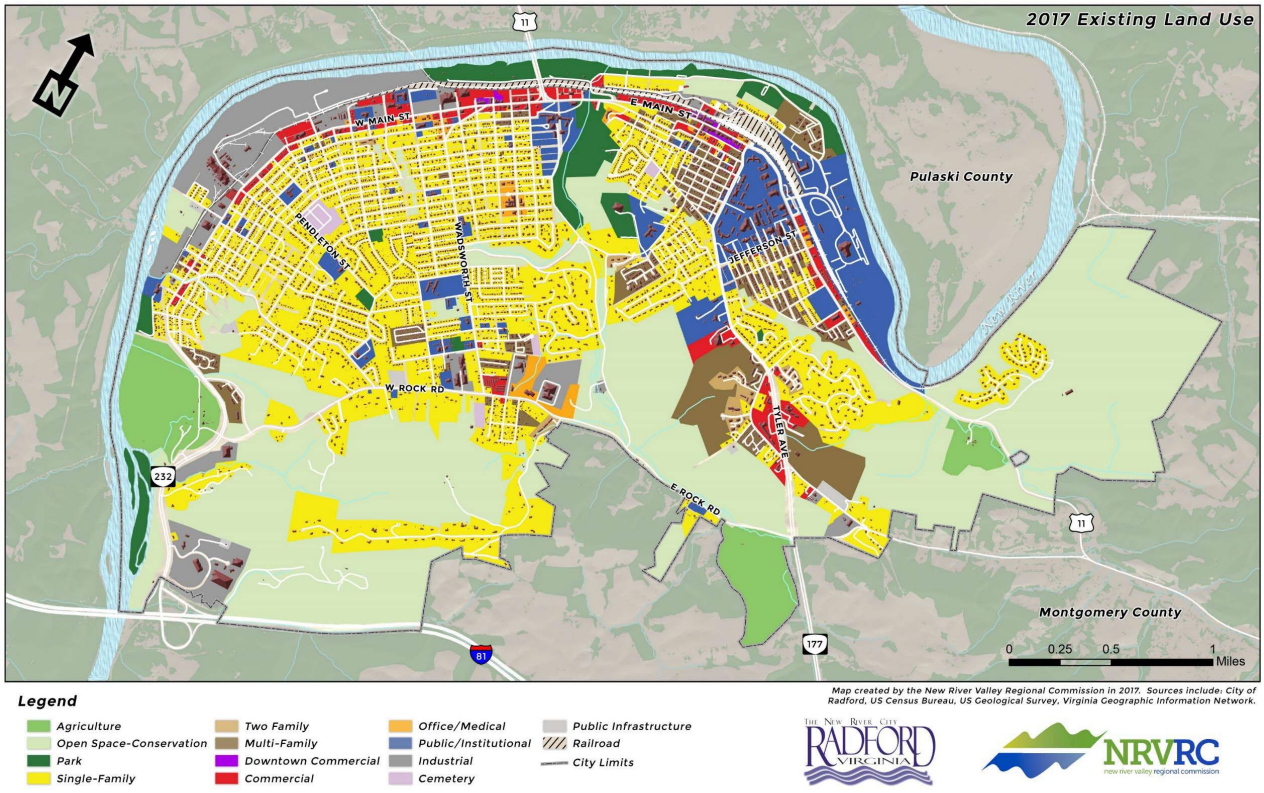


Figure 2-18 shows the City of Radford's potential future land use designated both in zoning and growth focus areas. The areas around Main Street are still intended to serve a commercial role as the Corridor Business Commercial center, while up-zoning the area immediately adjacent to Route 11 to downtown mixed-use provides more density. Additional mixed-use commercial developments have been added to the Tyler Gateway corridor. Potential single-family residential zoning has also been expanded South of W Rock Road and next to High Meadows Parkway. These future residential, commercial, and mixed-use areas represent potential service zones where enhanced transit service could be required to fulfill the transportation needs of future residents and businesses.

Figure 2-18: City of Radford Future Land Use

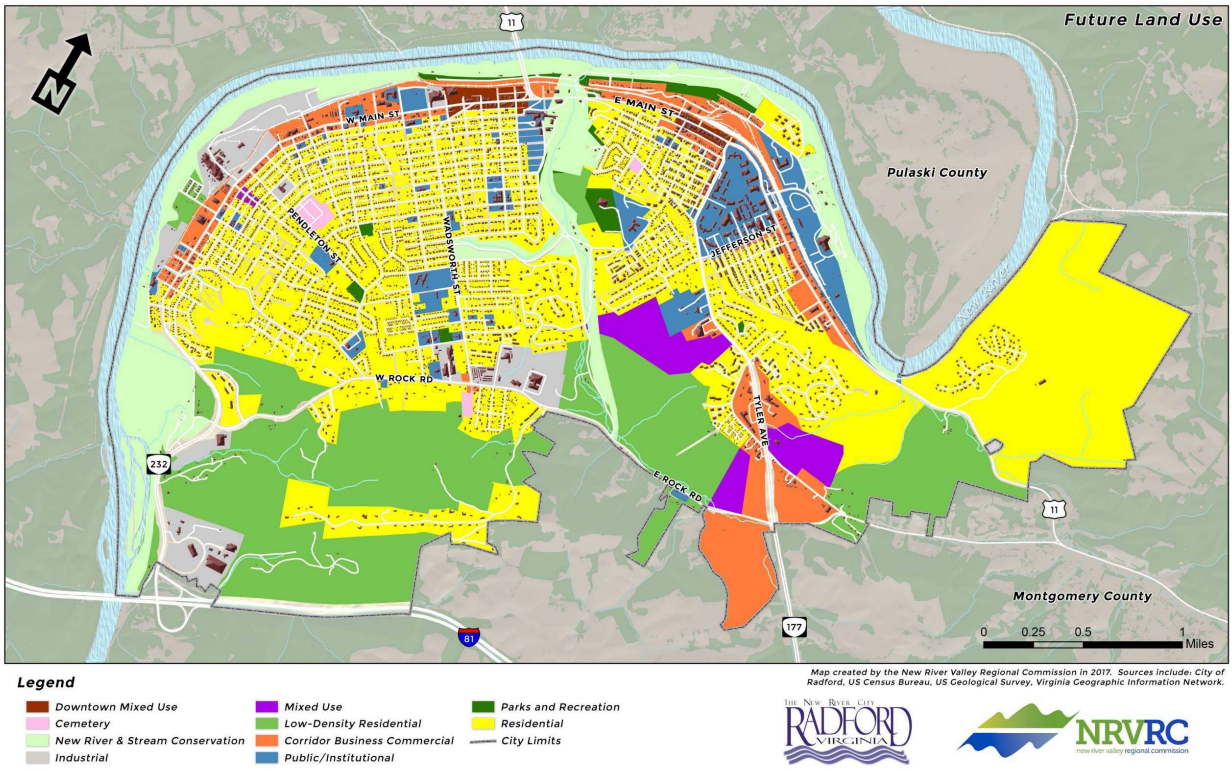
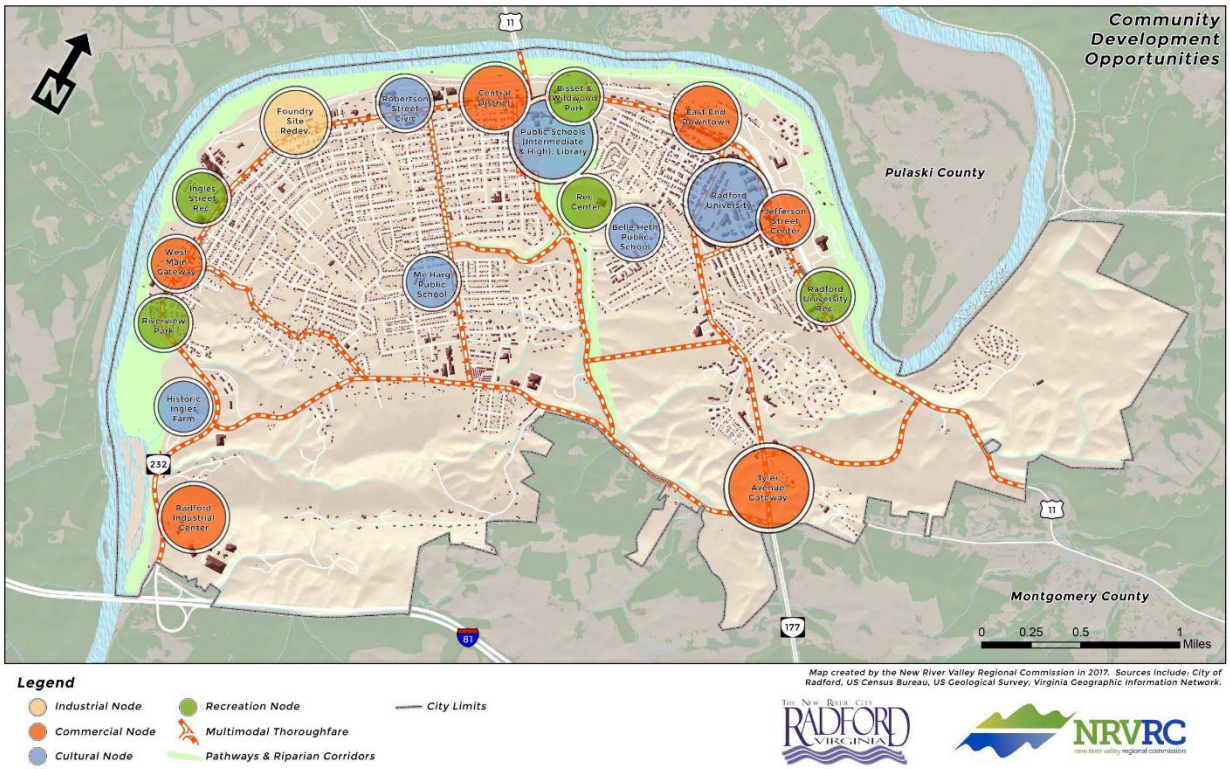


Figure 2-19 shows specific focus areas for community redevelopment broken out by general purpose type. To ensure resident access to these commercial centers, places of employment, and community amenities, future Radford Transit service should integrate these destinations as these specific node areas develop. Also shown is the planned transformation of current major streets traversing city neighborhoods into multimodal thoroughfares, which could include a transit component or at the very least, require single-occupancy vehicle model alternatives such as transit.

In addition to the development nodes, the City of Radford has also indicated four general Urban Development Areas (UDAs): the Central District, Foundry Industrial Area, Radford University and Tyler Gateway. The Central District and Foundry Industrial UDAs will feature pedestrian-friendly access to shopping, dining, employment, and recreational elements. Concurrently, RU's expansion will be driven by an outdoor recreational complex and amenities for students and faculty. Tyler Gateway will accommodate new student and resident housing as well as mixed-use development potential. Typically, these areas will not have sufficient parking to serve every trip generated, and non-vehicle access may be more desirable. Radford Transit service should consider expanding service to match future rider demand and travel patterns to and from these redevelopment areas.

Figure 2-19: Community Development Opportunities



The Radford TSP aims to capture the strategic vision for Radford Transit within the next ten years. As redevelopment and land-use trends progress, transit service should be planned to address the near-term and long-term needs of residents to travel from their homes to these development locations. To provide adequate transit service to existing land use and new growth areas, ensuring they remain connected to the community, these specific geographic areas and land use markets will be accounted for in the strategic planning process (i.e., some amount of transit service may be required as these areas continue to develop):

- Current and future commercial and mixed-use development along Central District
- Commercial and University development along East End Downtown
- Mixed-use and high density residential and commercial next to Tyler Avenue Gateway
- Single-family residential off Main Street and adjacent to Wadsworth and Pendleton Streets
- Future single-family residential along West Rock Road and in East Radford
- West Main Gateway/Riverview Park
- Radford Industrial Center
- Foundry Site (long-term)

Radford Transit also serves critical land use destinations outside the immediate City of Radford corporate limits, including destinations around Fairlawn and Dublin which are designated as commercial and medium density residential future growth areas by Pulaski County.[2] Additional regional destinations currently served by Radford Transit, including the Town of Christiansburg and Town of Blacksburg in Montgomery County, are projected to expand their housing and employment options over time. Regional trends are elaborated on more in the Population and Employment Growth sections.

Population Density and Growth

Existing Population Data

Identifying areas of population density for both current and future conditions plays a critical role in deciding where to concentrate transit service and how the network should change over time. Overall, fixed route public transportation is often most efficient when connected to high-density population and employment centers. Placement of transit service within one-fourth to one-half a mile of densely populated areas increases the ability of transit to serve a variety of trip purposes and destinations for multiple potential travelers. According to the Transit Cooperative Research Program (TCRP) Transit Capacity and Quality of Service Manual, 2nd Edition, densities of three households per acre (approximately six people per acre) or four jobs per acre can support hourly fixed route transit service.

[2] Pulaski County Draft Comprehensive Plan

Figure 2-20 shows the existing 2019 census-block level population density for the Radford Transit service area. Green shaded areas indicate areas of low population density, yellow and orange shows moderate density, while red shows highly populated areas.

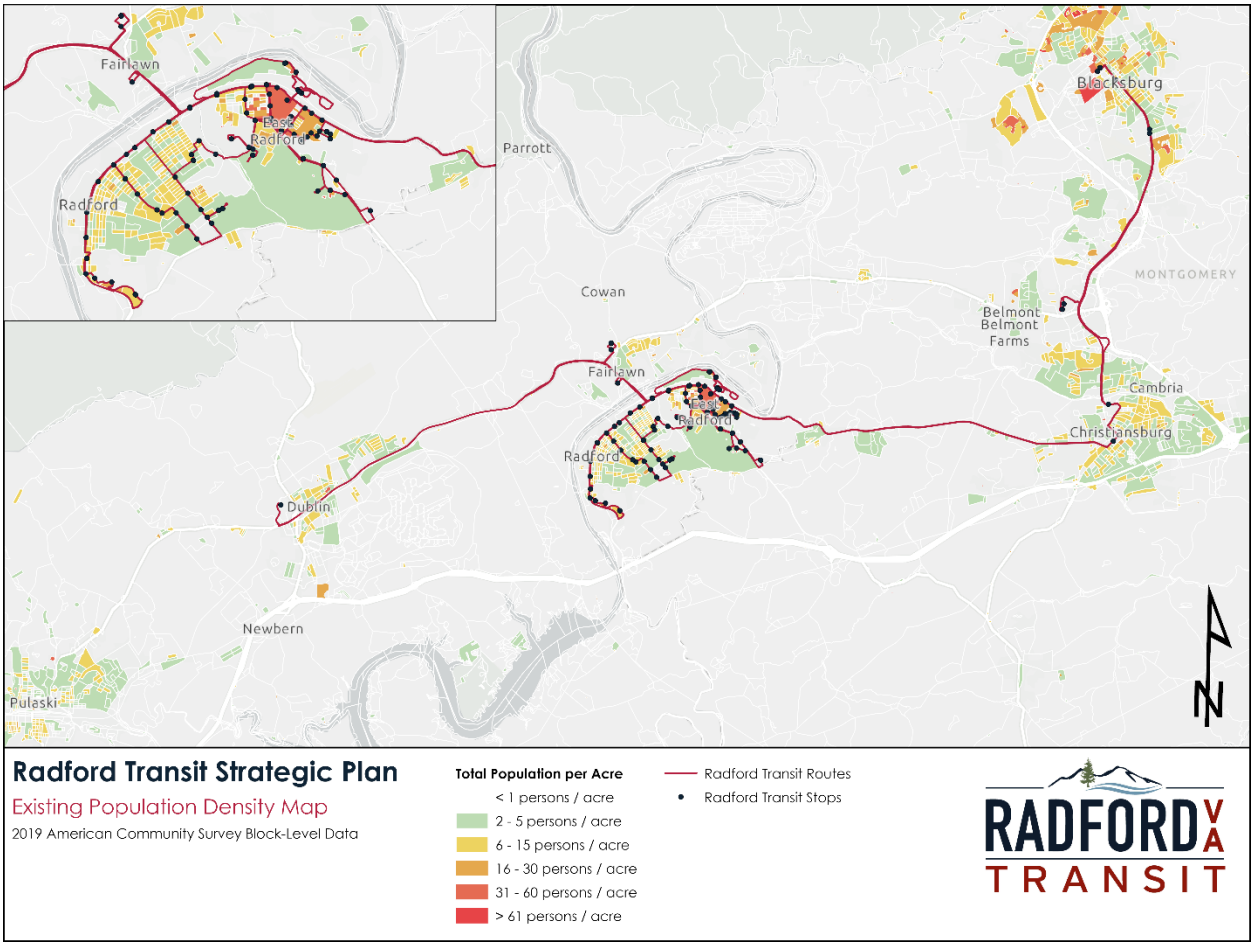
Some areas with moderate to high existing population density that are above the TCRP recommended threshold for fixed-route transit service include:

- Radford University – 42 Persons/Acre
- East Radford between Lawrence and Grove Avenue — 27 Persons/Acre
- West Radford along West Main Street adjacent to Jefferies Drive – 24 Persons/ Acre
- East Radford along Jefferson Street and Calhoun Street – 20 Persons/Acre
- West Radford along Wadsworth Street between Roosevelt Avenue and Sheppard Avenue – 15 Persons/Acre
- West Radford along Preston and Staples Street – nine Persons/Acre

Notable moderate to highly populated areas outside the City of Radford that are either currently served by Radford Transit or close enough to consider potential deviations or future stops include but are not limited to:

- Fairlawn east of Belspring Road – eight Persons/Acre
- Dublin along Broad Street Between Giles Avenue and Powell Avenue – six Persons/Acre
- Christiansburg residential neighborhoods North of Roanoke Street and adjacent to North Franklin Street – 13 Persons/Acre
- Blacksburg multi-family developments along South Main Street and Ellett Road – 15 Persons/Acre
- Blacksburg Virginia Tech Main Campus – 87 Persons/Acre

Figure 2-20: Existing Population Density Map



Future Population Forecasts

According to a Virginia Employment Commission (VEC), City of Radford's population is projected to grow from 18,355 in 2020 to 19,261 in 2030, with a growth rate of 4.9 percent. This is lower than the overall Virginia statewide growth rate of 9.2 percent. The population is expected to maintain its current age distribution between youth, working age and seniors, with the over-55 age group comprising 13.9 percent of the population in 2020 and 2030. The Radford Area minority population, such as the Hispanic and Latino population, is expected to increase from four percent of the population in 2020 to 10 percent of the population in 2030, potentially increasing the need for secondary language engagement for Radford Transit.

The New River Valley Metropolitan Planning Organization (NRV MPO) also maintains a travel demand model with the Virginia Department of Transportation that is used to forecast travel conditions and behavior. **Figure 2-21** illustrates the travel demand model's assumptions for growth for the Radford Transit service area from 2016 to 2045. Overall, the NRV MPO travel demand model projects the modeled region (which includes City of Radford and Montgomery County) will grow its net population by 12,583, while Radford and immediate areas around it are projected to grow by 3,559. Although the recommendation timeline in the Radford TSP is planned to a time horizon of 2034, not 2045, service adjustments can be planned to cover areas of anticipated population dynamics in the region. Some notable areas of population change that Radford Transit can target include:

- Moderate-high population growth greater than 500 persons along U.S 11 in New River and Cowan.
- Moderate growth of 100 persons or more in East Radford along East Main Street extending to Plum Creek.
- Growth of 255 persons in West Radford adjacent to Riverview Park.
- Loss of population greater than 100 in communities adjacent to the Little River as well as Christiansburg on North Franklin Street.

Figure 2-21: Population Change from 2016–2045

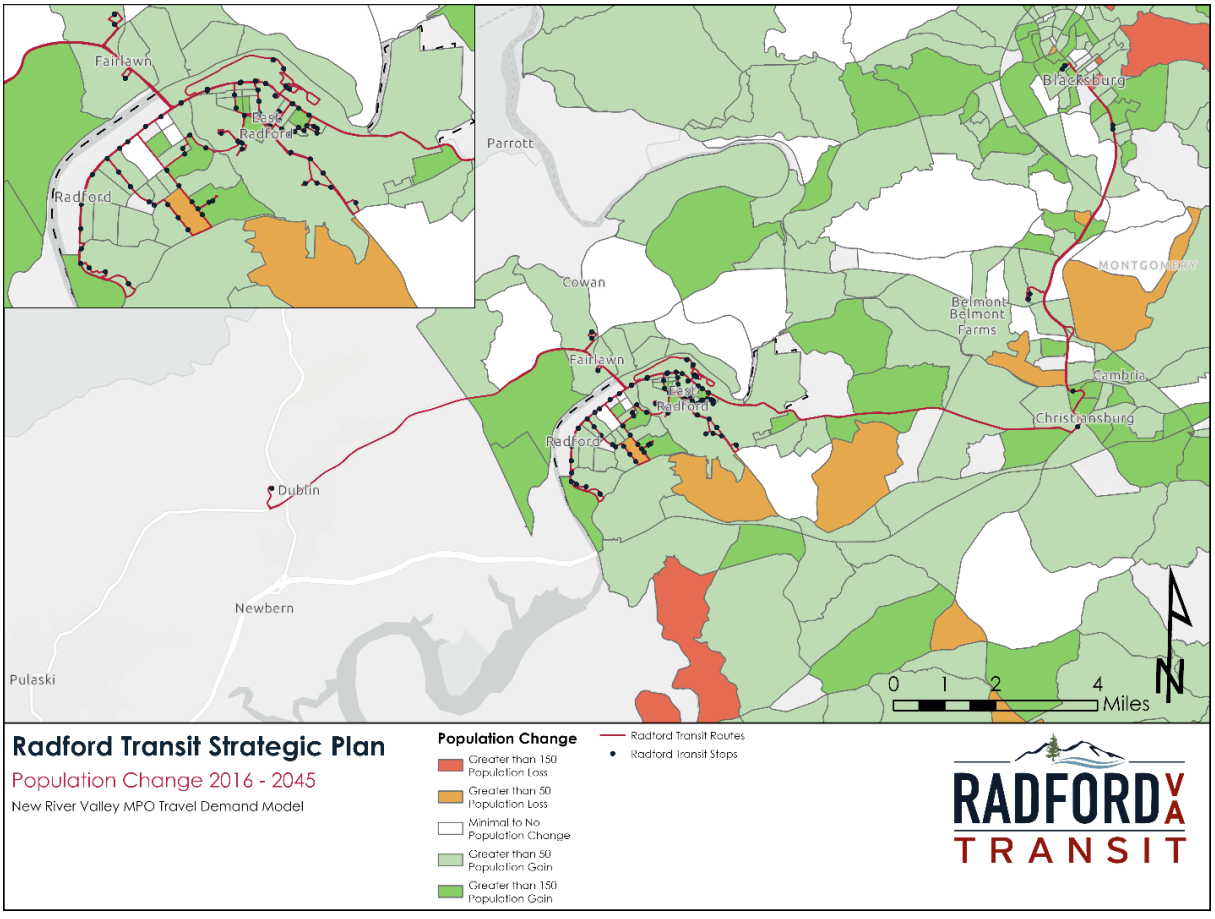
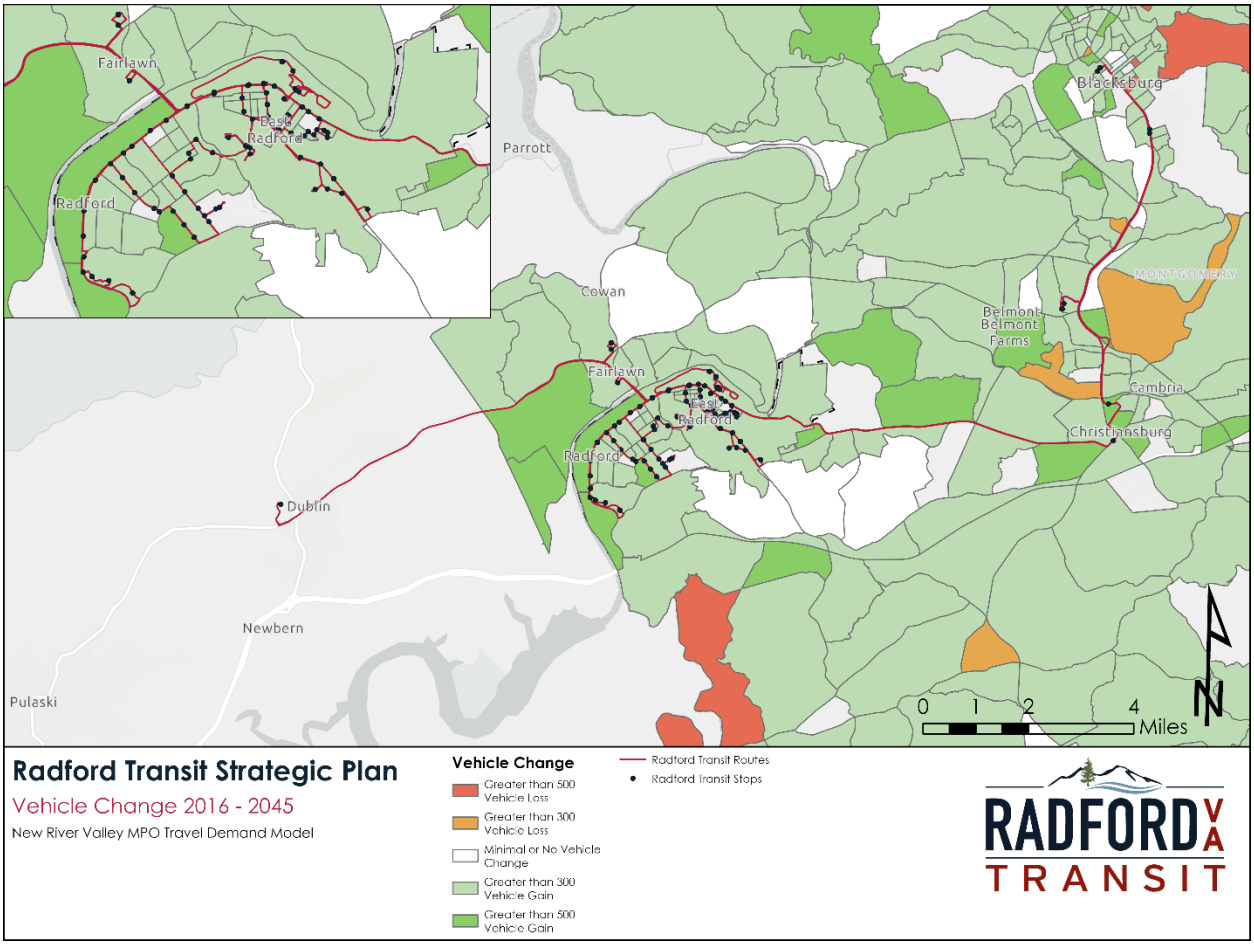


Figure 2-22 references the number of projected vehicles trips in 2045 across all Transportation Analysis Zones (TAZs) from the travel demand model. In the Radford Transit service area, the change in number of vehicles trips to residents is expected to increase by 30,785 for a typical weekday and more than 8,001 for City of Radford and its immediate surroundings. Similar to the population distribution change in the travel demand forecast, the number of daily vehicle trips can also be used to adjust transit service towards communities seeing increased levels of long-term activity. Within the Radford service, increase vehicle trips as a surrogate for activity can also be used to target areas where transit should be promoted more actively, to avoid increased vehicle traffic.

Figure 2-22: Vehicle Change from 2016–2045



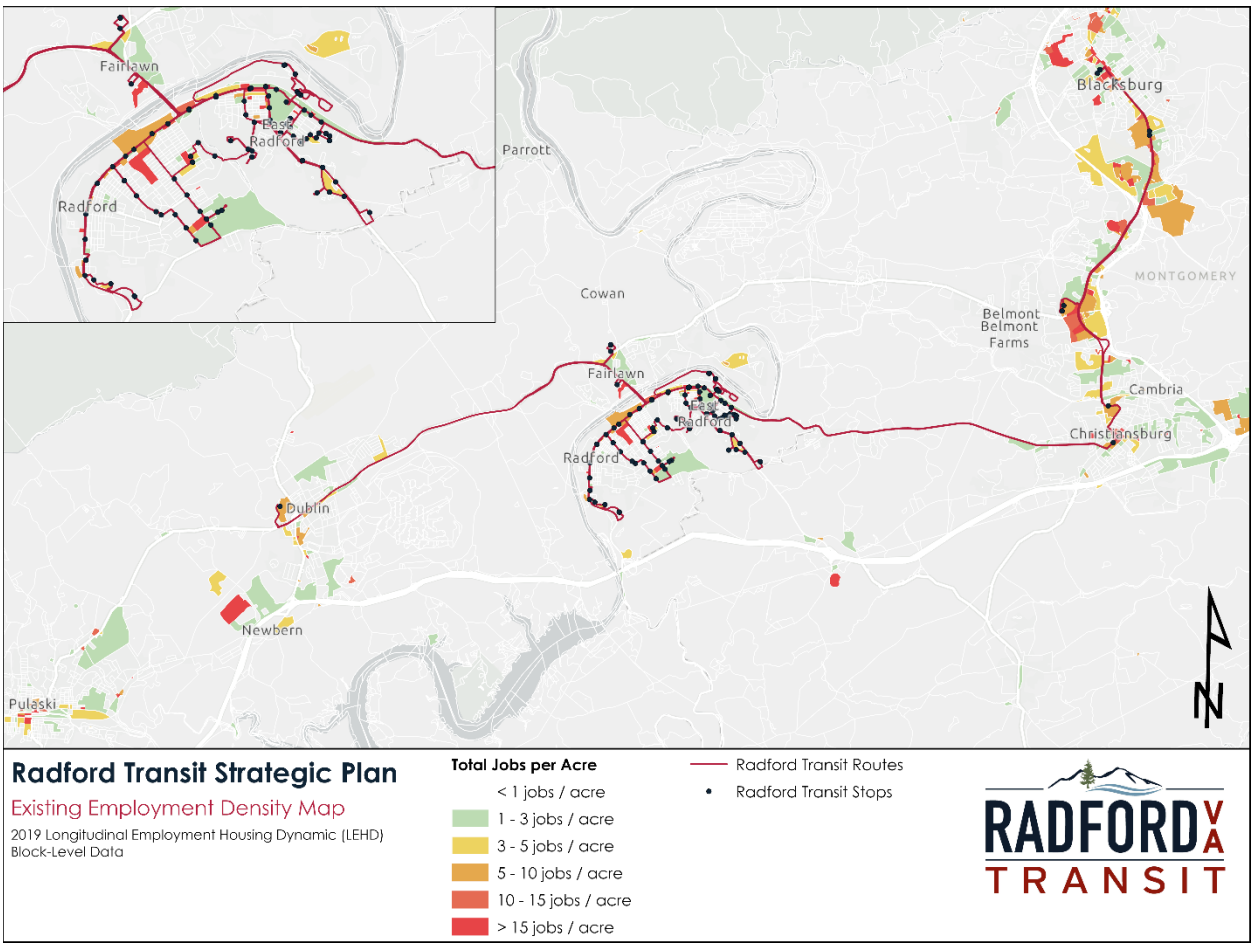
Employment Density and Growth

Existing Employment Data

Employment is traditionally one of the key drivers of transit fixed-route ridership because of regularity of commuting demand to deliver travelers to constant work locations. While changes in employment and labor market trends are still developing as result of the COVID-19 pandemic, concentrations of employment, especially classified employment such as retail where in person-work is still encouraged, are still a strong indicator of transit demand.

The Transit Capacity and Quality of Service (TCRP) Manual suggests that employment density of four jobs per acre or more can typically support base-level fixed route service. **Figure 2-23** shows the distribution of employment density in and around the current Radford Transit service area. Areas within the city with a high number of jobs include RU, Fairlawn, industrial workshops off West Main Street, as well as McHarg Elementary School. Outside the immediate Radford limits, Carillion Medical Center, the Uptown Christiansburg Mall, Lewis Gale Hospital, as well as Virginia Tech Campus in Blacksburg feature moderate to high job density that requires in-person employment that may be served by transit.

Figure 2-23: Existing Employment Density Map



According to Longitudinal Housing and Employment Dynamics (LEHD) data published by the Census, the New River Valley Planning District, a region which includes the City of Radford, employs 44,839 persons who live and work in the area, while another 23,734 persons commute in for work. For Radford specifically, 1,366 persons both live and work within City limits, while 6,326 commute into the city and 3,448 commute out of the City. Of the residents that commute from Radford, 1,243 are traveling to Montgomery County while 578 are traveling to Pulaski. Of those commuting into Radford, 1,890 come from Montgomery County and 1,711 come from Pulaski. Where exactly these work trips are occurring will be further elaborated on in the Travel Pattern section of this analysis.

In areas without central business districts and high-density employment, it is often useful to analyze major employers as unique destinations that could be served by transit to assist with more specific route planning. According to the VEC, which prepares economic and labor market data for Virginia localities, some notable employers in the New River Valley Planning District and Radford include:

- Virginia Tech – City of Blacksburg
- Volvo Truck North America – Town of Wurno
- Radford University – City of Radford
- Montgomery County School Board – Montgomery County
- Carilion New River Valley Medical Center – Montgomery County
- Bae Systems Ordnance System – Montgomery County
- Moog Inc – Radford, Blacksburg, Christiansburg
- Walmart – Pulaski, Montgomery County
- Kollmorgen Corporation – City of Radford
- Food Lion – New River Valley Regional
- City of Radford – City of Radford
- Radford School Board – City of Radford
- Goodwill Industries – City of Radford

Future Employment Forecasts

Current 2022 sectoral employment in the City of Radford is driven by State Government (1,614), Manufacturing (959), Local Government (554), Accommodation and Food Services (544) and Retail (420). The VEC does not forecast sectoral-level employment for Radford. However, the VEC does provide a snapshot of new hires by industry and long-term industry employment projections for the wider New River Valley region. There are projected to be 9,951 new job opportunities, or a growth of 6.92%, by 2040. The following major industries are expected to see significant job growth or decline:

- Health Care – growth of 2,719 or 17.7 percent
- Educational Services – growth of 2,327 or 10.9 percent
- Retail trade – growth of 862 or 4.8 percent
- Accommodation or Food Service – growth of 735 or 5.41 percent
- Manufacturing – decline of 752 or -2.9 percent

Figure 2-24 illustrates the forecast employment growth in the New River Valley model by Transportation Analysis Zone (TAZ). Areas that are projected to increase their overall employment within the City of Radford and adjacent to existing Radford Transit's city routes include Rock Road West and Forest Avenue, as well as commercial development in Christiansburg along Peppers Ferry Road and Roanoke Street. The area containing the Carillion New River Valley Medical Center also presents a potential opportunity for transit to serve the growing healthcare job market and the medical needs of residents.

Figure 2-24: Forecast Employment Change 2016–2040

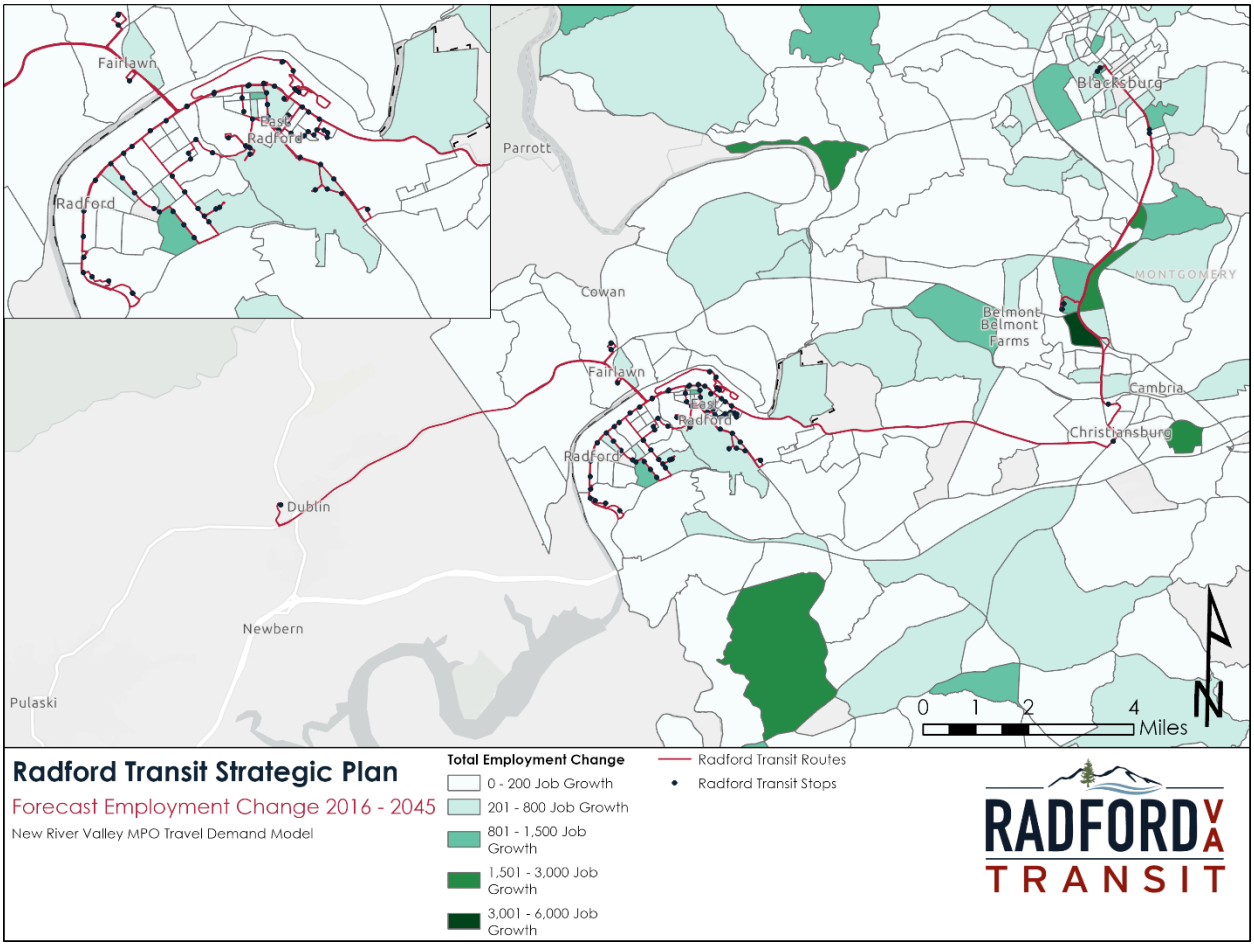
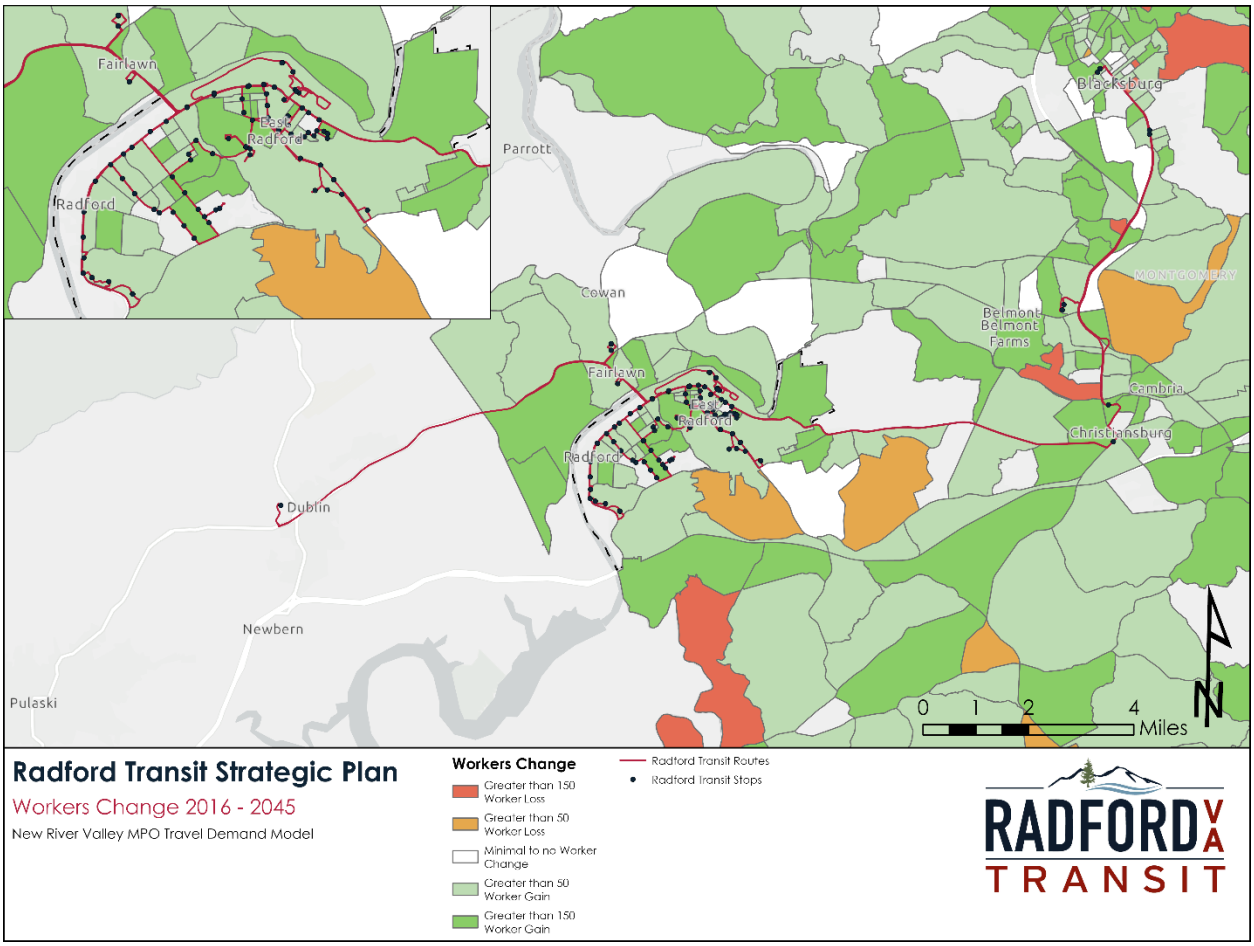


Figure 2-25 shows the change in number of persons of working age forecast in the New River Valley Model. Areas with high growth in number of employees include those within City limits and within the urban boundaries of other regional towns and cities such as Christiansburg and Blacksburg. Rural areas in the New River Valley those to the south of and east of Radford see low to moderate worker growth while those surrounding the Little River see declines proportional with the population decline in those areas. For Radford Transit, there are future opportunities to connect areas with employment growth seen in **Figure 2-24** with worker population growth areas observed in **Figure 2-25** through a transit connection. This would serve a future commuter market that could connect where future workers may reside directly to places of growing sectoral employment.

Figure 2-25: Forecast Number of Workers Change 2016–2045



Transit Potential

Areas with both higher density of residents and/or jobs often correlate with higher transit ridership. A transit potential evaluation combines the population and employment densities of each TAZ to indicate the viability of a fixed route transit service in the area. Although population and employment density are not the sole factors in selecting where to operate transit, transit is typically the most viable in areas with population densities of six people per acre and job densities of four jobs per acre. Together, the transit potential model assumes that regions where residents plus jobs total more than five per acre are transit supportive.

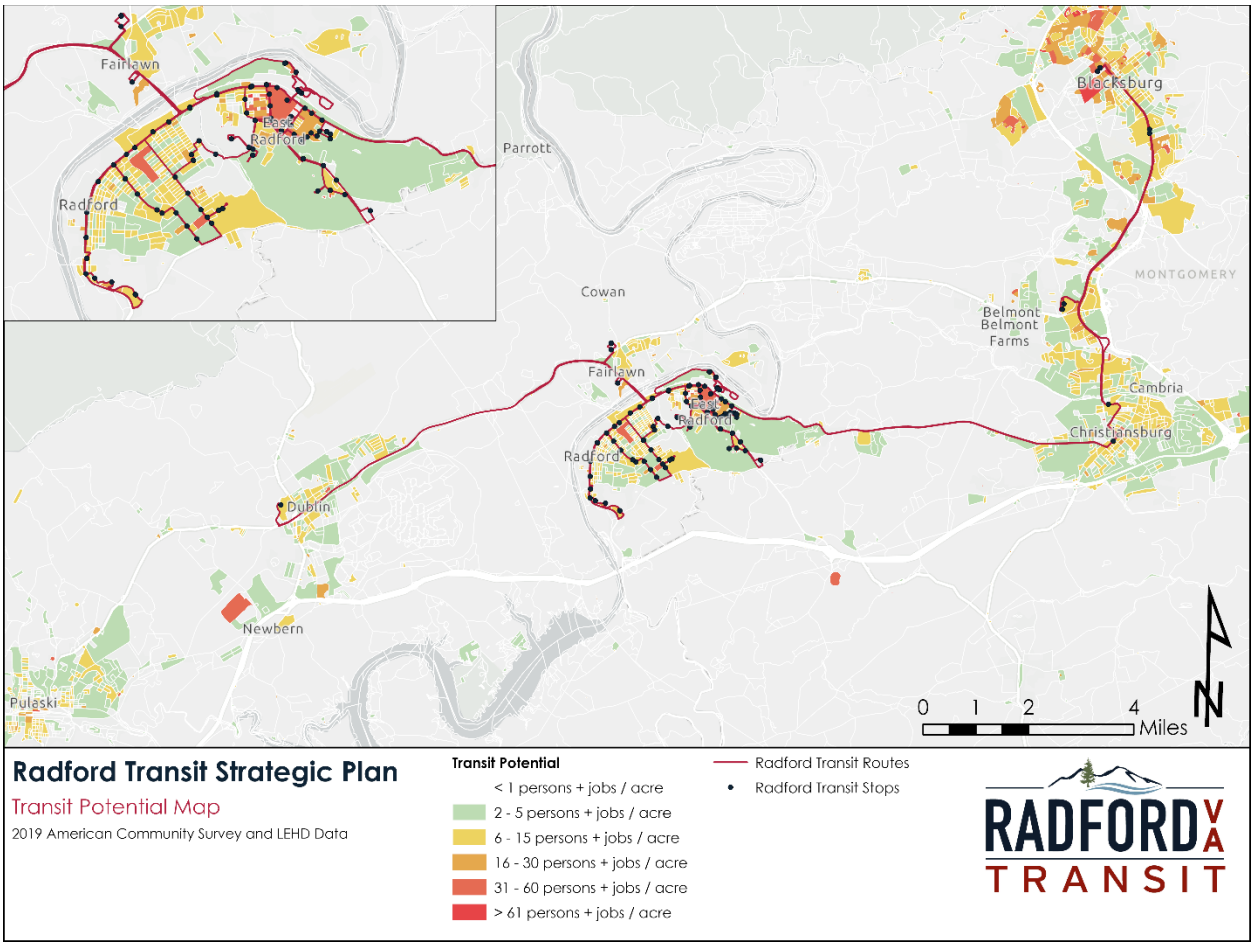
Table 2-4 Transit Potential Thresholds

Category	People and Jobs per Acre
Negligible	<1
Low	1-5
Low-Moderate	6–15
Moderate	16–30
Moderate-High	31–60
High	>60

Figure 2-26 shows the transit potential calculated for the Radford Transit service area and surrounds. The distribution of Transit Potential is similar to overall density patterns as moderate to high population density in Radford and surrounding areas drive much of the transit potential. Additional population and job combinations areas of high transit potential that may be further evaluated for service could include:

- Radford University – 40 Persons + Jobs / Acre
- West Radford adjacent to Wadsworth Street – 45 Persons + Jobs / Acre
- East Fairlawn – 16 persons + Jobs / Acre
- Commercial Offices, Retail and Senior Living off U.S 11 and University Park Drive – 17 Persons + Jobs / Acre

Figure 2-26: Transit Potential



Note that at a regional scale, the areas of Blacksburg and Christiansburg both indicate areas of high transit potential consistent with those found along Main Street in the City of Radford.

Transit Propensity

Transit propensity indices use population and employment to determine geographic areas with a high demand and need for fixed route transit service. However, a transit propensity index also included additional demographic and employment statistics to create a model assuming certain demographic subgroups may be more inclined to use transit. For example, a location with a high number of zero-car households will be more likely to have potential transit users than a location with relatively more multi-car households. Whereas transit potential is those who might ride transit, transit propensity is those who depend on it.

The transit propensity index for this study is created using the 2021 U.S. Census American Community Survey (ACS) data. Within the model, block groups and tracts are ranked based on demographic or employment characteristics (such as total population, or total jobs). Each block group is subsequently assigned a score for each characteristic based on its rank. Scores are then multiplied by weights associated with each characteristic and combined to generate a propensity score for each block group.

The model developed for this study assumes that areas with higher total population or household densities, as well as higher concentrations of seniors, youth, persons living in poverty, households with reduced vehicle access, and disabled persons will have a greater propensity to use transit.

Table 2-5: Transit Propensity Weights

Category	Weight
Total Population	25%
Youth Population	10%
Senior Population	15%
Low-Income Households	20%
Zero-Car Households	10%
One-Car Households	5%
Persons with Disabilities Population	15%

Figure 2-27 through **Figure 2-31** reveal the major demographic categories that comprise the Transit Propensity Index, broken down into maps showing where the geographic location of each category with major weighting.

Figure 2-27 shows the percentage of the overall population that is 18 or younger that would represent younger riders who may rely on the bus to get to school or other trip purposes. Youth population in the Transit Propensity score is weighted at 10 percent. Youth population with the Radford Transit service area is concentrated mostly around West Radford along West Main Street but also South of Radford along Rock Road.

Figure 2-27: Age 18 or Younger Population Percentage

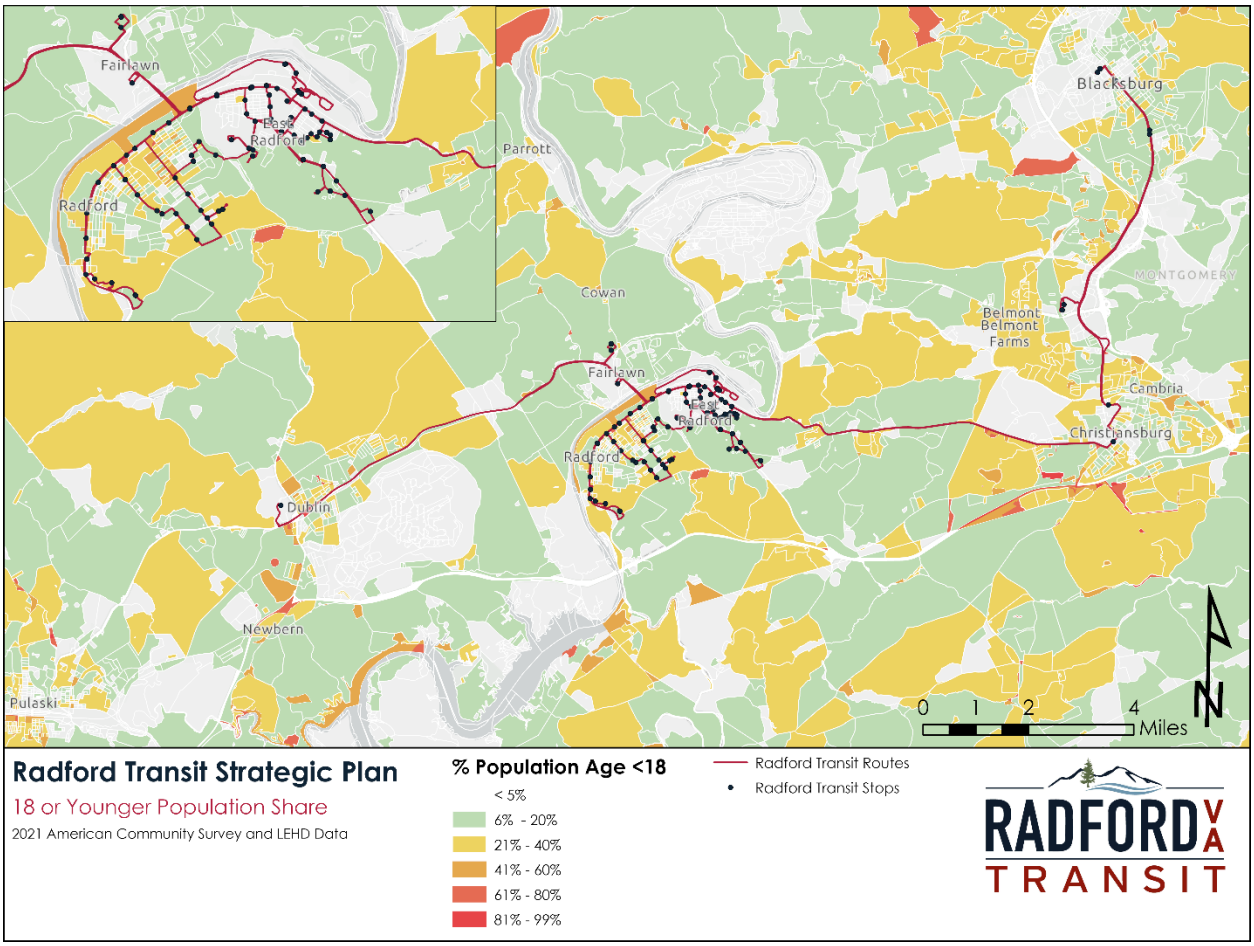


Figure 2-28 shows the percentage of the overall population that is age 65 or older. Often seniors may be more inclined to ride transit service to travel to essential destinations such as healthcare, social and shopping. Within the wider Radford Transit service area, the senior population as a percentage of total population are concentrated mostly outside the City of Radford, mostly in Fairlawn, Plum Creek, and Dublin. Senior populations within the City of Radford are concentrated in the neighborhoods adjacent to Rock Road and Wadsworth Street.

Figure 2-28: 65 or Older Population Percentage

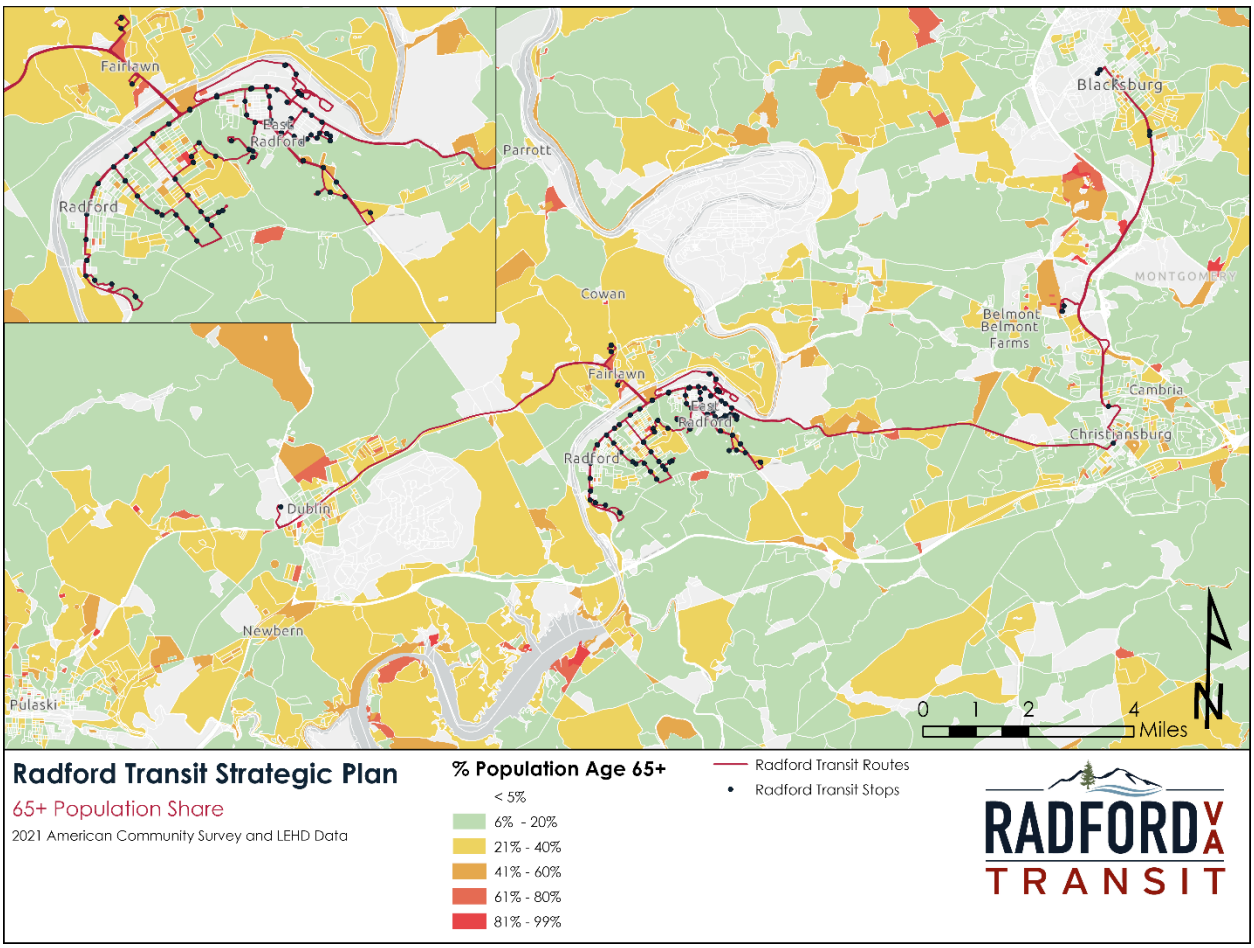
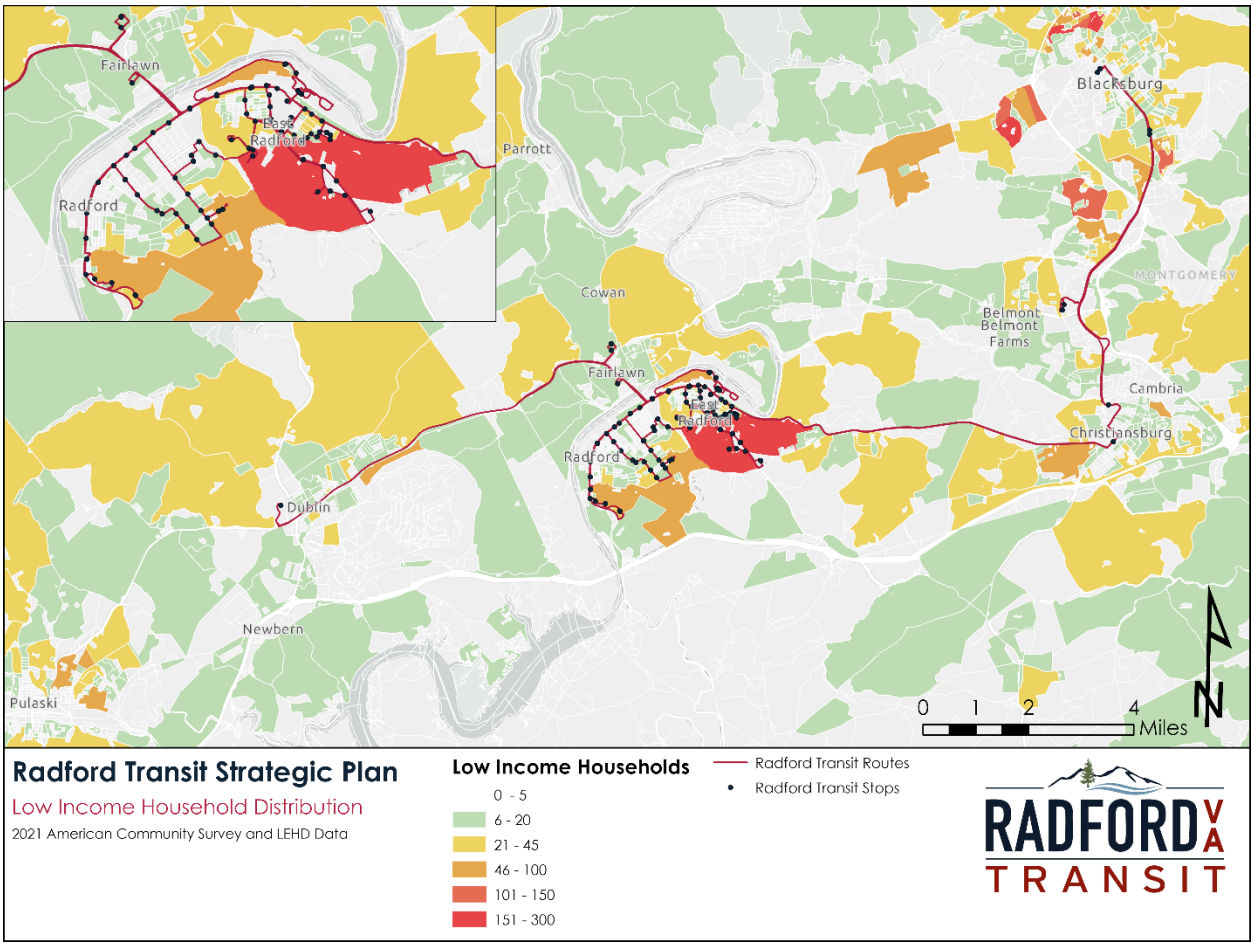


Figure 2-29 shows the low-income household distribution, which makes up 20 percent of the Transit Propensity weighting. Low-income thresholds are determined by the Housing and Human Services (HHS) Poverty Guidelines[3] for 2023, who measure the minimum income needed to support a certain number of persons in a household. In the Radford Transit Service Area, most of the households that qualify as low-income are found in the East and South of the City around the communities of Willow Woods and neighborhoods off of Tyler Avenue and East Main Street. Outside the City Boundary, prevalence of low income households are found adjacent to Lee Highway and Depot Street NW in Christiansburg as well as Ellett Road in Blacksburg.

Figure 2-29: Low Income Household Distribution



[3] https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines

Figure 2-30 shows the distribution of households with zero vehicles available in the Radford Transit service area. Often households without access to personal vehicles rely on walking, biking, shared rides, or public transit to travel from their homes to a variety of destinations. Most households without cars are concentrated in urban centers in the New River Valley where transit and other multi-modal options are available. Within Radford, buses could serve neighborhoods such as apartments off East Main Street between Jefferson Street and Robey Street. There are also areas with more than 12 zero car households in Southwest Radford, specifically apartments and single-family housing along Rock Road West. Outside of the City limits, there are limited households in Pulaski County west of Dublin and in Montgomery County in the towns of Christiansburg and Blacksburg that are adjacent to Radford Transit routes on Franklin Street and U.S 11.

Figure 2-30: Zero Car Household Distribution

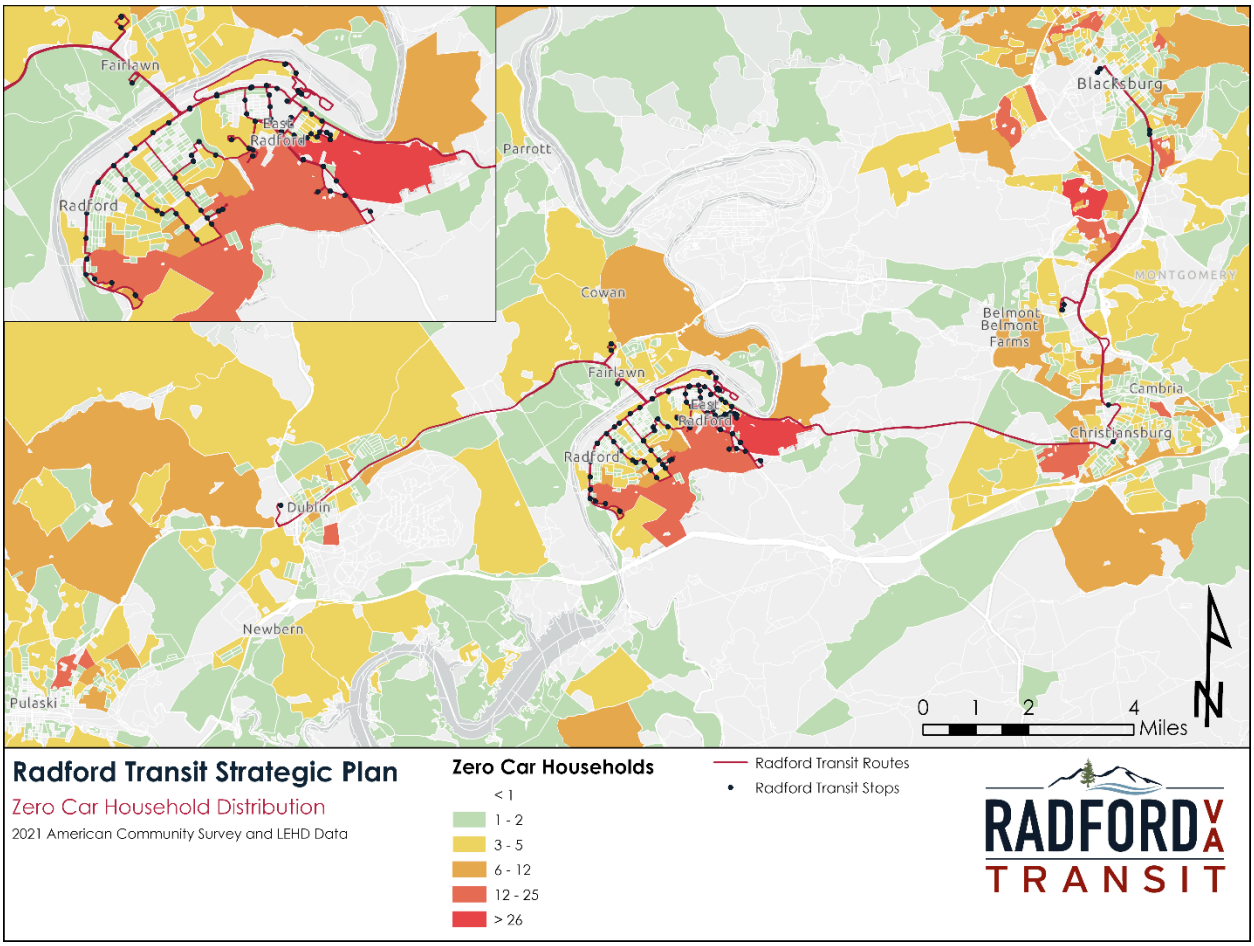


Figure 2-31 shows the distribution of the population that identify as disabled in the Radford Transit service area. Often those with disabilities rely on public transit or other forms of mobility assistance to reach destinations such as shopping and healthcare. In addition, those who are responsible for rendering in-home aid to the disabled population often rely on transit to visit patients' homes. Within the City of Radford, Radford University has the highest concentration of disabled persons, with 112 persons identified as disabled, while East Radford has at least 80 persons identified as disabled. Communities along Forest Avenue South have a total of 62 persons identified as disabled. Outside of Radford, Cowan in Pulaski County as well as Northwest of the Town of Dublin average at least 51 persons identified as disabled, while some communities around Belmont and south of Christiansburg also have high densities of disabled persons.

Figure 2-31: Disabled Population Distribution

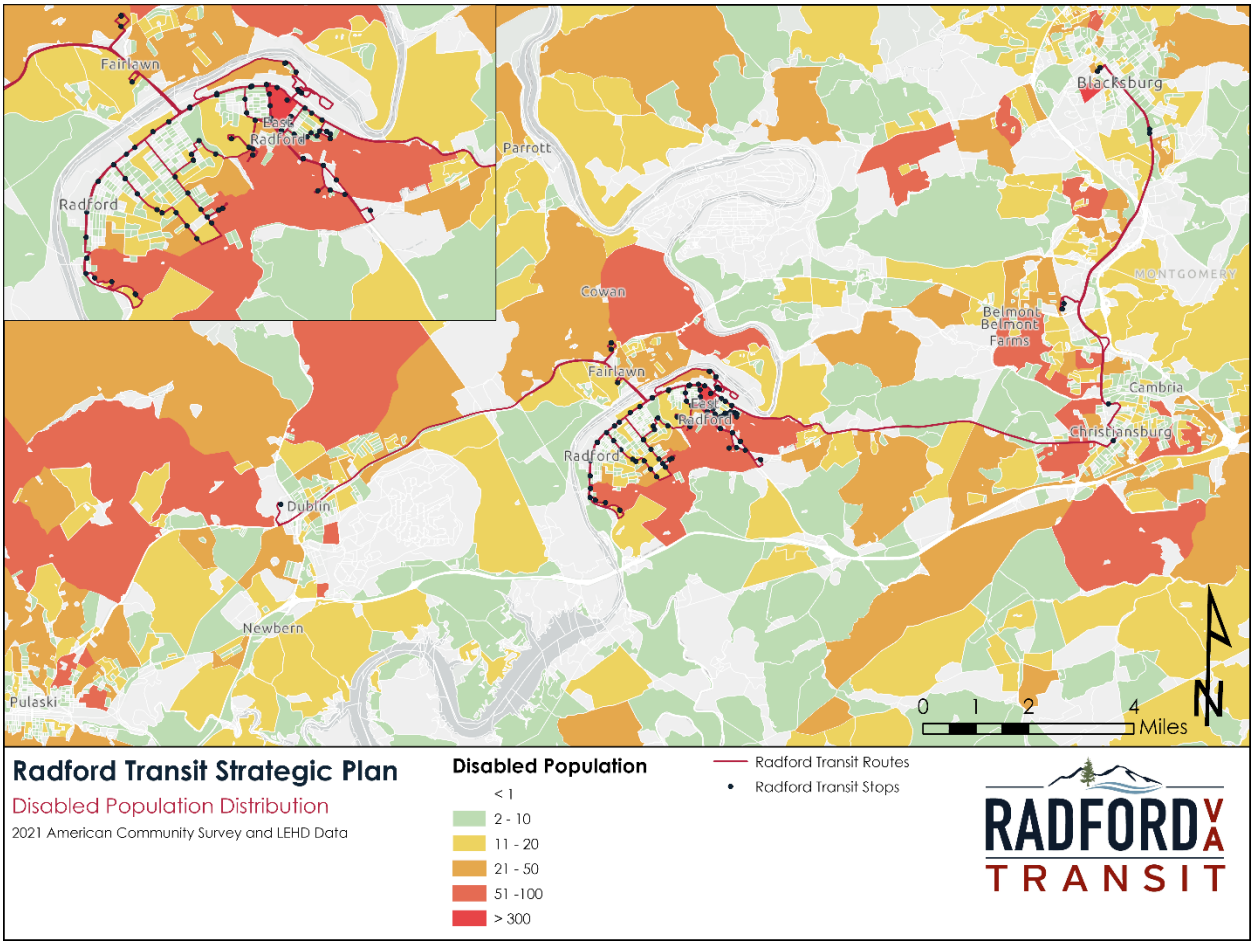


Figure 2-32 and **Figure 2-33** show the calculated transit propensity based on the above weighted factors at the census block group level (note that more granular data is unavailable based on the demographic input factors). **Figure 2-32** shows the transit propensity calculated for the New River Valley area, which means that the transit propensity for the City of Radford is calculated against the maximum and minimum of demographic categories in other towns and cities such as Blacksburg and Pulaski. **Figure 2-33** shows Radford-specific transit propensity at the census block group level which calculates the propensity score of Radford's base demographics, which would be more appropriate for assessing city-wide transit need.

Since the weighting prioritizes population, low-income, seniors, and need-based demographic categories, the appearance on the map varies from the transit potential or population density figures, as transit propensity puts more of an emphasis on those who rely on fixed-route transit service. Specific areas with moderate to high transit propensity scores which may be further considered for transit service adjustment or improvement include:

- West Radford between West Main Street, Rock Road West and Park Road
- East Radford adjacent to U.S 11 and Lee Highway
- Fairlawn east of Pulaski Avenue
- Tyler Avenue

Figure 2-32: Transit Propensity Map

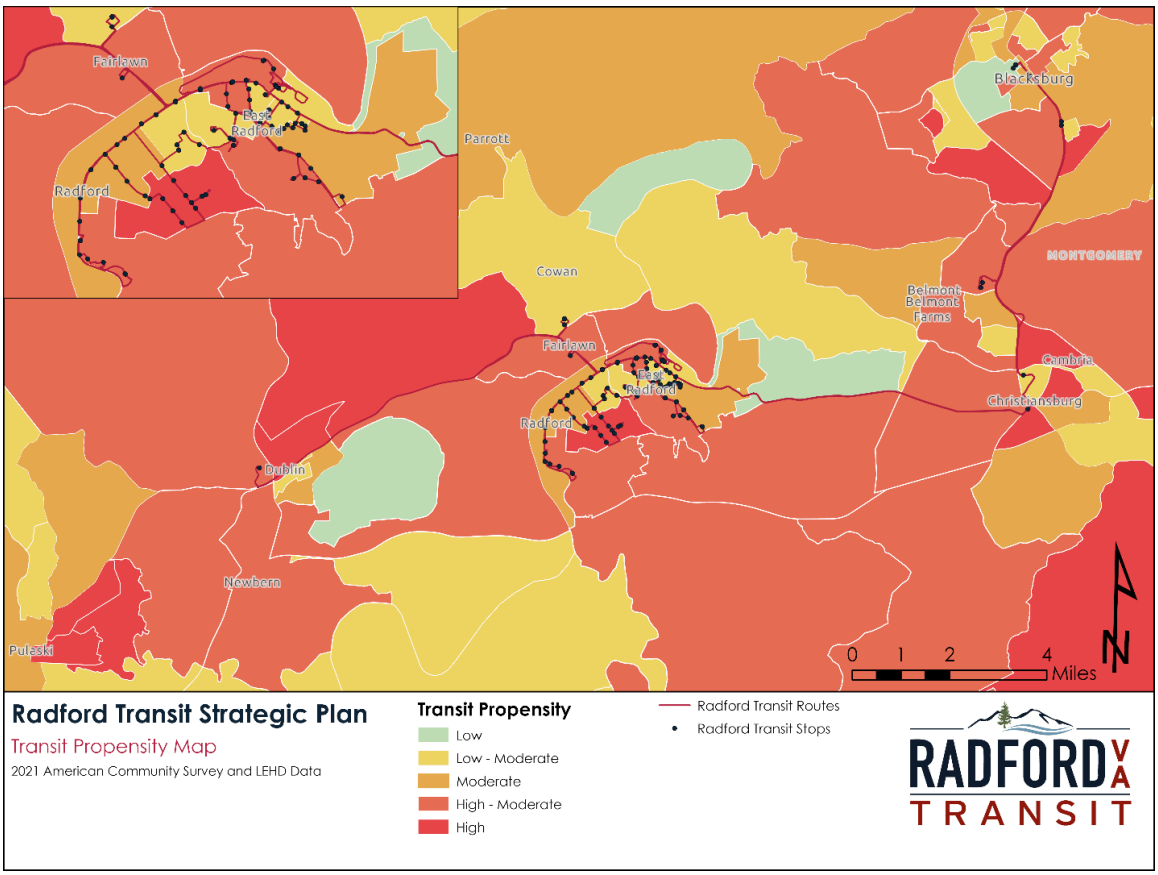
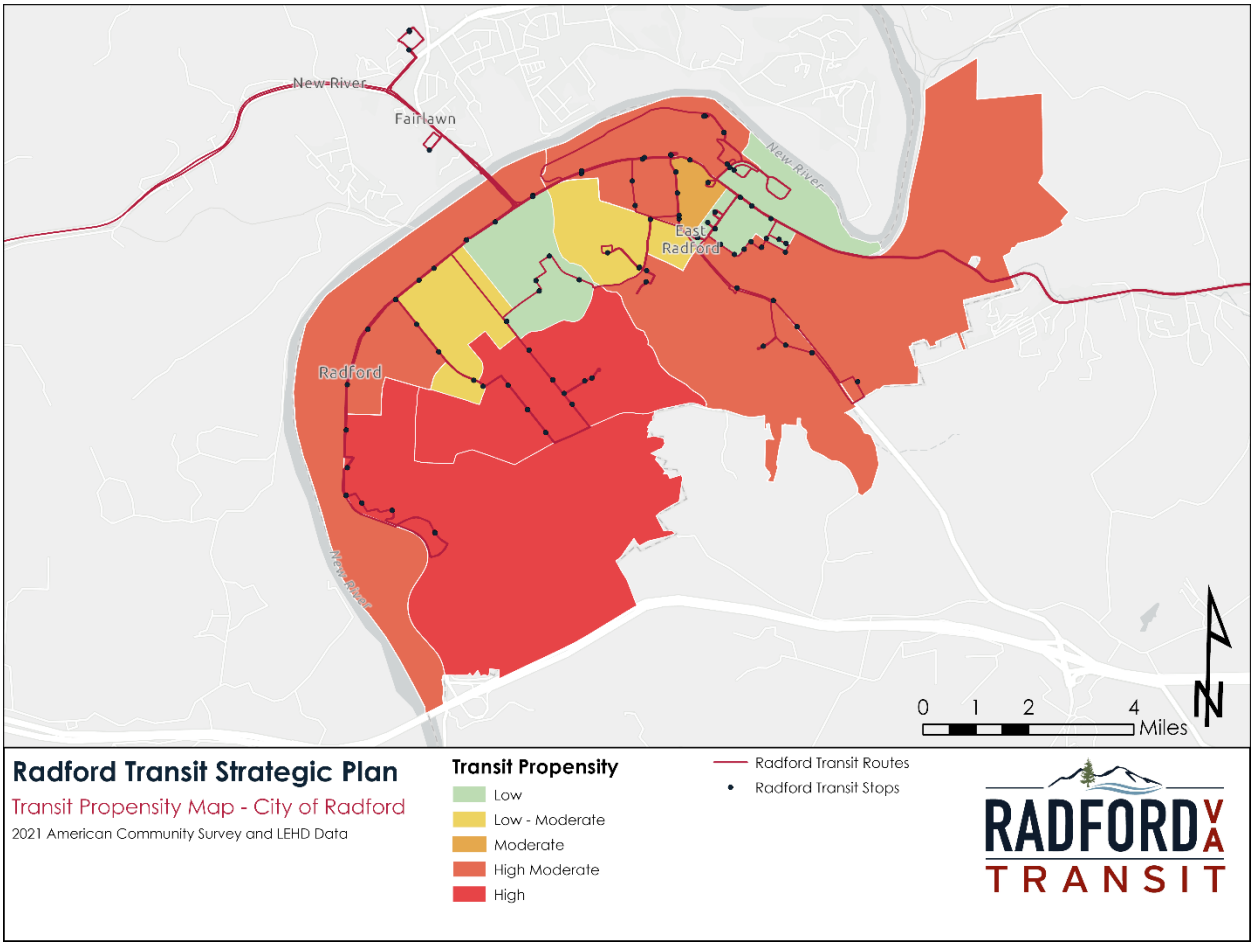


Figure 2-33: Radford Propensity Map (City of Radford Only)



Travel Patterns

In addition to the County-level population and employment information as described previously, more granular data on travel patterns and the overall demographic market for the City of Radford provides additional insight into who may be traveling, when they travel, and by what mode they typically travel. This information, combined with previous transit potential and demographics analysis, supports the understanding and development of more complex transit service and potential transportation needs. Analysis of this travel data will help answer the who, when, why, how, and where of travel in Radford and allow analysis of Radford Transit's role in servicing these markets.

This analysis is intended to provide Radford Transit an overall travel behavior survey of all of the City of Radford and surrounding counties to determine what rider segments and market opportunities transit can serve. Each section contains graphs explaining the overall travel in Radford, descriptive analysis of the data within the graph, as well as summary bullets at the end of each section explaining the applications of the data to address gaps in existing Radford Transit service.

Travel Market Data

The data used to understand and analyze granular travel information for this study is Replica. Replica is a third-party dataset which uses cellphone, GPS, and other anonymized location-based sources such as credit card transactions to model travel demand down to the Census Block level. Data is summarized at the person trip level, representing the characteristics of when an individual starts and end their journey. This is not to be confused with "Transit Trip" which refers to the run a bus may make on a certain schedule and certain route.

Person trip is sourced for Thursdays and Saturdays in the Fall of 2022 and is validated against real-world conditions. Replica provides unique insight not only into travel patterns within Radford, but also facilitates the assessment of wider origin and destination travel patterns across the region. Additionally, the data component enables a categorical breakdown of trips by purpose, length, duration, mode taken, and start and end times.

Replica also provides anonymized data on trip takers including household income, age, race, ethnicity, approximate home, work, and school location, and employment. Replica distinguishes trips taken by visitors versus full-time residents in the City of Radford and surrounding counties. As a result, it is useful for transit service network development to serve the needs of various customers. When combined with origin and destination data, this demographic data enables the evaluation of trips through various lenses. With this additional detail, transit service development can be catered to more specific customer needs by location.

Travel data considered in this analysis is separated into two major categories of trips taken:

1. Originating within the City of Radford, Pulaski County, Montgomery County, and Giles County
2. Originating outside of and terminating within the City of Radford, Pulaski County, Montgomery County, and Giles County

Trips starting within the City of Radford can be further broken into trips that only stay within the city and surrounding counties and trips that end externally of the city and surrounding counties. Trips starting and ending within the city and county area might be considered applicable to aligning local bus service with internal travel patterns. Travel from internal trips may be used to match Radford Transit service supplied and route structure with travel demand. Trips starting in Radford and crossing into other further neighboring jurisdictions could be considered for commuter or regional service.

External trips represent an opportunity for Radford Transit to serve employment and commercial centers if there are no partner regional routes currently serving the external trip markets into the City of Radford. If there are regional providers serving these trips, Radford Transit could coordinate service to ensure coverage of popular destinations within the city but avoids service redundancy.

Travel Demographics

This section details the demographics of trip takers starting and ending within Radford and surrounding counties (i.e., "who" is traveling). Replica data contains demographic information on trip takers such as individual and household income, household size, race, ethnicity, sex, work from home status, as well as available vehicles. These demographic categories can be correlated with trip travel data to determine the composition of travel markets throughout an area and evaluate whether transit is serving the travel demand of different populations.

Figure 2-34 shows the employment status and household income measured by number of trips taken in the City of Radford. This analysis shows the number of trips taken by low, medium, and high-income households during a typical weekday, as well as a breakdown of the work status (in-person work, remote work, unemployed, or under 16) of the trip takers within each household income group. Typically transit focuses on those with in-person work arrangements to provide the greatest usefulness for moderate to low-income commuters. Some key observations that will help determine transit service from **Figure 2-34** include:

- Household income groups of $25–$75k have the most trips with 18,000 trips each
- Most people work in-person across every income level (as opposed to remote work)
- Unemployed or under 16 persons still show up in trips taken across the income groups because they are either dependents or living in worker's households
- Workers comprise the majority of travel in household income cohorts $25k–$75k

Figure 2-34: Employment and Work from Home Status by Household Income Level (Weekday)

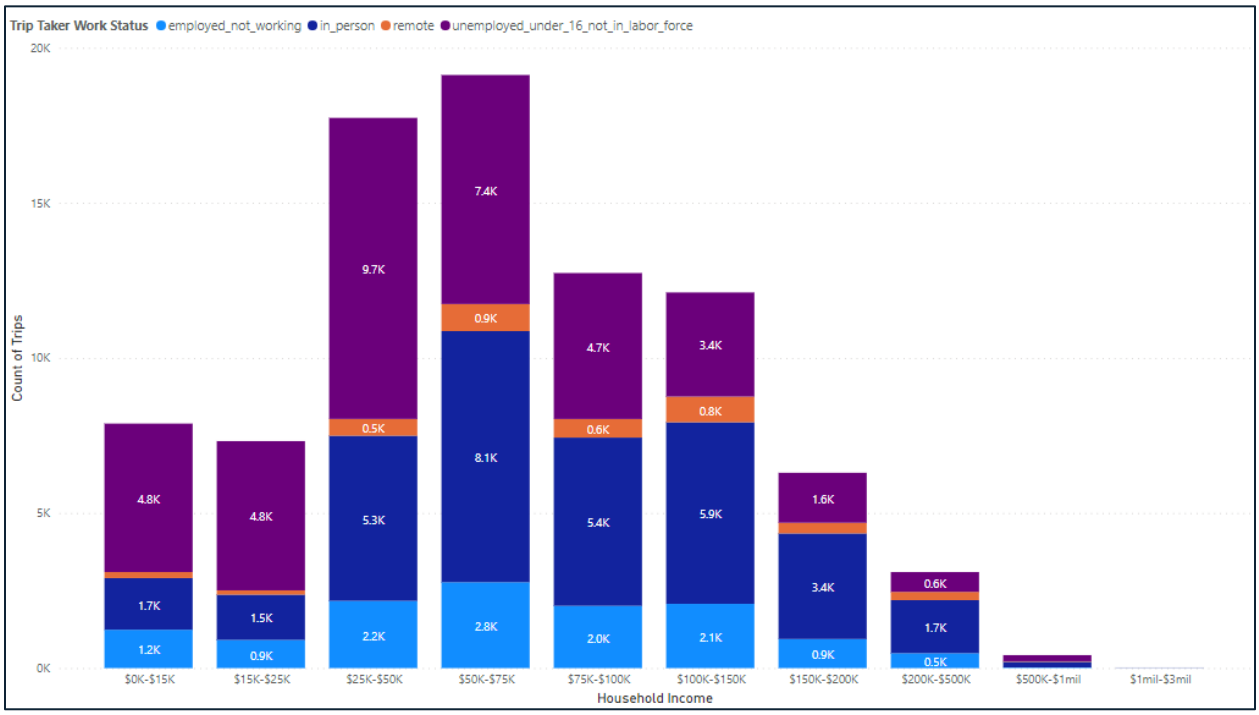


Figure 2-35 shows various average and median demographic statistics by mode for travel in the City of Radford service area. This analysis introduces the demographics of a typical transit rider and allows comparison to the average demographics of travelers who use other modes of transportation. This data may serve to adjust Radford Transit to better serve typical rider needs or seek to adjust service to compete with other modes with closely related demographics.

Median trip taker household income that rides public transit is only $12,000 for Radford, which is likely influenced by the number of students who ride and do not report income. Public transit's income demographics are most closely related to biking and walking, less congruent with private auto travel, and most different from those who take on-demand auto (Uber, Lyft).

The average trip distance by mode for public transit is just 2.2 miles, suggesting that most trips taken are close within the city. This does not mean all trips fall within 2.2 miles, as there are regional routes for Radford that most likely exceed this average. Compared to other modes, transit trips are the shortest distance besides walking, meaning that most often for regional destination travel, people usually take private auto. The purpose for these shorter trips on transit will be analyzed further in the Travel Purpose section of the market analysis.

The household size of the average trip taker of public transit ranks second highest compared to other modes. This may indicate that many people who take public transit in Radford live in multi-person households or shared housing.

The median age of persons taking public transit is the lowest of all modes at just 21 years old, which indicates a high propensity for younger people taking transit. By contrast, people by travel by on-demand auto have an average age of 47, and private auto an average age of 43, indicating prevalence of more private auto in medium, working-age populations.

Figure 2-35: Radford Travel Demographics by Mode

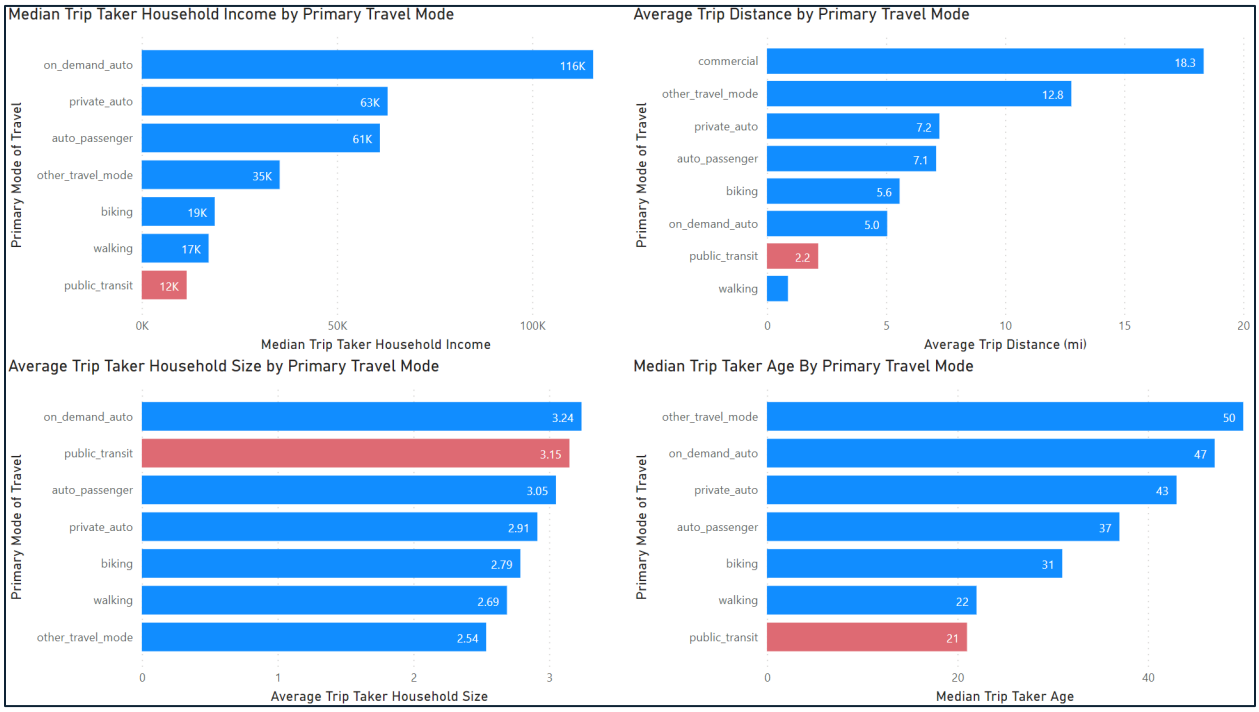
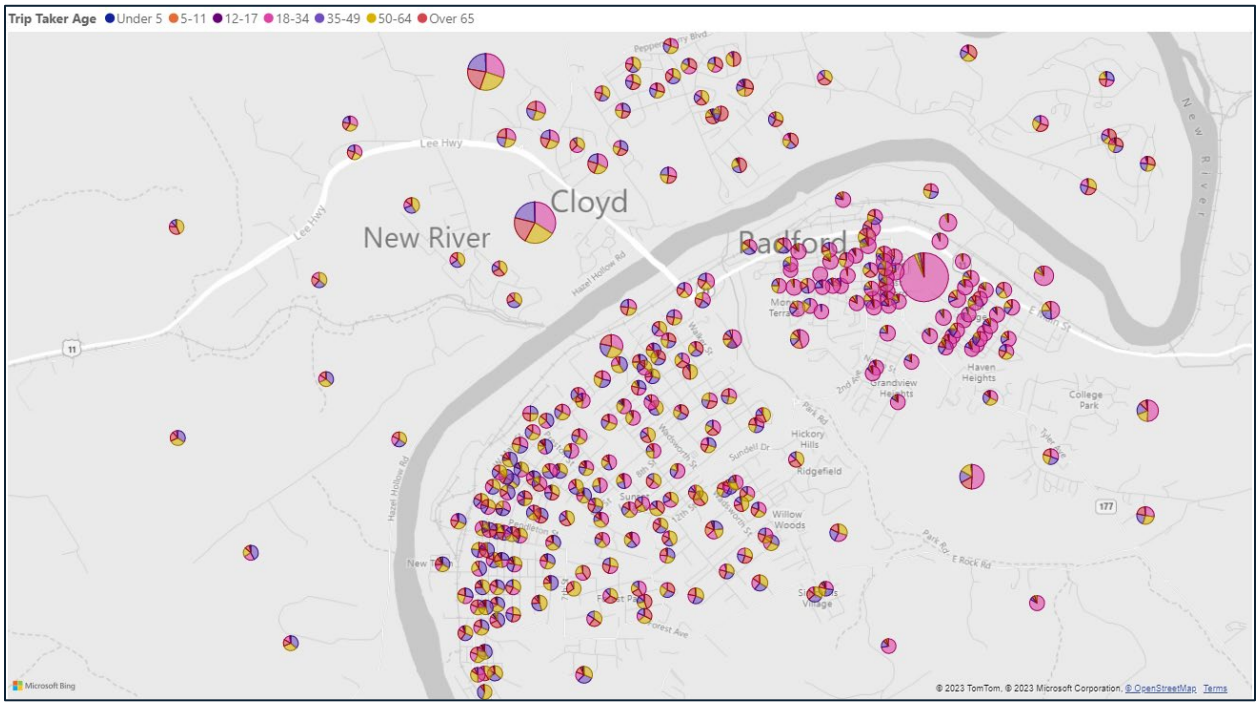


Figure 2-36 illustrates where trip takers of certain ages travel most frequently. The diameter of each dot represents the number of people traveling to each location while the different slices of the pie chart represent the share of each age cohort that comprises overall demand. East Radford around Radford University indicates a majority of trips taken by ages 18–34, while residences in West Radford see more 35–49 and 50–64 age groups. The commercial centers around Fairlawn and U.S 11 are comprised of the most diverse traveler age groups with ages 18–34, 35–49, 50–64 and over 65 making up about quarter each of overall demand.

Figure 2-36: Destination by Age



Travel Demand by Time

Determining what time of day travel is occurring is critical to understanding the role of transit so that service can be adjusted to adequately service riders' travel times or shift service to unmet demand. Trip data for travel to and from Radford can be analyzed by the start and end time of each trip taken, as well as trip duration and distance in minutes and miles. The number of aggregate trips by demographic category, trip purpose, mode, and other attributes, can also be identified and aggregated to a certain time of day, giving planners an idea of overall demand by hour that will be used to match transit service provided to different customer needs.

Figure 2-37 illustrates the overall trip demand for a typical weekday and weekend travel in the City of Radford which can be used to balance transit service to times of high potential ridership. Several observations of the overall travel demand data from **Figure 2-37** include:

- Weekday travel increases around the hours of 7:00 a.m. and 3:00 p.m. before declining. The peak travel demand for weekdays occurs at 3:00 p.m. with around 5,700 trips.
- Weekend travel demand follows a more gradual increase throughout the day until 11:00 a.m. and sustaining until 4:00 p.m. Weekend travel demand peaks at 4:00 p.m. at 4,100 trips, then follows weekday demand and drastically decreases into the late afternoon and night period.

Figure 2-37: Weekday and Weekend Travel Demand by Trip Start Hour

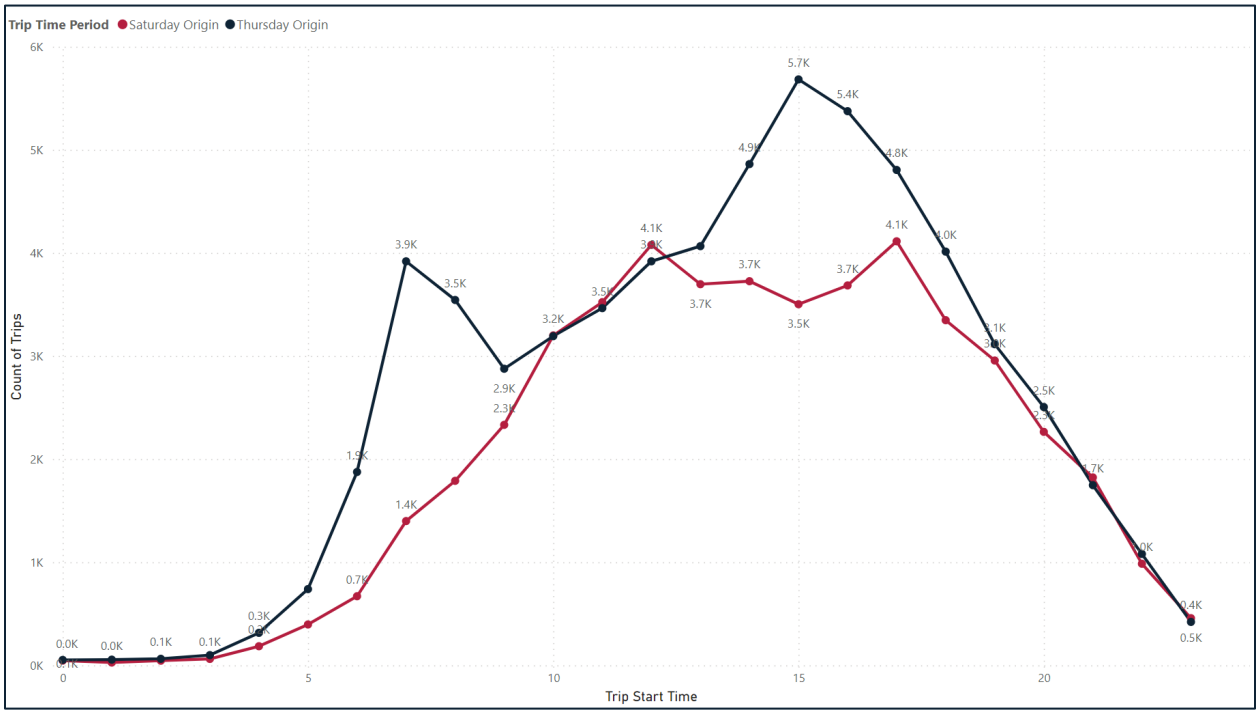


Figure 2-38 shows the average duration of trips starting and ending in the City of Radford throughout a typical weekday. Trips starting overnight around 12:00 a.m. average over 19 minutes of travel time, which steadily decreases throughout the early a.m. to midday time period. This means that persons traveling throughout the city typically take shorter trips, lasting about 14 minutes, during off-peak travel times (around 10:00 a.m. and after 4:00 p.m.). As noted in the travel demographics section, transit users typically have the shortest average trip length of all other modes at just 2.2 miles, which may mean that transit can target these periods and locations where shorter distance trips are occurring.

Figure 2-38: Average Trip Duration (Minutes) by Trip Start Hour

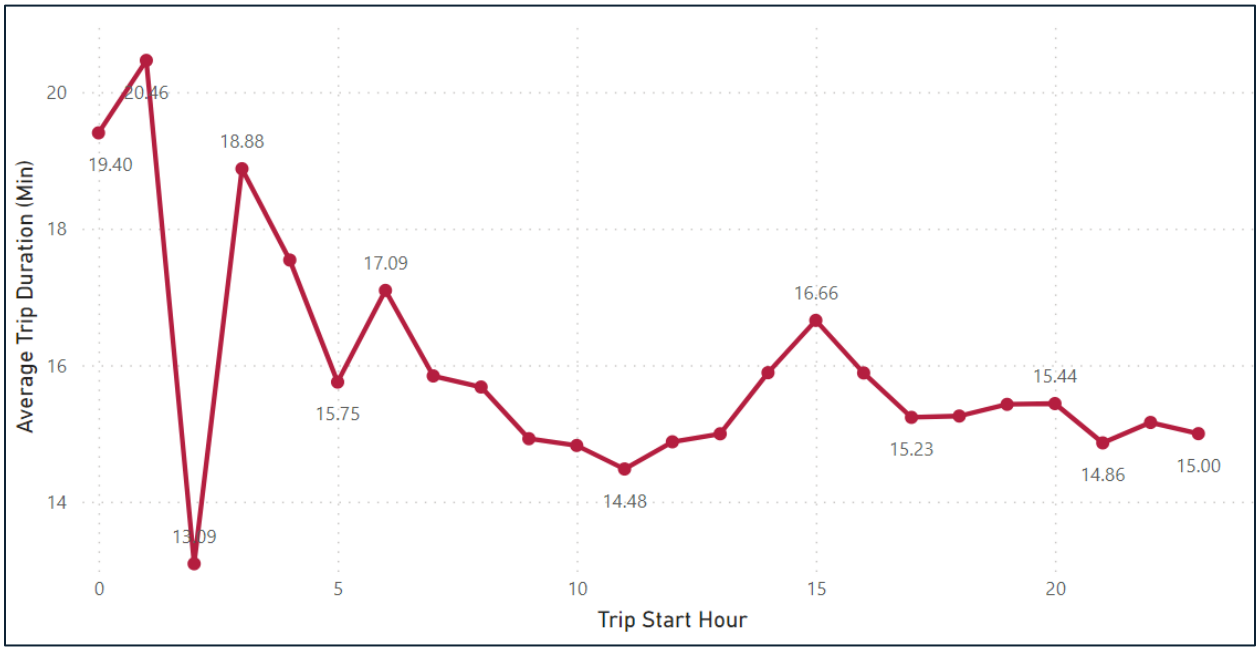


Table 2-6 shows the average trip duration in minutes by purpose and mode within the Radford Transit service area. On average, public transit riders' trips last around 23 minutes, with the longest travel times being for purposes of school, work, social, and lodging. Compared to other modes for trips starting within Radford, average transit travel times are higher than all other modes besides biking. Other data points that from trip purpose and mode that may be used to inform public transit service include:

- Trips to lodging have highest average trip time on public transit at 24 minutes. Trips to eating have the lowest at 18.9 minutes, which is reflective of all other modes.
- Walking trips, private auto trips, and auto passenger trips have lowest average trip times across all modes averaging under 19 minutes.
- Trips to school, eating, and work have the lowest travel time across all trip purposes averaging just under 15 minutes.
- As noted earlier in the travel demographics section, travelers in the Radford area that use public transit have the shortest average trip distance at 2.2 miles but average the longest overall trip times across all modes and for all trip purposes. Longer trip times for shorter distances could perhaps be attributed to longer first-wait times at stops or need to transfer to reach key destinations such as work or shopping.

Table 2-6: Average Trip Duration by Purpose and Mode

Trip Purpose	auto passenger	biking	on demand auto	other travel mode	private auto	public transit	walking	Average
Eat	12.51	25.39	13.17	15.68	13.9	18.91	12.35	15.99
Home	18.09	28.35	20.44	37.27	17.44	22.53	12.67	22.40
Lodging	24.03	44.16	18.05	60.37	19.05	31.13	21.28	31.15
Maintenance	18.17	40.04	17.63	36.97	17.68	23.72	10.35	23.51
Other Activity Type	18.85	32.12	23.2	10.07	18.24	24.91	10.85	19.75
Recreation	18.16	35.42	21.89	16.69	17.52	20.39	15.58	20.81
School	10.58	7.51	17.67	6.96	9.61	24.82	11.94	12.73
Shop	14.59	30.66	18.69	15.39	15.63	20.19	14.36	18.50
Social	24.73	43.13	23.32	17.51	22.56	25.35	9.58	23.74
Work	12.21	14.11	13.69	20.04	14.88	24.48	10.98	15.77
Average	17.19	30.09	18.78	23.70	16.65	23.64	12.99	20.43

Figure 2-39 shows a heatmap of the areas in the Radford Transit service area that experience the highest average trip duration. Some of the areas within the city where travel times are greatest and perhaps can be served by more direct and faster transportation options include:

- West Radford around Pendleton Street
- West Radford around Preston Street and Walker Street
- East Radford adjacent to Radford University

Figure 2-39: Heatmap of Average Trip Duration (Minutes)

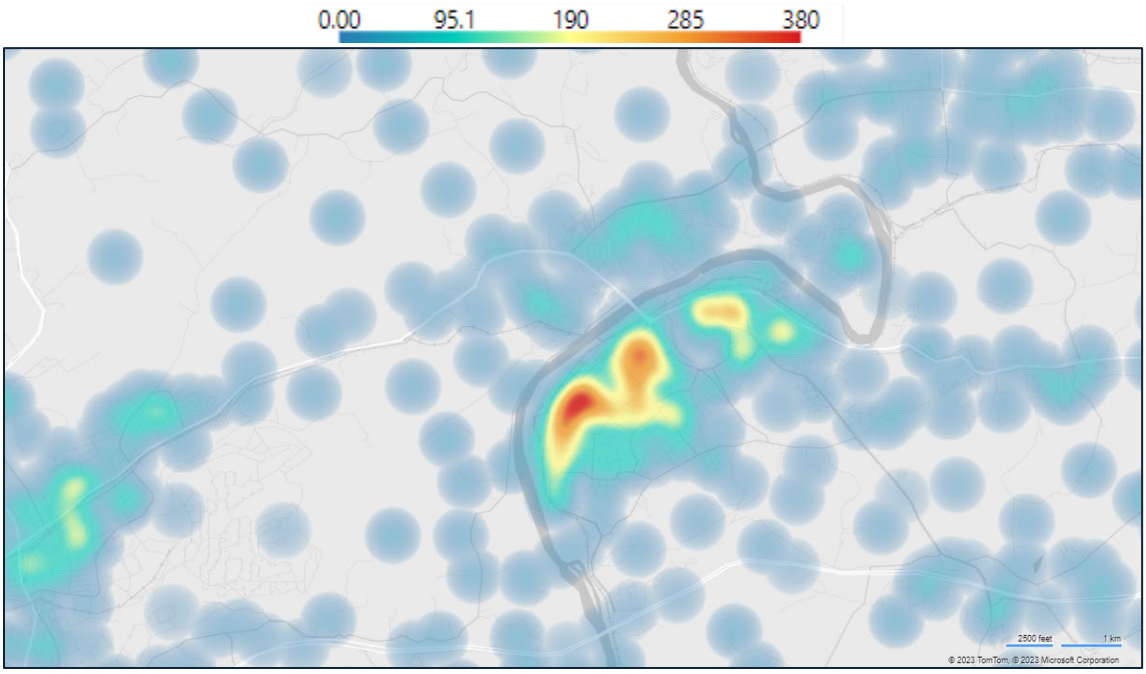


Figure 2-40 and **Figure 2-41** show the number of trips starting in the a.m. peak time period (6:00 a.m.–9:00 a.m.) and p.m. peak time period (3:00 p.m.–6:00 p.m.). These trip activity figures illustrate where people in Radford are starting their trips during the busiest parts of the day. In the a.m. period, most trips start from residential neighborhoods in West Radford and adjacent to RU. In the p.m., RU continues to generate trips, but neighborhoods in Radford and Fairlawn see less activity when compared to the morning. This is perhaps a result of travel starting from residential locations tempering in the late afternoon and morning evening. Flows between origins and destinations be further analyzed in the travel patterns section.

Figure 2-40: Trip Activity 6:00 a.m.– 9:00 a.m.

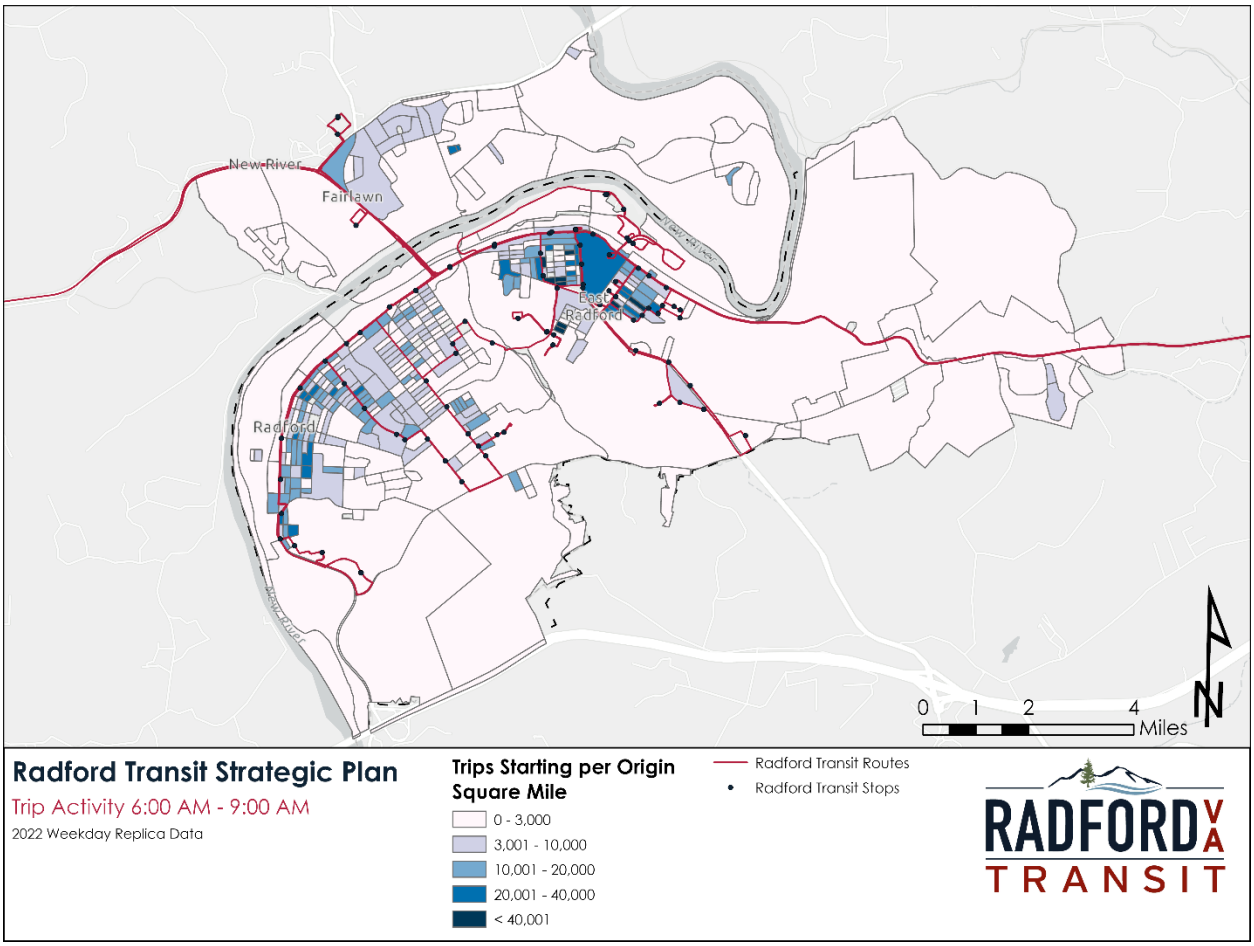
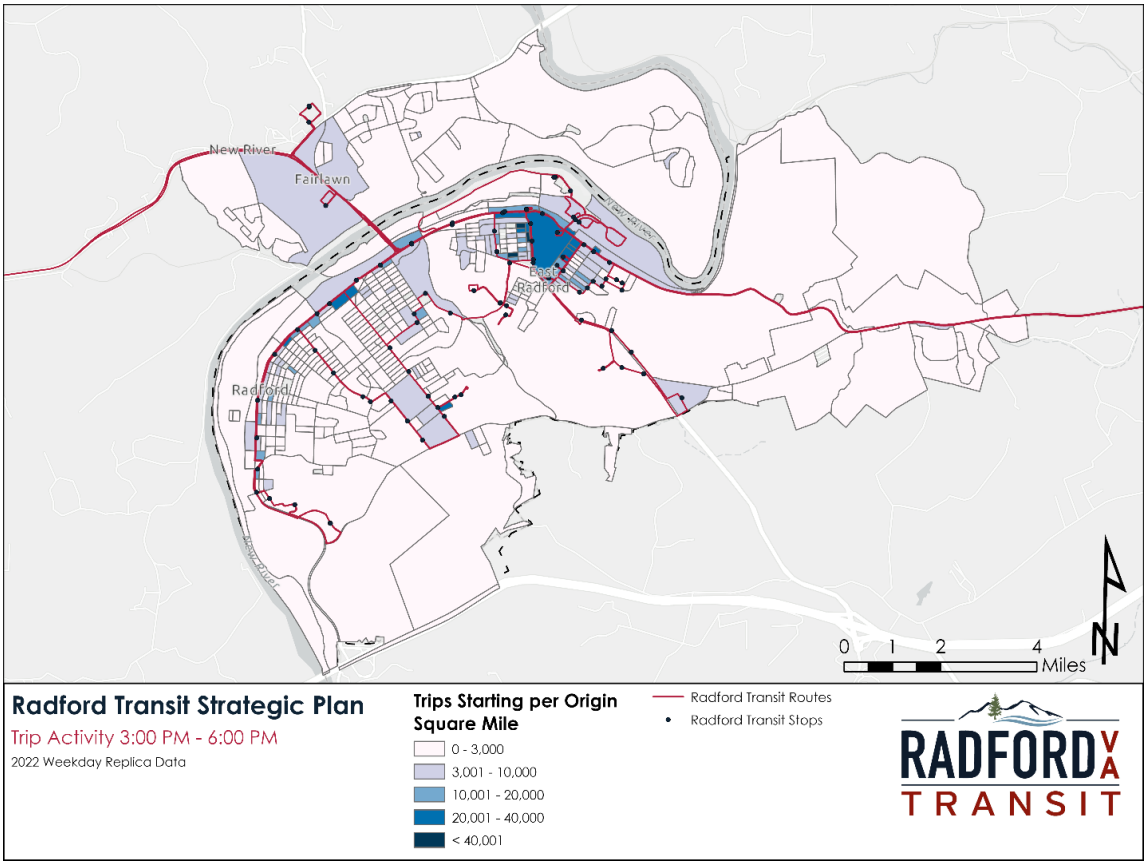


Figure 2-41: Trip Activity 3:00 p.m.–6:00 p.m.



Travel Purpose

This section builds upon the foundations of the Travel Demographic and Travel Demand sections to expand upon the unique trip purposes of populations traveling throughout Radford. Each unique trip observed in Radford's trip data is not only tied to unique travelers' socioeconomic attributes, but also their trip purpose information, which includes categories such as home, work, commercial, shopping, eating, school, social, recreation, and lodging. Individual trip purpose data may also be attributed to origin and destination land use (for example: to determine the flow of people traveling from single family homes to offices, education, healthcare, retail, and other land use types). In this analysis, travel purpose in the City of Radford will be broken down by their demographic attributes and travel time preferences to determine how transit might serve a variety of different traveler needs throughout a typical weekday and weekend. Travel purpose is also analyzed by time of day to determine when peak activities are occurring. Finally, City and region-wide trip purpose and land use data will be broken down by travel mode, as well as spatially analyzed to discern the exact locations within Radford market area where certain trip purposes are most prevalent. This process allows Radford Transit access to a virtual survey that fills in the gaps in data for the travel needs of transit riders and residents.

Figure 2-42 shows trip purpose by time of day for trips starting and ending in Radford on a typical weekday. The colored bands of varying heights represent the number of persons traveling from each purpose category at different times of the day. The tallest band at each time period represents the most common trip purpose during that hour (for example, the orange band, which symbolizes trips to home, slowly grows throughout the day and overtakes all categories by 11:00 a.m. while reaching the peak number of trips at 2.9k trips at 4:00 p.m.). Other key observations from trip purpose by time of day that may be applicable to transit include:

- Weekday school trips and work trips are concentrated between 7:00 a.m. and 9:00 a.m., then gradually decrease in frequency throughout the day. School trips briefly rebound at 12:00 p.m., while works trips also increase around 2:00 p.m. (possibly representing shift work).
- Weekday shopping trips increase after the peak morning period around 9:00 a.m. and steadily become the second most frequent trip purpose behind to home trips in the afternoon. The peak shopping hour for typical weekday is at 4:00 p.m.
- Weekday home trips comprise a majority of trips started in the City of Radford after 11:00 a.m., which is attributed to many persons traveling from diverse trip purposes to home, which serves as a broader category.
- Other trip categories such as social and eating do not appear to have significant volumes on weekdays during peak travel times or night periods.

Figure 2-42: Radford Trip Purpose by Trip Start Hour (Weekday)

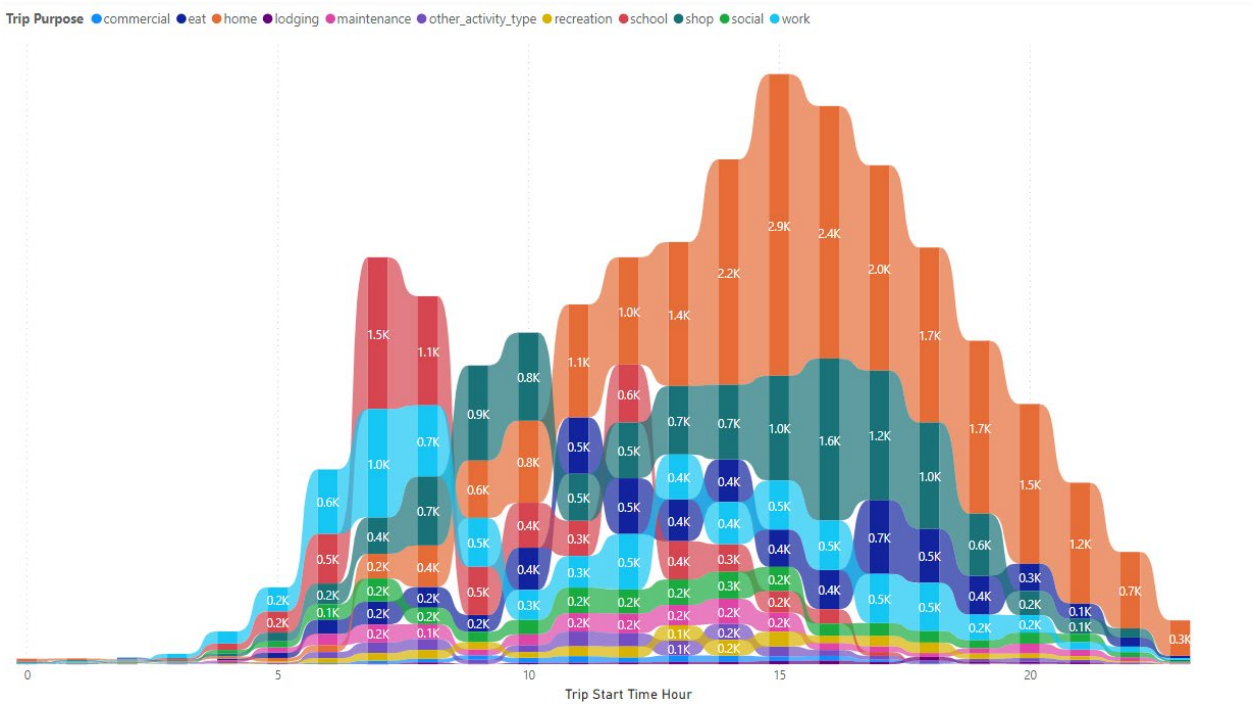


Figure 2-43 illustrates the trip purpose distribution by time on a typical weekend in Radford. There are less distinct peaks and overall, less trips than a weekday. Demand for different trip purposes increases steadily throughout the day but is sustained from 11:00 a.m. to 8:00 p.m. Notable takeaways for transit service from the weekend trip demand include:

- Though weekend service has less overall demand than weekday, trips are being taken later in the day into the evening period around 8:00 p.m.
- Trip purpose on weekends is concentrated on home, shopping, and eating trips (though eating trips peak early in the day at around 11:00 a.m. and decline).
- There are smaller concentrations of work and school trips throughout the weekend leveling at around 300 trips per hour. This would indicate that some service workers or trips to extra-curricular educational locations are still occurring.
- Social trips comprise more weekend trip share than weekdays with sustained 300 trips during 11:00 a.m. to 2:00 p.m.

Figure 2-43: Radford Trip Purpose by Start Hour (Weekend)

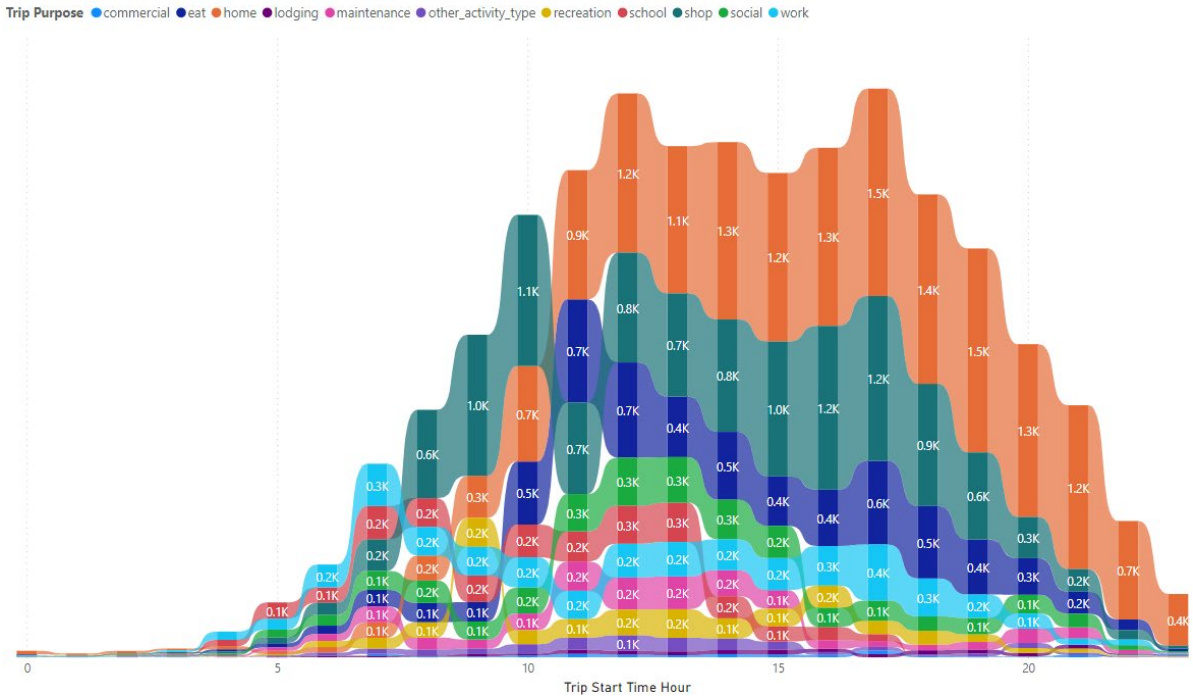


Figure 2-44 and **Figure 2-45** illustrate the number of trips starting from different land uses in the City of Radford for a typical weekday and weekend time period. This data can be used in conjunction with travel purpose data to align transit service to cover known land use where peak trip demand occurs. For trips starting in the city, demand usually occurs from the following land uses:

- On weekdays, single-family land use drives demand during the a.m. from 6:00 a.m. to 8:00 a.m. and then moderates throughout the day. On weekends demand from single-family land use is more distributed throughout the day. This data from single family residences may be used to compare if Radford Transit is providing coverage to residential neighborhoods when demand is greatest.
- Education trips start at 10:00 a.m. and peak at 3:00 p.m. Radford Transit may consider right-sizing resources to ensure demand from education and institutional land uses is met during late morning and early afternoon. On weekends, trips from educational land use is reduced and only peaks at 700 trips, while on weekdays it peaks at 2,300 trips.
- Travel from retail land use is the third highest trip generator throughout weekdays and weekends in Radford. On weekends, trips from retail are more frequent and sustained throughout the day, peaking at 1,300 trips at 5:00 p.m. Orienting bus service to serve retail centers around mid-late afternoon on both weekdays and weekends could ensure that Radford Transit is serving those end commercial destinations.

Figure 2-44: Radford Trip Origin Land Use by Start Hour (Weekday)

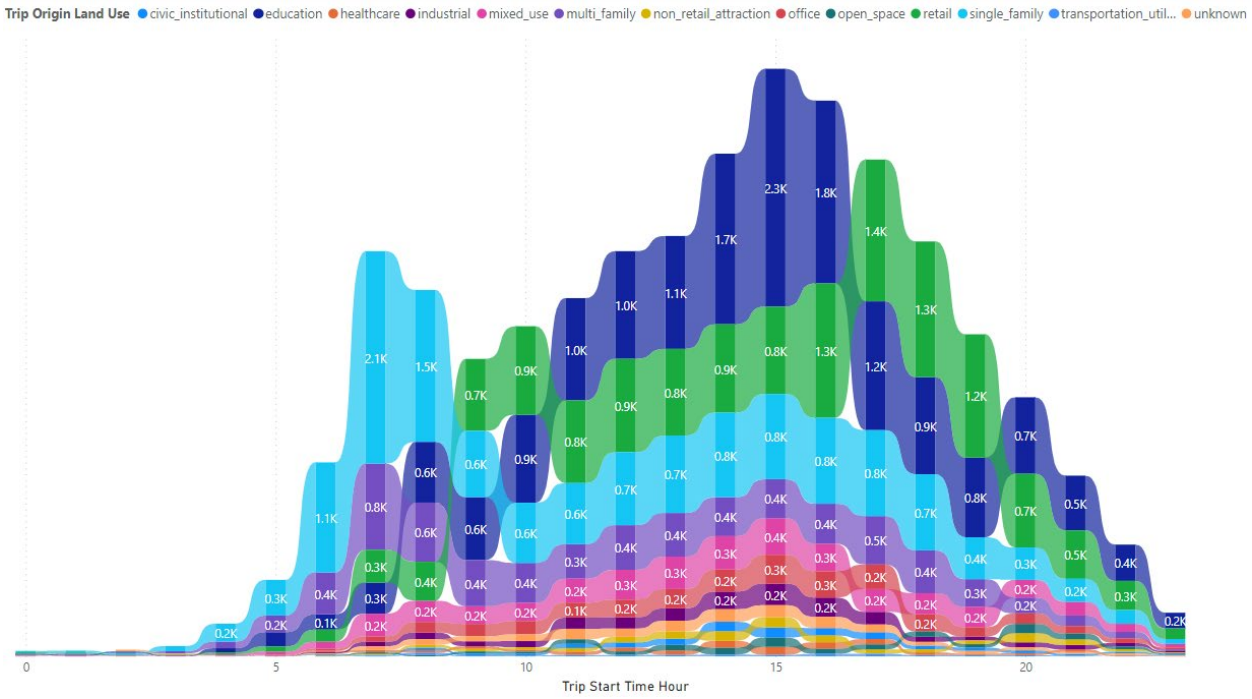


Figure 2-45: Radford Trip Origin Land Use by Start Hour (Weekend)

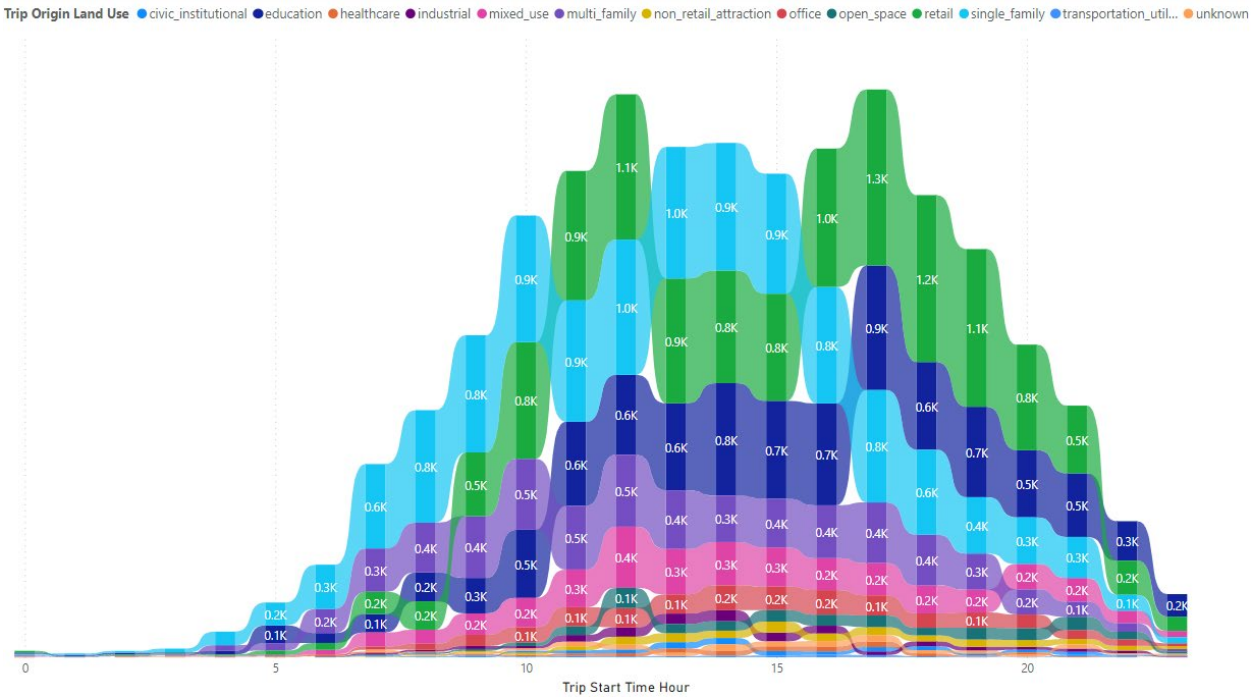


Figure 2-46 shows the breakdown of trip activity throughout the day by different income cohorts. People earning $25K to $75K make up most of the trips during both weekday and weekend, following the overall trip demand peaking at 9:00 a.m. and 3:00 p.m. Those travelers earning $25k or less do not follow traditional peaks. Instead, their travel gradually increases throughout the day, peaking around late afternoon from 5:00 p.m. to 7:00 p.m. Transit could potentially better serve the needs of low-income riders if more service was oriented towards low-moderate income earners around late afternoons.

Figure 2-46: Trip Taker Household Income by Trip Start Time

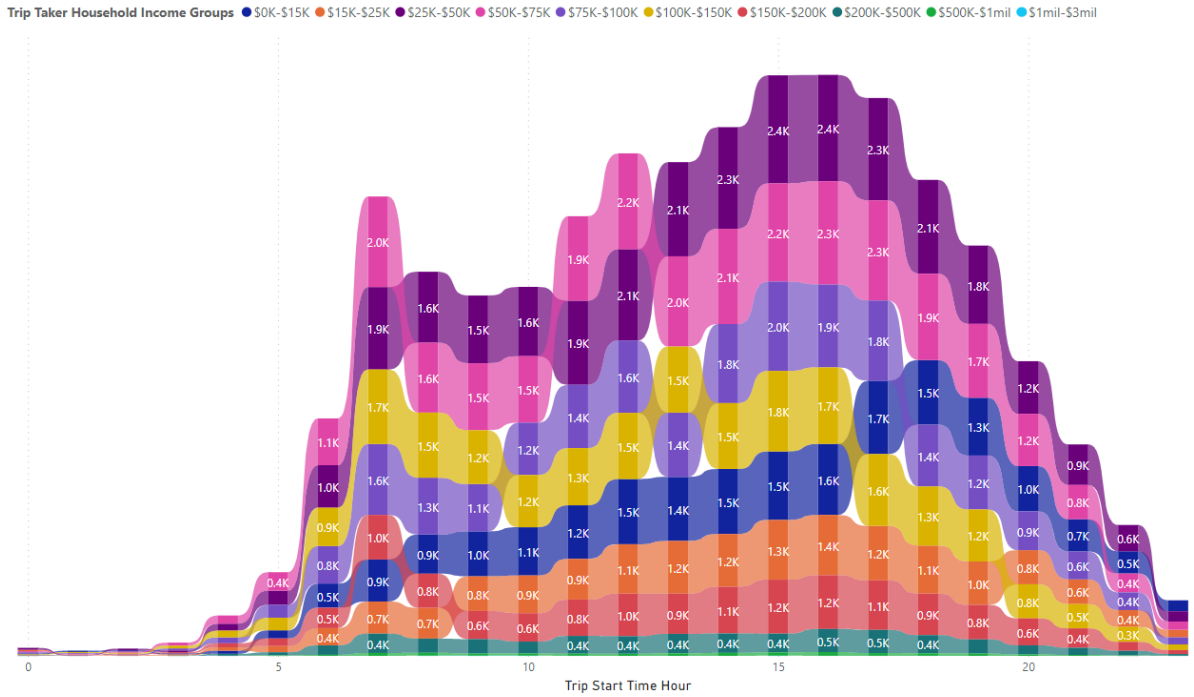


Figure 2-47 and **Figure 2-48** provide context for why people are traveling to certain locations around the Radford Transit service area by breaking down trip activity for destination census blocks by the reason that people traveling to them. For example, in **Figure 2-47**, Radford University as a destination is represented by a pie chart, with the diameter of the pie indicating how popular a destination it is on weekday, and unique slices of the pie in different colors corresponding to the different trip purposes that comprise its overall demand. Over almost a third of trips destined for Radford University are home trips (orange), while other purposes such as school (red) and work (light blue) are also illustrated. Data such as this, as well as the exact number of trips, can be used with the temporal demand data from Replica to determine that transit is providing adequate service to desired destinations, or even realign transit service to meet a gap in service for a popular trip purpose. Some key observations from the destination trip data that may be integrated into existing or future transit service could include:

- East Radford residential neighborhoods, including Lawrence Street or Haven Heights, are primarily destinations for home trips, but also social travel as well. As indicated in **Figure 2-47**, social travel occurs mostly on the weekends between 10:00 a.m. and 3:00 p.m., and this may serve as an example of how to serve educational trips to the university on weekends as well as target other trip types with existing routes during times when work and school travel is not prevalent.
- Work trips for both typical weekday and weekend periods are concentrated at Radford University, West Main Street, as well as limited destinations at Rock Road and Fairlawn. As previously noted in **Figure 2-42**, work trips occur most frequently in Radford on weekdays between 7:00 a.m. and 9:00 a.m.
- Shopping trips and eating trip are concentrated to the commercial center off U.S 11, Fairlawn, and Tyler Avenue. Eating trips are slightly more prevalent on weekdays than weekends in the commercial centers next to the Walmart, Kroger, and Rural King. On the weekends, most trips made to retail destinations throughout the city are shopping trips. In the travel demand data, these shopping trips peak during weekends around 2:00 p.m.
- Residential neighborhoods in West Radford expectedly see the most home destination travel activity (previously analyzed in **Figure 2-42**) on weekdays between 2:00 p.m. and 6:00 p.m.

Figure 2-47: Trip Purpose by Destination Census (Weekday)

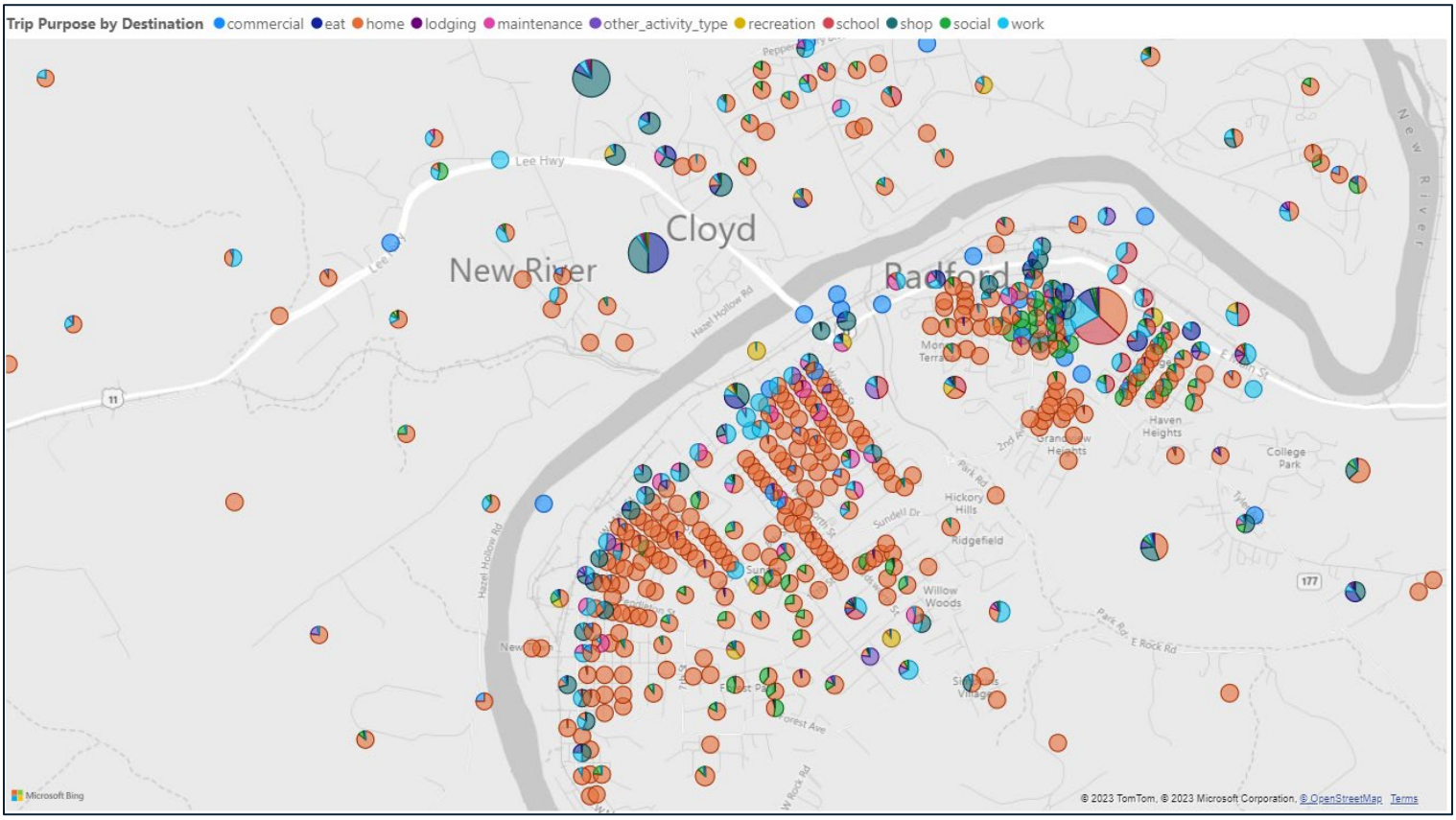
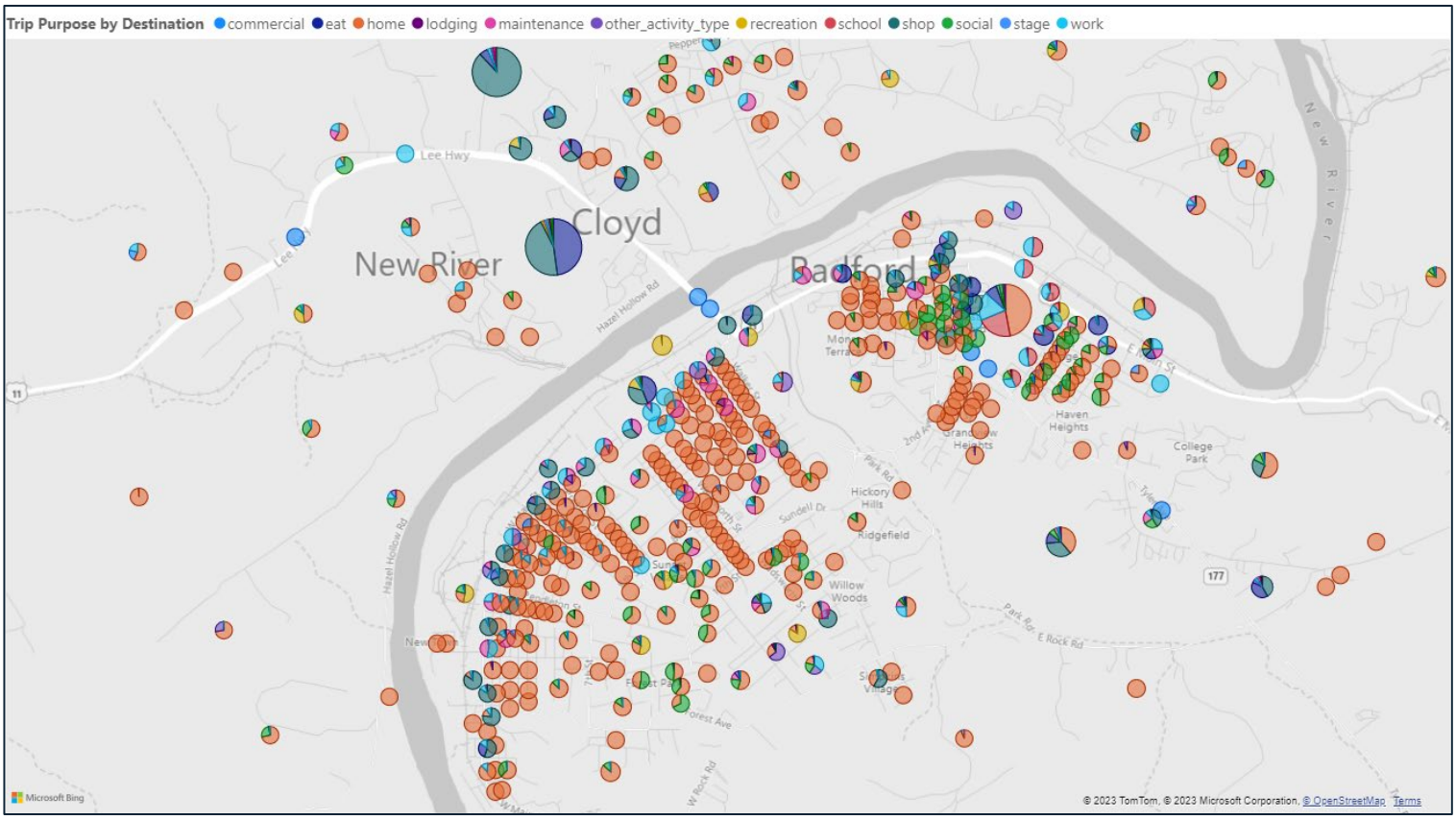


Figure 2-48: Trip Purpose by Destination Census (Weekend)



Travel Patterns Origins and Destinations

Origin-destination flow data provides a preview of exact travel patterns to and from specific locations that may be used to assess whether transit can serve a particular travel market. Building off the previous market assessment sections that identify areas of strong travel demand, as well as the predominant demographics of travelers within the Radford Transit service area, origin-destination flows are broken out into separate visuals that correspond to specific trip characteristics such as low-income, trips taken by zero-vehicle households, senior travel, work, and shopping trips.

Origin-destination flow data will be used to physically align Radford Transit service and stops with major trip destinations and paths that travelers and potential riders may take and conduct gap analysis. If an existing major travel flow that could be served by transit is not covered by current or planned service, this potential gap and recommendations for service alteration is noted below in section 2.2.2 Market Opportunities for Improvement and in Chapter 3 - Planned Improvements and Modifications.

Figure 2-49 and **Figure 2-50** show the major origin-destination flows for all trips starting and ending in Radford during a typical weekday at the regional and city level. The darker color and width of the arrow indicate the higher frequency of trips along certain corridors, while the radius of the dots indicate areas where trip arrivals and departures are highest.

Radford University remains the hub of travel that starts and ends within the City of Radford, with 22,000 trips arriving and departing on a typical weekday.

Of the trips that start and end from RU, approximately:

- 4,000 trips start and end at Fairlawn
- 3,500 travel to destinations in East Radford and Main Street
- 2,250 travel to Tyler Avenue
- 1,400 travel to West Main Street
- Outside the City, approximately 2,385 trips occur to the Uptown Christiansburg Mall, while 1,200 trips occur between RU and Dublin.

This data supports more routes from RU to commercial centers across the New River along U.S 11, East Radford, Tyler Avenue and College Park, but shows less travel demand for continuous east-west routes extending west beyond the intersection of West Main Street and Preston Street.

West Radford has more moderate and geographically dispersed trip flows than Radford University. According to the data:

- The areas adjacent to West Main Street along Berkley Street sees the most trip generation at 15,000 trips.
- 2,800 trips from West Radford travel between Fairlawn while 1,500 trips travel south to commercial areas around Rock Road West.
- Only 1,200 trips travel west to West Main Street between Pendleton Street and Cowan Street.

This data suggests that transit service can serve trips from West Main Street and Wadsworth Street across the River to Fairlawn and direct to East Radford.

Figure 2-49: All Trip Patterns O-D Flows (Regional)

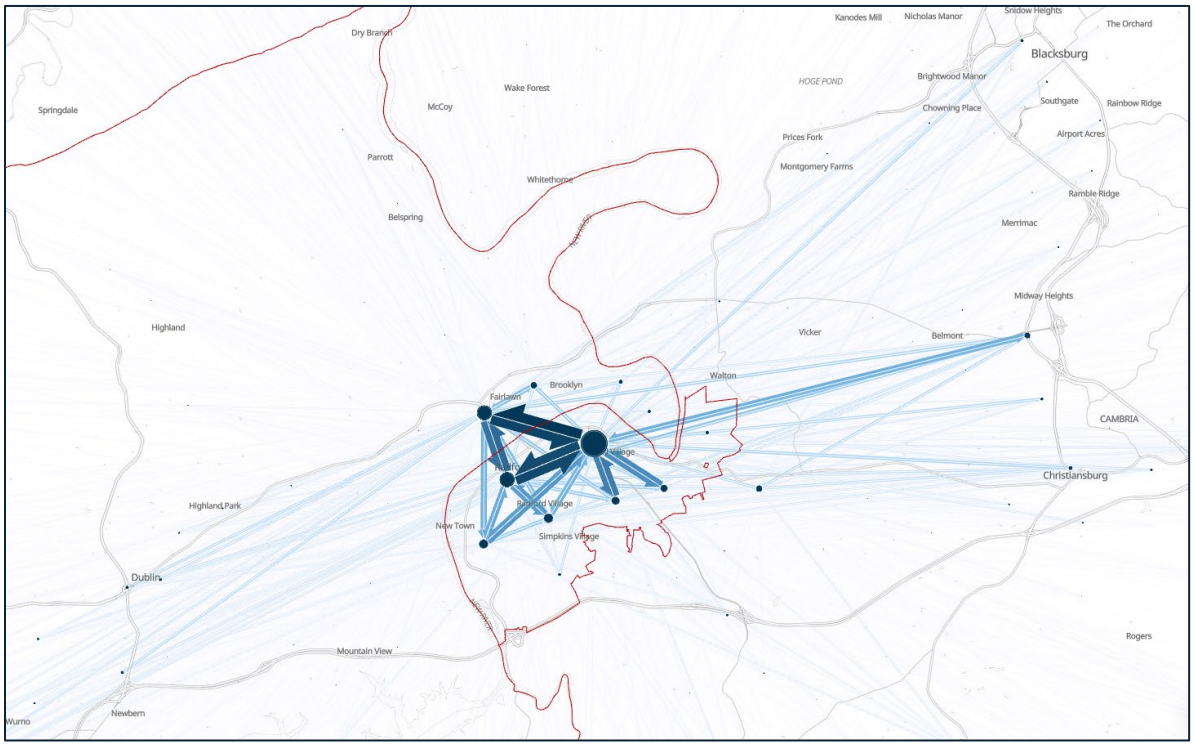


Figure 2-50: All Trip O-D Flow (City of Radford)

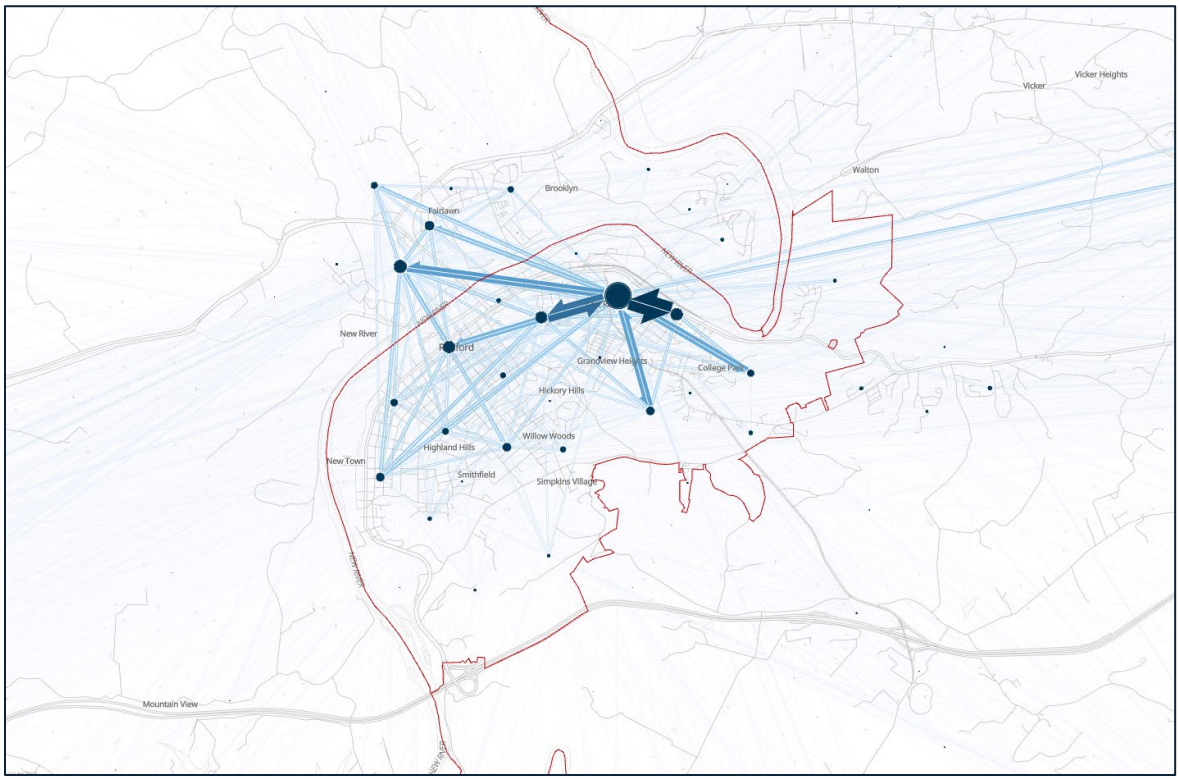


Figure 2-51 and **Figure 2-52** show work trip flows regionally and within the City of Radford. The unidirectional arrows in the figures pointed towards RU indicate that the University and East Radford is a center for commuting from neighboring areas.

The RU area sees 4,100 incoming trips during a typical weekday and only 1,200 departing trips. Most trips incoming to Radford University start from West Radford (572 trips), Fairlawn (535), College Park (458) and Sunset Village (396). In areas outside the City of Radford, such as downtown Christiansburg and Merrimac, approximately 200 trips head towards the university and East Radford on a typical weekday. This data would support more routes that serve Radford University as work hub connecting regional destinations as well as a primary commuter route from West to East Radford during work times.

Figure 2-52 shows more specific trip origins and destinations within the City of Radford. There is a major bidirectional work travel flow of around 1,500 trips on East Main Street around some of the athletic complexes that may not be served by transit as they could be university service jobs. Although not as frequent as trips that travel to East Radford, there are employment trips occurring between West Radford and the industrial locations adjacent to Wadsworth Street and Rock Road West. This data would support serving trips to commercial centers and Radford University during work hours particularly from locations such as College Park and Fairlawn.

Figure 2-51: Work Trip O-D Flow (Regional)

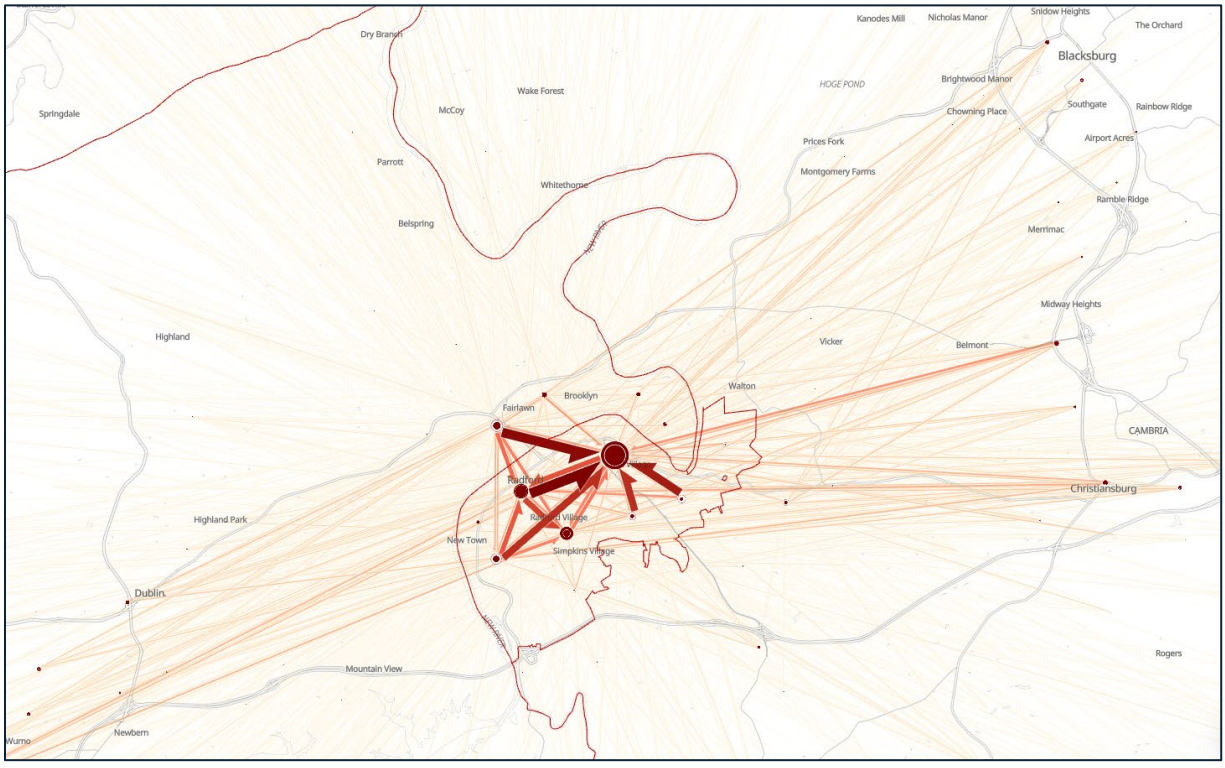


Figure 2-52: Work Trip O-D Flow (City of Radford)

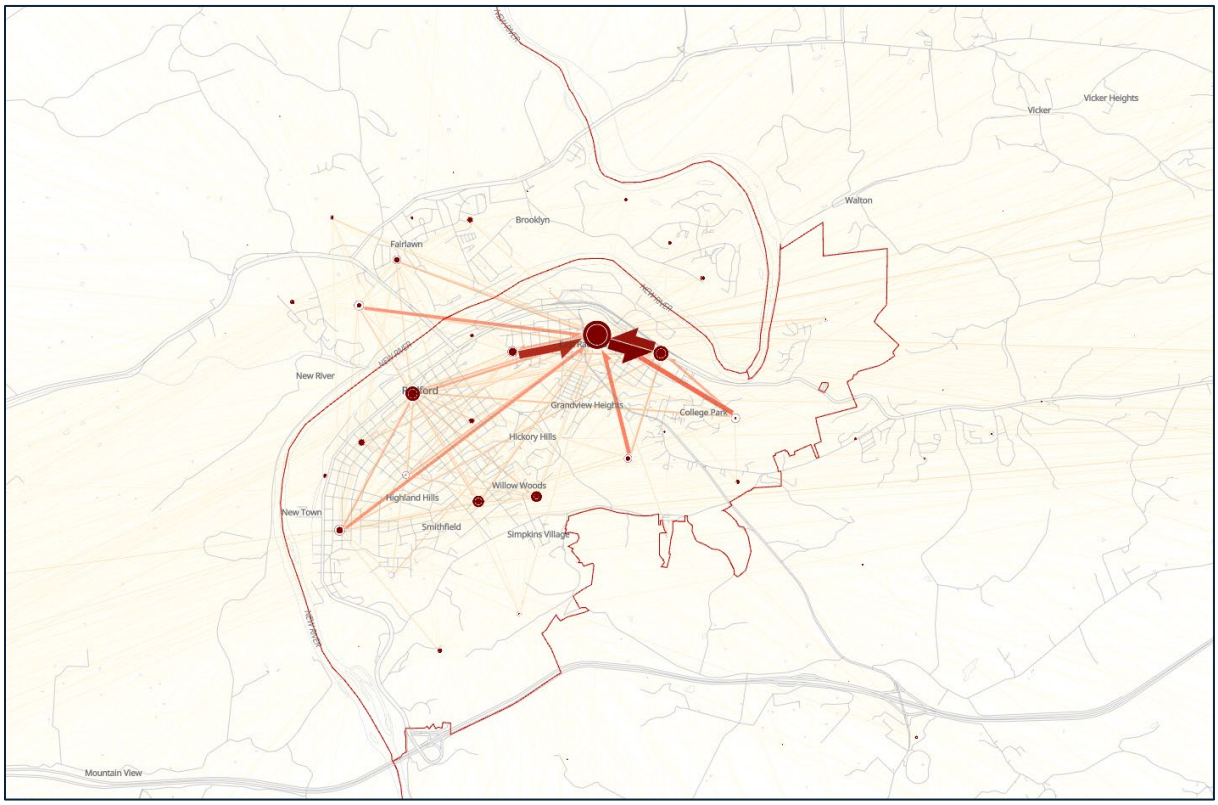


Figure 2-53 and **Figure 2-54** show the flow of travel towards home. The most frequent origin-destination pairs for home travel generally extends from RU to various neighborhoods in East Radford, including along Grove Avenue, Tyler Avenue and College Park Drive. Other home destinations include the university itself, with around 1,500 trips traveling from Fairlawn to campus. West Radford also sees moderate home destinations, with around 500 trips starting from Fairlawn and RU and ending near Sunset Village and Highland Hills. This data supports serving intermediate length trips to home from popular destinations such as the university and shopping centers and adjusting service to cover neighborhoods around Tyler Avenue where home travel is occurring.

Figure 2-53: O-D Home Trip Flow (Regional)

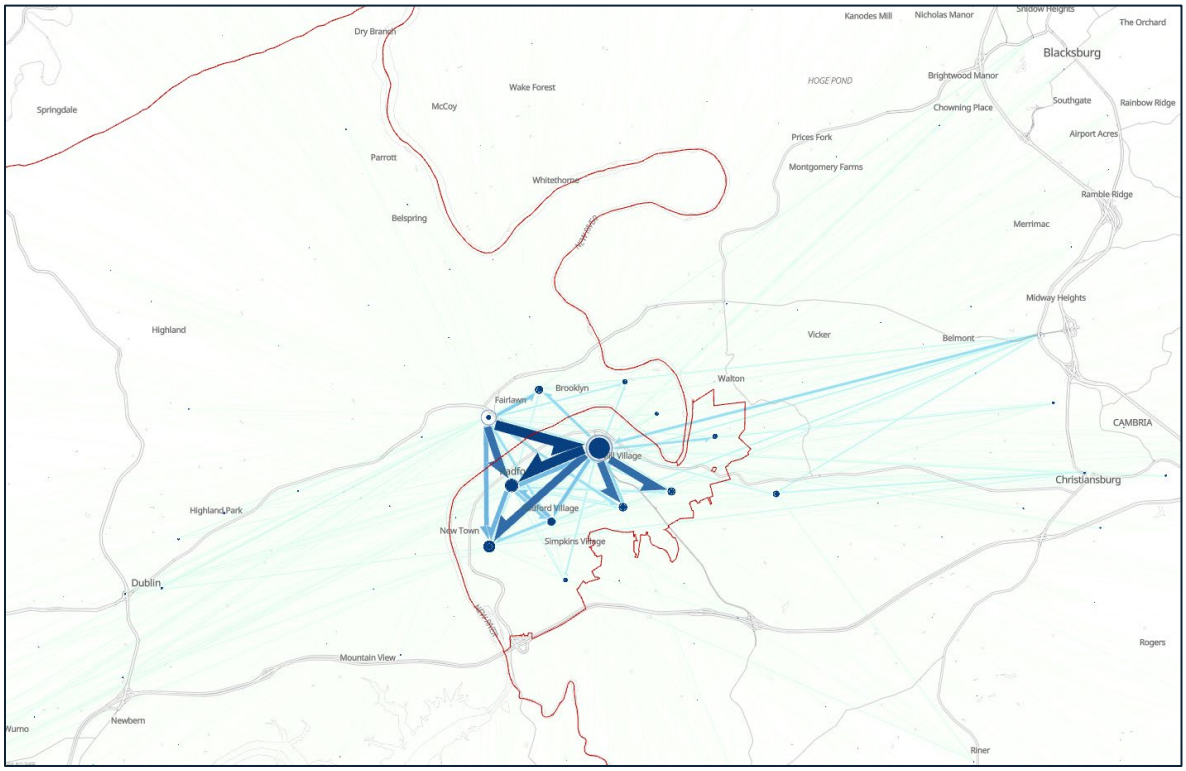


Figure 2-54: O-D Home Trip Flow (City of Radford)

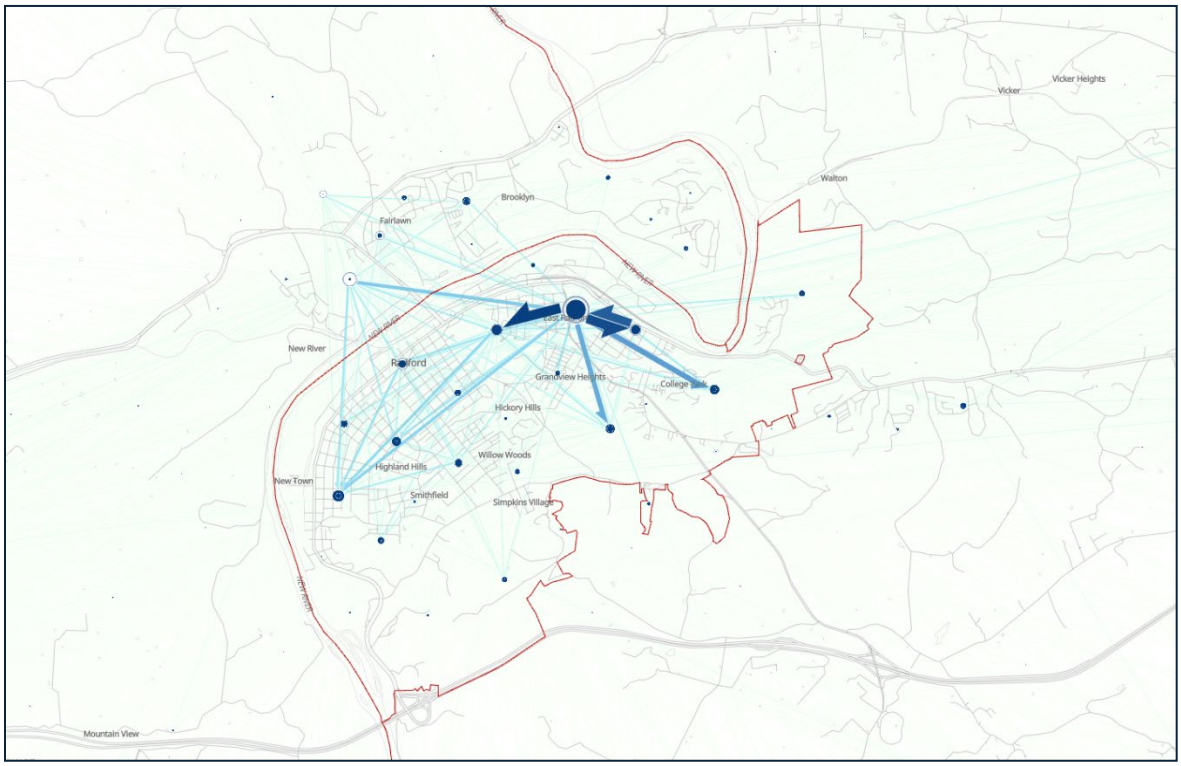


Figure 2-55 through **Figure 2-59** shows the origin destination travel flows of those trip takers that may best be served by transit, including trips made by those without vehicles, low income travelers, and travel by those identifying as minority, elderly and/or youth populations. Besides overall trip flows, these specific origin-destination flow categories may be used to intentionally align service with needs of specific areas of the transit-dependent population. Observations from these specific travel markets include:

- **Figure 2-55** and **Figure 2-56** show that regional and Radford-specific car-free travel is concentrated between areas adjacent to the University and West Radford as well as Fairlawn averaging around 100 trips per day. There is also a smaller subset of travel occurring directly between Fairlawn and the Uptown Christiansburg Mall and Dublin in Pulaski County. This data supports continuation of service from Fairlawn to Dublin to support car-free travel between those origin destination pairs as well as increased service between East and West Radford to cover the primary corridor of car-free travelers along Main Street across Wildwood Park.
- **Figure 2-57** illustrates the travel patterns of persons identifying as minorities in the City of Radford. Minority travel is most concentrated immediately around the University with around 120 trips daily to areas around Monroe Terrace and East Main Street. There are also approximately 50 trips between Highland Hills neighborhood and Staples Street in West Radford. This data indicates that in order to serve minority travel patterns with transit, service should be concentrated around Radford University and select neighborhood connections to retail and jobs.
- **Figure 2-57** and **Figure 2-59** illustrates that household earning less than $25,000 typically travel between College Park, Radford University, Tyler Avenue and Fairlawn, which may be attributable to college student travel, as most do not declare income. Travel from Radford to Uptown Christiansburg Mall is also frequent among moderate to low-income trip takers.

Figure 2-55: Zero Vehicle O-D Flows (Regional)

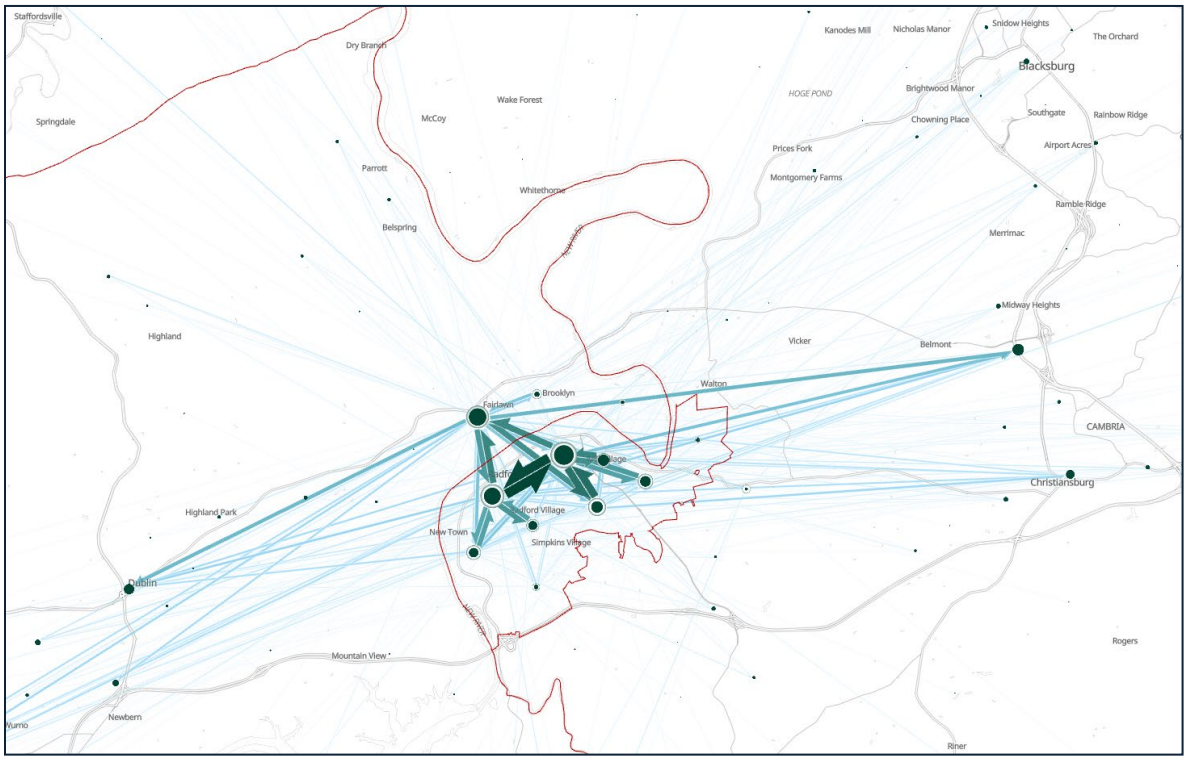


Figure 2-56: Zero Vehicle O-D Flows (Radford)

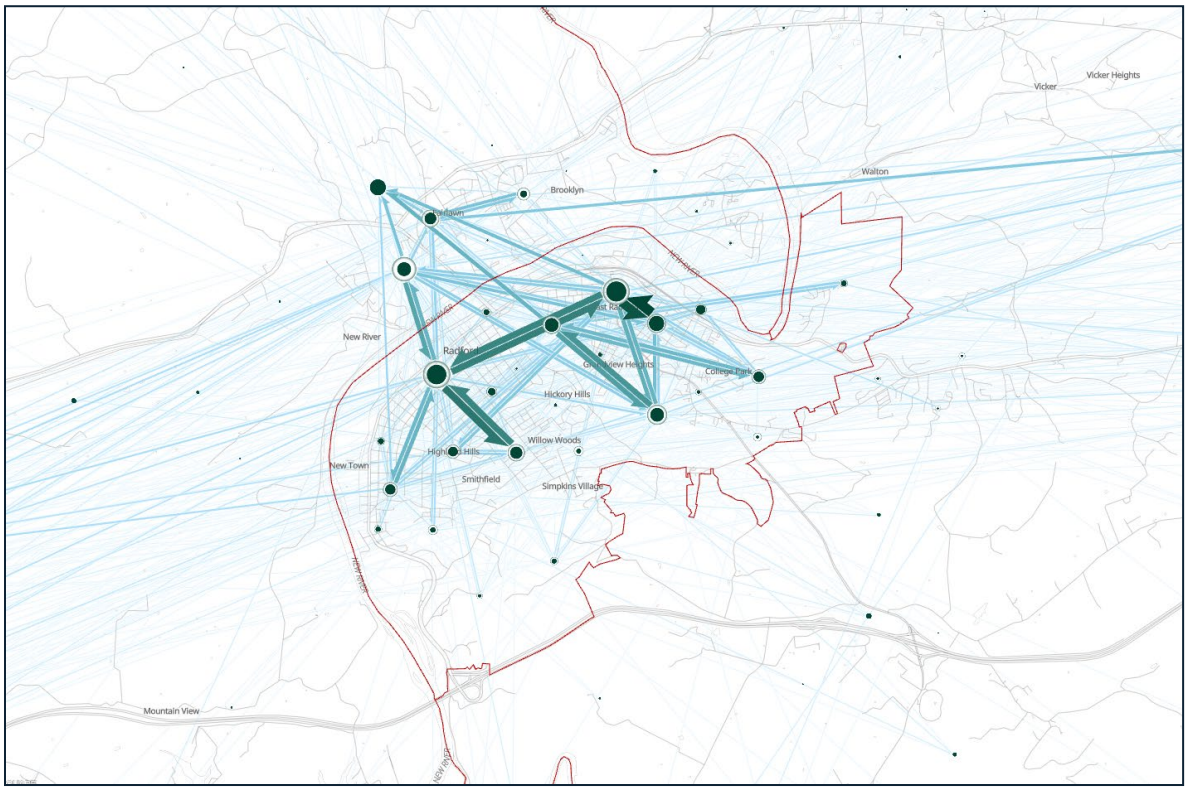


Figure 2-57: Minority O-D Flows (City of Radford)

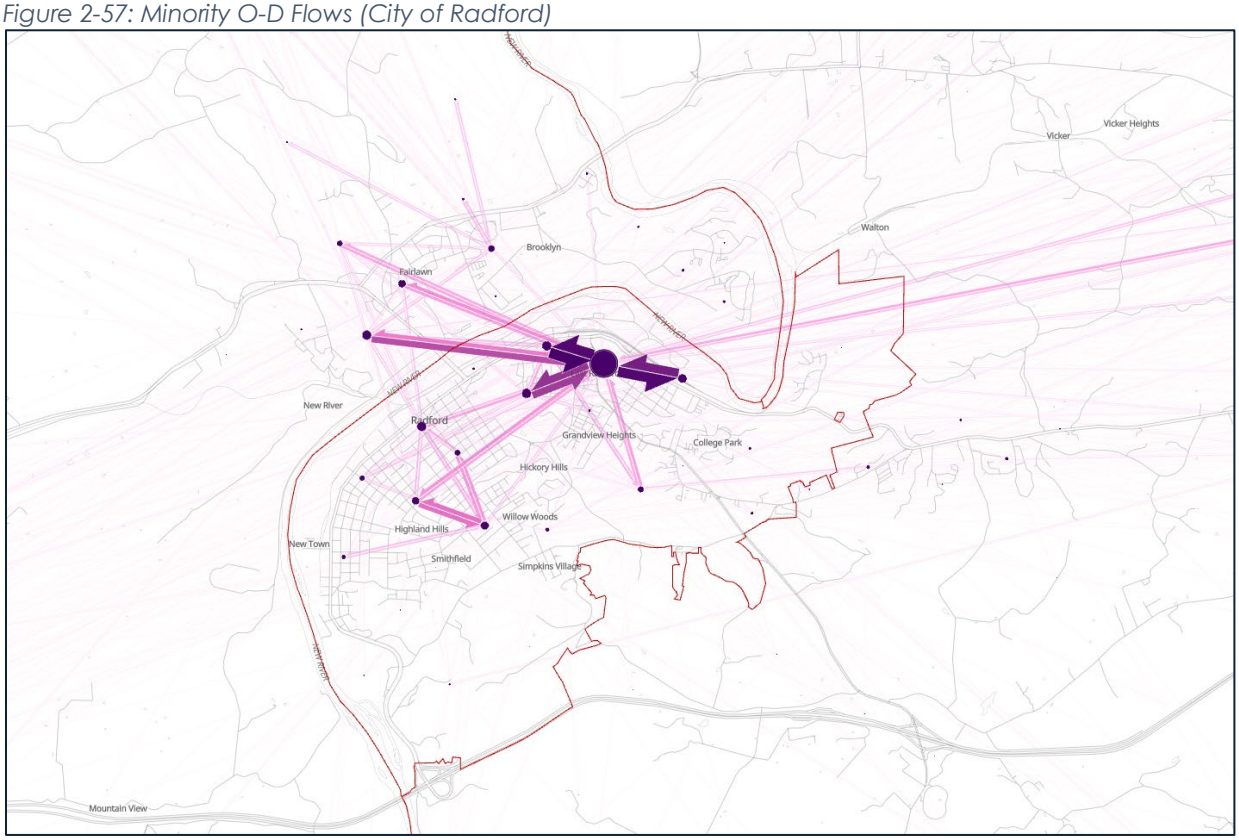


Figure 2-58: Low Income (Less than 25K Household Income) O-D Flows (Regional)

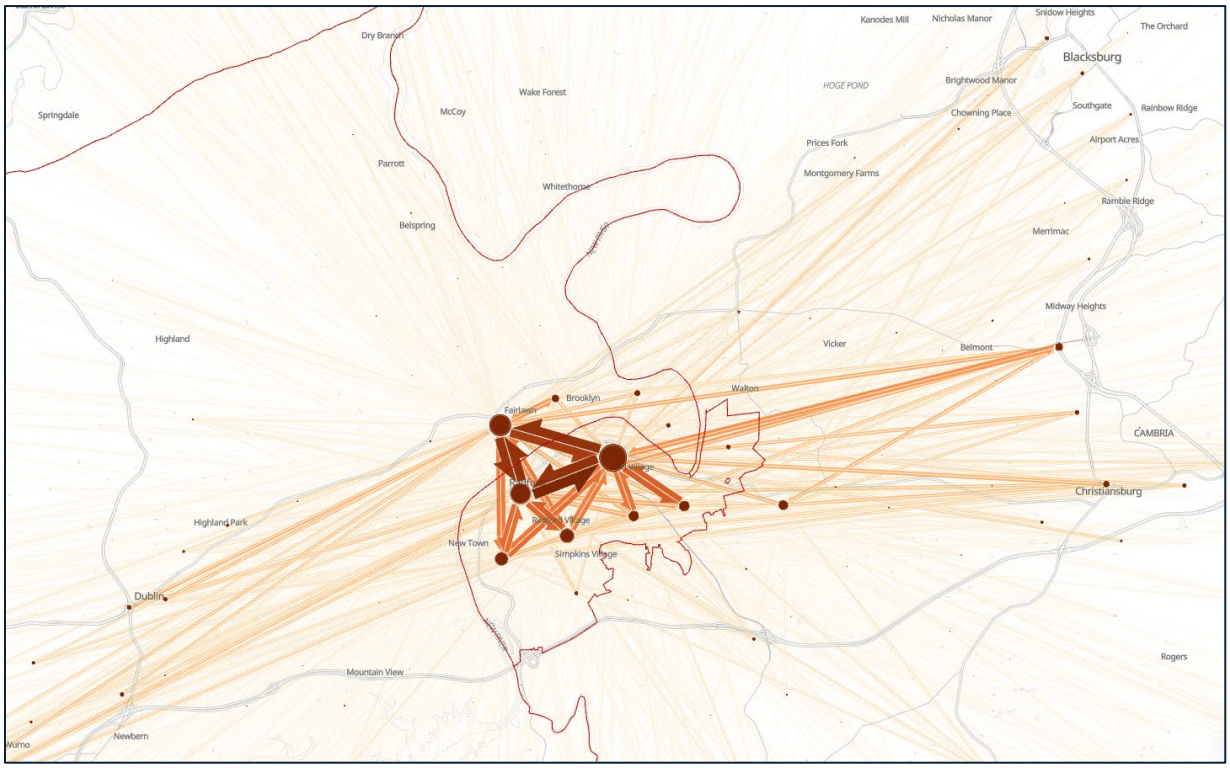


Figure 2-59: Low Income (Less than 25K Household Income) O-D Flows (City of Radford)

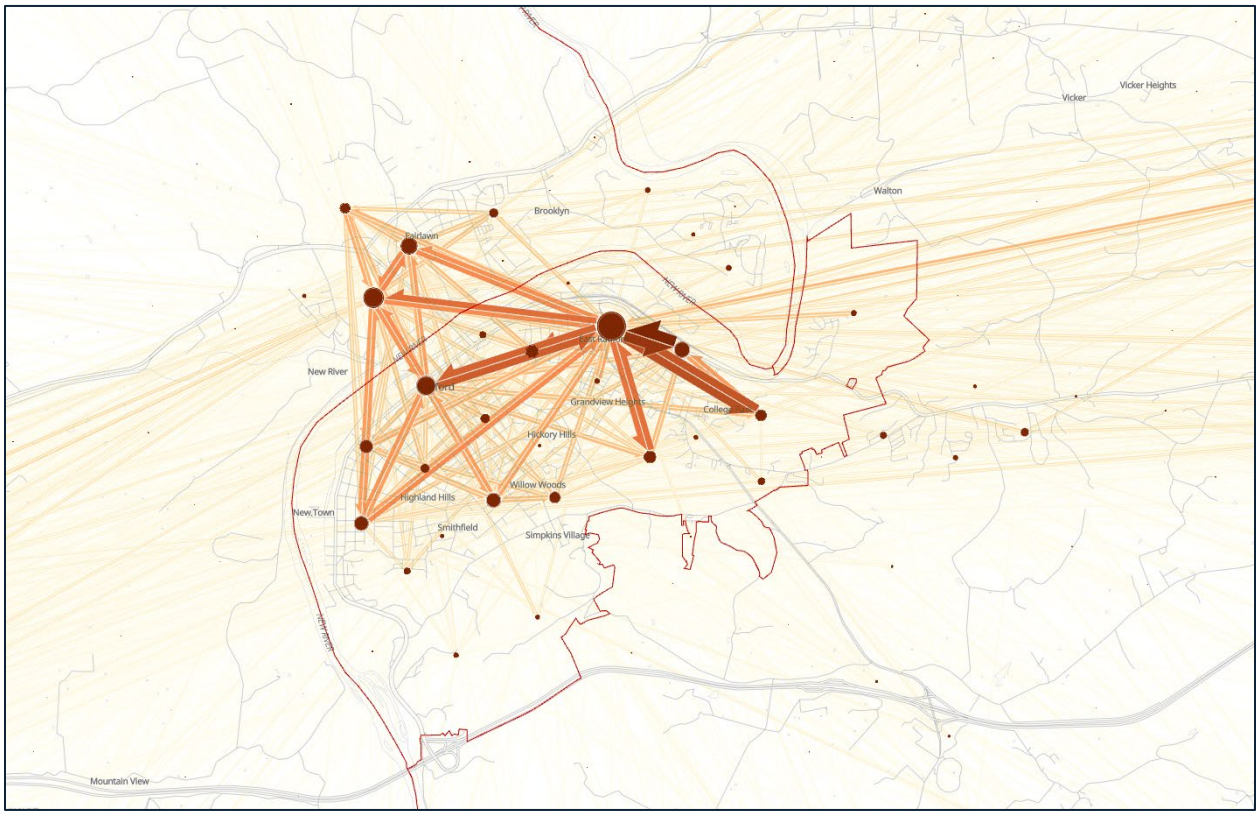


Figure 2-60 shows the distribution of different travel origins and destinations patterns by age group in the Radford City area. Persons ages 18–34 have much more specific travel destinations than other groups, with a majority of their travel occurring between Radford University, East Radford, Fairlawn, and the Uptown Christiansburg Mall. Persons ages 35–64 frequent similar origin-destination pairs, concentrated on the east side of Radford with a direct line of travel between U.S 11, West Main Street and along Wadsworth Street. Trips by persons over 65 are most concentrated between the areas of Randolph Street and West Main Street and retail shopping along U.S 11. For transit to cover the travel needs of all these age groups equitably, service could focus on serving trips between Fairlawn, West Main Street at Wadsworth Street and Radford University. If transit service were to be prioritized toward the travel needs of those 18–34 years, who make up approximately 35 percent (35%) of all trips taken during typical weekday, service should be concentrated in East Radford between Tyler Avenue and East Main Street. All age groups appear to travel to external destinations, particularly the Christiansburg Mall.

Figure 2-60: O-D Flows Ages 1)18–34 2) Age 35–49 3)50–64 4) Over 65

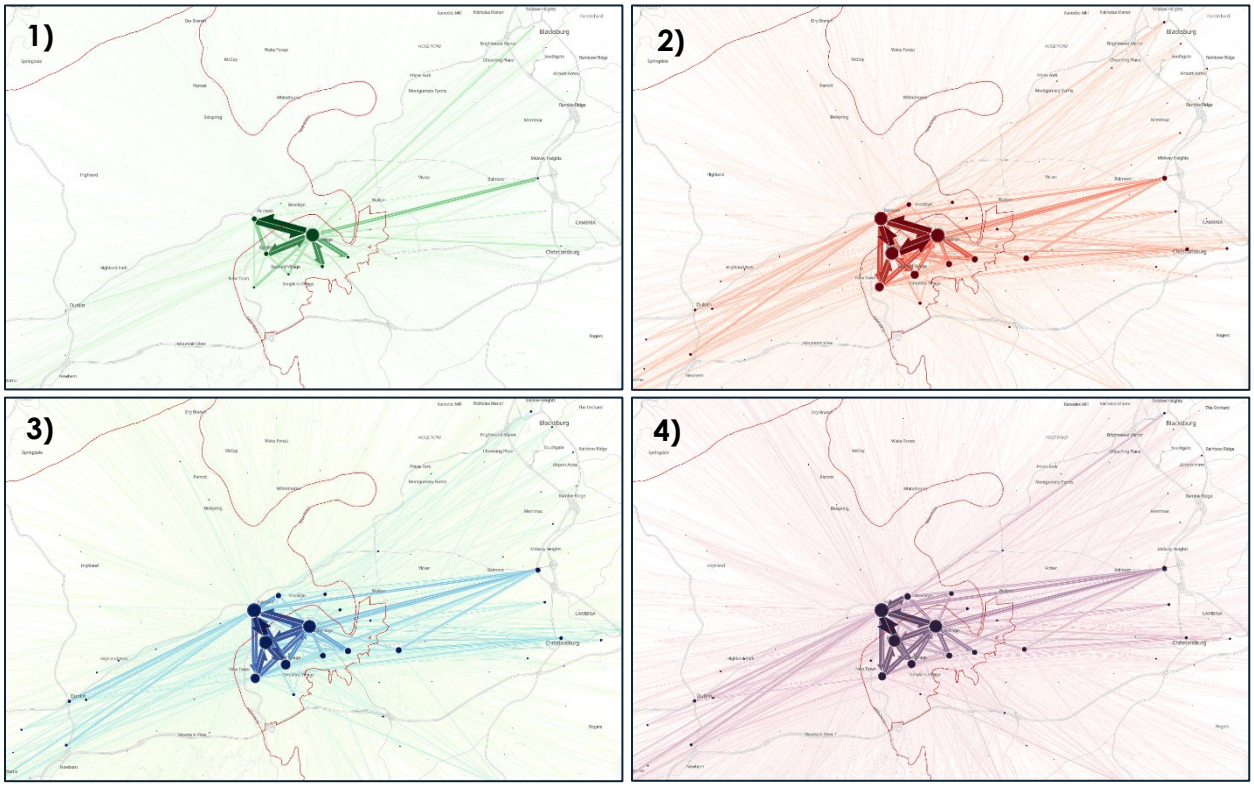


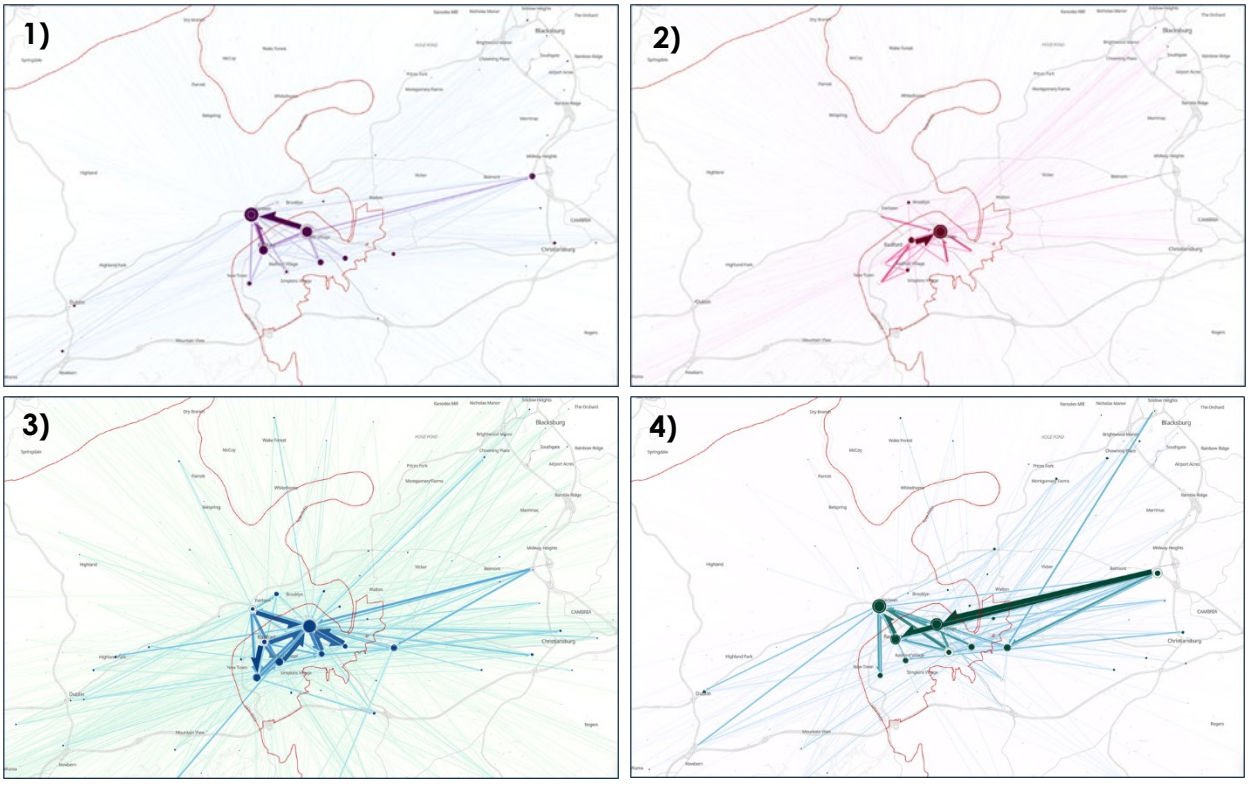
Figure 2-61 shows four (4) additional categories of travel purpose at the regional level that are popular among potential transit riders:

- Shopping trips that originate and end within Radford are concentrated at Fairlawn with around 7,000 incoming trips, Uptown Christiansburg Mall with 1,700 incoming trips, and Tyler Avenue with approximately 1,200 incoming trips. This

data would support transit service that prioritizes commercial center connections from the University.

- School trips are concentrated at RU mainly from adjacent block groups with 4,300 incoming daily trips, and around 4,000 trips that occur internal to the campus. There are also a cluster of 2,000 daily school trips ending at Radford High School, mainly from West Radford neighborhoods such as Highland Hills. This data would support transit service that served intermediate length trips (farther than walking distance) from student residential neighborhoods to the University.
- Social origin-destination pairs are more geographically distributed than other trip purposes and also less frequent, with around 2,000 trips occurring daily starting and ending on the Radford side of the new River. This data supports that if transit were to service social trips, service should be concentrated to business adjacent to East Main Street.
- Visitor origin-destination pairs, or trips that are made by persons that do not live in the City of Radford or neighboring New River Valley community, are concentrated in around 300 trips daily from Christiansburg Mall, Town of Christiansburg, and Blacksburg to RU, Fairlawn, and West Main Street. While Radford Transit can prioritize residents' and students travel needs, serving these destinations by transit may also allow Radford Transit to serve a smaller share of the tourist travel market within the city.

Figure 2-61: O-D Flows by Purpose (1Shopping 2)School 3)Social 4)Visitor Trips



2.2.2 Transit Demand and Underserved Areas Opportunity for Improvement

This section provides a review of the findings from the market assessment and previews system, route, and service area recommendations that will be further developed in Chapter 3 – Planned Improvements.

Opportunities Based on Transit Market Demand and Market Demographics

Planned future land use is concentrated on West and East Main Street Corridor. To provide more direct connections between the variety of mixed land use, retail, and residential outlined in the comprehensive plan, transit service that connects all these major hubs along Main Street could be considered. This would affect the route structure of those currently serving the main street corridor primary Routes 20 and 30. Future residential developments outside the downtown core, such as along Rock Road, may also warrant the realignment of the current 35 route. Connections between these future land use hubs both along Main Street and South Radford may also be designed as a new route.

Population density is currently well served by Radford Transit routes though some expansions of existing routes such as the 20 and 35 may cover population density that is currently not served in East Fairlawn. In future population growth scenarios, population is projected to grow along U.S 11, which may present an opportunity to add intermediate stops on the NRCCC route and on Route 40 near Plum Creek and at Silver Lake Road NW in Christiansburg.

Current transit coverage employment density is concentrated at RU and some businesses along Main Street and Wadsworth Street. Future employment growth is driven by healthcare, education, and retail, which may open opportunities for Radford Transit to continue or expand service to specific employers, such as Carilion New River Valley Medical Center, which would service both commuters and residents seeking travel for medical purposes.

Transit potential and propensity indicate that Radford transit currently covers populations with mobility needs well. Opportunities to expand include alteration of Routes 30 and 35 to link areas of high transit propensity directly to Tyler Avenue as well as exploration of flexible service options to cover the College Avenue to Plum Creek communities which see higher transit propensity but fewer, infrequent trips.

Opportunities Based on Travel Patterns

The most frequent trip takers in Radford are those with household incomes $25,000 - $75,000, who are typically a median age of 35 and have more than two (2) persons per household. The data shows that people who take public transit in the New River Valley area have household incomes around $12,000, with household sizes exceeding three (3) and a median age of 21. Areas of the City with transit rider demographics are concentrated around Radford University and East Main Street, which is adjacent to

Routes 15, 50, and 25. This group should be maintained as a core ridership market for Radford Transit. New areas with transit rider demographics that may be considered for expansion include Plum Creek, East Fairlawn, and potential new developments along West Main Street.

According to travel pattern data, weekday travel demand occurs in the morning around 8:00 a.m. and in the afternoon around 3:00 p.m. The trip purposes that are highest during this time include work and school in the morning, and trips to home and shopping during the afternoon peak. Trips also typically start from single family housing in the morning and from educational and retail land uses in the afternoon. There is an opportunity to serve increased travel demand to these locations, perhaps balancing service between residential and work destinations in the morning and commercial in the mid-afternoon to service demand. Routes that could see increased transit service frequency include ones that cover these respective areas during certain times of day: Routes 30 and 35 might see increased frequency in the morning, while in the afternoon more service might be allocated to the 20, 25, and 40. In addition, the above routes that serve the most common trip purposes (such as home, shopping and retail) may be realigned to connect popular traveler origin-destination pairs during peak hours.

Trip duration in the City of Radford and New River Valley community averages less than 20 minutes for all trip purposes across all modes. Public transit's average trip length is approximately 24 minutes across all trip purposes. Varying trip times via transit and other modes may be used as service guidelines for Radford Transit to aim to provide transit within the city that is comparable to other modes' travel time. Longer routes with specific regional destinations such as on the NRCCC and Route 40 may be improved by enhancing connections and transfers to these routes from common route transfers such as the 10, 11, and 20 may help bring overall travel time via transit closer to other modes. Travel data also shows that transit routes such as 10, 11, and certain segments of 15 and 50 that are intended to serve shorter trips, may be served by other modes such as bicycling, walking, and private auto.

Radford Transit routes may be more closely aligned with origin destination flows of potential transit riders. There is high demand for travel between three (3) major locations: RU, Fairlawn, and West Main Street. These main origin destination pairs are currently served by Routes 20, 30, and 35. Along these corridors there are opportunities for intermediate stop placements, particularly along U.S 11 and Fairlawn near Meredith Lane and the intersection of Peppers Ferry Road, to allow for rider access to food and retail destinations prior to the Walmart stop.

There is travel demand along an east-west travel corridor on Main Street from Pendleton to Burlington Street that is currently partially served by Route 30, which circulates through a residential neighborhood. Overall travel patterns east-west on main street decline after Ingles Street, which could serve as the western terminus of an east-west transit route.

Zero-car household origin-destination travel, which makes up 22 percent (22%) of all trips taken, is concentrated between RU, West Main Street, and Rock Road West and is

currently served by Route 30. A major destination for zero-vehicle household travelers is along Tyler Avenue. This destination could be served by potential rerouting or combining of Routes 25 and 30 that connect via Rock Road West. This action may provide a one-seat ride for those transit dependent populations to essential shopping and retail destinations.

Shopping trip origin-destination travel is concentrated on Fairlawn, U.S 11, Tyler Avenue, and Uptown Christiansburg Mall, with trips mostly originating from the University and West Main Street residential neighborhoods. Currently, Radford Transit serves these routes well, though there may be opportunities to add more frequent service on Route 40, particularly concentrating service at 4:00 p.m.–6:00 p.m. when shopping activity is frequent.

In addition to new or altered service that would provide connections along east-west travel patterns on Main Street, there is travel demand between West Radford and the Radford University Area via Park Road that is currently served by Route 30. A potential alteration to better align Route 30 with travel demand along this corridor would be an extension either to East Main Street or along Tyler Avenue, with stops to Auburn Avenue.

2.3 Performance Evaluation

This section assesses the existing performance of Radford's transit service using industry metrics and system averages and compares them to performance standards based on the strategic vision, goals, and objectives for the system. The performance evaluation seeks to understand Radford service at the system, route, and stop level, and identify where the system could improve. Opportunities for service improvements based on the performance evaluation are presented immediately following this section.

2.3.1 Performance Evaluation

The performance of Radford's service was evaluated on ridership, cost efficiency, safety, and system accessibility metrics. A peer comparison yields additional insight into how Radford is performing relative to other agencies with similar composition. The results of this evaluation are discussed in the following sections.

System Evaluation

Radford ridership, costs, and service data were collected from NTD for the five-year period from 2017 to 2021. **Table 2-7** summarizes the operating measures for all Radford routes.

Table 2-7: Operating Measures Five-Year Trend

Operational Measure	2017	2018	2019	2020	2021
Operating Expenses	$1,516,972	$1,396,188	$1,478,035	$1,497,428	$1,667,074
Fare Revenues	$503,846	$516,157	$621,913	$308,016	$160
Annual Unlinked Trips	338,719	328,929	268,727	185,459	102,199
Annual Vehicle Revenue Miles	340,436	347,734	342,655	302,634	312,479
Annual Vehicle Revenue Hours	31,759	31,419	31,215	27,797	30,471

Source: National Transit Database (NTD)

Table 2-8: Performance Measures Five-Year Trend

Performance Measure	2017	2018	2019	2020	2021*
Operating Expenses per Passenger Trip	$4.48	$4.24	$5.50	$8.07	$16.31
Operating Expenses per Vehicle Revenue Mile	$4.46	$4.07	$4.31	$4.95	$5.33
Operating Expenses per Vehicle Revenue Hour	$47.77	$44.44	$47.35	$53.87	$54.71
Passenger Trips per Vehicle Revenue Mile	1.0	1.0	0.8	0.6	0.3
Passenger Trips per Vehicle Revenue Hour	10.7	10.5	8.6	6.7	3.4
Farebox Recovery Ratio	32.8%	33.8%	37.6%	20.1%	0.0%

Source: National Transit Database (NTD)
** Operated with Zero Fare in 2021*

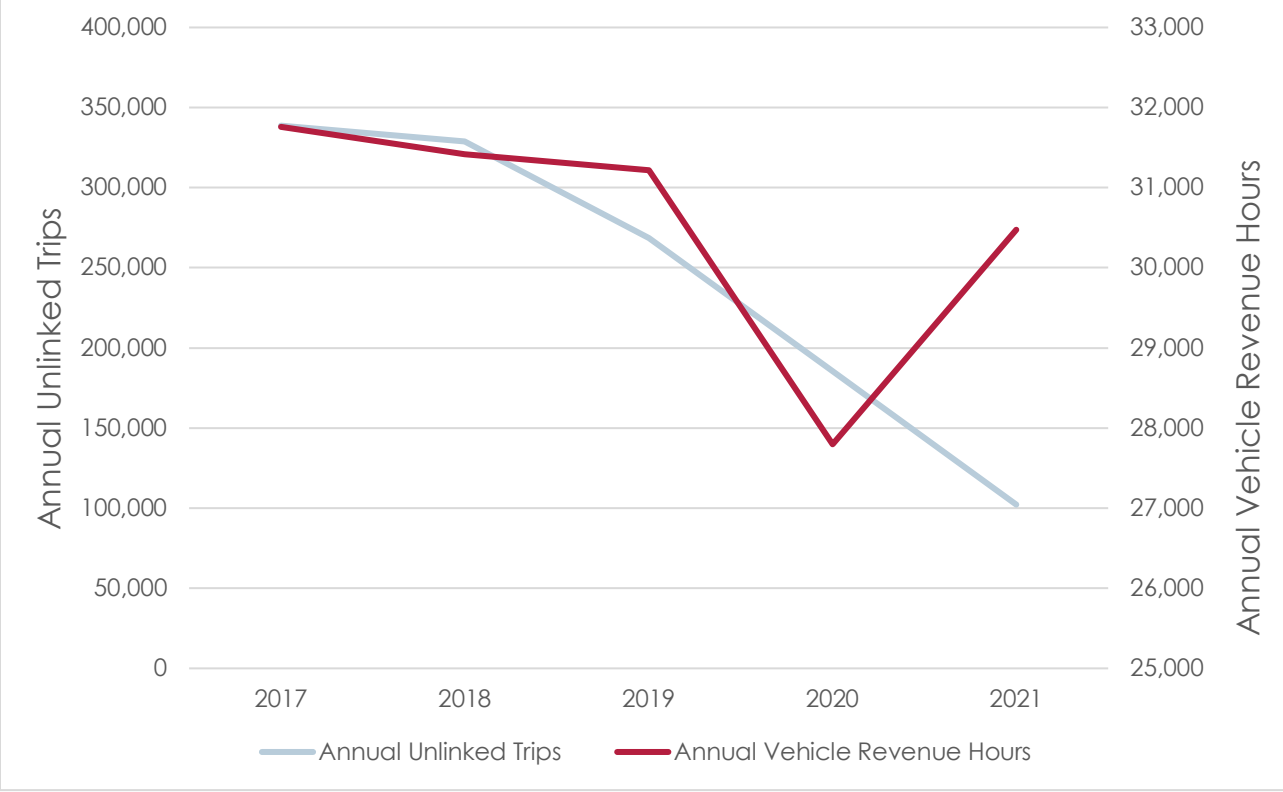
Table 2-7 and **Table 2-8** indicate metric trends over the course of the five-year period. Radford transit's operating expenses increased overall from 2017 to 2021 but saw a decrease in expenses from 2017 to 2020. Total operating expenses increased by $169,646 between those two (2) years. This increase came with both a zero-fare policy adoption in 2021, with a simultaneous increase in revenue miles. The farebox recovery ratio hovered around 30 percent (30%) for most of the five-year period but decreased to zero percent (0%) in 2021 because of the new policy. Overall, the cost of operation has also increased from $47.77 per vehicle revenue hour in 2017 to $54.71 per vehicle revenue hour in 2021.

From 2017 to 2021, both the Annual Vehicle Revenue Miles and Annual Vehicle Revenue Hours decreased. There was a slight uptick for both measures between 2020 and 2021 as more normal post-pandemic service resumed. On the contrary, the number of passenger trips steadily decreased from 2017 to 2021 and continued to drop even as available service returned to normal. Further highlighting this trend, the passenger trips per vehicle revenue mile went from 1.0 to 0.3 across the five-year period.

While ridership decreased from 2017 to 2021, the largest decrease happened between 2020 and 2021 due to the impacts from the COVID-19 pandemic which affected ridership in transit systems nationwide. It will be important to continue monitor trends in ridership and compare it to other metrics for the City of Radford community including Radford University enrollment.

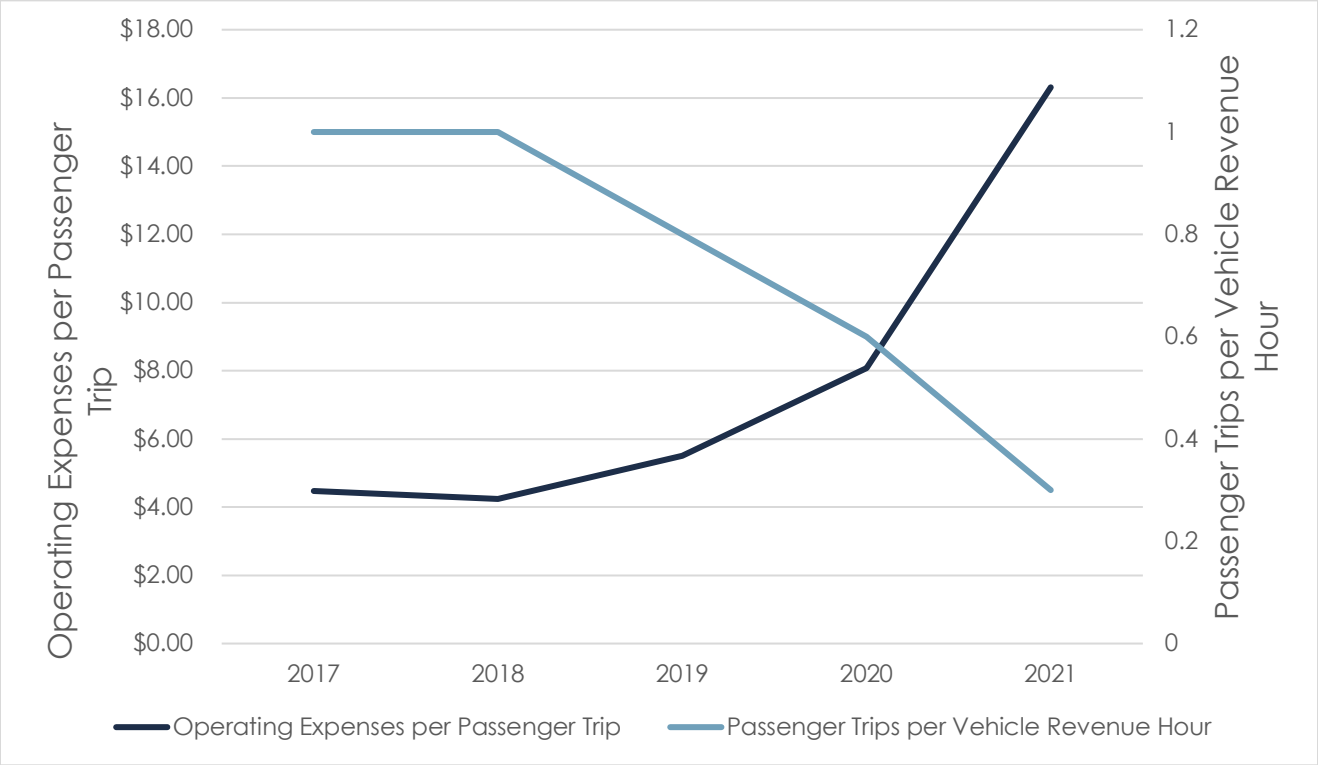
Decreasing ridership and increasing costs have made Radford Transit's system less efficient from 2017 to 2021. The operating expense $4.48 per trip in 2017, while in 2021 it was $16.31 per trip, a near four (4) times increase.

Figure 2-62: Passenger Trips and Revenue Hours Five-Year Trend



Source: National Transit Database (NTD)

Figure 2-63: Operating Expenses per Passenger Trip and Passenger Trips per Vehicle Revenue Hour Five Year Trend



Source: National Transit Database (NTD)

Peer Comparison

A peer comparison was conducted to understand the efficiency and effectiveness of Radford service with respect to similar agencies across the country. The peer comparison provides a quantitative comparison between similar agencies to highlight opportunities to improve Radford transit service and identify challenges in the region. A selection process using National Transit Database data, as well as a review of local transit development plans was conducted to identify Radford transit peers. Peers that were selected possessed several, but not always all, of the following selection criteria:

Similar city characteristics

- Urban area population is between 60,000–150,000
- System serves a college or multiple colleges with total undergraduate enrollment between 5,000–30,000 students

Similar services provided

- Vehicle revenue miles between 300,000–1,000,000 (2021)
- Vehicle revenue hours between 15,000–100,000 (2021)
- Standard bus vehicles operated in maximum service is 4-40 (2021)
- Provides fixed-route service or fixed-route deviated service

Similar agency makeup

- Governed directly by a city council
- Total facilities between zero (0) and three (3)
- Only Virginia agencies

The results of the peer comparison are divided into service area (**Table 2-9**) and staffing count (**Table 2-10**) metrics. Takeaways from the peer analysis are below:

- Radford Transit operates in a smaller service area than most of its peers, and is most similar to WinTran, which operates within Winchester City. Radford has a service area of 6,400 acres, which is much smaller than the peer average of 48,320.
- Radford Transit has 16 passenger trips per acre, which is less than the average, indicating that demand for the service is limited.
- Compared to the average, Radford Transit has more revenue miles and revenue hours run per acre at 48.8 and 4.8, respectively.
- Per passenger, Radford spends more on each trip than almost every peer agency ($16.31/trip). Only FXBGO! Spends more, with $26.79/trip.
- For other operating expenses, Radford Transit is the most cost effective, only spending $54.71 per revenue hour and $5.33 per revenue mile. These metrics are both less than any other peer agency.
- Overall, Radford transit shows less ridership than other peer agencies, but is more cost effective.

Table 2-9: Service Area Based Peer Comparison

Performance Measure	Radford Transit	Peer Average	FXBGO!	WinTran	City of Harrisonburg	Blacksburg Transit
Service Area (Acres)	6,400	48,320	154,880	5,760	10,880	21,760
Passenger Trips per Acre	16.0	23.7	0.92	13.7	44.1	36.2
Vehicle Revenue Miles per Acre	48.8	32.8	3.94	25.3	58.5	43.6
Vehicle Revenue Hours per Acre	4.8	3.1	0.26	2.1	6.0	4.1
Operating Expenses per Acre	$260.5	$245.0	$24.6	$171.8	$409.9	$373.7

Source: 2021 National Transit Database (NTD)

Table 2-10: Operating Expense and Passenger Based Peer Comparison

Performance Measure	Radford Transit	Peer Average	FXBGO!	WinTran	City of Harrisonburg	Blacksburg Transit
Operating Expenses per Passenger Trip	$16.31	$14.78	$26.79	$12.50	$9.49	$10.33
Operating Expenses per Vehicle Revenue Mile	$5.33	$7.13	$6.23	$6.80	$7.14	$8.58
Operating Expenses per Vehicle Revenue Hour	$54.71	$83.28	$93.28	$80.21	$69.47	$90.15
Passenger Trips per Vehicle Revenue Mile	0.33	0.58	0.23	0.50	0.80	0.80
Passenger Trips per Vehicle Revenue Hour	3.35	6.47	3.48	6.40	7.30	8.70

Source: 2021 National Transit Database (NTD)

Safety

Five years of safety performance data (2017-2021) is available for Radford Transit from the National Transit Database (NTD). NTD defines the formal conditions of a reportable incident as a fatality, injuries requiring medical attention away from the scene for one (1) or more persons, or property damage greater than or equal to $25,000. [4]

As outlined in Chapter 1, Radford Transit has outlined a set of safety performance targets in their Public Transit Agency Safety Plan (PTASP) in accordance with Federal Transit Administration regulations. Radford Transit collaborates with the PTAB every six months and conducts an evaluation of how well the agency has adhered to safety performance metrics in compliance with the requirements of the National Public Transportation Safety Plan. In the agency's most recent Transit Safety Plan, the following measurable safety performance targets were established as a benchmark for the overall safety performance of the agency.

[4] Radford Transit transitioned to a limited reporter in 2019 with safety data reporting to NTD voluntary.

Table 2-11: Safety Standards and Measures

Safety Standard	Fixed-Route Measure
Fatalities (total number of reportable fatalities per year)	**0**
Fatalities (rate per total vehicle revenue miles by mode)	**0**
Injuries (total number of reportable injuries per year)	**1**
Injuries (rate per total vehicle revenue miles by mode)	Less than .5 injuries per 100,000 vehicle revenue miles
Safety events (total number of safety events per year)	**3**
Safety events (rate per total vehicle revenue miles by mode)	Less than 1 reportable event per 100,000 vehicle revenue miles
Distance between Major Failures	10,000 miles
Distance between Minor Failures	3,200 miles

Table 2-12 show the total reportable accident and categories reported by Radford Transit to NTD. The only year where a reportable event occurred was in 2017, with two (2) events and one (1) injury. This is equal to the safety standard injury threshold per year.

Table 2-13 reports the safety measure totals compared to the safety performance measure rates established in the TDP by system utilization. In 2017 the injury rate per vehicle revenue miles exceeded the safety standard of 0.5 injuries per 100,000 vehicle revenue miles.

Table 2-12: NTD Safety Measure Totals

NTD Safety Measure Totals	2017	2018	2019	2020	2021
Reportable Events	2	0	0	0	0
Fatalities	0	0	0	0	0
Injuries	1	0	0	0	0

Source: 2021 National Transit Database (NTD)

Table 2-13: Safety Measure Performance

Accident Rate	2017	2018	2019	2020	2021
Bus Accidents per 100,000 miles	.58	0	0	0	0
Safety Incidents per 100,000 boardings	.59	0	0	0	0

Source: 2021 National Transit Database (NTD)

Route Evaluation

Route level performance is evaluated to understand productivity at a more detailed level. Radford's operating statistics and ridership data were reviewed, and performance metrics were calculated for every route in operation from July 2022 to January 2023. It should be noted here that two (2) factors have had an impact on ridership: the COVID-19 pandemic and zero-fare policy. The impacts of both factors are discussed in greater detail in this section.

Operating statistics by route are shown in **Table 2-14**, highlighting the routes that require the most resources in terms of daily revenue hours and revenue miles. Non-revenue hours and miles are also presented as a percent of the total hours and miles that a route operates. Routes with higher percentages indicate a greater number of non-revenue hours and non-revenue miles.

Table 2-14: Service Performance by Route (All Service Periods)

Route	Daily Revenue Hours		Daily Revenue Miles		Non-Revenue Hours		Non-Revenue Miles	
	Total	Rank	Total	Rank	Percent	Rank	Percent	Rank
10	18.8	1	170	3	6.70%	10	7.10%	11
11	11	10	101	10	5.80%	7	5.50%	8
15	11.2	9	129.5	7	9.60%	13	7.50%	14
20	12.5	5	122.2	8	8.50%	11	7.30%	12
25	12.5	6	135.4	6	9.10%	12	7.30%	13
30	12.1	8	159.6	4	6.10%	9	4.30%	6
35	12.5	7	172.5	2	6.00%	8	3.40%	5
40	13.6	4	259.7	1	10.00%	14	6.50%	9
41	-	-	-	-	-	-	-	-
50	15.2	3	147.4	5	5.10%	5	5.20%	7
60	15.2	2	107.6	9	5.60%	6	6.90%	10
70	-	11	-	11	-	1	-	1
80	-	11	-	11	-	1	-	1
100	-	11	-	11	-	1	-	1
Average	13.46		150.49		7.3%		6.1%	

Source: Radford Transit operating statistics report 01/01/2022 – 12/31/2022.
Note: Data sample includes dates during COVID-19 pandemic.
Color Key: Blue indicates higher rank and red indicates lower rank.

Given that the City of Radford's large university population is one of the primary users of the transit system, route service is split into two (2) categories: university service and city (regular) service. University service typically runs throughout the school year from late August to early May, while city service runs for the summers when class is no longer in session. For purposes of this evaluation, university routes ran from August 22nd, 2022, to May 5th, 2023. City service ran from July 1st to August 21st, 2022. Routes 15, 20, 25, 30, and 35 are summer routes, while all other routes are university routes. However, Routes 15, 20, and 25 are also university routes and operate different amounts of service depending on time of year.

Table 2-15: University (Regular) Service Performance by Route

Route	Daily Revenue Hours		Daily Revenue Miles		Non-Revenue Hours		Non-Revenue Miles	
	Total	Rank	Total	Rank	Percent	Rank	Percent	Rank
10	15.6	1	140.4	4	4.5%	8	3.2%	8
11	11.3	7	102.9	8	5.5%	6	3.7%	6
15	9.7	9	111.7	7	7.5%	4	3.7%	5
20	12.8	5	124.2	6	7.9%	3	4.8%	3
25	12.6	6	136.9	5	8.7%	2	5.8%	1
40	12.9	4	230.4	1	8.8%	1	5.0%	2
41	11.2	8	155.1	2	7.0%	5	3.2%	7
50	15.2	2	147.9	3	3.8%	9	2.4%	9
60	14.1	3	101.0	9	4.9%	7	4.2%	4

Source: Radford Transit Passio operating statistics 08/22/2022 – 05/05/2023.
Color Key: Blue indicates higher rank and red indicates lower rank or performance level.

For university routes shown in **Table 2-15** above:

- Route 10 had the most daily revenue hours, at 15.6, while also having the second smallest percent of non-revenue hours and miles.
- Route 40 had the most daily revenue miles run with 230.4; however, it also had the worst and second worst percent of non-revenue hours and miles run respectively. This route is one of the longest and goes into Christiansburg.
- Most routes have over 11 daily revenue hours run. Route 15 is the exception, with only 9.7 daily revenue hours.

Table 2-16: City Service Performance by Route

Route	Daily Revenue Hours		Daily Revenue Miles		Non-Revenue Hours		Non-Revenue Miles	
	Total	Rank	Total	Rank	Percent	Rank	Percent	Rank
15	12.5	1	140.7	3	4.1%	5	2.6%	5
20	12.1	2	120.0	5	7.0%	2	7.0%	2
25	11.3	5	123.5	4	11.8%	1	9.6%	1
30*	12.1	3	158.7	2	5.7%	4	3.7%	3
35*	12.0	4	165.2	1	6.5%	3	3.5%	4

Source: Radford Transit Passio operating statistics 07/01/2022 - 08/21/2022
**Different dates from other city routes (07/01/22-06/28/22)*
Color Key: Blue indicates higher rank and red indicates lower rank or performance level.

When looking at the city routes in **Table 2-16** above:

- Route 15 was the most efficient route and had the most daily revenue hours at 12.5. It also had the smallest percentage of non-revenue hours and miles.
- Route 35, which operates year-round, had the most amount of daily revenue miles at 165.2. This is one (1) of the only routes that does not stop at the university and goes into neighboring Fairlawn.
- Routes 20 and 25 had the lowest amount of revenue hours and revenue miles.

Service productivity by route is shown in **Table 2-17** below. This data shows aggregate counts for all versions of a route throughout the year, specifically for 2022. Observations from the route performance data are as follows:

- Route 20 is the strongest performing route in the transit network, with 126.4 passengers per day, 10.1 riders per revenue hour, and one (1) rider per revenue mile. However, it is important to note that this route is in the middle in terms of total revenue miles and hours across routes. It also has a larger percentage of miles and hours run that are not revenue hours.
- Route 10 and Route 35 are the next best performing routes, with 91.5 and 78.1 daily passengers, respectively. To close out the top five (5), the final two (2) most popular routes are Route 30 and Route 50.
- Routes 41, 70, 80, and 100 did not run service in 2022 and do not have any reporting data.
  The lowest performing route in 2022 was Route 15. This route had only 0.2 riders per revenue mile, 2.3 riders per revenue hour, and only 26.2 daily passengers.

Table 2-17: Service Productivity by Route

Route	Daily Passengers		Riders/Rev Hour		Riders/Rev Mile	
	Total	Rank	Total	Rank	Total	Rank
10	91.5	2	4.9	4	0.5	2
11	37.5	7	3.4	7	0.4	7
15	26.2	10	2.3	9	0.2	9
20	126.4	1	10.1	1	1	1
25	56.8	6	4.5	5	0.4	4
30	60.6	4	5	3	0.4	6
35	78.1	3	6.3	2	0.5	3
40	33.3	8	2.5	8	0.1	10
41	-	-	-	-	-	-
50	59.1	5	3.9	6	0.4	5
60	32.3	9	2.1	10	0.3	8
70	-	11	-	11	-	11
80	-	11	-	11	-	11
100	-	11	-	11	-	11
Average	60.18		4.5		0.42	

Source: Passio passenger boardings report 01/01/2022 – 12/31/2022
Color Key: Blue indicates higher rank and red indicates lower rank.

When considering the productivity of university routes as displayed in **Table 2-18:**

- Route 20 is the most productive and has 125.2 daily passengers, 9.8 riders per revenue hour and one (1) rider per revenue mile
- Conversely, Route 15 is the least productive with 13.9 daily passengers, 1.4 riders per revenue hour and 0.1 riders per revenue mile
  Routes 10 and 25 are the second and third best performing routes but are still significantly lower in performance than Route 20. They had 67.6 and 52.7 daily passengers, respectively.

Table 2-18: University Service Productivity by Route

Route	Daily Passenger		Riders/Rev Hour		Riders/Rev Mile	
	Total	Rank	Total	Rank	Total	Rank
10	67.6	2	4.3	2	0.5	2
11	33.5	6	3.0	5	0.3	5
15	13.9	9	1.4	9	0.1	9
20	125.2	1	9.8	1	1.0	1
25	52.7	3	4.2	3	0.4	3
40	34.6	5	2.7	6	0.2	7
41	20.9	8	1.9	8	0.1	8
50	45.5	4	3.0	4	0.3	6
60	33.1	7	2.3	7	0.3	4

Source: Radford Transit Passio operating statistics 08/22/2022 - 05/05/2023
Color Key: Blue indicates higher rank and red indicates lower rank or performance level.

Table 2-19 shows city or regular service productivity:

- Route 20 had 87.6 daily passengers, 7.2 rider per revenue hour, and 0.7 riders per revenue mile, which made it the most productive route. Route 20 operates from around the University to Fairlawn.
- Route 15 was the worst performing and had only 36.7 average daily riders, 2.9 riders per revenue hour, and 0.3 riders per revenue mile. This route may be considered for route alteration to better match service to demand.
- City service productivity was less variable than university service. Riders per revenue mile ranged from 0.3 to 0.7. Likewise, riders per revenue hour ranged from 2.9 to 7.2.
- Routes 30 and 35, routes that run concurrent with regular city service, had the second and third most productive service.

Table 2-19: City Service Productivity by Route

Route	Daily Passenger		Riders/Rev Hour		Riders/Rev Mile	
	Total	Rank	Total	Rank	Total	Rank
15	36.7	5	2.9	5	0.3	5
20	87.6	1	7.2	1	0.7	1
25	55.9	4	5.0	4	0.5	2
30*	60.8	3	5.0	3	0.4	4
35*	67.8	2	5.6	2	0.4	3

Source: Radford Transit Passio operating statistics 07/01/2022 - 08/21/2022
**Different dates from other city routes (07/01/22-06/28/23)*
Color Key: Blue indicates higher rank and red indicates lower rank or performance level.

Table 2-20 shows the financial performance for each route in terms of operating cost and cost per rider. Key findings are described below.

- Radford transit routes all operate with a cost per rider of less than $30.
- The average cost for the 2022 calendar year was $15, which matches what NTD reports where the average cost was $16.31 in 2021. Radford Transit eliminated fares in 2022, which might attribute to the decrease in cost.
- The most efficient route in the network is Route 20, as it has a cost per rider of only $5.43. However, the route with the cheapest daily expense is Route 11 as it costs $601.93 dollars to operate per day on average.
- Route 60 is the least efficient route at a cost of $25.72 per rider.

Table 2-20: Financial Performance by Route

Route	Daily Operating Cost		Cost/Rider	
	Total	Rank	Total	Rank
10	$1,030.03	1	$11.26	7
11	$601.93	10	$16.06	4
15	$615.02	9	$23.49	2
20	$686.60	5	$5.43	10
25	$684.31	6	$12.04	6
30	$663.84	8	$10.95	8
35	$682.57	7	$8.74	9
40	$742.57	4	$22.30	3
41	-	-	-	-
50	$829.51	3	$14.03	5
60	$830.97	2	$25.72	1
70	-	-	-	-
80	-	-	-	-
100	-	-	-	-
Average	$736.7		$15.0	

Source: Passio passenger boardings report 01/01/2022 – 12/31/2022. Cost assumption of $54.71 per revenue hour was utilized for cost per rider metric (Source 2021 NTD).

Bus Stop Level Evaluation

Radford Transit actively tracks stop-level data through their automatic passenger counter (APC) system Passio. This data is available to aggregate to the block and route levels to determine the most efficient operating days and stops with the most boardings by unique route. shows a dashboard layout of Radford Transit's system-level ridership performance including a map of total ridership by stop, ridership trends over calendar year 2022, a ranking of stops with the most boardings as well as the riders by route block. **Figure 2-65** shows the average ridership proportional to the number of arrivals at each stop, route block, and over time. Notable system ridership trends include:

- System stop-level boardings are concentrated around Radford University, Tyler Avenue, and West Radford totaling more than 632 boardings during 2022.
- Ridership peaked in the month of October 2022 at 14,500 boardings, most likely driven by regular school and commuting patterns. However, system ridership dropped approximately 50 percent (50%) in December 2022 and May 2022, when the Radford University summer break occurs.
- The highest ridership stops are The HUB and the Walmart, which has more than 14,000 annual boardings each. The lowest stops by boarding include those along West Main Street which totaled less than 1,000 boardings. This does not mean that Radford Transit riders do not utilize these stops to alight towards their destination, but rather these stops are not major trip generators or are not used for return journeys.
- The highest route block in the Radford Transit system is the 20 Monday-Friday regular service at over 17,000 riders in 2022. Whereas the data in **Table 2-15** through **Table 2-20** shows the entire-route productivity, **Figure 2-64** allows specifically productive route blocks to be ranked based on their service period. For example, comparing 20 M–F Regular block's high ridership to the moderate ridership of the equivalent 20 M–F City block's ridership, it is possible to analyze the difference in seasonal ridership of the same route structure when Radford University is in and out of session or the difference between weekday and weekend blocks.

Figure 2-64: Radford Transit System Level Ridership Performance Profile

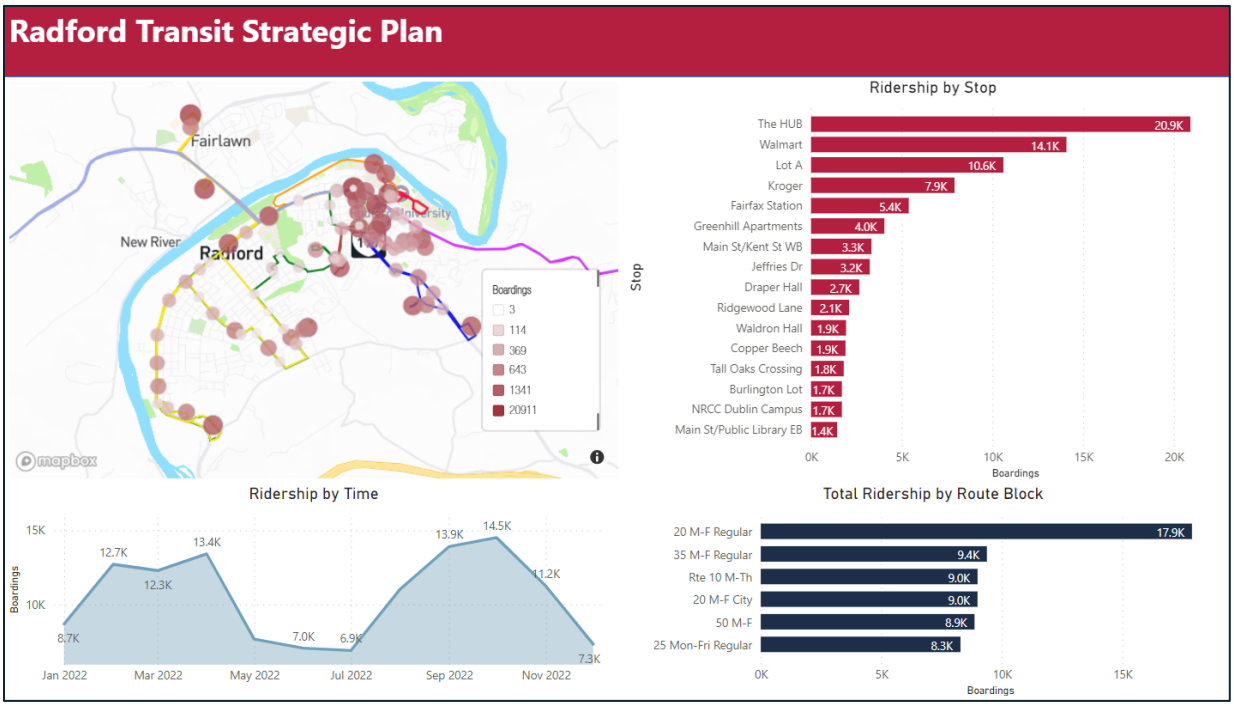
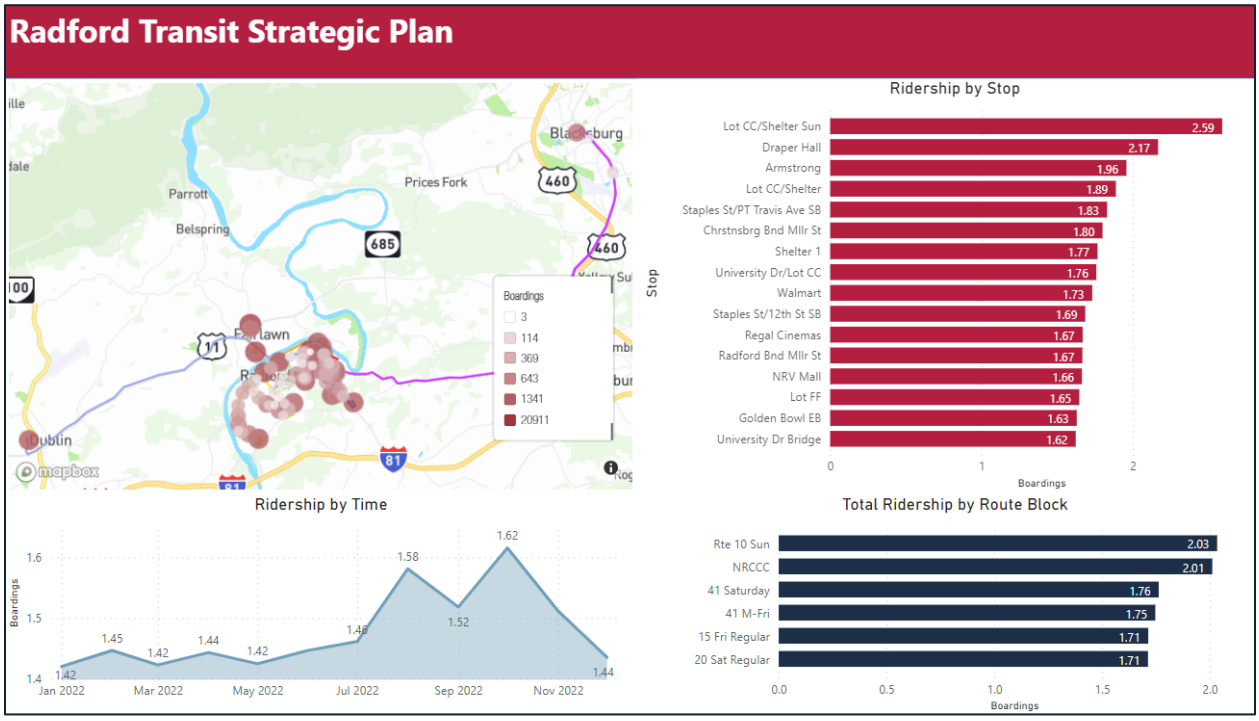


Figure 2-65: Radford Transit System-Level Ridership Efficiency Profile



System Accessibility

Route-level accessibility is analyzed to understand the different population and employment characteristics served by Radford Transit within 0.25 miles of each route's bus stop. While Radford Transit routes are designed to serve different populations and travel purposes, ensuring that one (1) route is not relying too much upon a single population group or is not missing an opportunity connect populations will ensure more reliance in ridership and utilization over time.

Table 2-21 and **Table 2-22** illustrates the accessibility of Radford Transit routes by the number of people, jobs, low-income, Limited English Proficiency (LEP) and zero car households they cover within .25 miles of their stops. These demographic categories are reflective of the demographic categories analyzed in Transit Propensity section, with those routes with higher low-income, zero vehicle, youth, senior populations, and other job categories like commercial employment more likely to retain dependent riders. **Table 2-21** and **Table 2-22** also color code the population and employment number by where they rank relative to Radford Transit routes, with blue ranking higher and red ranking lower.

Key takeaways from the system accessibility that may be applied to system and route-level improvements in Chapter 3 include:

- Routes that feature either high concentrations of population or employment should be consolidated so they can connect both residential to commercial areas. Routes such as 10, 11, 50 and 60 feature high population density but moderate to low employment density. Route 20 can serve as an example of a route that covers both population and employment centers within the City of Radford.
- Route 35 ranks among the highest in minority, LEP, Youth and Senior population accessibility but last in college enrolled population. This is likely because the route is concentrated on service in West Radford and does not access Radford University. It may be beneficial to examine whether Route 35 can serve both populations, as it retains a high access to service jobs within the City of Radford that may be desirable for some college students seasonally.
- Route 30 and Route 35 rank the highest in population density, senior population, zero car and low-income households, but do not link to high commercial centers where there are retail shopping and employment destinations that riders may desire to access, mainly in Fairlawn. Routes 30 and 35 also offer high access to the only industrial employment centers for low-income households.
- Route 35 covers the highest population of Youth (18 and younger) in Radford but does not connect to the middle school or recreation center.
- Route 40 and 41, which service Blacksburg and Christiansburg, offer high access to regional population centers and commercial employment opportunities. However, the routes rank lower in population density overall, particularly not providing direct service for areas with a higher concentration of people and households on Radford's West Side.

Table 2-21: System Route Population Accessibility

Route	Population	Population Density (square mile)	Minority	LEP	Youth	Enrolled in College	Senior
10	5,205	6,347	1,531	58	166	4,337	94
11	5,371	5,441	1,585	60	182	4,466	96
15	5,895	4,802	1,728	67	242	4,673	134
20	6,047	3,332	1,671	65	258	4,720	191
25	5,785	4,411	1,642	64	250	4,445	172
30	8,807	2,364	1,549	36	166	3,402	1,076
35	4,788	1,636	675	9	1,060	518	822
40	9,108	4,836	2,400	135	409	7,094	297
41	9,108	4,836	2,400	135	409	7,094	297
50	5,730	6,062	1,701	66	226	4,575	125
60	5,499	6,535	1,570	59	212	4,454	139
70	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-
100	5,537	4,711	1,592	59	202	4,528	185
Total	**17,436**	**2,368**	**3,700**	**169**	**1,885**	**9,188**	**1,536**

Table 2-22: System Route Household Accessibility

Route	Households	Low Income	Zero Car	One Car	Jobs	Job Density (square mile)	Service	Commercial	Industrial
10	1,259	793	46	481	427	528	389	39	5
11	1,325	817	51	510	460	466	416	36	7
15	1,575	926	54	613	526	429	476	42	7
20	1,690	258	57	622	1,415	780	1,006	336	74
25	1,575	905	61	609	678	517	535	141	1
30	3,659	1,602	148	1,290	5,240	1,407	2,766	249	2,226
35	2,330	774	108	800	4,983	1,703	2,391	362	2,230
40	2,248	1,023	98	873	4,348	2,309	3,194	1,019	135
41	2,248	1,023	98	873	4,348	2,309	3,194	1,019	135
50	1,476	885	62	578	510	540	469	41	0
60	1,367	829	49	522	540	573	438	44	0
70	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-
100	1,401	865	51	534	1,017	865	863	95	59
Total	**6,173**	**2,549**	**264**	**2,260**	**10,514**	**1,428**	**6,555**	**1,579**	**2,380**

2.3.2 Performance Based Opportunities for Improvement

Opportunities to improve Radford Transit service are evaluated based on current and proposed service standards as well as the relative ranking of route-level performance to system averages. Routes that fall below performance-based benchmarks represent an opportunity to suggest service alterations to increase the effectiveness of the route, which will be elaborated upon in Chapter 3: Planned Improvements and Modifications.

The average system performance and the opportunities for service alterations for routes that fall below system performance average or standards is included below, organized by performance category:

Non-revenue hours and non-revenue miles

- The average revenue hours for Radford Transit is 13.46. The average revenue miles are 150.49. The average non-revenue hours percentage for all routes is 7.3 percent (7.3%), while non-revenue miles is 6.1 percent (6.1%). The non-revenue performance metrics represent time that they vehicle is not serving customers, such as during layover, deadhead, or allocated to operator breaks.
- Routes 15, 20, 25, and 40 exceed the non-revenue hours average of 7.3 percent (7.3%). Routes 10, 15, 20, 25, 40, and 60 exceed the non-revenue mile average of 6.1 percent (6.1%).
- Usually transit routes with more non-revenue time is attributed to longer routes and service spans, which require more deadhead, but the routes that exceed the non-revenue hour average rank in the middle for service provided. This provides an opportunity to combine or evaluate the scheduling of these routes, introducing interlining and consolidation of service to avoid excess non-revenue time without compromising operator breaks and sufficient recover time.

Riders per revenue hour and revenue mile

- The average riders per revenue hour for the system is 4.5 boardings per hour. The average riders per revenue mile is 0.42 boardings per mile. Typically, boardings per service hour are used to account for different length of routes and types of service, to avoid penalizing routes that run more frequently on shorter segments.
- Routes 11, 15, 40, 50 and 60 fall below the average rider per revenue hour of 4.5. Routes 11, 15, 25, 40, 50 and 60 fall below the average riders per revenue mile of 0.42.
- Routes 15, 40 and 60 are significantly below the system average for ridership productivity, which could lead to opportunities to coordinate duplicative service on low ridership stops of the low performing routes shared by others in the system.

Cost per rider

- Cost per passenger is calculated directly at the route-level from the revenue hours, hourly cost, and ridership. The average cost per rider for the entire Radford Transit system is $15.00 in calendar year 2022. Radford Transit has been fare-free since 2021.
- Routes that exceed the $15.00 threshold include Routes 11, 15, 40, and 60. Routes 15 and 60 specifically exceed $20.00 per rider.
- Routes with high cost per rider are running more service than the ridership they are collecting on their current routes. For some cost-inefficient routes, such as Route 60, restructuring the route to extend to desirable destinations for riders could attract more ridership for similar amounts of service and cost. For other overlapping routes, such as Route 15 and Route 11, determining opportunities to reduce competition with duplicative service can increase system cost efficiency.

Bus Stop Ridership

- Radford Transit's annual 2022 stop ridership is heavily concentrated on a few transit center stops including The Hub (41,000), Walmart (27,000), Lot A (23,000), Kroger (14,000) and Fairfax Station (11,000). The average boarding per stop arrival, or each time the bus services a stop, is 1.48. The average boardings per stop arrival allows normalization on the amount of service each stop receives so that popular stops are analyzed in the context of how much service is provided.
- Stops that fall below 1.48 boardings per bus arrival for 2022 include stops on West Main Street such as Denby Street Eastbound and Carter Street Eastbound as well as stops on Route 25 on Tyler Avenue. A full list of stop ridership performance by Radford Transit route can be found in the route profiles in the appendix.
- Stops with low total annual ridership or average ridership by bus arrival can be evaluated to determine whether service should be continued. If the service is along a major corridor with no penalty for stopping at a low ridership stop, service can be continued. If service has to deviate to serve a low-ridership stop, then a route alteration should be considered to continue providing accessible coverage to the affected stop area.

2.4 Operating and Network Efficiency Evaluation

The operating and network efficiency evaluation provides a measurable baseline for Radford Transit operations that can be used to identify improvements to the system. Radford Transit schedule, ridership and operations data is benchmarked against system averages and other transit benchmarks to develop recommendations that can be implemented at the network, route, area, and stop level. These recommendations or opportunities for improvement based on the efficiency baseline will be incorporated into the planned service improvements in Chapter 3.

2.4.1 Efficiency Evaluation

The balance between network efficiency and efficacy is a complex calculation in operating transit service. If the service is too lean, running only at times and to locations where there is maximum ridership opportunity, it sacrifices accessibility for transit-dependent populations traveling on the off-peak hours or those who wish to travel to essential destinations that are out of the way. Running lean service also introduces some risk to operations themselves with very little margin for error if they miss a trip or if they are running late. If service is too abundant, running circuitous routes and frequent headways without matching service to demand, an agency risks serving only individual trips, not maximizing the capacity of their multi-passenger vehicles, and having too much non-revenue time.

The following network efficiency section analyzes the balance transit service to demand by evaluating frequency, span, speed, and reliability of service. This section will analyze deficiencies in efficiency and make recommendations to remedy the service which could include balancing service between routes, schedule, and operational improvements as well as suggestions to explore replacement of specific routes with alternative transit service options.

Service Span and Frequency

Radford Transit provides different service models when Radford University is in and out of session. Typical Radford Transit University routes run from August until May and feature longer service span with 30-minute, all-day headways. City route service, which is provided from May to August (and select holiday periods) retains the same route headway but with reduced route coverage and span adjusted for demand.

Table 2-23 and **Table 2-24** shows service span and frequency for regular and City of Radford Transit services.

Table 2-23: Radford Route Service Span and Frequency (Regular Service)

Route	Service Days	Weekday Span	Weekday Headway	Weekend Span	Weekend Headway
10	Mon–Fri; Sun	7:10 a.m. to 10:40 p.m.	30	5:40 p.m. to 11:40 p.m.	30
11	Mon–Fri	7:25 a.m. to 6:45 p.m.	30	-	-
15	Fri; Sat	10:30 p.m. to 2:40 p.m.	30	10:10 a.m. to 2:40 a.m.	30
20	Mon–Fri; Sat	7:00 a.m. to 9:30 p.m.	30	10:00 am to 9:30 p.m.	30
25	Mon–Fri; Sat	7:15 a.m. to 9:45 pm	30	10:15 a.m. to 9:45 p.m.	30
40	Mon–Fri; Sat	2:30 pm to 8:30 / 2:30 am (Fri)	35	10:30 a.m. to 2:30 a.m.	35
41	Mon–Fri; Sat	3:30 p.m. to 8:30 p.m. / 1:30 a.m. (Fri)	35	11:30 a.m. to 1:30 a.m.	35
50	Mon–Fri	7:00 a.m. to 10:40 p.m.	15	-	-
60	Mon–Fri	7:20 a.m. to 10:50 p.m.	15	-	-
100	Mon–Fri	8:15 a.m. to 5:30 p.m.	35	-	-

Table 2-24: Radford Route Service Span and Frequency (University Service)

Route	Service Days	Weekday Span	Weekday Headway	Weekend Span	Weekend Headway
15	Mon–Fri; Sat	7:10 a.m. to 7:50 p.m.	30	10:10 a.m. to 7:50 p.m.	30
20	Mon–Fri; Sat	7:00 a.m. to 7:30 p.m.	30	10:00 a.m. to 7:30 p.m.	30
25	Mon–Fri; Sat	7:15 a.m. to 7:45 p.m.	30	10:00 a.m. to 7:40 p.m.	30
30	Mon–Fri; Sat	6:50 a.m. to 7:50 p.m.	25	9:50 a.m. to 7:50 p.m.	25
35	Mon–Fri; Sat	7:05 a.m. to 8:05 p.m.	35	10:05 a.m. to 8:05 p.m.	35
40	Mon–Fri; Sat	6:50 a.m. to 6:50 p.m.	35	10:50 a.m. to 6:50 p.m.	35

Figure 2-66 and **Figure 2-67** show the annual ridership and number of available trips organized by hour on weekdays and weekends using Radford Transit APC data [5]. The bars represent the sum of all ridership in calendar year 2022, while the line represents the number of trips supplied by start hour. For example, during peak travel time at 3:00 p.m., there are 10,800 boardings and 6,700 revenue service trips supplied which results in a ratio of 1.61.

Combined with travel demand analysis **Figure 2-37** and **Figure 2-42** in section 2.3, transit and ridership demand by time of day can be matched to the appropriate level of service. Key findings include:

- The average boardings per service trip in 2022 is 1.7 for all time periods and 1.4 for weekdays and 1.6 for weekends.
- During weekdays, hours 7:00 a.m. through 9:00 a.m. average 1.3 boardings per service trip, be which represent an opportunity to adjust morning peak service.
- Average boardings per service trip on weekday late afternoons and evenings exceed the 1.6 boards per service trip with service efficiency and total ridership peaking from 3:00 p.m. to 6:00 p.m.
- After 8:00 p.m., total ridership and boardings per service trip decline, which may present an opportunity to adjust routes to serve more essential trips in the weekday evenings.
- On weekends, primarily Saturdays, ridership demand starts after 9:00 a.m. and is more efficient than weekdays at 1.6 boardings per trip. Peak ridership demand and trip efficiency over the entire year occurs the hour of 4:00 p.m. and drops off significantly after 7:00 p.m.
- The amount of overall service supplied remains constant in the mid-morning and afternoon even though ridership is peaking. This may present an opportunity to shift more service to when rider demand is greater. **Figure 2-37** also identifies the 2:00 p.m. to 5:00 p.m. as a critical travel time for all Radford residents not just bus riders.

[5] Radford Transit Passio APC data only tracks boardings

Figure 2-66: Annual Weekday Ridership and Trips by Start Hour

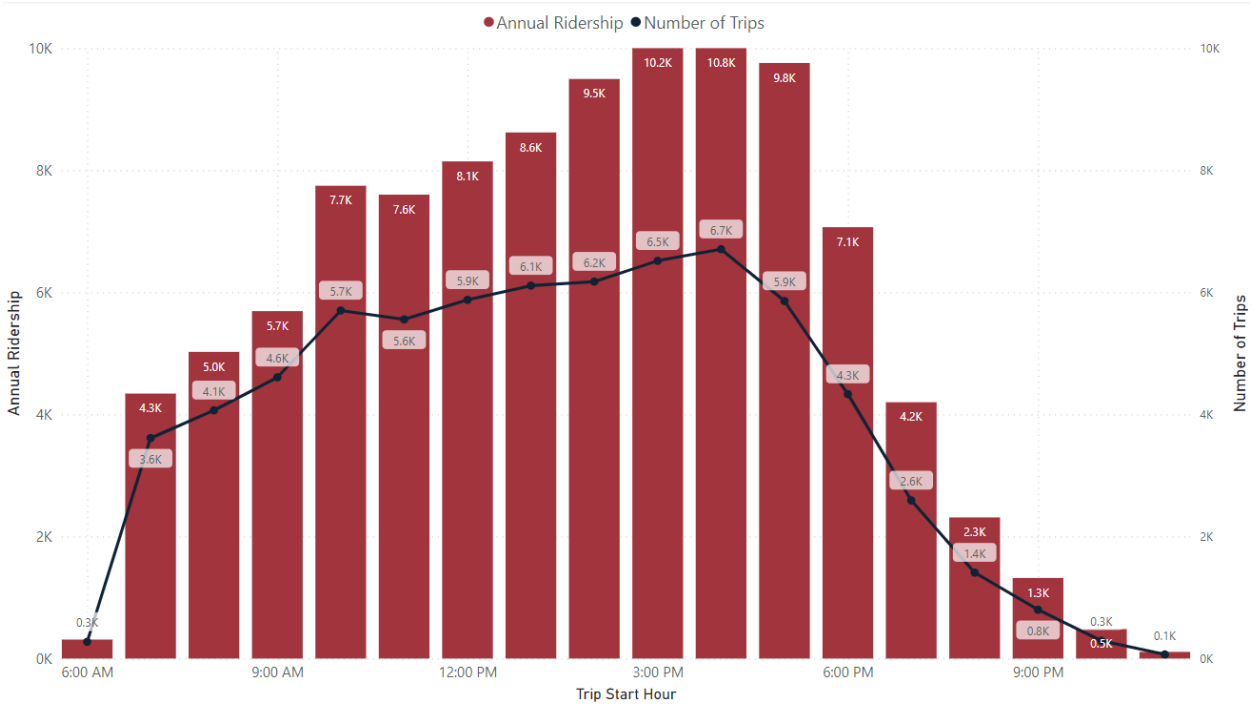


Figure 2-67: Annual Weekend Ridership and Trips by Start Hour

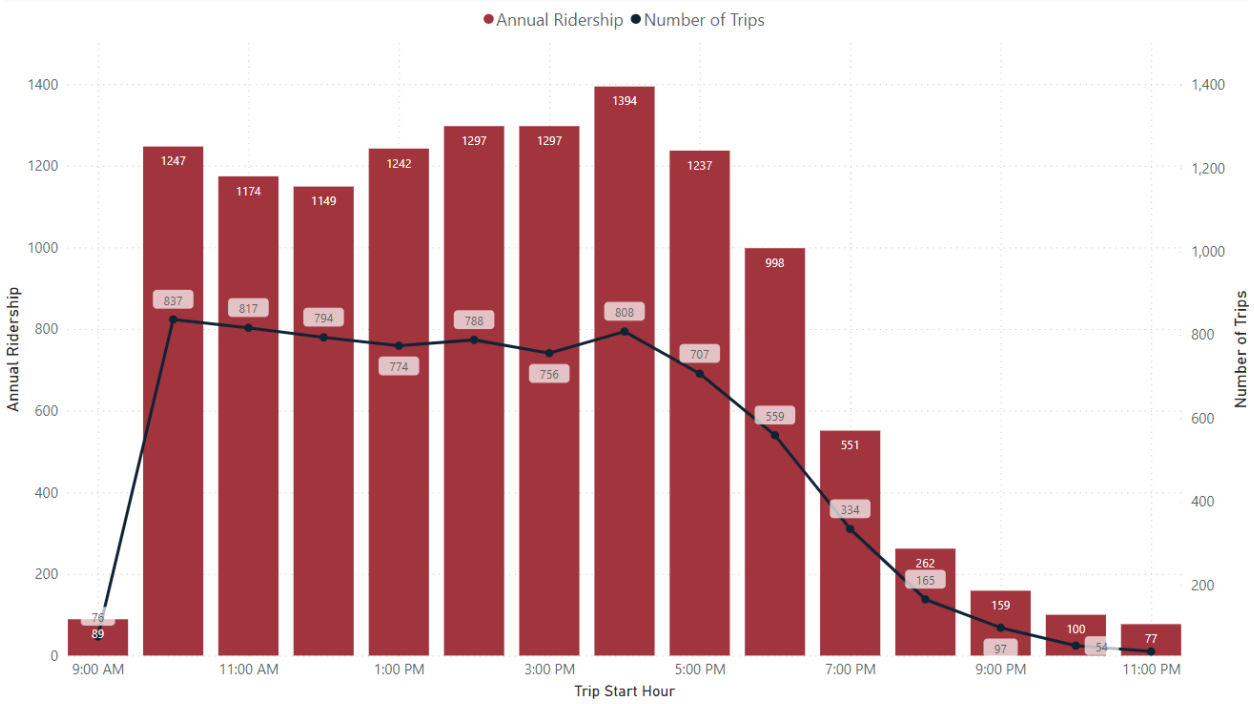


Figure 2-68 and **Figure 2-69** show the total ridership and trips per hour for periods where University and City-only service is run. University service, run majority during the Fall and Spring semesters, and City service, run during mostly the summer break experience similar ridership at 1.5 and 1.4 respectively. The university service periods have more overall ridership and show more ridership peaking behavior during the afternoon whereas city weekday service's demand is more distributed throughout the day although lower. Both periods experience a decline in ridership and trip efficiency after 7:00 PM. These late periods may benefit from exploration of alternative, on-demand service delivery options.

Figure 2-68: Annual Weekday Ridership and Trips by Start Hour (Regular Service)

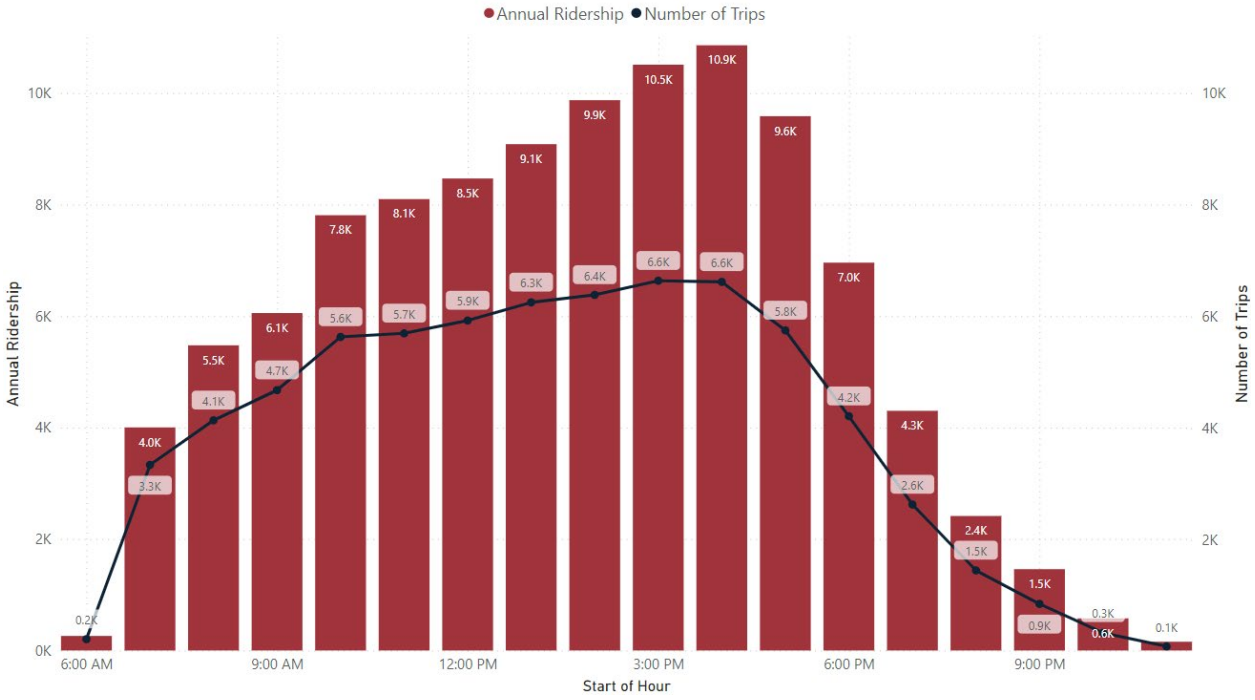
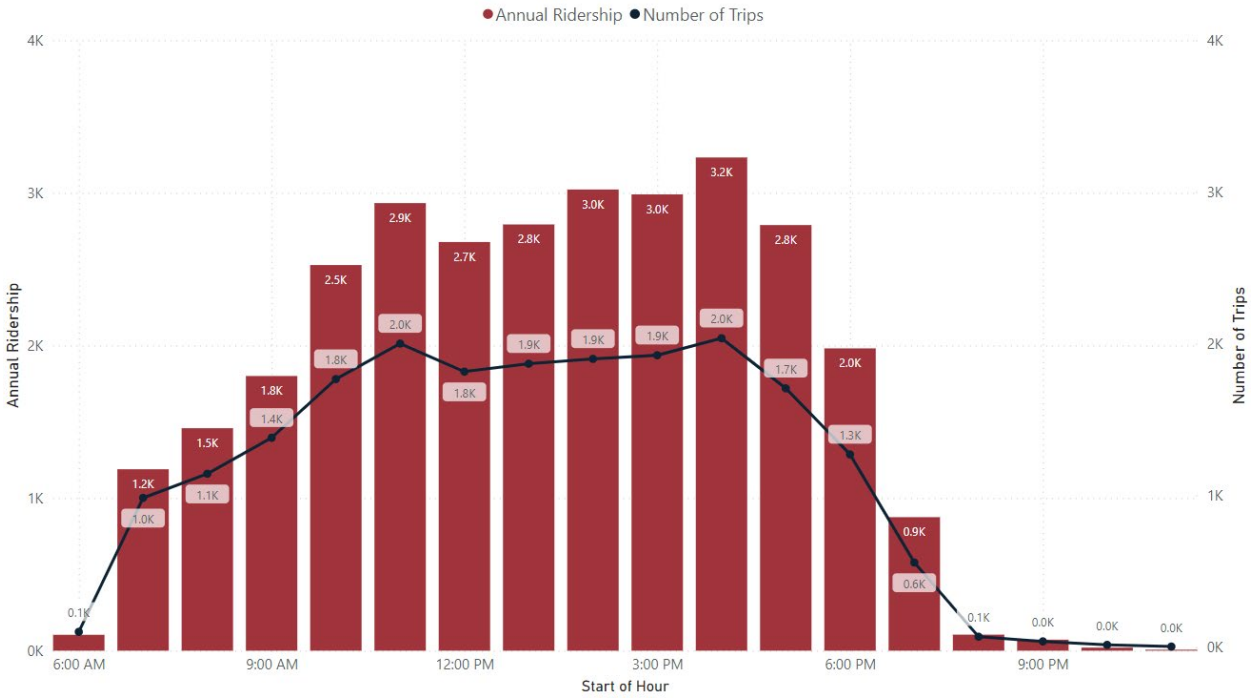


Figure 2-69: Annual Weekday Ridership and Trips by Start Hour (City Service)



Route Speeds

At the time of analysis, speed data was not available from Passio.

Route Reliability and On-Time Performance

Maintenance of arrival times at stops consistent with schedule is critical in retaining ridership and providing quality service to customers—even with real-time arrival information more readily accessible. Radford Transit service standards classify routes that are between zero (0) and five (5) minutes within their schedule time to be on-time. Radford Transit Service standards also mandate that no trips shall leave early.

Table 2-25 shows on-time performance by route and service period. This data is derived directly from Passio, Radford Transit's operations management software, which also provides percentage breakdowns of how early and late a route arrived. The magnitude of how early or late a route averaged over its service can be used to determine if there is excess time in the schedule or consider adding buffer time if it is consistently running late.

On-time performance for all Radford Transit service in 2022 averages 88.6 percent (88.6%), below the Radford Transit service proposed standard of 95 percent (95%). However, much of this overall on-time performance below the service standard can be attributed to routes arriving early, which may warrant schedule adjustment. Routes and periods that can be evaluated for service alterations based on their on-time performance include:

- Route 15 and 20 on Saturday service, both regular and city, average more than three percent (3%) of trips greater than five (5) minutes late.
- Route 40 and 41, which averaged approximately 85 percent of trips on time during 2022. Due to the longer service, there are more possibilities for the route to experience variability in travel time over the length of its service. Routes 40 and 41 arrives early specifically on Fridays and Saturdays and City-Only service in the summer, around 10 percent (10%) of the time which indicates during these periods there is an over-estimation of how long it takes to complete the end-end service.
- Route 100 NRCCC has the most service trips 2–5 minutes late at 19.1 percent (19.2%).

Table 2-25: On-Time Performance by Route and Service Period

Route	Period	> 4 Minutes Early	Between 4 minutes early and 2 minutes late	2–5 minutes late	5–10 minutes late	> 10 minutes late	Radford OTP Standard
10	Mon–Fri	3.7%	89.9%	4.3%	0.7%	1.2%	94.2%
10	Sun	7.8%	83.7%	7.7%	0.6%	0.1%	91.4%
11	Mon–Fri	3.0%	91.6%	4.0%	0.7%	0.6%	95.6%
15	Mon–Fri (Regular)	2.9%	86.2%	6.4%	1.5%	2.9%	92.6%
15	Mon–Fri (City)	2.8%	89.2%	4.0%	0.7%	3.3%	93.2%
15	Sat (Regular)	1.9%	82.6%	10.8%	3.1%	1.6%	93.4%
15	Sat (City)	2.5%	86.9%	5.1%	1.8%	3.7%	92.0%
20	Mon–Fri (Regular)	5.2%	85.7%	3.6%	0.7%	4.8%	89.3%
20	Mon–Fri (City)	4.6%	90.0%	1.4%	0.2%	3.8%	91.4%
20	Sat (Regular)	3.2%	87.3%	3.7%	0.5%	5.3%	91.0%
20	Sat (City)	5.7%	88.2%	3.0%	0.4%	2.7%	91.2%
25	Mo–Fri (Regular)	3.1%	89.2%	4.7%	0.8%	2.3%	93.8%
25	Mon–Fri (City)	2.2%	92.8%	2.2%	0.4%	2.4%	95.0%
25	Sat (Regular)	2.6%	90.8%	3.4%	0.4%	2.8%	94.2%
25	Sat (City)	3.6%	91.8%	1.7%	0.6%	2.3%	93.5%
40	Mon–Thu	10.6%	78.1%	7.4%	1.4%	2.4%	85.5%
40	Fri	8.5%	76.8%	8.5%	2.2%	4.1%	85.3%
40	Sat	10.5%	76.3%	7.0%	2.3%	3.9%	83.3%
41	Mon–Fri	11.0%	83.5%	2.7%	1.0%	1.8%	86.2%
41	Fri	12.5%	79.4%	5.5%	1.1%	1.5%	84.9%
41	Sat	11.6%	79.3%	4.4%	1.8%	2.9%	83.7%
50	Mon–Fri*	6.8%	89.4%	2.6%	0.5%	0.7%	92.0%
60	Mon–Fri*	43.2%	45.4%	2.2%	3.4%	5.9%	47.6%
100	Mon–Fri	2.7%	66.8%	19.1%	8.7%	2.8%	85.9%
Average		**7.2%**	**83.4%**	**5.2%**	**1.5%**	**2.7%**	**88.6%**

** Routes discontinued in 2022*

2.4.2 Efficiency Based Opportunities for Improvement

This section provides a review of the findings from the overall efficiency evaluation recommendations that will be further developed in Chapter 3 – Planned Improvements. These high-level findings will be used to target route, block and stop-level improvements based on efficiency and improving the reliability of service.

Service Span and Frequency

- Morning service periods from 7:00 a.m. to 9:00 a.m. fall below the average boardings per service trips of 1.7. This presents an opportunity to balance service from less productive a.m. routes to serve more when peak demand occurs in mid-late afternoon.
- Late night service declines in both total ridership and service efficiency aft 7:00 p.m. Radford Transit's service is mostly reflective of this drop-off in ridership with the majority service reducing except Routes 15, 25, 40, 41 and 50 which run less efficient service trips at night.
- Regular service versus City-only service periods do not see a significant change in trip efficiency but does see a significant change in service span run and peaking behavior. Regular service during the Radford University school semester has trips occurring later at night and until 9:00 p.m. while City service trips typically end at 7:00 p.m. There may be opportunity to balance service to make similar off-peak service available to non-student residents.

Route Reliability and On-time Performance

- Radford Transit overall reliability measured through on-time performance falls below the proposed service standard of 95 percent (95%); however, this is mostly attributable to routes arriving early. There is an opportunity to adjust routes that arrive early to serve more stops, balance their schedules, or increase trip frequency.
- Routes that have higher percentages of trips arriving late include longer routes such as 40, 41, and 100. There is an opportunity to build more buffer travel time into these route schedules or determine ways to improve reliability in highly-trafficked areas such as Blacksburg and Christiansburg.

2.5 Opportunities to Collaborate with Other Agencies and Stakeholders

This section provides detail on the transit service providers that operate in or near the City of Radford. The first section identifies the providers, while the second section provides detail on potential collaboration.

2.5.1 Collaboration Analysis

A list of regional transit providers which serve the New River Valley and for which Radford Transit service intersects as well as current service partnerships and initiatives are listed in Chapter 1.1.2. These service providers consist of:

- Blacksburg transit
- Virginia Breeze
- Pulaski Area Transit
- Smart Way (Greater Roanoke Transit Company)
- AMTRAK

Additionally, the City of Radford was previously part of the New River Valley Metropolitan Planning Organization (MPO). However, a change in definition for small urban and rural classification has removed the City of Radford from the MPO. As a result of this change, there has been a shift of collaboration between the City of Radford and the MPO to define the responsibility of transit service provision within the region.

RU is not included in this section as they are already integrated within the current system as a funding partner.

2.5.2 Collaboration Based Opportunities for Improvement

There are several potential collaboration efforts that could serve to improve, expand, and enhance transit service and overall mobility in the New River Valley region. Opportunities for improvement include:

- A new Amtrak station in planned for Christiansburg which is set to begin service in 2025. The exact location is unknown upon publication of this document. Multiple transit agencies, such as Blacksburg Transit, will modify their service to accommodate the new station once it begins operations. Radford Transit should coordinate service into Christiansburg around the schedules of Amtrak and Blacksburg Transit to maximize regional connections and efficiency.
- Routes 40 and 41 currently do not connect to the Exit 118 Park and Ride in Christiansburg. A connection to the Exit 118 Park and Ride would provide Radford Transit with an additional regional transit connections to Blacksburg Transit's Explorer Gold route, Virginia Breeze's Valley Flyer and Highlands Rhythm routes, and the Smart Way Bus. Radford Transit would be provided a new connection to the Smart Way Express Bus which provides a more direct service between Virginia Tech's Burress Hall on Virginia Tech's main campus and Virginia Tech Carilion School of Medicine in Roanoke. Radford Transit could investigate this through the TSP process, and then adjust the schedule of either Route 40 and/or 41 to sync up with the other services.
    - Radford Transit riders also indicated they were less familiar with the Blacksburg Transit system and are not aware of where to effectively transfer. Both Radford and Blacksburg Transit could coordinate on providing more clear route connection communication at transfer points

virtually and/or at transfer stop locations. There also may be an opportunity to coordinate between the systems to create a consistent name for the routes that connect to Blacksburg through Christiansburg to Radford.

- Radford Transit currently connects to Pulaski Area Transit's New River Express route in Fairlawn and Dublin with Route 20 at the Fairlawn Walmart and Route 100 at NRVCC, respectively. PAT does not currently run into Radford's city limits. Radford Transit should coordinate with PAT to investigate whether having PAT's NRE route running into Radford would be beneficial for either PAT or Radford Transit.
- Lane Stadium, Virginia Tech's football stadium, is a major attraction in the New River Valley region and a center for inter-city bus service. Our Bus and College Transit are two long distance, inter-city bus services which stop at Lane Stadium and provide connections to cities such as Charlotte, North Carolina, New York, New York, and Washington, D.C. Radford University has also purchased a set number of home tickets for Virginia Tech football games for Radford University students. Radford Transit could coordinate with regional stakeholders such as Radford University and Virginia Tech to analyze whether servicing Lane Stadium is prudential and/or feasible.

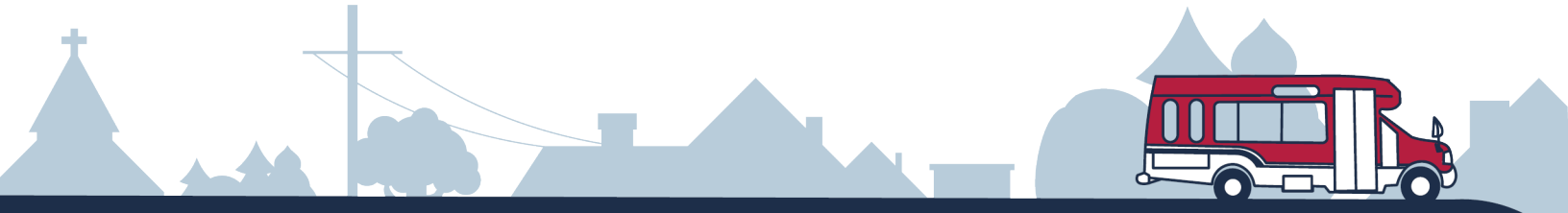
FY 2024 – FY 2033

Radford Transit

Transit Strategic Plan

Chapter 3

Final – May 2024



Contents

3 Planned Improvements and Modifications

Chapter 3 of the TSP prioritizes planned service improvements and modifications for Radford Transit over the next ten years (FY 2025 – FY 2034). The results of the system performance and operations analysis presented in Chapter 2 were used to assess Radford Transit's needs and develop service improvement recommendations to address those needs. Factors considered in the development of recommendations included the performance of existing routes, input from the public and stakeholders on community preferences, and demographic assessments indicating neighborhoods in Radford with a greater need for transit services. Details including maps, operating statistics, ridership estimates, and rationale for implementation are outlined for the service improvement recommendations discussed in this chapter.

The recommendations are prioritized and grouped into timeframes for short-term (one to four years), mid-term (five to seven years) (5-7), and long-term (eight to ten years) (8-10). Recommendations that may not be feasible over the ten-year timeframe are designated as unconstrained. The operating impacts of the planned service changes, including the required service hours and miles, are also discussed in this chapter.

3.1 Planned Service Improvements

This section describes planned service improvement projects for Radford University. For programming purposes, estimates of resources required for implementation are provided for each project. The existing service hours, service miles, peak vehicles, operating costs, and ridership are compared to proposed figures to show the impacts of the recommended changes. Service hours, service miles, and peak vehicles were calculated using existing and proposed schedules and route alignment measurements.

Each project in this section is financially constrained, meaning that funding for the project has already been secured or could reasonably be secured in the future. However, simply because a project is included in this section does not guarantee its implementation. Financial conditions are likely to evolve over time, and projects may ultimately change or be eliminated.

The service described in this plan represents the best estimates at the time of recommendation development and is subject to change due to funding availability, concurrent planning efforts, and changing demand. Updates to implementation and potential service destinations will be made during the annual updates to the TSP by Radford Transit.

Ridership estimates are forecasts based on an off-model approach that factors planned population and employment growth for 2030 and 2040, amount of service change, and the presence of overlapping service. The ridership indicated is based on the first year that the service recommendation is in place.

Note: As of May 2024, there are ongoing discussions to potentially change the name of the bus transfer facility, The Hub, to avoid confusion with RU's on-campus location that shares the same name. If changed, this can be updated in future documents.

3.1.1 Short-Term

Project 1. Routes 10/11 Consolidation

New University Express

The consolidation of Routes 10 and 11 are shown in **Figure 3-1**. The existing Routes 10 and 11 provide circulator service on the same alignment around Radford University's main campus and athletic fields. Both routes circulate the university clockwise at 30-minute frequencies; together, both routes provide a 15-minute clockwise circulator service to the university. The proposed service will take the existing 10 and 11 routes and consolidate them into a single service with bi-directional circulation service around Radford University. The proposed route will be served by two (2) vehicles, each operating at 30-minute frequencies in opposite directions. The proposed combination route will also have the same service span as the existing Route 10's service span.

The proposed route's alignment and stops will deviate slightly from the existing Route 10/11 alignment and stops. The proposed route will:

- Remove service into the Lot A loop
- Add service to a newly constructed bus cutout on the eastbound side of Main Street outside of Hemphill Hall
- Remove the stop at Waldron Hall and subsequent deviation onto Davis Street. The stop will be replaced with a stop along Jefferson Street at the intersection with Davis Street
- Add a stop at the intersection of Main Street and Jefferson Street

Rationale:

- Providing bi-directional circulation service will reduce travel time for students seeking to travel across campus, especially for students whose travel patterns follow a counterclockwise pattern around Radford University's campus which was not served by the previous clockwise-only circulation.
- Restructuring the route will save time and increase on-time performance by replacing deviations into Lot A and Waldron Hall with on-street stops.
- Consolidating the two (2) routes under one (1) name will help with the system's legibility.

Figure 3-1: Proposed Highlander Express Route / Consolidation of Routes 10 and 11

Table 3-1: Annual Statistics for Consolidating Routes 10 and 11

Annual Operating Statistics	Existing 10	Existing 11	Proposed Route	Change Over Existing
Service hours	1,452	1,220	3,551	879 (32.9%)
Service miles	11,996	9,968	36,598	630 (2.9%)
Peak Vehicles	1	1	2	0
Operating Costs	$117,039	$98,392	$286,283	$70,853 (32.9%)
Ridership	11,562	3,723	17,160	1,875 (12.3%)

Project 2. Remove Route 60 and Restructure Route 50 to Serve Copper Beech

New Proposed Short-Term Highlander Circle Route

The proposed changes to Route 50 and 60 are shown in **Figure 3-2.** Several major alignment and service changes are proposed for the existing routes 50 and 60. In the short-term, Route 60 will be eliminated. Route 50 will change its alignment to add service into the Copper Beech apartment complex via 2nd Avenue and Calhoun and Lawrence Streets, replicate Route 60's service. No coverage will be lost as Route 50 already provides duplicate service to the streets and stops around the university currently covered by Route 60. Beyond the extension to Copper Beech, Route 50's alignment will undergo smaller modifications. The minor alignment changes will:

- Remove service into the Lot A loop
- Remove the stop at Waldron Hall and subsequent deviation onto Davis Street. The stop will be replaced with a stop along Jefferson Street at the intersection with Davis Street.

The extension to Copper Beech will decrease the proposed route's frequency to every 25 minutes, down from Route 50's existing frequency of every 20 minutes. The proposed combination route will also have the same service span as the existing Route 10's service span.

Proposed Service Changes:

- Remove Route 60
- Restructure Route 50 to serve Copper Beech via 2nd Avenue
- Remove Waldron Hall from Proposed Route 50
- Remove Lot A from Proposed Route 50

Rationale:

- Eliminating Route 60 would free up one bus for cost savings and reallocation to other routes which serve other areas. The existing Route 60's only unique service area that is not covered by other routes is Copper Beech.
- Connecting Copper Beech to Radford University campus is still achieved through Route 50 to Tyler Avenue and the Hub.
- Provides complementary service to bidirectional University Express circulators.
- Provides additional connection between Copper Beech and East Main Street student residences.

Figure 3-2: Proposed Short-Term Highlander Circle / Removal of Route 60 and Route 50 Alignment Modifications

Table 3-2: Annual Statistics for the Removal of Route 60 and Restructure of Route 50

	Existing 50	Existing 60	Proposed Route	Change Over Existing
Service hours	1,666	1,650	1,743	-1,573 (-47.4%)
Service miles	14,322	10,720	16,981	-8,061 (-32.2%)
Peak Vehicles	1	1	1	-1
Operating Costs	$134,288	$133,058	$140,555	-$126,791 (-47.4%)
Ridership	6,963	4,929	10,509	-1,383 (-11.6%)

Project 3. Add Local Stops on NRCC Route

The proposed changes to the NRCC route are shown in **Figure 3-3**. Two (2) stops in the Town of Dublin are proposed to be added to the route: one (1) at the intersection of Route 11 and Cemetery Road and one (1) at the intersection of Route 11 and Giles Avenue.

Proposed Service Changes:

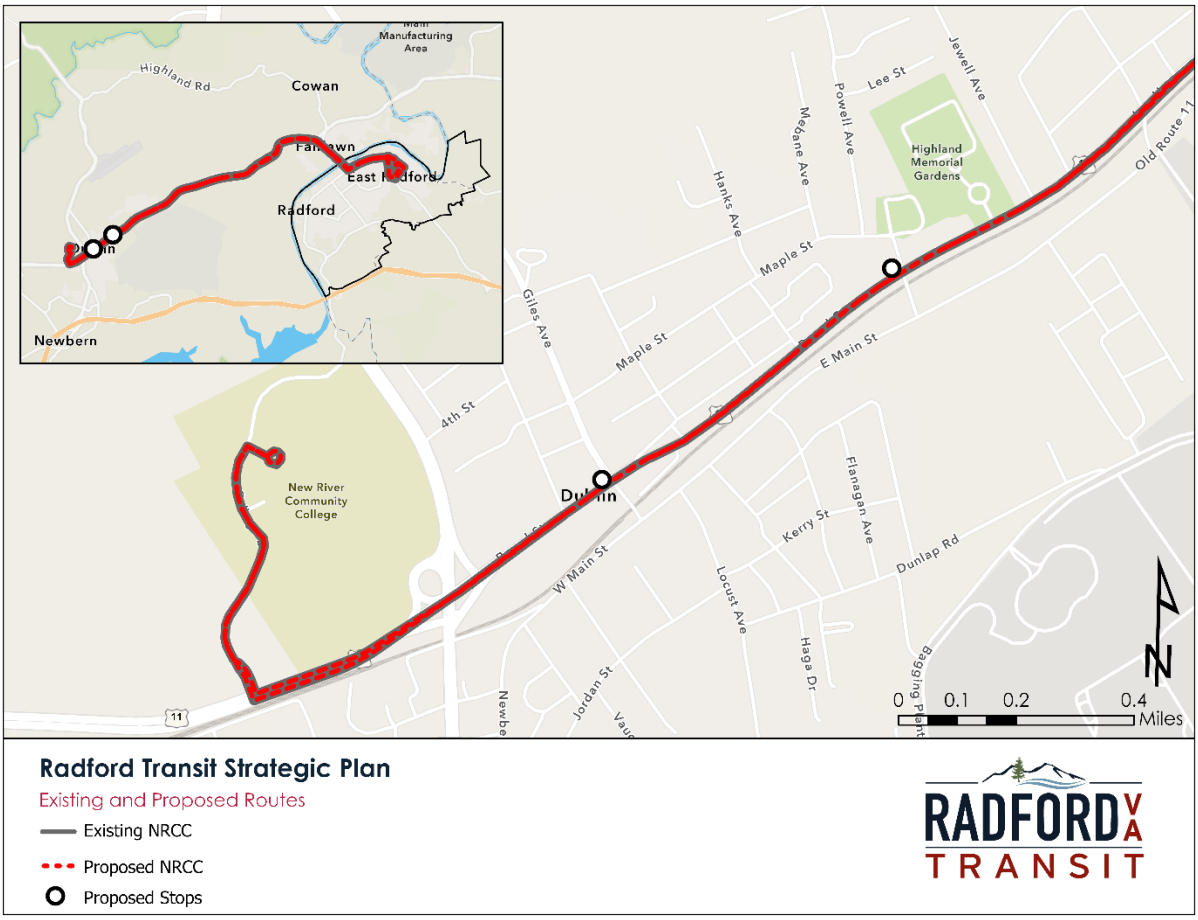
- Add local stops on NRCC route on US 11 at Giles Avenue and Cemetery Road inbound and outbound.
- Add local stop at Sheetz inbound and outbound.

The addition of the two (2) Dublin stops are expected to add coverage for at least 820 people and 147 jobs as well as 45 people enrolled in college according to census data. The alignment, existing stops, frequency, and service span would not change in this proposal. The proposed changes would only incur minimal capital costs with the installation of signs, the funding of which cannot be through the current NRCC and Radford University agreement. The proposed service changes will require coordination with Pulaski County and Pulaski Area Transit for the installation of the two stops.

Rationale:

- Service to Dublin was a frequently requested service change through the TSP's public outreach efforts. Adding two (2) stops in downtown Dublin is easily achievable without compromising service from Radford University to NRCC.
- Adding stops in downtown Dublin adds trip diversity for the NRCC route and increases potential ridership. The route can now be used to serve shopping and regional travel trips in addition to transporting people to and from the community college.
- The additional stops help increase Radford's regional connectivity; a need cited by stakeholders and the public alike.

Figure 3-3: Proposed Local Dublin Stops on NRCC Route



3.1.2 Mid-Term

Project 4. Consolidation of Routes 20 and 25

New Fairlawn- Tyler Avenue Route

Service Changes:

The proposed changes for the consolidation of Routes 20 and 25 are shown in **Figure 3-4**. The proposed route would combine the extents of the two (2) previous routes into one (1) route. Most of the routing remains the same with the most prominent change being the elimination of service to Veterans Field along New River Drive. Simplification of the routing around the university was made to avoid unnecessary duplicative service as both Routes 20 and 25 end their previous routing with a loop around Radford University. The new routing around Radford University is as follows:

- Northbound trips will travel along Tyler Avenue past the university with stops at Draper, Walker, and Muse Halls.
- Southbound trips will travel along East Main Street and make stops at CHBS and Lot A. The service will then turn right onto Jefferson Road and stop at Fairfax Station and Waldron Hall.
- Proposing to cutoff service to the park. The park will not lose service as the proposed MT New River Wadsworth will pick up Route 20's park service.

The existing Route 25 is a City Service route and only runs during a limited number of months when Radford University is not in session. The proposed mid-term Fairlawn-Tyler Avenue route will operate year-round, thus increasing the service levels to the areas currently accessed via Route 25. The switch to year-round service for the Tyler Avenue/Route 25 section also increases the associated service hours, service miles, and operating costs for the section. The proposed route will have the same service span as the current regular service Route 20, but the proposed route will not have Saturday service which was provided by the existing Route 20 during regular and city service periods. The proposed route will also have a 30-minute frequency, keeping it in line with the existing Route 25's frequency and improving upon Route 20's existing frequency of every 60 minutes.

Rationale:

- Tyler Avenue is a developing corridor in Radford which has mixed-use and high-density residential and commercial uses along it. Travel pattern data shows high demand for transportation to and from Tyler Avenue as the area is a major destination for shopping trips for Radford residents and Radford University students, third only to Fairlawn and Uptown Christiansburg Mall. Additionally, higher than average travel demand for Tyler Avenue is exhibited by low-income and zero-car households. With future land-use plans showing additional growth along Tyler Avenue in the coming years, increasing transit service to the area will help to meet its growing transportation demands, especially among households and student populations.

- Combing Routes 20 and 25 reduces redundant service from the campus circulators on Tyler Avenue, Jefferson Street, and Main Street.
- Travel patterns show Fairlawn and Tyler Avenue as two (2) of the three (3) areas with the most trips to and from Radford University. Combining Routes 20 and 25 increases the ease of student riders to access high demand locations from campus and allows for greater access to new retail and commercial areas and student housing options.

Figure 3-4: Proposed New River - Wadsworth Route / Consolidation of Routes 20 and 25

Table 3-3: Annual Statistics for Consolidating Routes 20 and 25

	Existing 20	Existing 25	Proposed Route	Change Over Existing
Service hours	3,163	2,310	5,258	-216 (-3.9%)
Service miles	26,842	22,599	52,341	2,900 (5.9%)
Peak Vehicles	1	1	2	0
Operating Costs	$255,046	$186,211	$423,875	-$17,382 (-3.9%)
Ridership	28,714	13,134	46,488	4,460 (11.1%)

Project 5. Route 30 Alignment Modification

New Main Street Express Route

Service Changes:

The proposed changes for the alignment modifications for Route 30 are shown in **Figure 3-5**. The proposed mid-term route's modifications would shift service away from the neighborhoods along Wadsworth and Preston Streets to increase the directness of service along Main Street. The proposed alignment maintains its western terminus at Jeffries Drive and runs along Main Street to its new, extended eastern terminus at the Burlington Lot. The extension from the Hub to the Burlington Lot adds six (6) additional stops:

- Radford University's College of Humanities and Behavioral Sciences
- Lot A
- Jefferson and Main
- Main Street/Madison Street
- Main Street/Burlington Street
- Burlington Lot

The new modifications would increase Route 30's frequency to every 30 minutes from every 60 minutes. Service span would remain the same.

Rationale:

- Greater east-west mobility along Main Street was a commonly cited need from stakeholders and the public. The transit demand and market demographic analysis also showed Main Street as a major transportation corridor expecting greater development in the coming years. Reducing the existing route's alignment to just serve Main Street and a few adjacent properties allows Radford Transit to provide more frequent service along a major transportation corridor with the same number of buses, giving Radford Transit more financial flexibility.
- Extending the route into East Radford increases the connectivity between the city and university sides of Radford. This allows greater access to businesses, communities, and parking spaces for the university and residents alike.

Figure 3-5: Proposed Main Street Express Route / Route 30 Modification

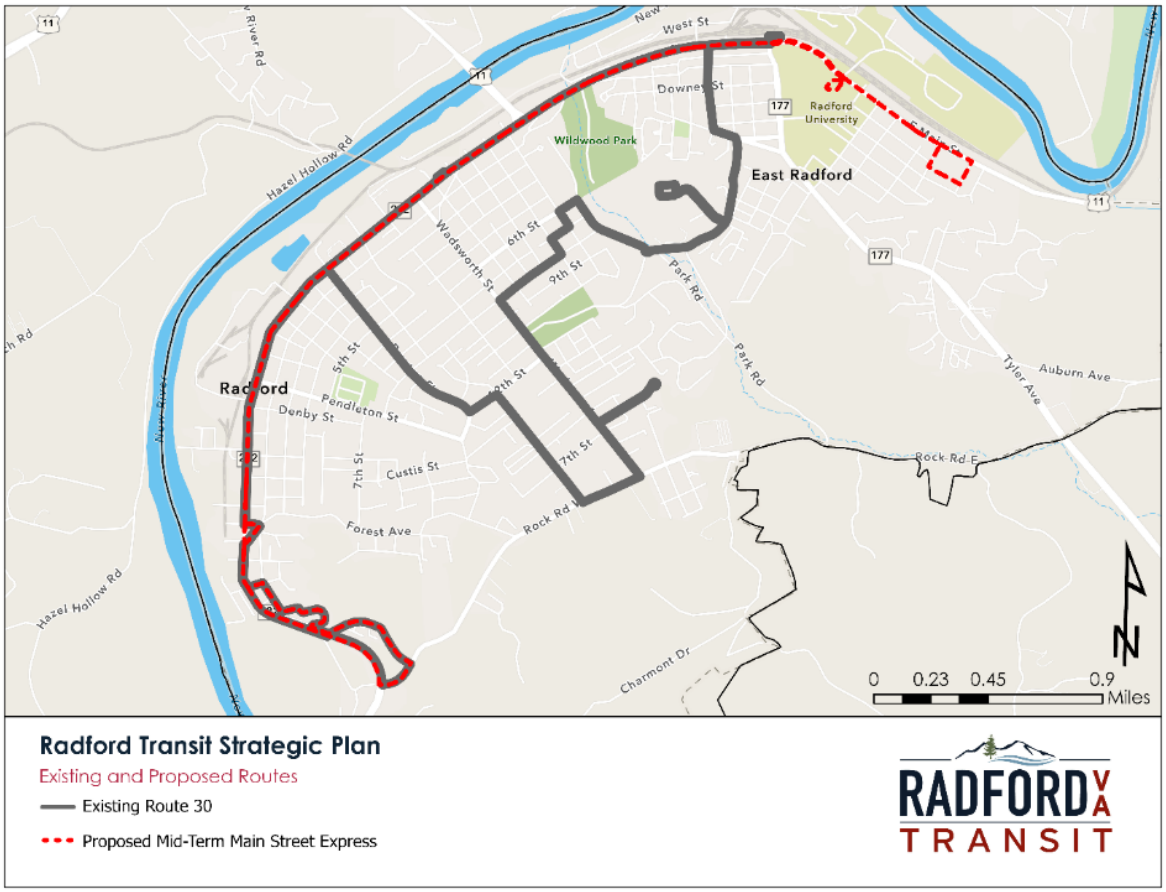


Table 3-4: Annual Statistics for Route 30's Alignment Modifications

	Existing 30	Proposed Route	Change Over Existing
Service hours	5,477	5,303	-174 (-3.2%)
Service miles	33,709	50,221	16,512 (49.0%)
Peak Vehicles	2	2	0
Operating Costs	$441,588	$427,525	-$14,063 (-3.2%)
Ridership	16,410	19,363	2,953 (18%)

Project 6. Route 35 Alignment Modification

New Willow Woods – Fairlawn Route

Service Changes:

The proposed changes to Route 35 are shown in **Figure 3-6**. The proposed route would operate between Willow Woods and Fairlawn. The largest alignment modification is the elimination of service on Main Street west of Preston Street. The proposed route has the potential to allocate more service further into Fairlawn depending on public and political feedback. This scenario would add two additional stops along Peppers Ferry Road; both stops would be between the east and west intersections of Peppers Ferry Road with Old Peppers Ferry Loop, with one located outside an auto repair shop and the other outside a laundromat. Northbound trips would service these stops before going to the Fairlawn Walmart. Buses would then take a right onto Old Peppers Ferry Road before turning back onto Peppers Ferry Road headed west and then turn into the Fairlawn Walmart's lot. The proposed route would also add a stop at the Fairlawn Walmart for both northbound and southbound trips.

Service span and frequency would remain the same between the existing Route 35 and the proposed mid-term route.

Rationale:

- The public cited a need for more directed service to Fairlawn/Walmart from Radford. Shortening the route by eliminating service to West Main Street allows for fast circulation and thus decreasing travel times between Radford and Fairlawn.
- The extension further along Peppers Ferry Road to the laundromat meets a desire stated by the public. This extension also increases the services and businesses available to low-income residents, especially those living in Willow Woods.

Figure 3-6: Proposed Willow Woods - Fairlawn route / Route 35 Alignment Modification

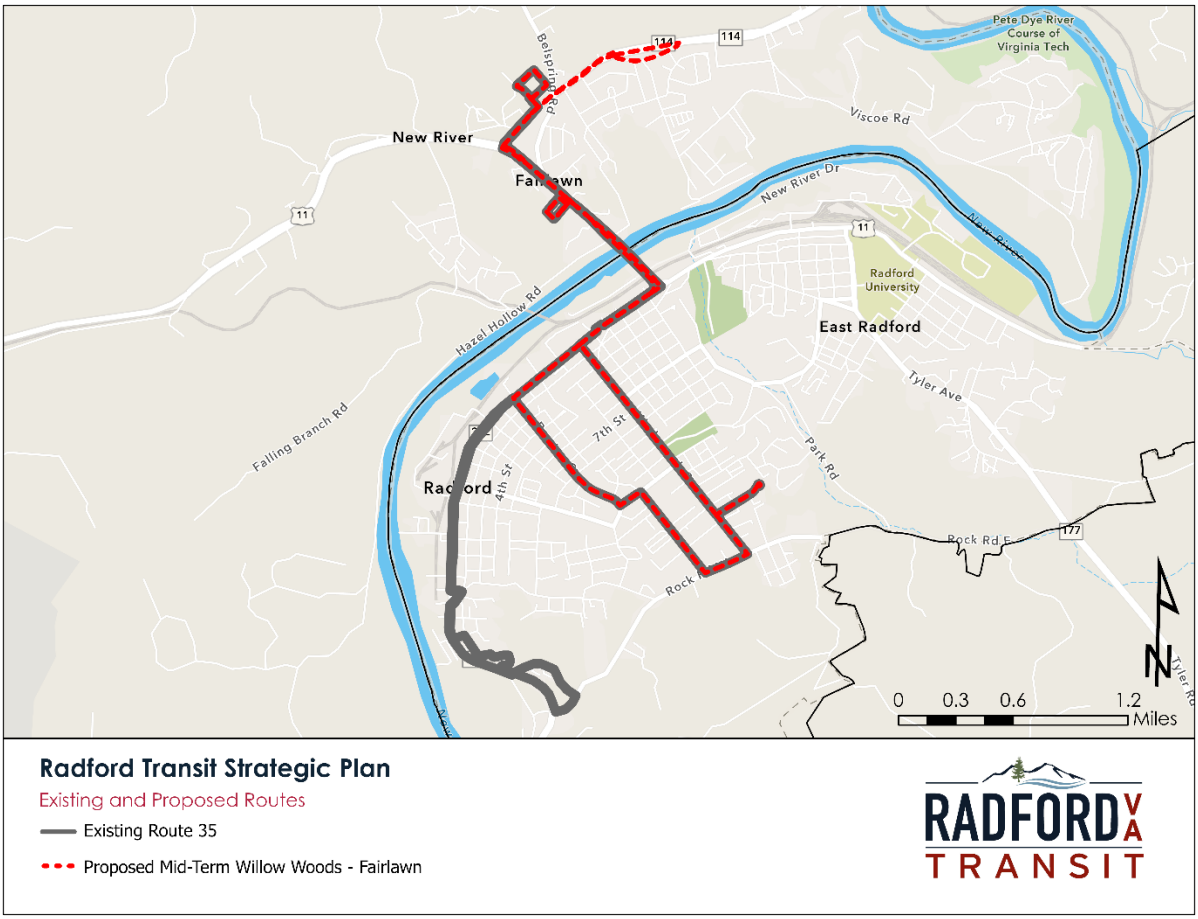


Table 3-5: Annual Statistics for Route 35's Alignment Modifications

	Existing 35	Proposed Route	Change Over Existing
Service hours	7,251	4,380	-1,066 (-10.4%)
Service miles	65,888	83,744	-23,451 (-21.9%)
Peak Vehicles	3	2	-1
Operating Costs	$275,427	$221,556	-$53,871 (-19.6%)
Ridership	18,914	15,880	-3,034 (-16.1%)

Project 7. Route 50 Alignment Modification

New Mid-term Highlander Circle

Service Changes:

The proposed mid-term modifications to the Highland Circle route are shown in **Figure 3-7**. The Highlander Circle route will undergo the following minor alignment changes from the short-term iteration of the route:

- The mid-term route will maintain the extension to Copper Beech added in the short-term iteration.
- The mid-term route will add service to Radford University's athletic fields and stadiums along University Drive.
- The mid-term route will remove the stops at Waldron Hall and Lot A and subsequent deviations onto Davis Street and Lot A, respectively. The stops at Waldron Hall and Lot A will be replaced with a stop along Jefferson Street at the intersection with Davis Street and a stop along East Main Street near the intersection with University Drive.

The proposed mid-term Highlander Circle route will have the same service span as the existing Route 50 and proposed short-term Highlander Circle route. The proposed mid-term route will return the service frequency to 20-minute service, matching the existing Route 50's service frequency. The proposed route will have an additional bus deployed during peak periods.

Rationale:

- The proposed route continues the connection to Copper Beech and increases the connection to the university through more frequent service, increased stops, and additional areas served.
- The proposed route provides a direct connection between the eastern and western residential sides of Radford University, two areas with a large number of student housing units.
- Increased frequency from the Burlington Lot to Radford University's campus could ease overflow parking on the main campus with the route acting as a park and ride service.
- The proposed route provides a direct connection between Copper Beech/2nd Avenue and the athletic fields and stadiums.

Figure 3-7: Proposed Mid-Term Highlander Circle / Route 50 Alignment Modification

Table 3-6: Annual Statistics for Route 50's Alignment Modifications

	Existing 50	Proposed Route	Change Over Existing
Service hours	1,666	3,378	1,712 (102.8%)
Service miles	14,322	28,178	13,856 (96.7%)
Peak Vehicles	1	2	1
Operating Costs	$134,288	$272,314	$138,026 (102.8%)
Ridership	6,963	13,165	6,202 (89.1%)

Project 8. Route 60 Alignment Modification

New New-River Wadsworth Route

Proposed Service Changes:

The mid-term modifications to Route 60 are shown in **Figure 3-8**. The mid-term plan proposes to reintroduce Route 60 with significant alignment modifications. The new New-River Wadsworth Loop will be a counterclockwise circulator route which would connect Copper Beech and Radford University to additional destinations in East Radford, including Veterans Park, downtown Radford, the Randolph Street medical clinics and health facilities, and the Radford Recreation Center.

The new route would maintain Route 60's existing alignment between Copper Beech and the Hub, but would turn onto University Drive instead of deviating into Lot A. The proposed route would then turn onto New River Drive from Stockton Street and loop back onto Main Street. The route would then travel eastbound along Main Street before turning left onto Wadsworth Street where the route detours through the neighborhood before getting on Scott Street/Park Road from 6th Street. The Route will then turn onto 2nd Avenue and service the Radford Recreation Center before finishing the loop at Copper Beech.

Frequencies on the route will reduce to every 45 minutes from every 30 minutes due to the increased area covered from the route. The proposed route will keep the same service span as the existing Route 60.

Rationale:

- The proposed route replaces service vacated by the combined Routes 20 and 25 reroute on New River Valley Road.
- The proposed route readds service to New River Drive and Veterans Park. These areas contain multiple locations and services important to residents of Radford, especially low-income and minority residents. Additionally, service to this area received large vocal support from stakeholders.
- The proposed route adds access to important medical facilities and the recreational center from downtown Radford and the university.
- The proposed route provides additional direct connections between commercial areas and residential neighborhoods and future redevelopment along the New River Valley Park.
- The circulator loops allow for greater connectivity between the eastern and western sides of Radford.

Figure 3-8: Proposed New River - Wadsworth/ Route 60 Alignment Modification

Table 3-7: Annual Statistics for Route 60's Alignment Modifications

	Existing 60	Proposed Route	Change Over Existing
Service hours	1,650	1,681	30 (1.8%)
Service miles	10,720	13,212	2,492 (23.2%)
Peak Vehicles	1	1	0
Operating Costs	$133,058	$135,505	$2,447 (1.8%)
Ridership	4,929	13,165	1,489 (12.8%)

3.1.3 Long-term

Project 9. Route 40/41 Alignment Modification

New NRV Connector Route

Proposed Service Changes:

- Add service to the NRV Carillion Hospital (Possibly)
- Add service to Route 118 Park and Ride Lot
- Change alignment for service to run on Route 460 by-pass instead of Main Street

The alignment modifications to Routes 40 and 41 are shown in **Figure 3-9**. The proposed NRV Connector route will replace Routes 40 and 41 and contains significant changes to the service currently provided by Routes 40 and 41. The proposed route would add service to the Carillion New River Valley Medical Center and the Exit 118 Park and Ride facility in Christiansburg, providing riders access to important medical and health services and multiple other transit service providers at the two (2) locations. The proposed route will no longer provide service to Blacksburg, weekend service, or late-night service, but it will connect to Blacksburg Transit routes at Christiansburg Mall. Additionally, the proposed route no longer loops around Radford University or provides service to East Main Street. Other alignment changes include:

- Buses will now turn onto Mill Lane NE to access the Christiansburg Aquatic Center from N Franklin Street northbound and from Depot Street NE southbound.
- Buses will run along Route 460 by-pass before merging onto N Franklin Street to access the Uptown Christiansburg Mall from Christiansburg rather than solely using N Franklin Street.

The proposed route will have a frequency of 60 minutes which matches the combined frequency of Routes 40 and 41. Two (2) vehicles will be serving the proposed route during peak service, which also matches the combined number of peak vehicles operated on Routes 40 and 41 during their weekday service. The proposed route's service span will run from 7:50 a.m. to 10:42 p.m. on weekdays, which starts one (1) hour later but also ends an hour later compared to the combined weekday service span of Routes 40 and 41. It will no longer provide service on weekends or late-night service.

Rationale:

- Providing transit access to the Carillion New River Valley Medical Center and its related medical and health services.
- The Exit 118 Park and Ride lot is a common stop for multiple regional transit service providers such as the Virginia Breeze, Smart Way, and Blacksburg Transit, as well as other commuter benefits. Providing transit service to this lot will increase connectivity to the greater New River Valley area.
- Providing more direct connection to Christiansburg Mall and future Amtrak station planned in the vicinity.
- Reducing weekend, late night, and Blacksburg service which are redundant to some of Blacksburg Transit's future routes, saves on operational costs which can

be allocated to other Radford Transit services. This will need to be coordinated with RU prior to implementation.

Figure 3-9: Proposed NRV Connector Route / Route 40 and 41 Alignment Modification

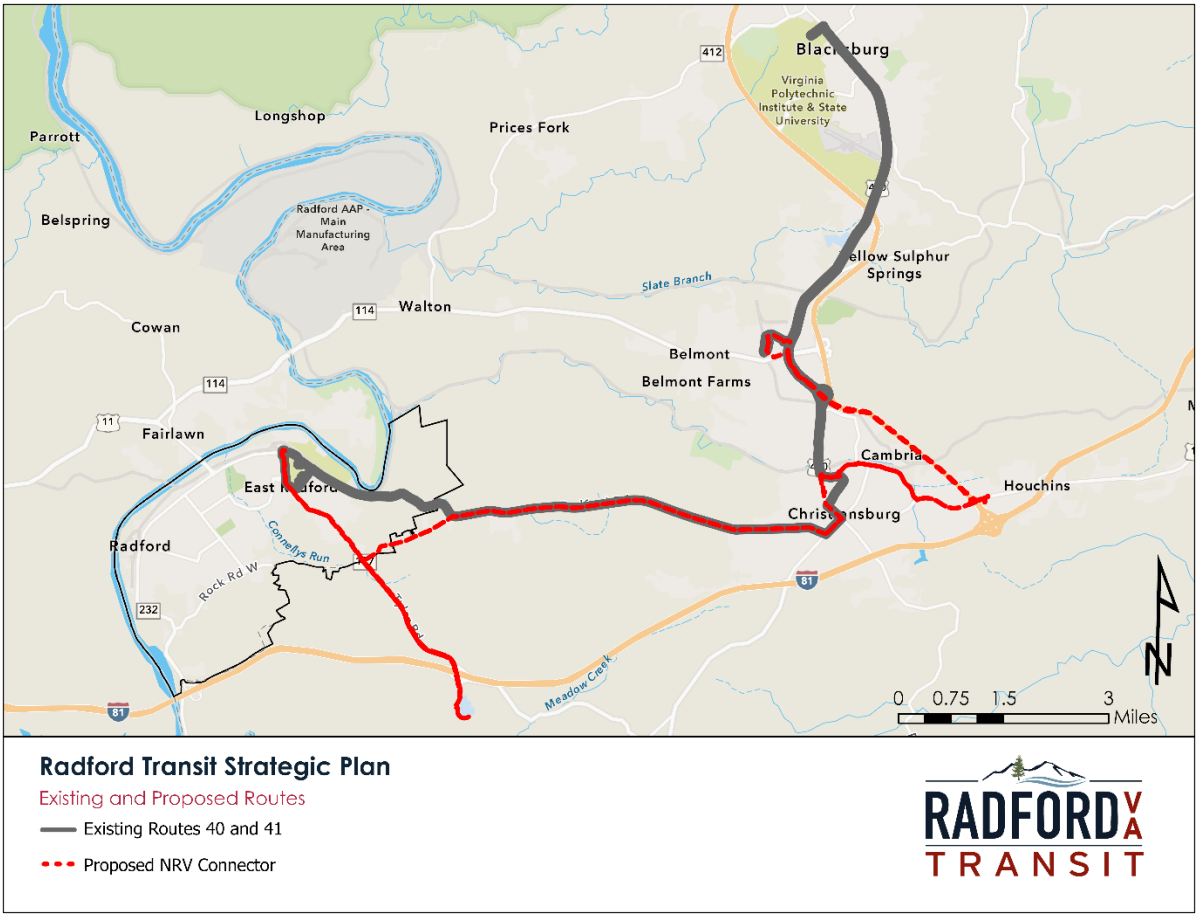


Table 3-8: Annual Statistics for the Route 40/41 Alignment Modifications

	Existing 40	Existing 41	Proposed Route	Change Over Existing
Service hours	2,132	2,687	3,037	-1,782 (-37.0%)
Service miles	38,223	55,798	61,666	-32,355 (-34.4%)
Peak Vehicles	2	2	2	-2
Operating Costs	$171,894	$216,648	$244,833	-$143,708 (-37.0%)
Ridership	4,151	1,130	4,149	1,132 (-21.4%)

Project 10. Potential Microtransit Zone

Proposed Service Changes:

The proposed microtransit zone can be seen in **Figure 3-10.** The proposed microtransit zone serves residents in western Radford; this area is currently served by Routes 30 and 35. Radford residents who live in the highlighted area can request trips to anywhere within the highlighted zone or to the Radford Shopping Plaza Shopping Center in Fairlawn.

The microtransit service will operate from 6:00 a.m. to 8:00 p.m. Monday through Saturday. Intra-zone trips will occur for the entire service span. Trips between the microtransit service zone and the Fairlawn commercial areas have specific pickup and drop-off times.

Rationale:

- The large area, lower density, and uniformity of land-use in the western Radford neighborhoods makes providing frequent and cost-efficient fixed-route transit service difficult. A demand-response service allows for more direct and faster service for the residents in western Radford.
- The stores in the commercial area of Fairlawn are high-demand destinations for travel among Radford residents. Microtransit will allow a greater portion of Radford to access direct, one-seat transit service to the Fairlawn commercial areas.
- Curb-to-curb service provides an easier user experience, especially for the physically impaired and senior populations.

Figure 3-10: Proposed Microtransit Zone

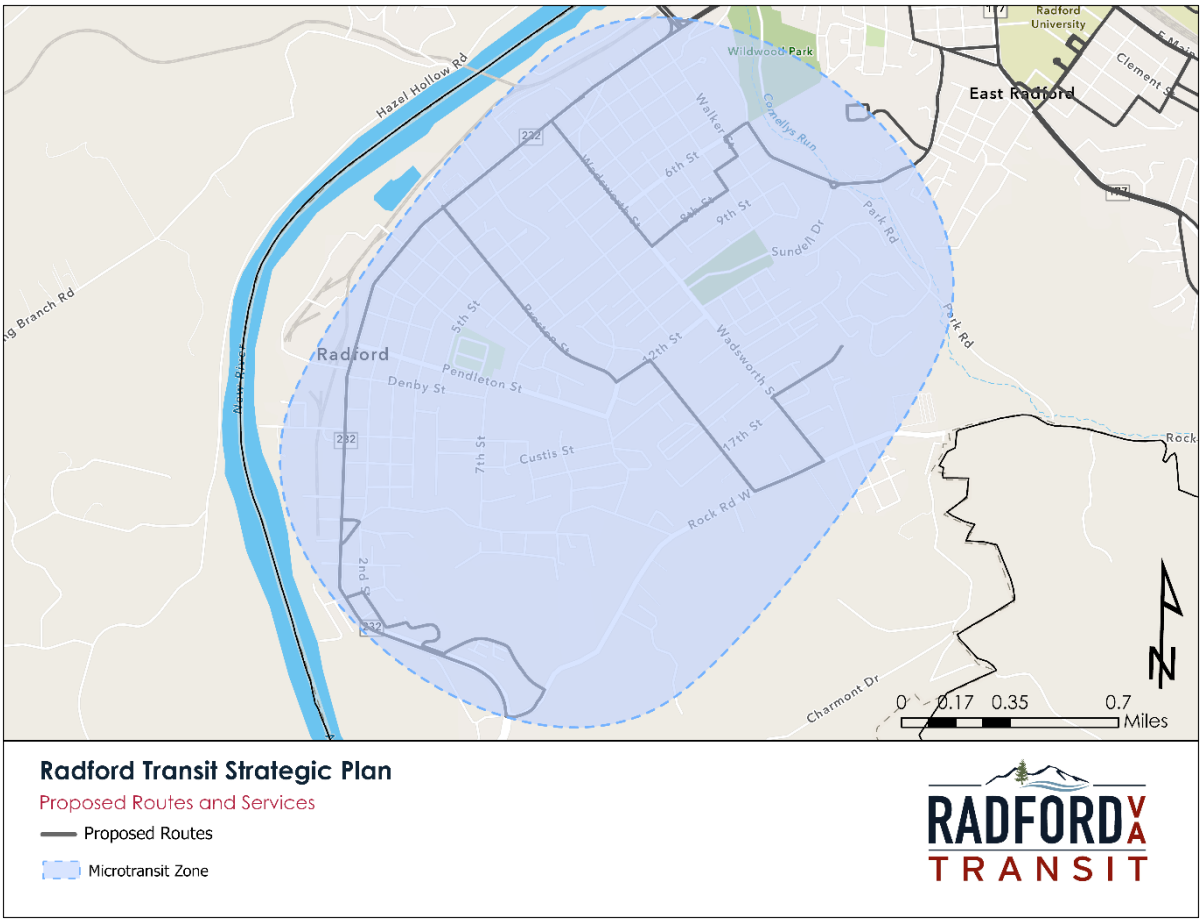


Table 3-9: Annual Statistics for the Proposed Microtransit Service

	Proposed Route
Service hours	7,668.4
Service miles	179,286.2
Peak Vehicles	2
Operating Costs	$407,700
Ridership	6,136

3.2 Prioritization of Planned Service Improvements

The projects identified in Section 3.1 help to address the transit needs of the Radford community identified through public engagement and Chapter 2 of the TSP. Planning for the implementation of these projects over the 10-year TSP horizon will allow Radford Transit to properly prepare for the operating expenses and capital costs associated with the service improvements.

Table 3-11 shows each of the projects placed in a 10-year timeframe with a planned implementation year, O&M cost, capital cost, and funding strategy. These dates are based on the contexts of the time of publication of this document and are subject to change as funding availability becomes clearer.

Projects were placed into three (3) time periods that correlate to the 10 years of this TSP:

- Short-Term (FY 2025 – 2028)
- Mid-Term (FY 2029 – 2031)
- Long-Term (FY 2032 – 2034)

Prioritization was based on the immediate context impacting Radford Transit. Since the COVID-19 pandemic, ridership system-wide has declined and Radford University's enrollment has declined as well. The declining ridership and ridership-base in conjunction with rising O&M costs has put an emphasis on making Radford Transit more cost-efficient. Projects which would either reduce O&M expenses and/or increase ridership efficiency at a minimal cost received high prioritization and put in the short-term plan. The short-term plan is also the longest out of the three (3) time periods to allow more time for the potential for enrollment and ridership rates to normalize after a once in a generation catastrophe.

The mid-term plan for Radford Transit is restore reductions in service and to expand service coverage and frequency through effective route alignment. Service hours and milage will increase in this period, and routes will be realigned to increase directness of service and avoid duplicative service. The long-term plan will increase regional service and trial new service types to boost Radford Transit's reach and usability.

All the projects within a delineated time period will occur simultaneously (i.e., all of the short-term projects will be implemented in FY 2026). Multiple existing routes will be realigned or temporarily discontinued, leaving certain areas without transit service until a proposed route is implemented which would service said area. To maintain consistent service coverage, projects which remove service to an area will be implemented simultaneously with a project restoring service to the same area(s).

The short-term plan will include three (3) projects which will reduce Radford Transit's O&M costs by $55,939 annually. The mid-term plan will include five (5) projects and will add $122,189 ($66,250 total) to Radford Transit's annual O&M costs. The long-term plan will include two (2) projects, adding $140,203 to the annual O&M costs. The planned improvements will increase Radford Transit's O&M costs by approximately $1,038,000 annually by FY 2034.

Table 3-10: Prioritization of Planned Service Improvement

	Fiscal Year	Project #	Project	Incremental Annual O&M Cost	Resulting Annual O&M (Project Specific)	Additional Capital Costs	Funding Strategy
Short-Term Plan	2025	-	-	-	-	-	-
	2026	1	Highlander Express/Route 10 and 11 Consolidation	$70,853	$286,283	-	FTA 5311 DRPT MERIT
		2	Short-Term Highlander Circle/Removing Route 60 and Route 50 Alignment Modification	-$126,791	$140,555	-	N/a
		3	Adding local stops on NRCC Route	$0	$88,706	$200	Local Funding
	2027	-	-	-	-	-	-
	2028						
Mid-Term Plan	2029	4	Fairlawn – Tyler Avenue / Consolidation of Route 20 and 25	-$17,382	$197,943	-	N/a
		5	Main Street Express / Route 30 Alignment Modifications	-$14,063	$427,525	-	N/a
		6	Willow Woods – Fairlawn / Route 35 Alignment Modifications	-$113,631	$470,999	-	N/a
		7	Mid-Term Highlander Circle / Route 50 Alignment Modifications	$138,026	$279,575	-	FTA 5311 DRPT MERIT
		8	New River – Wadsworth / Route 60 Alignment Modification	$2,447	$135,505	-	FTA 5311 DRPT MERIT
	2030	-	-	-	-	-	-
	2031	-	-	-	-	-	-
Long-Term Plan	2032	9	Route 40/41 Alignment Modification	-$183,279	$205,262	-	DRPT TRIP Grants
		10	Microtransit Deployment	$283,911	$283,911	-	DRPT TRIP Grants DRPT Demonstration Grants
	2033	-	-	-	-	-	-
	2034	-	-	-	-	-	-

3.3 Service Development

3.3.1 Operations Planning

A summary of the operating impacts of the planned service changes is shown in **Table 3-12.** The impact of each planned service improvement on service hours and service miles is presented for the projects in the short-term, mid-term, long-term, and unconstrained plans.

The short-term plan contains three improvements and is expected to be implemented over four fiscal years from FY 2025 to FY 2028. The short-term plan for the system calls for a pared-back system due to Radford Transit's declining ridership and Radford University's declining enrollment forecasted in the short term. Route 60 is Radford Transit's least efficient route, and its temporary discontinuation with Route 50's alignment modification will help Radford Transit to decrease its operating expenses without reducing its service coverage. This will reduce Route 50's frequency from every 20 minutes to every 25 minutes, but it will increase the number of areas accessible from Route 50 while preventing areas from losing transit service. The consolidation of Routes 10 and 11 will increase the revenue service slightly but should not greatly affect Radford Transit's O&M costs. The restructuring of the routes to run in opposing directions will also help to increase cost efficiency due to decreasing duplicative service and competition between routes. The modification of the NRCC route will not affect the route's service hours or miles, and minimal capital is required for the installation of two (2) bus stops. The addition of two (2) stops in Dublin will help to increase the utility of the NRCC route beyond academic travel between the university and the community college. In total, the short-term projects will impact Radford Transit's current network through a 696 service hour and 7,430 service mile reduction.

The mid-term plan, which is planned to run three fiscal years from FY 2029 to FY 2031, contains five (5) projects that will reverse the reduction of service implemented in the short-term plan and increase the frequency and coverage of Radford Transit's current service. This is the largest portion of the planned service improvement, but most of the changes are simplifying existing routes to increase their directness and frequency by eliminating duplicative service and/or shortening the length of the routes. As a result, four (4) of the five (5) projects either reduce service hours or require a small increase of 30 service hours. The largest improvement by service hours is the mid-term Highlander Circle route which requires an additional 1,712 service hours over the existing Route 50 and will eliminate the 1,573-service hour reduction from the short-term Highlander Circle route in the short-term plan. The improvements in the mid-term plan will increase Radford Transit's service hours and service miles by 1,516 hours and 29,406 miles, respectively, over the short-term plan.

The long-term plan, which covers FY 2031 to FY 2033, will add two additional projects which will increase Radford Transit's regional connectivity and introduce new services to meet Radford residents' transportation needs. The modified NRV Connect route assumes the continuation of the service levels introduced through the TRIP grant and will decrease service hours by 1,782 hours and service miles by 32,355 miles. The annual service additions incurred from the microtransit service are variable due to malleable nature of microtransit service. Given the parameters of the proposed service, the microtransit route will likely add 5,443 service hours and 110,687 service miles to Radford Transit's system annually.

Table 3-11: Service Development

	Fiscal Year	Project #	Project	Annual Service Hours Change	Annual Service Miles Change	Cumulative Service – Hours	Cumulative Service Miles
Short-Term Plan	2025						
	2026	1	Highlander Express/Route 10 and 11 Consolidation	630	879	3,551	22,595
		2	Short-Term Highlander Circle/Removing Route 60 and Route 50 Alignment Modification	-1,573	-8,061	1,743	16,981
		3	Add local stops on NRCC Route	0	0	1,100	20,780
	2027						
	2028						
Mid-Term Plan	2029	4	Fairlawn – Tyler Avenue / Consolidation of Route 20 and 25	-216	-2,900	5,258	52,341
		5	Main Street Express / Route 30 Alignment Modifications	-174	16,512	5,303	50,221
		6	Willow Woods – Fairlawn / Route 35 Alignment Modifications	-1,782	-32,355	5,842	51,474
		7	Mid-Term Highlander Circle / Route 50 Alignment Modifications	1,712	13,856	3,378	28,178
		8	New River – Wadsworth / Route 60 Alignment Modification	30	2,492	1,681	13,212
	2030						
	2031						
Long-Term Plan	2032	9	Route 40/41 Alignment Modification	-1,782	-32,355	3,037	179,286
		10	Microtransit Deployment	5,443	110,687	5,443	110,687
	2033						
	2034						

3.3.2 Additional Implementation Considerations

Several other important or evolving considerations that will affect service implementation are identified below.

Route 40/41 Transit Ridership Incentive Program Grant

Radford Transit received a FY23 Transit Ridership Incentive Program (TRIP) Regional Connectivity grant from DRPT as outlined in Chapter 1.1.2. The TRIP provides $653,963 over three years to increase service of Radford Transit's Routes 40 and 41. The grant is set to expire at the end of FY 2025, so Radford Transit will have to obtain additional sources of funding to keep the same level of service on Routes 40 and 41.

Radford Transit Rebranding and Route Redesign

One of the core requests shown in public and stakeholder engagement is the need to redesign and simplify the Radford Transit route structure and make the service more accessible to the public. Renaming and rebranding routes is one initiative that may bring the service more in-line with desired rider destinations. This additional cost may include one-time costs for rebranding of materials, production of route maps, and reprogramming of route schedules, both GTFS and static.

Fare-Free Service

Radford Transit suspended fare payments on all routes in response to the COVID-19 pandemic and plans to make fare-free service permanent. Future service expansions by Radford Transit will have to be implemented through funds other than fare box funds. Additionally, changes in ridership are divorced from Radford Transit's revenue and thus cannot be relied upon to supplement capital and/or operational funding.

New Operations and Maintenance Facility

Radford Transit is currently in the process of planning and constructing a new operations and maintenance facility, as outlined in Chapter 1.1.2. The location, design, and the opening date of the new facility have not been determined, so the fleet currently operates out of a temporary location at 1422 W Main St, Radford, Virginia 24141. The planning and design for a new facility is expected to begin in FY 2028. The new O&M facility will provide a permanent base of operations and will alter non-revenue service hours and miles.

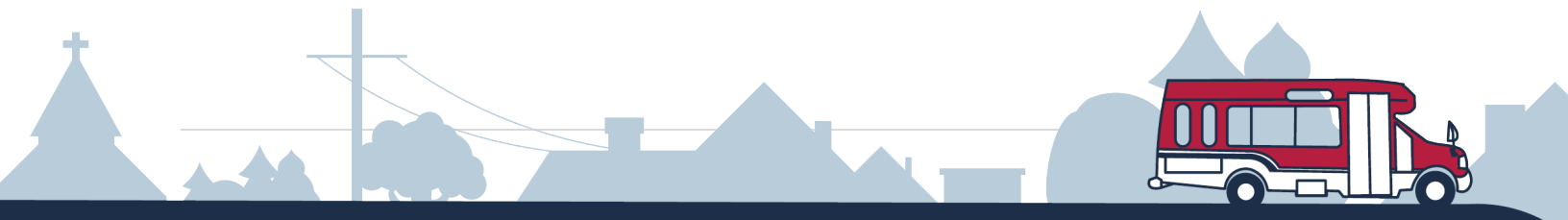
FY 2025 – FY 2034

Radford Transit

Transit Strategic Plan

Chapter 4

Final – May 2024



Contents

4 Planned Improvements and Modifications

The Implementation Plan lists steps required by an agency to carry out the operations and services described in Chapter 3. The implementation plan also should reference the approved Transit Asset Management plan to guide the schedule for replacing and/or increasing rolling stock and facilities to maintain a State of Good Repair (SGR).

4.1 Asset Management

Virginia Department of Rail and Public Transportation's (DRPT) Transit Asset Management (TAM) plan establishes asset inventory, assessment, replacement, and investment policies to ensure all transit agencies in Virginia remain in a state of good repair. DRPT classifies Radford Transit as a Tier II agency. Tier II denotes rural and small urban transit agencies operating fewer than 100 vehicles across all fixed-route services. Radford Transit opted to participate in a statewide group TAM plan for Tier II agencies in December 2021.

Radford Transit defers most policies on their fleet, facilities, and service practices to the state-wide standards outlined in DRPT's biannual Virginia Group Tier II Transit Asset Management Plan. DRPT's current TAM plan is in effect for FY 2022 – FY 2025, and the policies detailed below meet the standards of the current iteration of the DRPT TAM plan. In certain instances, Radford transit has developed tailored policies to address the specific needs of their service.

4.1.1 Vehicle Fleet Replacement and Retirement Policies

Table 4-1 exhibits the FTA's guidelines for their useful life standards (UL) for each class of vehicle Radford Transit current owns. Transit agencies which receive federal funds from the FTA for vehicle purchases must have their fleet vehicles hit either the age or mileage requirements before being decommissioned or receive financial sanctions. As a result, these benchmarks are used as a baseline for replacing existing vehicles. The City of Radford's five-year capital budget is another factor Radford Transit uses to determine their fleet replacement schedule. Radford Transit will delay the replacement of certain vehicles, even if they have reached the UL benchmarks, if the capital costs of replacing all vehicles surpass the capital budget.

Table 4-1: Useful Life Benchmarks for Radford Transit's Fleet's Classes

Vehicle Category	Useful Life	
	Years	Miles
Large heavy-duty transit buses 35'-40'	12	500,000
Medium-size medium-duty transit buses 25'-35'	7	200,000
Automobile (non-revenue)	8	140,000

Source: Federal Transit Administration

Radford Transit's fleet turnover is also determined by the condition of its vehicles, measured via the FTA's Useful Life Benchmarks (ULB). ULBs reflect the expected lifecycle for each vehicle type in its operating environment; assets which exceed their ULB are not considered to be in a state of good repair. **Table 4-2** shows the performance targets set by DRPT, which adheres to the FTA's default targets, for each asset class represented in Radford Transit's 20-vehicle fleet. The rightmost column reflects the maximum number of vehicles per asset class, which can exceed the ULB while still meeting DRPT's asset condition targets, based upon the number of vehicles per asset class in Radford Transit's fleet in FY 2024.

Table 4-2: Useful Life Benchmarks and Targets for Radford Transit's Fleet Classifications

Asset Class	ULB (Years)	Target %	# in RT Fleet	RT Target
Bus	14	15%	4	0
Cutaway	10	10%	16	1

Source: Virginia Group Tier II Transit Asset Management Plan FY 2022 – FY 2025

4.1.2 Facilities Maintenance

The DRPT TAM plan establishes a performance target of fewer than 10 percent (10%) of administrative and maintenance facilities rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale. **Table 4-3** describes the TERM scale in greater detail.

Table 4-3: FTA's TERM Classifications

Term Rating	Condition	Description
Excellent	4.8 – 5.0	No visible defects; new or near new condition; may still be under warranty if applicable
Good	4.0 – 4.7	Good condition, but no longer new; may be slightly defective or deteriorated, but is overall functional
Adequate	3.0 – 3.9	Moderately deteriorated or defective, but has not exceeded useful life
Marginal	2.0 – 2.9	Defective or deteriorated; in need of replacement; exceeded useful life
Poor	1.0 – 1.9	Critically damaged or in need of immediate repair; well past useful life

Source: Source: Virginia Group Tier II Transit Asset Management Plan FY 2022 – FY 2025

As of the publishing of this document, Radford Transit does not own any administrative or maintenance facilities, but any future facilities would be subject to the TERM Scale.

4.1.3 Passenger Facilities

The TAM plan also employs the TERM scale to establish a performance target of fewer than 15 percent (15%) of passenger facilities rating below 3.0. As of the publishing of this document, Radford Transit does not own any passenger facilities/stations whose conditions need to be reported to the FTA.

Radford Transit has internal policies for the condition of their bus stops. All bus stops must have a Radford Transit sign with a unique stop code and a list of routes servicing the stop. Bus stops with daily boardings greater than 25 passengers should have benches and bus stops with 50 or more daily boardings should have a shelter.

4.1.4 Technology and ITS

Radford Transit currently has automatic vehicle location (AVL) and automated passenger counter (APC) systems installed on their vehicles and works with Passio Technologies, a technologies service provider, to create an online, dashboard to display real-time system and scheduling information to passengers. Radford Transit maintains the onboard equipment in partnership with Passio Technologies and manages its technology assets and contracts on an individual case basis.

Radford Transit installed Automated Passenger Counter (APC) Systems in 2018 to improve customer service, record keeping and reporting compliance, accountability, and overall effectiveness of the transit service.

4.2 Capital Implementation Plan

The following capital implementation plan reflects asset investments required by the TAM plan as well as projects introduced in Chapter 3 of this document. The proposed expenditures are organized into two (2) investment types: rolling stock and capital needs.

4.2.1 Rolling Stock

Proposed Improvements and Expansion

The improvements outlined in Chapter 3 require no additional vehicles, thus Radford Transit will not expand its fleet during the 10-year TSP period. Additionally, Radford Transit plans on keeping its fleet composition the same with 16 cutaway buses and four (4) 35-foot buses. As a result, no capital funds are needed for the expansion or composition transition of Radford Transit's fleet. The only capital needs related to Radford Transit's rolling stock to complete the improvements in Chapter 3 are the replacement costs of Radford Transit's fleet to maintain a State of Good Repair.

Revenue Vehicle Fleet

All 20 of Radford Transit's revenue vehicles are planned for replacement over the course of the 10-year TSP timeframe. This includes five (5) cutaways that have been ordered and will be added to the existing fleet in FY 2024. As of February 2024, one (1) cutaway bus has surpassed its ULB guideline, and two (2) cutaway buses have surpassed the years-of-service UL benchmark but not the mileage UL benchmark. As most of Radford Transit's fleet are cutaway buses and have lowered required age and mileage thresholds for retirement, Radford Transit will replace 11 of its 16 cutaway buses within the first two (2) fiscal years of the TSP period.

All of the Ford E-450s in Radford Transit's fleet will be replaced before the start of the TSP period. Radford Transit is currently procuring Chevy G-450s as their main choice for their mid-sized vehicles. The useful life of this category of vehicles is seven (7) years or 200,000 miles and the vehicles cost approximately $212,507 (FY 2023 dollars). The Chevy G-450s are slightly longer than the Ford E-450s,

The larger, 35-foot New Flyer buses were manufactured in 2013 and 2022 and will be replaced with similarly sized vehicles in FY 2026 and FY 2034, respectively, upon hitting their ULB age requirement. The ULB on this category of vehicle is 12 years or 500,000 miles and these buses cost is scheduled to be $521,171 (FY 2023 dollars).

Radford Transit's has a fleet of support automobiles. These vehicles are scheduled to be replaced every four (4) years in accordance with their ULB and are scheduled to cost $40,000 per vehicle (FY 2024 dollars).

The planned revenue vehicle fleet purchases over the TSP timeframe will enable Radford Transit to retire and sell older rolling stock and replace them with a more consistent line of vehicles. The cost and model of Radford Transit's rolling stock is subject to change based on the timing of a transition to an alternative fuel fleet, but the replacement schedule will remain unchanged.

Vehicle Plan Replacement Summary

Table 4-4 shows the planned replacement of vehicles by year and type from FY 2025 to FY 2034. The replacement schedule is based on Radford Transit's fleet data inventory as of February 7th, 2023.

The fiscal year of replacement for each vehicle was either provided by Radford Transit or was calculated using the UL for the cutaway buses. The initial replacement year for Radford Transit's FY 2023 fleet was provided. Since minimum useful life of the cutaway buses in Radford Transit's fleet is seven (7) years, multiple cutaways will be replaced more than once during the 10-year TSP timeframe. These future replacements not specified by Radford Transit were calculated using the vehicle's specified UL for the respective cutaways of seven (7) years. The projected replacement date for every 35-foot bus was provided by Radford Transit. The purchase year for each vehicle type's projected replacement is assumed to be one (1) year before the expiration of its useful life. This allows for adequate time for Radford Transit to purchase and procure the necessary replacement vehicles before entering them into service. All costs are given in expenditure year dollar amounts given the four percent (4%) assumed rate of inflation.

Table 4-4: Vehicle Capital Needs ($1,000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Replacement Vehicles										
Bus (> 30 ft)	0	2	0	0	0	0	0	0	2	0
Bus (< 30 ft)	0	8	0	0	0	5	3	0	8	0
Support Vehicles	0	0	2	1	0	0	2	1	0	0
Replacement Costs ($1,000s)										
Bus (> 30 ft)	$0	$1,210	$0	$0	$0	$0	$0	$0	$2,008	$0
Bus (< 30 ft)	$0	$1,978	$0	$0	$0	$1,651	$1,065	$0	$3,282	$0
Support Vehicle	0	0	$92	$50	0	0	$123	$66	0	0
Total Costs ($1000s)	**$0**	**$3,188**	**$92**	**$50**	**$0**	**$1,651**	**$1,188**	**$66**	**$5,290**	**$0**

Source: Radford Transit Fleet Management Data (2023)

1. *Assumes a 7.5% annual inflation rate*
2. *Vehicle replacement year is one year before the respective vehicle's ULB*
3. *Assumes Diesel Model Bus Replacement*

Alternative Fuel Vehicles – Potential Conversion

Transitioning to an alternative fuel type(s) is the objective Radford Transit is striving towards to align itself with the national greenhouse gas reduction goals. However, transitioning to alternative fuel vehicles is dependent on a permanent operations and maintenance facility. As of the publishing of this document, the planning and design of the permanent operations and maintenance facility is on hold thus the capital needs for the fleet transition cannot be calculated.

A transition to an alternative fuel fleet would require additional capital as alternative fuel vehicles are more expensive than gas and diesel vehicles; **Table 4-5** shows the average planning estimate cost of alternative fuel vehicles of comparative make and models currently in Radford Transit's fleet; the price of a vehicle is heavily dependent on the model's range, on-board additions, and the maturation of the fuel type's technology.

Table 4-6 shows a potential vehicle replacement schedule for various bus fuel types based on Radford's current fleet replacement plan. This table illustrates the estimated relative cost of acquiring alternative fuel vehicles each year based on the vehicles that are scheduled to be replaced. While Battery Electric (BEB) and Fuel Cell (FCEB) buses are more expensive for both transit and body-on-chassis vehicle types, CNG vehicle costs are comparable over the 10-year replacement schedule. These costs are a current estimate that may change as technologies mature. This does not include facility or ongoing maintenance costs which may be higher for alternative fuel vehicles.

Table 4-5: POTENTIAL (For Future Consideration) Cost of Alternative Fuel Vehicles ($1,000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
35' Bus										
Base (Diesel)	$563	$605	$651	$699	$752	$808	$869	$934	$1,004	$1,079
BEB	$900	$968	$1,040	$1,118	$1,202	$1,292	$1,389	$1,493	$1,605	$1,726
FCEB	$1,125	$1,209	$1,300	$1,398	$1,502	$1,615	$1,736	$1,866	$2,006	$2,157
CNG	$540	$581	$624	$671	$721	$775	$833	$896	$963	$1,035
Cutaway[1]										
Base (Diesel)	$230	$247	$266	$286	$307	$330	$355	$382	$410	$441
BEB	$263	$283	$304	$327	$351	$378	$406	$436	$469	$504
FCEB	$286	$307	$331	$355	$382	$411	$441	$474	$510	$548
CNG	$220	$237	$254	$273	$294	$316	$340	$365	$392	$422

Source: Argonne National Laboratory's AFLEET tool (2023)

1. *Assumes a 7.5% inflation rate*
2. *BEB – Battery Electric Bus*
3. *FCEB – Fuel Cell Electric Bus*
4. *CNG – Clean Natural Gas Bus*

Table 4-6: POTENTIAL (For Future Consideration) Estimated Cost of Alternative Fuel Vehicles Replacement ($1,000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Replacement Bus										
Bus (> 30 ft)	0	2	0	0	0	0	0	0	2	0
Bus (< 30 ft)	0	8	0	0	0	5	3	0	8	0
Bus Replacement Costs by Fuel Type ($1,000s)										
Diesel	$0	$3,188	$0	$0	$0	$1,651	$1,065	$0	$5,290	$0
BEB	$0	$4,197	$0	$0	$0	$1,888	$1,218	$0	$6,963	$0
FCEB	$0	$4,878	$0	$0	$0	$2,053	$1,324	$0	$8,093	$0
CNG	$0	$3,053	$0	$0	$0	$1,579	$1,019	$0	$5,065	$0

Source: Radford Fleet Management Data (2023)

1. *Future vehicle costs assume a 7.5% inflation rate*
2. *BEB – Battery Electric Bus*
3. *FCEB – Fuel Cell Electric Bus*
4. *CNG – Clean Natural Gas Bus*

4.2.2 Capital Needs

Facilities Operations and Maintenance

Radford Transit is current using leased land at 1422 West Main Street for its vehicle storage and maintenance operations. Radford Transit is planning on constructing a new operations and maintenance facility on city-owned land, but the process of locating a site and designing a new facility is still in development. FY 2028 is planned start of the project, and $12,000,000 has been used as a planning estimate for the capital costs required for the planning, design, and construction for the new facility. The total costs will change depending on the year of expenditure. Additionally, the capital costs of the facility will also vary depending on the alternative fuel(s) chosen to transition to achieve the FTA's greenhouse gas reduction targets.

Radford Transit will also regularly purchase vehicle and shop equipment to maintain their vehicles and facilities in a state of good repair. **Table 4-7** details the capital costs associated with the anticipated improvement and maintenance of Radford Transit's facilities.

Table 4-7: Facility Capital Needs ($1,000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Design & Engineering of Maintenance Facility	-	-	-	$12,000.0	-	-	-	-	-	-
Purchase Shop Equipment	-	$51.5	-	$54.6	-	$58.0	-	$61.5	-	$65.2
Total	**$0**	**$51.5**	**$0**	**$12,054.6**	**$0**	**$58.0**	**$0**	**$61.5**	**$0**	**$65.2**

Source: DRPT FY 2024 SYIP

Passenger Facilities

Table 4-8 summarizes Radford Transit's capital needs to maintain and enhance their passenger amenities over the 10-year TSP period.

Radford Transit plans to perform continuous upkeep and improvement of their passenger facilities, including installing shelters and benches at applicable stops. The improvements in Chapter 3 will create new stops throughout Radford Transit's service area which will require the installation of new bus stop signs. The FY2020–FY2024 Capital Improvement Plan (CIP) includes 150 new bus stops signs at a total cost of $6,750 in FY2020. Adjusted for inflation, a new bus stop sign will cost $53.30 in FY 2024 dollars.

Five (5) of the proposed routes in Chapter 3 would require signs due to the addition of new stops:

- Short-Term NRCC Route
  - Broad Street at Giles Avenue
  - Broad Street at Cemetery Road
- Mid-Term Main Street Express
  - Three westbound pair stops to existing stops along Lee Highway between Jefferson and Burlington Streets
- Mid-Term Willow Woods – Fairlawn Route
  - Two stops along Peppers Ferry Boulevard between ends of Old Peppers Ferry Loop
- Mid-Term New River – Wadsworth Route
  - Veterans Park at New River Drive
  - Wadsworth Street at 4th Street (Northbound)
- Long-Term New River Valley Connector
  - Carilion New River Valley Medical Center
  - Route 118 Park and Ride

These new stops require the installation of 13 new signs at eight (8) locations listed locations, requiring $789 in capital over the next 10 years.

In addition, Radford University has its own program of funding and developing transit stop improvements. These improvements generally include maintenance of bus bay cutouts, shelter improvements and curbside pullouts. This program is funded and implemented separately from Radford Transit. Radford University plans to install new stops and cutouts on and around their campus during the TSP time period.

Radford Transit also plans on performing an agency rebrand in coordination with the University to align the agency more closely with the City of Radford's rebrand. The study and implementation of Radford Transit's rebrand is expected over two (2) years.

Table 4-8: Passenger Facilities Capital Needs (YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Needs										
Signs	-	$0.2	-	-	$0.4	-	-	$0.1	-	-
Benches and Shelters	-	$10.3	-	$10.9	-	$11.6	-	$12.3	-	$13.0
Rebrand Study	-	$150.0	-	-	-	-	-	-	-	-
Rebrand Implementation	-	-	$100.0	-	-	-	-	-	-	-
Total	**$0**	**$160.5**	**$100.0**	**$10.9**	**$0.4**	**$11.6**	**$0**	**$12.4**	**$0**	**$13.0**

Source: FY2020 – FY2024 Capital Improvement Plan

Technology and ITS

Table 4-9 summarizes Radford Transit's technology and ITS capital needs over the course of the 10-year TSP, including computer hardware, radios, security equipment, and automated passenger counters (APCs). There are no specific recommendations for equipment within the TSP timeframe, however regular replacement of equipment is included in the Radford Transit CIP.

Table 4-9: Technology and ITS Capital Needs (YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
APCs/ADP Hardware	-	-	$26.5	-	-	-	$29.9	-	-	-
Total	**$0**	**$0**	**$26.5**	**$0**	**$0**	**$0**	**$29.9**	**$0**	**$0**	**$0**

Source: Radford Transit

4.2.3 Capital Overview

Table 4-10 shows a detailed year-by-year implementation plan for FY 2025 to FY 2034. Since the planned service modifications in Chapter 3 do not require additional capital funding beyond bus stop signs, the capital implementation plan is based entirely on maintaining a state of good repair. Although the asset management activities are not directly related to the projects described in Chapter 3, they were grouped into the same timeframes of short- (FY 2025 – FY 2028), mid- (FY 2029 – FY 2031), and long-term (FY 2031 – FY 2034) for consistency. Anticipated state and federal funding sources are included and will be discussed further in Chapter 5.

Table 4-10: Capital Implementation Plan ($1,000s, YOE$)

	Fiscal Year	Project Type	Project Description	Project Cost	Annual Capital Cost
Short-Term Plan	2025	-			
	2026	Facilities Needs	Purchase shop equipment	$52	$3,256
		Passenger Facilities	NRCC Route Sign Installation	$0.2	
		Vehicle Replacement	Replace 8 Cutaways	$1,978	
		Vehicle Replacement	Replace 2 35-foot Buses	$1,210	
		Passenger Facilities	Benches and Shelters	$10	
		Passenger Facilities	Rebrand Study	$150	
	2027	Technology and ITS	APCs/ADP Hardware	$27	$219
		Passenger Facilities	Rebrand Implementation	$100	
		Vehicle Replacement	Replace 2 support vehicles	$92	
	2028	Maintenance Facility	Planning/Design/Construction of New Maintenance Facility	$12,000	$12,116

	Fiscal Year	Project Type	Project Description	Project Cost	Annual Capital Cost
		Facilities Needs	Purchase Shop Equipment	$55	
		Passenger Facilities	Benches and Shelters	$11	
		Vehicle Replacement	Replace 1 Support Vehicle	$50	
Mid-Term Plan	2029	Passenger Facilities	Main Street Express Sign Installation	$0.2	$0.4
		Passenger Facilities	Willow Woods – Fairlawn Sign Installation	$0.1	
		Passenger Facilities	New River – Wadsworth Sign Installation	$0.1	
	2030	Vehicle Replacement	Replace 5 Cutaways	$1,651	$1,721
		Facilities Needs	Purchase shop equipment	$58	
		Passenger Facilities	Benches and Shelters	$12	
	2031	Vehicle Replacement	Replace 3 Cutaways	$1,065	$1,218
		Vehicle Replacement	Replace 2 Support Vehicles	$123	
		Technology and ITS	APCs/ADP Hardware	$30	
Long-Term Plan	2032	Passenger Facilities	NRV Route Sign Installation	$0.1	$140
		Vehicle Replacement	Replace 1 Support Vehicle	$66	
		Facilities Needs	Purchase shop equipment	$62	
		Passenger Facilities	Benches and Shelters	$12	
	2033	Vehicle Replacement	Replace 2 35-foot Buses	$2,008	$5,290
		Vehicle Replacement	Replace 8 Cutaways	$3,282	
	2034	Facilities Needs	Purchase shop equipment	$65	$78
		Passenger Facilities	Benches and Shelters	$13	

1. All costs in $1,000s
2. All Vehicle costs assume a 7.5% annual escalation rate
3. Non-vehicle costs assume a 3% inflation rate

FY 2025 – FY 2034

Radford Transit

Transit Strategic Plan

Chapter 5

Final – May 2024

Contents

5 Financial Plan

The financial plan of the TSP projects the expected operating and capital costs, as well as anticipated funding sources over the 10-year TSP period. The chapter is segmented into two sections based on costs and funding sources: operating and maintenance costs and associated funding sources, and capital costs and associated funding sources.

The projections made in financial plan are based on the most up to date and available data, however the COVID-19 pandemic and the related relief funding significantly has altered Radford Transit's typical funding levels. To best develop Radford Transit's revenue assumptions and financial forecasts, Radford Transit's proposed FY 2025 budget, the FY 2024 DRPT Six Year Improvement Program (SYIP), standard escalation rates, and historical records were used.

Financial projections contain uncertainty which increases the further into the future the projections extend. There is additional uncertainty in some projections because of the disruption caused by the COVID-19 pandemic and the influx of relief funds lasting through the onset of the 10-year TSP timeframe. Additionally, the City of Radford has been reclassified as a rural community rather than a small urban jurisdiction which changes the types of grants Radford Transit can apply for. The pandemic related impacts are discussed throughout this chapter in the areas that are most affected. As the first year of the TSP will also be the first year Radford will be classified as a rural community, uncertainty exists in the effects of the transition will have on the levels of federal funding, therefore values and figures are subject to change over time.

All costs in this chapter have been inflated to year of expenditure dollars (YOE$), accounting for the minimum three percent (3%) annual factor specified in the DRPT Transit Strategic Plan Guidelines. A three-year retrospective of operating and capital expenses is provided in Appendix X for recent historical context.

5.1 Operating and Maintenance Costs and Funding Sources

This section provides details on the projected expenditures and the corresponding levels of funding required to create a balanced operating and maintenance budget over the next 10 years.

5.1.1 Revenue Assumptions

The future operating costs for Radford Transit were projected using Radford Transit's projected FY 2025 budget (the latest approved SYIP as of April 2024) as a basis. Radford generates operating and maintenance revenue that is categorized into five (5) categories: farebox revenue, advertising, federal funding, state funding, and local/university funding. Future years beyond the already budgeted FY 2025 are based on the following assumptions:

Farebox Revenue

Fare collection was originally suspended in FY 2020 in response to the COVID-19 pandemic. Radford Transit has decided to make fare-free service permanent, and thus no farebox revenue will be assumed for the 10-year TSP period for both the baseline and service change scenarios. Historically, fare revenues were never a large portion of Radford Transit's operating budget. In FY 2019, the last full year of pre-pandemic data, Radford Transit's farebox revenue was $27,476 accounting for 1.8 percent (1.8%) of Radford Transit's revenues.

Advertising

Advertising revenue was negatively impacted by the COVID-19 pandemic. In FY 2021, the advertising revenue dropped to approximately $2,560, one fourth of what had been generated in pre-pandemic years. FY 2023 revenues from advertising were not available, but it is expected that revenues will return to pre-pandemic levels. Advertising revenues are projected to be $10,000 for FY 2024 which is the basis for future year projections. For the FY 2025 to FY 2034 TSP timeframe, advertising revenue is projected to increase at a three percent (3%) annual escalation rate. The advertising assumptions remain the same between the baseline and service change scenarios.

Federal Funding

Federal operations assistance funding for Radford Transit primarily came from two sources: FTA Section 5307 and Coronavirus Aid, Relief, and Economic Security (CARES) Act (2020) funding.

Radford Transit's operational federal funding previously came from FTA Section 5307. Radford Transit's 5307 funding was directly proportioned by DRPT as Radford was considered a small, urbanized area (a metropolitan area of < 200,000 people). Now, the City of Radford has been reclassified as a rural area which qualifies Radford Transit for FTA Section 5311 funds. FY 2025 is the first year Radford Transit would receive 5311 funds, so the change in the level of funding is unknown as of the publication of this document. However, FTA 5311 funding is assumed to be 50 percent (50%) of operating costs FY 2025–FY 2034 for both the baseline and service change scenarios.

Radford Transit received a significant influx of federal funding during the COVID-19 pandemic and the years following due to the public transit allocations in the CARES Act. The additional federal funding from CARES was allocated through the 5307 apportionments. Radford Transit expects that CARES funds will be expended by the end of FY 2024, and thus no additional CARES funds were assumed for the TSP timeframe.

State Funding

Radford Transit's state funding is comprised of DRPT Operating Assistance and DRPT TRIP Grant revenue.

The FY 20225 DRPT operating funding is from Radford Transit's proposed FY 2025 budget. FY 2026–FY 2034 DRPT Operating Assistance funding is based on the change of total Operating Assistance funding estimated in the DRPT FY 2024 SYIP shown in **Table 5-1**. For the baseline scenario, FY 2026–FY 2029 DRPT Operating Assistance funding is anticipated to change at the same rate of total state funding. For FY 2030–FY 2034, DRPT Operating Assistance funding is expected to increase at 2.0 percent (2.0%).

Table 5-1: State Operating Assistance Anticipated Change

Year	Percent Change from Previous Year
FY 2025 to FY 2026	2.0%
FY 2026 to FY 2027	2.1%
FY 2027 to FY 2028	1.9%
FY 2028 to FY 2029	1.6%

Source: DRPT FY 2024 SYIP

The projected state operating assistance funds in the 2024 SYIP provides a basis to project Radford Transit's future state funding, but the exact allocation from the state is likely to vary year to year. This is due to the Virginia General Assembly, in 2018, passing a statute requiring transit grant funding to be based on performance (Section 33.2-1526.1 of the Code of Virginia). Performance-based allocation of state transit operating funding, which began in FY 2020, accounts for both the size of the agency and three years of performance trends of the agency. Sizing metrics are used to correlate funding allocations with the size of the agency and include operating cost (50%), ridership (30%), revenue vehicle hours (10%), and revenue vehicle miles (10%). The sizing allocation is then adjusted based on a comparison of performance trends of the agency to statewide trends for five (5) performance metrics:

- Passengers per Revenue Vehicle Hour
- Passengers per Revenue Vehicle Mile
- Operating Cost per Revenue Vehicle Hour
- Operating Cost per Revenue Vehicle Mile
- Operating Cost per Passenger

As the allocation of performance-based funding is dependent on Radford Transit's performance relative to the performance of all transit agencies statewide, reliably projecting state funding allocation is based on multiple variables. Radford Transit's proposed service changes will keep Radford Transit near its baseline service levels, thus the service change scenario will follow the same assumptions as the baseline scenario: DRPT operating assistance will increase by the listed percentages in **Table 5-1** for

FY 2026–FY 2029, and FY 2029–FY 2034 is forecasted to increase at two percent (2%) annually.

Radford Transit also receives state operating assistance through their TRIP Regional Connectivity grant which provides state funds to enhance the level of service on Radford Transit's 40 and 41 routes. The grant began in FY 2023 and spans three years with the level of state assistance decreasing each year. The grant is value at $235,000, and the TRIP funding for FY 2025 is budgeted at $64,900. Radford Transit cannot reapply for the regional connectivity TRIP grant, but Radford Transit is still eligible to apply for other TRIP grants such the TRIP Zero and Reduced Fares grant.

Radford Transit is eligible to apply for the DRPT Zero and Reduced Fares TRIP grant which would provide state funds to support Radford Transit's fare free service. The zero fare TRIP grant last four years with a gradual step-down in state funding each year: state funding covering 80 percent (80%) funding in year one (1), 60 percent (60%) in year two (2), 30 percent (30%) in year three (3), and Radford Transit would have to cover the total costs of the fare-free service in year four (4). It is recommended for Radford Transit to apply for this grant as it already provides fare-free service. For both scenarios, it is assumed that Radford Transit will receive this grant beginning in FY 2029; assuming the same level of farebox revenue from FY 2019, the TRIP grant would be worth $569,409 for the baseline scenario and service change scenarios. This assumes that the grant covers costs currently covered by RU to subsidize students. Additional coordination would be required prior to implementation to confirm amounts and splits of funding. State funding assistance would end in FY 2032.

Local-University Funding

Radford Transit's local funding is supplied by the City of Radford and Radford University. The level of local funding significantly decreased during Covid-19 and the following couple years afterwards as CARES funding supplemented the need for local funds. The level of local funding has since normalized, so the projections are based on Radford Transit's projected FY 2025 budget.

Revenue from the City of Radford and Radford University changes annually based on the need of the transit system and is proportional to the service distribution within each respective organization. The baseline and service changes scenario both assume that local funding accounts for the remaining portion of revenues required to balance the total operating expenses, which amounts to approximately $724,000 in FY 2025. The split in local funding for FY 2025 is 31.7 percent (31.7%) the City of Radford and 68.3 percent (68.3%) Radford University. The split in funding is subject to change each year based on the distribution of service hours between city and university routes.

5.1.2 Ten-Year Financial Plan Scenarios

Two (2) ten-year financial plan scenarios were developed: a baseline scenario and a service changes scenario. The baseline scenario assumes no service changes are implemented over the TSP timeframe and the service changes scenario assumes the service changes discussed in Chapter 3 are implemented. The revenue hours are constant for all years in the baseline scenario and increase to reflect the timing of the proposed service changes in the service change scenario. Projected operating expenses reflect an assumed four percent (4%) escalation rate each year as well as additional operating expenses associated with any increased service.

Baseline Scenario

In the baseline scenario, shown in **Table 5-2,** operating costs are expected to increase by $768,000 from FY 2025 to FY 2034 due to inflation, representing a 30.5 percent (30.5%) increase. Federal funding is assumed to return to pre-pandemic levels at the start of the ten-year TSP period. This increase is projected to be covered with an increase in various revenues (federal, state, and local sources):

- Advertising revenues are projected to increase from $10,000 in FY 2025 to $13,000 in FY 2034
- Federal funding is expected to increase from $1,126,000 in FY 2025 to $1,644,000 in FY 2034
- State funding is projected to increase from $526,000 to $626,200 between FY 2025 to FY 2034
- Local revenues are projected to increase from $229,500 in FY 2025 to $318,500 in FY 2034
- University revenues are expected to account for the majority of the increase in operating revenues with revenues increasing from $450,200 in FY 2025 to $686,300 in FY 2034

Table 5-2: Projected Radford Transit Operating and Maintenance Costs Under Baseline Scenario ($1000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Revenue Hours	31,253	31,253	31,253	31,253	31,253	31,253	31,253	31,253	31,253	31,253
Total Operating Cost	$2,520	$2,596	$2,673	$2,754	$2,836	$2,921	$3,009	$3,099	$3,192	$3,288
Expected Operating Revenue Sources										
Farebox	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Advertising	$10.0	$10.3	$10.6	$10.9	$11.3	$11.6	$11.9	$12.3	$12.7	$13.0
Federal	$1,260.0	$1,297.8	$1,336.7	$1,376.8	$1,418.1	$1,460.7	$1,504.5	$1,549.6	$1,596.1	$1,644.0
State Operating Assistance	$526.0	$536.5	$547.8	$558.2	$567.1	$578.5	$590.0	$601.8	$613.9	$626.2
TRIP Regional	$64.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0	$0	$0	$0
TRIP Zero Fare	$0	$0	$0	$0	$455.5	$341.6	$170.8	$0	$0	$0
Local	$208.9	$238.1	$246.7	$256.0	$121.8	$167.7	$232.0	$296.6	$307.4	$318.5
University	$450.2	$512.9	$531.6	$551.7	$262.4	$361.3	$499.8	$638.9	$662.2	$686.3

1. Revenue hours remain constant under baseline scenario
2. Advertising revenues for FY 2025 are from DRPT SYIPs. Future years are expected to escalate by 3% annually from FY 2025 levels
3. All Costs in $1,000s
4. If the TRIP Zero Fare grant is not awarded, the cost will be split between the city and the university

Service Changes Scenario

The service changes scenario, shown in **Table 5-3**, assumes the service restructuring discussed in Chapter 3 of this TSP is implemented, resulting in a slight increase in service hours. Annual revenue hours are projected to increase by 3,990 hours, representing a 12.8 percent (12.8%) increase from FY 2025 to FY 2034.

Radford Transit's total operating costs will fluctuate depending on the timeframe of the TSP. Operating costs will decrease in the short-term due to the suspension and restructuring of routes and then re-approach parity with the baseline scenario's operating costs during the reintroduction of services in the mid-term. In the long-term, operating costs and service hours are expected to increase due to the introduction of the microtransit service.

Projected expenses will increase by $1,197,000 over the TSP timeframe, from $2,520,000 in FY 2025 to $3,717,000 in FY 2034. Revenues from all sources will need to increase from FY 2025 levels to meet the increased costs:

- Advertising revenues are projected to increase from $10,000 in FY 2025 to $13,000 in FY 2034
- Federal funding is expected to increase from $1,126,000 in FY 2025 to $1,858,500 in FY 2034
- State funding is projected to increase from $526,200 to $626,400 between FY 2025 to FY 2034
- Local revenues are projected to increase from $208,900 in FY 2025 to $386,500 in FY 2034
- University revenues are expected to account for the majority of the increase in operating revenues with revenues increasing from $450,000 in FY 2025 to $832,600 in FY 2034

Table 5-4 compares the total revenue hours and operating costs of the baseline and service changes scenarios. By the end of the ten-year timeframe, the total revenue hours, including the service additions, increases to 35,243 hours in FY 2034 and the total operating costs increases to $3,717,000. By FY 2034, the difference in operating costs between the baseline and service changes scenario is $429,000.

Table 5-3: Projected Radford Transit Operating and Maintenance Costs and Revenues Under Service Change Scenario ($1000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Revenue Hours	31,253	30,557	30,557	30,557	32,073	32,073	32,073	35,243	35,243	35,243
Total Operating Cost	$2,520	$2,537	$2,613	$2,691	$2,910	$2,997	$3,087	$3,504	$3,609	$3,717
Expected Operating Revenue Sources										
Farebox	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Advertising	$10.0	$10.3	$10.6	$10.9	$11.3	$11.6	$11.9	$12.3	$12.7	$13.0
Federal	$1,260.0	$1,268.5	$1,306.5	$1,345.5	$1,455.0	$1,498.5	$1,543.5	$1,752.0	$1,804.5	$1,858.5
State Operating Assistance	$526.2	$536.7	$548.0	$558.4	$567.3	$578.7	$590.2	$602.0	$614.1	$626.4
TIRP Regional	$64.9	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
TRIP Zero Fare	$0	$0	$0	$0	$455.5	$341.6	$170.8	$0	$0	$0
Local	$208.9	$228.7	$237.1	$246.1	$133.4	$179.6	$244.2	$360.6	$373.3	$386.5
University	$450.0	$492.8	$510.8	$530.1	$287.5	$387.0	$526.3	$777.0	$804.4	$832.6

1. *Advertising revenues for FY 2025 are from DRPT SYIPs. Future years are expected to escalate by 3% annually from FY 2025 levels*
2. *All Costs in $1,000s*
3. *If the TRIP Zero Fare grant is not awarded, the cost will be split between the City and the University*

Table 5-4: Projected Radford Transit Operating and Maintenance Costs for Service Changes ($1000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Existing System										
Revenue Hours	31,253	31,253	31,253	31,253	31,253	31,253	31,253	31,253	31,253	31,253
Total Operating Cost	$2,520	$2,596	$2,673	$2,754	$2,836	$2,921	$3,009	$3,099	$3,192	$3,288
Service Additions										
Additional Revenue Hours (yearly improvement)		-696			1,516			3,170		
Additional Operating Cost (yearly Improvement)		($59)			$219			$417		
Cumulative Change in Operation Costs (yearly increase)		($59)	($60)	($63)	$74	$76	$78	$405	$417	$429
Totals										
Total Revenue Hours	31,253	30,557	30,557	30,557	32,073	32,073	32,073	35,243	35,243	35,243
Total Operating Cost	$2,520	$2,537	$2,613	$2,691	$2,910	$2,997	$3,087	$3,504	$3,609	$3,717

1. Costs are stated in year of expenditure dollars, with the assumed annual escalation rate of 3%
2. Operational changes include only changes that incur additional operating costs
3. All costs in $1,000s

5.2 Capital Costs and Funding Sources

The anticipated capital costs presented in this section are driven by the implementation plan presented in Chapter 4 and are grouped into vehicle purchase costs and facility and other capital costs. Chapter 4 should be referenced for additional information regarding the planning of these capital purchases.

5.2.1 Vehicle Purchase Costs and Funding Sources

Radford Transit's vehicle replacement schedule discussed in Chapter 4 shows the anticipated new vehicle needs for each year in the TSP timeframe which ranges from zero vehicles (FY 2025, 2029, and 2034) to ten vehicles (FY 2026). Anticipated vehicle costs by year are shown in **Table 5-5**. On average, Radford Transit's vehicle purchase costs for FY 2025 to FY 2034 are approximately $1,152,000 annually (YOE$). FY 2033 is expected to have the largest vehicle replacement costs at $5,290,000 (YOE$), followed by FY 2026 at $3,188,000 (YOE$) and FY 2030 at $1,651,000 (YOE$).

The capital funding for vehicle purchases will be split between federal, state, and local sources. Radford Transit's replacement bus purchases will be placed in the state of good repair category for DRPT's Making Efficient and Responsible Investments in Transit (MERIT) capital assistance funding. For this category, total capital funding for these purchases is divvied between the three fundings sources with 28 percent (28%) of funding coming from federal, 68 percent (68%) from state, and four percent (4%) from local. Radford Transit does not plan on expanding its fleet during the TSP timeframe.

Table 5-5: Financial Plan for Funding Vehicle Purchases ($1000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Vehicle Costs										
Bus (> 30ft)	$0	$1,210	$0	$0	$0	$0	$0	$0	$2,008	$0
Bus (< 30ft)	$0	$1,978	$0	$0	$0	$1,651	$1,065	$0	$3,282	$0
Support Vehicles	0	0	$92	$50	0	0	$123	$66	0	0
Total	**$0**	**$3,188**	**$92**	**$50**	**$0**	**$1,651**	**$1,188**	**$66**	**$5,290**	**$0**
Anticipated Funding Sources										
Federal	$0	$893	$26	$14	$0	$462	$333	$18	$1,481	$0
State	$0	$2,168	$63	$34	$0	$1,123	$808	$45	$3,597	$0
Local	$0	$128	$4	$2	$0	$66	$48	$3	$212	$0

1. Vehicle costs identified in Chapter 4 of TSP
2. Vehicle purchases assume 28% funding through FTA (Section 5339 program), 68% from State, and the remaining 4% from local
3. Vehicle costs assume a 7.5% annual inflation factor

5.2.2 Facility Improvement and Other Capital Costs and Funding Sources

In addition to vehicle costs, Radford Transit has capital needs to improve their facilities, passenger amenities, and technology over the course of the TSP life cycle. **Table 5-6** shows the anticipated capital cost by category by year, as well as anticipated revenue from federal, state, and local funding sources. The greatest local funding need occurs in FY 2028, where a need of $482,000 in local funding is estimated, primarily due to the four percent (4%) local match expected for construction of the bus maintenance facility.

The facility improvements and other capital costs are accounted for by a combination of federal, state, and local funding. The funding for these capital costs is expected to remain at a split of 28 percent (28%) federal, 68 percent (68%) state, and four percent (4%) local, with state funding tied to project prioritization scores for all improvements except the maintenance facility. Radford Transit will also apply for grant funding for the construction of the maintenance facility. For the purposes of the financial plan, Radford Transit assumed a split of 80 percent (80%) Federal funding from FTA 5311, 16 percent (16%) state funding (through the Major Expansion category of the Capital Assistance MERIT grants program), and four percent (4%) local funding. If grant funding is not secured Radford Transit would need to find additional funding sources or delay the maintenance facility project.

Radford Transit is also planning on performing a rebrand of its organization's image in coordination with the University. The process will require two (2) parts: a rebrand study and the implementation of the rebrand. Radford Transit will apply for DRPT's Technical Assistance MERIT grant for the rebrand study, which if selected would provide 50 percent (50%) in state funding and the remaining 50 percent (50%) is assumed to come from local funding sources. If grant funding is not secured Radford Transit would need to find additional funding sources. The financial responsibility for the implementation of the rebrand would fall entirely on local revenue sources.

Table 5-6: Financial Plan for Funding Non-Vehicle Capital Costs ($1000s, YOE$)

	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	FY34
Anticipated Costs										
Facilities										
Design & Engineering of Maintenance Facility				$12,000.0						
Purchase Shop Equipment		$51.5		$54.6		$58.0		$61.5		$65.2
Passenger Amenities										
Signs		$0.20			$0.40			$0.10		
Benches and Shelters		$10.3		$10.9		$11.6		$12.3		$13.0
Rebrand Study		$150								
Rebrand Implementation			$100							
Technology										
APCs/ADP Hardware			$26.5				$29.9			
Total	**$0**	**$212.0**	**$126.5**	**$12,065.6**	**$0.4**	**$69.6**	**$29.9**	**$73.9**	**$0**	**$78.3**
Anticipated Funding Sources										
Federal	$0	$17	$7	$3,378	$0	$19	$8	$21	$0	$22
State	$0	$118	$18	$8,205	$0	$47	$20	$50	$0	$53
Local	$0	$77	$101	$483	$0	$3	$1	$3	$0	$3

1. All costs assume a 3% escalation rate
2. Costs are sourced from DRPT's FY 2024 SYIP
3. Costs assume a 28% federal, 68% state, and a 4% local split
4. The rebrand study assumes a 50% state and 50% local funding split
5. The rebrand implementation assumes a 100% local funding split

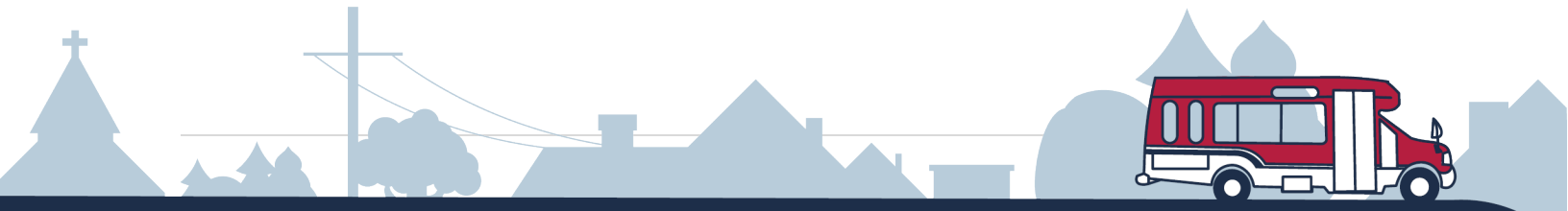
FY 2025 – FY 2034

Radford Transit

Transit Strategic Plan

Appendix A

Final – May 2024



Contents

A Appendix

A.1 History

Radford Transit was established on August 8, 2011, through a joint partnership between Radford University, the City of Radford, the Virginia Department of Rail and Public Transportation (DRPT), and the Federal Transit Administration (FTA). The system evolved out of a Radford University (RU) run shuttle service and is now a fully fledge transit agency operating 20 revenue vehicles on 12 routes across five (5) jurisdictions. The following milestones show Radford Transit's incremental growth from a college shuttle system to a regional transit provider.

- 2009 – A transit feasibility study is developed for the City of Radford and Radford University
- 2010 – The City of Radford is incorporated into the New River Valley Metropolitan Planning Organization allowing the city access to federal 5307 funding
- 2011 – Radford Transit is formed out of the existing university-run "Tartan Transit" shuttle service through a partnership between the City of Radford, Radford University, DRPT, and the FTA
- 2011 – New River Valley Community Services is made Radford Transit's contracted operator
- 2012 – Connection to the New River Valley Medical Center is scaled back to on-demand service
- 2013 – Radford Transit partners with RIDE Solutions1 and the Pulaski Area Transit to provide up-to-date routing and schedule information via Google Maps.
- 2014 – Former Radford Transit general manager, Josh Baker, is honored by the White House Champions for Change Program
- 2015 – Radford Transit website is redesigned
- 2016 – A regional transit study is conducted to study potential enhancements to shared bus stops
- 2017 – Fairfax Street Station on Radford University's campus opens
- 2020 – Radford Transit suspends fare payments and begins fare free service
- 2022 – RTW Management takes over the operation contract for Radford Transit
- 2023 – Radford Transit is awarded a DRPT Regional Connectivity grant increasing the level of service between Montgomery County and the City of Radford

A.2 Governance

The New River Valley Metropolitan Planning Organization (NRV MPO) Policy Board has authorized the City Manager of the City of Radford on behalf of the NRV MPO to seek federal and state funding to support transit services. The Transit Department is one of nine (9) departments under the City's Administrative Services which is overseen by the City Manager. The interests of Radford University are represented through a Stakeholder Committee composed of City and University representatives which acts as the policy board for Radford Transit. Committee members are appointed by the City and University administrations, and the committee meets quarterly or as needed.

Radford Transit does not currently have a citizens advisory committee.

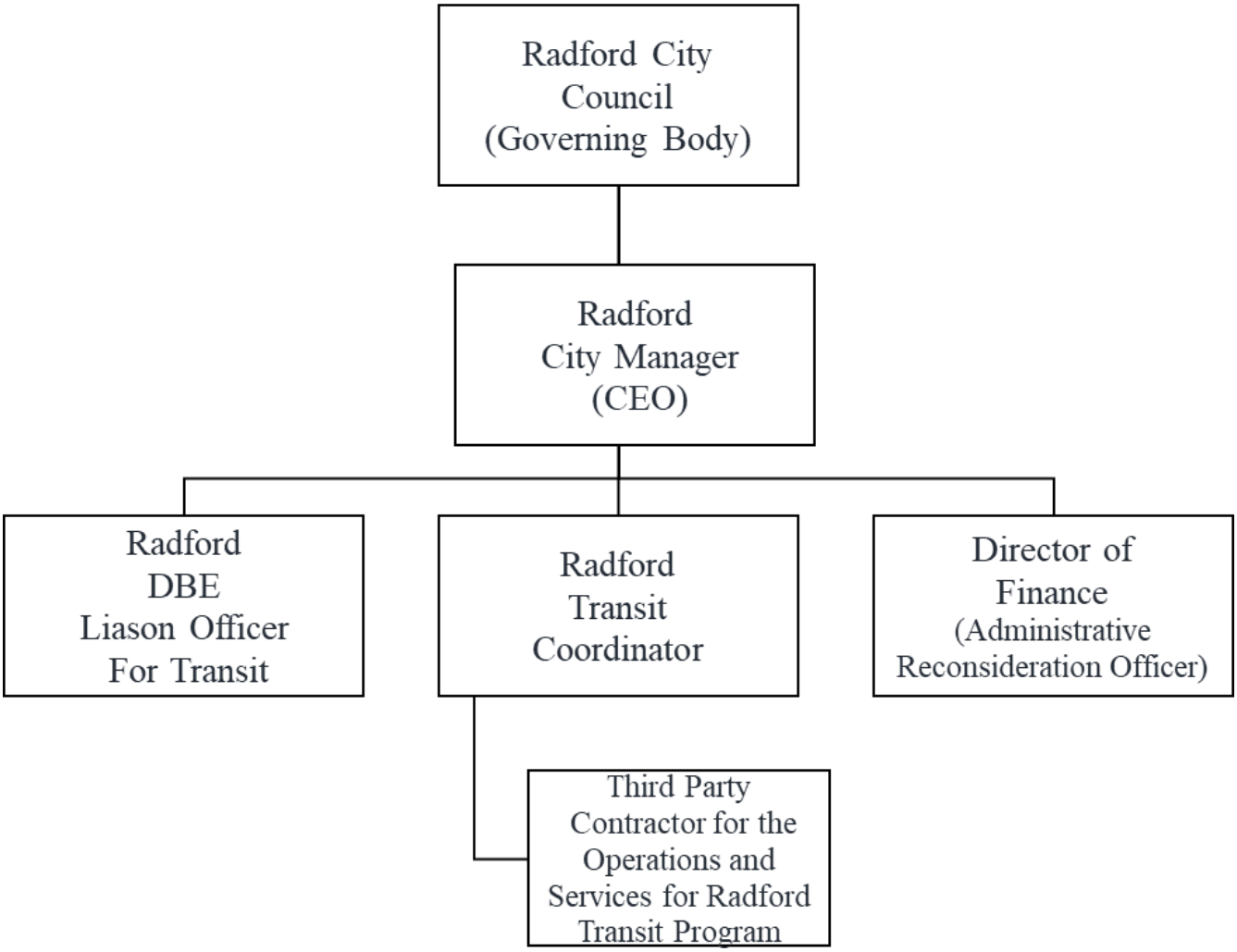
The City of Radford and RU have a Memorandum of Understanding (MOU) that sets out how the transit system is operated and evaluated and how costs are shared. The MOU designates "University routes," "City routes," and "University/City shared routes." Each entity is responsible for capital and operating costs based upon those routes and their service hours. The city prepares and submits monthly invoices to Radford University for its share of operating costs, along with monthly ridership reports.

The City of Radford has a transit fund to reflect the special revenue characteristics of this department. In addition to local funding transfer, the transit fund receives revenues from the Federal Government, Commonwealth of Virginia, Radford University, and advertising fees.

A.3 Organizational Structure

Radford Transit operates under Radford's city manager, David Ridpath. Radford Transit's Transit Coordinator is Melissa Skelton. The City Manager and the Transit Coordinator report to the City Council and oversee managing Radford Transit and the RTW contract. In total, Radford Transit has 46 full and part-time employees. The City of Radford contracts out operations to RTW Management. Radford Transit operators and maintenance technicians are not unionized. The Radford Transit organizational chart, as of May 2024, is shown in **Figure A-1**.

Figure A-1: Radford Transit's Organizational Chart (May 2024)



A.4 Services Provided and Areas Served

Radford Transit provides local bus services for the City of Radford with routes operating into Montgomery and Pulaski Counties and the towns of Blacksburg and Christiansburg. Radford Transit operates deviated fixed route service which allows buses to travel up to three fourths (¾) mile off the standard route.

Radford Transit serves a 10-square-mile area within the greater New River Valley region. As of Spring 2024, Radford Transit operates 12 routes and provides transit service year-round with reduce service during periods when Radford University is not in session: summer, winter, and Thanksgiving break. The service period when Radford University is in session is referred to as "Regular Service" while the reduced service period is referred to as "City Service."

Service is primarily provided Monday through Saturday from 7:00 a.m. to 10:30 p.m. for Regular Service and 7:00 a.m. to 8:00 p.m. for City Service. Some Regular Service routes provide late-night service on Friday and Saturday nights (10:30 p.m. to 2:30 a.m.), and Route 10 provides evening service on Sundays (5:40 p.m. to 11:40 p.m.). Radford Transit's routes operate hourly headways between 20 and 120 minutes. The university circulator routes (Routes 10, 11, 15, 50, 60) typically operate at 20–30-minute headways while the routes servicing the city (Routes 20, 30, and 35) typically operate at 60-minute headways.

Table A-1: Radford Transit Service Summary

Route	Route Name	Service Periods	Major Origin-Destination	Days of Operation	Span	Frequency
10	University Express	Regular Service	Radford University – Radford University Sports District – The Hub	Monday-Friday; Sunday	7:10 a.m.—10:40 p.m. (M-F) 5:40 p.m.—11:40 p.m. (Sun)	30 minutes
11	New River Circulator	Regular Service	Radford University – Radford University Sports District – The Hub	Monday-Friday	7:25 a.m.—6:45 p.m.	30 minutes
15	Highlander Circular (City Only) Or University Express	Regular Service; City Service	Radford University – Radford University Sports District – The Hub	Monday-Saturday	7:10 a.m.—7:50 p.m. (M-F, City Only) 10:10 a.m.—7:50 p.m. (Sat, City Only) 10:30 p.m.—2:40 a.m. (Fri) 10:10 a.m.—2:40 p.m. (Sat)	30 minutes
20	New River Rapid	Regular Service; City Service	Radford University – The Hub – Fairlawn Walmart	Monday-Saturday	7:00 a.m.—7:30 p.m. (City Only) 7:00 a.m.—9:30 p.m.	60 minutes
25	New River Rapid	Regular Service; City Service	The Hub – Ridgewood	Monday-Saturday	7:15 a.m.—7:45 p.m. (M-F) 10:30 a.m.—7:45 p.m. (Sat)	30 minutes
30	Cross City	Regular Service; City Service	The Hub – Rec Center – Jeffries Drive	Monday-Saturday	6:50 a.m.—7:50 p.m. (M-F) 9:50 a.m.—7:50 p.m. (Sat)	60 minutes
35	Cross City	Regular Service; City Service	Riverview Park – City Hall – Fairlawn Walmart	Monday-Saturday	7:05 a.m.—8:05 p.m. (M-F) 10:05 a.m.—8:05 p.m. (Sat)	60 minutes
40	NRV Connect	Regular Service; City Service	The Hub – NRV Mall – Virginia Tech Squires Center	Monday-Saturday	6:50 a.m.—8:50 p.m. (M-F) 10:50 a.m.—9:50 p.m. (Sat) 8:50 p.m.—12:50 p.m. (Fri-Sat Late Night) 6:50 a.m.—6:50 p.m. (M-F, City Only) 10:50 a.m.—6:50 p.m. (Sat, City Only)	120 minutes
41	NRV Connect	Regular Service; City Service	The Hub – NRV Mall – Virginia Tech Squires Center	Monday-Saturday	7:50 a.m.—9:50 p.m. (M-F) 9:50 a.m.—8:50 p.m. (Sat) 8:50 p.m.—1:50 p.m. (Fri-Sat Late Night) 6:50 a.m.—6:50 p.m. (M-F, City Only) 10:50 a.m.—6:50 p.m. (Sat, City Only)	120 minutes
50	Highlander Circular	Regular Service	Radford University – The Hub – Burlington Lot	Monday-Friday	7:00 a.m.—10:40 p.m.	20 minutes
60	South Beech Express	Regular Service	The Hub – Copper Beech – Fairfax Station	Monday-Friday	7:20 a.m.—10:50 p.m.	30 minutes
100	NRCC Connector	Regular Service	Radford University – The Hub – New River Community College	Monday-Friday	8:15 a.m.—5:30 p.m.	60 minutes

A.4.1 Routes 10/11/15 – University Express/Highlander Circulator

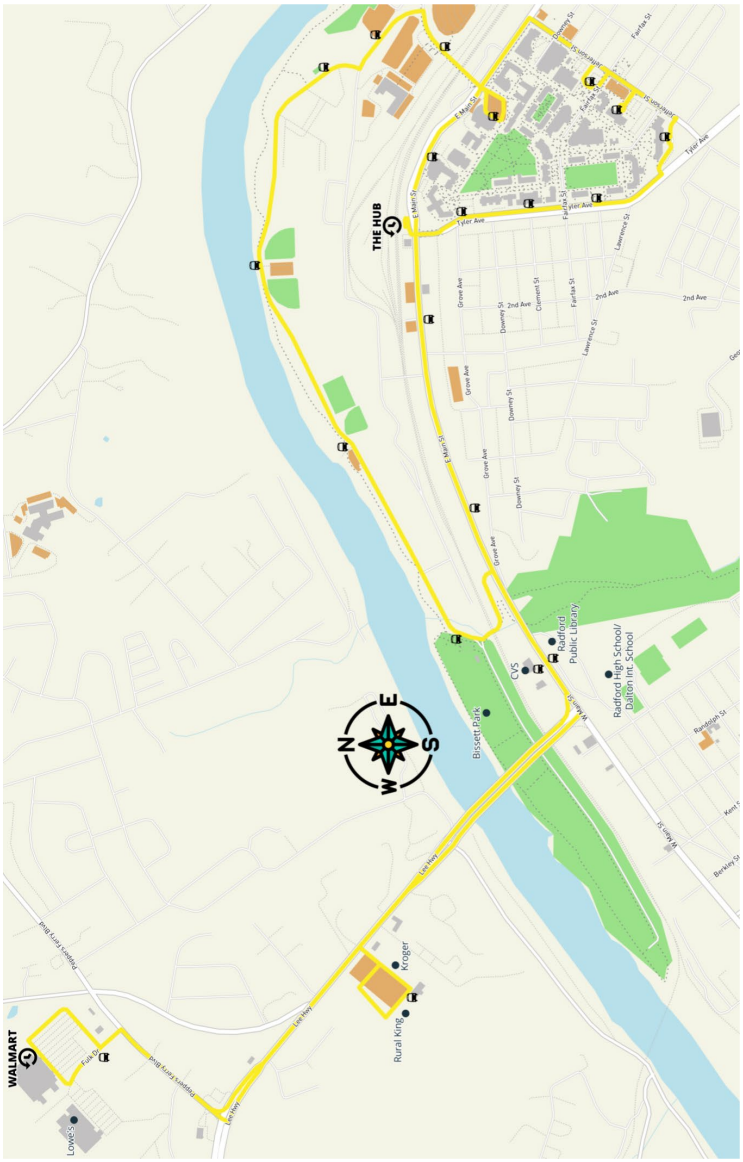
Routes 10, 11, and 15 provide circular transit service around Radford University's central campus and its athletic fields. Routes 10, 11, and 15 operate in a counterclockwise pattern with Routes 10 and 11 operating during Regular/University Service, and Route 15 operating during University/Regular and City Service periods. Route 10, additionally, provides service on Sunday nights, and Route 15 provides full-day Saturday service during City Service periods and late-night service on Fridays and Saturdays during University Service periods. **Figure A-2** shows the alignment of Routes 10, 11, and 15.

Figure A-2: Routes 10/11/15 Alignment

A.4.2 Route 20 – New River Rapid

Route 20 provides a connection between the commercial centers in Fairlawn with Radford University. The route operates in a counterclockwise loop and serves Radford University, Veterans Park, the commercial developments in Fairlawn, and eastern Radford. Riders can transfer to other Radford Transit routes at the Hub and Pulaski Area Transit's New River Express route at the Fairlawn Kroger and the Fairlawn Walmart stops. Route 20 operates during both Regular and City Service periods. Route 20's alignment is display in **Figure A-3**.

Figure A-3: Route 20 Alignment



A.4.3 Route 25 – New River Rapid

Route 25 provides a connection between the commercial centers along Tyler Avenue with Radford University. The route runs primarily along Tyler Avenue deviating off at times to serve the Food Lion Plaza, Tall Oaks Crossing, and onto Auburn Avenue to serve the Ridgewood Place Apartments and the other nearby residential developments. Route 25 operates during both Regular and City Service periods. Route 25's alignment is display in **Figure A-4**.

Figure A-4: Route 25 Alignment

A.4.4 Route 30 – Cross City

Route 30 operates between the housing developments along Jefferies Drive in western Radford and the Hub. The route operates in a one-way counterclockwise loop with buses traveling west along Main Street and then returning to the Hub via traveling through the residential neighborhoods of western Radford. The route serves the residential neighborhoods of Radford, downtown Radford, the Radford Recreational Center, and the Hub where riders can transfer to every other Radford Transit route. Route 30 operates during both Regular and City Service periods. Route 30's alignment is illustrated in **Figure A-5**

Figure A-5: Route 30 Alignment

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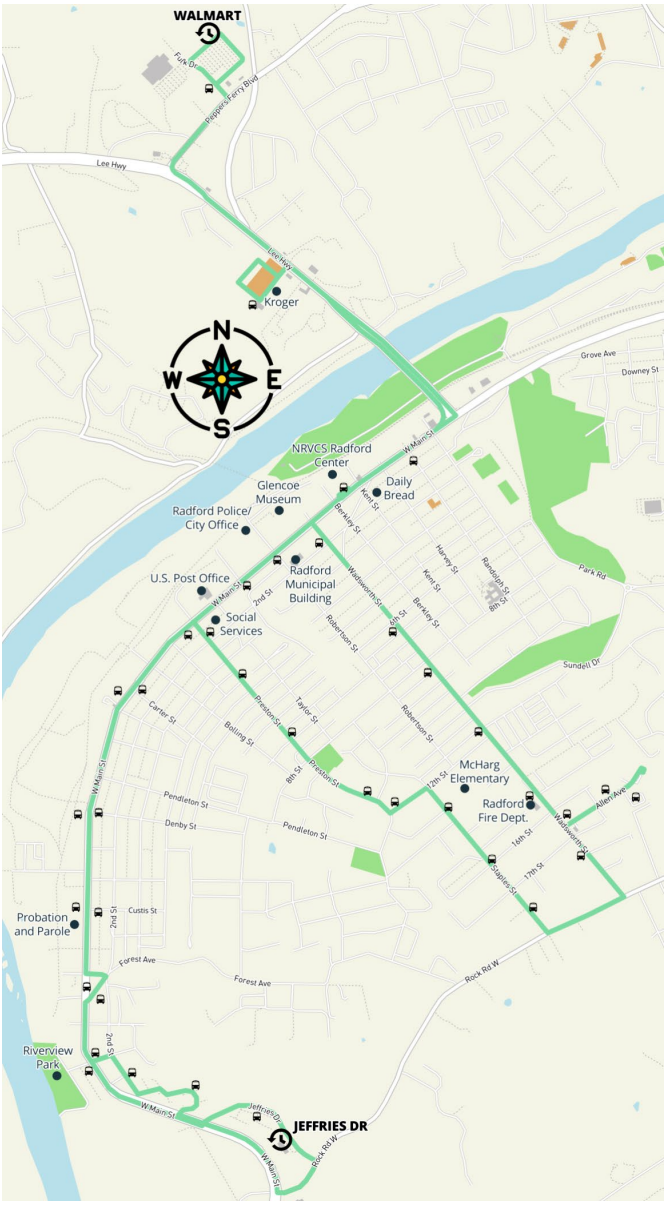
A.4.5 Route 35 – Cross City

Route 35 operates between the housing developments along Jefferies Drive in western Radford and the Fairlawn Walmart. The route primarily serves West Main Street and Route 11, but the route deviates mid-route and serves the residential neighborhoods along Preston Street and Wadsworth Street. Route 35 interlines with Routes 20 and 30 , and riders can transfer to Pulaski Area Transit's New River Express route at the Fairlawn Kroger and the Fairlawn Walmart stops. Route 35 operates during both Regular and City service periods. Route 35's alignment is illustrated in **Figure A-6**

Figure A-6: Route 35 Alignment



A.4.6 Routes 40/41 – NRV Connect

Routes 40 and 41 operate between Radford University and New River Valley Mall. The route primarily runs along Route 11 and North Franklin Street and serves the university, downtown Christiansburg, the Christiansburg Aquatic Center, and the commercial areas surrounding the New River Valley Mall. Routes 40 and 41also provide late-night service into the Town of Blacksburg on Friday and Saturday nights, adding a stop at the Squires Student Center on Virginia Tech's campus. Riders can transfer to Blacksburg Transit's Two Town Trolley route at the New River Valley Mall stop. Routes 40/41 operate during both Regular and City Service periods. Routes 40/41 Regular and late-night service route alignments are illustrated in **Figure A-7** and **Figure A-8**, respectively.

Figure A-7: Routes 40/41 Alignment

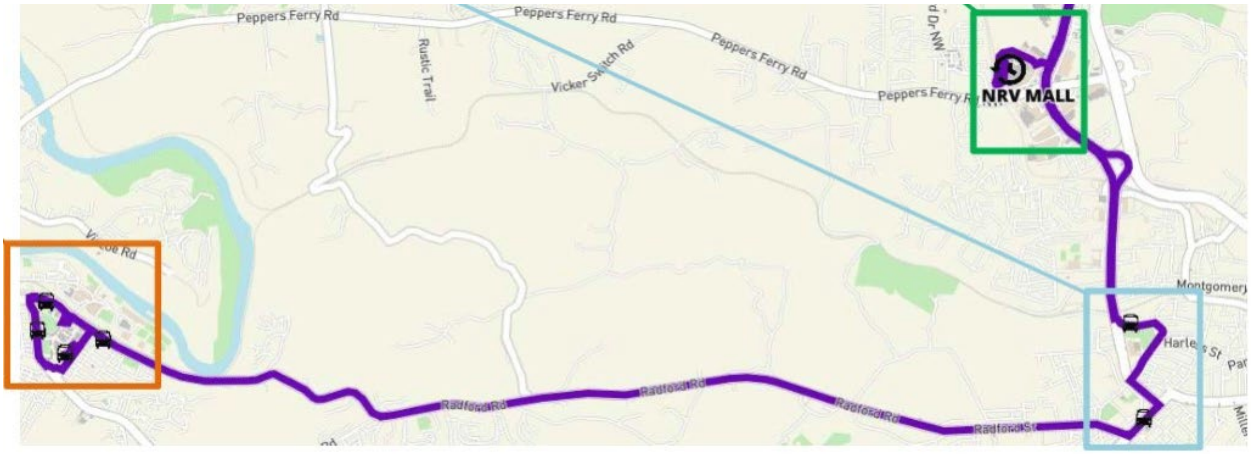
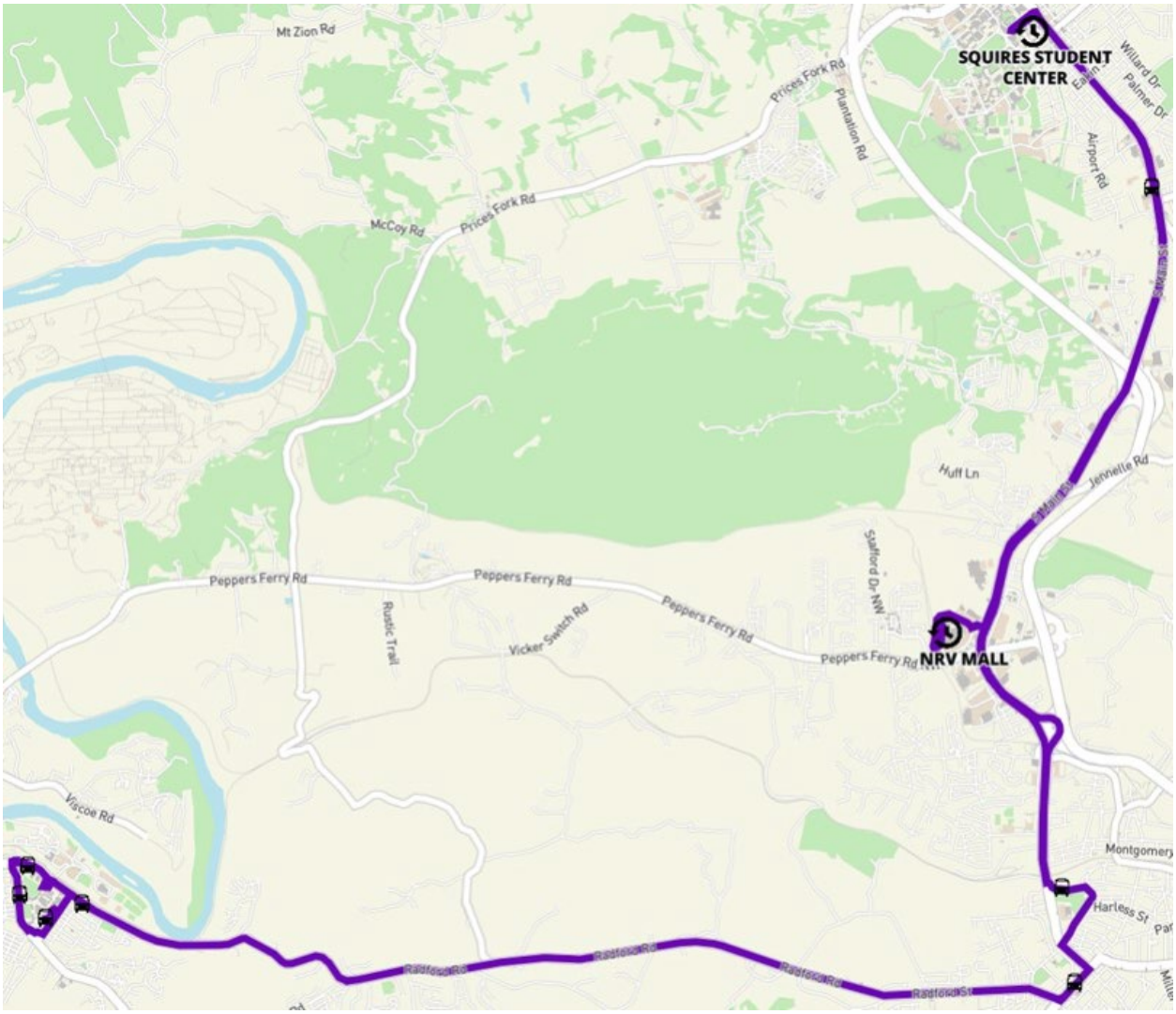


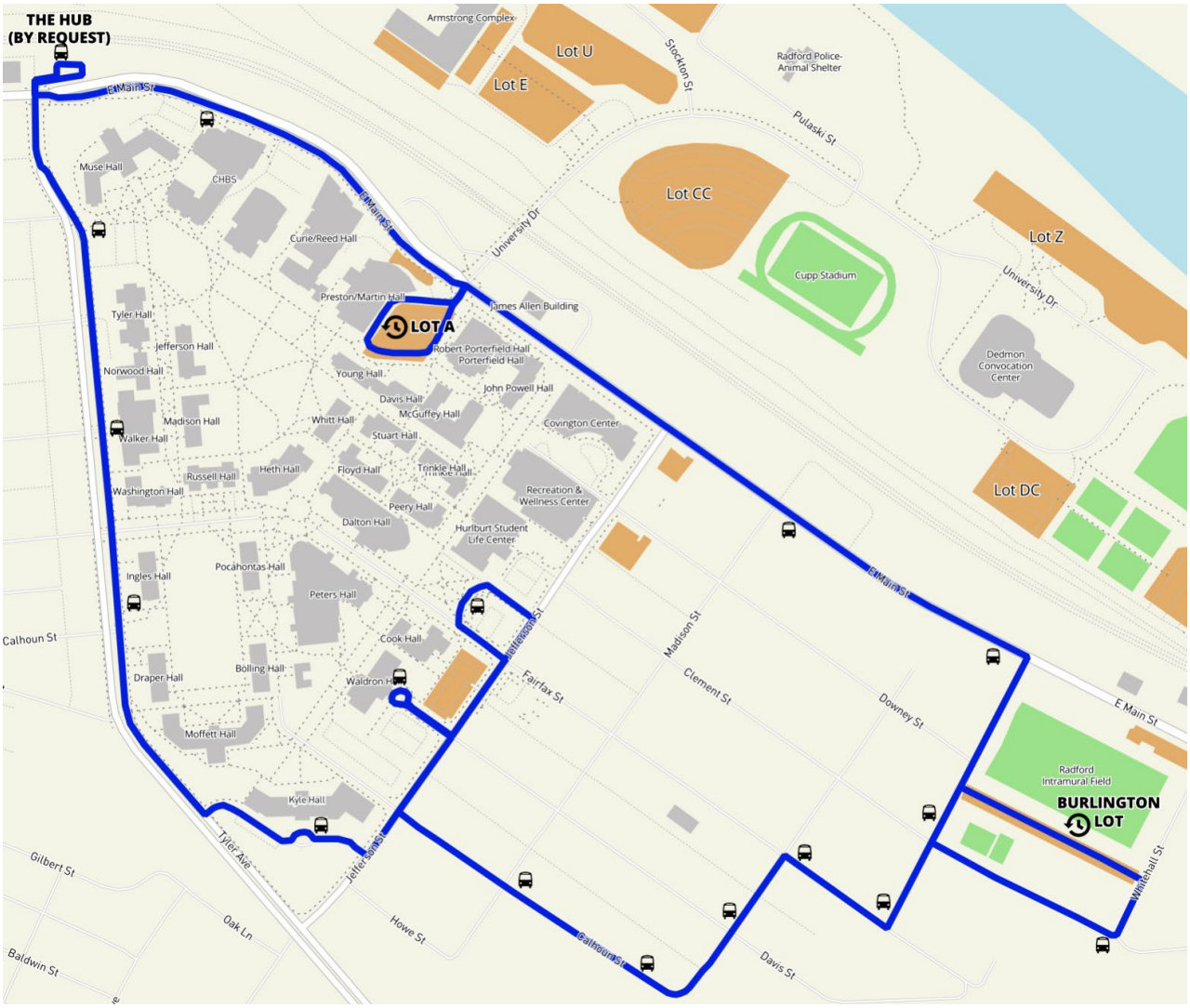
Figure A-8: Routes 40/41 Late-Night Alignment



A.4.7 Route 50 – Highlander Circular

Route 50 provides service between Radford University and neighborhoods to the east of the University which houses a large amount of Radford University students. The route stops at multiple halls around the University and at large housing developments. The route has a time stop at the Burlington Lot which serves at overflow parking for Radford University students, staff, and faculty as well as a direct connection to a university owned athletic field. Route 50 operates only during Regular Service. **Figure A-9** shows the alignment of the route.

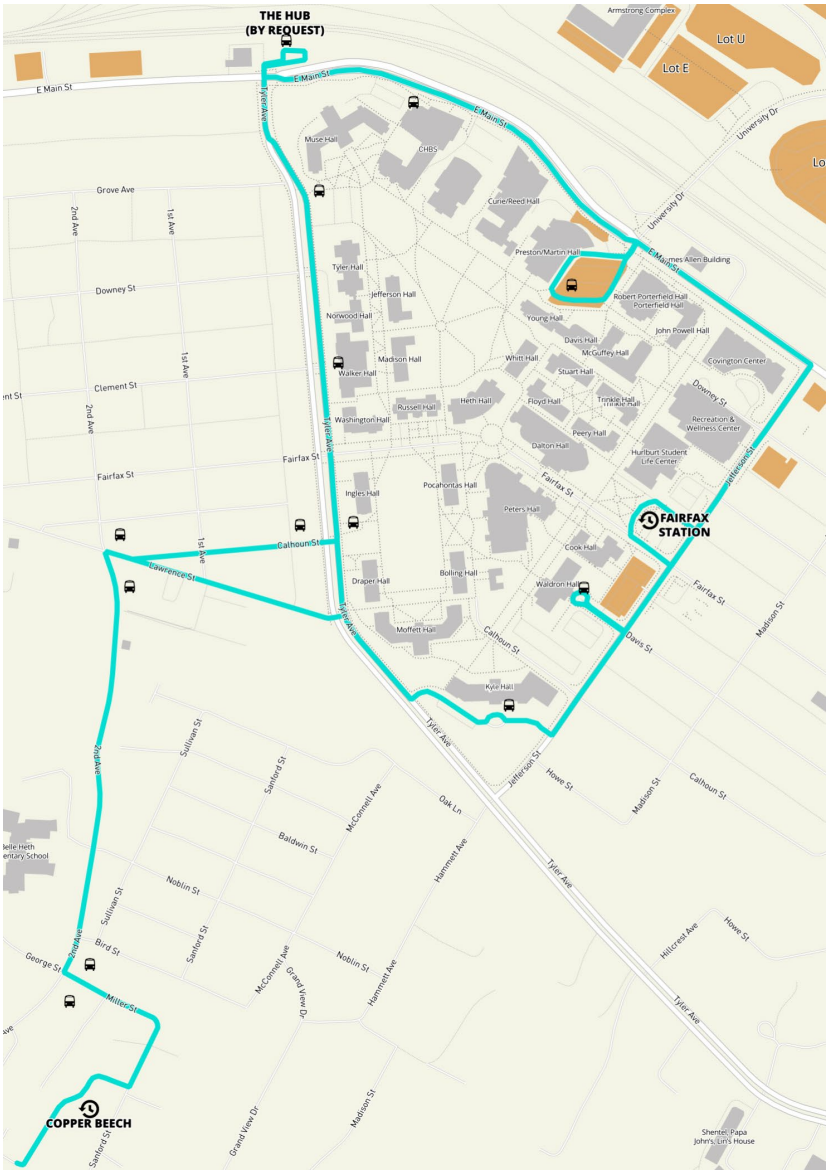
Figure A-9: Route 50 Alignment



A.4.8 Route 60 – South Beech Express

Route 60 connects student housing centers along 2nd Avenue with Radford University. Starting from the Hub, the route completes most of a clockwise loop around Radford University's campus before turning onto Calhoun Street. The route then turns onto 2nd Avenue and travels to the Copper Beech housing development. The route then doubles back and completes the loop of the University's campus and terminates at the Hub. Route 60 operates only during Regular Service. **Figure A-10** shows the route's alignment.

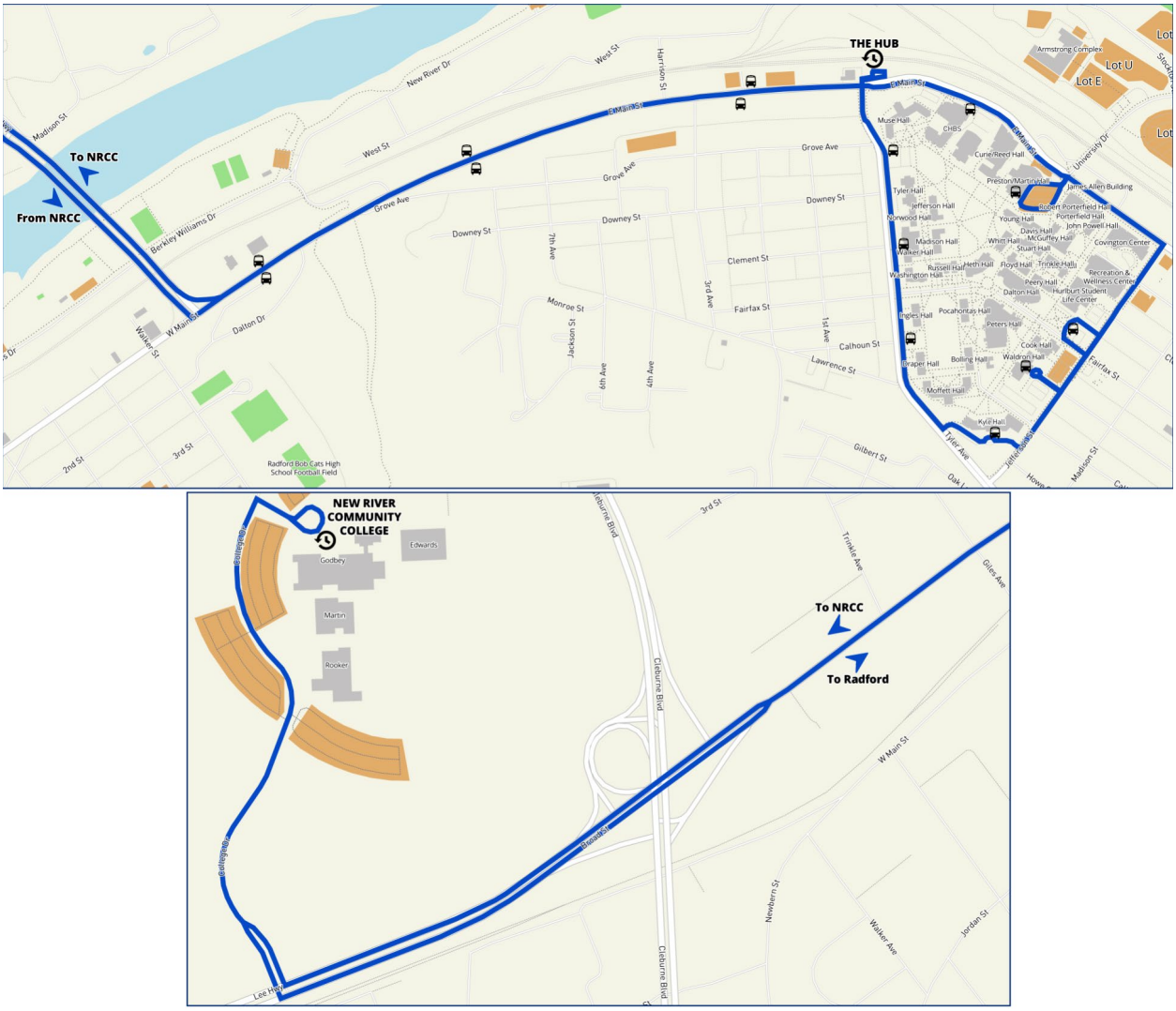
Figure A-10: Route 60 Alignment



A.4.9 Route 100 – NRCC Connector

Route 100 provides a connection between the New River Community College (NRCC) in Pulaski County and Radford University. The route begins at the Hub and makes stops along East Main Street until crossing the river where it heads directly along Route 11 to the NRCC campus. The return route follows the same path and stops as the outbound trip until it reaches the university. The route then performs a counterclockwise loop around Radford University's campus before returning to the Hub. Route 100 only operates during Regular Service. **Figure A-11** shows the route's alignment.

Figure A-11: Route 100 Alignment



A.5 Fare Structures, Payment, and Purchasing

Radford Transit suspended fare payments on all routes in response to the Covid-19 pandemic. As of Spring 2024, fare payments remained suspended, and Radford Transit plans on making fare-free service permanent. Before the suspension of fares, the general public fare was $1.00 while adults 65 years and older, persons with disabilities, Medicare card holders, children 12 years and younger, and Radford University students, faculty, and staff all could ride Radford Transit for free.

A.6 Transit Asset Management – Existing Fleet and Facilities

A.6.1 Existing Fleet

Radford Transit's fleet consists of 24 vehicles including four (4) automobiles and 20 revenue service vehicles. Radford Transit revenue service fleet consists of a mix of cutaways and low floor, heavy-duty transit buses with makes from Ford, Chevy, and New Flyer. See **Table A-2** for Radford Transit's revenue service fleet as of FY 2023.

The FTA published a Final Rule for Transit Asset Management in July 2016 requiring FTA grantees to develop asset management plans. Agencies have the option of developing their own transit asset management (TAM) plan. In the Commonwealth of Virginia, Radford Transit is one of the operators opting to use DRPT's statewide TAM plan, which is permitted under the FTA rule. The TAM plan covers public transportation assets including vehicles, facilities, equipment, and other infrastructure. The latest edition of the statewide TAM plan was published in 2022 and covers FY 2022 through FY 2025.

Table A-2: Radford Transit Revenue Fleet (FY 2023)

Year	Type	Useful Life	Make and Model	Replacement Year	Quantity
2013	Bus	12	New Flyer XD35	FY 20	2
2013	Cutaway	7	Ford BOC	FY 2024	1
2016	Cutaway	7	Ford BOC	FY 2024	1
2017	Cutaway	7	Ford BOC	FY 2024	3
2017	Cutaway	7	Chevy G450	FY 2025	3
2018	Cutaway	7	Chevy G450	FY 2026	8
2022	Bus	12	New Flyer XD35	FY 2034	2

A.6.2 Existing Facilities

Radford Transit does not own any facilities as of the publishing of this document. Radford Transit's vehicle maintenance and parking is conducted out of 1422 West Main Street, and Radford Transit's administrative operations are performed out of the City of Radford's City Hall at 10 Robertson Street.

A.7 Transit Security Program

RTW Management has both an employee training program and an emergency preparedness plan. Under the training program, all new employees must pass a background and criminal check along with a drug test. In addition to a two-day general employee orientation, new operators complete route specific training sessions and instruction on wheelchair loading, pre/post trip inspection, etc. New operators must be able to obtain a CDL Class B learners permit and must attend defensive driving, first aid/CPR, and diversity training courses.

Under the emergency preparedness plan, the following measures are in place:

A.7.1 Communications

In the event of an emergency or accident, Radford Transit staff and drivers are trained to first call 911. Staff can then use the PA system to disseminate a warning message within the building. Drivers are instructed to utilize two-way radios to reach the office or, if necessary, their personal cell phones. In the event of severe weather or any other shelter-in-place situation, the Radford Recreation Center is the designated safe shelter location.

A.7.2 Safety Equipment

All Radford Transit vehicles are equipped with two-way radios, fire extinguishers, emergency triangles, first aid/bloodborne pathogens kits, and seat belt cutters. Vehicles also have on-board GPS units which include silent alarms.

A.7.3 Training

As noted above, all staff are trained in first aid/CPR and emergency response procedures.

A.7.4 System Security

Staff are instructed to report all suspicious people, objects, and activities, and drivers are required to wear ID badges when operating vehicles or on transit property. Fares, when collected, were stored in a tamper proof money vault system.

In addition to the emergency preparedness plan, per FTA's Public Transportation Agency Safety Plan (PTASP) Final Rule, Radford Transit developed a safety plan that includes the processes and procedures necessary for implementing Safety Management Systems (SMS), including safety risk management, safety assurance, and safety promotion. This plan was approved by the Radford City Council in April 2020, and the plan was most recently revised in October 2023.

A.8 Intelligent Transportation System Programs

Radford Transit uses an onboard Automatic Vehicle Location (AVL) system, which feeds into the Passio GO! web tool to predict bus locations. The information can be accessed by mobile devices and the Radford Transit website. Passio GO! uses GPS satellite technology to track the exact location of buses and estimate real time arrivals to specific stops. Arrival times are also displayed digitally at the Main Street and Tyler Avenue Transfer Hub.

Radford Transit installed Automated Passenger Counter (APC) Systems in 2018 to improve customer service, record keeping and reporting compliance, accountability, and overall effectiveness of the transit service.

Radford Transit is also looking to update its website to integrate with GTFS systems in FY 2025.

A.9 Data Collection and Ridership/Revenue Reporting Method

Radford Transit provides Quarterly Ridership and Performance Reports to the Stakeholder Committee as appointed by the City and University administrations. The reporting tracks monthly system ridership with six-years of historical trends. Route ridership, fare type utilized, and trends in growth are presented for all routes. Detailed breakdowns and monitoring of route performance for Route 40 is provided due to its regional service.

Currently, passenger counts are tracked manually by drivers and compared to fare box revenues for accuracy. Radford Transit has identified that this method leaves room for human error and is time consuming and clumsy.

A.10 Coordination with Other Transportation Service Providers

The New River Valley Regional Transit Coordinating Council (RTCC) enables dialog among the region's transit providers and provides a stronger multi-jurisdictional/multi-system perspective. A Regional Transit Study in 2016 identified enhanced coordination at high-volume and overlapping stops which are served by numerous routes. Many overlap areas identified where in the vicinity of Christiansburg and Blacksburg where Radford Transit (Route 40 and 41) and Blacksburg Transit (BT) service overlap. Specific areas included the New River Valley (NRV) Mall, Aquatics Center (Christiansburg), Squires Student Center (Virginia Tech), and Blacksburg Municipal Building. Strategies were identified to better align schedules for easy transfers, co-brand the stops, and provide some passenger amenities. A listing of all key providers that interface with Radford Transit is included below and shown in Chapter 2.

A.10.1 Blacksburg Transit (BT)

BT serves the towns of Blacksburg and Christiansburg. While BT primarily connects major residential areas to the Virginia Tech campus and commercial areas, the system also provides connecting service to Christiansburg as well. Radford Transit Route 40 and 41 connects with BT in Christiansburg at Regal Cinemas and at the New River Valley Mall. Radford Transit also connects with BT in Blacksburg at Virginia Tech's Squires Center.

A.10.2 Virginia Breeze

Virginia Breeze provides intercity bus service throughout Virginia. The service is funded by Virginia Department of Rail and Public Transit and operated by Megabus. The City of Radford is directly served by the Highlands Rhythm line which runs from Bristol to Washington, D.C. The Highland Rhythm stops at Radford University's parking lot JJ and operates one northbound and one southbound trip daily. Virginia Breeze's Valley Flyer line also operates near the City of Radford and runs buses from Blacksburg to Washington D.C. While the Valley Flyer line does not have a stop in Radford, Valley Flyer's southern terminus is at Virginia Tech's Squires Student Center which Radford Transit's Route 41 directly serves. The Valley Flyer also runs one northbound and one southbound bus daily.

A.10.3 Pulaski Area Transit (PAT)

PAT provides service connecting Pulaski, Dublin, and Fairlawn with one extended run to the New River Mall in Christiansburg. Radford Transit Route 20 meets this service at the Kroger and Walmart in Fairlawn. Radford Transit NRCC Connector Route also meets PAT at the New River Valley Community College in Dublin.

PAT service operates on Monday–Friday to the Fairlawn location with a total of three (3) daily round trips. In addition to the communities served, this connection also provides Radford Transit customers access to the New River Community College in Dublin. PAT fares for this service are $2.00.

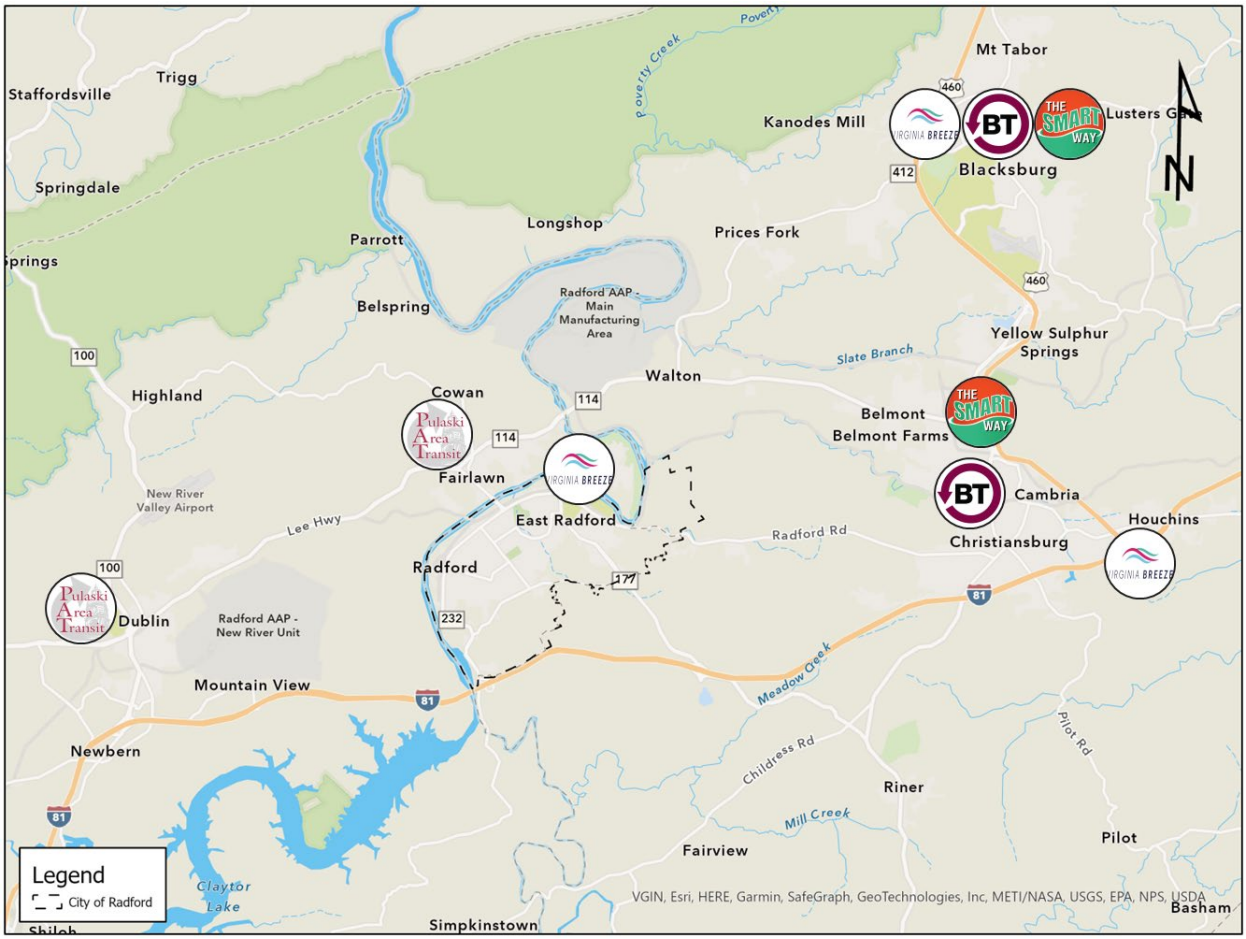
A.10.4 Smart Way

Smart Way Bus (operated by Valley Metro under the Greater Roanoke Transit Company, GRTC) provides commuter bus service between Roanoke and the New River Valley. Smart Way Bus's southern terminus is Virginia Tech's Squires Student Center, and the northern terminus is Roanoke's Third Street Station. The bus also connects riders with the Roanoke-Blacksburg Regional Airport and Roanoke's Amtrak Station. While Smart Way Bus does not have a stop in Radford, Smart Valley Flyer's southern terminus is at Virginia Tech's Squires Student Center which Radford Transit's Route 41 directly serves. The Valley Flyer also runs one northbound and one southbound bus daily.

A.10.5 AMTRAK

AMTRAK is a national passenger rail service offering multiple routes across the country. The Commonwealth of Virginia announced the construction of a station in Christiansburg with the intention of servicing the station through the extension of the Northeast Regional route. The Northeast Regional currently operates between Roanoke, Virginia and Boston, Massachusetts or Springfield, Massachusetts. The final location for the station has not been announced as of Spring 2024, but the station will likely be in the vicinity of the Christiansburg mall. This area is currently served by Radford Transit Routes 40 and 41.

Figure A- 12: Radford Transit Connections to Other Transit Services



A.11 Current Initiatives

A.11.1 Fare-Free Service

Radford Transit suspended fare payments on all routes in response to the Covid-19 pandemic. As of Spring 2024, fare payments remained suspended, and Radford Transit plans on making fare-free service permanent. Before the suspension of fares, the general; public fare was $1.00 while adults 65 years and older, persons with disabilities, Medicare card holders, children 12 years and younger, and Radford University students, faculty, and staff all could ride Radford Transit for free.

A.11.2 New Operations and Maintenance Facility

Radford Transit is currently in the process of planning and constructing a new operations and maintenance facility. Radford Transit's fleet facility was formerly on Corporate Drive in the Southwestern corner of the city limits, co-located with the then-operator's facility (New River Valley Community Services). As a result of the change in operators, the fleet now operates out of a temporary location at 1422 W Main Street, Radford, Virginia 24141.

The location of the new facility has not yet been determined, but the potential locations under consideration are closer to the center of the city, reducing non-revenue service miles traveled. The new facility will also allow for Radford Transit to increase their capacity as well as provide space for alternative fueling infrastructure. A facility study is underway, with anticipated activities resulting in an estimated completion of the new facility in 2028.

A.11.3 Transit Ridership Incentive Program Regional Routes Grant

Radford Transit received a FY23 Transit Ridership Incentive Program (TRIP) Regional Connectivity grant from the Virginia Department of Rail and Public Transportation (DRPT). The TRIP grant will provide $653,963 over three years to increase service of Radford Transit's Routes 40 and 41 which connect Radford to Christiansburg and Blacksburg. Routes 40 and 41 will now have increased service hours, more frequent service, and run year-round.

A.12 Retrospective Financials

Capital and operating expenses have fluctuated but steadily increased over the past three (3) years[1]. Prior to the COVID-19 pandemic, years with higher than usual expenditures were typically those where new vehicles were purchased, and capital expenses contributed to spikes in spending. However, recent years have had increases in operating expenses, because of operating costs associated with the pandemic and rising costs due to inflation.

Along with state and federal funds, Radford Transit receives local funding from a variety of sources, including Radford University, the City of Radford, and bus advertisements. Radford Transit's operating and capital revenues from the previous three (3) fiscal years are shown in **Table A-3**.

Table A-3: Radford Transit Fund Revenues and Expenditures (FY 2021–FY 2023)

	2021 Actuals	2022 Actuals	2023 Actuals
Revenues	**$ 1,688,366**	**$ 2,723,023**	**$ 2,593,271**
Charges for Services	$ 4,262	$ 25,760	$ 28,666
Miscellaneous Revenues	$ 4,720	$ 110,680	$ 264,306
Intergovernmental	$ 1,679,384	$ 2,586,583	$ 2,300,299
Expenditures	**$ 1,678,235**	**$ 2,801,645**	**$ 2,856,713**
Other Financing Sources	$ 2,602	$ 75,843	$ 240,429
Fund Balance (Ending)	**$ 12,733**	**$ 9,954**	**$ 6,941**

Source: City of Radford Annual Financial Report

[1] *Radford Transit's detailed expenditures from the previous years are outlined in the City of Radford FY 2025 Recommended Budget: https://www.radfordva.gov/DocumentCenter/View/5466/FY-2025-Preliminary-Budget*

A.13 Audited Financial Report

The City of Radford audited financial reports for FY 2021–FY 2023 are attached in the pages that follow.

Exhibit 13

City of Radford, Virginia
Transit Fund
Schedule of Revenues, Expenditures, and Changes in Fund Balances - Budget and Actual
For the Year Ended June 30, 2021

	Budgeted Amounts		Actual Amounts	Variance with Final Budget - Positive (Negative)
	Original	Final		
REVENUES				
Charges for services	$ 30,000	$ 30,000	$ 4,262	$ (25,738)
Miscellaneous	778,143	778,143	4,720	(773,423)
Intergovernmental	1,970,890	1,970,890	1,679,384	(291,506)
Total revenues	$ 2,779,033	$ 2,779,033	$ 1,688,366	$ (1,090,667)
EXPENDITURES				
Current:				
Community development	$ 3,002,981	$ 3,002,981	$ 1,678,235	$ 1,324,746
Total expenditures	$ 3,002,981	$ 3,002,981	$ 1,678,235	$ 1,324,746
Excess (deficiency) of revenues over (under) expenditures	$ (223,948)	$ (223,948)	$ 10,131	$ 234,079
OTHER FINANCING SOURCES (USES)				
Transfers in	$ 223,948	$ 223,948	$ 2,602	$ (221,346)
Total other financing sources (uses)	$ 223,948	$ 223,948	$ 2,602	$ (221,346)
Net change in fund balances	$ -	$ -	$ 12,733	$ 12,733
Fund balances - beginning	-	-	-	-
Fund balances - ending	$ -	$ -	$ 12,733	$ 12,733

Note: GAAP serves as the budgetary basis of accounting

Exhibit 13

City of Radford, Virginia
Transit Fund
Schedule of Revenues, Expenditures, and Changes in Fund Balances - Budget and Actual
For the Year Ended June 30, 2022

	Budgeted Amounts		Actual Amounts	Variance with Final Budget - Positive (Negative)
	Original	Final		
REVENUES				
Charges for services	$ 30,000	$ 30,000	$ 25,760	$ (4,240)
Miscellaneous	757,471	757,471	110,680	(646,791)
Intergovernmental	2,474,551	2,474,551	2,586,583	112,032
Total revenues	$ 3,262,022	$ 3,262,022	$ 2,723,023	$ (538,999)
EXPENDITURES				
Current:				
Community development	$ 3,492,592	$ 4,513,050	$ 2,801,645	$ 1,711,405
Total expenditures	$ 3,492,592	$ 4,513,050	$ 2,801,645	$ 1,711,405
Excess (deficiency) of revenues over (under) expenditures	$ (230,570)	$ (1,251,028)	$ (78,622)	$ 1,172,406
OTHER FINANCING SOURCES (USES)				
Transfers in	$ 230,570	$ 230,570	$ 62,283	$ (168,287)
Sale of capital assets	-	-	13,560	13,560
Total other financing sources (uses)	$ 230,570	$ 230,570	$ 75,843	$ (154,727)
Net change in fund balances	$ -	$ (1,020,458)	$ (2,779)	$ 1,017,679
Fund balances - beginning	-	1,020,458	12,733	(1,007,725)
Fund balances - ending	$ -	$ -	$ 9,954	$ 9,954

Note: GAAP serves as the budgetary basis of accounting

Exhibit 13

City of Radford, Virginia
Transit Fund
Schedule of Revenues, Expenditures, and Changes in Fund Balances - Budget and Actual
For the Year Ended June 30, 2023

	Budgeted Amounts		Actual Amounts	Variance with Final Budget - Positive (Negative)
	Original	Final		
REVENUES				
Charges for services	$ 20,000	$ 20,000	$ 28,666	$ 8,666
Miscellaneous	382,652	382,652	264,306	(118,346)
Intergovernmental	2,690,038	2,690,038	2,300,299	(389,739)
Total revenues	$ 3,092,690	$ 3,092,690	$ 2,593,271	$ (499,419)
EXPENDITURES				
Current:				
Community development	$ 3,380,793	$ 3,518,289	$ 2,856,713	$ 661,576
Total expenditures	$ 3,380,793	$ 3,518,289	$ 2,856,713	$ 661,576
Excess (deficiency) of revenues over (under) expenditures	$ (288,103)	$ (425,599)	$ (263,442)	$ 162,157
OTHER FINANCING SOURCES (USES)				
Transfers in	$ 288,103	$ 288,103	$ 246,829	$ (41,274)
Sale of capital assets	-	-	13,600	13,600
Total other financing sources (uses)	$ 288,103	$ 288,103	$ 260,429	$ (27,674)
Net change in fund balances	$ -	$ (137,496)	$ (3,013)	$ 134,483
Fund balances - beginning	-	137,496	9,954	(127,542)
Fund balances - ending	$ -	$ -	$ 6,941	$ 6,941

Note: GAAP serves as the budgetary basis of accounting