Roanoke Valley Transportation
PLANNING ORGANIZATION

Staffed by the
REGIONALcommission

Roanoke Valley
TRANSIT VISION PLAN

Approved September 22, 2016

PART 5: Recommendations

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1.0 REFLECTIONS ON THE PAST AND THE CURRENT STATE OF TRANSIT SERVICE IN THE ROANOKE VALLEY

A majority of this plan has focused around Valley Metro fixed-route services, their current extent, and where additional connections are needed. The system today provides basic service coverage across most of the City of Roanoke, Town of Vinton, and the City of Salem with a pulse based system. The service model has thus far been designed to provide uniform coverage to as many areas as possible within the confines of financially contributing local governments. The associated limited funding and constrained services means that the current frequency of routes is low and the span of service hours is limited to first shift and daytime and early evening services.

The resulting service, though essential to the region, is limited in its ability to meet the needs of residents and provide a true transportation choice for more people. The lack of convenience, including long waits due to infrequent service and required transfers, means that the system is not attractive to many people thus leading them to use other transportation modes and is difficult to use for people who use it regularly.

Outside of the current Valley Metro service area, other transit services are limited to seniors and people with disabilities. As a result many commuters do not have access to any transit service, and employment sites outside Roanoke City, Salem, and Vinton are not accessible via transit. This is a hardship on both employees and employers: the former looking for options to get to work, and the latter needing to find employees who can get to their job site.

The recommendations of the Transit Vision Plan are designed to address a broad range of challenges facing the Roanoke Valley and will help the region realize the goals of the Livable Roanoke Valley plan. The recommendations described in this plan were developed to promote economic opportunity and a greater quality of life for all Roanoke Valley residents by creating a system that better meets the needs of the entire Roanoke Valley. This would be accomplished by adding new services to access new locations and providing more frequent service and operations for longer hours, thus making transit more convenient and attractive to a larger number of residents and visitors.

The Roanoke Valley Transit Vision Plan recommendations focus on improving existing and creating new enhanced bus services that will connect key destinations with a more frequent network across the region. Enhancing local and commuter bus services will provide additional support to the region's workforce, and help attract and retain businesses that are focused on providing a high quality of life for their employees. The recommendations will vastly increase the number and variety of destinations that are accessible via transit, giving people new options for getting to shopping, restaurants, services, recreation, education, social, and cultural destinations. In short, the recommendations of the Transit Vision Plan will help make the Roanoke Valley more livable, by stitching together the fabric of life that makes it such a desirable place to live, work, and play.

2.0 BASIS FOR DEVELOPING RECOMMENDATIONS

Recommendations were based upon four different inputs:

- Service Gap Analysis
- Service Connection Analysis
- Frequent Corridor Analysis
- Public Input

These inputs were analyzed individually and compared against the existing service to determine where the need and demand for transit service exists throughout the Roanoke Valley region. Once compiled they were prioritized, based upon another round of public input, and placed into priority timeframes of short-, medium-, and long-term recommendations. The initial timeframe of six years was intended to correspond with the next phase of this planning process which is creating the six-year Transit Development Plans for Valley Metro and for RADAR.

All of the recommendations were then translated into potential network scenarios including route additions, reallocation of services, and route extensions for the purposes of developing cost estimates and input to the 2016 update to the regional VDOT Travel Model currently under development. With each change, service for people with disabilities would follow given that paratransit service is required within ¾ mile of any fixed-route transit service.

It is important to note that these are conceptual scenarios estimating how the recommendations could be implemented though other possibilities exist.

The following sections describe the third phase of public engagement that was utilized to refine the proposed recommendations. Public outreach in this phase included the following strategies:

- PUBLIC WORKSHOPS
- ONLINE ENGAGEMENT
- SURVEY ON VALLEY METRO BUSES
- SURVEY ON RADAR BUSES
- SURVEY ON BOTETOURT SENIOR AND ACCESSIBLE VANS

These sections are followed by the recommendations themselves. The other analyses used to develop recommendations are described in Part 4.

2.1 Public Workshops: January 21, 2016

Two public outreach workshops were held on January 21, 2016 to review draft recommendations. The workshops were held at Campbell Court and the Vinton Library and were advertised in a local newspaper, online (social media, website, email), through signage outside Campbell Court and along major roadways, and on-board Valley Metro and RADAR buses. Approximately 28 people participated in the January workshops.

Figure 2.1-1 | Workshop Participants Learn about Draft Recommendations

The January workshop attendees participated in a transit investment exercise where they were asked to hypothetically assign existing and future funding resources to the recommendations. The results were tallied and used to help refine the potential phasing of improvements. The recommendations with the highest amount of votes (stickers for existing and future funding) include:

- Additional connections to Roanoke DMV
- New route(s) connecting Tanglewood, Cave Spring, Oak Grove, Lewis Gale, and Downtown Salem
- Longer hours of fixed-route service
- New Sunday fixed-route service (Routes 15/16, 35/36, 55/56, 91/92)
- New connection to Daleville

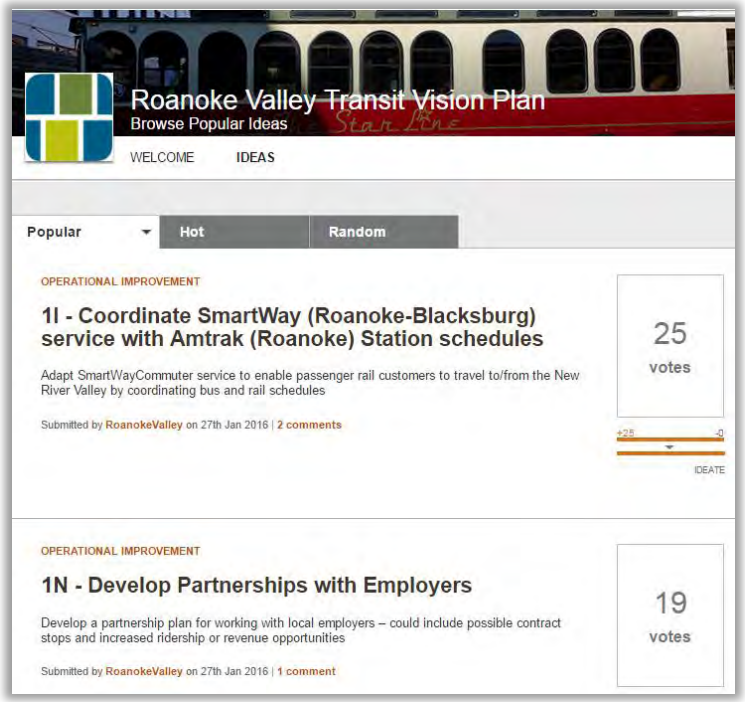
2.2 Online Engagement

In addition to traditional public workshops, citizens were offered the opportunity for digital input via an interactive community forum.

An online community forum was developed in January 2016 and provided participants with an opportunity to vote and comment on the proposed recommendations (**Figure 1.2-1**). The forum provided an online alternative to the January 21 public workshops and remained open until mid-March 2016. Approximately 71 users visited the site, providing 23 comments and casting 440 votes on the draft recommendations. The highest ranked recommendations by votes were:

- Coordinate SmartWay (Roanoke-Blacksburg) service with Amtrak (Roanoke) Station schedules (25 votes, 2 comments)
- Develop Partnerships with Employers (19 votes, 1 comment)
- Bus Arrival Real-time Information (19 votes)
- New route(s) connecting Tanglewood, Cave Spring, Oak Grove, Lewis Gale, and Downtown Salem (19 votes, 1 comment)
- Additional Connection to Cave Spring Corners (17 votes)

Figure 2.2-1 | IDEAscale Online Forum Screenshot



After viewing the "welcome screen", the online forum participants could vote or comment on the draft recommendations. In all, 440 votes were cast.

2.3 Valley Metro Draft Recommendations Survey

Valley Metro riders were asked to provide their input on the usefulness of the draft recommendations to themselves personally as well as from their perspective of the needs of other people. The survey was distributed by Valley Metro operators on the buses on February 17, 2016; citizens had the opportunity to return the survey by February 19. A total of 1500 surveys were distributed and 501 were returned. For each timeframe, the results are shown in the following tables.

The results of the survey helped to inform the timeframe for implementing the recommendations. The additional recommendations listed also provided insight into other needs that had not yet been incorporated into the Plan.

A copy of the survey instrument is provided in the following figures.

Table 2.3-1 | Valley Metro Riders' Responses to Short-Term Recommendations by % and # Respondents

	VERY USEFUL TO ME		SOMEWHAT USEFUL TO ME		VERY USEFUL TO OTHER PEOPLE		SOMEWHAT USEFUL TO OTHER PEOPLE	
1A: Hourly to DMV	65%	321	19%	91	52%	256	9%	43
1B: Hourly/Peak to Airport	40%	196	32%	158	45%	221	18%	88
1C: Peak between Downtown Roanoke and Vinton	57%	279	24%	117	46%	226	13%	63
1D: Hourly between Dtown Roanoke & RCIT/Blue Hills Drive	39%	191	32%	158	44%	214	19%	92
1E: Hourly to Cave Spring Corners	41%	203	31%	154	42%	206	21%	102
1F: Hourly peak to Oak Grove	34%	169	31%	153	41%	199	21%	101
1G: Hourly bet. Salem & SmartWay, I-81 Exit 140 P&R	45%	223	27%	134	45%	220	15%	76
1H: Hourly to Glenvar/Richfield	34%	169	34%	168	40%	198	21%	104
1K: Express bet. East Park, Bonsack & Roanoke	43%	209	29%	141	41%	202	20%	96
1L: Sunday service on rtes. 15/16, 35/36, 55/56 and 91/92	72%	354	14%	68	51%	251	8%	39
1S: Trolley between Carilion and Towers Shopping Center	64%	316	19%	93	48%	238	9%	42

The total number of people who provided input on the short-term recommendations was 491.

Table 2.3-2 | Valley Metro Riders' Responses to Medium-Term Recommendations by % and # Respondents

	VERY USEFUL TO ME		SOMEWHAT USEFUL TO ME		VERY USEFUL TO OTHER PEOPLE		SOMEWHAT USEFUL TO OTHER PEOPLE	
Connect Salem to the Airport/Crossroads/Valley View and Hollins	55%	264	25%	118	43%	205	13%	61
Connect Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Salem	55%	261	24%	116	42%	202	12%	57
Peak service to Salem	54%	258	22%	103	42%	199	14%	65
Hourly between northwest Roanoke County and Hollins area	48%	228	27%	127	41%	193	16%	78
Hourly/Peak between Bonsack-RCIT/Blue Hills Dr.-Downtown Roanoke	44%	208	27%	130	42%	201	15%	72
30-minute all day on routes 15/16, 21/22, 35/36, 55/56, 75/76	65%	309	18%	88	43%	203	11%	50
Later evening service - WORK	71%	337	11%	54	41%	194	7%	31
Later evening service - SOCIAL	48%	227	10%	49	31%	149	6%	29
Later evening service - SHOPPING	51%	241	11%	50	33%	157	6%	29
Later evening service - AMTRAK CONNECTION	40%	190	10%	47	27%	127	5%	23
Earlier morning service - WORK	65%	311	17%	83	40%	191	10%	46
Earlier morning service - AMTRAK CONNECTION	39%	185	14%	65	27%	128	8%	36
Hourly between Lewis Gale, Towers Shopping Center, Carilion	58%	274	21%	102	44%	209	12%	58
Peak between Cave Spring and Downtown Roanoke	45%	214	28%	133	39%	186	19%	92
Hourly to A Porters Haven in Vinton	34%	164	33%	156	37%	175	23%	110

The total number of people who provided input on the medium-term recommendations was 476.

Table 2.3-3 | Valley Metro Riders' Responses to Long-Term Recommendations by % and # Respondents

	VERY USEFUL TO ME		SOMEWHAT USEFUL TO ME		VERY USEFUL TO OTHER PEOPLE		SOMEWHAT USEFUL TO OTHER PEOPLE	
Hourly to Daleville/Botetourt County	36%	165	33%	149	41%	186	24%	108
Hourly to Clearbrook/220 Walmart area, Roanoke County	53%	243	23%	106	42%	193	17%	78
Hourly to South County Library	37%	169	32%	147	38%	173	24%	109
Hourly to East Vinton/East Roanoke County/William Byrd High School	40%	182	32%	148	41%	188	21%	94
Hourly/Peak between Hollins area and VA Medical Center/Lewis Gale via Peters Creek Road	50%	228	28%	129	43%	199	16%	73
Peak with Limited Stops: Glenvar/Richfield - Downtown Salem - Downtown Roanoke	51%	234	28%	127	42%	194	16%	75
High frequency corridors w/15-minute peak, 30-minute midday/evening: Downtown Roanoke - Downtown Salem, Downtown Roanoke - Downtown Vinton, Downtown Roanoke - Hollins, and Downtown Roanoke - Tanglewood/South Roanoke County	67%	309	18%	84	44%	200	12%	53

The total number of people who provided input on the medium-term recommendations was 458.

Figure 2.3-1 | Sample Valley Metro Survey (front)

Dear Valley Metro Riders:

The future of transit in the Roanoke Valley is being planned now! Please review these draft recommendations and check the appropriate boxes to indicate how useful you think the recommendation will be to you and to other people.

To participate in an online discussion about the recommendations, visit: http://roanoketransitvision.ideascale.com/

More information about the plan is available at www.rvarc.org/transit
If you have questions or need assistance completing this form, please call Cristina Finch at (540) 343-4417. **Please return surveys to Campbell Court or to any Bus Operator by Friday, February 19.** Thank you for your time!

Valley Metro | Roanoke Valley Transportation Planning Organization

Short Term Recommendations: New services for the next 6 years	Useful to ME: Very	Useful to ME: Some-what	Useful to OTHER PEOPLE: Very	Useful to OTHER PEOPLE: Some-what
1A: Hourly to DMV	☐	☐	☐	☐
1B: Hourly/Peak to Airport	☐	☐	☐	☐
1C: Peak between Downtown (Dtown) Roanoke and Vinton	☐	☐	☐	☐
1D: Hourly between Dtown Roanoke and RCIT/Blue Hills Drive	☐	☐	☐	☐
1E: Hourly to Cave Spring Corners	☐	☐	☐	☐
1F: Hourly/Peak to Oak Grove	☐	☐	☐	☐
1G: Hourly between Salem and Smart Way, I-81 Exit 140 P-n-R Lot	☐	☐	☐	☐
1H: Hourly to Glenvar/Richfield	☐	☐	☐	☐
1K: Express between East Park, Bonsack and Roanoke	☐	☐	☐	☐
1L: Sunday service on routes 15/16, 35/36, 55/56, and 91/92	☐	☐	☐	☐
1S: Trolley between Carilion and Towers Shopping Center	☐	☐	☐	☐

Short Term Recommendations

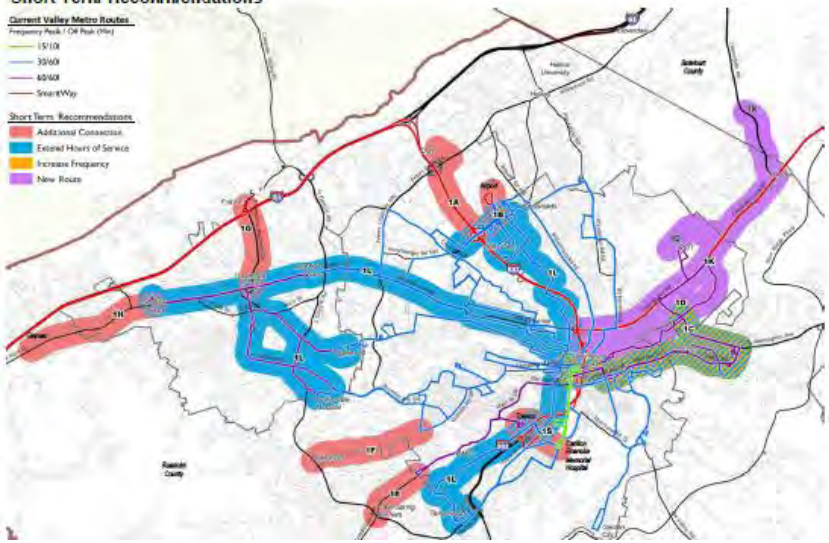


Figure 2.3-2 | Sample Valley Metro Survey (back)

Medium Term: Next 6-12 years	Useful to ME: Very	Useful to ME: Some-what	Useful to OTHER PEOPLE: Very	Useful to OTHER PEOPLE: Some-what
Connect Salem to the Airport/Crossroads/Valley View and Hollins	☐	☐	☐	☐
Connect Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Salem	☐	☐	☐	☐
Peak service in Salem	☐	☐	☐	☐
Hourly between northwest Roanoke County and Hollins area	☐	☐	☐	☐
Hourly/Peak between Bonsack-RCIT/Blue Hills Dr-Dtown Roanoke	☐	☐	☐	☐
30-minute all day on routes 15/16, 21/22, 35/36, 55/56, 75/76	☐	☐	☐	☐
Later evening service (Circle purpose: work / social / shopping / Amtrak connection)	☐	☐	☐	☐
Earlier morning service (Circle purpose: work / Amtrak connection)	☐	☐	☐	☐
Hourly between Lewis Gale, Towers Shopping Center, Carilion	☐	☐	☐	☐
Peak between Cave Spring and Dtown Roanoke	☐	☐	☐	☐
Hourly to A Porters Haven in Vinton	☐	☐	☐	☐
Long Term: Next 12-25 years				
Hourly to Daleville, Botetourt County	☐	☐	☐	☐
Hourly to Clearbrook/220 Walmart area, Roanoke County	☐	☐	☐	☐
Hourly to South County Library	☐	☐	☐	☐
Hourly to East Vinton/East Roanoke County/William Byrd High School	☐	☐	☐	☐
Hourly/Peak between Hollins area and VA Medical Center/Lewis Gale via Peters Creek Rd.	☐	☐	☐	☐
Peak with Limited Stops: Glenvar/Richfield - Dtown Salem - Dtown Roanoke	☐	☐	☐	☐
High frequency corridors w/15-minute peak, 30-minute midday/evening: Dtown Roanoke - Dtown Salem, Dtown Roanoke - Dtown Vinton, Dtown Roanoke - Hollins, and Dtown Roanoke - Tanglewood/South Roanoke Co.	☐	☐	☐	☐

What is your home zip code?_____
Which locality do you live in? ☐ City of Roanoke ☐ Roanoke County ☐ Vinton ☐ Salem ☐ Other_____

What is your work zip code?_____
Which locality do you work in? ☐ City of Roanoke ☐ Roanoke County ☐ Vinton ☐ Salem ☐ Other_____ ☐ I am not currently employed

Do you own a car? ☐ **Yes** ☐ **No**

Please list any comments or additional recommendations: _____

_____

_____

Surveys that are fully completed will be eligible to win a 31-day pass. Thank you for your time!

Name: _____ ***Phone:*** _____ ***Email:*** _____

2.4 RADAR Survey

RADAR customers in the Roanoke Valley include users of STAR (complementary paratransit service to Valley Metro) and/or CORTRAN (County of Roanoke Transportation). At public meetings or via online public surveys, citizen feedback indicated a need for expanded hours and additional service area coverage. Thus, a survey for both services was administered together to better understand the user's need for more services and inquire about their interest in pursuing alternative ways to get around the Valley. Bus operators distributed the surveys over a two-week period in March 2016. Customers had the opportunity to return the survey to an operator or mail it in; some needed assistance in completing the survey which was provided either on the telephone by staff or in person by an operator. In total, 112 surveys were received. The following table shows the breakdown of customer's residential locality.

Table 2.4-1 | RADAR Survey – Customer's Locality of Residence

	Percentage of Responses	Total Responses
City of Roanoke	55.7%	59
Roanoke County	29.2%	31
Vinton	7.5%	8
Salem	7.5%	8
Botetourt County	< 1%	1
Answered Question		**106**
Skipped Question		**6**

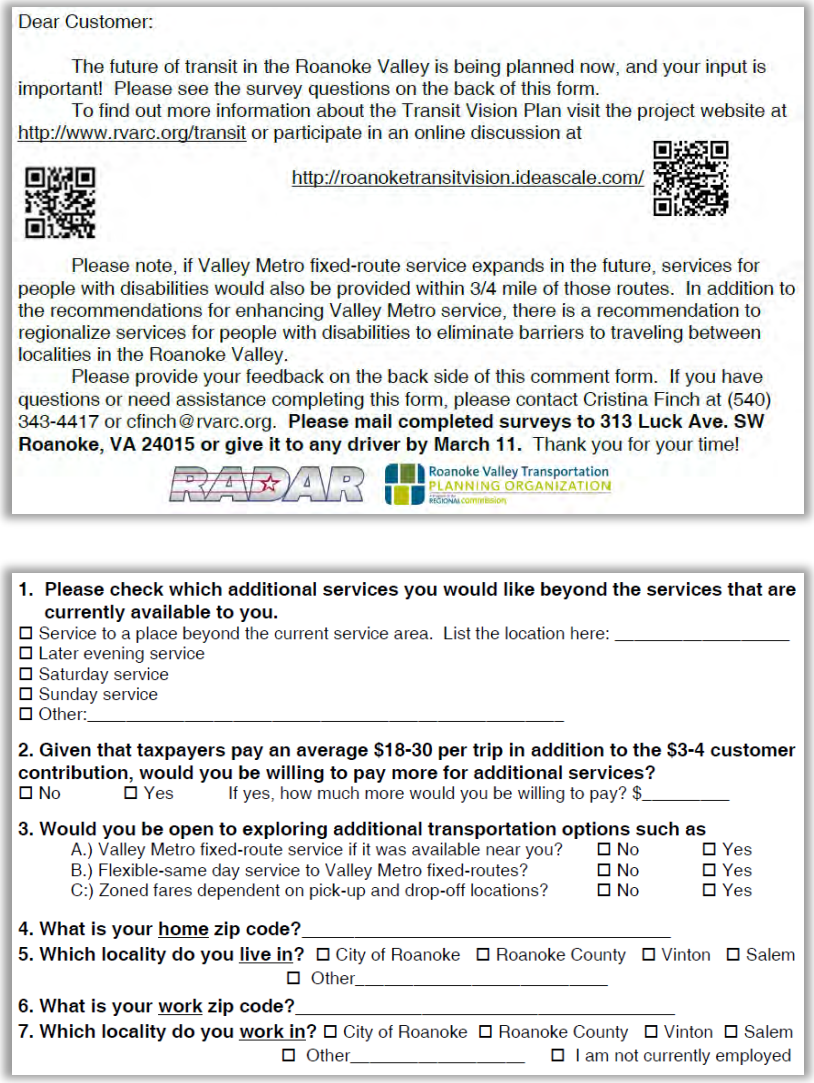
The next table shows the responses to "In which locality does the customer work?"

Table 2.4-2 | RADAR Survey – Customer's Locality of Employment

	Percentage of Responses	Total Responses
City of Roanoke	21.8%	22
Roanoke County	5.9%	6
Vinton	1.0%	1
Salem	7.9%	8
I am not currently employed	63.4%	64
Answered Question		**101**
Skipped Question		**11**

Customers indicated that they are not currently employed due to a disability or retirement. The survey is shown in **Figure 2.4-1** followed by a summary of the responses received.

Figure 2.4-1 | RADAR Customer Survey



Dear Customer:

The future of transit in the Roanoke Valley is being planned now, and your input is important! Please see the survey questions on the back of this form.

To find out more information about the Transit Vision Plan visit the project website at http://www.rvarc.org/transit or participate in an online discussion at

http://roanoketransitvision.ideascale.com/

Please note, if Valley Metro fixed-route service expands in the future, services for people with disabilities would also be provided within 3/4 mile of those routes. In addition to the recommendations for enhancing Valley Metro service, there is a recommendation to regionalize services for people with disabilities to eliminate barriers to traveling between localities in the Roanoke Valley.

Please provide your feedback on the back side of this comment form. If you have questions or need assistance completing this form, please contact Cristina Finch at (540) 343-4417 or cfinch@rvarc.org. **Please mail completed surveys to 313 Luck Ave. SW Roanoke, VA 24015 or give it to any driver by March 11.** Thank you for your time!

RADAR Roanoke Valley Transportation PLANNING ORGANIZATION

1. Please check which additional services you would like beyond the services that are currently available to you.

☐ Service to a place beyond the current service area. List the location here: _____
☐ Later evening service
☐ Saturday service
☐ Sunday service
☐ Other:_____

2. Given that taxpayers pay an average $18-30 per trip in addition to the $3-4 customer contribution, would you be willing to pay more for additional services?

☐ No ☐ Yes If yes, how much more would you be willing to pay? $_____

3. Would you be open to exploring additional transportation options such as

A.) Valley Metro fixed-route service if it was available near you? ☐ No ☐ Yes
B.) Flexible-same day service to Valley Metro fixed-routes? ☐ No ☐ Yes
C:) Zoned fares dependent on pick-up and drop-off locations? ☐ No ☐ Yes

4. What is your home zip code?_____

5. Which locality do you live in? ☐ City of Roanoke ☐ Roanoke County ☐ Vinton ☐ Salem ☐ Other_____

6. What is your work zip code?_____

7. Which locality do you work in? ☐ City of Roanoke ☐ Roanoke County ☐ Vinton ☐ Salem ☐ Other_____ ☐ I am not currently employed

Additional Service Interests

Of the RADAR customers that responded, 78% indicated they desire additional services.

Table 2.4-3 | RADAR Survey – Interest in Service beyond the Current Service Area

	Percentage of Responses	Total Responses
Service to a place beyond the current service area	54.5%	48
Other	15.9%	14
Answered Question		*88*
Skipped Question		*24*

Responses to "Service to a place beyond the current service area" and "Other" include:

- BEDFORD COUNTY
- BLACKSBURG
- BOTETOURT COUNTY
- DALEVILLE
- FRANKLIN COUNTY
- LYNCHBURG
- MILL MOUNTAIN
- RADFORD
- ROANOKE COUNTY (BRAMBLETON AREA, HOLLINS, HOLLINS LIBRARY, FRIENDSHIP MANOR, POSTAL DRIVE, RESTIN, BONSACK, BONSACK WALMART, CLEARBROOK WALMART, BETWEEN LEWIS GALE AND TANGLEWOOD MALL)
- ROCKY MOUNT
- TROUTVILLE

- RURAL AREA
- ALL OVER THE ROANOKE VALLEY
- SMITH MOUNTAIN LAKE AREA
- ADDITIONAL DR. OFFICES

Citizens also noted the following desires:

- THE ABILITY FOR CITY OF SALEM AND CITY OF ROANOKE RESIDENTS TO TRAVEL INTO ROANOKE COUNTY
- SERVICE TO SPECIAL EVENTS AFTER 6:30 P.M.
- THE ABILITY TO STOP DURING A TRIP TO GET SOMETHING TO EAT *(WITHOUT HAVING TO SCHEDULE AN EXTRA TRIP IN ADVANCE)*
- CORTRAN PASSES
- EARLIER MORNING SERVICE FOR AN EARLY WORK SCHEDULE
- EARLIER BUS SERVICE TO THE AIRPORT

RADAR customers also provided feedback about need for later evening, Saturday, and Sunday services as shown in the following table.

Table 2.4-4 | RADAR Survey – Need for expanded hours

	Later Evening	Saturday	Sunday
City of Roanoke	20	10	28
Roanoke County	14	20	16
Salem	1	1	2
Vinton	2	2	5
Not provided	**2**	**1**	**1**
Totals	**39**	**34**	**52**

Of the three timeframes, providing service on Sundays is the most needed service expansion overall. Roanoke County does not currently have any Saturday service, which is why Roanoke County customers ranked it their highest service need.

In the City of Roanoke, City of Salem, and Vinton, service ends at 8:45 p.m. making it challenging for customers to go out in the evening or access evening jobs. The challenge is compounded for Roanoke County citizens where service ends at 6:00 p.m.

Willingness to pay more for additional services

Customers were asked if they would be willing to pay more for additional service given that taxpayers pay an average of $18-30 per trip (one-way) in addition to the $3-4 customer contribution. Almost all the respondents (104 people) shared their feelings: 54% said “yes” and 46% said “no”. Of the respondents who said they would be willing to pay more the following is a breakdown of how much more.

Table 2.4-5 | Additional amount RADAR customers are willing to pay

Amount	# of Respondents
$1	9
$2	9
$3	4
$4	3
$5	8
$6	2
$7	1
$10	1
$15	1

Openness to Exploring additional transportation options

Customers were asked if they would be open to exploring additional transportation options.

- OPTION A: VALLEY METRO FIXED-ROUTE SERVICE IF IT WAS AVAILABLE NEAR YOU?
- OPTION B: FLEXIBLE-SAME DAY RADAR SERVICE TO VALLEY METRO FIXED-ROUTES?
- OPTION C: ZONED FARES DEPENDENT ON PICK-UP AND DROP-OFF LOCATIONS?

Option A would more likely be of interest to Roanoke County since the other localities have dedicated fixed-route services.

Through other public involvement, citizens have shared that having to make reservations at least a day in advance for transportation may not always be possible, and they would like the option of having a same-day notification transportation option. Thus, Option B inquires about citizen interest in same-day service that would provide access to Valley Metro fixed-routes instead of the door-to-door origin-to-destination service which requires a 24-hour reservation for scheduling purposes.

Option C aims at gauging customer interest in zone-based fares. This would only apply to areas outside of the ¾-mile fixed-route bus system which, by federal law, caps fares within the service area at twice the fixed-route fare. Customer responses to the options are shown in the following table. In total, 103 customers contributed responses.

Table 2.4-6 | RADAR Survey – Interest in Additional Transportation Options

Locality	Option A		Option B		Option C	
	No	**Yes**	No	**Yes**	No	**Yes**
Botetourt County	1	**0**	0	**0**	0	**1**
City of Roanoke	23	**22**	18	**27**	24	**23**
Roanoke County	9	**17**	6	**19**	13	**7**
City of Salem	3	**3**	3	**4**	3	**3**
Town of Vinton	2	**4**	2	**4**	4	**3**
Unknown	2	**2**	2	**1**	2	**0**
Total	**40**	**48**	**31**	**55**	**46**	**37**

Notable results include that in Roanoke County and the Town of Vinton more respondents than not are interested in Valley Metro fixed-route service if it were available near them as well as same-day RADAR service to access Valley Metro fixed-routes. Roanoke County and Town of Vinton respondents were not as

interested in the zoned-based fares as they are currently able to access any location in Salem, Vinton, Roanoke City or County for a flat $4 fare.

City of Roanoke and City of Salem respondents were split on their interest to use Valley Metro if it were closer to them; lack of interest is likely due to disability. They were also split on their interest in zoned-based fares. This is likely tied to their need to go beyond the current service area; customers who need to go further are likely willing to pay more for that benefit. There was also a strong interest among City of Roanoke customers, in particular, in same-day flexible service to Valley Metro fixed-routes.

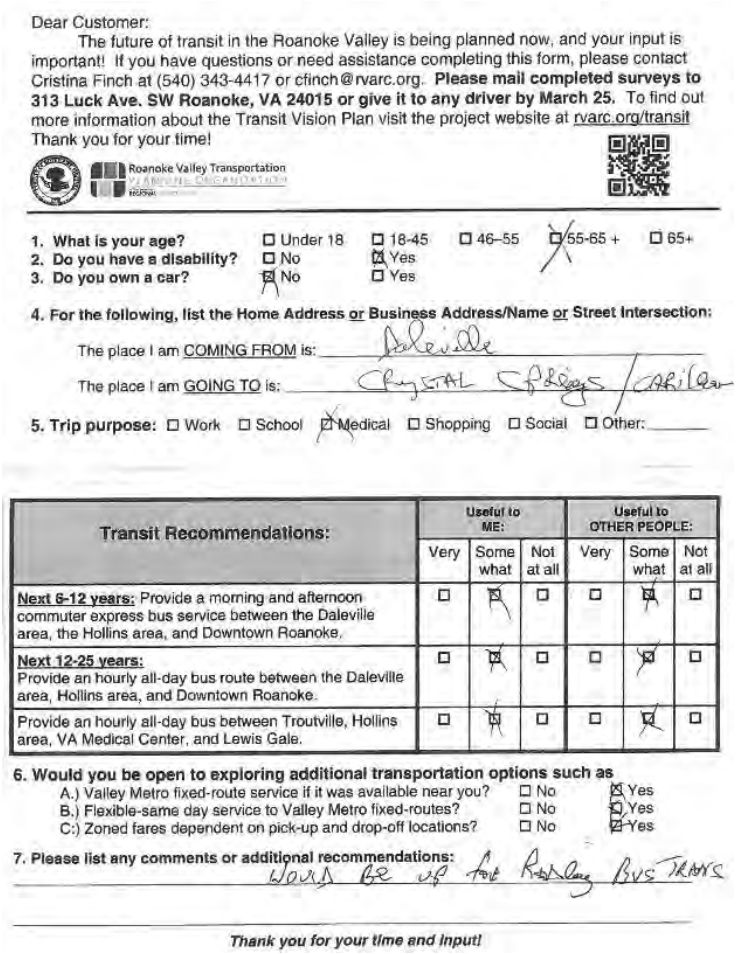
2.5 Botetourt Senior and Accessible Van Survey

In cooperation with the Botetourt County Parks and Recreation department, staff administered a survey targeting the Senior and Accessible Van riders asking about their trip origin and destination, trip purpose, the usefulness of certain recommendations derived from the development of this Plan, and the possible exploration of additional transportation options.

In the survey, which was conducted during a two-week period from March 11-25, 2016, there were eight respondents. Of those eight, seven were aged 55 and over, with four of the seven over 65. Six people indicated they have a disability and three said they own a car.

Next, the survey inquired of respondents their trip origin, destination and trip purpose. The origins of respondents included Blue Ridge, Daleville, Eagle Rock, Fincastle and Troutville. The destinations included Carilion (Crystal Spring), the Bonsack area of Roanoke County, Daleville (bank and grocery stores), Lewis Gale in Salem, and various stores in Troutville and Daleville. Six of the eight respondents (75%) identified that their trip purpose was medically related, while the remaining two or 25% were designated as shopping trips.

Figure 2.5-1 | Botetourt Senior/Access Van Users Survey



Dear Customer:
The future of transit in the Roanoke Valley is being planned now, and your input is important! If you have questions or need assistance completing this form, please contact Cristina Finch at (540) 343-4417 or cfinch@rvarc.org. **Please mail completed surveys to 313 Luck Ave. SW Roanoke, VA 24015 or give it to any driver by March 25.** To find out more information about the Transit Vision Plan visit the project website at rvarc.org/transit
Thank you for your time!

Roanoke Valley Transportation

1. **What is your age?** ☐ Under 18 ☐ 18-45 ☐ 46–55 ☒ 55-65 + ☐ 65+
2. **Do you have a disability?** ☐ No ☒ Yes
3. **Do you own a car?** ☒ No ☐ Yes

4. **For the following, list the Home Address or Business Address/Name or Street Intersection:**
The place I am COMING FROM is: Daleville
The place I am GOING TO is: Crystal Springs / Carilion

5. **Trip purpose:** ☐ Work ☐ School ☒ Medical ☐ Shopping ☐ Social ☐ Other: ____

Transit Recommendations:	Useful to ME:			Useful to OTHER PEOPLE:		
	Very	Some what	Not at all	Very	Some what	Not at all
Next 6-12 years: Provide a morning and afternoon commuter express bus service between the Daleville area, the Hollins area, and Downtown Roanoke.	☐	☒	☐	☐	☒	☐
Next 12-25 years: Provide an hourly all-day bus route between the Daleville area, Hollins area, and Downtown Roanoke.	☐	☒	☐	☐	☒	☐
Provide an hourly all-day bus between Troutville, Hollins area, VA Medical Center, and Lewis Gale.	☐	☒	☐	☐	☒	☐

6. **Would you be open to exploring additional transportation options such as**
A.) Valley Metro fixed-route service if it was available near you? ☐ No ☒ Yes
B.) Flexible-same day service to Valley Metro fixed-routes? ☐ No ☒ Yes
C:) Zoned fares dependent on pick-up and drop-off locations? ☐ No ☒ Yes

7. **Please list any comments or additional recommendations:** Would be up for Roanoke Bus Trans

Thank you for your time and input!

In response to specific draft recommendations for Botetourt County, citizens provided the following feedback.

Recommendation in the next 6-12 Years:

Provide a morning and afternoon commuter express bus service between the Daleville area, Hollins area, and Downtown Roanoke.

Table 2.5-1 | Botetourt Survey – Recommendation for Next 6-12 Years

Response	Count
Useful to Me--VERY	1
Useful to Me--SOMEWHAT	7
Useful to Me--NOT AT ALL	0
Useful to Other People—VERY	0
Useful to Other People—SOMEWHAT	7
Useful to Other People--NOT AT ALL	0
Total Respondents	**8**

Recommendation in the next 12-25 Years:

Provide an hourly all-day bus route between the Daleville area, Hollins area, and Downtown Roanoke.

Table 2.5-2 | Botetourt Survey - Recommendation for Next 12-25 Years

Response	Count
Useful to Me--VERY	1
Useful to Me--SOMEWHAT	7
Useful to Me--NOT AT ALL	0
Useful to Other People—VERY	0
Useful to Other People—SOMEWHAT	7
Useful to Other People--NOT AT ALL	0
Total Respondents	**8**

Provide an hourly all-day bus between Troutville, Hollins area, VA Medical Center, and Lewis Gale.

Table 2.5-3 | Botetourt Survey - Recommendation for hourly all-day bus service

Response	Count
Useful to Me--VERY	1
Useful to Me--SOMEWHAT	7
Useful to Me--NOT AT ALL	0
Useful to Other People—VERY	0
Useful to Other People—SOMEWHAT	7
Useful to Other People--NOT AT ALL	0
Total Respondents	8

All respondents indicated that the above referenced recommendations would be useful to them, and seven of eight felt that they would be useful to others.

Finally, the respondents were asked if they would be open to the possibility of exploring additional transportation options. Those options and the responses are as follows in **Table 2.5-4**.

Table 2.5-4 | Botetourt Survey – Interest in exploring additional transportation options

	No	Yes	Total Responses
A) Valley Metro fixed-route service if it was available near you?	50% (4)	50% (4)	8
B) Flexible same-day service to Valley Metro fixed-routes?	50% (4)	50% (4)	8
C) Zoned fares dependent on pick-up and drop-off locations?	50% (4)	50% (4)	8

Half of the Botetourt survey respondents would be interested in Valley Metro fixed-route service if it was available nearby, flexible same-day service to Valley Metro fixed routes, as well as zoned fares dependent on pick-up and drop-off locations.

2.6 Focus Groups/Local Government Involvement

Throughout the course of the planning process focus group meetings were held to engage key stakeholder groups in the development of the recommendations. Meetings were held and presentations were given to the following groups:

- ROANOKE REGIONAL CHAMBER, TRANSPORTATION COMMITTEE, *NOVEMBER 12, 2015*
- ROANOKE COUNTY PLANNING COMMISSION, *NOVEMBER 16, 2015 AND APRIL 19, 2016*
- (X)PO WEDNESDAY, GRANDIN CO-LAB, *JANUARY 27, 2016*
- RAVE (ROANOKE ALLIANCE FOR THE VISUALLY ENABLED), *FEBRUARY 17, 2016*
- HOUSING AUTHORITY - *MELROSE TOWERS, FEBRUARY 25, 2016 AND LANSDOWNE, FEBRUARY 29, 2016*
- BOTETOURT COUNTY PLANNING COMMISSION, *APRIL 4, 2016*

In addition to the focus groups, local governments reflected on the draft recommendations and provided feedback which led to the final recommendations. Local government staff participated in the Steering Committee and the Transportation Technical Committee. Local elected officials provided input through the Roanoke Valley Transportation Policy Board. In addition, notable meetings with local Councils and Boards are listed below.

- VINTON TOWN COUNCIL, *MARCH 15, 2016*
- ROANOKE CITY COUNCIL, *APRIL 4, 2016*
- BOTETOURT COUNTY BOARD OF SUPERVISORS, *APRIL 26, 2016*

3.0 SHORT-TERM RECOMMENDATIONS (2016-2022)

The short-term recommendations propose a significant expansion to the existing transit service area to provide basic service coverage to some areas and improved quality of service where it would benefit greater ridership levels. **Figure 3.0-1** illustrates the fixed-route short-term recommendations. In this phase, service is recommended for many places where critical connections to employment and residential areas are needed, including the North Roanoke County/Hollins/Plantation Road area, Electric Road Corridor, Glenvar, Salem/I-81 Exit 140, Bonsack, and the Roanoke Centre for Industry and Technology.

Additionally, the short-term recommendations make improvements to the existing services including increasing frequency, increasing the span of service, adding weekend service and adding new routes within the existing service area.

These recommendations collectively significantly improve the access and quality of service for the residents and employers of the Roanoke Valley region. As shown in **Table 3.0-1**, the short-term recommendations would benefit many people with new service to over 16,000 residents and 14,000 jobs while improving the quality of service for over 50,000 residents and jobs.

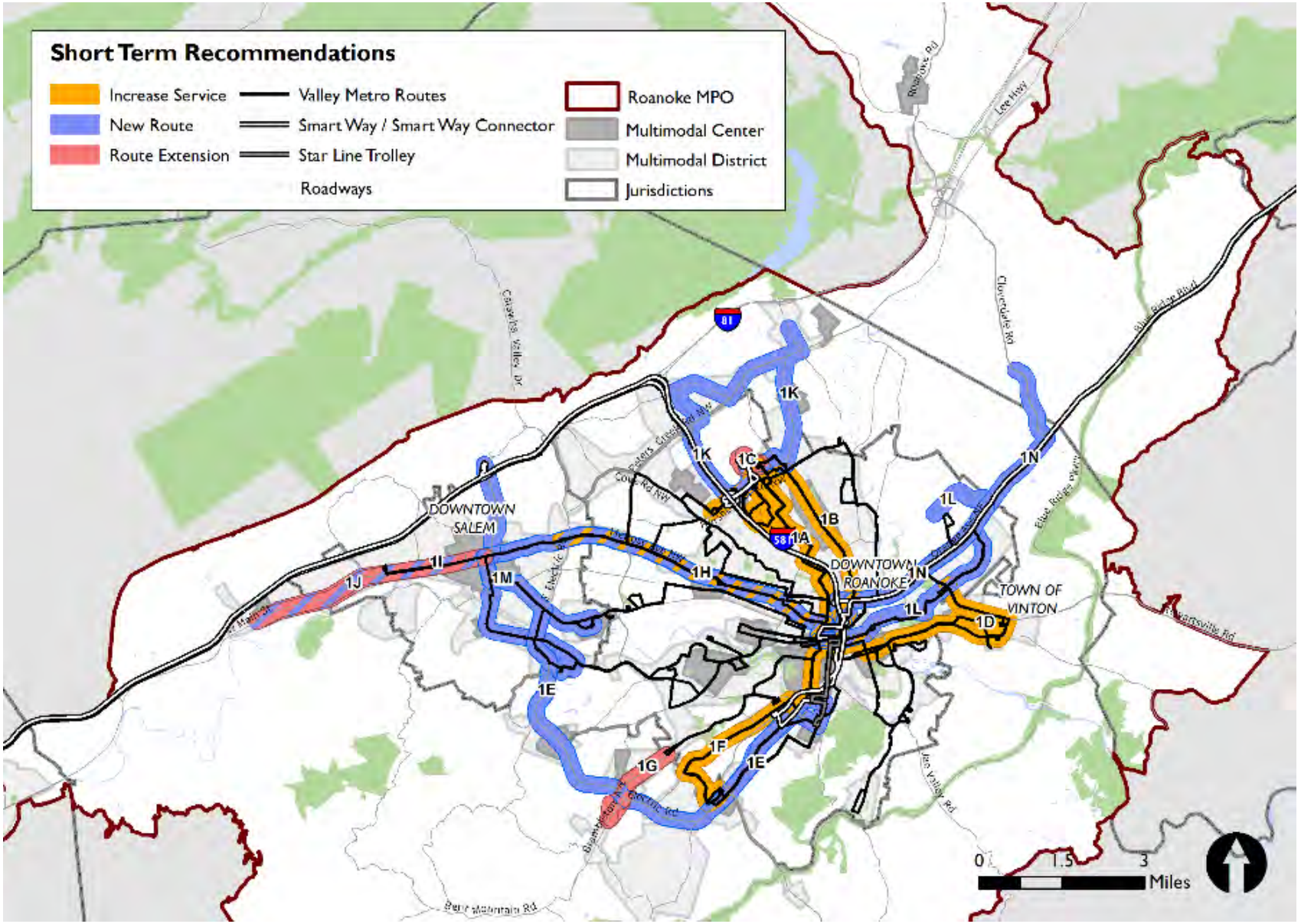
Table 3.0-1 | Short-Term Benefits

Metric	Existing Service Area	Short Term Service Area	Improved Service[1]	Percent Growth in Population Served	Percent Improved Service[2]
Population	90,254	106,561	58,414	118%	65%
Jobs	65,224	80,012	54,301	123%	83%
Households	39,315	46,375	25,784	118%	66%

The short-term recommendations address the transit service needs that should be addressed within the next six years (2016-2022). The majority of these recommendations will feed into the 2017 Transit Development Plan, where a phasing and implementation plan will be further developed.

[1] Includes areas being served by existing routes that have recommendations for increased span or frequency, or a new route overlaid.
[2] Percent of existing service area population receiving improved service.

Figure 3.0-1 | Conceptual Short-Term Recommendations Map



3.1 New Routes

Recommendation 1E: Create a new route that eliminates a missing transit connection between Salem and Carilion and that connects the communities and businesses of the 419 corridor

The Carilion area continues to grow exponentially and is the single-largest employer in the Roanoke Valley. Tanglewood Mall is being sold and redevelopment opportunities abound. The Route 419 Corridor Study recognizes the significant growth in travel occurring in the corridor. Transit can help ease travel on Route 419/Route 220 Business and provide people with a new way to get to and from places along the corridor between Salem and Carilion.

Routes 51/52 currently connect Downtown Roanoke, Carilion, and Tanglewood. Utilize the Starline Trolley for the Downtown Roanoke to Carilion connections and consolidate Routes 51/52 into new Routes 4/5 connecting Carilion, Tanglewood, Cave Spring, Oak Grove, Lewis Gale, and Downtown Salem. Also, add Sunday service.

This recommendation is based upon results from public input, as well as through the residential, workforce, and commuter propensity analyses, and trip flow analysis. It is also a recommendation in the Route 419 Corridor Study and supported by the City of Salem's Comprehensive Plan.

Table 3.1-1 | Recommendation 1E - Routes 51/52

		Current Routes 51/52	Proposed Routes 4/5
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	60
	Saturday	60	60
	Sunday	---	60

Recommendation 1I: Provide a convenient express connection between Glenvar/Richfield, Downtown Salem, and Downtown Roanoke for workers and residents to improve access to employment and key activity centers

A prime corridor for dense development due to its linear connectivity, Route 460 West connects many key shopping, employment, and residential areas between Glenvar and Downtown Roanoke. Downtown Salem is poised for growth with the adoption of a new Downtown Plan in 2016. Roanoke College, Glenvar Library, and the Salem Library are all located on this route and each play a strong role in the community. Green Hill Park and the Roanoke River Greenway would become accessible via transit and a short walk or bike ride down Diuguids Lane.

Create a new express route in Roanoke County and Salem (Routes 911/922) that in conjunction with the existing 91/92 will enable peak 30-minute service between Glenvar/Richfield, Downtown Salem, and Electric Road, with closed-door express service from Electric Road to Downtown Roanoke.

This recommendation is based upon results from the workforce and commuter propensity analyses and trip flow analysis. The recommendation is also supported by the Glenvar Community Plan, Roanoke County's 2005 Community Plan, the City of Salem's Comprehensive Plan, the Roanoke Valley-Alleghany Regional Commission's Age Wave Study, and the RVTPO's Planning for Elderly and Disabled Mobility Study.

Table 3.1-2 | Recommendation 1I - Routes 911/922

		Current Routes 85/86	Proposed Routes 85/96	Proposed Routes 911/922
Days of Service		Mon-Sat	Mon-Fri	Mon-Fri
Frequency (minutes)	M-F Peak	30	60	60
	M-F Midday/ Evening	60	60	---
	Saturday	60	60	---
	Sunday	---	---	---

Recommendation 1K: Implement a new circulator connecting the activity centers of Crossroads, Hollins/Plantation Road, the DMV and other key locations in North Roanoke County

The Exit 146/Plantation Road area is the second largest employment center in the Roanoke Valley. Nearby Hollins University is a hub of activity with a large student population eager to be better connected with the regional transit system. The DMV was the most requested addition to the transit system, and many businesses nearby as well as the Green Ridge Recreation Center and Hollins Library would benefit from being transit accessible.

Create a new weekday-only circulator (Route 1) providing a one-way hourly loop connecting key North Roanoke County activity centers to the Crossroads Shopping Area.

This recommendation is based upon public input, the results of the workforce and commuter propensity analyses, and the trip flow analysis. The City of Roanoke Comprehensive Plan, Vision 2001-2020, the Roanoke County 2005 Community Plan, the Hollins Area Plan, and the RVTPO Congestion Management Process Plan also support this recommendation.

Table 3.1-3 | Recommendation 1K - Route 1

		Current	Proposed
Days of Service		N/A	Mon-Fri
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	---
	Sunday	---	---

Recommendation 1L: New peak hour service between the Roanoke Centre for Industry and Technology and Downtown Roanoke to improve access to key employment sites for area residents

Create a new peak service (Route 311) connecting Downtown Roanoke to RCIT/Blue Hills *(note: six-month trial service began in January 2016 via the 31X).*

This recommendation is based upon results from public input, as well as through the workforce propensity analysis and Home-Based Work trip flow analysis. A survey of RCIT tenants was completed in 2014 which also indicated great need and desire among RCIT employers to provide the service. The

recommendation is also supported by the City of Roanoke's Comprehensive Plan, Vision 2001-2020.

Table 3.1-4 | Recommendation 1L - Route 311

		Current	Proposed
Days of Service		*(in trial service)*	Mon-Sat
Frequency (minutes)	M-F Peak	60	60
	M-F Midday/ Evening	---	---
	Saturday (Peak Only)	---	60
	Sunday	---	---

Recommendation 1M: Connect Salem and its key destinations with the Smart Way Commuter regional service using a new circulator

Regional Smart Way Commuter service is so close to Salem's key activity centers, but walking/biking are only options for some people in some weather. A transit connection between Salem and the Exit 140 Park and Ride Lot would make the Smart Way Commuter service a more attractive option for people traveling between the New River Valley and Salem.

Concurrent with recommendation 1I, create a new hourly circulator (Route 93) connecting Downtown Salem, Lewis Gale, and the VA Medical Center to the I-81 Exit 140 Park and Ride Lot. Incorporate service to the Rt. 311/Rt. 419 Park and Ride Lot, Lakeside Plaza, and nearby businesses and residential areas in Salem and Roanoke County along 419 during peak working hours. During special events, incorporate service to the Salem Civic Center.

This recommendation is based upon feedback received through public input and the Steering Committee, results of the workforce and commuter propensity analyses and the trip flow analysis. This recommendation is supported by the City of Salem's Comprehensive Plan and the Route 419 Corridor Study.

Table 3.1-5 | Recommendation 1M - Route 93

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

Recommendation 1N: Improve access to employment sites in Bonsack - Eastern Roanoke County, Botetourt County, and Downtown Roanoke with a new peak hour service

A transit connection to the Bonsack area was one of the general public's highest priorities. A mutually beneficial new express, limited-stop peak service route (Route 3111) is recommended to service the EastPark Commerce Center, Bonsack area businesses, and Downtown Roanoke. Connecting with local transit in Downtown Roanoke, employees can expressly access destinations in Eastern Roanoke County and Botetourt County. Likewise, residents from Blue Ridge, Bonsack and Bedford can commute into Downtown Roanoke and make local connections via this transit service. A new park and ride lot accessible to this new transit service around Rt. 220 Alternate/Route 460 is recommended for citizens traveling westbound to Downtown Roanoke and destinations beyond.

This recommendation is based upon feedback received from public input and the trip flow analysis. The 2014 Bonsack Area Business Survey, the Roanoke County 2005 Community Plan, the

Roanoke Valley-Alleghany Regional Commission Rural Transportation Priorities 2012, and the RVTPO Congestion Management Process Plan all support this recommendation.

Table 3.1-6 | Recommendation 1N - Route 3111

		Current	Proposed
Days of Service		N/A	Mon-Fri
Frequency (minutes)	M-F Peak	---	75
	M-F Midday/ Evening	---	---
	Saturday	---	---
	Sunday	---	---

3.2 Route Extension/Realignment

Recommendation 1C: Improve job access and regional connectivity with an all-day connection and additional peak service to Roanoke-Blacksburg Regional Airport

A local connection to the airport was one of the general public's highest priorities. The Roanoke-Blacksburg Regional Airport is currently only accessible via the Smart Way Commuter service which has limited service times to the airport and limited connectivity with local routes via Campbell Court. The recent Towne Square Boulevard/Aviation Drive roadway improvement project enables an easy connection between Crossroads and the airport that previously was not possible.

Extend Routes 21/26 to Roanoke-Blacksburg Regional Airport.

This recommendation is based upon results from public input, as well as through the results of the workforce and non-work propensity analyses and the Home-Based Work trip flow analysis.

Table 3.2-1 | Recommendation 1C - Routes 21/26

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sat
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	60
	Saturday	60	60
	Sunday	---	---

Recommendation 1G: Create new access to the Cave Spring activity center for area residents and connect the community with Downtown Roanoke via an all-day connection

A worn path is present along the west side of Brambleton Avenue from Cave Spring to where the bus picks up/drops off passengers near the Roanoke County/City of Roanoke line. There are medical offices, shopping destinations, residential areas, and jobs that generate the foot traffic between these destinations and the Red Rock bus stop.

By adjusting the alignment of Routes 61/62 to reach Colonial Avenue/Brambleton Avenue in Cave Spring, the major destinations can be made accessible with transit service. This recommendation includes the removal of the 61/62 Towers Shopping Center connection given that the 55/56 also services Towers. Removing the 61/62 connection to Towers enables the recommendation to be accomplished using existing vehicles and providing a straight-line direct connection between Cave Spring and Downtown Roanoke.

This recommendation is based upon feedback received through public input and the Steering Committee, and the results of the

residential, workforce, commuter and non-work propensity analyses, and the Home-Based Work trip flow analysis. The Roanoke County 2005 Community Plan and Route 419 Corridor Study support this recommendation.

Table 3.2-2 | Recommendation 1G - Routes 61/62

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sat
Frequency (minutes)	M-F Peak	60	60
	M-F Midday/ Evening	60	60
	Saturday	60	60
	Sunday	---	---

Recommendation 1J: Create more convenient access within Salem and connect Glenvar/Richfield to the regional transit system by providing a 7-day service for residents/ employees

As mentioned previously, Salem recently adopted a new Downtown Plan and increasing trips to Downtown Salem will be realized as new businesses open and redevelopment occurs. Beyond Salem there are many businesses that would benefit from transit accessibility including the proposed end-of-the-line, Richfield Retirement Center. Like recommendation 1I, this service would greatly benefit the many residential areas and businesses with easy direct service between popular destinations in Glenvar, Salem, and Downtown Roanoke.

Realign Routes 91/92 to extend to Glenvar/Richfield, reassign the Lewis Gale and VA Medical Center connections to recommendation 1M, and add Sunday service.

This recommendation is based upon feedback received from public input and the Steering Committee, as well as through the non-work propensity analysis. The Glenvar Community Plan, Roanoke County's 2005 Community Plan, the City of Salem Comprehensive Plan, the RVARC Age Wave Study, and the RVTPO Planning for Elderly and Disability Mobility Study support this recommendation.

Table 3.2-3 | Recommendation 1J - Routes 91/92

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	60	60
	M-F Midday/Evening	60	60
	Saturday	60	60
	Sunday	---	60

3.3 Other Service Changes

Recommendation 1A: Improve mobility and access between Valley View and Downtown Roanoke by adding greater midday/evening service frequency and Sunday service

The Valley View Mall area is a popular destination and increasing service frequency and hours of service would greatly benefit citizens shopping and employees working until stores close which are later than current bus operations that end at 8:45 p.m.

Add Sunday service to Routes 15/16; increase midday/ evening frequency between Valley View and Downtown Roanoke to every 30 minutes.

This recommendation is based upon feedback received from public input and the Steering Committee, as well as through the non-work propensity analysis. The City of Roanoke's Comprehensive Plan supports this recommendation.

Table 3.3-1| Recommendation 1A - Routes 15/16

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

Recommendation 1B: Improve convenience by connecting two key activity centers with enhanced midday and evening service between Crossroads Shopping Area, Williamson Road, and Downtown Roanoke

The Crossroads Shopping Area and Williamson Road corridor to Downtown Roanoke are busy with activity throughout the day. Expanding service between these key destinations would make transit more convenient to more residents. Increase midday/evening frequency to every 30 minutes on Routes 21/22.

This recommendation is based upon results of the non-work propensity analysis and is supported by the City of Roanoke's Comprehensive Plan, Vision 2001-2020 and the RVTPO's Congestion Management Process Plan.

Table 3.3-2 | Recommendation 1B - Routes 21/22

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sat
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	---

Recommendation 1D: Enhance activity and improve connectivity in and between Vinton and Downtown Roanoke by adding peak and Sunday service

Development in Downtown Vinton and Downtown Roanoke continues to grow with new businesses and residential options in two of the most transit-friendly places in the region. Adding Sunday service and 30-minute peak service to Routes 35/36 would better connect these two expanding activity centers while providing better mobility to residents who want to enjoy a car-light lifestyle. Access to the new Vinton Library, the Lakedrive Plaza shopping center and residential areas in both Vinton and SE Roanoke would greatly improve.

This recommendation is based upon feedback received through public input and the Steering Committee, as well as through the residential and non-work propensity analyses. The Vinton Area Corridors Plan, the RVTPO Congestion Management Process plan, and the City of Roanoke's Comprehensive Plan, Vision 2001-2020, support this recommendation.

Table 3.3-3 | Recommendation 1D - Routes 35/36

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	Peak	60	30
	M-F Midday/ Evening	60	60
	Saturday	60	60
	Sunday	---	60

Recommendation 1F: Improve convenience by enhancing midday and evening service between Tanglewood Mall, Virginia Western Community College, Towers Shopping Center, and Downtown Roanoke

Exciting new growth and development is taking place at Virginia Western Community College and Downtown Roanoke and is just now being envisioned for a significant redevelopment of the Tanglewood area. Improving transit service between these key destinations will improve access between them for more people.

Add Sunday service and increase midday/evening frequency to every 30 minutes for Routes 55/56.

This recommendation is based upon feedback received from public input and the Steering Committee, as well as through the non-work propensity analysis. The City of Roanoke's Comprehensive Plan, Vision 2001-2020, the RVTPO's Congestion Management Process Plan, and the Route 419 Corridor Study also support this recommendation.

Table 3.3-4 | Recommendation 1F - Routes 55/56

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

Recommendation 1H: Improve convenience and jobs access by enhancing midday and evening service between Goodwill Salem/Lakeside Plaza and Downtown Roanoke while improving regional connectivity

Ridership between Goodwill Salem/Lakeside Plaza and Downtown Roanoke is the greatest of any routes in the system. Providing 30 min. service throughout the day would ease overcrowding on buses, particularly as other destinations in the region become accessible with 30 min. service.

Create 30-minute frequency on the Melrose Avenue corridor by increasing midday/evening frequency of Routes 81/82 to every 30 minutes.

This recommendation is based upon public input, current overcrowding on buses, and the results from the non-work propensity analysis. Both the City of Salem and City of Roanoke's Comprehensive Plans support this recommendation along with the RVTPO's Congestion Management Process Plan.

Table 3.3-5 | Recommendation 1H - Routes 81/82

		Current	Proposed
Days of Service		Mon-Fri	Mon-Fri
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	30
	Saturday	---	---
	Sunday	---	---

Recommendation 1O: Greatly increase the convenience and attractiveness of transit service in the valley by expanding the hours of service

Aside from adding Sunday services, expanding the hours of service, particularly later in the evening, were the public's highest service priorities.

Expand Valley Metro hours of service from 15 hours a day to 18 hours a day; determine optimal morning/evening span changes for employment shifts, as well as new passenger rail connections. This recommendation is for all Valley Metro bus routes though key destinations may be initiated first.

This recommendation is based upon feedback received from public input and the Steering Committee. This recommendation is supported by the Livable Roanoke Valley Plan.

3.4 Additional Recommendations

Recommendation 1U: Pursue a partnership among local governments for public transportation service to increase and improve transit service and funding

Paramount to the implementation of this Roanoke Valley Transit Vision Plan is the establishment of a true regional collaborative partnership among the local governments to make unified decisions about the direction of public transportation in the region.

Develop a collaborative partnership at a minimum between Roanoke County, Botetourt County, the City of Salem, the Town of Vinton, and the City of Roanoke for fixed-route service provision. Other partners such as Montgomery County and Bedford County may also benefit from being included due to their presence in the Roanoke Valley transportation management area.

The Livable Roanoke Valley Plan supports this recommendation.

Recommendation 1P: Coordinate transit services with Amtrak (Roanoke) Station schedules to increase regional connectivity and the convenience of longer trips

Adapt the Smart Way Commuter service to enable passenger rail customers to travel to/from the New River Valley by coordinated bus and rail schedules.

Along with the increase in local service span (Recommendation 1O), further evaluate the potential local routes that would benefit Roanoke Valley citizens and businesses with local transit connections to/from Amtrak service. Transit connections from park-and-ride lots around the region would provide people with an alternative to storing their personal vehicle long-term in Downtown Roanoke. As the region grows and becomes more of a tourist destination, the ability for people to travel to/from the Roanoke Valley without the need to use or rent a car will be an attractive quality.

The Livable Roanoke Valley Plan, the Montgomery County Comprehensive Plan, and the Elliston and Lafayette Village Plan all support this recommendation.

Recommendation 1Q: Study the need for additional Smart Way commuter services (Roanoke-Lynchburg) to improve regional connectivity and increased jobs access

With the onset of passenger rail, the Smart Way Connector bus service will cease to exist. The Connector bus also currently

provides trips between Roanoke and Lynchburg that are unrelated to accessing Amtrak.

Study the need for a commuter bus service between Roanoke and Lynchburg, similar to Smart Way service between Roanoke and Blacksburg.

The Livable Roanoke Valley Plan supports this recommendation.

Recommendation 1R: Study the potential for consolidating bus stops to reduce transit travel time and improve reliability

Review bus stop spacing by route to determine optimal locations for bus stops.

Recommendation 1S: Develop partnerships with employers to increase jobs access and funding

Develop a partnership plan for working with local employers – could include possible contract stops, increased ridership or revenue opportunities.

Recommendation 1T: Update route schedule publications and maps to ensure that transit is attractive and easy to use

Update route schedule publications and maps both in print and online.

Recommendation 1V: Evaluate individual routes for efficiencies and enhancements to save or maximize time and investment

Evaluate route modifications of alignment and termini.

Recommendation 1W: Greatly increase the attractiveness and usability of transit by providing real-time information

Provide up-to-the-minute, on-demand, "real-time" information about the arrival time and status of the bus on smartphones and computers.

Recommendation 1X: Reduce costs and significantly improve connectivity by regionalizing services for persons with disabilities and for seniors across jurisdictional boundaries

Coordinate existing services for people with disabilities to enable them to easily travel to destinations around the Roanoke Valley without jurisdictional barriers. Identify jurisdictional needs to provide service beyond paratransit (3/4 mile within fixed routes) to seniors and persons with disabilities through the Roanoke Valley region.

This is a key regional need that was identified as a huge barrier and citizens repeatedly spoke of this need throughout the planning process. In particular, citizens with disabilities who live in Salem and Roanoke City are currently unable yet need to access places in Roanoke County primarily. Likewise, citizens in Roanoke County, as well as Salem, Roanoke City, and Vinton, are unable to access destinations in Botetourt County. These are the most common needs identified by people with disabilities. Eliminating travel barriers across jurisdiction boundaries, particularly for people with disabilities, are immediate needs.

Recommendation 1Y: Adjust PM peak service hours to better align with travel patterns and daytime work hours

The morning peak hours begin around the region picking up and dropping people off as they travel across the region. In contrast, the afternoon peak hours begin in Downtown Roanoke at 3:45 p.m. and end in Downtown Roanoke at 6:45 p.m. with the next option to connect to destinations around the region at 7:15 p.m. Thus, if someone takes the last peak bus into Downtown Roanoke and their final destination requires a transfer, they have a 30-minute wait until the next bus.

These hours should be shifted to begin a half-hour earlier (at 3:15 p.m.) around the region to facilitate travel as people begin to get off of work from earlier shifts. Peak service would then end around the region at 6:15 p.m. The pm peak service would then operate like the morning peak, providing better services between destinations throughout the region.

Recommendation 1Z: Explore additional special activity/event transit services to popular recreational destinations

As the region becomes a bigger destination for special events, providing transit service to enable people to access the event without the need to provide excessive parking at the event will become a bigger need. Transit options already exist for people to access daytime festivals, cultural activities, or other special events within the service area. With more events taking place in the evenings, such as those at the Salem Civic Center, the Berglund Center, and Elmwood Park, later evening transit service is needed to enable participants to get home after the event.

As the region grows and its outdoor amenities become more popular, specialized transit services will be needed to help people access the attraction. For example, on many weekends, McAfee's Knob on Rt. 311 is frequented by many people yet parking is limited. Transit service, potentially from the I-81 Exit 140 Park and Ride Lot and the Orange Market Park and Ride Lot at Rt. 311/Rt. 419 would provide people with an option to access this popular recreation site while minimizing traffic and parking needs on the mountain. Similarly, as Explore Park is developed into a regional destination, transit service to Explore Park will be important.

Additional shuttles during events, and other opportunities for special activity/event transit service should be explored as the needs arise.

Recommendation 1AA: Extend service for people with disabilities later in the evening and on weekends where transit services are provided beyond the fixed-routes

For places beyond the ¾-mile area around fixed-routes that choose to provide transit service for people with disabilities and seniors, such as Roanoke County's CORTRAN and the Botetourt Senior and Accessible Van service, extend the hours of operation into the evening and on weekends. Citizens with disabilities cited the desire to be able to work, attend meetings, shop, and be social in the evenings and on weekends; the lack of transportation service available to them currently is a barrier to them being able to participate in many activities.

Recommendation 1BB: Study the ability to vary the fleet size based on ridership demands to better meet current and future needs while minimizing capital and operating expenses

Local transit services are provided with 35-foot buses and the Smart Way service utilizes 45-foot buses. Currently, the 91/92 experiences overcrowding and could benefit from a larger vehicle. Other routes may also benefit from a larger vehicle. New services, particularly express limited-stop services, may not require full-size buses and may be implemented using smaller vehicles. The need to provide different sized vehicles to maximize efficiency should be evaluated by route and with each new service implemented.

3.5 Summary of Short-Term Recommendations

A summary of the short-term recommendations is provided in the following table. To support these recommendations, additional recommendations related to regional connections (**Section 6.0**) and facilities (**Section 7.0**) should be considered in the short-term and continuously as needed to support the evolving transit system.

Table 3.5-1 | Summary of Short-Term Recommendations

#	SHORT-TERM RECOMMENDATION	TYPE
1A	*Improve mobility and access between Valley View and Downtown Roanoke by adding greater midday/evening service frequency and Sunday service*	Other Service; Routes 15/16
1B	*Improve convenience by connecting two key activity centers with enhanced midday and evening service between Crossroads Shopping Area, Williamson Road, and Downtown Roanoke*	Other Service; Routes 21/22
1C	*Improve job access and regional connectivity with an all-day connection and additional peak service to Roanoke-Blacksburg Regional Airport*	Route Extension/ Realignment 21/26
1D	*Enhance activity and improve connectivity in and between Vinton and Downtown Roanoke by adding peak and Sunday service*	Other Service; Routes 35/36
1E	*Create a new route that eliminates a missing transit connection between Salem and Carilion and that connects the communities and businesses of the 419 corridor*	New Route 51/52
1F	*Improve convenience by enhancing midday and evening service between Tanglewood Mall, Virginia Western Community College, Towers Shopping Center, and Downtown Roanoke*	Other Service; Routes 55/56
1G	*Create new access to the Cave Spring activity center for area residents and connect the community with Downtown Roanoke via an all-day connection*	Route Extension/ Realignment 61/62
1H	*Improve convenience and jobs access by enhancing midday and evening service between Goodwill Salem/Lakeside Plaza and Downtown Roanoke while improving regional connectivity*	Other Service; Routes 81/82
1I	*Provide a convenient express connection between Glenvar/Richfield, Downtown Salem, and Downtown Roanoke for workers and residents to improve access to employment and key activity centers*	New Route 911/922
1J	*Create more convenient access within Salem and connect Glenvar/Richfield to the regional transit system by providing a 7-day service for residents/ employees*	Route Extension/ Realignment 91/92
1K	*Implement a new circulator connecting the activity centers of Crossroads, Hollins/Plantation Road, the DMV and other key locations in North Roanoke County*	New Route 1
1L	*New peak hour service between the Roanoke Centre for Industry and Technology and Downtown Roanoke to improve access to key employment sites for area residents*	New Route 311 (31X)
1M	*Connect Salem and its key destinations with the Smart Way Commuter regional service*	New Route

	using a new circulator	93
1N	*Improve access to employment sites in Bonsack - Eastern Roanoke County, Botetourt County, and Downtown Roanoke with a new peak hour service*	New Route 3111
1O	*Greatly increase the convenience and attractiveness of transit service in the valley by expanding the hours of service*	Other Service
1P	*Coordinate transit services with Amtrak (Roanoke) Station schedules to increase regional connectivity and the convenience of longer trips*	Additional
1Q	*Study the need for additional Smart Way commuter services (Roanoke-Lynchburg) to improve regional connectivity and increased jobs access*	Additional
1R	*Study the potential for consolidating bus stops to reduce transit travel time and improve reliability*	Additional
1S	*Develop partnerships with employers to increase jobs access and funding*	Additional
1T	*Update route schedule publications and maps to ensure that transit is attractive and easy to use*	Additional
1U	*Pursue a partnership among local governments for public transportation service to increase and improve transit service and funding*	Additional
1V	*Evaluate individual routes for efficiencies and enhancements to save or maximize time and investment*	Additional
1W	*Greatly increase the attractiveness and usability of transit by providing real-time information*	Additional
1X	*Reduce costs and significantly improve connectivity by regionalizing services for persons with disabilities and for seniors across jurisdictional boundaries*	Additional
1Y	*Adjust PM peak service hours to better align with travel patterns and daytime work hours*	Additional
1Z	*Explore additional special activity/event transit services to popular recreational destinations*	Additional
1AA	*Extend service for people with disabilities later in the evening and on weekends where transit services are provided beyond the fixed-routes*	Additional
1BB	*Study the ability to vary the fleet size based on ridership demands to better meet current and future needs while minimizing capital and operating expenses*	Additional

4.0 MEDIUM-TERM RECOMMENDATIONS (2022-2030)

The medium-term recommendations are focused on improving the quality of transit service in the Roanoke Valley region by making new connections within the existing and short-term service area as well as adding basic service coverage to more key activity centers. These changes provide additional transit options for more people and would improve service along large portions of existing routes or routes implemented in the short-term. New routes outside the existing service area that would connect to areas in Daleville, Clearbrook, South Roanoke County, and Vinton are also recommended for the medium-term.

The medium-term recommendations identify the transit service needs that should be addressed within the period between 2022 and 2030. **Figure 4.0-1** illustrates the recommendations being made in the medium-term.

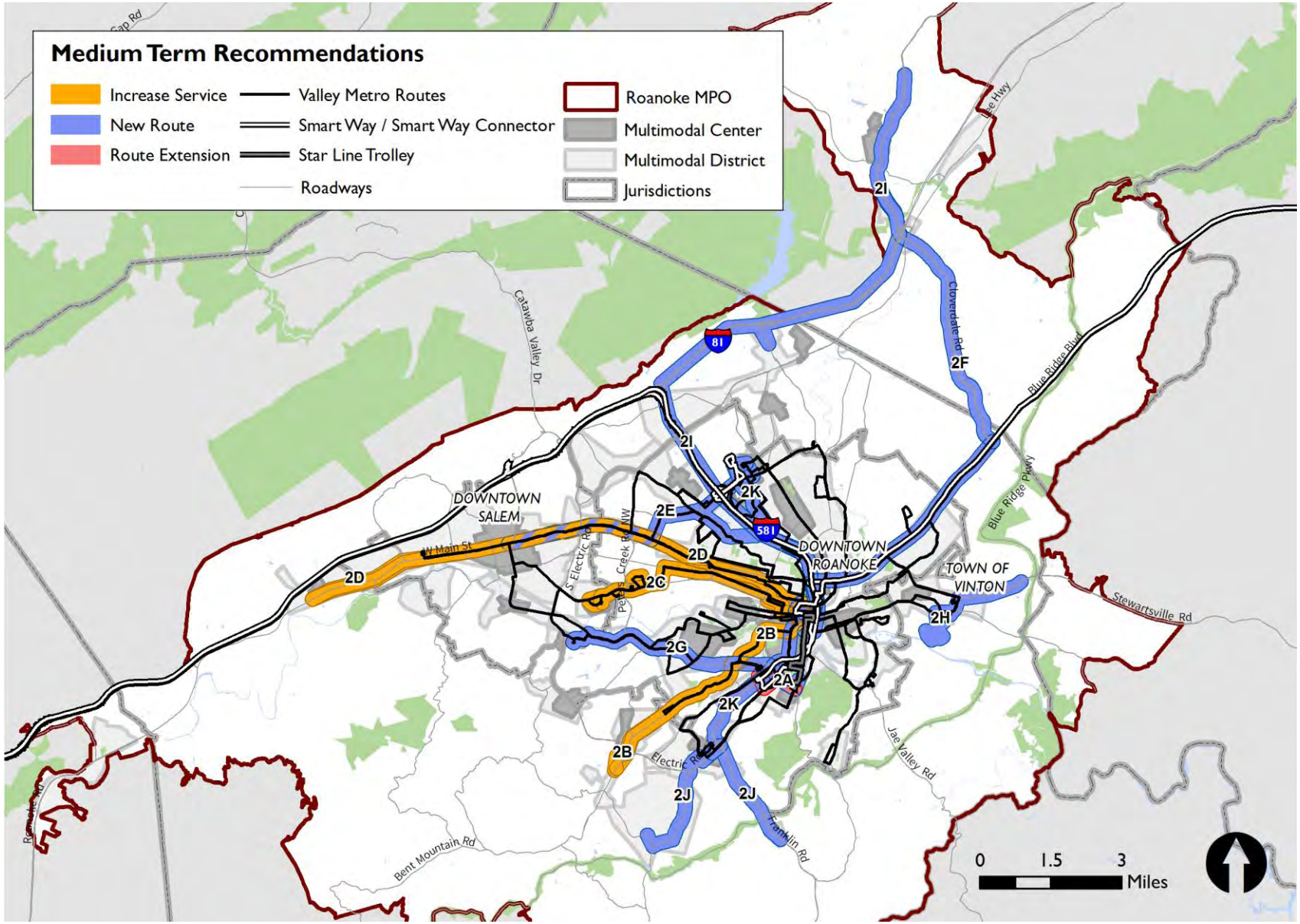
As shown in **Table 4.0-1**, the medium-term recommendations improve the quality of service for 49 percent of the population (52,000) and 62 percent of the jobs (47,000) in the short-term service area. The new areas being served in this term increase the total population being served by seven percent (7,000) and the number of jobs by six percent (4,000).

Table 4.0-1 | Medium-Term Benefits

	Short Term Service Area	Medium Term Service Area	Improved Service[3]	Percent Growth in Population Served	Percent Improved Service[4]
Population	106,561	114,512	52,528	7%	49%
Jobs	80,012	85,087	49,275	6%	62%
Households	46,375	49,900	22,891	8%	49%

[3] Includes areas being served by existing routes that have recommendations for increased span or frequency, or a new route overlaid.
[4] Percent of short term service area population receiving improved service.

Figure 4.0-1 | Conceptual Map of Additional Recommendations for the Medium-Term



4.1 New Routes

Recommendation 2E: Create a new cross-town connection between Salem/Lakeside Plaza and Crossroads/Valley View connecting Salem with key activity centers

Facilitate the ability for people who travel between Salem and Crossroads/Valley View to reach their destination efficiently by providing a direct transit connection and eliminating the need to travel to Downtown Roanoke to make the trip using transit.

Create a new route (Route 3) from Lakeside Plaza/Goodwill Salem to Crossroads (which enables greater connections), past Valley View through the new I-581/Valley View interchange connection to Cove Road and back to Salem. The connections would offer opportunities to connect with additional routes in the Crossroads area and provide service to new developments that will arise from the interchange improvement.

This recommendation is based upon feedback received from public input, through the Steering Committee, and the results of the residential, non-work, and workforce analyses and Home-Based Work trip flow analysis. The City of Salem and City of Roanoke Comprehensive Plans as well as the RVTPO Congestion Management Process Plan support this recommendation.

Table 4.1-1 | Recommendation 2E - Route 3

		Current	Proposed
Days of Service		N/A	Mon-Sun
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	60

Recommendation 2F: Create a new connection providing access between Greenfield/Daleville, Bonsack, and Downtown Roanoke

Several exciting new business announcements will spur additional travel in southern Botetourt County as they transpire over the next several years. These new developments and additional future growth plans in Botetourt County will spur the need to provide a new transit connection among key destinations in the southern part of the County and connect with nearby destinations in the Bonsack area and Downtown Roanoke.

Create a new route (Route 8) connecting Greenfield/Daleville, Bonsack and Downtown Roanoke via Cloverdale Road, Challenger Avenue, and Orange Avenue.

This recommendation is based upon public input, input from Botetourt County Planning Commission, and through the workforce propensity and Home-Based Work trip flow analyses. The Roanoke County 2005 Community Plan, the City of Roanoke's Comprehensive Plan, Vision 2001-2020, and the RVTPO Congestion Management Process Plan all support this recommendation.

Table 4.1-2 | Recommendation 2F - Route 8

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

Recommendation 2G: Create new cross-town service connecting the key destinations of Lewis Gale, Towers Shopping Center, and Carilion improving access for residents

A new route is recommended to facilitate easier travel across the region without needing to transfer in Downtown Roanoke.

Create a new east-west route (Route 2) connecting Lewis Gale, Towers Shopping Center, and Carilion. This route provides new connections while reinstating the lost connection between routes 61/62 (Brambleton Avenue) and Towers Shopping Center in the short-term due to the reallocated service to add a connection to Cave Spring.

This recommendation is based upon feedback from public input and is supported by the City of Roanoke's Comprehensive Plan, Vision 2001-2020, and the Route 419 Corridor Study.

Table 4.1-3 | Recommendation 2G - Route 2

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

Recommendation 2H: Reduce dependency on paratransit services and provide new connections for residents via a new circulator connecting key destinations in Vinton and Eastern Roanoke County

Areas in Vinton that are underserved by fixed-route transit experience high paratransit demands. Public input indicates a need for basic service coverage to destinations in Eastern Roanoke County.

Create a new hourly circulator (Route 24) to connect A Porter's Haven, Clearview Manor, Lakedrive Plaza, Downtown Vinton, East Vinton Plaza Shopping Center, and William Byrd High School.

This recommendation is based upon feedback received from the Town of Vinton, an analysis of high trip generators, and public input. This recommendation is supported by the RVTPO Bus Stop Accessibility Study.

Table 4.1-4 | Recommendation 2H - Route 24

		Current	Proposed
Days of Service		N/A	Mon-Fri
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	---
	Sunday	---	---

Recommendation 2I: Improve regional connectivity with new peak hour service between Greenfield/Daleville, Plantation Road and Downtown Roanoke providing transit access to key destinations

Businesses and employment abound in Downtown Roanoke, the Hollins/Plantation Road area, and in Greenfield/Daleville. Create a new route (Bus Route 220) with peak morning and afternoon limited stop express service between Downtown Roanoke, I-81 Exit 146/Plantation Road, and Daleville/Greenfield to provide travel options to employment sites.

This recommendation is based upon results received from the public input, through feedback from the Steering Committee and the commuter propensity analysis. It is supported by the RVTPO

Congestion Management Process Plan and the City of Roanoke's Comprehensive Plan, Vision 2001-2020.

Table 4.1-5 | Recommendation 2I - Route 220

		Current	Proposed
Days of Service		N/A	Mon-Fri
Frequency (minutes)	M-F Peak	---	75
	M-F Midday/ Evening	---	---
	Saturday	---	---
	Sunday	---	---

Recommendation 2J: Implement a new circulator connecting the communities of Clearbrook, Tanglewood, and South Roanoke County

Key regional activity centers and new businesses located in South Roanoke County and Clearbrook necessitate transit connections to provide a transportation option for moving around the southern part of the region.

Create a new hourly circulator (Route 10) to connect South County Library, Tanglewood, and Clearbrook via Starkey Road, Route 419, and Route 220 South.

This recommendation is based upon feedback received during public input, through the workforce, commuter, and non-work propensity analyses and the trip flow analysis. It is supported by the Roanoke County 2005 Community Plan and the RVTPO Congestion Management Process Plan.

Table 4.1-6 | Recommendation 2J - Route 10

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

Recommendation 2K: Create a new express service between Crossroads, Valley View, Downtown Roanoke, and Tanglewood improving efficient mobility across the region

Basic access is currently provided to Crossroads, Valley View, Downtown Roanoke, and Tanglewood; however, the local nature of the service is not time efficient for riders wanting to access the final destination. To make travel between these key regional activity centers more timely, a new express service is recommended.

Create a new limited-stop express service (Route 1000) which utilizes I-581 and U.S. 220, connecting Crossroads, Valley View, Downtown Roanoke and the Tanglewood area.

This recommendation is based upon public input, the Steering Committee, and the results of the commuter propensity analysis. The Roanoke County 2005 Community Plan, RVTPO Congestion Management Process Plan, and the City of Roanoke's Comprehensive Plan, Vision 2001-2020 support this recommendation.

Table 4.1-7 | Recommendation 2K - Route 1000

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

4.2 Route Extension/Realignment

Recommendation 2A: Improve job and retail access and circulation by extending the Star Line Trolley to connect Downtown Roanoke and Carilion Roanoke Memorial Hospital to Towers Shopping Center and Carilion Clinic on Franklin Road

New residences, businesses, and a growing medical community around Carilion will benefit from being better connected through an extension of the trolley service to include nearby restaurants and shopping.

Extend the Star Line Trolley from the Crystal Spring Medical Building to Towers Shopping Center and Carilion Clinic on Franklin Road. A reverse service enables people to travel from Franklin Road businesses to Towers Shopping Center and back to Carilion Roanoke Memorial Hospital and Downtown Roanoke; add 30-minute evening service and weekend service.

This recommendation is based upon feedback received from public input.

Table 4.2-1 | Recommendation 2A - Star Line Trolley

		Current	Proposed
Days of Service		Mon-Fri	Mon-Fri
Frequency (minutes)	M-F Peak	15	15
	M-F Midday	10	10
	M-F Evening	---	30
	Saturday	---	30
	Sunday	---	30

4.3 Other Service Changes

Recommendation 2B: Improve the attractiveness of transit between Cave Spring and Downtown Roanoke by adding peak hour service between these key activity centers

Increase peak frequency on Routes 61/62 to every 30 minutes to encourage transit use between these key destinations by making it more convenient to residents and to encourage non-auto access to Downtown Roanoke.

This recommendation is based upon feedback received from public input and the trip flow analysis.

Table 4.3-1 | Recommendation 2B - Routes 61/62

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sat
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	60
	Saturday	60	60
	Sunday	---	---

Recommendation 2C: Improve convenience and access to medical services by enhancing midday and evening service, and add Sunday service between the VA Medical Center and Downtown Roanoke

Increase midday/evening frequency of Routes 75/76 to every 30 minutes and add Sunday service.

This recommendation is based upon results from the non-work propensity analysis.

Table 4.3-2 |Recommendation 2C - Routes 75/76

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

Recommendation 2D: Improve jobs access and regional connectivity by enhancing service between Salem/Lakeside Plaza and Downtown Roanoke

Consolidate Routes 81/82 into realigned Routes 91/92 (see short-term recommendation 1H), which in the medium-term would have increased frequency (30 minutes all day on weekdays) and added Sunday service.

This recommendation is based upon results from the non-work propensity analysis.

Table 4.3-3 | Recommendation 2D - Routes 81/82 and Routes 91/92

		Current Routes 81/82	Proposed Routes (Short Term) 91/92	Proposed Routes 91/92
Days of Service		Mon-Fri	Mon-Sun	Mon-Sun
Frequency (minutes)	M-F Peak	30	60	30
	M-F Midday/ Evening	60	60	30
	Saturday	---	60	60
	Sunday	---	60	60

4.4 Summary of Medium-Term Recommendations

A summary of the medium-term recommendations is provided in the following table. To support these recommendations, additional recommendations related to regional connections and facilities should be considered as needed to support the new and improved services as described in **Sections 6.0 and 7.0** of this document.

Table 4.4-1 | Summary of Medium-Term Recommendations

#	MEDIUM-TERM RECOMMENDATION	TYPE
2A	*Improve job and retail access and circulation by extending the Star Line Trolley to connect Downtown Roanoke and Carilion Roanoke Memorial Hospital to Towers Shopping Center and Carilion Clinic on Franklin Road*	Route Extension/ Realignment Star Line Trolley
2B	*Improve the attractiveness of transit between Cave Spring and Downtown Roanoke by adding peak hour service between these key activity centers*	Other Service; Routes 61/62
2C	*Improve convenience and access to medical services by enhancing midday and evening service, and add Sunday service between the VA Medical Center and Downtown Roanoke*	Other Service; Routes 75/76
2D	*Improve jobs access and regional connectivity by enhancing service between Salem/Lakeside Plaza and Downtown Roanoke*	Other Service; Routes 81/82
2E	*Create a new cross-town connection between Salem/Lakeside Plaza and Crossroads/Valley View connecting Salem with key activity centers*	New Route 3
2F	*Create a new connection providing access between Greenfield/Daleville, Bonsack, and Downtown Roanoke*	New Route 8
2G	*Create new cross-town service connecting the key destinations of Lewis Gale, Towers Shopping Center, and Carilion improving access for residents*	New Route 2
2H	*Reduce dependency on paratransit services and provide new connections for residents via a new circulator connecting key destinations in Vinton and Eastern Roanoke County*	New Route 24
2I	*Improve regional connectivity with new peak hour service between Greenfield/Daleville, Plantation Road and Downtown Roanoke providing transit access to key destinations*	New Route 220
2J	*Implement a new circulator connecting the communities of Clearbrook, Tanglewood, and South Roanoke County*	New Route 10
2K	*Create a new express service between Crossroads, Valley View, Downtown Roanoke, and Tanglewood improving efficient mobility across the region*	New Route 1000

5.0 LONG-TERM RECOMMENDATIONS (2030-2040)

The long-term recommendations further enhance the level of transit service throughout the region by increasing frequency, increasing the hours of service, adding weekend services and adding new routes within the existing service area. This term also recommended routes outside the existing service area that would connect to new areas in Troutville and North Roanoke County between Peters Creek Road and Route 419.

The long-term recommendations identify the transit service needs that should be addressed within the 10-year period between 2030 and 2040. **Figure 5.0-1** illustrates the recommendations being made in the following section.

These types of improvements are vital to ensure that the Roanoke Valley can improve upon the quality of life for its residents. Increasing the frequency makes routes more convenient for existing riders, and it makes transit attractive to new riders by making it a viable alternative to the automobile for a wider variety of trips. New connections with new transit service means that a wider variety of locations will be accessible to a larger portion of the population. With the realization of the recommendations of this plan citizens will be able to travel to all of the major destinations in the Valley via transit.

Frequent transit service is transformative!

It supports and encourages a denser and mixed-use development of land use which in turn increases property value and quality of life.

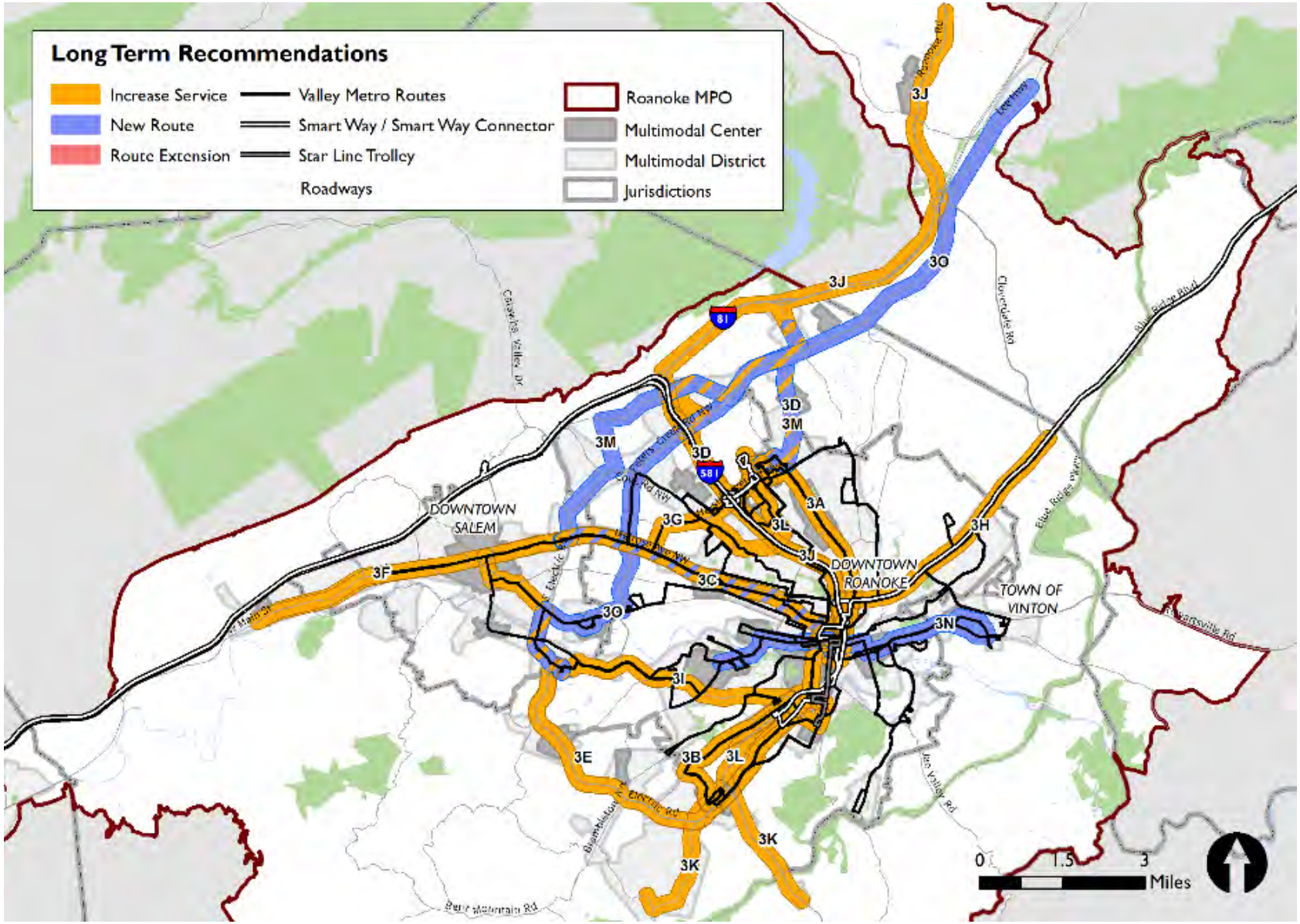
The long-term recommendations improve the quality of service for 66% of the population (75,000) and 80% of the jobs (67,000) in the short-term service area, as shown in the table below.

Table 5.0-1 | Long-Term Recommendation Benefits

	Medium Term Service Area	Long Term Service Area	Improved Service[5]	Percent Growth in Population Served	Percent Improved Service[6]
Population	114,512	116,722	75,168	2%	66%
Jobs	85,087	87,647	67,806	3%	80%
Households	49,900	50,670	33,051	2%	66%

[5] Includes areas being served by existing routes that have recommendations for increased span or frequency, or a new route overlaid.
[6] Percent of short term service area population receiving improved service.

Figure 5.0-1| Conceptual Map of Additional Recommendations for the Long-Term



5.1 New Routes

Recommendation 3M: Create a new connection between Salem and Crossroads via DMV/Plantation Road providing new access to area residents to key destinations and services

New service from Goodwill Salem/Lakeside Plaza at Route 419/East Main Street to Crossroads via the DMV, Green Ridge Road, Peters Creek Road, Plantation Road and Williamson Road. This recommendation builds off the short-term recommendation 1A, by providing an hourly bus bi-directionally between Salem, North Roanoke County, and the City of Roanoke.

This recommendation is based upon results from the commuter propensity analysis and is supported by the Hollins Area Plan, City of Roanoke Comprehensive Plan-Vision 2001-2020, Roanoke County 2005 Community Plan, City of Salem Comprehensive Plan, and the RVTPO Congestion Management Process Plan.

Table 5.1-1 | Recommendation 3M - Route 7

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

Recommendation 3N: Quick and continuous connections between Grandin Village, Downtown Roanoke, and Downtown Vinton

The Grandin Village, Downtown Roanoke, and Downtown Vinton all offer unique opportunities to live a car-light lifestyle and are in close proximity to each other. As these activity centers and the neighborhoods between them continue to grow and attract residents and employees that appreciate a multimodal lifestyle, a more robust transit connection throughout the day will strengthen these communities.

The new Route 7135 would complement Routes 71/72 and 35/36 to provide increased frequency, every 30 minutes, on the portion of those routes between Grandin Village, Downtown Roanoke, and Downtown Vinton/Kroger on Hardy Road.

This recommendation is based upon public input and the results from the residential propensity analysis. It is supported by the Vinton Area Corridors Plan, the RVTPO Congestion Management Process Plan, and the City of Roanoke's Comprehensive Plan, Vision 2001-2020.

Table 5.1-2 | Recommendation 3N - Route 7135

		Current	Proposed
Days of Service		N/A	Mon-Fri
Frequency (minutes)	M-F Peak	---	---
	M-F Midday/ Evening	---	60
	Saturday	---	---
	Sunday	---	---

Recommendation 3O: New service connecting residents and businesses between Troutville, Hollins, the VA Medical Center and Lewis Gale

As the U.S. 11 corridor grows in North Roanoke County and Botetourt County, a new cross-town connector will provide travel options for citizens between these areas and the Salem medical centers.

A new hourly route connecting Troutville, Hollins, the VA Medical Center and Lewis Gale is recommended that provides new access for residents to key destinations and services and improves regional connectivity.

This recommendation is needed to provide a basic coverage connection for residents between growing areas in the north part of the region, key destinations, and services. Improved access to employment centers and a non-auto travel option would be provided.

This recommendation is supported by the RVTPO Congestion Management Process Plan and the City of Salem Comprehensive Plan.

Table 5.1-32 | Recommendation 3O - Route 117

		Current	Proposed
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	---	30
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

5.2 Other Service Changes

Recommendation 3A: Create a highly connected, activity filled corridor between Crossroads Shopping Area and Downtown Roanoke

To make it easier and more attractive for people to travel to/from destinations along Williamson Road, around Crossroads and Downtown Roanoke, additional service frequency is recommended.

Increase peak frequency in the Williamson Road corridor on Routes 21/22 to every 15 minutes and add Sunday service.

This recommendation is based upon feedback from the frequent corridor propensity analysis. It is supported by the RVTPO Congestion Management Process Plan and the City of Roanoke's Comprehensive Plan, Vision 2001-2020.

Table 5.2-1 | Recommendation 3A - Routes 21/22

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	30	15
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

Recommendation 3C: Create a high frequency corridor between Downtown Salem and Downtown Roanoke

As land in the corridor between Downtown Roanoke and Downtown Salem is developed, the density of destinations and people increases to a level that supports higher frequency transit service.

Add Routes 81/82 back into the system (in medium-term recommendation 2D, they were consolidated into Routes 91/92); this recommendation results in a 15-minute frequency along this corridor when combined with Routes 91/92.

This recommendation is supported by the frequent corridor propensity analysis and the RVTPO Congestion Management Process Plan.

Table 5.2-2 | Recommendation 3C – Routes 81/82

		Proposed Medium Term	Proposed Long Term
Days of Service		---	Mon-Fri
Frequency (minutes)	M-F Peak	---	30
	M-F Midday/ Evening	---	---
	Saturday	---	---
	Sunday	---	---

Recommendation 3E: Create more convenient, easy access between Carilion and Salem via quicker connections between the activity centers along Route 419

On the short-term proposed Route 4/5, connecting Carilion-Tanglewood, Cave Spring, Oak Grove, Lewis Gale, and Downtown Salem, add midday service at every 30 minutes.

This recommendation is supported by the Roanoke County 2005 Community Plan, the RVTPO Congestion Management Process Plan, and the City of Salem Comprehensive Plan.

Table 5.2-3 | Recommendation 3E - Routes 4/5

		Proposed Short Term	Proposed Long Term
Days of Service		Mon-Sun	Mon-Sun
Frequency (minutes)	M-F Peak	30	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	60	60

Recommendation 3F: Create a high frequency corridor between Glenvar and Salem

Similar to Recommendation 3C, increase peak frequency on Routes 911/922 to every 30 minutes. Combined with Route 91/92 this creates a 15-minute frequency between Glenvar and Salem.

This recommendation is supported by the frequent corridor propensity analysis, the Glenvar Community Plan, and the City of Salem Comprehensive Plan.

Table 5.2-4 | Recommendation 3F - Routes 911/922

		Current	Proposed
Days of Service		Mon-Fri	Mon-Fri
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	---	---
	Saturday	---	---
	Sunday	---	---

Recommendation 3H: Enhance the connection between Bonsack and Downtown Roanoke and add Sunday service

Increase frequency to 30 minutes during peak and midday and add Sunday service on Route 8, which was created in the medium-term (Recommendation 2F).

This recommendation is based upon public input, and through the workforce propensity and Home-Based Work trip flow analyses.

Table 5.2-5 | Recommendation 3H - Route 8

		Proposed Medium Term	Proposed Long Term
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

Recommendation 3I: Create easy access and improve connectivity between Lewis Gale, Towers Shopping Center, and Carilion

Increase peak and midday frequency to 30 minutes and add Sunday service on Route 2, which was created in the medium-term (Recommendation 2G).

Table 5.2-6 | Recommendation 3I - Route 2

		Proposed Medium Term	Proposed Long Term
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

Recommendation 3B: Create a high frequency corridor between Tanglewood Mall and Downtown Roanoke

With a redeveloped Tanglewood area, more trips will be generated from the area and attracted to the area. Two key activity generators in the region become connected with high quality transit service with this recommendation.

Add 15-minute peak service between Tanglewood and Downtown Roanoke; increase weekend service frequencies.

This recommendation is supported by the frequent corridor propensity analysis.

Table 5.2-7 | Recommendation 3B - Routes 55/56

		Current	Proposed
Days of Service		Mon-Sat	Mon-Sun
Frequency (minutes)	M-F Peak	30	15
	M-F Midday/ Evening	60	30
	Saturday	60	30
	Sunday	---	30

Recommendation 3G: Make the connection between Salem and Crossroads more appealing to more people through increased frequency.

Increase peak and midday frequency to 30 minutes on the new Route 3 between Salem/Lakeside Plaza and Crossroads, which was created in the medium-term (Recommendation 2E).

Table 5.2-8 | Recommendation 3G - Route 3

		Current	Proposed
Days of Service		Mon-Sun	Mon-Sun
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	60	60

Recommendation 3D: Create easy access and improve connectivity between Hollins/Plantation Road and the DMV

Increase weekday frequency to 30 minutes and add Saturday/Sunday service to Route 1, which was created in the short-term (Recommendation 1K).

This recommendation is supported by the Hollins Area Plan, the City of Roanoke's Comprehensive Plan, Vision 2001-2020, the Roanoke County 2005 Community Plan, and the RVTPO Congestion Management Process Plan.

Table 5.2-9 | Recommendation 3D - Route 1

		Proposed Short Term	Proposed Long Term
Days of Service		Mon-Fri	Mon-Sun
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	30
	Saturday	---	60
	Sunday	---	60

Recommendation 3J: Provide a consistent all-day connection between Greenfield/Daleville via Plantation Road to Downtown Roanoke

Increase the frequency on the new "Bus Route 220", which was created in the medium-term (Recommendation 2I), to hourly all-day service and add Saturday service.

This recommendation is based upon public input, Steering Committee input, and the results from the commuter propensity analysis. It is supported by the Hollins Area Plan, the RVTPO Congestion Management Process Plan, and the Roanoke County 2005 Community Plan.

Table 5.2-10 | Recommendation 3J - Route 220

		Proposed Medium Term	Proposed Long Term
Days of Service		Mon-Fri	Mon-Sat
Frequency (minutes)	M-F Peak	75	60
	M-F Midday/ Evening	---	60
	Saturday	---	60
	Sunday	---	---

Recommendation 3K: Enable improved mobility between Clearbrook, Tanglewood, and the South County Library

Increase peak frequency to every 30 minutes on Route 10, which was created in the medium-term (Recommendation 2J).

This recommendation is supported by the RVTPO Congestion Management Process Plan and the Roanoke County 2005 Community Plan.

Table 5.2-11 | Recommendation 3K - Route 10

		Proposed Short Term	Proposed Long Term
Days of Service		N/A	Mon-Sat
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	60
	Saturday	60	60
	Sunday	---	---

Recommendation 3L: Enable quick and easy connections between Crossroads/Valley View, Downtown Roanoke, and Tanglewood

Increase weekday frequency to 30 minutes and add Sunday service to Route 1000, which was created in the medium-term (Recommendation 2K).

This recommendation is based upon public input, the Steering Committee, and the results of the commuter propensity analysis. It is supported by the RVTPO Congestion Management Plan, the City of Roanoke's Comprehensive Plan, Vision 2001-2020, and Roanoke County's 2005 Community Plan.

Table 5.2-12 | Recommendation 3L - Route 1000

		Proposed Medium Term	Proposed Long Term
Days of Service		N/A	Mon-Sun
Frequency (minutes)	M-F Peak	60	30
	M-F Midday/ Evening	60	30
	Saturday	60	60
	Sunday	---	60

5.3 Summary of Long-Term Recommendations

A summary of the long-term recommendations is provided in the following table. To support these recommendations, additional recommendations related to regional connections and facilities should be considered as needed to support the new and improved services as described in **Sections 6.0 and 7.0** of this document.

Table 5.3-1 | Summary of Long-Term Recommendations

#	LONG-TERM RECOMMENDATION	TYPE
3A	*Create a highly connected, activity filled corridor between Crossroads Shopping Area and Downtown Roanoke*	Other Service; Routes 21/22
3B	*Create a high frequency corridor between Tanglewood Mall and Downtown Roanoke*	Other Service; Routes 55/56
3C	*Create a high frequency corridor between Downtown Salem and Downtown Roanoke*	Other Service; Routes 81/82
3D	*Create easy access and improve connectivity between Hollins/Plantation Road and the DMV*	Other Service; Route 1/ Recommendation 1K
3E	*Create more convenient, easy access between Carilion and Salem via quicker connections between the activity centers along Route 419*	Other Service; Route 4/5
3F	*Create a high frequency corridor between Glenvar and Salem*	Other Service; Routes 911/922
3G	*Make the connection between Salem and Crossroads more appealing to more people through increased frequency.*	Other Service; Route 3/ Recommendation 2E
3H	*Enhance the connection between Bonsack and Downtown Roanoke and add Sunday service*	Other Service; Route 8/ Recommendation 2F
3I	*Create easy access and improve connectivity between Lewis Gale, Towers Shopping Center, and Carilion*	Other Service; Route 2/ Recommendation 2G
3J	*Provide a consistent all-day connection between Greenfield/Daleville via Plantation Road to Downtown Roanoke*	Other Service; Route 220/ Recommendation 2I
3K	*Enable improved mobility between Clearbrook, Tanglewood, and the South County Library*	Other Service; Route 10/ Recommendation 2J
3L	*Enable quick and easy connections between Crossroads/Valley View, Downtown Roanoke, and Tanglewood*	Other Service; Route 1000/ Recommendation 2K
3M	*Create a new connection between Salem and Crossroads via DMV/Plantation Road providing new access to area residents to key destinations and services*	New Route; Route 7
3N	*Quick and continuous connections between Grandin Village, Downtown Roanoke, and Downtown Vinton*	New Route; Route 7135
3O	*New service connecting residents and businesses between Troutville, Hollins, the VA Medical Center and Lewis Gale*	New Route; Route 117

6.0 REGIONAL CONNECTIONS RECOMMENDATIONS

The Roanoke Valley is the largest urban area in Southwest Virginia. As such, there is a desire for places outside the Valley to be better connected to it for a number of reasons such as access to medical services, jobs, shopping, and entertainment, as well as transferring to other regional transportation via the Roanoke-Blacksburg Regional Airport, the future Roanoke Amtrak station or intercity buses. Connections are already present with Christiansburg and Blacksburg and should be expanded to enable a connection with Amtrak's daily departures and arrivals. The Plan's public involvement process uncovered several places where a transit connection with the Roanoke Valley is desired including:

- ALLEGHANY HIGHLANDS (ALLEGHANY COUNTY, COVINGTON, AND CLIFTON FORGE)
- BEDFORD
- HARRISONBURG
- LYNCHBURG
- MARTINSVILLE
- RADFORD
- ROCKY MOUNT
- SMITH MOUNTAIN LAKE AREA (FRANKLIN AND BEDFORD COUNTIES)

Each of the places listed above have their own unique draws which would benefit from being better connected to the Roanoke Valley for purposes such as tourism, access to education, and jobs.

In addition to connecting people to Amtrak in Roanoke, there is particular interest in a transit connection between the Roanoke Valley and Amtrak's Cardinal line service. The train makes a stop in Clifton Forge as it travels between Chicago-Indianapolis-Cincinnati-Washington DC-New York as follows:

- #51 TRAIN TRAVELING FROM NEW YORK TO CHICAGO MAKES A STOP IN CLIFTON FORGE ON SUNDAYS, WEDNESDAYS, AND FRIDAYS AT 4:13 P.M.
- #50 TRAIN TRAVELING FROM CHICAGO TO NEW YORK MAKES A STOP IN CLIFTON FORGE ON SUNDAYS, WEDNESDAYS, AND FRIDAYS AT 12:44 P.M.

A transit service available from the Roanoke Valley would make the Cardinal train a long-distance travel option for more people.

The feasibility of providing a transit connection with these regional destinations should be studied in the short-term.

7.0 FACILITY RECOMMENDATIONS

This section discusses facility recommendations to support transit operations including transfer facilities, bicycle and pedestrian facilities, park-and-ride facilities, bikeshare opportunities, and storage, maintenance, and administrative facilities.

7.1 Transfer Facilities Overview

A Transit Transfer Facility (TTF) is a location where two or more transit routes and/or modes (bus, train, etc.) share a common hub and where some level of amenities for passengers are provided. The primary function of a TTF is to improve connectivity of the system by bringing transit routes together in logical locations. This provides additional opportunities for users to transfer either between transit routes, transportation modes, or even different transit providers, expanding access via transit throughout the region. Examples include landmark stations served by many local routes and transportation modes and small transfer points served by a few local services and rural transit providers. By pooling resources to invest in a hub jointly used by multiple providers, these facilities may feature comfortable waiting areas, local art or décor, information kiosks, and other amenities.[7]

[7] TCRP Report 173: Improving Transit Integration among Multiple Providers. Volume I: Transit Integration Manual.

Transit transfer facilities should be the pride of the transit system. As visible hubs of a thriving transit network, they are a reflection of community values; providing customers with an inviting, safe, and comfortable user experience is paramount.

A Livable Roanoke Valley requires a future transit system with world-class transit facilities. The scale of TTFs in the region are broken into three categories: Small, Medium, and Large. At a minimum, TTFs will provide a number of key passenger amenities such as real-time information, trash cans, shelters, and lighting. All TTFs should be easily accessed by pedestrians and bicyclists, connect to nearby destinations, and provide bicycle racks. Centers that serve a large number of cyclists can include secure bicycle parking as well. The extent of infrastructure at transit centers will depend on the level of service and importance of each facility (**Table 7.1-1**).

Table 7.1-1 | Infrastructure at Transit Transfer Facilities

Amenity	Small Transfer Facility	Medium Transfer Facility	Large Transfer Facility
ADA Accessible Boarding/Alighting Area	●	●	●
Flag Sign with Basic Route Information	●	●	●
Seating	●	●	●
Shelter	●	●	●
Trash Receptacle	●	●	●
Lighting	●	●	●
Detailed Route Information	●	●	●

Amenity	Small Transfer Facility	Medium Transfer Facility	Large Transfer Facility
System Map	●	●	●
Real-Time Information Displays	●	●	●
Ticket Vending Machines	●	●	●
Bike Racks	●	●	●
Bathrooms		●	●
Information Kiosk		●	●
Indoor Seating			●
Staff (fare sales and information)			●

Small TTFs are located at minor transfer points, facilitating linkages between transit services. Because of their lower expected ridership, these facilities are small scale facilities located largely in curb-side settings. A premium version is shown in **Figure 7.1-1**[8], with a bus shelter, real-time information, security cameras, lighting, and benches. As these TTFs do not handle a large number of routes, bus layover space can be accommodated with a concrete bus pad instead of dedicated bus bays or a bus loop. In many cases, a Small TTF will only need to be a large shelter with multiple benches and other enhanced amenities. When small TTFs are located in activity centers, pedestrian and bicycle accommodations should connect the TTF to nearby destinations.

Figure 7.1-1 | Examples of Small-Scale Transit Transfer Facility

Mid-size TTFs represent the next step up in the hierarchy. Like those pictured in **Figure 7.1-2**, these are larger facilities, typically located off-street, that can accommodate connections to

[8] Photo Credit: Wikimedia.org (top); timberframes.org (bottom)

multiple routes as well as in some instances multi-modal transfers. These facilities feature a bus loop and dedicated layover area to accommodate the higher level of traffic expected at such locations. In addition to the features provided at small TTFs, mid-size TTFs should have dedicated restroom facilities and at least part-time staffing to provide enhanced security and surveillance of the facility. Finally, these TTFs may include passenger drop-off areas (i.e. kiss-and-rides).

Figure 7.1-2 | Example of Medium-Size Transit Transfer Facility in Seattle Region

Large TTFs represent the most important transfer nodes within the entire regional transit system. As capstones of the transit network they are the heart of a mobile community. As an icon of a proud citizenry, their attractiveness and ease of use directly contribute to people's desire and decision to use transit. These facilities should be able to accommodate a large number of transit connections through an off-road bus loop, bus bays, and layover areas. The facilities should include kiss-and-rides to allow passengers to be dropped off and picked up (**Figure 7.1-3**).

Furthermore, depending on the location, large transit centers can include park-and-ride facilities. Large TTFs should include indoor waiting areas, restrooms, and a full-time staff presence to serve customers and provide an enhanced security presence.

Large TTFs have the potential to benefit their surroundings greatly by capitalizing on the number of people that can utilize transit to get to/from nearby destinations; they are prime locations for adjacent high density business and residential areas.

Figure 7.1-3 | Example of Large-Scale Transit Transfer Facility in Las Vegas

7.2 Transit Transfer Facility Recommendations

Proposed TTFs are defined at three levels: Small Transit Center, Medium Transit Center, and Large Transit Center. Recommendations for TTFs throughout the region are provided in **Table 7.2-1**.

Table 7.2-1 | Recommended Size of Proposed Transit Transfer Facilities in the Region

Recommended Transit Center Size	Facility	Phase
Small Transit Transfer Facility	Crossroads/Airport	Short-Term
	Valley View Mall	Short-Term
	Downtown Salem	Short-Term
	Salem VA Medical Center	Short-Term
	Lewis Gale Medical Center	Short-Term
	Cave Spring	Short-Term
	Tanglewood	Short-Term
	Carilion Roanoke Memorial Hospital	Short-Term
	Vinton	Mid-Term
	Hollins	Long-Term
	Salem (460/419 intersection)	Long-Term
Medium Transit Transfer Facility	Crossroads/Airport	Mid-Term
	Carilion Roanoke Memorial Hospital	Mid-Term
	Tanglewood	Long-Term
	Lewis Gale Medical Center	Long-Term
Large Transit Transfer Facility	Downtown Roanoke	Short-Term

The results of the analysis illustrate the need for new TTFs throughout the region to support the proposed route recommendations (See **Figure 7.2-31, Figure 7.2-2,** and **Figure 7.2-3).** The recommended locations depicted denote general areas where a facility is deemed necessary to provide system connectivity, not precise locations. More precise locations for each facility would be determined through further study and in concert with implementation of the phased route recommendations included in the plan. Each figure only shows the TTFs for each phase; for clarity, recommendations from the previous phase are not carried through.

Much like the phased approach described for fixed-route services, in many cases it may be more efficient to begin with smaller facilities and increase their size and amenities as transit service and user activity increases. The risk with this approach is the inability to acquire sufficient space for growth in future years.

If the Transit Vision Plan recommendations are realized, the system will ultimately include seven small TTFs, four medium TTFs, and one large TTF providing crucial amenities and information to users throughout the system.

7.2.1 Downtown Roanoke

The network analysis (described in **Part 4: Preferences and Demand**) illustrates the importance of Downtown Roanoke to the regional transportation system. According to the regional travel demand model 50% of all trips in the region pass through the Downtown area. This is a result of both its status as a cultural, social, and employment center, and the historic development of transportation infrastructure in the area, the latter of which has been shaped by natural features such as Mill Mountain, Read Mountain, and the Roanoke River. The railroads, an important part of the Roanoke economy since the mid-1800's, have also played a significant role in shaping the local roadway network by creating east-west and north-south barriers

to transportation. Given the cost of bridges and tunnels, and the desire to preserve natural habitat, certain limitations to the Roanoke area transportation infrastructure have resulted in the funneling of many trips to and through Downtown Roanoke.

As a result, Downtown Roanoke will remain the most important location for transit service for the foreseeable future. The current bus system utilizes the Campbell Court facility in Downtown Roanoke for its pulse service, whereby all buses arrive and depart on the same schedule. Given the recommendations of the Transit Vision Plan, this system will evolve over time; some routes, and particularly new routes, will no longer follow this pattern. Nevertheless, the importance of a centralized transit hub for the region in this location will remain.

A large transit transfer multimodal facility is needed in Downtown Roanoke for several reasons.

1. Downtown Roanoke will continue to be the primary hub of cultural, social, and employment activities where a significant number of trips are destined. As such, the presence of a multimodal transit facility in Downtown Roanoke is critical to the continued and future success of alternative modes to passenger vehicles for daily activities and special events.
2. The benefits of co-locating multiple modes in a single location are well established. First and foremost, a facility with multiple transportation services makes transfers between these services convenient, encouraging their use. Second, efficiencies are gained with parking, amenities, information, and fare services reducing the costs and footprint of these services in the urban core. These benefits extend beyond the facility itself. Studies have shown that required parking spaces can be reduced by 30 and 50 percent, respectively, for office and retail development in transit-intensive areas.[9]
3. Transit operating frequencies as described in this Vision are insufficient to eliminate the pulse system altogether.
4. Transfers will continue to be needed between routes to facilitate movement throughout the region. For geographic purposes, this transfer option is most suited to be located in Downtown Roanoke.
5. Despite claims to the contrary, well planned and designed transit services and facilities increase the value of surrounding real estate, increase retail sales, increase wages[10], and significantly contribute to the ability for businesses to attract and retain employees[11]. 54 percent of millennials would consider moving to a new city if it offered a wider and better range of transportation options.[12]

As such, it is recommended that a large transfer facility continue to be located in Downtown Roanoke.

The current facility at Campbell Court has served the region well for over 30 years. Changes have occurred since the building was converted into a bus transfer station, and Valley Metro operators and staff have adapted exceptionally well given the

[9] American Public Transportation Association (APTA) "Benefits of Public Transit: Relieving Traffic Congestion," 2007: http://www.apta.com/resources/reportsandpublications/Documents/congestion.pdf
[10] http://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx
[11] http://www.citylab.com/work/2013/08/public-transit-worth-way-more-city-you-think/6532/

[12] The Rockefeller Foundation. "2014 Public Opinion Survey of Millennials," 2014

constraints of the site. These changes have included meeting the minimum ADA accessibility standards; accommodating wheelchair lifts and bicycles on buses; accommodating the increasing number of passengers using mobility devices; the ongoing replacement of the fleet to a new standard width of buses from 96" to 102"; accommodating more routes and vehicles in the facility; and the growing number of special events taking place in Downtown Roanoke. While Valley Metro has been able to adapt, these constraints still make it challenging for bus operators and passengers alike to maneuver through the facility and maintain consistent operations.

With the onset of passenger rail in 2017, the need to accommodate more intermodal transfers will increase, and the utility of easy transfers for visitors through this gateway into the Valley will become even more valuable. As the region envisions a healthy, livable, multimodal future, the Downtown Roanoke intermodal facility should be a place where residents and visitors enjoy their transportation experience.

For the reasons stated in this Transit Vision Plan, and per the recommendations of the Downtown Roanoke Intermodal Transportation Study, developing a new attractive multimodal facility, with high quality amenities and services for users as well as comfortable space for traveling through the facility, making connections, and maintaining consistent daily operations, is recommended. Ultimately, whether transfers in Downtown Roanoke continue at Campbell Court or a new facility (site to be determined) will be up to Roanoke City Council, the Greater Roanoke Transit Company, and other stakeholders to decide.

Figure 7.2-1 | Conceptual Map of Short-Term Transit Transfer Recommendations

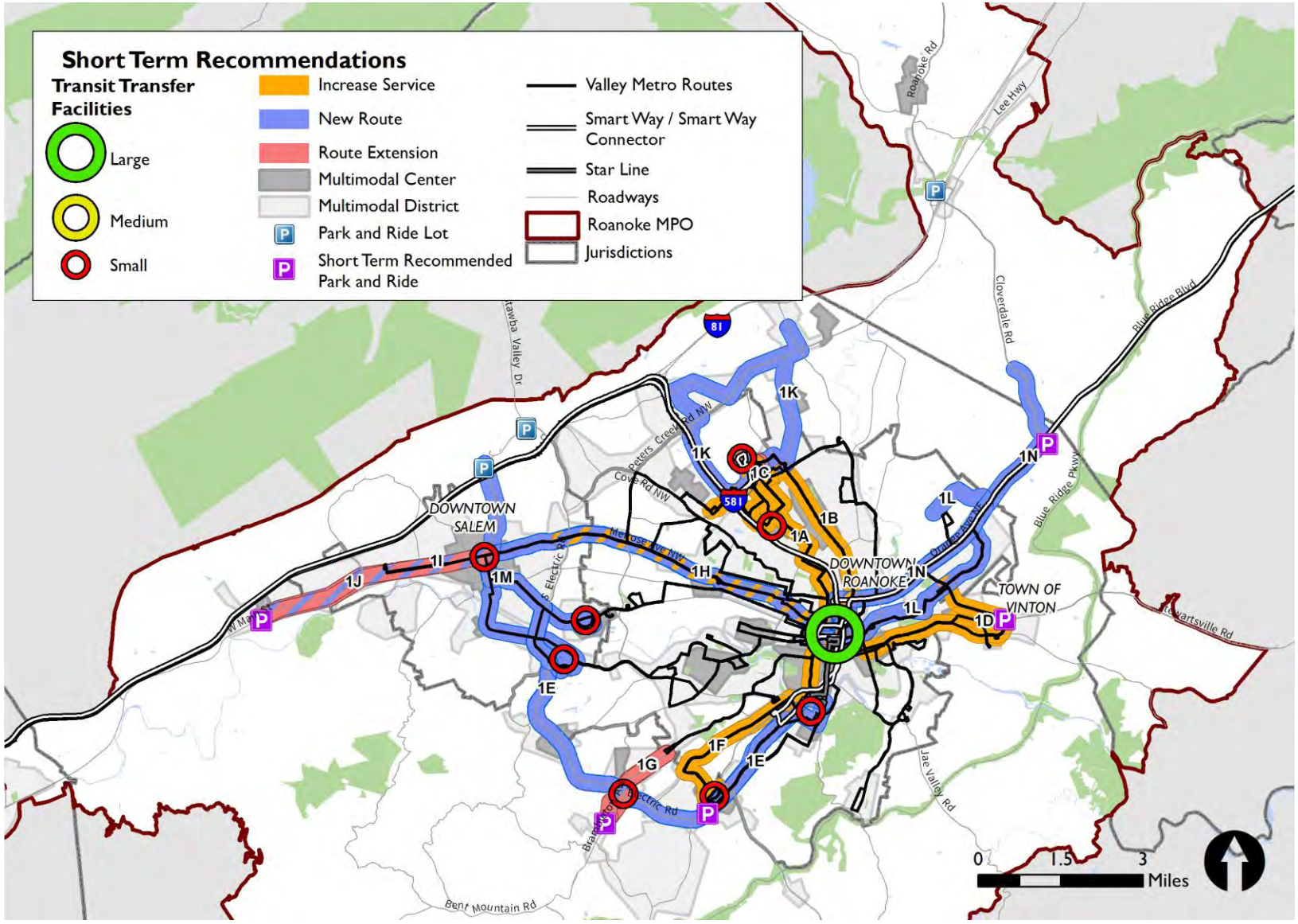


Figure 7.2-2 | Conceptual Map of Additional Medium-Term Transit Transfer Recommendations

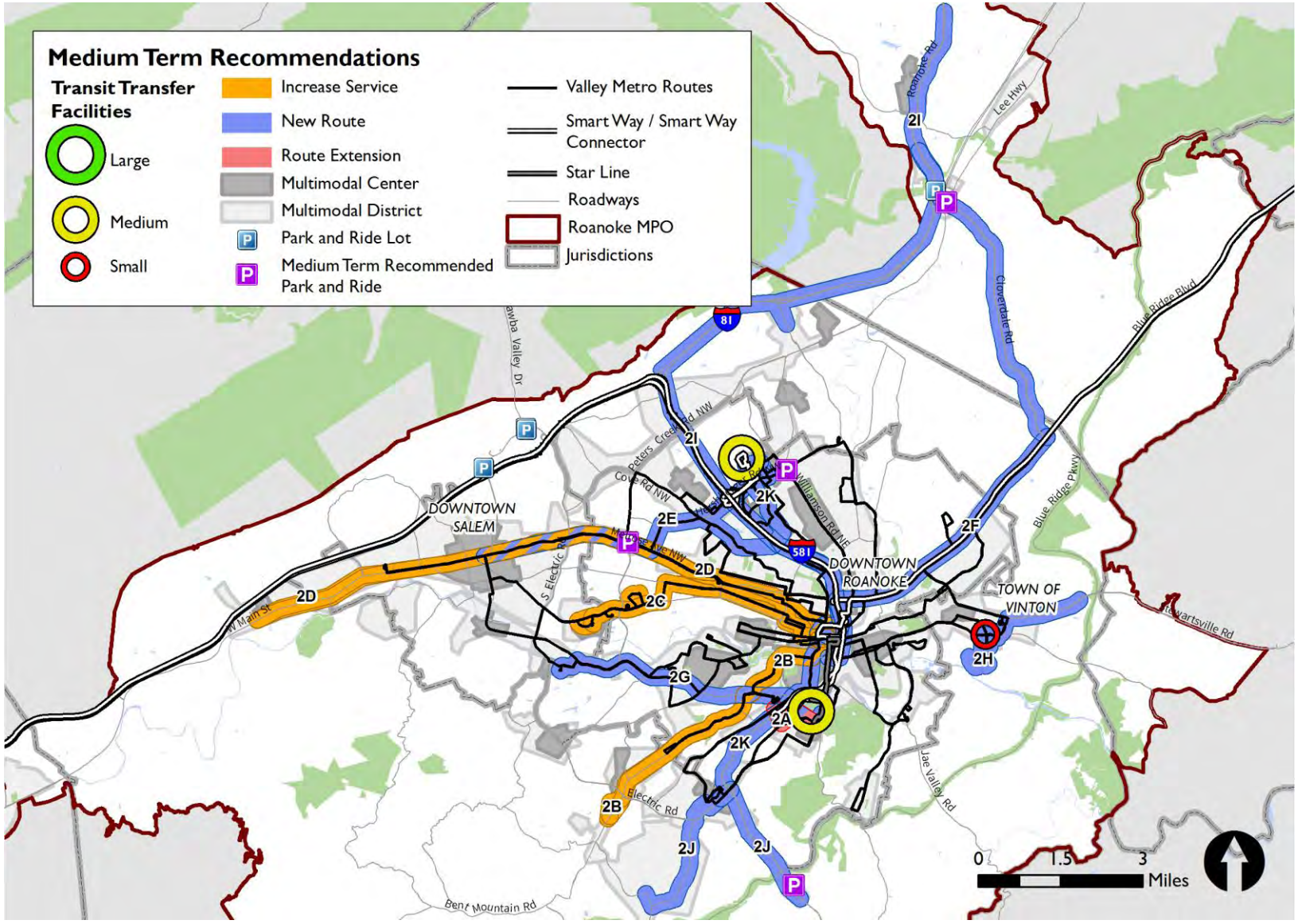
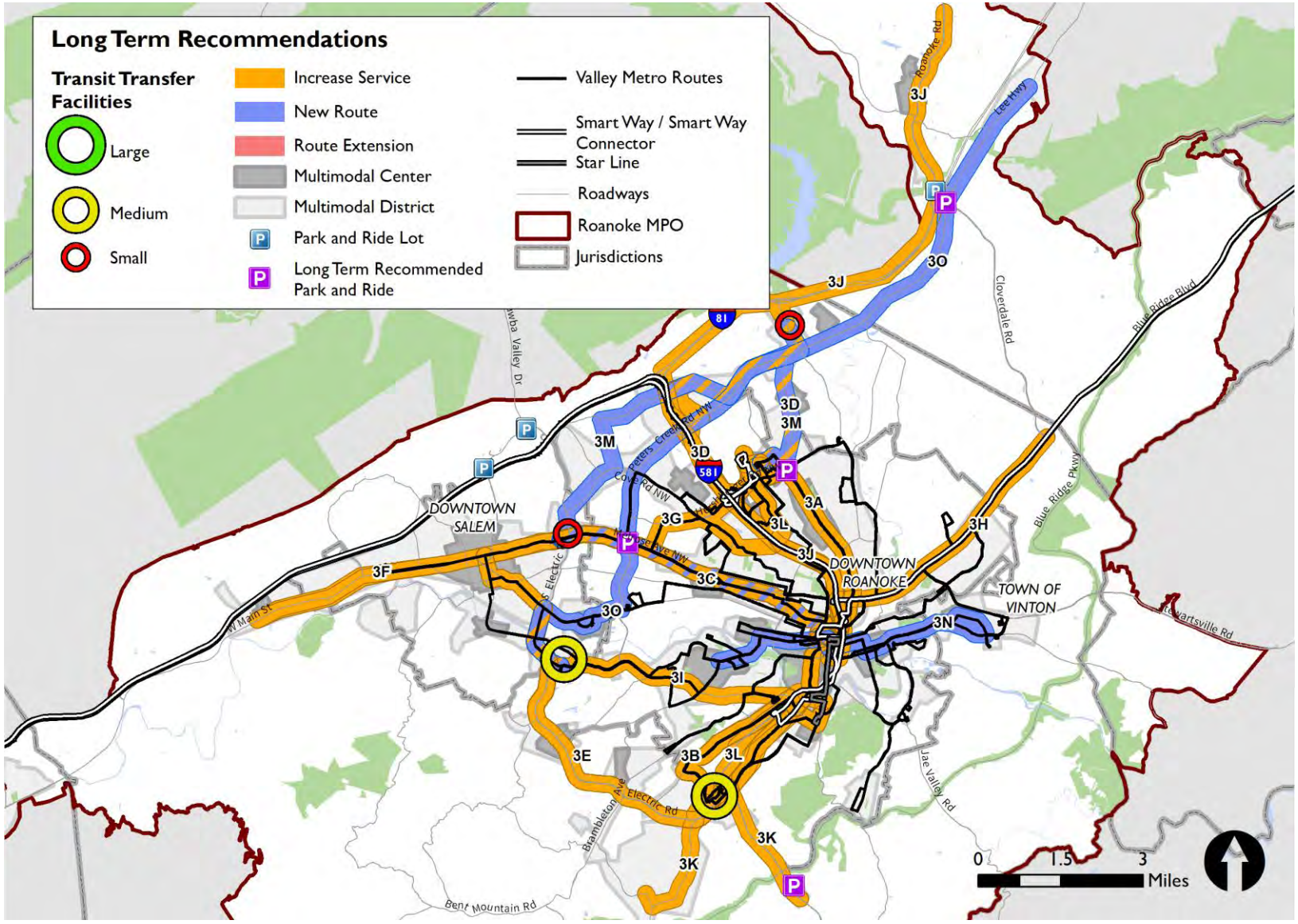


Figure 7.2-3 | Conceptual Map of Additional Long-Term Transit Transfer Recommendations



7.3 Pedestrian Accommodations

7.3.1 Passenger Amenities

To support the recommendations of the Roanoke Transit Vision the following amenity standards are proposed that will guide the provision of transit amenities across the region. These standards call for every bus stop to have proper signage and ADA access where feasible. These amenity standards call for additional stop features based on ridership and service hours like lighting and trash receptacles at bus stops. Additional convenience features such as real-time arrival displays and fare vending machines should be provided at key locations such as transit transfer facilities and along future high-frequency bus corridors.

Table 7.3.1-1| Recommended Bus Stop Amenities

Amenity	Threshold
ADA Accessible Boarding/Alighting Area	All stops (where feasible)
Flag Sign with Basic Route Information	All stops
Seating	25 boardings/day or stops serving special populations (senior, disabled, etc.)
Shelter	50 boardings/day
Trash Receptacle	All stops with shelters or where litter is a problem.
Lighting	All stops with evening or early morning service.
Full Route Information	10 boardings/day
System Map	All stops with shelters; include a "You are here" marker on maps.
Real-Time Information Displays	Transfer locations served by three routes or more and at all transfer hubs
Ticket Vending Machines	Transit Hubs/Centers
Bike Racks	50 boardings/day

7.3.2 Access to Transit - Bicycle and Pedestrian Infrastructure

Active transportation (biking and walking) are crucial for supporting a robust transit system. All transit riders are cyclists or pedestrians at some point of their journey, and without safe, comfortable, and convenient active transportation links, people will be dissuaded from choosing public transportation.

As such, "Active Transportation" infrastructure to enable bicyclists and pedestrians to access transit is a critical element of the overall transportation network. Such linkages should be provided at all bus stops, transit centers, and park-and-rides throughout the region. This also addresses the need to elevate active transportation as a viable mode for complete trips.

Active transportation is a key component to realizing the Roanoke Transit Vision Plan, as excellent pedestrian and bicycle connections support all other types of movement, and are the foundation for all public transit improvements.

The Roanoke Valley Pedestrian Vision Plan (2015) and the Bikeway Plan for the RVAMPO (2012 Update) envision a robust active transportation network across the region to support access to public transportation. An upgraded network of sidewalks and bicycle lanes/paths, expanded pedestrian priority at intersections, and improved connections at bus stops will

create a more accessible system. The potential for bike share is also discussed as an element to support the transit network. Building on the Roanoke Valley Pedestrian Vision Plan and the Bus Stop Accessibility Study, the following sections describe best practices for improving access to transit in the Roanoke Valley.

7.3.3 Why Invest in Active Transportation?

Transit-supportive biking and walking facilities are essential to the success of public transportation because they provide critical connections, create more livable communities, and promote physical activity and healthy lifestyles.

Providing Critical Connections

Active transportation is a crucial component in developing a more robust and functional transit system for the Roanoke Valley.

Nearly every transit rider begins and/or ends their trip as a pedestrian or cyclist. A lack of infrastructure and poor street conditions will discourage people from using transit and limits the size of a transit stop's service area.

Pedestrian infrastructure can make the transit system more accessible for users with disabilities. In Oregon, pedestrian infrastructure improvements resulted in higher ridership of fixed-route services among disabled persons and contributed to lower paratransit ridership; making transit services accessible for the disabled not only expands mobility options but reduces demand for high-subsidy paratransit trips.[13]

Therefore, to enable connections from origins to transit stops and from transit stops to destinations, pedestrian infrastructure within ½-mile and biking infrastructure within three miles is essential.

Creating More Livable Communities

Investments in better transit-supportive walking and bicycling infrastructure makes for more livable communities.

- THEY PROVIDE PEOPLE, REGARDLESS OF INCOME OR AGE, AN ECONOMICAL AND HEALTHY WAY TO GET AROUND. COMMUNITIES THAT NEGLECT TRANSIT-SUPPORTIVE ACTIVE TRANSPORTATION NETWORKS CREATE HOSTILE URBAN ENVIRONMENTS.
- PLACES THAT ENGINEER-OUT TRANSIT, WALKING AND BIKING AS INTERRELATED TRANSPORTATION CHOICES REQUIRE PEOPLE TO DEPEND ON THEIR CARS FOR EVERY TRIP. AUTO DEPENDENCY LEADS TO THE NEED TO BUILD MORE PARKING AND WIDER ROADS. IT CONTRIBUTES TO SPRAWL, INCREASED TRAFFIC CONGESTION, HIGHER TRANSPORTATION COSTS, LOST PRODUCTIVITY, AND INCREASED EMISSIONS.[14]

Compared to new roads and expanded parking lots, even small investments in improved transit, bicycle and pedestrian infrastructure can have a major economic impact.

- RIDING TRANSIT, WALKING AND BICYCLING ALLOWS PEOPLE TO ENGAGE WITH THEIR NEIGHBORS, FRIENDS AND NEW ACQUAINTANCES AS A NATURAL PART OF THEIR DAY IN A WAY SIMPLY NOT POSSIBLE FROM THE INSIDE OF A CAR. RESIDENTS ON LOWER TRAFFIC MULTIMODAL STREETS ARE

[13] TCRP, TCRP Report 163: Strategy Guide to Enable and Promote the Use of Fixed-Route Transit by People with Disabilities

[14] Litman, Todd *Automobile Dependency and Economic Development.* Victoria Transportation Policy Institute, 2002

MORE LIKELY TO HAVE A STRONGER SOCIAL NETWORK WITH THEIR NEIGHBORS THAN AUTO-ORIENTED ROADS.[15]

Promotes Physical Activity and Healthy Lifestyles

Transit use increases active transportation resulting in extensive public health benefits by integrating physical activity into travel.

- IMPROVED PEDESTRIAN AND BICYCLE INFRASTRUCTURE ALSO HAS THE SECONDARY BENEFIT OF IMPROVING PUBLIC SAFETY AS BETTER INFRASTRUCTURE CAN REDUCE BICYCLE AND PEDESTRIAN INJURIES DUE TO COLLISION. THE CENTERS FOR DISEASE CONTROL (CDC) FOUND THAT ACTIVE TRANSPORTATION IMPROVEMENTS CAN RESULT IN AN INCREASE OF PHYSICAL ACTIVITY OF UP TO 35 PERCENT.[16]

7.3.4 Prioritizing Investments in the Region

While it is recommended that pedestrian and bicycle infrastructure be incorporated into developments across the region, the Roanoke Valley should work to focus future active transportation investments where they can have the most impact for daily trips. Determining regional priorities for new bicycle and pedestrian infrastructure however is challenging. Successful bicycle and pedestrian planning must happen on the local level with regional input and look at a broad range of factors from the location of key destinations to the quality of existing infrastructure. A combination of population and employment densities, as well as the density of the local street network, should be used to determine which parts of the region would benefit most from strong pedestrian and bicycle links.

The Roanoke Valley undertook such an effort in developing the Roanoke Valley Pedestrian Vision Plan that was adopted in January 2015. The purpose of the Pedestrian Vision Plan is to provide a coordinated and strategic approach to making walking a more widely chosen form of transportation. It is the region's first plan focusing specifically on promoting walking for everyday trips. With limited financial resources for pedestrian improvements, this plan identifies where pedestrian infrastructure investments are most needed based on the number of potential residents, employees, shoppers, diners, and other visitors to walk to access nearby destinations. Through the development of a regional pedestrian network, safe and attractive walking environments can exist to enable people to accomplish their daily tasks with greater ease.

Good pedestrian and bicycle connections should underpin the transit investments outlined in the Roanoke Transit Vision Plan. Developing good active transportation links to transit begins with adoption of "Complete Streets" design principles for urban design and planning for better street connectivity. In developing improved linkages to transit stations and stops, planners should consider how users will access these multimodal transfer locations. Decisions like where to improve sidewalks or install a crosswalk should be guided by where investments maximize the convenience for pedestrians and bicyclists. People are most likely to walk or bicycle to a facility if their path is time efficient, direct, and easy to take. Lengthy wait times at intersections and crosswalks as well as long walking or biking connections that are out of the way for users will all reduce accessibility to stops.[17] The typical walk shed for a transit stop ranges from one-quarter

[15] Appleyard, Donald, *Livable Streets,* 1981
[16] American Public Health Association and Safe Routes to School, *Promoting Active Transportation, An Opportunity for Public Health,* 2013
[17] Los Angeles County Metro *Path Planning Guidelines* 2013

to one-half of a mile for pedestrians and up to three miles for cyclists; these radii should be the focus for improving active transportation connections to transit.[18]

The design of bus stops themselves and the amenities provided at stops can also play a role in building better connections to/from transit. All transit stops should be sited to maximize connections to existing pedestrian and bicycle accommodations. All stops should be fully ADA accessible, where feasible. At busier locations, bicycle racks or even secure bicycle storage should be provided to aid in bike-transit trips.

7.4 Park and Ride Connections

The transit network recommendations for the Roanoke Valley connect Botetourt County, Roanoke County, the City of Salem, the City of Roanoke, and the Town of Vinton with fixed-route services. Two additional localities, Bedford County and Montgomery County, are also within the Roanoke Valley Transportation Planning Organization study area yet the densities and land uses do not lend themselves to consistent fixed-route transit connections. Instead, local stakeholders recommended incorporating more opportunities for their residents to connect with the fixed-route transit network through park-and-ride facilities. Through the Valley Metro surveys, it was shown that residents beyond the extent of the current transit network do use the fixed-route services. Therefore, it will be important moving ahead to create more places where people can connect with the transit network through park-and-ride facilities.

[18] Ibid

The following park-and-ride locations should be studied further to improve access to transit. The need for the park-and-ride lot coincides with the recommended services in each timeframe.

SHORT-TERM:

- CLOVERDALE ROAD/U.S.460, ROANOKE/BOTETOURT COUNTY
- BYPASS ROAD/WASHINGTON BOULEVARD, TOWN OF VINTON
- TANGLEWOOD MALL, ROANOKE COUNTY
- GLENVAR/U.S. 460, ROANOKE COUNTY
- BRAMBLETON AVENUE/COLONIAL AVENUE, ROANOKE COUNTY

MEDIUM-TERM:

- U.S. 460/ROUTE 419, CITY OF SALEM
- CLEARBROOK, ROANOKE COUNTY
- HOLLINS/PLANTATION ROAD, ROANOKE COUNTY
- U.S. 220 NORTH/I-81 EXIT 150 OR DALEVILLE/GREENFIELD, BOTETOURT COUNTY

LONG-TERM:

- TROUTVILLE, BOTETOURT COUNTY

In addition to enabling more people to access transit, the development of more park-and-ride lots in the Roanoke Valley would enable new carpooling opportunities as well as free long-term parking options for Amtrak or airport connections.

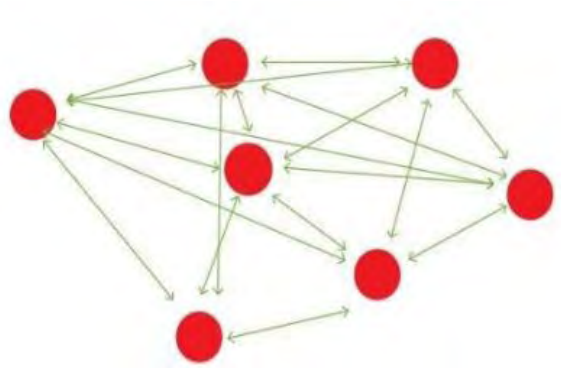
7.5 Bike Share Connections

The Roanoke Transit Vision plan includes a series of potentially transformative public transit recommendations, including route extensions, new routes, increases in frequency, and supporting facilities, amenities, and technology. When completed these improvements will provide stronger links within the Valley and make transit a viable option for more people for a wider variety of trips to a wider variety of destinations. The concept of bike share is being explored as part of this Vision Plan as a means to leverage these transit investments by providing improved access to destinations for residents, employees, and visitors who are touring the region and wish to minimize automobile usage.

Bike share has the potential to enhance mobility, encourage physical activity and help support the region's economic vitality and the overarching goals of the Livable Roanoke Plan. More detailed background information on bike share as a mode, how it works, who uses it, and its benefits, can be found in **Appendix A: Bike Share**.

As shown in **Figure 7.4-1**, bike share requires a network of facilities that allow users to travel from point to point, typically trips of 1-3 miles. As such bike share does not function well as an isolated service on the periphery of a transit system to extend the reach of that system. Nevertheless, bike share could play a role in supporting transit in the region and increasing mobility.

Figure 7.4-1 | Bike Share is designed to Facilitate Point-to-Point Trips



7.5.1 Potential for Bike Share in Roanoke

The following section describes potential locations for bike share stations in Roanoke that would support elements of the Transit Vision Plan. A full bike share development plan would be needed before any system could be launched to understand the market, geographic scope and size, and to develop a business plan and implementation plan. Furthermore, one of the greatest determining factors in the success of bike share is the level of bicycle facilities (racks, lanes, cycle tracks, greenways, etc.) that exist for users to take advantage of. Without these facilities, and in the absence of sidewalks, many potential users will not feel comfortable using roadways and mixing with vehicular traffic to use the system. **Figure 7.5.1-1** provides an example of a typical dock based bike share station.

Figure 7.5.1-1 | Typical Dock Based Stations

While this section provides some suggested locations for a potential bike share system in the Roanoke region, there is no definitive way to declare whether or not bike share is feasible in a region. Feasibility in this Vision Plan has been defined as whether or not bike share would contribute positively to the goals and objectives identified by the study stakeholders. Bike share does support these goals and objectives, however the level of ridership, mode share, and other potential performance measures have not been defined and therefore do not play into the determination of feasibility.

The areas identified for bike share stations are intentionally broad given the high level nature of the Vision Plan. They are based on existing land use data combined with the recommendations of the Transit Vision Plan. As such it is likely (and similar to most bike share systems), that implementation would be phased over time as transit vision recommendations and supporting bicycle infrastructure are implemented.

Furthermore, it is unlikely that users would utilize bike share to travel between the widely separated areas identified below, given the distances, lack of destinations, and lack of supporting infrastructure. If the regional greenway network is further built out, users in these isolated areas could use bike share to travel between them.

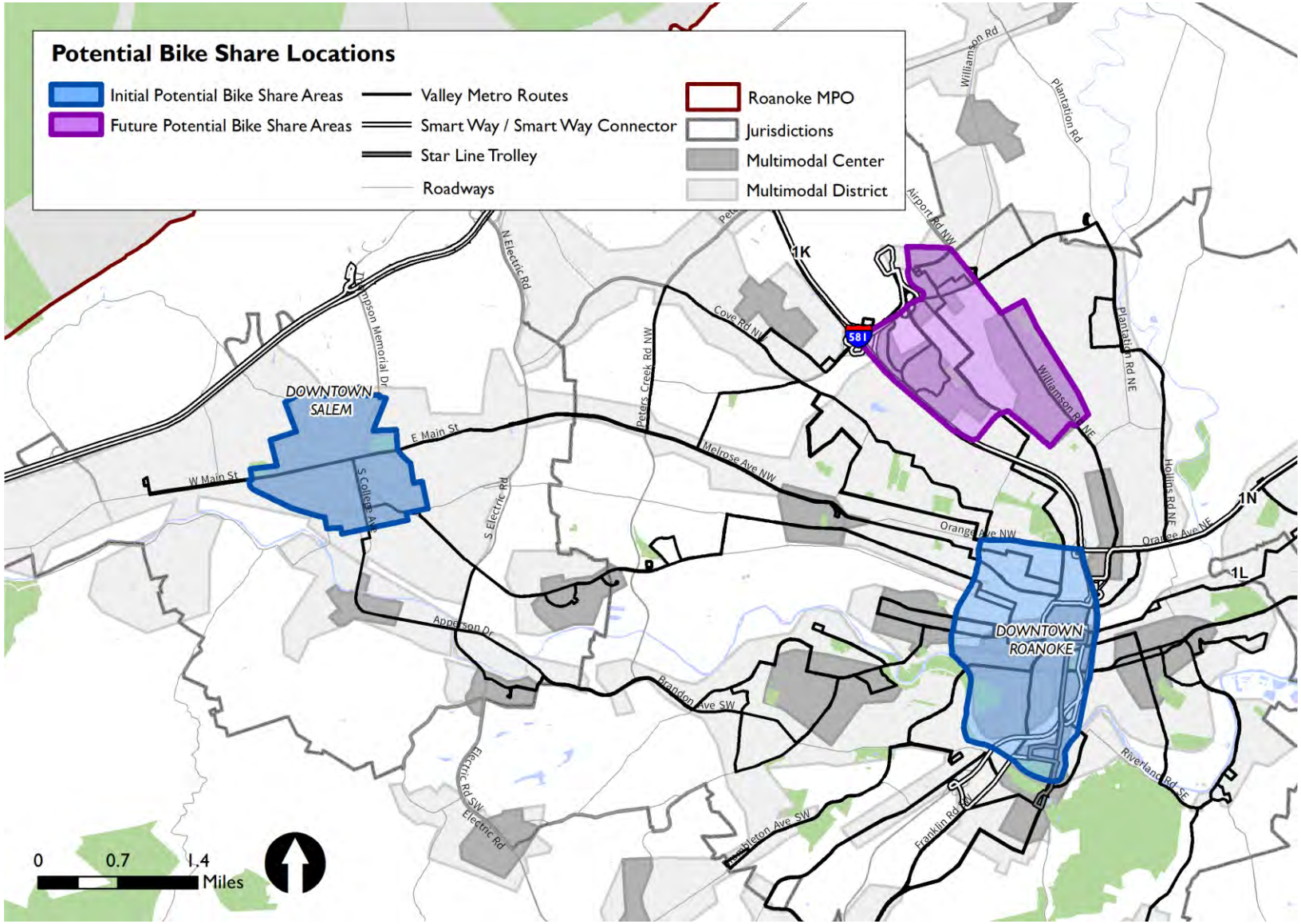
Currently, there are only two locations that even potentially support bike share, Downtown Roanoke and Downtown Salem. This is primarily based on the existing land use and roadway network. The former having a mix of land uses and destinations, and the latter being a grid system of small roadways that will encourage bicycle use (less traffic and slower speeds). For Downtown Roanoke this is the area approximately bordered by Orange Avenue to the north, 10th Street SW on the west, I-581 on the east, and the railroad tracks/Roanoke River on the south. **Figure 7.5.1-2** depicts this area. For Downtown Salem this area is smaller when compared to Downtown Roanoke and includes the downtown core, neighborhoods and parks immediately surrounding the core, and Roanoke College.

The greater Salem Civic Center could be connected to the Downtown Salem system should investments in bicycle infrastructure be made on area roadways.

Similarly, should significant investments in bicycle infrastructure be made, the Crossroads/Valley View Mall area, and surrounding neighborhoods, may support bike share in the future, given the mix of land uses and destinations.

To support better connections to transit, particularly on the periphery of the system, the region should invest in pedestrian and bicycle infrastructure, including sidewalks, bike lanes, and bike racks on buses and at bus stops.

Figure 7.5.1-2 | Potential Bike Share Locations



7.6 Storage, Maintenance, and Administrative Facilities

As the transit system grows to serve more places and more people, the need for additional facilities to store and maintain facilities will be needed. The current maintenance facility is at capacity, and the Greater Roanoke Transit Company has already purchased land adjacent to its administration and maintenance building to accommodate expansion. To minimize the distance traveled to take a vehicle from the garage to the point of revenue service, additional garages or storage facilities to house vehicles closer to their point of service origin/destination may be needed.

Similar to Valley Metro, RADAR, Botetourt County's Senior and Accessible Van Program, and public schools all maintain and store buses that require facility investments. Where possible, sharing facilities should be considered to minimize expenses. The maintenance and administrative facility needs should be continuously evaluated and new facilities proposed as soon as it is identified that they will be needed.

Figure 7.6-1 | Valley Metro Administration and Maintenance Facility

Figure 7.6-2 | RADAR Administration and Maintenance Facility

Figure 7.6-3 | One of Several School Bus Storage and Maintenance Facilities in the Region

8.0 CAPITAL AND OPERATING COSTS

The following section details the operational and capital costs by short-, medium-, and long-term. Annual operational costs were determined by multiplying the estimated revenue hours by the actual cost per hour and the average number of service days. The assumptions were as follows:

- COST PER HOUR FOR ONE ROUTE: $75.54
- AVERAGE NUMBER OF WEEKDAYS: 256
- AVERAGE NUMBER OF SATURDAYS: 52
- AVERAGE NUMBER OF SUNDAYS: 52

Capital costs were determined with the following assumptions[19]:

- SHORT-TERM:
  - FY 2018 Replacement 35' Vehicle Cost - $448,000
  - FY 2019 Replacement Vehicle Cost - $464,000
  - FY 2020 Replacement Vehicle Cost - $481,000
  - FY 2021 Replacement Vehicle Cost - $497,835
  - FY 2021 Commuter Bus Replacement Cost - $630,000
  - FY 2022 Replacement Vehicle Cost - $514,335
  - FY 2022 Commuter Bus Replacement Cost - $645,000
  - Expanded Vehicle Cost: $465,000
- MEDIUM-TERM:
  - Replacement Vehicle Cost - $586,000
  - Expanded Vehicle Cost - $586,000
- LONG-TERM:
  - Replacement Vehicle Cost - $670,000
  - Expanded Vehicle Cost - $670,000

New or improved facilities to support the expanded fleet will need to be priced individually as each project is more fully scoped. Currently, an expanded maintenance facility for Valley Metro on their property is estimated at $2,200,000. The following list provides rough estimates for transit transfer facilities (not including site specific expenses such as potential land acquisition or park and ride lots). TTFs are discussed in more detail in **Section 7.2**.

- **SMALL SIMPLE TTF: $50,000**

  NICE STOP (TWO SHELTERS)
- **SMALL ENHANCED TTF: $100,000**

  SUPER STOP WITH REAL-TIME PASSENGER INFORMATION (RTPI)
- **MEDIUM SIMPLE TTF: $350,000 TO $500,000**

  OFF-STREET BUS LOOP AND SHELTERS
- **MEDIUM ENHANCED TTF: $750,000 TO $1,000,000**

  OFF-STREET BUS LOOP WITH STRUCTURE WITH ROOF, RTPI, BATHROOMS
- **LARGE TTF: $5,000,000-$10,000,000**

  FULL MULTIMODAL TRANSFER FACILITY, INDOOR WAITING AREA, BATHROOMS, STAFFED, RTPI, MULTIPLE BUS LOOPS, KISS AND RIDE, ETC.

[19] As route planning is refined through the Transit Development Plan process, the opportunity to use different vehicle sizes, smaller or larger based on needs, will be analyzed.

8.1 Short-Term Costs (2016-2022)

8.1.1 Capital Costs

The Valley Metro vehicle replacement schedule in the short-term calls for a replacement of 22 vehicles or 49 percent of the fleet (**Table 8.1.1-1**). This will cost a total of $10,909,670.

The service recommendations in the Short Term will require six extra vehicles, or will result in a 13 percent increase in the fleet size (**Table 8.1.1-2**). This will result in a fleet size of 51 vehicles, including 10 spares, and cost a total of $2,790,000. Recommendations include reallocating resources from existing operational services on routes 51/52, 65/66 and 85/86.

- *51/52: Reallocation due to utilization of the Starline Trolley between Downtown Roanoke and Carilion and the incorporation of 51/52 resources to provide expanded connections via Routes 4/5 between Carilion, Tanglewood, the 419 Corridor, and Downtown Salem.*
- *65/66: Reallocation of peak service due to low ridership and the presence of routes 71/72 nearby as alternatives.*
- *85/86: Reallocation of peak service due to low ridership and the presence of routes 81/82 and 11/12 nearby as alternatives.*

This will result in four additional vehicles that can be used for expansion of service. In total, replacement and expansion of the fleet will cost approximately $13,699,670.

Table 8.1.1-1 | Capital Costs - Replacement Fleet (Short-Term)

	Fleet	FY 2018		FY 2019		FY 2020		FY 2021		FY 2022	
Vehicle Type	**Size**	**Vehicles**	**Cost**	**Vehicles**	**Cost**	**Vehicles**	**Cost**	**Vehicles**	**Cost**	**Vehicles**	**Cost**
2004 Heavy Duty Transit Buses	9										
2006 Heavy Duty Transit Buses	18	8	$3,584,000	4	$1,856,000	4	$1,924,000	2	$995,670		
2008 Medium Duty Trolley Buses	4										
2009 Over-the-Road Commuter Buses	5							2	1,260,000	2	$1,290,000
2014 Heavy Duty Transit Buses	9										
Total	**45**	**8**	**$3,584,000**	**4**	**$1,856,000**	**4**	**$1,924,000**	**4**	**$2,225,670**	**2**	**$1,290,000**

Table 8.1.1-2 | Capital Costs - Service Expansion Fleet (Short-Term)

Route	Recommendation	Description	Existing Number of Vehicles	Additional Vehicles Needed	Percent Change	Cost
Star Line Trolley		Carilion/Downtown Roanoke	3	---	---	---
11/12		Valley View/Downtown Roanoke	2	---	---	---
15/16		Valley View/Downtown Roanoke	2	---	---	---
21/22		Crossroads/Downtown Roanoke	2	---	---	---
25/26		Crossroads/Downtown Roanoke	2	---	---	---
31/32		Vinton/Downtown Roanoke	1	---	---	---
35/36	1D	Vinton/Downtown Roanoke	1	1	100%	$465,000
41/42		Southeast Roanoke/Downtown Roanoke	1	---	---	---
51/52	1E	Tanglewood/Downtown Roanoke	2	-2	-100%	---
55/56		Tanglewood/Downtown Roanoke	2	---	---	---
61/62		Red Rock/Downtown Roanoke	1	---	---	---
65/66		Carlton & Grandin/Downtown Roanoke	2	-1	-50%	---
71/72		Lewis Gale/Downtown Roanoke	2	---	---	---
75/76		Veterans Hospital/Downtown Roanoke	2	---	---	---
81/82		Goodwill Salem/Downtown Roanoke	1	---	---	---
85/86	1I	Peters Creek Road/Downtown Roanoke	2	-1	-50%	---
91/92	1J	Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	2	---	---	---
Smart Way		Roanoke Valley/New River Valley	1	---	---	---
Smart Way Connector		Lynchburg/Bedford/Roanoke Valley/New River Valley	4	---	---	---
1	1K	Crossroads/Plantation Road/DMV	---	1	---	$465,000
311	1L	RCIT/Downtown Roanoke	---	1	---	$465,000
4/5	1E	Carilion/Tanglewood/Cave Spring/Oak Grove/ Lewis Gale/Downtown Salem	---	4	---	$1,860,000
93	1M	Exit 140/Downtown Salem/Medical Centers	---	1	---	$465,000
3111	1N	East Park/Bonsack/Downtown Roanoke	---	1	---	$465,000
911/922	1I	Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	---	1	---	$465,000
		Spare Fleet	**10**	---	**---**	**---**
		Total	**45**	**6**	**13%**	**$2,790,000**

8.1.2 Operating Costs

In the short-term eight operational studies/service adjustments, three programs for increased collaboration on transportation services by regional partners and two customer enhancements are being recommended. In total these general enhancements are estimated to cost $595,000 (**Table 8.1.2-1**).

The short-term also includes recommendations to increase the level of services on five existing routes, reduce levels of service on three routes, add six new routes, add Sunday service on select routes and increase the overall length of service across the system to 18 hours a day. This results in $3,905,000 of additional annual operational costs over the existing operational cost, an increase of 46 percent (**Table 8.1.2-2**). Individual annual costs within the short-term timeframe will depend upon implementation.

Table 8.1.2-1 | Operational Costs – General Projects

Recommendation	Description	Proposed Cost
1P	Coordinate SmartWay (Roanoke-Blacksburg) service with Amtrak (Roanoke) Station schedules	---
1Q	Study need for SmartWay (Roanoke-Lynchburg) commuter service	---
1R	Bus Stop Consolidation Study	$20,000
1S	Develop Partnerships with Employers	---
1T	Update route schedule publications and maps	$20,000
1U	Collaborative Jurisdictional Partnership for public bus service	---
1V	Evaluate individual routes for efficiencies and enhancements	$80,000
1W	Real-time Information	$225,000
1X	Regionalize services for persons with disabilities and for seniors across jurisdictional boundaries	---
1Y	Adjust PM peak service hours to better align with travel patterns and daytime work hours	$250,000
1Z	Explore additional special activity/even transit services to popular recreational destinations	Varies
1AA	Extend service for people with disabilities later in the evening and on weekends	Varies
1BB	Study the ability to vary the fleet size based on ridership demands	---
	Total	**$595,000**

Table 8.1.2-2 | Operational Costs - Service Expansion Fleet (Short-Term)

Route	Recommendation	Description	Existing Costs	Additional Costs	Percent Change
Star Line Trolley		Carilion/Downtown Roanoke	$542,000	---	---
11/12		Valley View/Downtown Roanoke	$466,000	---	---
15/16	1A	Valley View/Downtown Roanoke	$466,000	$232,000	50%
21/22	1B, 1C	Crossroads/Downtown Roanoke	$466,000	$174,000	37%
25/26		Crossroads/Downtown Roanoke	$466,000	---	---
31/32		Vinton/Downtown Roanoke	$348,000	---	---
35/36	1D	Vinton/Downtown Roanoke	$348,000	$176,000	51%
41/42		Southeast Roanoke/Downtown Roanoke	$466,000	---	---
51/52	1E	Tanglewood/Downtown Roanoke	$466,000	-$466,000	
55/56	1F	Tanglewood/Downtown Roanoke	$466,000	$232,000	50%
61/62		Red Rock/Downtown Roanoke	$348,000	---	---
65/66		Carlton & Grandin/Downtown Roanoke	$466,000	-$118,000	-25%
71/72		Lewis Gale/Downtown Roanoke	$466,000	---	---
75/76		Veterans Hospital/Downtown Roanoke	$466,000	---	---
81/82		Goodwill Salem/Downtown Roanoke	$290,000	---	---
85/86		Peters Creek Road/Downtown Roanoke	$466,000	-$118,000	-25%
91/92	1J	Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	$337,000	$57,000	17%
Smart Way		Roanoke Valley/New River Valley	$895,000	---	---
Smart Way Connector		Lynchburg/Bedford/Roanoke Valley/New River Valley	$232,000	---	---
1	1K	Crossroads/Plantation Road/DMV	---	$290,000	---
311	1L	RCIT/Downtown Roanoke	---	$82,000	---
4/5	1E	Carilion/Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Downtown Salem	---	$1,048,000	---
93	1M	Exit 140/Downtown Salem/Medical Centers	---	$349,000	---
3111	1N	East Park/Bonsack/Downtown Roanoke	---	$116,000	---
911/922	1I	Glenvar/Richfield/Downtown Salem/Downtown Roanoke	---	$116,000	---
All Routes	1O	Expand span of service to 18 hours	---	$1,735,000	---
		Total	**$8,466,000**	**$3,905,000**	**46%**

8.2 Medium-Term Costs (2022-2030)

8.2.1 Capital Costs

The service recommendations in the medium-term will require nine extra vehicles, or will result in an 18 percent increase over the short-term fleet size (**Table 8.2.1-1**). This will result in a fleet size of 60 vehicles, including 10 spares, and cost a total of $5,274,000. Operational services will be reduced on routes 81/82 which will result in one additional vehicle that can be used for expansion of service.

8.2.2 Operating Costs

In the medium-term it is being recommended to increase the level of services on three existing routes, reduce levels of service on one route and add seven new routes. This results in $15,843,000 of total annual operational costs in the medium-term, an increase of $4,042,000 or 33 percent over the short-term (**Table 8.2.2-1**). Individual annual costs within the medium-term timeframe will depend upon implementation.

Table 8.2.2-1 | Capital Costs - Service Expansion Fleet (Medium-Term)

Route	Recommendation	Description	Short-Term Number of Vehicles	Additional Vehicles Needed	Percent Change	Cost
Star Line Trolley	2A	Carilion/Downtown Roanoke	3	1	33%	$586,000
11/12		Valley View/Downtown Roanoke	2	---	---	---
15/16		Valley View/Downtown Roanoke	2	---	---	---
21/22		Crossroads/Downtown Roanoke	2	---	---	---
25/26		Crossroads/Downtown Roanoke	2	---	---	---
31/32		Vinton/Downtown Roanoke	1	---	---	---
35/36		Vinton/Downtown Roanoke	2	---	---	---
41/42		Southeast Roanoke/Downtown Roanoke	1	---	---	---
51/52		Tanglewood/Downtown Roanoke		---	---	---
55/56		Tanglewood/Downtown Roanoke	2	---	---	---
61/62	2B	Red Rock/Downtown Roanoke	1	1	100%	$586,000
65/66		Carlton & Grandin/Downtown Roanoke	1	---	---	---
71/72		Lewis Gale/Downtown Roanoke	2	---	---	---
75/76		Veterans Hospital/Downtown Roanoke	2	---	---	---
81/82	2D	Goodwill Salem/Downtown Roanoke	1	-1	---	-$586,000
85/86		Peters Creek Road/Downtown Roanoke	1	---	---	---
91/92		Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	2	---	---	---
Smart Way		Roanoke Valley/New River Valley	1	---	---	---
Smart Way Connector		Lynchburg/New River Valley/Roanoke Valley/Bedford	4	---	---	---
1		Crossroads/Plantation Road/DMV	1	---	---	---
311		RCIT/Downtown Roanoke	1	---	---	---
4/5		Carilion/Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Downtown Salem	4	---	---	---
93		Exit 140/Downtown Salem/Medical Centers	1	---	---	---
3111		East Park/Bonsack/Downtown Roanoke	1	---	---	---
911/922		Glenvar/Richfield/Downtown Salem/Downtown Roanoke	1	---	---	---

Route	Recommendation	Description	Short-Term Number of Vehicles	Additional Vehicles Needed	Percent Change	Cost
3	2E	Goodwill Salem/Crossroads/Valley View/Salem	---	1	---	$586,000
8	2F	Greenfield/Daleville/Bonsack/Downtown Roanoke	---	2	---	$1,172,000
2	2G	Lewis Gale/Towers Shopping Center/Carilion	---	1	---	$586,000
24	2H	A Porters Haven/ William Byrd High School	---	1	---	$586,000
220	2I	Greenfield/Daleville/Plantation Road/Downtown Roanoke	---	1	---	$586,000
10	2J	Clearbrook/Tanglewood/South County Library	---	1	---	$586,000
1000	2K	Crossroads/Valley View/Downtown Roanoke/Tanglewood	---	1	---	$586,000
		Spare Fleet	**10**	---	**---**	---
		Total	**51**	**9**	**18%**	**$5,274,000**

Table 8.2.2-2 | Operational Costs - Service Expansion Fleet (Medium-Term)

Route	Recommendation	Description	Short Term Costs	Additional Costs	Percent Change
Star Line Trolley	2A	Carilion/Downtown Roanoke	$542,000	$838,000	155%
11/12		Valley View/Downtown Roanoke	$466,000	---	---
15/16		Valley View/Downtown Roanoke	$698,000	---	---
21/22		Crossroads/Downtown Roanoke	$640,000	---	---
25/26		Crossroads/Downtown Roanoke	$466,000	---	---
31/32		Vinton/Downtown Roanoke	$348,000	---	---
35/36		Vinton/Downtown Roanoke	$524,000	---	---
41/42		Southeast Roanoke/Downtown Roanoke	$466,000	---	---
51/52		Tanglewood/Downtown Roanoke		---	
55/56		Tanglewood/Downtown Roanoke	$698,000	---	---
61/62	2B	Red Rock/Downtown Roanoke	$348,000	$118,000	34%
65/66		Carlton & Grandin/Downtown Roanoke	$348,000	---	---
71/72		Lewis Gale/Downtown Roanoke	$466,000	---	---
75/76	2C	Veterans Hospital/Downtown Roanoke	$466,000	$232,000	50%

Route	Recommendation	Description	Short Term Costs	Additional Costs	Percent Change
81/82	2D	Goodwill Salem/Downtown Roanoke	$290,000	-$290,000	
85/86		Peters Creek Road/Downtown Roanoke	$348,000	---	---
91/92	2D	Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	$394,000	$300,000	76%
Smart Way		Roanoke Valley/New River Valley	$895,000	---	---
Smart Way Connector		Lynchburg/New River Valley/Roanoke Valley/Bedford	$232,000	---	---
1		Crossroads/Plantation Road/DMV	$290,000	---	---
311		RCIT/Downtown Roanoke	$82,000	---	---
4/5		Carilion/Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Downtown Salem	$1,048,000	---	---
93		Exit 140/Downtown Salem/Medical Centers	$349,000	---	---
3111		East Park/Bonsack/Downtown Roanoke	$116,000	---	---
911/922		Glenvar/Richfield/Downtown Salem/Downtown Roanoke	$116,000	---	---
All Routes	1O	Expand to 18 hours of service	$1,735,000	$348,000	20%
3	2E	Goodwill Salem/Crossroads/Valley View/Salem	---	$348,000	---
8	2F	Greenfield/Daleville/Bonsack/Downtown Roanoke	---	$698,000	---
2	2G	Lewis Gale/Towers Shopping Center/Carilion	---	$348,000	---
24	2H	A Porters Haven/ William Byrd High School	---	$290,000	---
220	2I	Greenfield/Daleville/Plantation Road/Downtown Roanoke	---	$116,000	---
10	2J	Clearbrook/Tanglewood/South County Library	---	$348,000	---
1000	2K	Crossroads/Valley View/Downtown Roanoke/Tanglewood	---	$348,000	---
		Total	**$15,843,000**	**$4,042,000**	**33%**

8.3 Long-Term Costs (2030-2040)

8.3.1 Capital Costs

The service recommendations in the long-term will require 18 extra vehicles and four extra spare vehicles, resulting in a 37 percent increase over the medium-term fleet size for a total cost of $14,740,000 (**Table 8.3.1-1**). This will result in a total fleet size of 82 vehicles, which includes 14 spares.

Table 8.3.1-1 | Capital Costs - Service Expansion Fleet (Long-Term)

Route	Recommendation	Description	Medium-Term Number of Vehicles	Additional Vehicles Needed	Percent Change	Costs
Star Line Trolley		Carilion/Downtown Roanoke	4	---	---	---
11/12		Valley View/Downtown Roanoke	2	---	---	---
15/16		Valley View/Downtown Roanoke	2	---	---	---
21/22	3A	Crossroads/Downtown Roanoke	2	2	100%	$1,340,000
25/26		Crossroads/Downtown Roanoke	2	---	---	---
31/32		Vinton/Downtown Roanoke	1	---	---	---
35/36		Vinton/Downtown Roanoke	2	---	---	---
41/42		Southeast Roanoke/Downtown Roanoke	1	---	---	---
51/52		Tanglewood/Downtown Roanoke		---		---
55/56	3B	Tanglewood/Downtown Roanoke	2	2	100%	$1,340,000
61/62		Red Rock/Downtown Roanoke	2	---	---	---
65/66		Carlton & Grandin/Downtown Roanoke	1	---	---	---
71/72		Lewis Gale/Downtown Roanoke	2	---	---	---
75/76		Veterans Hospital/Downtown Roanoke	2	---	---	---
81/82	3C	Goodwill Salem/Downtown Roanoke	---	2	---	$1,340,000
85/86		Peters Creek Road/Downtown Roanoke	1	---	---	---
91/92		Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	2	---	---	---

8.3.2 Operating Costs

In the medium-term it is being recommended to increase the level of services on 14 existing routes, and add three new routes. This results in $22,843,000 of total annual operational costs, an increase of 46 percent over the medium-term (**Table 8.3.2-1**). Individual annual costs within the long-term timeframe will depend upon implementation.

Route	Recommendation	Description	Medium-Term Number of Vehicles	Additional Vehicles Needed	Percent Change	Costs
Smart Way		Roanoke Valley/New River Valley	1	---	---	---
Smart Way Connector		Lynchburg/New River Valley/Roanoke Valley/Bedford	4	---	---	---
1	3D	Crossroads/Plantation Road/DMV	1	1	100%	$670,000
311		RCIT/Downtown Roanoke	1	---	---	---
4/5		Carilion/Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Downtown Salem	4	---	---	---
93		Exit 140/Downtown Salem/Medical Centers	1	---	---	---
3111		East Park/Bonsack/Downtown Roanoke	1	---	---	---
911/922	3F	Glenvar/Richfield/Downtown Salem/Downtown Roanoke	1	1	100%	$670,000
3	3G	Goodwill Salem/Crossroads/Valley View/Salem	1	1	100%	$670,000
8	3H	Greenfield/Daleville/Bonsack/Downtown Roanoke	2	2	100%	$1,340,000
2	3I	Lewis Gale/Towers Shopping Center/Carilion	1	1	100%	$670,000
24		A Porters Haven/ William Byrd High School	1	---	---	---
220		Greenfield/Daleville/Plantation Road/Downtown Roanoke	1	---	---	---
10	3K	Clearbrook/Tanglewood/South County Library	1	1	100%	$670,000
1000	3L	Crossroads/Valley View/Downtown Roanoke/Tanglewood	1	1	100%	$670,000
7	3M	Salem/Crossroads via DMV/Plantation Rd	---	2	---	$1,340,000
7135		Grandin Village/Downtown Roanoke/Vinton	---	---	---	---
117	3O	Troutville/Hollins/VA Medical Center/Lewis Gale	---	2	---	$1,340,000
		Spares Vehicles	**10**	**4**	**---**	**$2,680,000**
		Total	**60**	**22**	**37%**	**$14,740,000**

Table 8.3.2-1 | Operational Costs – Service Expansion (Long-Term)

Route	Recommendation	Description	Medium-Term Costs	Additional Costs	Percent Change
Star Line Trolley		Carilion/Downtown Roanoke	$1,160,000	---	---
11/12		Valley View/Downtown Roanoke	$466,000	---	---
15/16		Valley View/Downtown Roanoke	$698,000	---	---
21/22	3A	Crossroads/Downtown Roanoke	$640,000	$638,000	100%
25/26		Crossroads/Downtown Roanoke	$466,000	---	---
31/32		Vinton/Downtown Roanoke	$348,000	---	---
35/36		Vinton/Downtown Roanoke	$524,000	---	---
41/42		Southeast Roanoke/Downtown Roanoke	$466,000	---	---
51/52		Tanglewood/Downtown Roanoke		---	
55/56	3B	Tanglewood/Downtown Roanoke	$698,000	$580,000	83%
61/62		Red Rock/Downtown Roanoke	$466,000	---	---
65/66		Carlton & Grandin/Downtown Roanoke	$348,000	---	---
71/72		Lewis Gale/Downtown Roanoke	$466,000	---	---
75/76		Veterans Hospital/Downtown Roanoke	$698,000	---	---
81/82	3C	Goodwill Salem/Downtown Roanoke	---	$232,000	---
85/86		Peters Creek Road/Downtown Roanoke	$348,000	---	---
91/92		Glenvar/Richfield/Downtown Salem/ Downtown Roanoke	$694,000	---	---
Smart Way		Roanoke Valley/New River Valley	$895,000	---	---
Smart Way Connector		Lynchburg/New River Valley/Roanoke Valley/Bedford	$232,000	---	---
1	3D	Crossroads/Plantation Road/DMV	$290,000	$408,000	141%
311		RCIT/Downtown Roanoke	$82,000	---	---
4/5	3E	Carilion/Tanglewood/Cave Spring/Oak Grove/Lewis Gale/Downtown Salem	$1,048,000	$348,000	33%
93		Exit 140/Downtown Salem/Medical Centers	$349,000	---	---
3111		East Park/Bonsack/Downtown Roanoke	$116,000	---	---
911/922	3F	Glenvar/Richfield/Downtown Salem/Downtown Roanoke	$116,000	$116,000	100%

Route	Recommendation	Description	Medium-Term Costs	Additional Costs	Percent Change
All Routes	1O	Expand to 18 hours of service	$2,083,000	$1,338,000	64%
3	3G	Goodwill Salem/Crossroads/Valley View/Salem	$348,000	$350,000	101%
8	3H	Greenfield/Daleville/Bonsack/Downtown Roanoke	$698,000	$698,000	100%
2	3I	Lewis Gale/Towers Shopping Center/Carilion	$348,000	$350,000	101%
24		A Porters Haven/ William Byrd High School	$290,000	---	---
220	3J	Greenfield/Daleville/Plantation Road/Downtown Roanoke	$116,000	$232,000	200%
10	3K	Clearbrook/Tanglewood/South County Library	$348,000	$292,000	84%
1000	3L	Crossroads/Valley View/Downtown Roanoke/Tanglewood	$348,000	$350,000	101%
7	3M	Salem/Crossroads via DMV/Plantation Rd		$698,000	---
7135	3N	Grandin Village/Downtown Roanoke/Vinton		$252,000	---
117	3O	Troutville/Hollins/VA Medical Center/Lewis Gale		$466,000	---
Total			**$16,413,000**	**$7,488,000**	**46%**

APPENDIX A: BIKE SHARE

A.1 What is Bike Share?

Quite simply, bike share is bicycle-based public transportation. Bike share systems allow users to access a fleet of bicycles for short-term use. Systems are designed for one-way journeys, allowing a rider to pick up a bike in one place and return it somewhere else in the system. Bike share differs from other modes of public transportation as it is available on-demand. Since users are not tied to a fixed bus route or train line with set schedules, bike share provides tremendous flexibility.

The concept of bike share originated in the 1960's in Amsterdam, and early bike share systems consisted of specially marked bikes placed around cities for free use. These pioneers of bike share, referred to today as "first generation" bicycle systems, saw limited success as there were few curbs on theft and vandalism. It was not until the arrival of automated locking and payment systems that bike share began to see wide-spread implementation world-wide. Today modern bike share systems are most often fully automated systems. Users use a membership card, kiosk, or phone to unlock bicycles. Vandalism and theft is deterred through robust locking mechanisms, and users typically must provide a credit card or debit card hold to rent a bicycle.

The first major bike share system in North America was Montreal's BIXI, launched in May 2009. Since then, bike share systems have multiplied rapidly across North America, with over 35 systems in place in the United States alone. The largest bike share systems in the country are located in major cities such as New York (CitiBike), Boston (Hubway), Chicago (Divvy), and Washington DC (Capital Bikeshare), however cities of all sizes feature bike share. A number of small and medium sized metropolitan areas have bike share systems, including Greenville, SC, Chattanooga, TN, and Boulder, CO. Bike share systems are increasingly moving beyond downtowns and inner city neighborhoods and into the suburbs. Capital Bikeshare in Montgomery County, MD and Bay Area Bike Share in Santa Clara County, CA are providing bike share as a means to connect suburban communities to transit and facilitate reverse commutes.

Table A.1-1 | Examples of Bike Share Systems[20]

System Name	Greenville B-Cycle	Boulder B-Cycle		Nice Ride MN	Capital Bikeshare
City	Greenville, SC	Boulder, CO		Minneapolis & St. Paul, MN	Washington, DC and suburbs
Population of Cities Served	60,000	97,000		684,000	1,218,000
Number of Bikes	28	150		1,550	2,700+
Number of Stations	6	22		170	310+
Annual Ridership	3,200	30,000		305,000	2,725,000
Average Daily / Bike	0.32	0.55		0.91	2.76

As **Table A.1-1** illustrates, system size and ridership levels differ widely among bike share systems. Larger bike share systems tend to have a higher utilization per bike because these systems

[20] 2015 data.

benefit from the network effect of having many possible destinations reachable by bike share, and also because large bike share systems are mostly located in dense urban areas with high travel demand.

Many of the bike share systems in smaller or less dense cities are located in places with a high concentration of visitors or students. San Antonio's bike share system, for example, benefits from high tourist use, with stations concentrated around major downtown attractions and recreation trails. Other bike share systems, like the Spartanburg, SC and Boulder, CO B-Cycle systems, are located in college towns with a high concentration of students to help drive usage. Not all bike share systems in smaller cities rely on a large tourist or student populations however, some are successful with a combination of both.

Regardless of what city bike share stations are located in, bike share is most highly used in places where there is a high concentration of destinations within biking distance to one another. Bike share works best in mixed-use communities where bikes can be utilized for a variety of purposes. Neighborhoods with a high concentration of housing, retail, and employment generate trips throughout the day, not just during peak commuting times.

A.2 How Does Bike Share Work?

Most bicycle share systems in North America are dock-based systems, an example of which is shown in **Figure A.1-1** and **Figure A.2-2**. Bicycles are picked up and returned to stations composed of a set of docks and a payment kiosk. The bicycles are locked into the dock, making theft extremely difficult. Dock based systems are often solar powered, allowing for stations to be installed without any electric hardwiring or other in-ground infrastructure.

Figure A.1-1 | DecoBike Station in Miami Beach

Source: Matt Johnson

Figure A.2-2 | Typical Dock Based Stations

An alternative to dock-based systems are smart bikes, an example of which is shown in **Figure A.2-3**. With smart bikes, the locking mechanism and payment system are on the bicycle itself. Some smart bike systems allow users to lock a bicycle anywhere within a service area, but many establish virtual stations where bikes must be returned.

Figure A.2-3 | Example Smart Bike Station

A.3 Who Uses Bike Share?

Bike share attracts a diverse base of users. While some bike share users are avid cyclists who use bike share in addition to their own bicycles, a large proportion of bike share riders are new or infrequent cyclists. A study of Capital Bikeshare users found that bike share users are more likely to be female, have a lower household income, own fewer cars and bicycles, and are more likely to cycle for utilitarian trip purposes than the typical area cyclist[21]. Bike share users tend to be well-educated but not necessarily well-off, a function of the low average age of riders.[22] Survey and trip data show that bike share serves a transportation need for the majority of trips; bike share is utilized for short-one way trips in lieu of another mode. Bike share riders have distinct commute patterns compared to the general population, typically living within a few miles of their place of employment.[23] Finally bike share shows close integration with other modes of public transportation, with many systems reporting their highest ridership bike share locations at or near major transit hubs.

In addition to the most common dock and smart bike systems referenced above there are several other types of bike share implementations in the U.S. including university and community based systems.

[21] Buck, Darren et. al. *Are Bikeshare Users Different from Regular Cyclists? A First Look at Short-Term Users, Annual Members, and Area Cyclists in the Washington, DC Region* Transportation Research Board 2012

[22] Shaheen, Susan et. al. *Public Bikeshare in North America: Early Operator and User Understanding* Mineta Transportation Institute 2012

[23] ibid

A.4 University Systems

Universities have utilized a variety of bike share implementations. The simplest form by which faculty and staff sign out dedicated departmental bikes for trips around campus. More advanced systems have utilized Zagster, a bike share company that typically creates closed bike share systems for private entities, e.g., colleges and universities, corporate campuses, hotels, and multifamily buildings. The Zagster system uses branded bicycles, U Locks, and dedicated bicycle racks and requires a cell phone to text a code for unlocking the bicycle. Another option is a bike library with a fixed number of bikes that can be checked out for free but must be returned by the end of the day. Some universities have used Republic Bikes' system which is closed and requires a code to check out bikes. It operates much like Zagster.

Figure A.3-1 | Bicycle Library at UConn Storrs

Source: today.uconn.edu

A.5 Community Systems

Community bike share system often operate as a bike library created and run through a group of dedicated community volunteers. Bikes may be housed at local businesses frequented by tourists, and both tourists and locals sign out bike locks and helmets to access the bicycles. Usage is free but there is a deposit. The system relies on volunteer time, fundraising support through local businesses, and recently, grant writing.

Some bike libraries are seasonal focused on serving recreational riders in a given area or utilizing a specific trail or trail system. In some cases, a small group of local bicycle advocates start these systems and set up distribution centers, typically local businesses, who sponsor the system. Riders check out bikes and locks inside the store, a process similar to many other systems. The rider is required to leave a deposit and the bikes must be returned to where they were checked out.

Figure A.5-1 | Mystic Community Bikes

Source: (top) themysticwave.com, (bottom) Mystic Community Bikes

A.6 Why Bike Share?

Bike share is a unique opportunity to provide a physically active form of public transportation that integrates with and supports Roanoke's current and proposed transit options. These systems provide a short distance transportation option that fills the gap between distances that are too far to walk but too close to justify waiting for and riding other transit options, e.g., bus.

Transportation Network Benefits

Bike share systems give a new option for short distance trips and increase the diversity and effectiveness of a region's public transportation system. Bike share works in conjunction with bus service and walking to provide the "last mile" connections for riders. Bike share enhances options for car-free and car-light households by providing a new public transit mode that is free from schedules or routes. In Roanoke, bike share could provide travelers with another means to connect with the existing bus system and future bus system, allowing users to transfer from the stop/station and bike farther than they would be able to walk.

Bike share has also been shown to reduce the dependence on personal vehicles. In a multi-city study, 40 percent of bike share users reported driving less often since joining. The same study also found that two percent of members sold their personal

vehicles and claimed that bike share had an influence in their decision making.[24]

Health Benefits

Bike share is one of the only physically active forms of public transportation and has the potential to help make a healthier city. In general cycling has been linked with increased cardiovascular health which reduces the likelihood of heart disease and obesity. A health survey conducted by Capital Bikeshare (Washington, DC region) found that 31% of members reported weight loss since joining the program and 27% reported an improvement in personal physique.[25]

Bike share also offers safety benefits to the cycling community at large. Increasing the number of bikes on the streets helps acclimate drivers to sharing the road. A study in the British Medical Journal found that increasing the number of cyclists and pedestrians in a community reduced the relative risk of a collision.[26] While there is still a risk of injury with cycling, the health benefits have been found to far outweigh the risk of injury.[27]

[24]Public Bikesharing in North America: Early Operator and User Understanding, Mineta Transportation Institute Report 11-26, June 2012, http://transweb.sjsu.edu/PDFs/research/1029-public-bikesharing-understanding-early-operators-users.pdf
[25] Vehicle 4 Change: Health Implications of the Capital Bikeshare Program, December 2012, http://capitalbikeshare.com/assets/pdf/v4c_capstone_report_final.pdf
[26] Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling, British Journal of Medicine, Volume 9 Issue 3, September 2003, http://injuryprevention.bmj.com/content/9/3/205.full
[27] The Health Risk and Benefits of Cycling in Urban Environments Compared with Car Use: Health Impact Assessment Study, British Journal of Medicine, August 2011, http://www.bmj.com/content/343/bmj.d4521

Economic Benefits

Bike share helps connect riders with local business and generates new trips to retail and tourist destinations. In the Minneapolis-Saint Paul region the introduction of the NiceRide bike share system generated an additional $150,000 dollars to businesses around bike docking stations.[28] Tourism is another significant economic benefit of bike sharing. Tourists can quickly and easily access sites around the city, without the expense of a cab or car rental.

Environmental Benefits

Bike share creates an opportunity to decrease the pollution in our environment. On average, the cars driven in the U.S. produce a pound of CO^2 per mile driven. In the first year of Denver B-Cycle operations, there was an estimated reduction over 300,000 pounds of CO^2 and in the four years since the number has risen to over a million pounds annually.[29] Bike share systems help promote greater environmental consciousness in the communities they serve, and many systems provide users customized statistics on pounds of CO^2 saved by each trip.

[28] University of Minnesota Center for Transportation Studies *Catalyst*, July 2012, http://www.cts.umn.edu/Publications/catalyst/2012/july/niceride/
[29] Denver Bike Sharing 2013 Annual Report, http://denverbikesharing.org/AnnualReports/DBS_2013_Annual_Report.pdf