New River Valley Metropolitan Planning Organization 2040 Long Range Transportation Plan

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Developed by

The New River Valley
Metropolitan Planning Organization

In Cooperation with

the Virginia Department of Transportation,

the Virginia Department of Rail and Public Transportation,

the Federal Highway Administration, and

the Federal Transit Administration

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TABLE OF CONTENTS

Introduction ……1
- Purpose……1
- Metropolitan Area Boundary……1
- Study Area Map……2
- Scope and Plan Requirements……3

Background and Outreach……4
- Document Review……4
- Stakeholder Outreach……5
- Public Outreach……7
  - Survey……8
  - Public Meeting……13

Demographic Profile……14

Roadway Network……20

Pedestrian and Bicycle Network……22

Transit Services……23

Park & Ride/Rideshare……25

Rail Transportation……26

Air Transportation……26

Travel Demand Management and Land Use……27

Roadway Safety Needs……27

Environmental Overview……27

Future Growth/Transportation Needs……28

Financially Constrained Plan……35
- Overview……35
- Funding Forecast……35
- Project Listing……36

INTRODUCTION

PURPOSE

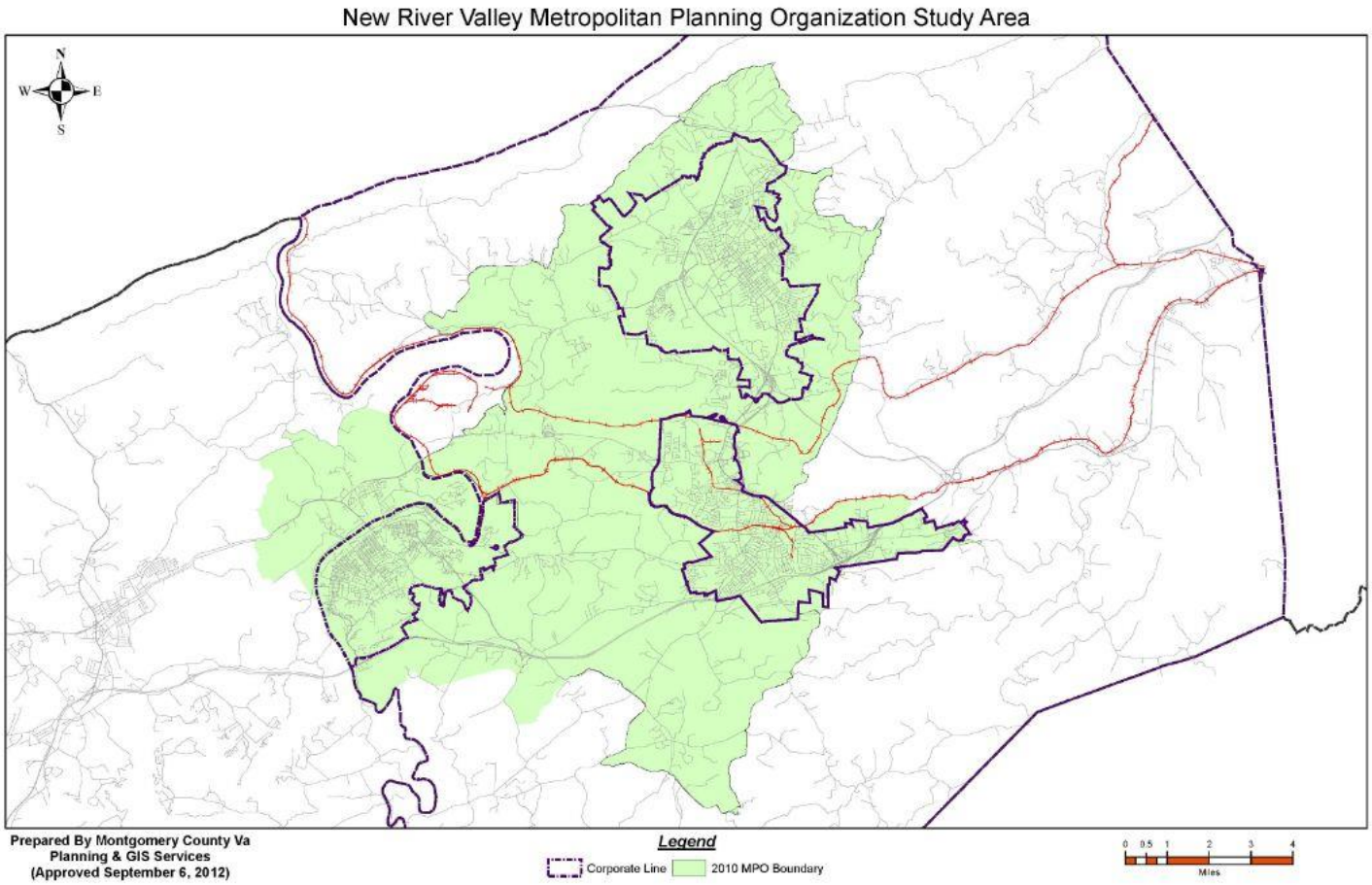
The goal of the transportation planning process is "to encourage and promote the safe and efficient management, operation, and development of surface transportation systems that will serve the mobility needs of people and freight and foster economic growth and development within and between States and urbanized areas, while minimizing transportation-related fuel consumption and air pollution. To achieve this goal, agencies develop long range transportation plans (LRTPs) ranging from statewide plans to metropolitan planning organization (MPO) plans. The purpose of the LRTP is to outline future projects, transportation policies, and investment planning strategies generated from the transportation planning process. The *New River Valley (NRV) Long Range Transportation Plan (LRTP) 2040 Update* is the result of this transportation planning process within the New River Valley MPO planning area.

The NRV LRTP 2040 Update is an update to the previous Blacksburg/Christiansburg/Montgomery Area 2035 Transportation Plan that was developed in 2010. Since the 2035 Transportation Plan was completed, the NRV MPO expanded its boundaries and the NRV LRTP 2040 Update incorporates these expanded boundaries. Also, new federal requirements, emphasizing a performance based planning approach for transportation planning were established in the Moving Ahead for Progress in the 21st Century Act (MAP-21) and signed into law in 2012. In 2015, the Virginia Department of Intermodal Planning and Investment updated its statewide long-range multimodal policy plan to comply with the performance based planning approach set forth in MAP-21, and summarized the new policy plan in VTrans2040.

METROPOLITAN AREA BOUNDARY

According to federal regulations, a metropolitan planning organization is designated for each urbanized area in the country with a population of more than 50,000 individuals and the adjacent area that is expected to be urbanized within the next 20 years. Using census data, the U.S. Census Bureau releases a list of Urbanized Areas (UZAs) to include within MPO boundaries. The 2010 census data from the New River Valley region warranted changes to the UZAs from the previous UZAs; therefore the NRV MPO boundary was redrawn with the release of the 2010 census data[1]. The NRV MPO planning area now encompasses the Towns of Blacksburg and Christiansburg and the City of Radford, as well as surrounding urbanized portions of Montgomery and Pulaski Counties within the state of Virginia. These urbanized portions of Montgomery County include the Villages of Prices Fork, Riner, Belview, and Plum Creek and the portion of Pulaski County includes Fairlawn. In total, the NRV MPO covers an area of 170 square miles with a population of 99,552 according to the 2010 census.

MPO Study Area Map



SCOPE AND PLAN REQUIREMENTS

Federal requirements for the national transportation program are set forth in legislation – Moving Ahead for Progress in the 21st Century Act (MAP-21). MAP-21 establishes national performance goals for Federal highway programs:

- **Safety**—To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure condition**—To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion reduction**—To achieve a significant reduction in congestion on the NHS.
- **System reliability**—To improve the efficiency of the surface transportation system.
- **Freight movement and economic vitality**—To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental sustainability**—To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced project delivery delays**—To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

The Virginia statewide transportation plan, VTrans 2040, set five goals for transportation within the state of Virginia in order to achieve its vision of "a multimodal transportation system that is safe, strategic, and seamless. The goals set in VTrans 2040 compliment the scope of the planning process that is outlined in MAP-21. HB2 established a framework to select projects that meet the goals of VTrans 2040 and met the goals set forth. HB2 legislation requires that the measures be quantifiable and objective, that the analysis of a project's benefits are relative to its cost (essentially a benefit-cost analysis using the HB2 factors), and that the CTB consider all modes of transportation. The law requires that the measures fall into six factor areas, listed below:

- Safety;
- Congestion Mitigation;
- Accessibility;
- Environmental Quality;
- Economic Development; and
- Land Use Coordination (for areas over 200,000 population).

The goals and scope of the *NRV LRTP 2040 Update* are the same as the goals of VTrans 2040 addressing the following transportation issues and needs within the planning area:

1. Economic Competitiveness and Prosperity
2. Accessible and Connected Places
3. Safety for All Users
4. Proactive System Management
5. Healthy and Sustainable Communities

Background and Outreach

DOCUMENT REVIEWS

Previous planning efforts throughout the New River Valley have been extensive, ranging from statewide transportation plans, such as VTrans 2040, to jurisdictional plans, such as the Montgomery County Village Plans. The following plans have been reviewed during the development of the *NRV LRTP 2040 Update.*

State

- 2016-21 VDOT Six Year Improvement Plan
- VTrans 2035
- VTrans 2040
- HB2 (2015 Implementation Policy Guide)

NRV MPO

- 2015-2016 Unified Planning Work Program (UPWP)
- Blacksburg/Christiansburg/Montgomery Area 2035 Transportation Plan

NRV RC

- 2011 Bikeway, Walkway, Blueway Plan
- 2012 Regional Transit Study
- 2014 Livability, Housing, and Energy Reports

Jurisdictional Plans

- Radford Area Including Fairlawn 2020 Transportation Plan
- 2004 Update of the Montgomery County 2025 Comprehensive Plan
- 2005-2007 Montgomery County Village Plans
- 2007 Montgomery County Village Transportation Links Plan
- 2007-2009 Pulaski County Comprehensive Plan
- 2009 Update of the City of Radford Comprehensive Plan 2030
- 2012 Update of the Blacksburg 2046 Comprehensive Plan
- 2013 Update of the Town of Christiansburg 2040 Comprehensive Plan

Other Plans

- Virginia Tech Parking and Transportation Plan
- 2006 Virginia Tech Campus Master Plan Update
- 2009 RIDE Solutions Park and Ride Study

- 2010 RIDE Solutions Long-Range Transportation Demand Management Plan

STAKEHOLDER OUTREACH

Stakeholders

Early in the development of the *NRV LRTP 2040 Update* meetings were held with key stakeholders within the New River Valley. The stakeholders were categorized as Local Jurisdictions, State and Regional Agencies, and Focus Groups with multiple stakeholders from each category, which can be seen below.

- Local Jurisdictions
    - Town of Blacksburg
    - Town of Christiansburg
    - City of Radford
    - Montgomery County
    - Pulaski County
- State and Regional Agencies
    - Virginia Department of Transportation
    - NRV Planning District Commission
- Focus Groups
    - Virginia Tech
    - Blacksburg Transit and Radford Transit
    - NRV Economic Development Alliance

Stakeholder Insights

Based on the feedback gathered during the stakeholder meetings, insights were gathered and categorized based on the goals set forth for the *NRV LRTP 2040 Update.* This feedback is summarized below.

Economic Competitiveness & Prosperity

- Local needs versus federal/state performance-based criteria
- Slower growth trends; variations in growth patterns or areas
- Potential economic drivers such as key projects, interstate access, or transit
- Influence of Millennials and Active Baby Boomers

Accessible & Connected Places

- Local roles versus intercommunity or regional interdependencies
- Transportation "barriers"; US 460 congestion, crossings of I-81 or rail lines
- Enhancing east-west access; I-81, US 11, Peppers Ferry, Prices Fork, Mud Pike
- Increased emphasis on alternate modes of travel and regional access

Safety for All Users

- Ongoing cooperation/collaboration of safety/security planning
- Critical links including I-81, US 460, railroads, hospital access
- Spot locations based on crash reviews, village areas, survey comments

- Influence of trucks and freight; I-81, I-81 detours, RAAP, first/last mile

Proactive System Management

- Signal optimization and improvements
- Intersection improvement strategies
- Access management opportunities
- I-81 truck traffic, climbing lanes, detour impacts
- Funding-constraints and impacts on maintenance priorities or transit services

Healthy & Sustainable Communities

- Increased emphasis on alternate modes of travel
- Livability and community interests
- Preservation/promotion of the areas rural and town characters
- Special event access and influence

Site/Project-Specific Needs or Improvement Strategies

- Previous plan recommendations
- Key interest areas; I-81, US 460 Bus, US 8, Peppers Ferry, Prices Fork
- Implementable project packages

PUBLIC OUTREACH

In addition to stakeholder and agency coordination, outreach to the general public was also secured through an online/paper survey as well as a public meeting.

Survey

Online and paper surveys were distributed throughout the area from December 2014 through February 2015 to provide a direct channel of feedback from the public. More than 800 unique survey responses and over 1,000 write-in comments were received and provided information that covered all facets of transportation in the project area. Sample results are included on the following page (see Appendix for details), with notable findings as follows:

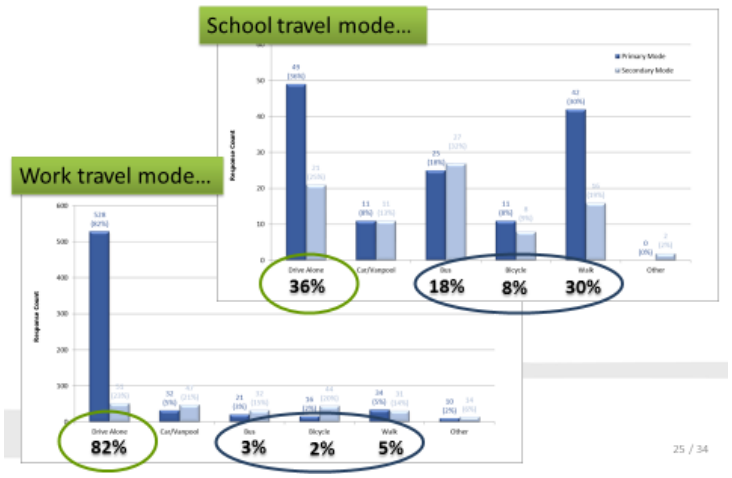
- Questions on where people live and work highlighted the need to accommodate commuting patterns and transportation interconnectivity across jurisdictional boundaries throughout the region, particularly between the rural county areas and employment hubs, or between Christiansburg and Blacksburg. Surveys indicated, for example, a much lower percentage of workers than residents in Montgomery County (2% versus 16%) or Christiansburg (16% versus 23%); whereas the opposite is true for Blacksburg (66% versus 45%).

- Questions on travel mode highlighted the current car-dependence of the areas' existing workforce, as well as a vast difference versus school travel amongst the university population. Over 82% of respondents indicated that they drive alone for work, with only 10% combined traveling by bus, bicycle, or on foot. In contrast only 36% of respondents indicated that they drive alone for school, with approximately 18% by bus, 8% by bicycle, and 30% on foot. The contrast between the two groups emphasizes a need (and its accompanying challenges) to accommodate a wide variety of users with potentially conflicting interests, while also implying broader concerns related to multimodal travel options (e.g., availability, quality, interest, etc.).

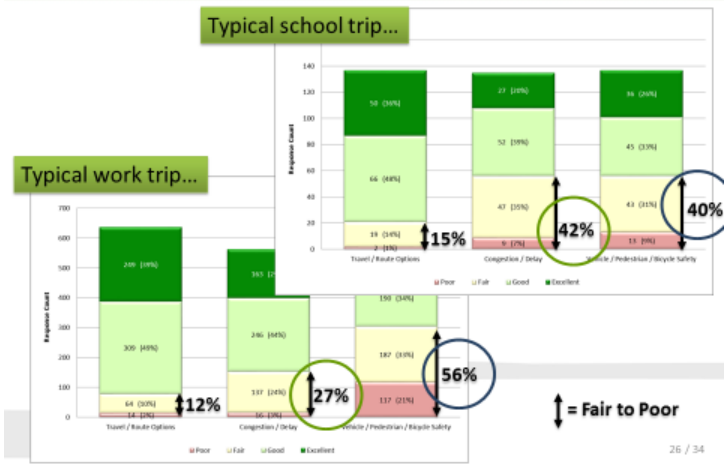
- Questions on typical travel experiences – including travel or route options, congestion or delay, and safety perceptions – added further insight into the area's transportation choices, particularly when compared to the previous travel mode questions. For example, approximately 42% of school trip respondents rated congestion as fair to poor (versus only 27% of work trip respondents), which may be a contributing factor in their higher level of multimodal travel (i.e., to avoid auto traffic congestion that may higher near/through campus areas). Additionally, over half (56%) of work trip respondents perceived safety as fair to poor, which may be a contributing factor in their much lower level of multimodal travel (i.e., they do not feel safe walking or biking given their trip length, purpose, location, etc.).

- Questions on interest in other transportation modes also provided insights as to travelers' perceived transportation needs. Responses generally implied that the majority of travelers are content with the availability, quality, and safety of the area's auto-centric systems. In contrast, many respondents desired more access to bus (56%), bicycle (28%), and walking (28%) opportunities. Additionally, 31% of respondents specifically indicated that the quality or safety of bicycle travel needs to improve, while 23% indicated the same for walking.

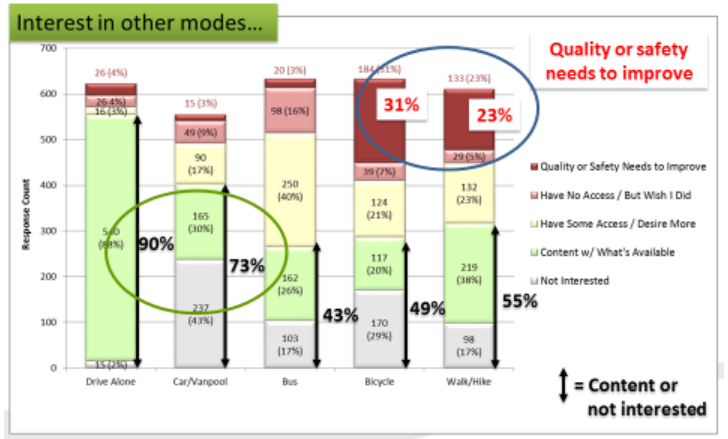
Transportation Survey

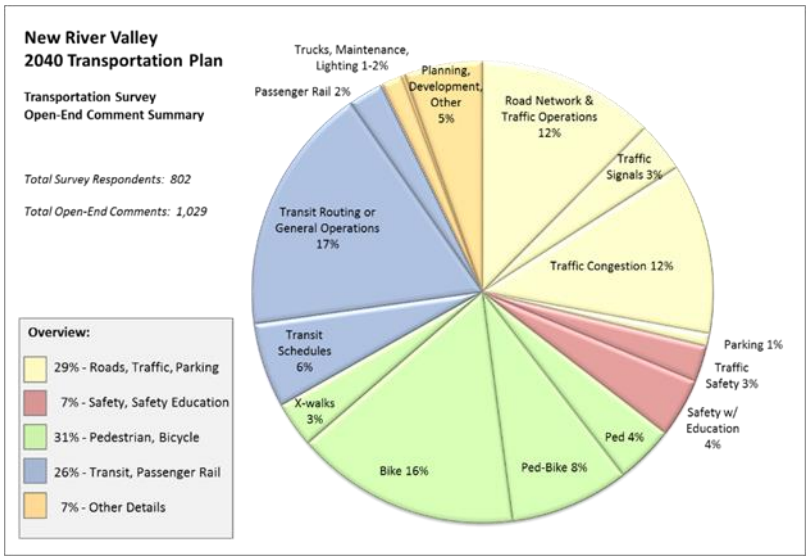


Transportation Survey



Transportation Survey





In tallying the more than 1,000 write-in comments that were also received as part of the survey effort, general trends, interests, and frequent areas of concern were identified to serve as valuable references and help guide the planning process. Approximately 31% of the write-in responses pertained to pedestrian or bicycle issues, not including an additional 7% that pertained to safety or safety education concerns, many of which also focused on pedestrian and bicycle travel behaviors. Approximately 29% of the responses pertained to road, traffic, or parking issues including general traffic operations, traffic congestion, and traffic signals; while another 26% of the responses pertained to transit issues and passenger rail. The remaining 7% of the responses pertained to miscellaneous comments focused primarily on truck travel, maintenance issues, lighting, or general planning and development topics. When compiled, a number of recurring focus areas were found to surface from the overall set of write-in comments. These insights were cross-referenced to the general goal categories for the long-range plan to yield the set of survey-based summary insights tabulated on the following pages. Where specific location references were included in the write-in comment, GIS tools were also used to locate and map the comments by type and by location density as shown on the summary maps on the following pages. These combined insights will continue to be used to help guide the planning process and the development of policy/project alternatives throughout the completion of this LRTP.

Survey Insights

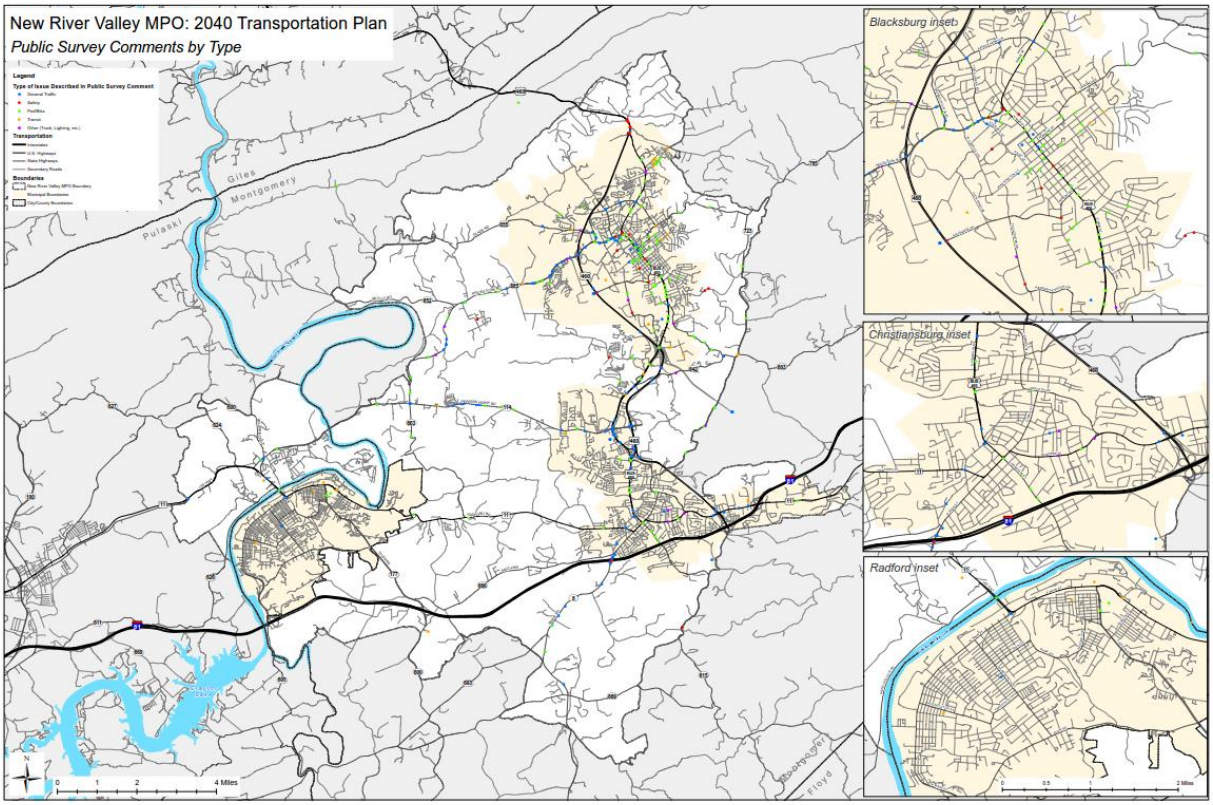
Whitman, Requardt & Associates, LLP
Engineers · Architects · Environmental Planners · Est. 1915

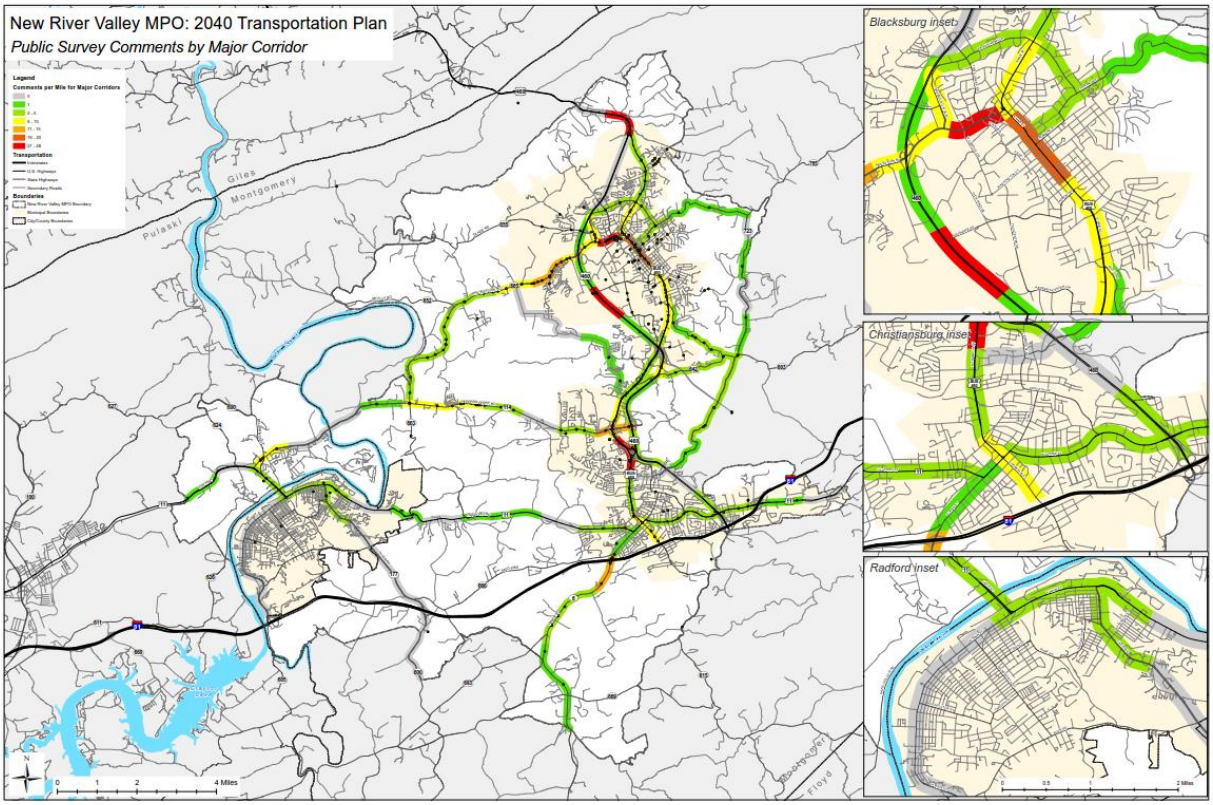
VTRANS 2040 GOALS

- Economic Competitiveness & Prosperity
- Accessible & Connected Places
- Safety for All Users
- Proactive System Management
- Healthy & Livable Communities

Economic Competitiveness & Prosperity	Accessible & Connected Places	Safety for All Users	Proactive System Management	Healthy & Livable Communities	SUMMARY NEEDS BASED ON SURVEY FEEDBACK:
●				●	Focus on community transportation and recreational assets
●	●		●	●	Focus on inter-community connections across all modes
●	●				Focus on regional multimodal connections
●	●			●	Focus on multimodal access to key destinations
		●		●	Ped/bike safety improvements
		●			Ped/bike safety education and enforcement
	●	●		●	Infill of fragmented sidewalk and bicycle networks
	●	●		●	Bike lanes and separation of bike/car traffic
		●	●		Reduction of aggressive/distracted driving, bicycling, and walking
	●	●	●	●	Ped crosswalk and lighting enhancements
●	●			●	Improved access to transit (schedule, duration, stops, consistency)
●	●			●	Expansion of inter-community and regional transit connections
●	●			●	County transit access and connectivity
	●		●	●	Improved trip planning resources
	●		●	●	Access to car-share/bike-share programs and carpool resources
●	●	●	●		Strategic corridor improvements
	●	●	●		Strategic intersection/interchange improvements
	●	●		●	Multimodal traffic planning/management near retail hubs
●		●	●		Interstate truck traffic improvements

Source: Summary insights from 12/2014 thru 02/2015 project survey responses; category icons from VTrans 2040 at http://www.vtrans.org/


New River Valley MPO: 2040 Transportation Plan
Public Survey Comments by Type
Legend
Type of Issue Described in Public Survey Comment
General Traffic
Safety
Ped/Bike
Transit
Other (Trash, Lighting, etc.)
Transportation
Interstate
U.S. Highways
State Highways
Secondary Roads
Boundaries
New River Valley MPO Boundary
Municipal Boundaries
City/County Boundaries
Pulaski
Giles
Montgomery
Floyd
Blacksburg
0 1 2 4 Miles
Blacksburg inset
Christiansburg inset
Radford inset
0 0.5 1 2 Miles


New River Valley MPO: 2040 Transportation Plan
Public Survey Comments by Major Corridor
Legend
Comments per Mile for Major Corridors
Transportation
Boundaries
Giles
Montgomery
Pulaski
Floyd
Blacksburg inset
Christiansburg inset
Radford inset
0 1 2 4 Miles

Public Meetings

Public meetings were scheduled at key points in the project's development. The first public meeting was held on April 23, 2015, at the Montgomery County Government Center to serve as a "kick-off" meeting to introduce the project, review existing conditions, and solicit input on areas of concern throughout the region. Open-house style discussions reviewed topics such as plan consistency with the goals and objectives of VDOT's statewide planning update (*VTrans 2040*); current population/employment estimates for the New River Valley MPO area; and relevant transportation insights based on historic planning documents and ongoing stakeholder outreach. Major new comments received at the public meeting focused on:

- Interest in traffic signal timing improvements along key corridors including, for example, the US 460 Business (South Main Street / North Franklin Street) corridor through major commercial areas in Christiansburg.
- Interest in traffic signal detection improvements, efficiencies, or repairs at key intersections including, for example, the Lowe's Driveway intersection along Route 114 (Peppers Ferry Road) in Christiansburg.
- Pavement maintenance and surface improvements, specifically including the road/bridge humps along US 460 just south of Blacksburg.
- Concerns along rural roadways carrying portions of Bike Route 76 including, for example, interest in a reevaluation and potential re-routing of the bicycle corridor to avoid exceptionally narrow, winding stretches of roadway; or the addition of enhanced bike warning signs to remind motorists of the potential for bicycle traffic where visibility around curves or passing opportunities are extremely limited by mountainous topography.
- Interest in rural route maintenance and enhancements including, for example, guiderail improvements or additions, or proactive clearing of hillside debris in areas prone to rock slides.

Demographic Profile

The demographic profile of the New River Valley MPO Study Area has changed very little since the 2035 Update 5 years ago. Current data is listed in this chart and on the following maps.

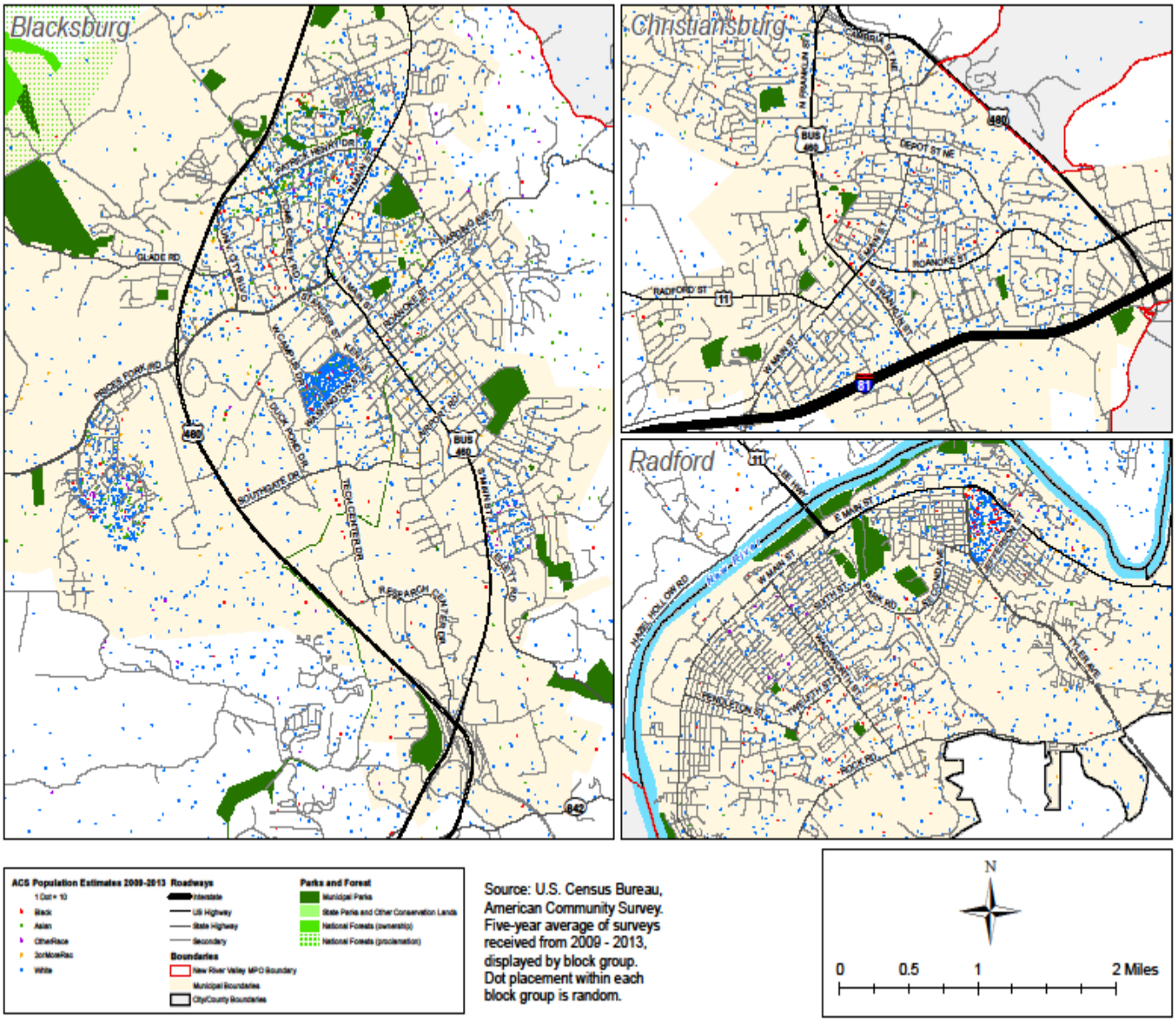
U.S. Census Bureau American Community Survey Population Estimates 2009 - 2013*		
	New River Valley MPO**	**Virginia**
White	87%	69%
Non-White:	13%	31%
Black	5%	19%
Asian	5%	6%
Other Race	1%	3%
2 or more races	2%	3%
Hispanic or Latino	3%	8%
Low income***	36%	19%

* Figures are a five-year average of survey responses from 2009 - 2013, analyzed at the block group level

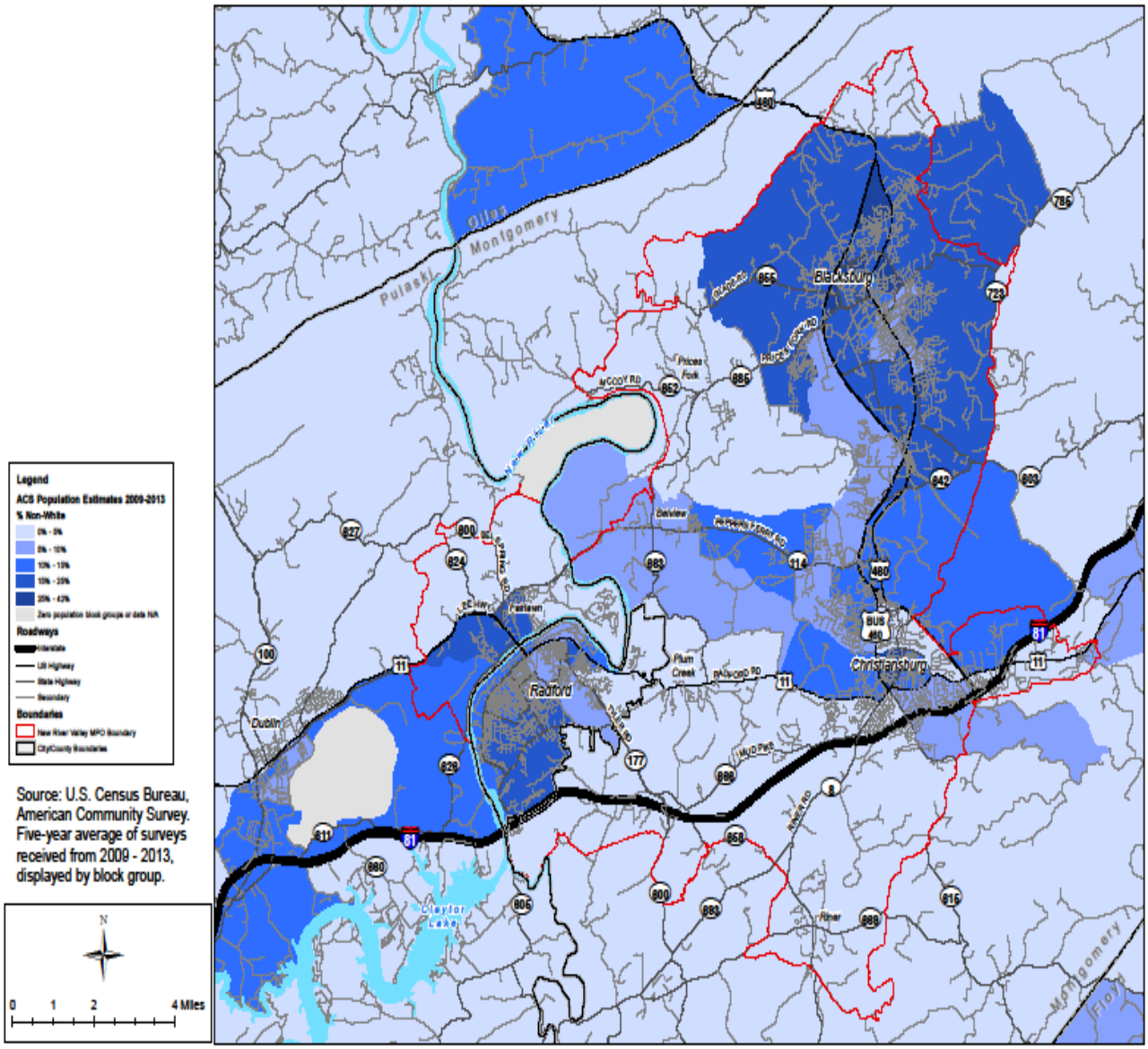
**Approximate boundaries

*** people with income less than or equal to 150% of poverty level

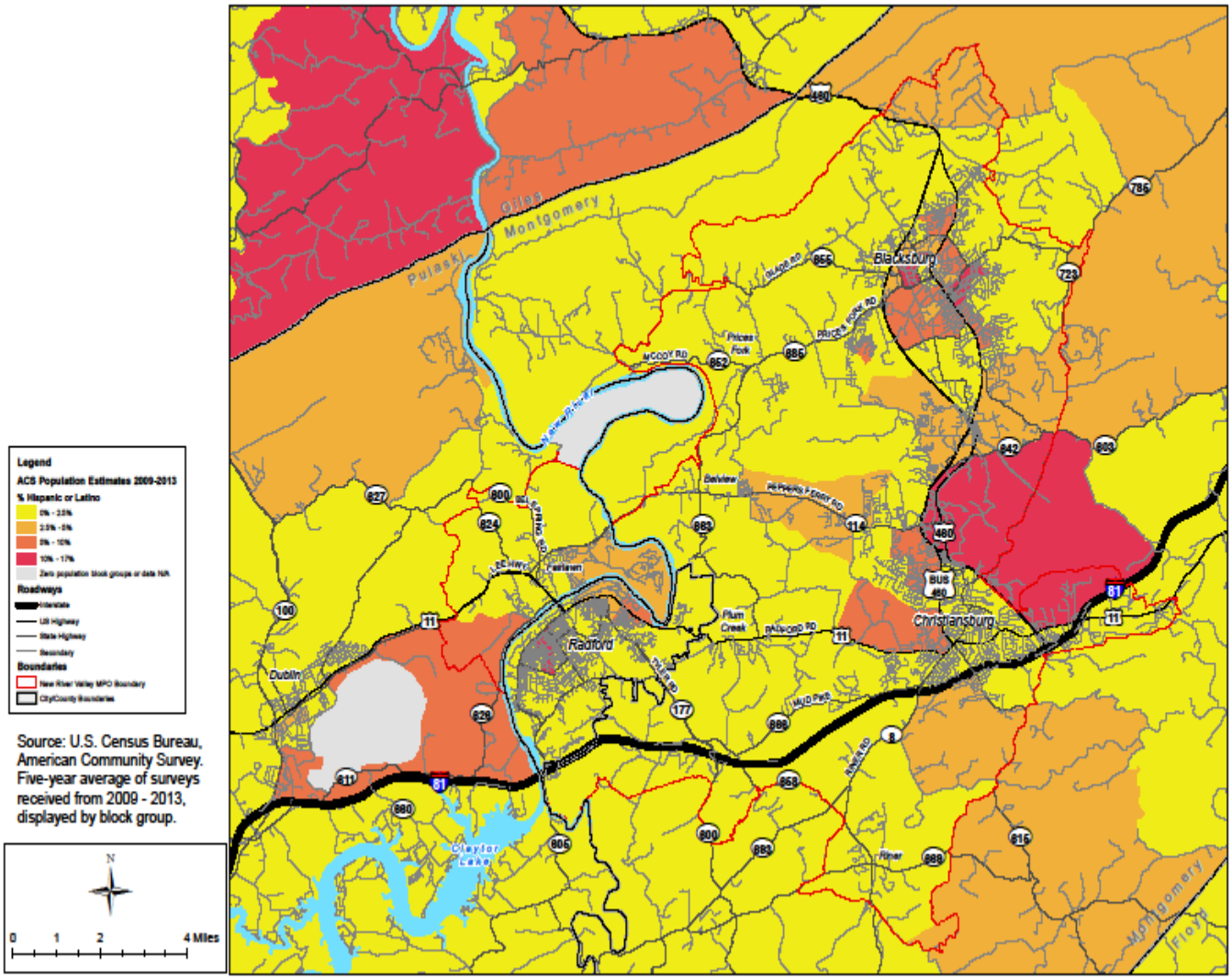
Dot Map by Race



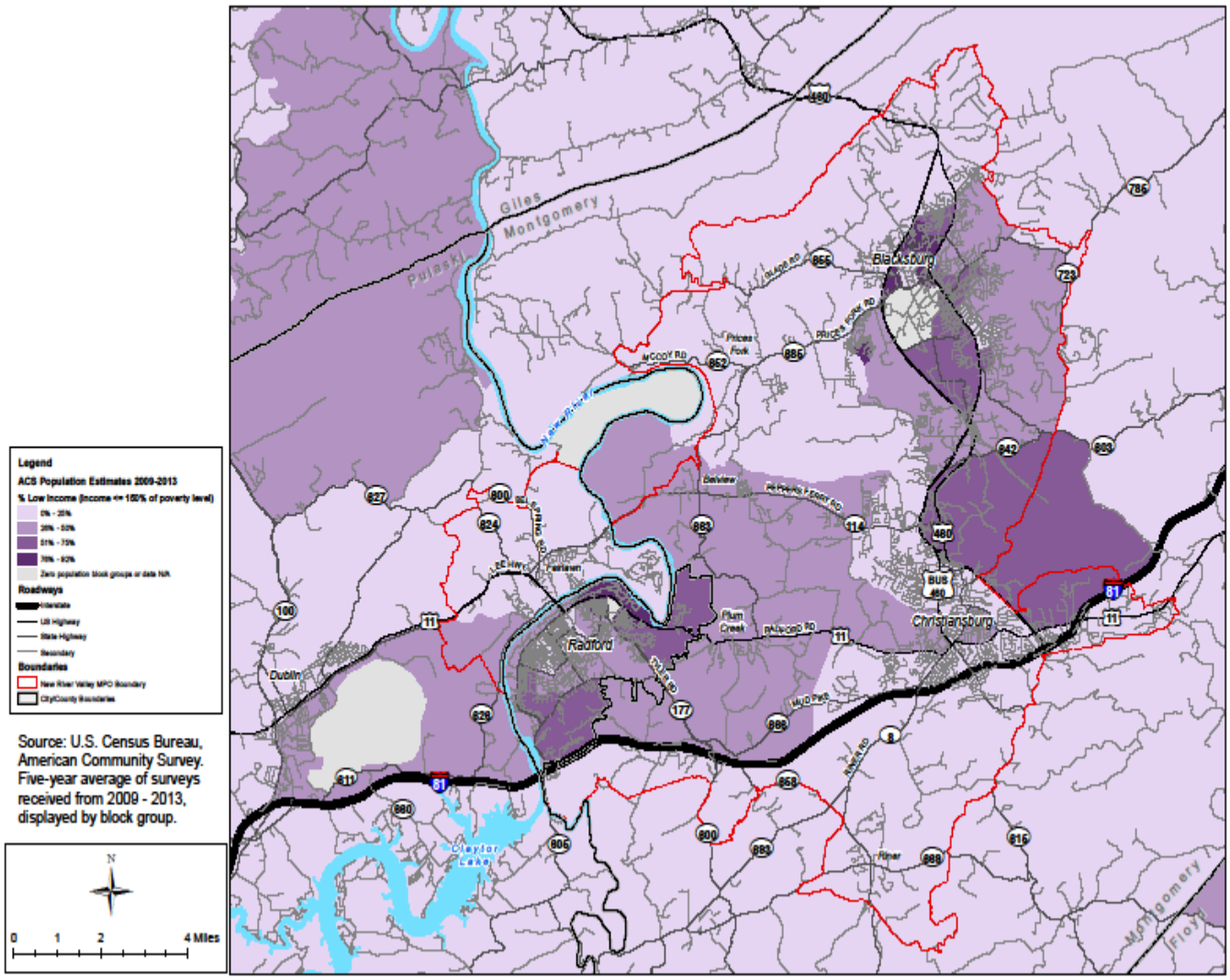
NonWhite Population



Hispanic Population



Low Income Population



Academic Institutions

Virginia Tech, Virginia's largest university, is located in the Town of Blacksburg. The university enrolls over 30,000 students per year, employs over 7,000 faculty and staff, and attracts additional visitors to sporting events, the Center for the Arts, and alumni events[2]. The planning area is also home to Radford University, with a population of nearly 10,000 students and over 500 faculty members, as well as a branch of the New River Valley Community College located in the New River Valley Mall.

Employment Centers

The academic institutions within the NRV act as employment centers for the region. In addition to the faculty and staff employed by Virginia Tech, the Virginia Tech Corporate Research Center (VTCRC) is located adjacent to the Virginia Tech Campus and is home to over 170 companies that employ over 2,700 people[3]. Additional notable employment centers include the Radford Army Ammunition Plant located just east of the planning area on the banks of the New River, the Carilion New River Valley Medical Center, as well as multiple business, corporate, and industrial parks.

Recreational Interests

The New River flows through the Valley with the Appalachian Mountains to the north and the Blue Ridge Mountains to the south. These mountain ranges are host to regional recreational opportunities such as the Appalachian Trail, the Jefferson National Forest, and the Blue Ridge Parkway which attract tourists and outdoor enthusiasts to the nearby planning area.

Community Interests

Residents of the planning area also have available to them the Blacksburg Community Center, Christiansburg Recreation Center, and the Radford Recreation Department, all offering indoor recreation activities and gathering spaces. The Blacksburg Aquatic Center and Christiansburg Aquatic Center offer recreational and competitive swimming and fitness activities. Additional township parks, golf courses, and trails give residents abundant options for outdoor recreation. Christiansburg also hosts the New River Valley Mall, the New River Valley Center, and the Spradlin Farms Shopping Center as shopping destinations. The combination of these regional and local amenities and employment centers attract a diverse range of residents and visitors to the New River Valley throughout the year.

EXISTING TRANSPORTATION SYSTEM

The study area is served by a network of roads, sidewalks, and bicycle facilities. Pedestrian travel is served by sidewalks within the downtowns and on local and thoroughfare roads elsewhere. In general, bicycle travel is permitted on existing roads. The MPO is also served by a number of ever increasing off road trails for recreational as well as commuter use by pedestrians and cyclists. On-street parking is permitted in Blacksburg, Christiansburg, and Radford unless restrictions are posted. Transportation needs are also served by Blacksburg Transit, Radford Transit, Pulaski Area Transit, the Smart Way bus service between Blacksburg/Christiansburgand Salem/Roanoke, taxi service, and the Virginia Tech-Montgomery Executive Airport. Commercial air travel is provided out of RoanokeRegional Airport (approximately 35 miles to the northeast), while theclosest location for intercity passenger train service (Amtrak) is eitherClifton Forge, 67 miles to the north, or Lynchburg, approximately 90miles to the northeast. Intercity bus service was reinstituted in the NRV MPO with the introduction of Megabus service on December 15,2010. This service offers daily departures to Knoxville and daily departures to Washington from its arrival and departure location located at the Park & Ride Lot off of I-81at Exit 118 on Roanoke Street in Christiansburg.

ROADWAY NETWORK

The focus of the Plan is the functionally classified urban thoroughfare system. The urban thoroughfare system is a subset of the area's overall road network that is designated by VDOT, the Federal Highway Administration, the City of Radford, and the Towns of Blacksburg and Christiansburg. The thoroughfare system includes roads that are functionally classified as arterials or collectors, and comprises approximately 210 roadway miles (580 lane-miles) within the NRV MPO study area. Arterial roads serve as the major traffic-carrying facilities in the area, and carry through traffic. Collector roads carry a lesser volume of traffic and feed traffic to the arterial roadways. Since these roadways make use of federal and state funds for construction and maintenance, they must be included in the Plan.

The New River Valley MPO lies at the convergence of several major north-south and east-west routes. A summary of the system is listed below.

Interstates and Freeways / Expressways

Interstate 81 is a north-south interstate that begins in Dandridge, TN and ends at the Canadian border in New York. I-81 passes through the New River Valley in the east-west direction in the southern portion of the MPO Planning Area. I-81 has been identified by VTrans as part of the Crescent Corridor, a Corridor of Statewide Significance. I-81 is one of the most heavily traveled routes with the highest truck percentage of any roadway in the planning area and provides a link to the City of Roanoke, and the Mid-Atlantic states north of the planning area and southwest Virginia and Tennessee south of the planning area. Four exits (Exit 105, Exit 109, Exit 114, and Exit 118) off of the Interstate provide limited access to the planning area.

US Route 460 is a primary east-west route that begins in Norfolk, VA and ends in Frankfort KY. US 460 passes through the planning area in the north-south direction connecting with Giles County and West Virginia to the west and the City of Roanoke and eastern Virginia to the east. VTrans has labeled US 460 as

a part of the Heartland Corridor, a Corridor of Statewide Significance. US 460 splits into *US 460 Bypass* and *US 460 Business* north of Blacksburg and rejoins north of I-81 in Christiansburg. Two connections occur between the Bypass Route and the Business Route, one in southern Blacksburg and the other northeast of Christiansburg.

Arterial System

US Route 460 Business (North and South Main Street in Blacksburg and Roanoke Street, East Main Street, and North Franklin Street in Christiansburg) splits from US 460 Bypass north of Blacksburg and rejoins north of I-81 in Christiansburg. US 460 Business passes through a roundabout at the intersection with SR 685 (Prices Fork Road) in Blacksburg and then intersects with Virginia Tech's Alumni Mall. As US 460 Business continues south, it passes by the Corporate Research Center before encountering the first of two interchanges with US 460 Bypass. Before the second interchange, US 460 Business passes through a commercial area north of Christiansburg, passing the New River Valley Mall, New River Valley Center, Spradlin Farms, and other commercial destinations. After the second interchange, US 480 Business passes through downtown Christiansburg and then reconnects with US 460 Bypass near I-81, south of Christiansburg.

US Route 11 stretches through the MPO Planning Area as Lee Highway in Pulaski County, Main Street in the City of Radford, Radford Road in Montgomery County, and Radford Street, Main Street, and Roanoke Street in Christiansburg. Route 11 passes through the Village of Plum Creek while connecting the MPO Planning Area to Dublin and the Town of Pulaski to the west and Shawsville and Elliston to the east. It has also been labeled as part of the Crescent Corridor by VTrans among the corridors of Statewide Significance.

US Route 177 is a major north-south link that originates at I-81 continues to US Route 11 in the City of Radford. Within the City of Radford, Route 177 is referred to as Tyler Avenue while in Montgomery County, Route 177 is called Tyler Road.

State Route 8 ties Christiansburg with the Village of Riner and continues south to connect the planning area with Floyd County. Route 8 originates as West Main Street in Christiansburg, and becomes Riner Road in Montgomery County.

State Route 114 is an east-west connection from US Route 11 in Pulaski County to US Route 460 in Christiansburg. The common street name for Route 114 is Peppers Ferry Boulevard in Pulaski County and Peppers Ferry Road in Montgomery County. This roadway provides a link from Pulaski County and the City of Radford to the commercial area in Christiansburg. Route 114 also serves the Radford Army Ammunition Plant (RAAP) and passes through the Village of Belview. There is also heavy commuter use of Route 114.

State Route 111 (Depot Street, NE and Cambria Street, NE, both in Christiansburg) connects US Route 460 Business (North Franklin Street) to US Route 11/US Route 460 Business (Roanoke Street) in Christiansburg.

State Route 412 and State Secondary 685 combine to form Prices Fork Road. Route 412 originates at a roundabout with US 460 Business in Blacksburg and becomes State Secondary 685 at the western

Blacksburg town limit. Prices Fork Road is a four lane roadway with turn lanes, until the intersection with SR 657 (Merrimac Road).

Collector System

Collector roads carry less traffic than Interstates and Arterials and serve to "collect" traffic from local roads and feed traffic to the arterial roadways.

PEDESTRIAN AND BICYCLE NETWORK

In 2014 the NRV MPO completed a Bicycle and Pedestrian Master Plan as a component in developing a long-range multimodal system strategy. Information found in the Bicycle and Pedestrian Master Plan provides a comprehensive inventory of the complete pedestrian and bicycle network in the NRV MPO planning area. The Master Plan serves as a guide to localities in development of Bicycle/Pedestrian Facilities in their particular jurisdiction. Primary focus is to coordinate Bicycle/Pedestrian efforts regionally and to assure connections between activity centers.

Pedestrian and Bicycle Facilities

The primary pedestrian transportation facilities in the planning area include sidewalks which can be found within Blacksburg, which has approximately 140 miles, Christiansburg, and the City of Radford. Walking and biking trails, or multi-use paths, can also be found in Blacksburg, Christiansburg, and the City of Radford near the Radford University campus and along the New River. Bike lanes also exist within the planning area with prevalence around Blacksburg and several roads in the planning area have Shared Road Designations for bicycles which support bicycle transportation.

Huckleberry Trail

The Huckleberry Trail is currently an over 8 mile paved running, walking, and biking trail that has been converted from an abandoned railroad line. The trail connects the Blacksburg Library to the Christiansburg Recreation Center. Extensions of the trail, north into the Jefferson National Forest and south into downtown Christiansburg, are at various phases of construction, design, and planning.

Radford Riverway

The Radford Riverway is an approximately 3 mile paved trail that connects the City of Radford to Radford University. The Riverway passes through Bisset and Wildwood Parks to provide a recreation facility in addition to a local commuter facility. Plans exist to expand the trail into West Radford.

US Bike Route 76 (USBR 76)

US Bike Route 76 is a cross-country bicycle route that stretches from Missouri to the east coast of Virginia. In Virginia, USBR 76 is a signed bicycle route that enters the NRV MPO Planning Area from the west on Route 626 before crossing the New River on US Route 11. USBR 76 continues from the City of Radford, through the planning area, to Christiansburg on Routes 177, 787, 664, 666, 111, 723, and 785.

TRANSIT SERVICES

The MPO is served by local transit agencies as well as regional operators, both public and private. Alternative transportation facilities and organizations also provide transportation options for those living in and visiting the New River Valley. These options are listed below:

- Blacksburg Transit
- Radford Transit
- Pulaski Area Transit
- New River Valley Senior Services
- Smart Way Commuter Service
- Megabus
- Exit 118 Park and Ride Lot
- RIDE Solutions ridesharing program

Blacksburg Transit

Started in 1983, Blacksburg Transit, a department of the Town of Blacksburg, has routes in three of the MPO member jurisdictions and provides over 3,600,000 rides per year. Currently, all Blacksburg Transit routes lie within the MPO study area, and BT has been active in discussions regarding the potential expansion of service both within the current service area, and to adjoining areas such as within Montgomery County and to other nearby areas. The MPO will work with Blacksburg Transit in completing the Transit studies currently underway and assist in selecting other areas for planning level study. In November 2011, BT initiated pilot bus service to the Warm Hearth Area of Montgomery County. A funding proposal was again submitted to VDRPT in February 2015 to further support the service connection between Warm Hearth and the nearby Lewis Gale Hospital Montgomery, allowing connections to existing BT routes that serve Blacksburg and Christiansburg as well as trips to additional destinations both within Warm Hearth and the service area. In July 2014, the Warm Hearth service expanded to three days of week (Tuesday-Thursday) of demand-response service. On a monthly basis average monthly ridership has increased 83% compared to a year ago.

A Transit Development Plan (TDP) was completed for Blacksburg Transit to identify transit needs in the future to give a priority order for transit expansion and enhancement as funding becomes available. The final report was completed in June 2011. This report was added to the MPO 2035 Long Range Plan, and will be added to the 2040 Plan as well. As a follow-up, and based on preliminary recommendations from the TDP effort, BT has also submitted a DRPT grant request; if approved an amendment to the UPWP will be done. A follow-up effort for a new TDP has been put in motion, tentatively to start during FY17 (Fall 2016), as required by DRPT.

Blacksburg Transit also operates service in and to the Town of Christiansburg. These services, including a fixed-route, a demand-response service, and commuter routes, are evaluated and refined on a regular basis. The MPO continues to work with Blacksburg Transit and the Town of Christiansburg to evaluate the service and implement refinements to increase ridership. Now in its fifth year, ridership has increased steadily from approximately 1,000 trips per month to 2,400 as of July, 2014. These services provide an affordable public transit option for citizens. The commuter service was expanded to 2 routes in 2012, with refinements implemented during FY14 to provide a daily connection between the Town of Christiansburg and the Town of Blacksburg. The commuter service provided over 5,500 passenger trips during FY14 with just two vehicles.

Radford Transit

Radford Transit is a joint partnership between The City of Radford, Radford University, and New River Valley Community Services (as operators). The system was launched August 8th, 2011 and serves the entire City of Radford, Radford University campus, Fairlawn and Carillion New River Valley Medical Center. Connecting routes exist to Blacksburg, Christiansburg as well as the Exit 118 Park & Ride lot to connect with Megabus and the SmartWay bus. Annual ridership is approximately 375,000 passenger trips per year. The system operates ten small (10) body-on-chassis (Cutaway) style buses, two (2) medium duty body-on-chassis (Cutaway) style buses, four (4) low floor heavy duty transit buses and is in the process of procuring two (2) medium duty body-on-chassis (Cutaway) style buses and refurbishing two (2) low floor heavy duty transit buses as required for passenger demands/expansion and spare ratios.

In the coming year Radford Transit will have to replace its original fleet of seven (7) buses as they have reached end of life. The system will be seeking a more viable long-lasting solution to these vehicles based on system utilization and load based needs.

The system has finalized its Transit Development Plan (TDP) which fully identifies future growth needs including operating and capital requirements.

Currently minor expansions are planned for FY 2016 to include extending the Route 20 (providing service to Fairlawn) by 2 hours daily during our full service schedule. Route 40 (providing service between Radford, Christiansburg, and Blacksburg) will be redirected off of Route 114 and utilize Route 11 due to safety concerns with the Route 114 corridor.

Pulaski Area Transit

Pulaski Area Transit was established in 2003 to provide the community with public transportation including a mixture of deviated fixed route and demand response service. PAT provides Fixed Route service from the Town of Pulaski to Dublin, including New River Community College, and the Fairlawn area of Pulaski County. PAT meets Radford Transit at Wal-Mart in Fairlawn and picks up passengers and transports them to Dublin and New River Community College. The Fixed Route service makes 4 trips per day and is available Monday through Friday. PAT also offers 24 hour Demand Response service to the Fairlawn Area. In FY 2013, PAT provided 81,559 passenger trips covering 199,597 vehicle miles. PAT operates 10 body on chasis 14 passenger buses. In addition, PAT has received several awards recognizing their success.

SmartWay Commuter Bus Service

The SmartWay Intercity bus route connects Blacksburg and the Virginia Tech campus to the City of Roanoke with stops in Christiansburg and the Park and Ride Lots at Exits 118 and 140. Service is provided 6 days per week by 5 “over the road” coaches. An extension of that service provides connection to Amtrak in the City of Lynchburg.

Megabus

Megabus, a private carrier provides direct connections to Knoxville to the southwest and Washington to the northeast. Connections with other routes provide substantial coverage of the eastern portion of the United States.

Park and Ride/Rideshare

Park and Ride

The MPO has one official Park and Ride lot located at Exit 118 off of I 81. There are numerous informal lots throughout the MPO Study Area. The Exit 118 Park and Ride lot also serves as a mini Transit hub for the region. Currently it is served by Blacksburg Transit, Radford Transit, District 3 Transit, SmartWay, and Megabus. Due to overcrowding, the lot is currently being expanded from 70 spaces to over 250. Separate transit slips and passenger amenities are included in the project.

Ride Solutions

RIDE Solutions is a Transportation Demand Management (TDM) effort that provides alternative transportation options to the residents of the New River Valley and Roanoke Valley. RIDE Solutions partners with citizens and businesses, introducing options such as ridesharing, biking, public transit, walking, and guaranteed ride home services as alternatives to single occupancy vehicle trips. The program is dedicated to improving the efficiency of the roadway network and reducing environmental impacts of vehicle emissions.

RAIL TRANSPORTATION

Passenger Rail

Currently, there is no passenger rail service to the NRV MPO Planning Area. The closest rail station is located in Lynchburg, VA, from where Amtrak offers daily round-trip service to the Northeast Corridor. As mentioned earlier, the SmartWay Connector bus service gives citizens living in the planning area access to the rail transportation. It was announced in 2014 that passenger rail service will be extended to Roanoke, with service beginning in 2017. Bus service to Roanoke to meet Amtrak will be a modification of the existing SmartWay service. An ongoing study is evaluating a potential future extension to the New River Valley region.

Freight Rail

Norfolk and Southern provides freight rail service to the MPO area. Freight rail service passes through the planning area on Norfolk Southern rail lines. The New River Valley is on both the Heartland Corridor (east-west) and the Crescent Corridor (north-south).

AIR TRANSPORTATION

Virginia Tech-Montgomery County Executive Airport

The Virginia Tech-Montgomery County Executive Airport is the only airport located in the planning area and is governed by the Montgomery County Executive Airport Authority which is comprised of representatives from Blacksburg, Christiansburg, Montgomery County, and Virginia Tech. The Airport serves primarily corporate and private clientele from its location on the Virginia Tech Campus. An updated Long Range Plan was developed by the Airport Authority in 2008 and includes plans for expanding facilities and extending the runway.

Roanoke-Blacksburg Regional Airport

Although located outside of the MPO Planning area in Roanoke, VA, the Roanoke-Blacksburg Regional Airport is a commercial airport which can accommodate passenger airlines, airfreight carriers, general

aviation, corporate, air taxi and charter operators, and the military. Service to and from the airport is provided by the SmartWat Bus Service.

New River Valley Airport

The New River Valley Airport is a primarily cargo airport located in Dublin and operated by the New River Valley Airport Commission. The airport commission is represented by Pulaski County, Montgomery County, Giles County, the City of Radford, and the Towns of Dublin, Pulaski, and Christiansburg. The New River Valley Airport offers a 6,201' x 150' runway with an instrument landing system, aircraft refueling, and freight handling capabilities.

Travel Demand Management and Land Use

Developing estimates of travel demands is the key first step in the process of identifying transportation needs. Existing traffic demands were determined based on an extensive set of data collected and maintained by VDOT, as supplemented by count data from other sources such as local governments, and counts performed for transportation studies including traffic impact studies performed for new development. For analysis purposes, all count data is adjusted, based on historic traffic trend data, to a common base year. As noted earlier, the base year for the Plan update is 2012. The New River Valley Transportation Plan supports land use concepts that support a walkable, bicycle and transit friendly community; following smart growth principles and transit oriented development (TOD) concepts. These principles support efficient travel that promote a high quality of life, sustainability, and reduced impacts on the environment; and are particularly applicable to the bicycle lanes, greenways, and sidewalks. Local Comprehensive Plans detail a number of planning objectives and action strategies for these parts of the transportation network.

Roadway Safety Needs

Roadway safety needs were determined based on reviews of Virginia Department of Transportation crash databases covering the years 2010 through 2012. Locations with 9 or more crashes over this time period qualified for funding. Some Safety projects are included in VDOT's Six Year Plan. Other identified locations are shown for funding in subsequent years.

Environmental Overview

The environmental overview of projects included a review of existing mapping and databases, aerial photographs, and, in some cases, field reviews, to identify the presence of features near a project area that could be affected by the project. The overview included the following aspects:

Potential residential and business displacements;
Environmental justice group (low-income and minority) impacts;
Community disruptions;
Community service impacts;

Land use/zoning conflicts;
Hazardous materials sites;
Impacts on historic sites and districts;
Impacts to wildlife refuges, critical habitats, and known locations of threatened and endangered species;
Proximity to wild and scenic rivers;
Encroachment on critical soil types (prime farmlands, erosive soils);
Proximity to managed forest lands, scenic routes, and parks/recreation areas;
Air quality impacts; impacts to noise sensitive receptors; and
Impacts to water quality, floodplains, and wetlands.

The overview of potential environmental impacts for projects in the Financially Constrained Plan focused on those projects not included in the current VDOT Six-Year Improvement Program (SYIP). This isbecause the SYIP projects have largely moved beyond the planning stage to the programming stage. Other similar projects that have moved beyond the conceptual stage include the proposed Multi-Modal Transfer Facility on Perry Street on the Virginia Tech Campus. The majority of the other projects in the Financially Constrained Plan consist of studies; or of spot improvements that are not expected to only minimal environmental effects.

Future Growth/Transportation Needs

Traffic forecasts are primarily a function of expected increases inpopulation and employment, and the particular areas where trafficgrows at the highest levels is based on where this anticipatedgrowth is expected to occur. Base year population and employment datawas determined for geographic areas in the region called transportation analysis zones (TAZs). In consultation with local planners, futuregrowth in population and employment for each TAZ was also determined,with overall growth estimates guided by regional control totals. The New River Valley is expected to continue to grow at an above average pace due to the growth plans of both Virginia Tech and Radford University. Both of these institutions are the economic engines for the region. Transportation needs in the NRV MPO were identified based on input from transportation providers, local governments, the general public, and transportation planning and traffic engineering analysis. Base year population and employment are from data from the U. S. Census Bureau and the Virginia Employment Commission and the year 2012 is being used. Growth projections are for the year 2040. The maps following represent this information.

MPO Population and Employment Growth Projections by Jurisdiction

POPULATION

	POPULATION 2012	POPULATION 2040	PROJECTED Growth	PROJECTED % Growth	ANNUAL Linear % Growth
Blacksburg	43,028	54,602	11,574	26.9%	0.96%
Christiansburg	21,290	31,737	10,447	49.1%	1.75%
Radford City	16,450	19,318	2,868	17.4%	0.62%
Montgomery County	26,836	34,702	7,866	29.3%	1.05%
Pulaski County	4,237	4,533	296	7.0%	0.25%
MPO TOTAL	111,841	144,892	33,051	29.6%	1.06%

Notes:

1) 2040 Population projections for Blacksburg, Christiansburg, and Radford City based on Weldon Cooper
2) Montgomery and Pulaski County 2040 projections used calculated linear annual growth rate based on Weldon Cooper projected data for these two counties

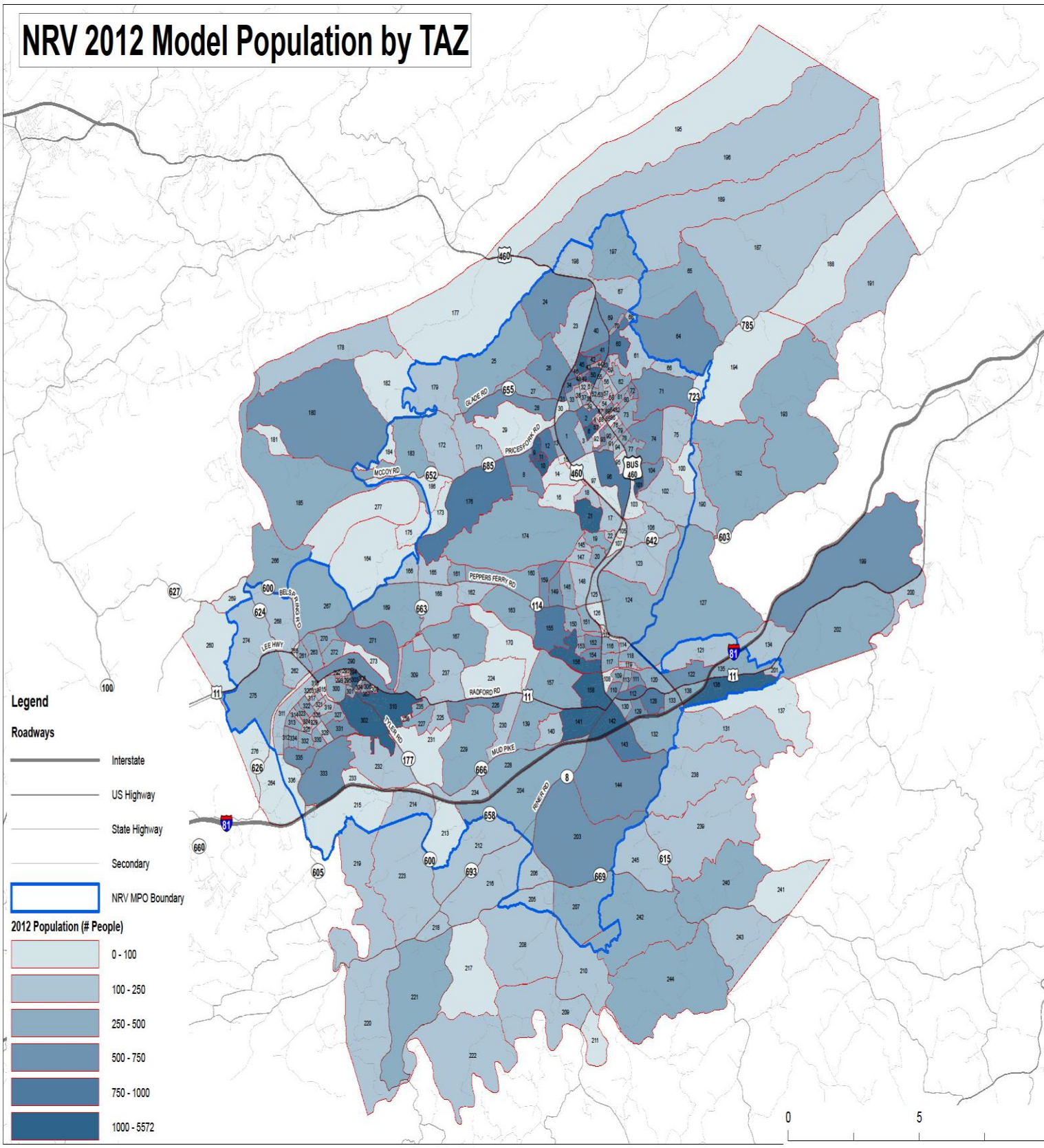
EMPLOYMENT

	EMPLOYMENT 2012	EMPLOYMENT 2040	PROJECTED Growth	PROJECTED % Growth	ANNUAL Linear % Growth
Blacksburg	21,523	29,116	7,593	35.3%	1.26%
Christiansburg	12,205	16,101	3,896	31.9%	1.14%
Radford City	5,734	7,388	1,654	28.8%	1.03%
Montgomery County	4,939	6,502	1,563	31.6%	1.13%
Pulaski County	1,586	2,043	457	28.8%	1.03%
TOTAL	45,987	61,150	15,163	33.0%	1.18%

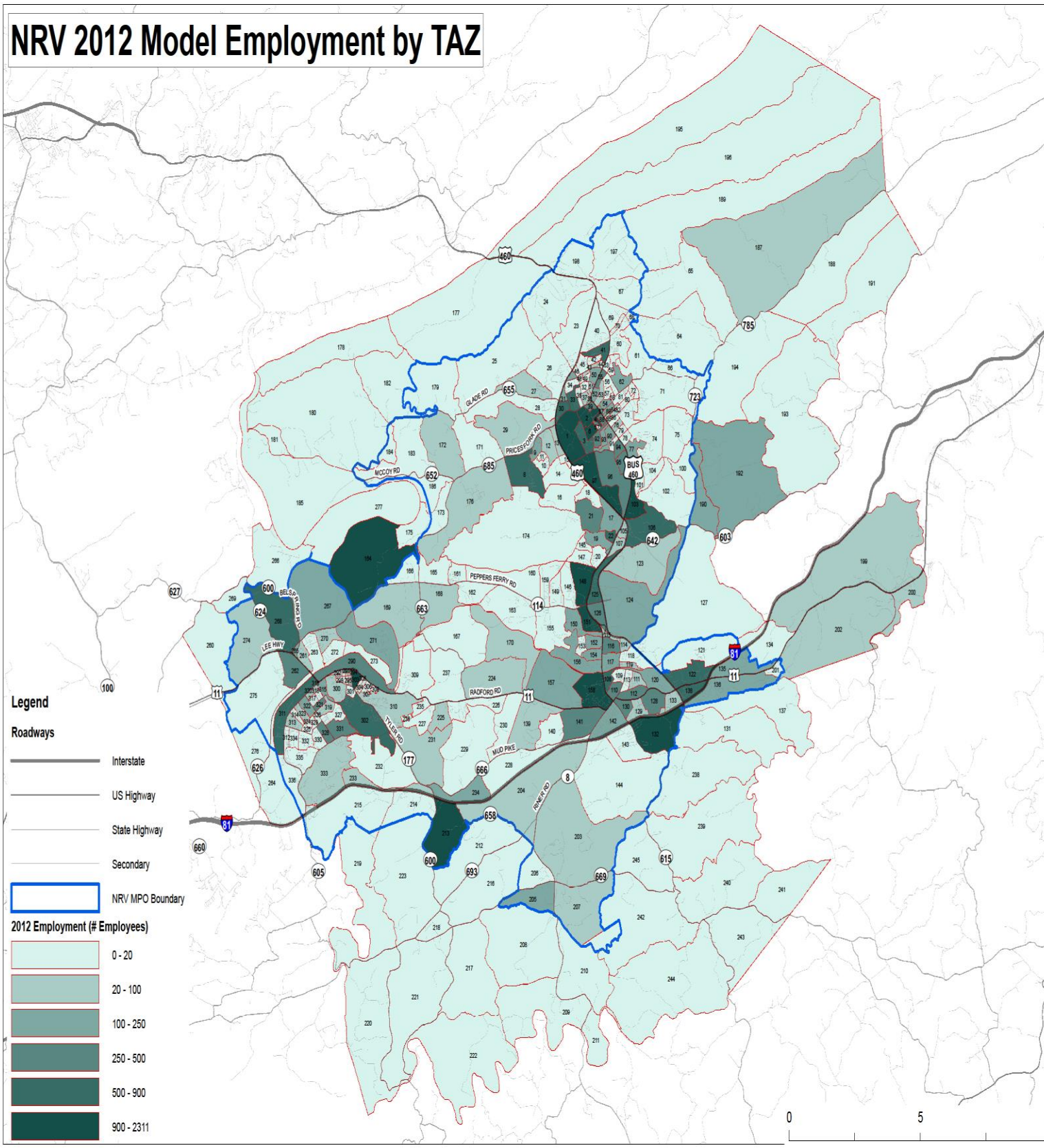
Notes:

Growth Rates based on LMI - Industry Projections (Long-Term) for multiple industries in New River/Mt Rogers (LWIA II) in 2012-2022 Growth Projections

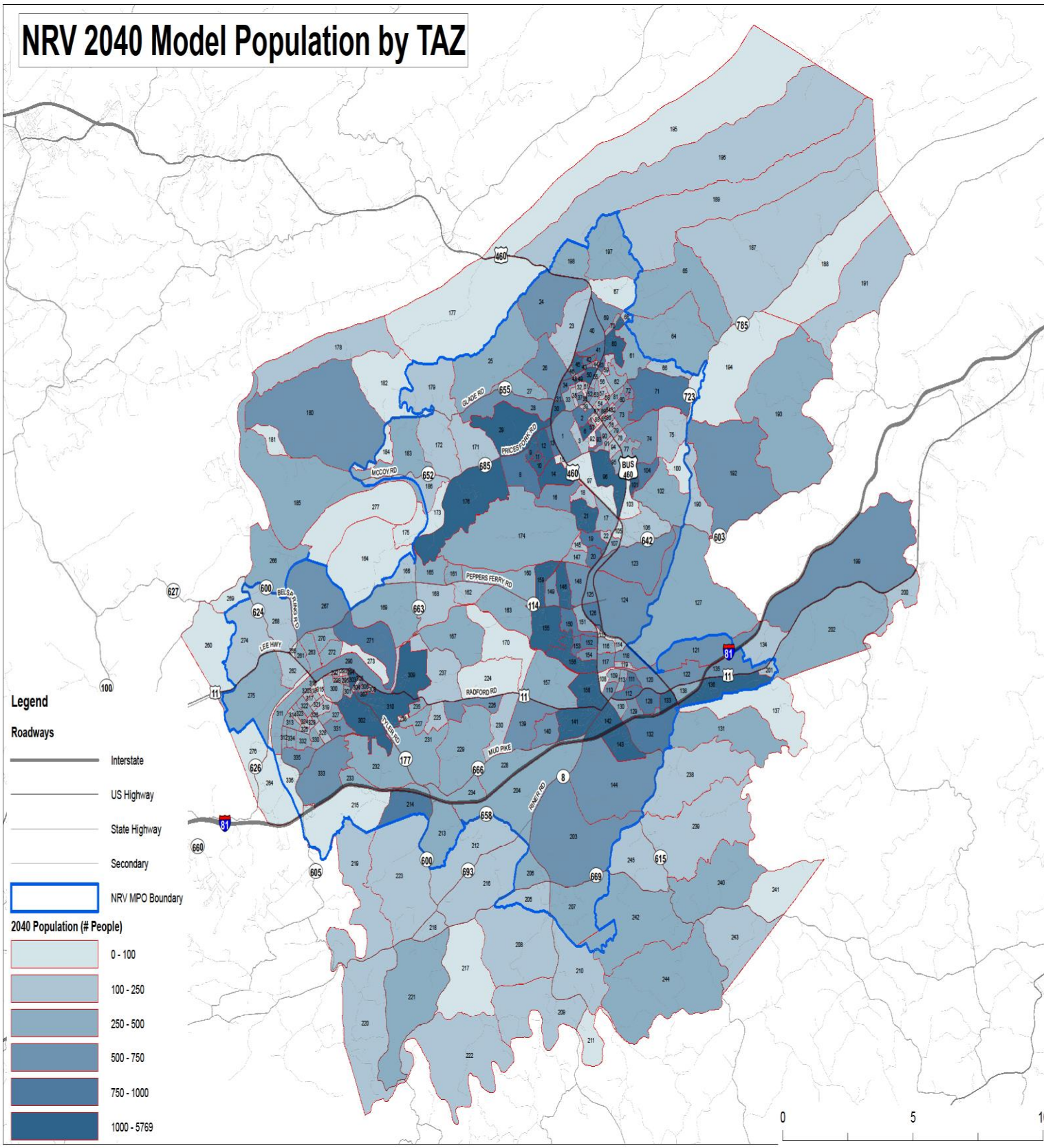
NRV 2012 Model Population by TAZ



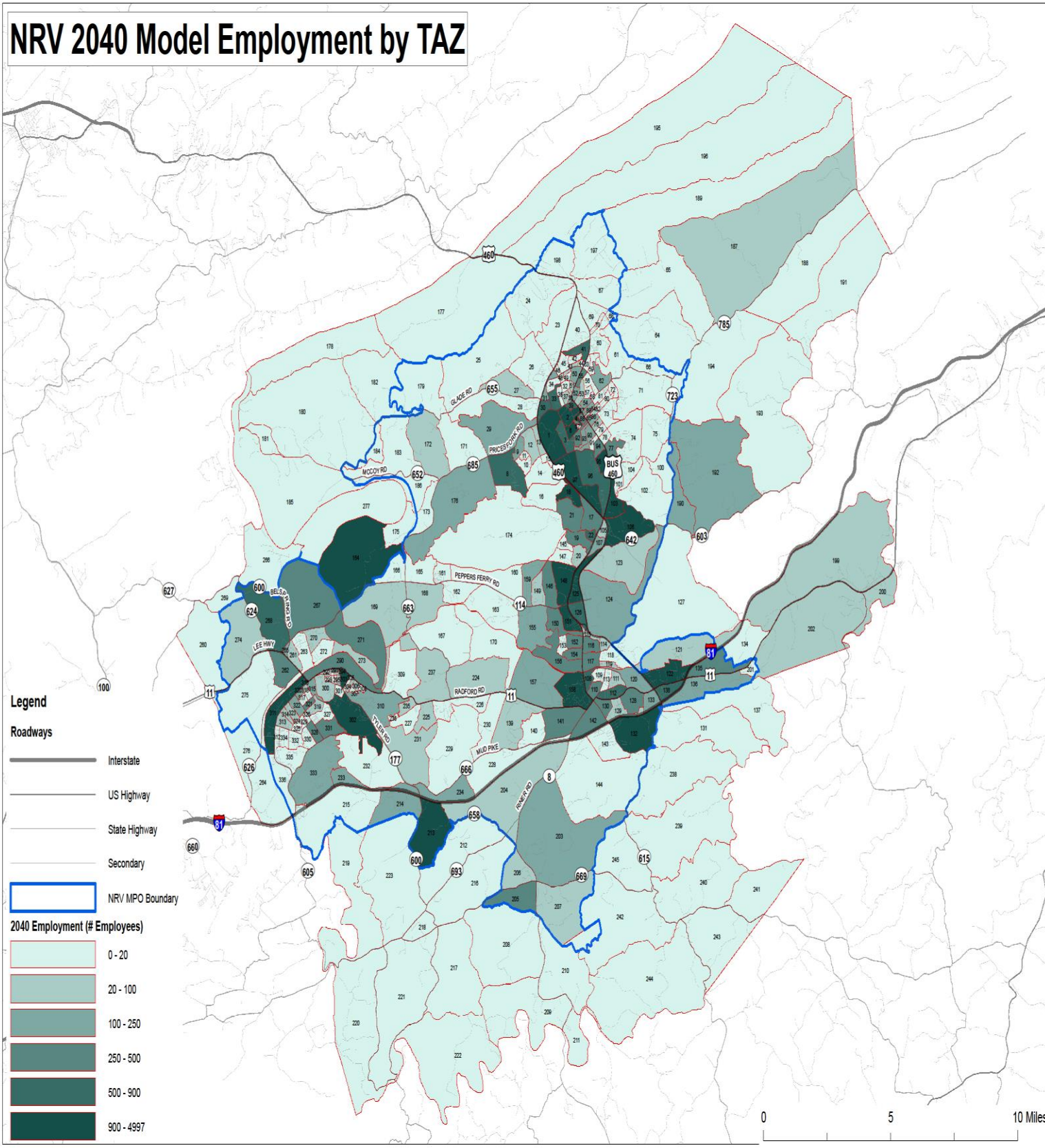
NRV 2012 Model Employment by TAZ



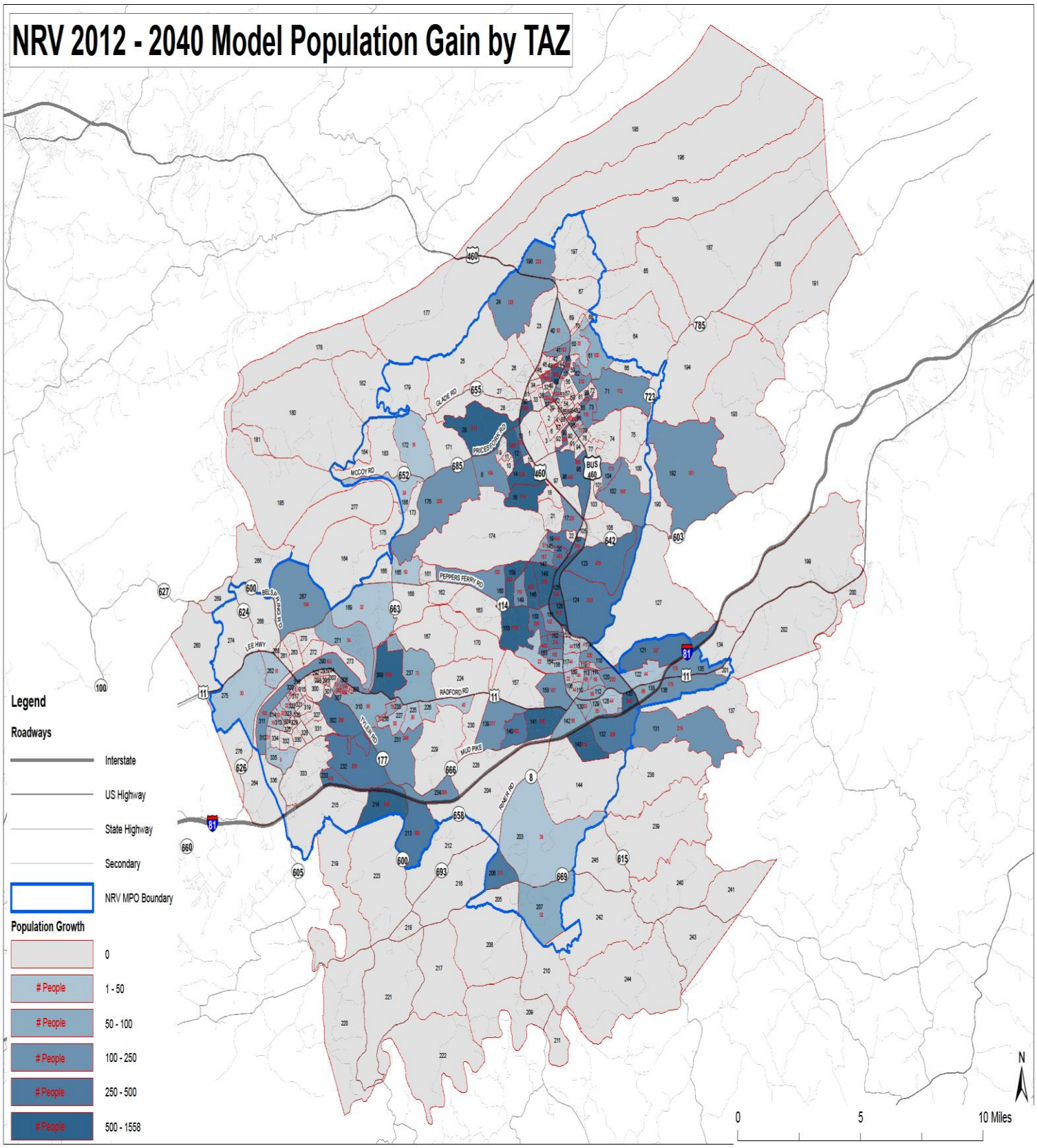
NRV 2040 Model Population by TAZ



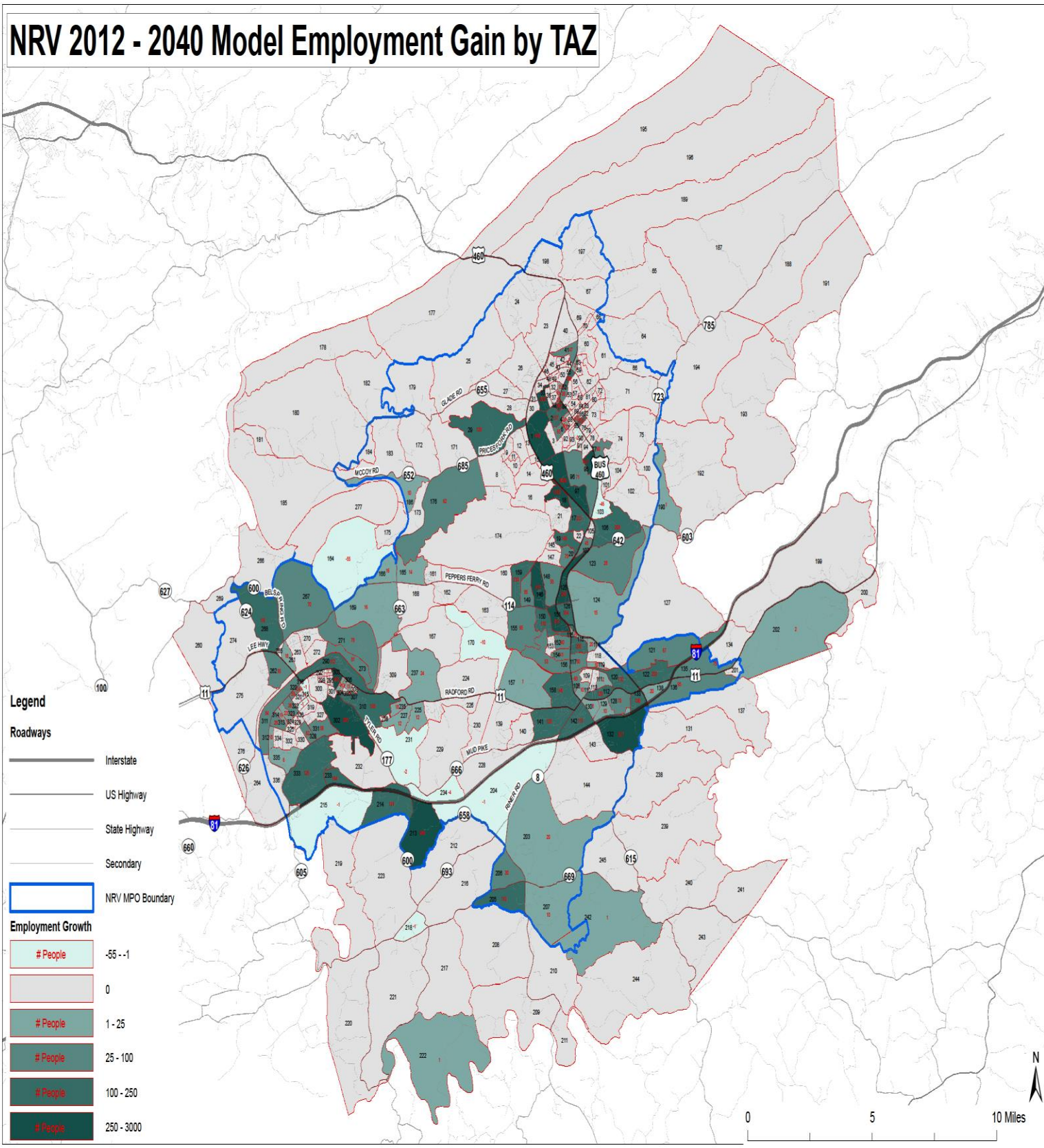
NRV 2040 Model Employment by TAZ



NRV 2012 - 2040 Model Population Gain by TAZ



NRV 2012 - 2040 Model Employment Gain by TAZ



FINANCIALLY CONSTRAINED PLAN

Overview

Federal regulations that guide the development of transportation plans for metropolitan planning areas require that the plans demonstrate that funds will be available to implement the projects based on reasonably expected public and private funding sources. For metropolitan areas in Virginia, the Virginia Department of Transportation (VDOT) provides estimates of transportation funding levels to the year 2040. Those projects that can be funded based on these estimates comprise the Financially Constrained Long-Range Transportation Plan which is described in this section. Since HB2 was adopted by the State Legislature and the State is beginning implementation, VDOT is unable to provide anticipated funding. The MPO has taken funding projected in the last Long Range Plan Update, modified it based on projects in VDOT's current Six Year Plan, and have developed as accurate a plan as possible. Upon VDOT providing updated funding projections, the MPO will Amend the Plan to accurately reflect the anticipated funding.

Funding Forecast

Anticipated Funding Stream for Constrained Plan	
Category	Anticipated Funding (2021-2040)
	in $1000s
VDOT District Grant Program	$25,419
VDOT High Priority Program	$25,419
VDOT Other Discretionary Construction	$13,272
VDOT State of Good Repair Program	$41,595
Federal Transit	$14,510
Revenue Sharing	$29,322
Sub-Total	**$149,537**
Six Year Plan Funds	**$185,463**
Six Year Plan Revenue Sharing Funds	**$26,930**
Total	**$361,930**

Financially Constrained Long Range Plan Project Listing

Jurisdiction	Route	Project Location	Description	SYIP	FCLR	ESTIMATE
						In $1,000s
Blacksburg		Various	Revenue Sharing - Bicentennial Greenway	X	X	$40
Blacksburg	460	Intersection of Route 460 & North Main Street	Intersection Improvements HB2 FY17	X	X	$3,317
Blacksburg		North Main Street @ Red Maple Drive	Safety – Improve Sight Distance	X	X	$271
Blacksburg		Various	Revenue Sharing – Paving, Drainage, Sidewalks, Curb & Gutter, Guardrail, Trails, Signals Reconstruction	X	X	$9,598
Blacksburg	460	Route 460 @ Route 314 (Southgate Dr.)	Interchange & Connector Road	X	X	$51,802
Christiansburg / Montgomery County	81	@ Route 8, Exit 114	Replace Bridges and approaches on I 81 over Route 8	X	X	$34,907
Christiansburg	460	EB Exit Ramp to Franklin Street	New Ramp Construction HB2 FY17	X	X	$2,124
Christiansburg	81	Exit 118 B off of I 81	Relocation of Park & Ride Lot	X	X	$5,215
Christiansburg		Chrisman Mill Road	Realign road at railroad crossing	X	X	$570
Christiansburg			Revenue Sharing - Paving, Drainage, Guardrail, Trails, Signals, Pavement Overlays, Sidewalks	X	X	$10,094
Christiansburg		North Franklin Street From Cambria Street to Independence Blvd.	Realign EB Ramp from Route 460 and make operational & safety upgrades between Cambria Street and Independence Blvd. – Includes Access Management	X	X	$8,490
Montgomery & Pulaski	81	I 81 at Exit 105	Replacement of NB & SB bridges over the New River	X	X	$126,078
Montgomery	81	Various	Pavement Rehabilitation	X	X	$1,273
Montgomery	8	at Route 669	Install Turn Lanes	X	X	$2,279
Montgomery	Smart Road		2 lanes on 4 lane Right of Way	X	X	$9,577
Montgomery	600		Restoration & Reconstruction	X	X	$4,904
Montgomery	685	In Prices Fork	Revenue Sharing – Prices Fork Road Turn Lane Construction	X	X	$2,060
Montgomery		Virginia Tech Campus	Revenue Sharing – Western Perimeter Road new construction	X	X	$34,500
Montgomery		Belview ES & Auburn ES/MS	Safe Routes to School - Bicycle/Pedestrian Improvements	X	X	$500
Radford	177	Tyler Avenue	Resurfacing	X	X	$341
Radford	11	City Wide	Traffic Signal Analysis & Installation	X	X	$83

Radford		Tyler Avenue to Main Street	Construct New 2 Lane Connector	X	X	$6,399
Pulaski		From Riverlawn Park to the New River	Riverlawn Court Trail	X	X	$200
Blacksburg		Perry Street, Virginia Tech Campus	Construct Multi-Modal Transportation Facility	X	X	$14,510
Christiansburg	111	Depot Street (Route 111) over Walnut Branch	Upgrade bridge		X	$1,000
Montgomery	8	Riner Road (Route 8) at Life Drive (Route 1295)	Safety Improvements		X	$100
Montgomery	11	Radford Road (US 11) at Walton Road (Route 663)	Safety Improvements		X	$100
Montgomery	81	I-81 at Tyler Road (Route 177) -- Exit 109A	Install signals		X	$400
Montgomery	643	Yellow Sulphur Road (Route 643) over Wilson Creek	Upgrade bridge		X	$500
Montgomery	655	Mount Zion Road (Route 655)over Toms Creek	Upgrade bridge		X	$400
Montgomery	657	Merrimac Road (Route 657)at Hightop Road (Route 808)	Improve intersection		X	$1,100
Montgomery	658	Meadow Creek Road (Route 658) over Meadow Creek	Upgrade bridge		X	$750
Montgomery	679	Nolley Road (Route 679) over Elliott Creek (South)	Upgrade bridge		X	$1,000
Montgomery	679	Nolley Road (Route 679)over Elliott Creek (North)	Upgrade bridge		X	$1,000
Montgomery	785	Catawba Road (Route 785)over Indian Run	Upgrade bridge		X	$547
Montgomery	808	Hightop Road (Route 808) over Slate Branch	Upgrade bridge		X	$500
Montgomery	81	At Exit 114	Reconstruct, Add Sound Walls,Add a Park & Ride Lot		X	$27,000

Vision Plan Project Listing

Jurisdiction	Route	Project Location	Description	SYIP	FCLR	ESTIMATE
						In $1,000s
Christiansburg	8	Route 8 (West Main Street) from Route 11 (Radford Street) to I 81	Widen to 4 lanes			$18,000
Montgomery	114	Route 114 from Christiansburg Corporate Limits to 0.5 Miles east of Route 685	Widen to 4 lanes			$51,000
Montgomery	114	0.5 Miles east of Route 685 to RAAP	Widen to 4 lanes			$27,000
Blacksburg/ Montgomery	460	Route 460 Business (North main Street) at Route 460	Construct new interchange			$45,000
Blacksburg/ Montgomery	----	Route 460/Southgate Drive (Route 314) Interchange to Prices Fork Road (Route 685)	Construct new roadway			$114,000
Christiansburg	------	Parkway Drive Extension to South Franklin Street	Construct new roadway			$16,000
Montgomery	8	Route 8 from Route 669 in Riner to I 81	Widen Road and Improve Intersections			$62,000
Montgomery	8	Route 8 from Route 669 to South Study Area Boundary	Reconstruct to current standards			$12,000
Montgomery	-----	Extend Smart Road from current end to I 81	2 lane on 4 lane right of way			$157,000

Department of Aviation Commonwealth of Virginia

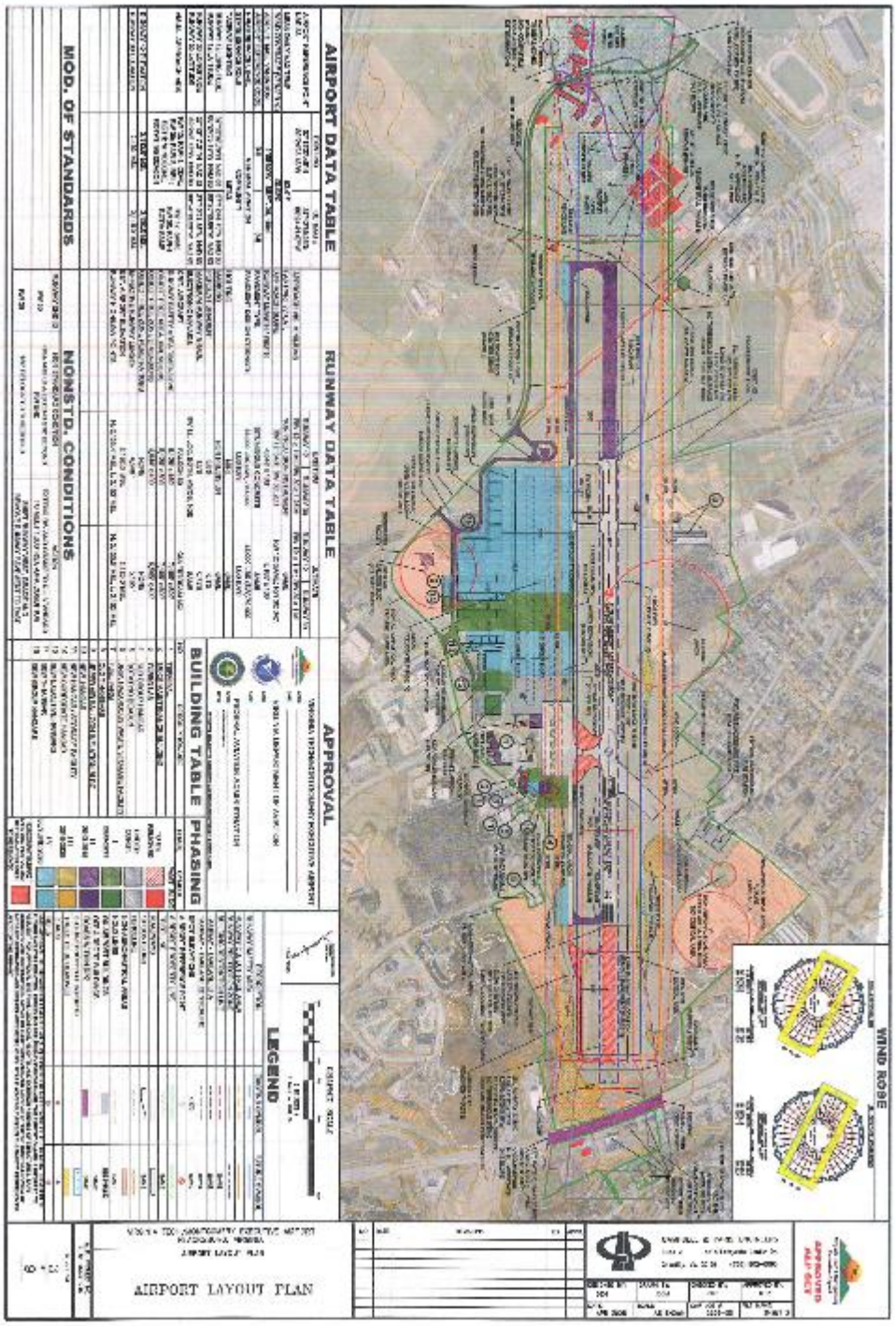
Project List Report

Years: 2015, 2016, 2017, 2018, 2019, and 2020 Project Categories: All

Project Types: CAF Project Statuses: CP

	FAA	State	Local	VDOT	Total
Virginia Tech-Montgomery Executive Airport					
2015					
Corporate Hanger # 2 Site Preparation (Construction)	$0.00	$610,456.00	$235,165.00	$0	$845,621.00
Research Center Drive & Huckleberry Trail Relocation	$2,941,812.00	$261,494.40	$65,373.60	$0	$3,268,680.00
Runway Extension Phase 1 (Construction)	$2,058,120.00	$182,944.00	$45,736.00	$0	$2,286,800.00
T-Hanger Site Preparation (Construction)	$0.00	$629,611.00	$203,448.00	$0	$833,059.00
2015 Sub Total	$4,999,932.00	$1,684,505.40	$549,722.60	$0	$7,234,160.00
2016					
Fuel Farm Relocation (Design)	$0.00	$60,000.00	$15,000.00	$0	$75,000.00
Runway Extension Phase 2 (Construction)	$4,999,999.50	$444,444.40	$111,111.10	$0	$5,555,555.00
2016 Sub Total	$4,999,999.50	$504,444.40	$126,111.10	$0	$5,630,555.00
2017					
Fuel Farm Relocation (Construction)	$0.00	$180,000.00	$45,000.00	$0	$225,000.00
Runway Extension Phase 3 (Construction)	$4,999,999.50	$444,444.40	$111,111.10	$0	$5,555,555.00
2017 Subtotal	$4,999,999.50	$624,444.40	$156,111.10	$0	$5,780,555.00
2018					
Land Acquisition Phase 1	$2,458,565.10	$218,539.12	$54,634.76	$0	$2,731,738.98
Runway Extension Phase 4 (Construction)	$2,541,434.40	$225,905,.28	$5,476.32	$0	$2,823,816.00
2018 Subtotal	$4,999,999.50	$444,444.40	$111,111.08	$0	$5,555,554.98
2019					
Land Acquisition Phase 2	$4,999,999.50	$444,444.40	$111,111.10	$0	$5,555,555.00

2019 Subtotal	$4,999,999.50	$444,444.40	$111,111.10	$0	$5,555,555.00
2020					
Land Acquisition Phase 3	$1,001,436.00	$89,016.00	$22,254.00	$0	$1,112,706.00
2019 Subtotal	$1,001,436.00	$89,016.00	$22,254.00	$0	$1,112,706.00
Virginia Tech-Montgomery Executive Airport Subtotal	$26,001,366.00	$3,791,299.00	$1,076,420.98	$0	$30,869,085.98
Total	$26,001,366.00	$3,791,299.00	$1,076,420.98	$0	$30,869,085.98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RUNWAY DATA TABLE
APPROVAL
MOD. OF STANDARDS
NONSTD. CONDITIONS
BUILDING TABLE
PHASING
LEGEND
WIND ROSE
AIRPORT LAYOUT PLAN