

# Chapter 7: Scenarios

<b>Overview of Scenarios</b> .....	<b>73</b>
<b>Process</b> .....	<b>73</b>
<b>Base Scenario</b> .....	<b>80</b>
<b>Round 1 Scenarios</b> .....	<b>86</b>
<b>Round 2 Scenarios</b> .....	<b>96</b>
<b>Round 3 Scenarios</b> .....	<b>104</b>
<b>Preferred Scenario</b> .....	<b>114</b>
<b>Conclusion</b> .....	<b>120</b>

## List of Figures

<a href="#">Figure 7-1.</a>	Planning Proces for LRTP 2040
<a href="#">Figure 7-3.</a>	Candidate US 29/US 250 Widening
<a href="#">Figure 7-4.</a>	US 250 – Pantops Widening
<a href="#">Figure 7-5.</a>	Berkmar Drive Extended
<a href="#">Figure 7-6.</a>	Western Bypass Extension
<a href="#">Figure 7-7.</a>	Eastern Connector (2-lanes/4-lanes)
<a href="#">Figure 7-8.</a>	Multimodal US 29
<a href="#">Figure 7-9.</a>	Meadow Creek Parkway Route
<a href="#">Figure 7-10.</a>	Airport Route/Route 7 Extension
<a href="#">Figure 7-11.</a>	US 29 Bus Rapid Transit (BRT)
<a href="#">Figure 7-12.</a>	Route 10 with Transit-only Bridge
<a href="#">Figure 7-13.</a>	Reducing Headways System wide (Existing System only)
<a href="#">Figure 7-14.</a>	Crozet Route
<a href="#">Figure 7-15.</a>	Route 1A Extension with Transit-only Bridge
<a href="#">Figure 7-16.</a>	Western Bypass BRT
<a href="#">Figure 7-17.</a>	Committed Projects in the 2040 E+C Base Scenario
<a href="#">Figure 7-18.</a>	2040 E+C Base Scenario Daily Congestion
<a href="#">Figure 7-19.</a>	Progression of Projects in each Round of Scenarios.
<a href="#">Figure 7-20.</a>	Scenario 1A Projects
<a href="#">Figure 7-21.</a>	Scenario 1B Projects
<a href="#">Figure 7-22.</a>	Scenario 1C Projects
<a href="#">Figure 7-23.</a>	How to read the Analysis Results Table
<a href="#">Figure 7-24.</a>	Scenario 1A Daily Congestion
<a href="#">Figure 7-25.</a>	Scenario 1B Daily Congestion
<a href="#">Figure 7-26.</a>	Scenario 1C Daily Congestion
<a href="#">Figure 7-27.</a>	Scenario 2A Projects
<a href="#">Figure 7-28.</a>	Scenario 2B Projects
<a href="#">Figure 7-29.</a>	How to read the Analysis Results Table
<a href="#">Figure 7-30.</a>	Scenario 2A Daily Congestion
<a href="#">Figure 7-31.</a>	Scenario 2B Daily Congestion
<a href="#">Figure 7-32.</a>	Scenario 3A Projects

<a href="#">Figure 7-33.</a>	Scenario 3B Projects
<a href="#">Figure 7-34.</a>	Scenario 3C Projects
<a href="#">Figure 7-35.</a>	How to read the Analysis Results Table
<a href="#">Figure 7-36.</a>	Scenario 3A Daily Congestion
<a href="#">Figure 7-37.</a>	Scenario 3B Daily Congestion
<a href="#">Figure 7-38.</a>	Scenario 3C Daily Congestion
<a href="#">Figure 7-39.</a>	Preferred Scenario Projects
<a href="#">Figure 7-40.</a>	How to read the Analysis Results Table
<a href="#">Figure 7-41.</a>	Preferred Scenario Daily Congestion

## List of Tables

<a href="#">Table 7-1.</a>	Candidate Project List
<a href="#">Table 7-2.</a>	2040 E+C Base Scenario Description
<a href="#">Table 7-3.</a>	2040 E+C Base Scenario Analysis Results
<a href="#">Table 7-4.</a>	Scenario 1A Description
<a href="#">Table 7-5.</a>	Scenario 1B Description
<a href="#">Table 7-6.</a>	Scenario 1C Description
<a href="#">Table 7-7.</a>	Round 1 Analysis Results
<a href="#">Table 7-8.</a>	Round 1 Transit Analysis
<a href="#">Table 7-9.</a>	Scenario 2A Description
<a href="#">Table 7-10.</a>	Scenario 2B Description
<a href="#">Table 7-11.</a>	Round 2 Analysis Results
<a href="#">Table 7-12.</a>	Round 2 Transit Analysis
<a href="#">Table 7-13.</a>	Scenario 3A Description
<a href="#">Table 7-14.</a>	Scenario 3B Description
<a href="#">Table 7-15.</a>	Scenario 3C Description
<a href="#">Table 7-16.</a>	Round 3 Analysis Results
<a href="#">Table 7-17.</a>	Round 3 Transit Analysis
<a href="#">Table 7-18.</a>	Preferred Scenario Description
<a href="#">Table 7-19.</a>	Preferred Scenario Analysis Results
<a href="#">Table 7-20.</a>	Preferred Scenario Transit Analysis



## ► Overview of Scenarios

The region's core transportation network is an interdependent system comprised of both roadways and transit service. When roadway projects are added to the network; existing roads are altered; or when transit routes are added or modified, it impacts how the entire network functions. To leverage this dynamic, the Charlottesville-Albemarle MPO implemented a new process for evaluating projects in the Long Range Transportation Plan. Rather than assessing the benefits of individual projects in an isolated manner, proposed projects were combined into scenarios for evaluation. This allowed staff and decision-makers to identify which combination of projects worked well together and provided the greatest benefit to the region's transportation system.

## ► Process

Several tasks were completed early on in the forming of the Long Range Transportation Plan, and led to the development of the scenarios (Refer to [Figure 7-1](#)). First, staff and decision-makers developed a list of goals (the Regional Mobility Goals) that focused on the region's future vision. These were considered in conjunction with the Eight Planning Factors, outlined with the goals in Chapter 4. Once a list of goals was established, a series of corresponding performance measures was developed to assess each scenario. Implementing performance measures allowed for an objective evaluation of each scenario. It also provided staff, decision-makers, and residents with the opportunity to understand the mobility, economic, environmental, and community implications of each scenario, as discussed in Chapter 5. Transportation deficiencies were then identified for the region's roadway network and transit system. This offered insight regarding which areas should be targeted for improvement. (Refer to Chapter 6).

Based on the transportation deficiencies, MPO staff worked with its committees to develop a candidate project list. (Refer to the Candidate Project List in [Table 7-1](#)). The candidate project list was extensive, including ten road projects and eleven transit projects. All of these projects were modeled individually to determine the benefit of each project on the 2040 transportation system. Staff and com-

2040 LRTP Process Steps (Figure 7-1)



mittees assessed each project to determine whether or not they generated enough benefit to merit moving forward in the process. Roadway projects were evaluated based on improvements to congestion, while transit projects were evaluated based on their estimated daily ridership as well as their system-wide benefit.

Candidate Project List (Table 7-1)

PROJECT NUMBER	PROJECT NAME	PROJECT DETAILS	DID PROJECT PROGRESS TO COST ESTIMATION?		
			YES	NO	REASON
1	Pantops Master Plan US 250 Corridor Improvements	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).	✓		In keeping with other community plans.
2	Southern Parkway	A connector road south of I-64 from Avon Street to 5th Street Extended to include sidewalks and bike lanes.		✓	Designated a local project.
3a	Proposed Eastern Connector: Proffit Road Alignment.	A two-lane roadway, with parallel bicycle and pedestrian facilities. Following the current alignment of Proffit Road.		✓	Not enough benefit.
3b	Proposed Eastern Connector: Polo Grounds Road Alignment.	A two-lane roadway, with parallel bicycle and pedestrian facilities. Following the current alignment of Polo Grounds Road.		✓	Not enough benefit.
3c	Proposed Eastern Connector: Pen Park Lane Alignment, two lane.	A two-lane roadway, with parallel bicycle and pedestrian facilities. Following the current alignment of Pen Park Lane.	✓		Further consideration was requested.
3d	Proposed Eastern Connector: Pen Park Lane Alignment, four lane.	A four-lane roadway, with parallel bicycle and pedestrian facilities. Following the current alignment of Pen Park Lane.	✓		Further consideration was requested.
4	Route 29 Blvd Concept	Reshape portion of Route 29, bypassed by the western bypass, into a slower moving Boulevard.	✓		In keeping with other community plans.
5	I-64 Widening	Widening to 6 lanes from Keswick to Ivy.		✓	Not enough benefit.
6	Route 29 Bypass Extension	Extend Route 29 Bypass beyond Lewis and Clark Drive.	✓		Further consideration was requested.
7	Eastern Avenue/Crozet Main Street Extension	Eastern Connector: A north-south road that will connect Route 240 and Route 250 east of Crozet. Crozet Main Street Extension: An east-west road that will connect Eastern Crozet with Downtown Crozet.		✓	Designated local projects.
8	Route 250/29 Widening	Widening US 250/29 from Barracks Rd to I-64 interchange	✓		Further consideration was requested.
9	Berkmar Dr. Extention	Extend existing roadway from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River.	✓		In keeping with other community plans.
10	Sunset-Fontaine Connector	Connector road from Sunset Ave to Fontaine Ave. Will include bike lanes, sidewalks and a railroad crossing (overpass/underpass)		✓	Designated a local project. Currently included in UnJAM 2035.
11	Bus Rapid Transit: Existing 29	BRT From UVA Hospital to Hollymead Town Center along Emmet Street and Route 29 North. Every 15 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 30 minutes off-peak hours.	✓		Further consideration was requested.
12	Bus Rapid Transit: Route 29 Bypass	Add BRT between Hollymead and UVA Northgrounds (Western Bypass). Every 15 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 30 minutes off-peak hours.	✓		Further consideration was requested.
13	Transit: Via Meadow Creek Parkway	Add route connecting Route 29 N and Downtown via the Meadow Creek Parkway. Every 15 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 30 minutes off-peak hours.	✓		Further consideration was requested.
14	Extend standard transit service to Airport	Extend Route 7 to the Airport via existing Route 29	✓		Further consideration was requested.
15	Extend standard transit service to Glenmore	Extend Route 10 to Glenmore via Route 250		✓	Not enough benefit.
16	Extend standard transit service to Crozet	New service along Route 250 and Route 240 from Barracks Road to Crozet.	✓		Further consideration was requested.
17	Decrease Transit Headways	Increase transit frequency in areas with existing service.	✓		Further consideration was requested.
18	Transit-Only Bridge connecting Pantops and the City (State Farm Drive).	Extend route 1A across Rivanna River to Pantops. Connection between Chesapeake Street and State Farm Boulevard.	✓		Further consideration was requested.
19	Transit-Only Bridge connecting Pantops and the City (River Bend Drive).	Extend route 10 across Rivanna River to Pantops. Connection between High Street and River Bend Drive.	✓		Further consideration was requested.
20	Commuter Service Transit to Lake Monticello.	From Downtown Mall Transit Center to Lake Monticello via Route 53. Every 30 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 1 hour off-peak.		✓	Not enough benefit.
21	Commuter Service Transit to Ruckersville	From Downtown Mall Transit Center to Lake Monticello via Route 53. Every 30 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 1 hour off-peak.		✓	Not enough benefit.
22	Commuter Service Transit Zion Crossroads	From Downtown Mall Transit Center to Zion Crossroads, via Route 250. Every 30 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 1 hour off-peak.		✓	Not enough benefit.

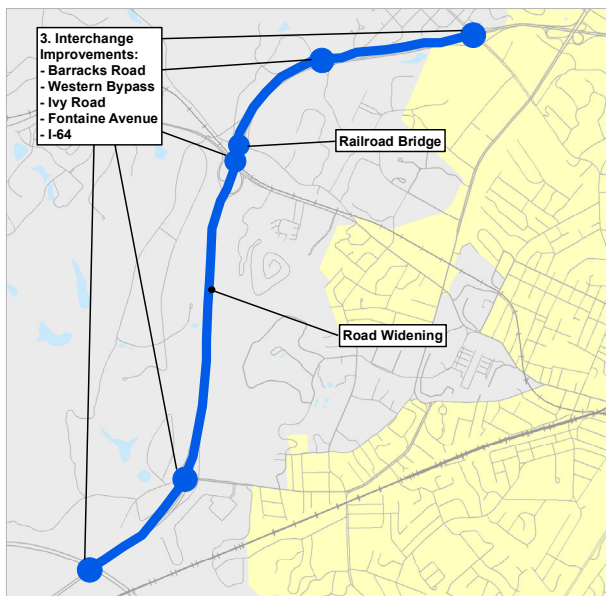


Seven roadway projects and eight transit projects demonstrated benefit to the region and progressed to the first round of scenarios, as noted in [Table 7-1](#). Once these projects were selected, staff developed preliminary cost estimates for each roadway project using VDOT's State-wide Level Cost Estimate template. Because no such template was available to prepare the transit estimates, staff developed a spreadsheet that accounted for operat-

ing, overhead, and maintenance costs, as well as capital and revenue. The methods used to generate these cost estimates were the best tools available to MPO staff during the development and assessment of these projects. The values calculated were subject to change, and did change in some cases, as projects were better defined later in this process. Roadway and transit projects that progressed to the first round of scenarios include the following:

## Roadway Projects

- 1) Interstate 64/US 29 Interchange
- 2) US 29/US 250 Widening (Figure 7-2)

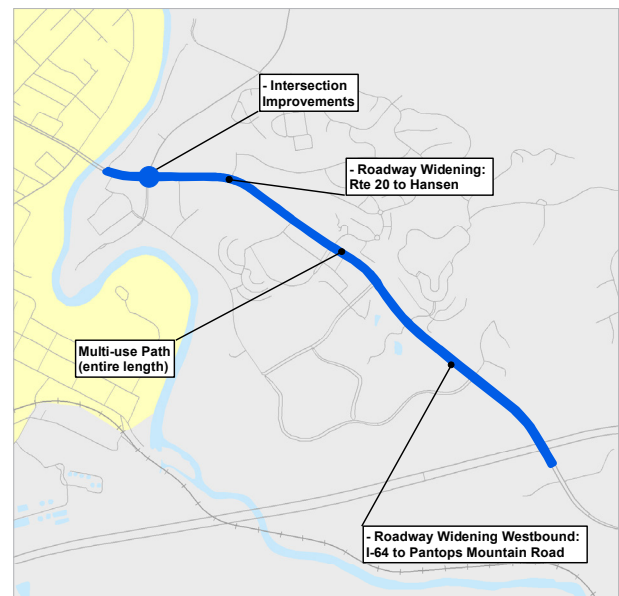


1. Reconstruct the I-64/US29 interchange to make it safer for higher volumes of traffic. Project cost estimate in the spring of 2013 was approximately [\\$128 million](#).

*This project would need to work in tandem with the US 29/US 250 widening.*

2. Widen US 29/US 250 from Barracks Road south to the I-64 interchange from four lanes to six lanes. This project was initially estimated to cost approximately \$86.1 million, and was revised in summer 2013 to approximately [\\$105.1 million](#).

US 250 – Pantops Widening (Figure 7-3)

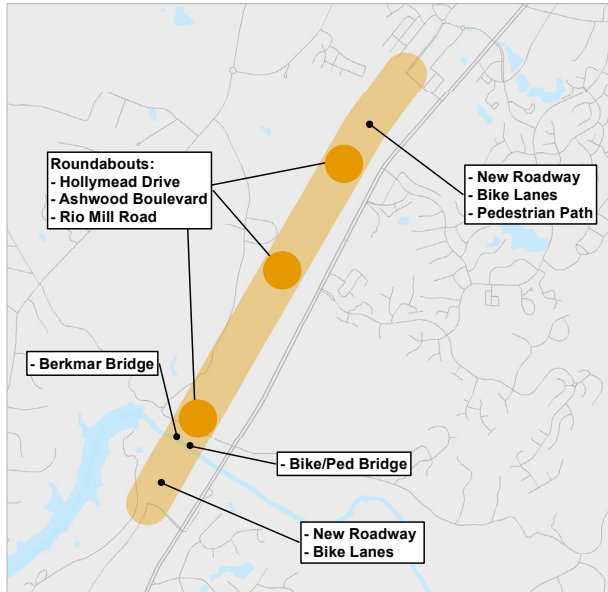


Widen the US 250 East corridor to no more than six lanes and add pedestrian crossings as recommended in the Pantops Master Plan. This project was estimated to cost approximately [\\$48.3 million](#).



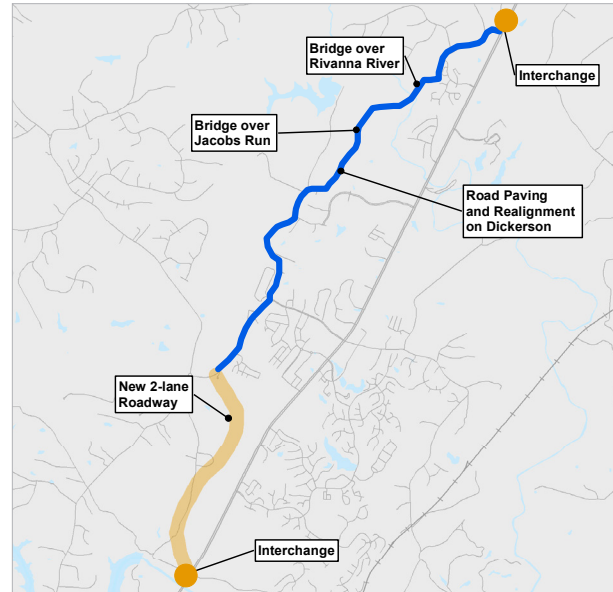
► Projects as depicted were altered during the LRTP planning process.

### Berkmar Drive Extended (Figure 7-4)



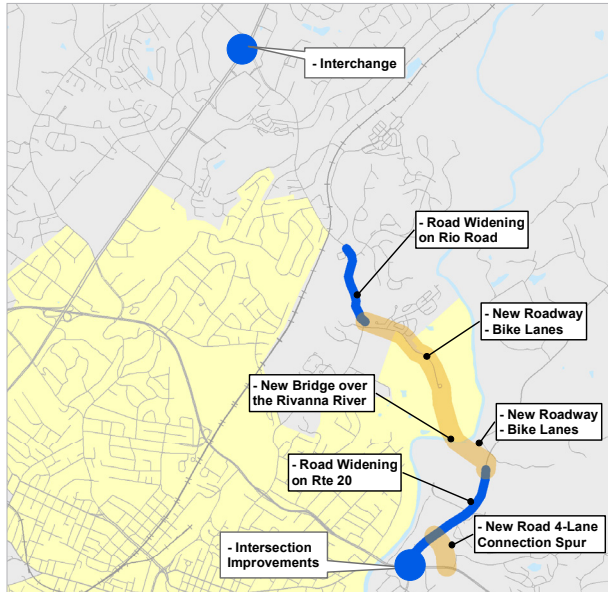
Extend the existing Berkmar Drive from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River. This project was estimated to cost approximately \$56.9 million.

### Western Bypass Extension (Figure 7-5)



Connect the planned US 29 Western Bypass from Rio Mills Road north to the intersection of Dickerson Road and US 29. This project was estimated to cost approximately \$132.7 million.

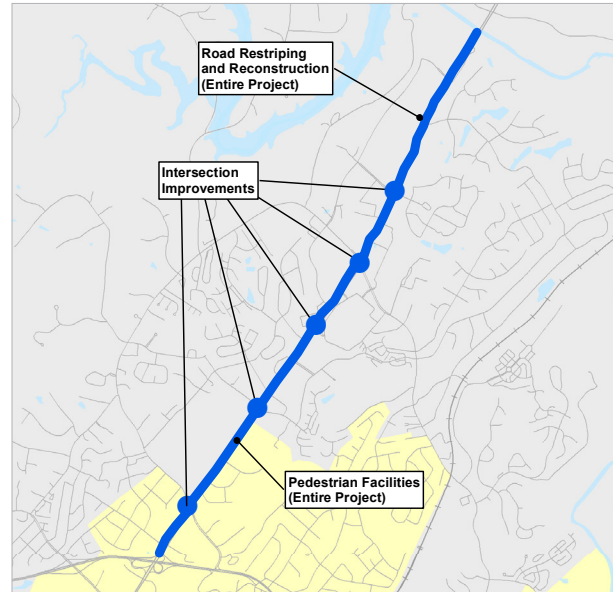
### Eastern Connector: 2-lanes/4-lanes (Figure 7-6)



Construct a two-lane or four-lane roadway with bicycle and pedestrian facilities that aligns with Pen Park Lane.

The two-lane project was estimated to cost approximately \$113 million. The four-lane project was estimated to cost \$145.2 million.

### US 29 Boulevard Concept\* (Figure 7-7)



Repurpose two of the through lanes on US 29 (one in each direction) for transit use from Hydraulic Road north to the south fork of the Rivanna River. Included as part of this project are bicycle and pedestrian facilities accompanied by improved signalization along US 29. The Route 29 Boulevard concept was estimated to cost \$46.1 million.

\* The Boulevard Concept is now known as Multimodal US 29. At the end of this process the multimodal US 29 concept was split out into individual transit and bike and pedestrian improvements. This split out aided the fiscal-constraint process and was more in-keeping with how transportation improvements are implemented.

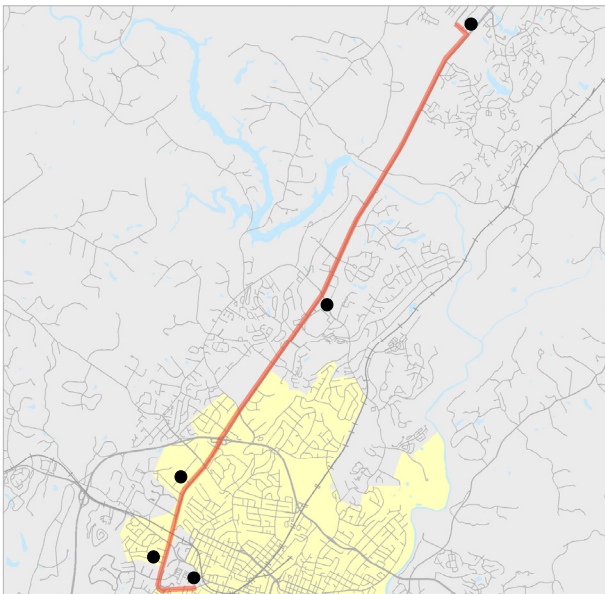
## Transit Projects

Meadow Creek Parkway Route (Figure 7-8)



Provide a new transit route connecting US 29 North to downtown via the Meadow Creek Parkway. Service would run every 15 minutes during peak hours (7 am to 10 am, and 4 pm to 7 pm), and every 30 minutes during off-peak hours. This service was estimated to cost \$25.6 million.

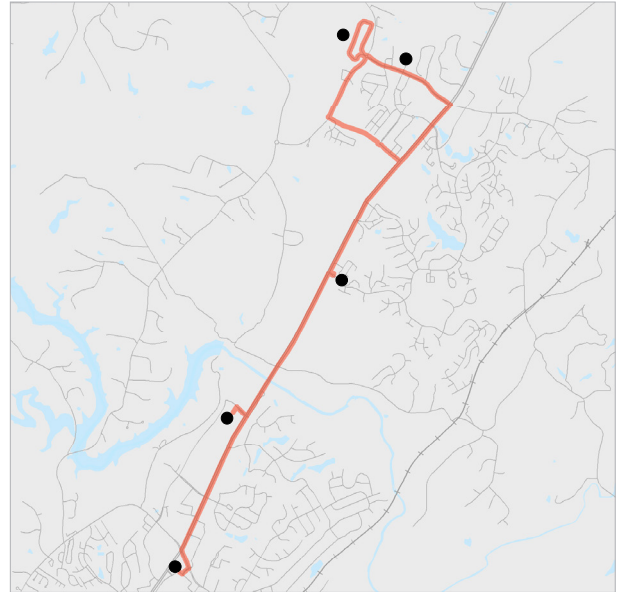
US 29 Bus Rapid Transit (BRT) (Figure 7-10)



Provide bus rapid transit (BRT) service from UVA Hospital along US 29 north to Hollymead. Service would run every 15 minutes from 6am to 8pm. The BRT service was estimated to cost \$126.9 million.

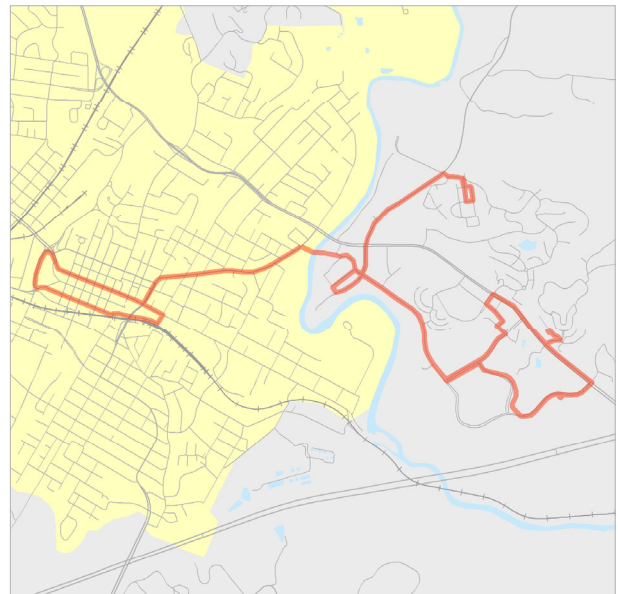
*This would be implemented in conjunction with the US 29 Boulevard Concept listed with the road projects.*

Airport Route/Route 7 Extension (Figure 7-9)



Extend CAT's existing Route 7 to the airport along US 29. This service was estimated to cost \$51.6 million.

Route 10 with Transit-only Bridge (Figure 7-11)

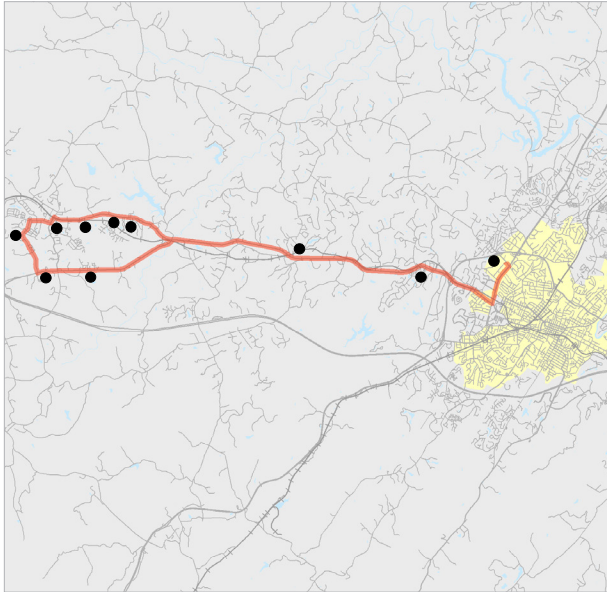


Extend CAT's existing Route 10 across the Rivanna River to via a proposed transit-only bridge. The new bridge would avoid the congestion on US 250 between High Street and River Bend Drive. The bridge would also include bicycle and pedestrian facilities. This service was estimated to cost \$2.4 million.

*This estimate was revised in the spring of 2013 to cost \$5.4 million.*

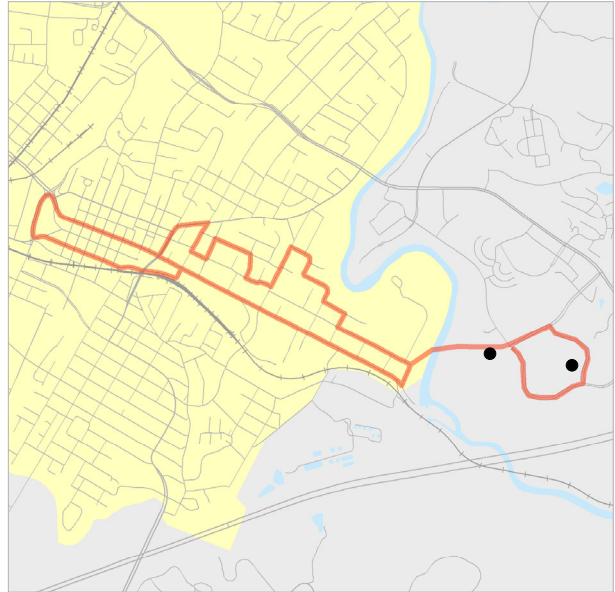


Crozet Route (Figure 7-12)



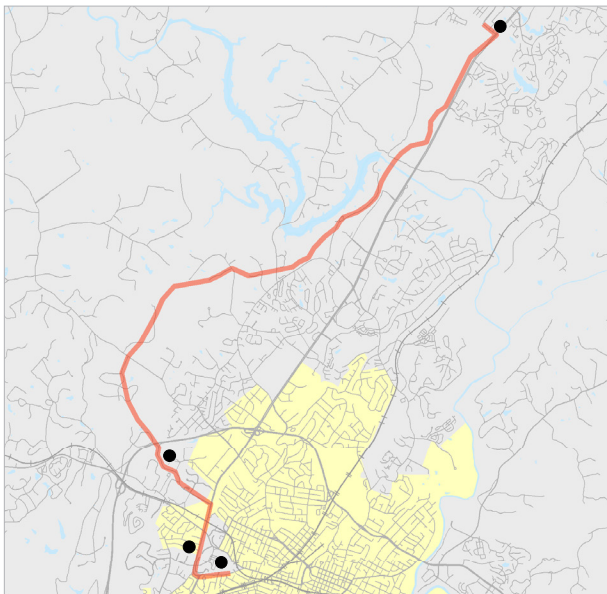
Provide transit service along US 250 and SR 240 from Barracks Road to Crozet. Service would run every 30 minutes during peak hours (7 am to 10 am, and 4 pm to 7 pm), and every 60 minutes during off-peak hours. This service was estimated to cost \$42 million.

Route 1A Extension with Transit-only Bridge (Figure 7-13)



Extend CAT's existing Route 1A across the Rivanna River to Pan-tops using a proposed transit-only bridge. Service would run every 15 minutes during peak hours (7 am to 10 am, and 4 pm to 6 pm), and every 30 minutes during off-peak hours. This service was estimated to cost \$6.5 million.

Western Bypass BRT (Figure 7-14)



Provide a BRT route from UVA's medical campus north along the Western Bypass to Hollymead. Service would run every 15 minutes from 6 am to 8 pm. This service was estimated to cost \$140.6 million.

Various combinations of these projects comprised the three scenarios for the first round of analysis. Each of the scenarios was assessed using the performance measures and was then compared with the 2040 Base Scenario: the 2040 conditions if no additional projects are built. This allowed staff and decision-makers to understand how each scenario is expected to change the future transportation conditions and to compare the benefits of one scenario against another. The findings from each analysis were then presented to the MPO's committees to determine which projects should be considered in the next round of scenario analysis. This three-step process was repeated for three rounds of scenarios, which led to the development of a final Preferred Scenario. **i**



► **Step One: Develop a scenario of capacity-building projects.**

This involved reviewing the list of projects and their respective cost-estimates, and choosing several projects to consider together in a transportation improvement scenario.

► **Step Two: Analyze the scenario using the performance measures.**

Each of these scenarios was assessed using the 16 performance measures, developed by the MPO. This analysis was not simply structured to consider the new projects individually, but how those projects would affect the entire transportation system. Each of the scenarios was compared with the 2040 Base Scenario.

► **Step Three: Present the findings from the analysis.**

This analysis was presented to the MPO Committees for approval, and to select which projects to include in the next round of scenarios.

## » Scenario Analysis Results Tables

A Performance Measurement Analysis Table was created for each round of scenarios. A set of sixteen performance measures was used to analyze each scenario. Tables 7-7, 7-11, 7-16, 7-19 show the results of the analysis based on these measures. Cells highlighted in shades of green indicate measures where the scenario is moving toward the region's goals. Cells highlighted in shades of red indicate measures where the scenario is moving away the region's goals. The darker the shade, the further the scenario moved toward or away from the region's goals.

Analysis Tables Guide (Figure 7-15)

Green indicates that the scenario's measure promotes the goal, while red indicates that it does not, and grey shows minimal change (< 1%). Darker shades of red or green indicate greater impact of the scenario on that performance measure.

COLOR KEY				
Measure Shows Trend Toward Goals	1% to 5%	5.1% to 10%	10.1% to 20%	More than 20%
Measure Show Trend Away from Goals	-1% to -5%	-5.1% to -10%	-10.1% to -20%	Less than -20%
No Trend Shown	.99% to-.99%			

Positive values indicate the scenario fosters LRTP goals.  
Negative values indicate the scenario does not foster goals.



## ► Base Scenario

### 2040 Existing and Committed (E+C) Base Scenario

The 2040 Existing and Committed (E+C) Base Scenario is comprised of the existing roadway network and additional projects that are committed to be built by the future year 2040. This scenario serves as the control to compare other scenarios against, allowing staff and decision-makers to determine the projected impacts of various project combinations. [Table 7-2](#) lists the nine roadway projects that are committed to be built by 2040 and are included in the 2040 Base Scenario. [Figure 7-16](#) identifies the location of each of these projects.

The base scenario includes the existing road network and several projects that are not yet built but are underway and anticipated to be a part of the future transportation network. These projects are referred to as committed projects. These committed projects are listed below.

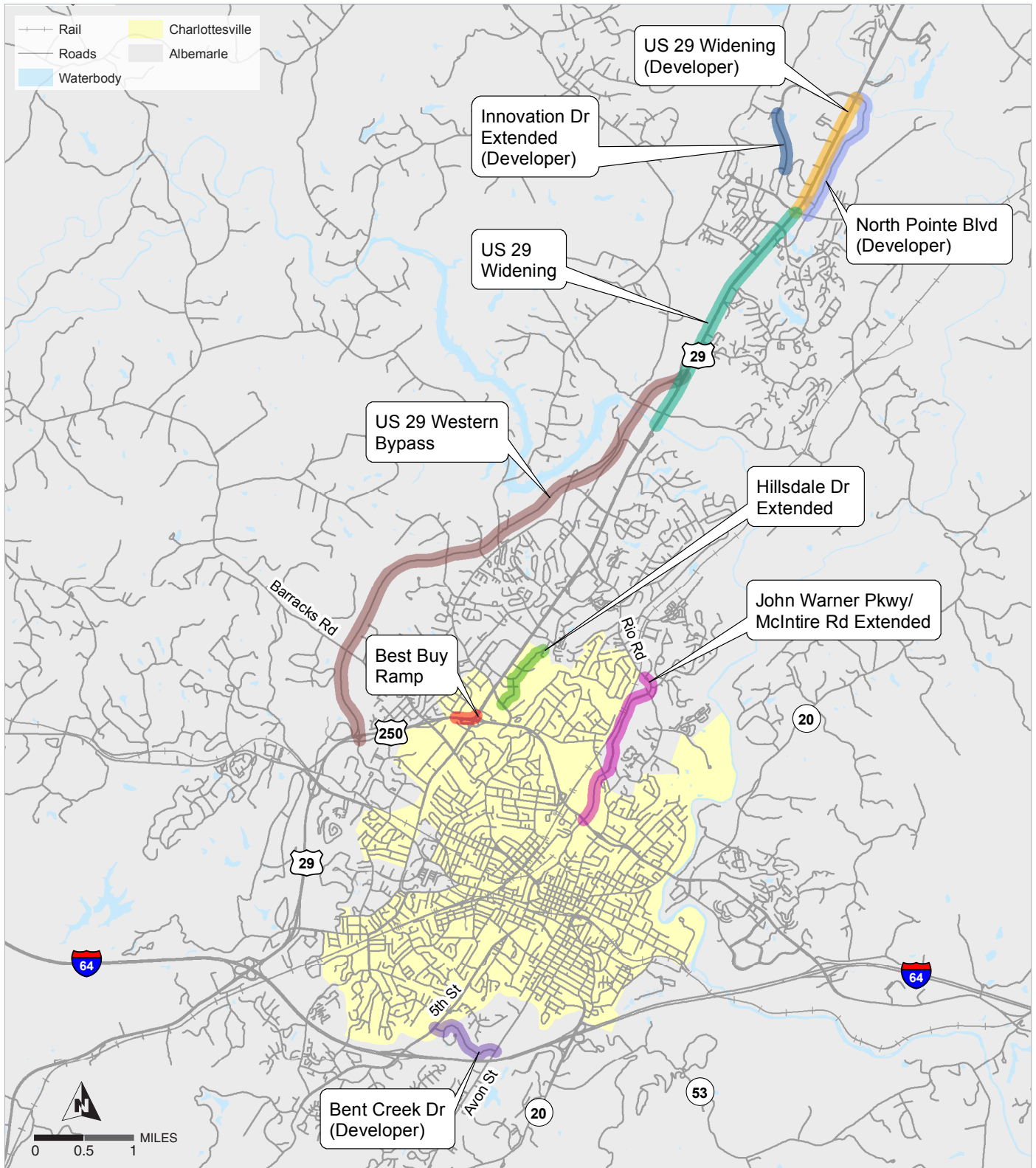
Base Network (Existed and Committed) (Table 7-2)

PROJECT	COST (IN MILLIONS)*	DESCRIPTION
US 29 Western Bypass *	\$244.0	6.24 miles 4-lane limited access road, which bypasses US 29 from the South Fork of the Rivanna River to the US 250 Bypass at Leonard Sandridge Road.
US 29 Widening	\$33.0	Widening of US 29 to 6-lanes, between the South Fork of the Rivanna River to Timberwood Boulevard.
Hillsdale Drive Extended	\$14.0	2-lane road that would parallel US 29 on its east side, beginning at Hydraulic Road and connecting with the existing Hillsdale Drive in Albemarle County.
John Warner Parkway/McIntire Road Ext./US 250 Interchange at McIntire Road	\$77.0	Two separate roadways, one in the City and one in the County that link. Also a new interchange at McIntire Road and Route 250.
Best Buy Ramp	\$11.0	Ramp improvements and additional lane capacity along US 29, extending from slightly north of Angus Rd to the US 250 Bypass.
North Pointe Boulevard	Developer Project	Developer road that would serve as the spine road for the North Pointe development located on the east side of US 29, just north of Proffit Road. The road would intersect with Proffit Rd and parallel US 29 intersecting 29 at the Lewis and Clark Drive signal.
US 29 Widening north of Airport	Developer Project	Widening of US 29 from Airport Rd to Lewis and Clark Drive from 4-lanes to 6 lanes.
Innovation Drive	Developer Project	Connects south terminus of Lewis and Clark Drive with Airport Road and Hollymead Town Center.
Bent Creek Drive	Developer Project	Developer road that would facilitate traffic into the Fifth Street Station development. It would intersect 5th Street and then travel east paralleling Moore's Creek and intersecting with Avon Street.
TOTAL	\$379.0	This total does not include developer projects.

\* Costs shown are estimates from the Charlottesville-Albemarle MPO's Transportation Improvement Program. These estimates have been rounded.

\*\* The US 29 Western Bypass project began a reevaluation process on February 19th, 2014.

Committed Projects in the 2040 E+C Base Scenario (Figure 7-16)



For purposes of comparison, the 2040 E+C Base Scenario was evaluated using the performance measures. The results from this analysis are displayed in [Table 7-3](#).

2040 E+C Base Scenario Analysis Results (Table 7-3)

PERFORMANCE MEASUREMENT	BASE	
Mobility	Value	Unit of Measure
Congestion (% of roads at LOS E or F)	14.1%	% of Roads
Congestion (hours of delay per day)	23,181.0	Hours
Mode Share (percent of Trips)	759,319	Trips/Day
Auto	88.1%	Percent of Trips
Transit	2.5%	Percent of Trips
Bike	2.7%	Percent of Trips
Walk	6.7%	Percent of Trips
Vehicle Mobility (vehicle miles traveled)	6,228,031.0	Miles/Day
Vehicle Crashes (crashes per year)	2,865.0	Crashes/Year
Bicycle Connectivity (% in largest connected area)	68.2%	Percent of largest area
Economy	Value	Unit of Measure
Access to Jobs (average travel time to work)	10.6	Minutes
Transit Accessibility (total population within ¼ mile of transit stop) (2040)	67,185	People
Transit Accessibility (total employment within ¼ mile of transit stop) (2040)	52,633	People
Environment	Value	Unit of Measure
Habitat	1,775.5	Eco Logical Score/Mile
Air Quality (tons per year)	13,321.0	Tons/Year
Water Quality (% change in stormwater/water pollutants) (tons per year)	1,079.1	Tons/Year
Flood Plain (acres of 100 year flood plain affected)	99.1	Acres
Historical (designated historic sites within 500 feet of projects)	1,141	# of Sites
Archeological (designated archeological sites within 500 feet of projects)	264	# of Sites
Community	Value	Unit of Measure
Land Uses Affected (number of parcels within 500 feet of projects)	35,061	Parcels
Residential	32,411	Parcels
Commercial/Industrial	1,267	Parcels
Parks	42	Parcels
Educational/Religious/Charitable	343	Parcels
Agriculture or undeveloped	998	Parcels
Environmental Justice and Title VI Populations with Transit Access (2010), within ¼ mile of transit stops	Value	Unit of Measure
Total Minority with transit access	18,996	People
Total 65 and over with transit access	5,135	People
Total Limited English-Speaking with transit access	8,428	People
Total Households with transit access	20,877	People
Total Household Income Less than \$25,000 with transit access	6,564	People
Environmental Justice and Title VI Populations potential impacts due to projects (2010)	Value	Unit of Measure
Total Minority impacted	28,812	People
Total 65 and over impacted	10,658	People
Total Limited English-Speaking impacted	13,427	People
Total Households impacted	37,119	People
Total Household Income Less than \$25,000 impacted	9,287	People

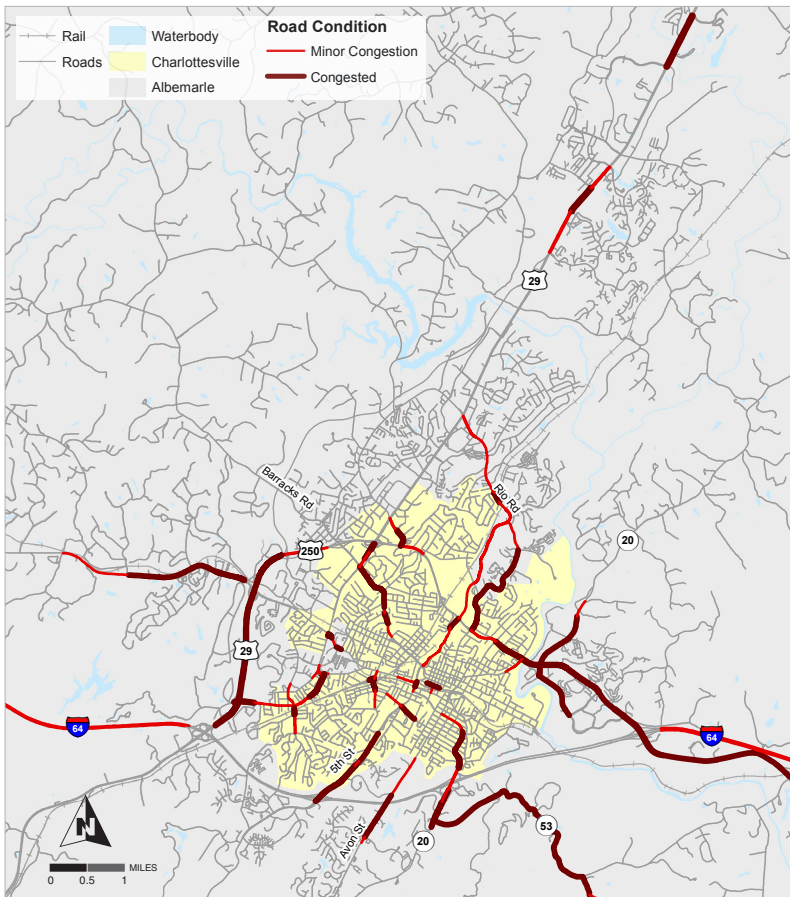


» *The sixteen performance measures are divided into four general categories:*

1. **Mobility** – examines how travel conditions change as a result of the projects added in each scenario. This is measured in terms of congestion, the mode of transportation used to travel, vehicle mobility, safety, and bicycle connectivity.
2. **Economy** – examines employment accessibility for both auto and transit trips.
3. **Environment** – examines the environmental impacts to the region in terms of habitat, air and water quality, floodplain, and historical and archeological sites.
4. **Community** – examines the land use impacts, as well as the environmental justice and Title VI populations impacted by the projects included in each scenario.

Output from the MPO’s travel demand model identifies where congestion is expected within the region. While this cannot identify exact locations at which congestion is certain to occur, it does allow staff to compare how conditions are expected to change if specific scenarios are implemented. [Figure 7-17](#) maps the location and degree of anticipated daily congestion for the 2040 Existing and Committed Base Scenario. Roads with “Minor Congestion” are expected to be congested during rush hour, or peak-hour travel, but not during other times of the day. “Congested” roads are expected to experience heavy congestion throughout the day.

2040 E+C Base Scenario Daily Congestion (Figure 7-17)



- ▶ **Successful Roadway Projects:** Projects that improve the level of congestion on the road. If the road is expected to be congested in the 2040 Base Scenario but is expected to experience only minor congestion with a project, that project is viewed as “successful.”
- ▶ **Successful Transit Projects:** Projects that attract passengers on the proposed route as well as increase ridership systemwide. Determining the success of transit projects is more subjective than the success of implementing road projects. Input from local transit authorities was a valuable asset throughout this process.

Once the 2040 Base Scenario was developed and reviewed, scenarios for the first round were created and evaluated against this Base. This first round of scenarios only integrated projects from the list of seven roadway projects and eight transit projects (earlier discussed in this chapter) that came out of the candidate project list. These scenarios were analyzed to determine which projects were beneficial to the region. Projects identified as successful (improving the level of congestion on roads or attracting significant ridership for transit) continued to move forward to the next round of analysis. Projects that were not as beneficial to the region were either modified or omitted from the list. Modified projects were those which staff or decision-makers felt showed promise for being successful in the region but did not perform as well as hoped when

originally developed. For example, in the first and second rounds of scenarios, the bus rapid transit (BRT) route on US 29 extended from UVA Hospital to Hollymead. In the third round of scenarios, this project was altered to extend from NGIC to downtown. The intent behind allowing these types of modifications was to thoroughly explore transportation alternatives that would provide the greatest benefit to the region. In some cases, additional projects not included in the initial list of fifteen were added for consideration and evaluation. This iterative process continued through three rounds of scenarios before establishing the Preferred Scenario, which is delineated in this plan and has been approved by the Policy Board. The following diagram outlines the process used to arrive at the Preferred Scenario.

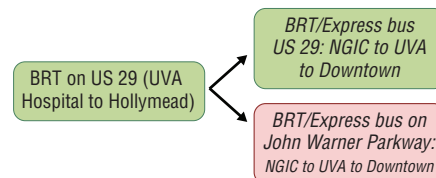
## Scenario Process Overview

Each round of scenarios included various roadway and transit projects for analysis. The first round of scenarios included only projects from the previously listed candidate project list. Based on the performance of a given project in the first round of scenarios, staff pursued one of three courses of action:

1. The project progressed to future rounds of scenarios for further analysis (denoted by a green box).
2. The project did not progress to future rounds of scenarios for analysis (denoted by a pink box).
3. The project was modified for further study. Modified projects are denoted in italics. Those that progressed to future rounds of scenarios for further analysis are shown in a green box and those that did not progress to future rounds of scenarios for analysis are shown in a pink box.

Widening  
US 29/US 250

Western Bypass  
Extension



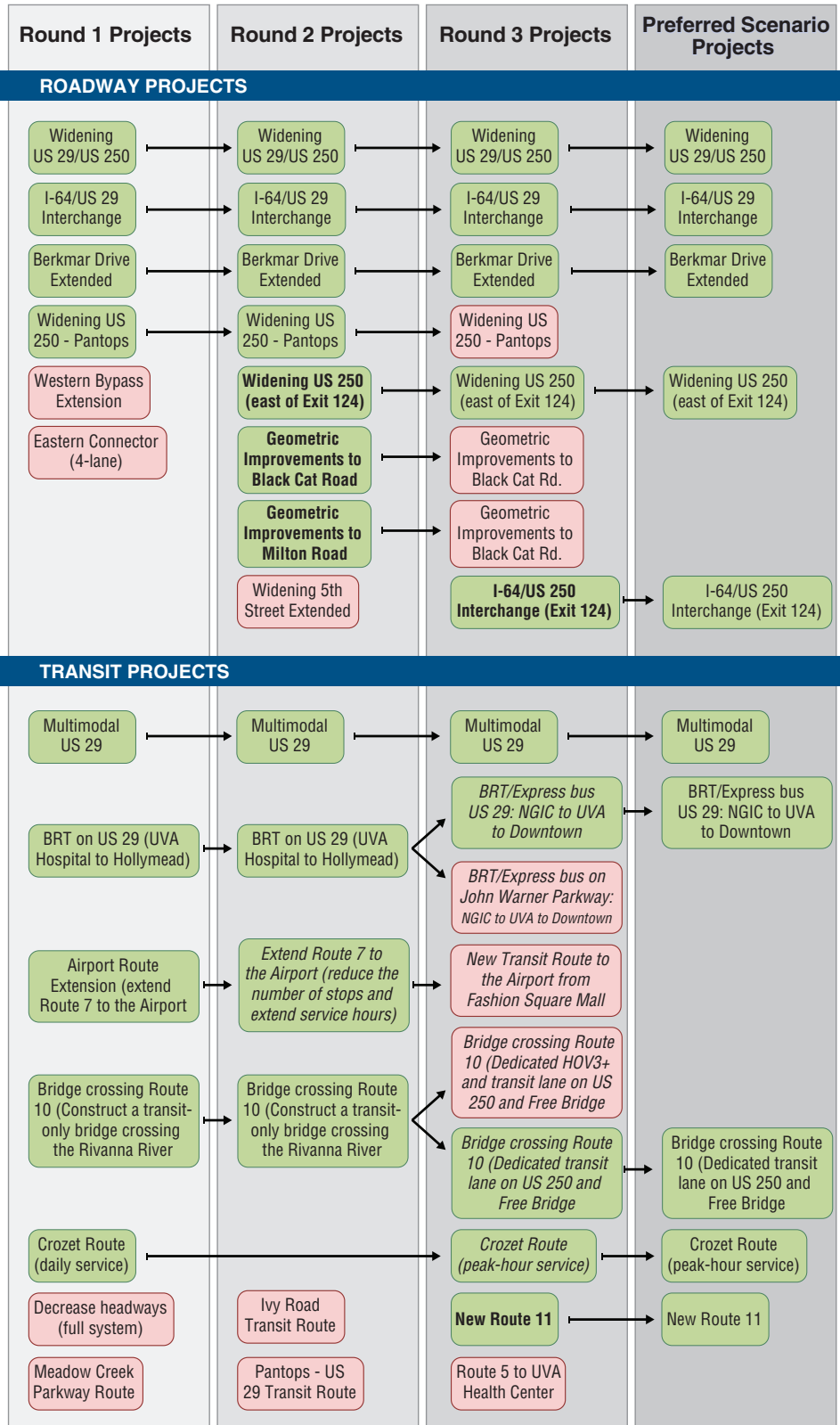
Geometric  
Improvements to  
Milton Road

Widening 5th  
Street Extended

In the second and third rounds of scenarios additional projects were introduced in effort to alleviate problems that were not addressed by projects in the first round of scenarios. These projects are listed in bold to distinguish new projects from previously considered ones. New projects either progressed to future rounds of scenarios for further analysis (shown in below green) or did not progress to future rounds of scenarios for analysis (shown below in pink) based on the benefit they provided.

Figure 7-18 illustrates the progression of projects throughout this process which led to the development of the Preferred Scenario. This is discussed in more detail in the subsequent section in this chapter, Descriptions of Scenarios.

Progression of Projects in each Round of Scenarios (Figure 7-18)



\*Multimodal US 29 is the new title for the US 29 Boulevard Concept

## ► Round 1 Scenarios

The first round of scenarios served as an example of how the scenario development and analysis process would function.

Scenario 1A was developed to analyze the impacts expected on the transportation system if only road projects were developed in 2040 and the transit network remained unchanged.

Scenario 1B was developed to analyze the anticipated impacts on the transportation system if only transit projects were developed in 2040 and a portion of US 29 was repurposed to accommodate bus rapid transit (BRT). Because there were two BRT projects and two projects that included transit-only links crossing the Rivanna River, the project with the greatest increase in ridership from each option was selected for this scenario.

Scenario 1C was developed to analyze the impacts on the transportation system if a combination of both roadway and transit projects were developed by 2040. This analysis, though only an example, indicated that the region's future transportation network needs a variety of transportation improvements to avoid congestion, delays, and other negative impacts. The most beneficial option from round one was Scenario 1C: the multimodal option.

### Scenario 1A

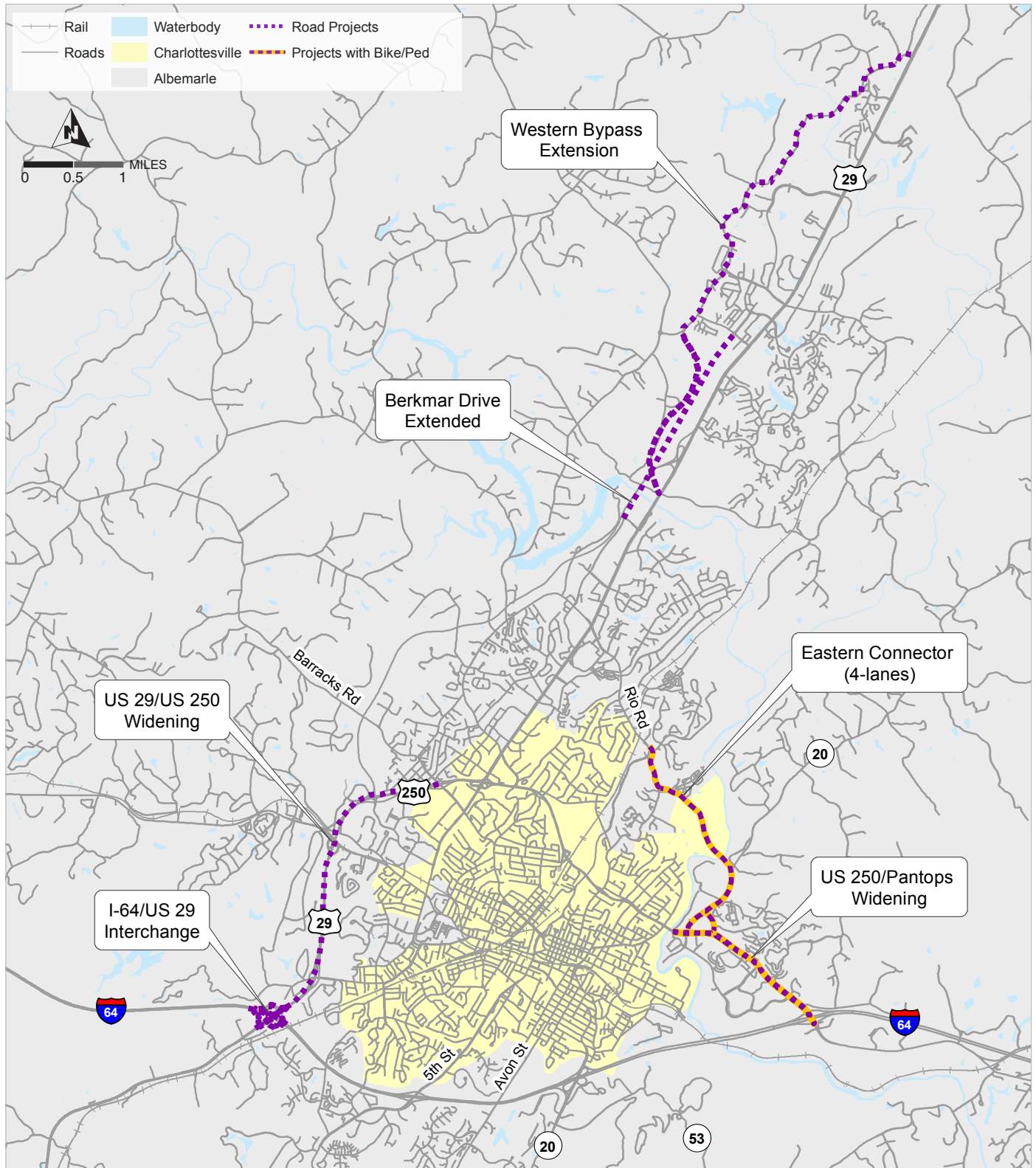
Scenario 1A was developed to analyze the impacts on the transportation system if six of the seven road projects were developed in 2040 and the transit network remained unchanged. (Refer to [Table 7-4](#) for the project descriptions and [Figure 7-19](#) for the project locations). This provided the opportunity to assess the expected community benefits should funding be used to improve only the roadway portion of the transportation system.

Scenario 1A Description (Table 7-4)

PROJECT	COST (IN MILLIONS)*	DESCRIPTION
Widening US29/US250	\$105.0	Widening US 250/29 from Barracks Rd to I-64 interchange
I-64/US29 Interchange	\$128.0	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Widening US250 - Pantops	\$48.2	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).
Berkmar Drive Extended	\$56.9	Extend existing roadway from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River.
Western Bypass Extension	\$128.9	The Western Bypass Extension project would connect with the planned US 29 Western Bypass and extend north from Rio Mills Road to where Dickerson Road intersects with US 29.
Eastern Connector (4-Lane)	\$144.5	A four-lane roadway, with parallel bicycle and pedestrian facilities. Following the current alignment of Pen Park Lane.
Total	\$611.5	

\* Costs shown are planning level estimates and subject to change.

Scenario 1A Projects (Figure 7-19)





## Scenario 1B

Scenario 1B was developed to analyze the impacts on the transportation system if only transit projects were developed in 2040, and a portion of US 29 was repurposed to accommodate bus rapid transit (BRT). (Refer to [Table 7-5](#) for the project descriptions and [Figure 7-20](#) for the project locations). As previously mentioned, the two BRT route options overlapped with each other, so the route resulting in the greatest increase in ridership, BRT on US 29, was included in this scenario. Similarly, both Route 1A and

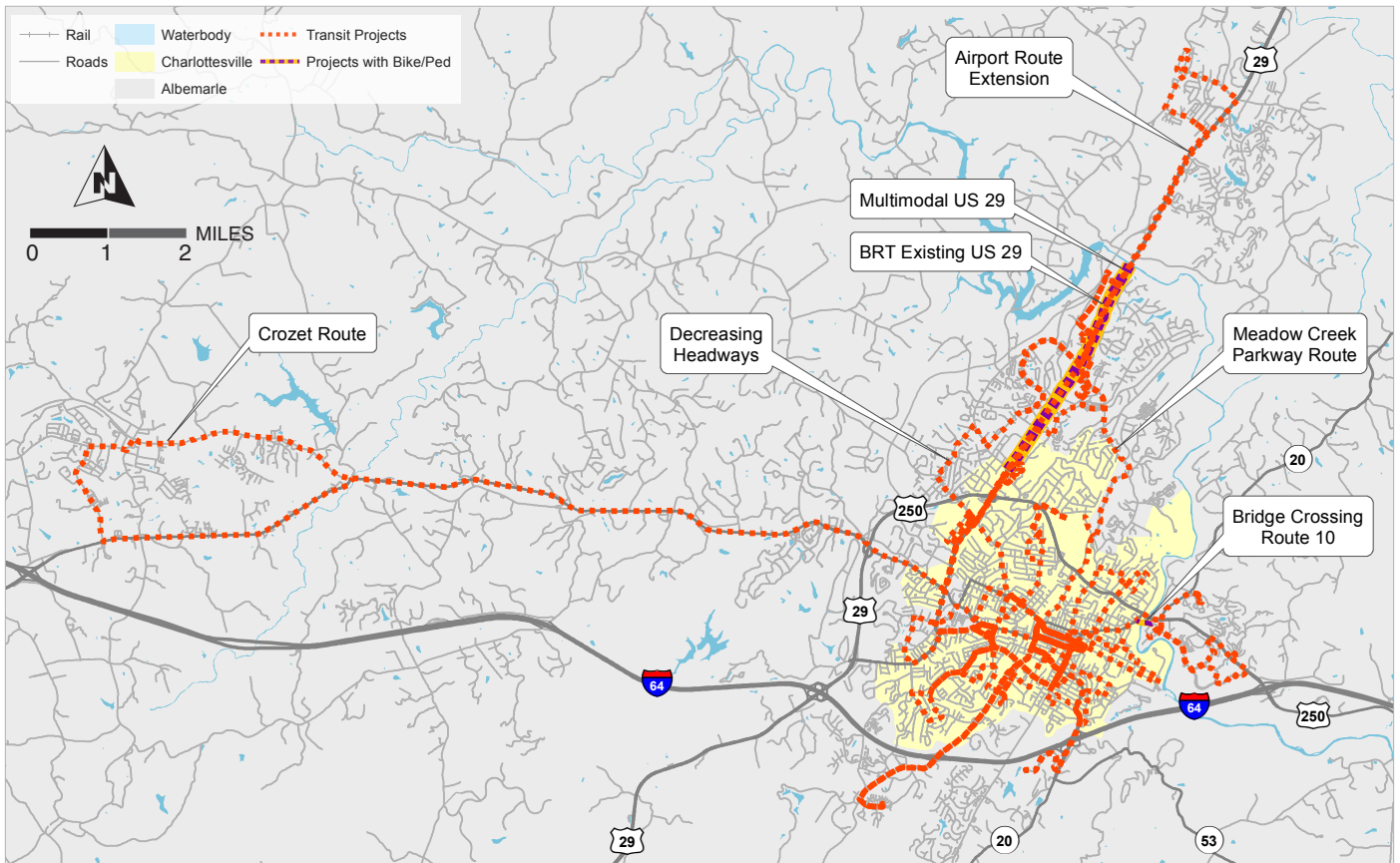
Route 10 were modified to provide a transit-only bridge crossing the Rivanna River. Implementing this change on Route 10 resulted in a greater increase in ridership than it did on Route 1A. Other than implementing the Multimodal US 29 project, the road network remained unchanged in this scenario. This provided the opportunity to assess community benefits should funding be solely allocated to improve the transit portion of the transportation system.

Scenario 1B Description (Table 7-5)

PROJECT	COST (IN MILLIONS) *	DESCRIPTION
Meadow Creek Parkway Route	\$25.6	Route connecting Route 29 N and Downtown via the MCP. Every 15 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 30 minutes off-peak.
Airport Route Extension	\$51.6	Extend Route 7 to the Airport via existing Route 29.
Multimodal US 29	\$46.9	Reshape portion of Route 29 bypassed by the Western Bypass, into a slower moving Boulevard. (To be modeled in combination with Transit Projects).
BRT Existing US 29	\$127.0	BRT: UVa Hospital to Hollymead, along US 29 North. Every 15 minutes from 6am to 8pm.
Bridge Crossing Route 10	\$5.4	Have Route 10 cross the Rivanna on a transit-only bridge (also includes bike and pedestrian facilities). Increase headways to 15 minutes during the peak hours and to 30 minutes during off-peak hours.
Decreasing Headways, full system	\$254.2	Increase transit frequency in areas with existing service.
Crozet Route	\$42.0	New service along Route 250 and Route 240 from Barracks Road to Crozet.
Total	\$552.7	

\*Costs shown are based on an estimation process developed by MPO staff. These totals do not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.

Scenario 1B Projects (Figure 7-20)



## Scenario 1C

Scenario 1C was developed to analyze the impacts on the transportation system if a combination of both roadway and transit projects were developed by 2040. (Refer to [Table 7-6](#) and [Figure 7-21](#)). This provided the opportunity to assess community benefits should funding be divided to improve both the transit and roadway components of the transportation system.

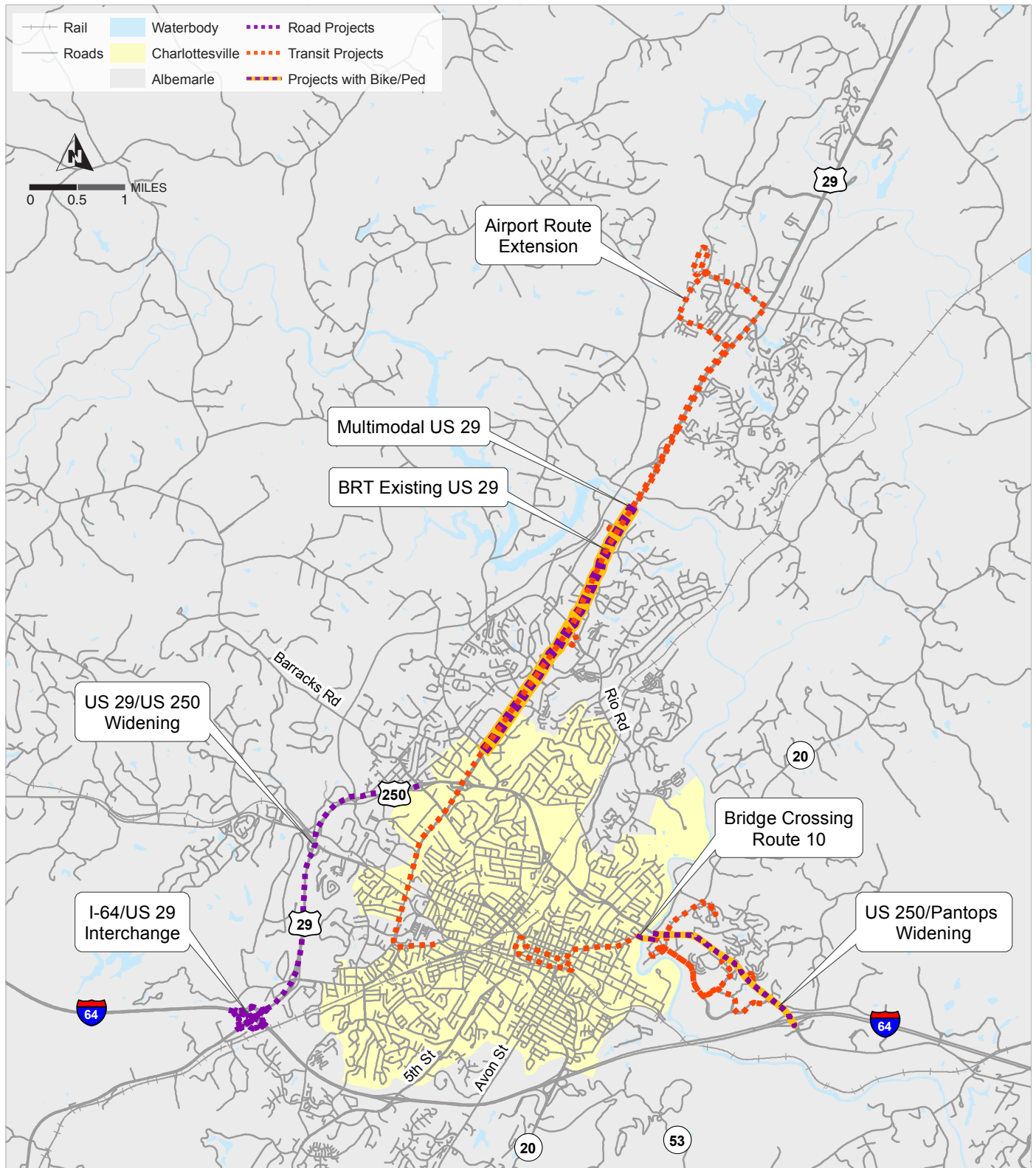
Scenario 1C Description (Table 7-6)

PROJECT	COST (IN MILLIONS)*	DESCRIPTION
Multimodal US 29	\$46.9	Reshape portion of Route 29 bypasses by the Western Bypass, into a slower moving Boulevard. (To be modeled in combination with Transit Projects).
BRT Existing US 29	\$127.0	BRT: UVa Hospital to Hollymead, along US 29 North. Every 15 minutes from 6am to 8pm.
Widening US29/US250	\$105.0	Widening US 250/29 from Barracks Rd to I-64 interchange
I-64/US29 Interchange	\$128.0	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Widening US250 - Pantops	\$48.2	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).
Airport Route Extension	\$51.6	Extend Route 7 to the Airport via existing Route 29.
Bridge Crossing Route 10	\$5.4	Have Route 10 cross the Rivanna on a transit-only bridge (also includes bike and pedestrian facilities). Increase headways to 15 minutes during the peak hours and to 30 minutes during off-peak hours.
<b>Total</b>	<b>\$384.1</b>	

\* Costs shown for road projects are planning level estimates and subject to change. Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.



Scenario 1C Projects (Figure 7-21)



## Round 1 Analysis: Findings

Overall, **Scenario 1A** performs well in the mobility performance measures; however, it does not help meet the goals related to the environmental and community performance measures.

**Scenario 1B** performs well in the measures that relate directly to transit and in the Environmental Justice community measures, but does not help meet the many of the other goals related to the mobility, environmental, and land use performance measures.

**Scenario 1C** performs well in the mobility and economy measures, but not as strongly in some of the environmental and community measures related to the overarching goals.

In general, the analysis from the first round of scenarios emphasizes the importance of investing in both roadway and transit improvements for the future. It also conveys that each scenario results in tradeoffs between mobility, economic, environmental, and community performance measurement improvements.

### » *Project-specific Findings*

The success of each project in the first round of analysis is detailed in the list below. Projects with a check (✓) indicate those that were moved forward to the next rounds of scenarios. Projects with a hyphen (–) indicate those that did not move forward to the next rounds of scenarios. (Refer to [Figure 7-18](#)).

Project-specific findings from the congestion and ridership analysis of the first round of scenarios include the following:

- ✓ **Widening US 29/US 250** in both Scenarios 1A and 1C is expected to either alleviate or reduce the congestion on this portion of the road.
- ✓ **Berkmar Drive Extended** in Scenario 1A provides additional capacity parallel to US 29. This is expected to show additional benefit when combined with the Multimodal US 29 project.
- ✓ **Widening US 250 – Pantops** in Scenario 1C is expected to reduce the congestion on this portion of the road.
- **Western Bypass Extension** in Scenario 1A was not expected to result in a significant change in congestion on parallel portions of US 29. Scenario 1C without the Western Bypass Extension was expected to experience less congestion in this area than Scenario 1A.



▶ **“Alleviate congestion”** means that roadways that were expected to experience either congestion or minor congestion are no longer expected to experience any congestion.

**“Reduce congestion”** means that roadways that were expected to experience either congestion or minor congestion are still expected to experience congestion, but to a lesser extent than in the 2040 Base Scenario.

- **Eastern Connector (4-lane)** in Scenario 1A was expected to experience congestion by 2040 and Free Bridge would likely remain heavily congested.
- ✓ **Multimodal US 29** in Scenarios 1B and 1C would not likely result in the development of even minor congestion on this portion of US 29.
- ✓ **BRT on US 29 (UVA Hospital to Hollymead)** in Scenarios 1B and 1C is expected to increase ridership through the US 29 corridor and system-wide.
- ✓ **Airport Route Extension (Extend Route 7 to the Airport)** in Scenarios 1B and 1C will likely increase ridership on Route 7 and system-wide.
- ✓ **Crozet Route (daily service)** in Scenario 1B will not likely attract substantial ridership; however, providing transit service to Crozet was important to the Committees.
- ✓ **Route 10 Transit-only Bridge** in Scenarios 1B and 1C is expected to nearly triple ridership on Route 10 and increase ridership system-wide.
- **Decrease headways (full system)** in Scenario 1B is expected to result in an increase in ridership that should nearly double. However, the cost to implement this improvement system-wide was viewed by staff and the MPO committees as prohibitive.
- **Meadow Creek Parkway Route** in Scenario 1B did not attract substantial ridership.

### *Performance Measure Analysis*

A set of sixteen performance measures was used to analyze the performance of each scenario. [Table 7-7](#) shows the results of the analysis based on these measures. Cells highlighted in shades of green indicate measures where the scenario is moving toward the region’s goals. Cells highlighted in shades of red indicate measures where the scenario is moving away the region’s goals. The darker the shade, the further the scenario moved toward or away from the region’s goals.

# Chapter 7: Scenarios

Round 1 Analysis Results (Table 7-7)

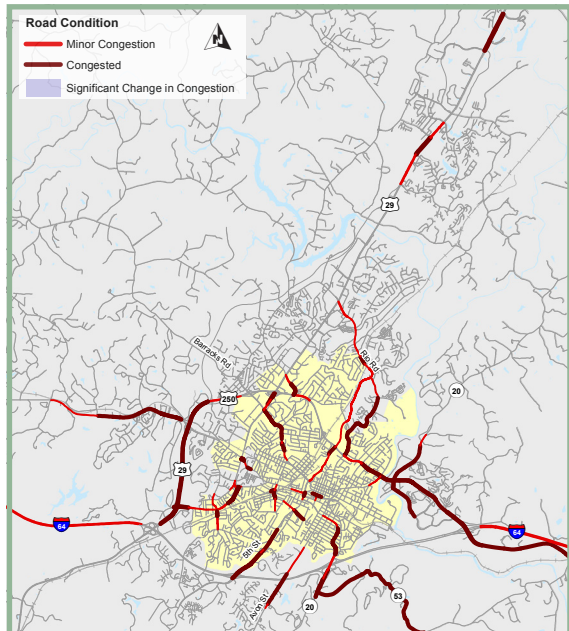
Performance Measurement	Base		Scenario 1A		Scenario 1B		Scenario 1C	
	Value	Unit of Measure	Value	% Change	Value	% Change	Value	% Change
<b>Mobility</b>								
Congestion (% of roads at LOS E or F)	14.1%	% of Roads	12.6%	10.5%	14.6%	-3.5%	12.9%	8.0%
Congestion (hours of delay per day)	23,181.0	Hours	20,187.0	11.6%	23,757.1	-2.5%	20,907.8	9.8%
Mode Share (percent of Trips)	759,319	Trips/Day	759,334	0.0%	759,488	0.0%	759,317	0.0%
Auto	88.1%	Percent of Trips	88.1%	0.1%	87.6%	0.7%	87.9%	0.2%
Transit	2.5%	Percent of Trips	2.5%	0.1%	3.1%	25.9%	2.6%	5.1%
Bike	2.7%	Percent of Trips	2.7%	0.2%	2.7%	-0.8%	2.7%	0.3%
Walk	6.7%	Percent of Trips	6.8%	0.9%	6.7%	-0.6%	6.8%	1.1%
Vehicle Mobility (vehicle miles traveled)	6,228,031.0	Miles/Day	6,145,450.8	0.6%	6,214,996	0.2%	6,193,388	0.6%
Vehicle Crashes (crashes per year)	2,865.0	Crashes/Year	2,827.0	1.3%	2,859.0	0.2%	2,849.0	0.6%
Bicycle Connectivity (% in largest connected area)	68.2%	% of largest area	73.4%	5.2%	79.2%	16.1%	81.6%	19.6%
<b>Economy</b>								
Access to Jobs (average travel time to work)	10.6	Minutes	10.3	2.8%	10.4	1.9%	10.3	2.8%
Transit Accessibility (total population within ¼ mile of transit stop) (2040)	67,185	People	67,185	0.0%	70,589	5.1%	69,101	2.9%
Transit Accessibility (total employment within ¼ mile of transit stop) (2040)	52,633	People	52,633	0.0%	55,907	6.2%	55,269	5.0%
<b>Environment</b>								
Habitat	1,775.5	Eco Logical Score/Mile	1,786.9	-0.6%	1,773.4	0.1%	1,778.4	-0.2%
Air Quality (tons per year)	13,321.0	Tons/Year	13,211.0	0.8%	13,302.0	0.1%	13,348.0	-0.2%
Water Quality (% change in stormwater/water pollutants) (tons per year)	1,079.1	Tons/Year	1,168.3	-8.3%	1,080.5	-0.1%	1,085.7	-0.6%
Flood Plain (acres of 100 year flood plain affected)	99.1	Acres	120.2	-21.3%	99.1	0.0%	105.0	-6.0%
Historical (designated historic sites within 500 ft of projects)	1,141	# of Sites	1,171	-2.6%	1,149	-0.7%	1,154	-1.1%
Archeological (designated archeological sites within 500 ft of projects)	264	# of Sites	299	-13.3%	275	-4.2%	270	-2.3%
<b>Community</b>								
Land Uses Affected (# of parcels within 500 ft of projects)	35,061	Parcels	35,895	-2.4%	35,167	-0.3%	35,465	-1.2%
Residential	32,411	Parcels	33,055	-2.0%	32,463	-0.2%	32,660	-0.8%
Commercial/Industrial	1,267	Parcels	1,400	-10.5%	1,307	-3.2%	1,394	-10.0%
Parks	42	Parcels	45	-7.1%	42	0.0%	42	0.0%
Educational/Religious/Charitable	343	Parcels	359	-4.7%	346	-0.9%	352	-2.6%
Agriculture or undeveloped	998	Parcels	1,036	-3.8%	1,009	-1.1%	1,017	-1.9%
<b>Environmental Justice and Title VI Populations with Transit Access (2010), within ¼ mile of transit stops</b>								
Total Minority with transit access	18,996	People	18,996	0.0%	19,365	1.9%	19,104	0.6%
Total 65 and over with transit access	5,135	People	5,135	0.0%	5,448	6.1%	5,191	1.1%
Total Limited English-Speaking with transit access	8,428	People	8,428	0.0%	8,643	2.6%	8,498	0.8%
Total Households with transit access	20,877	People	20,877	0.0%	21,581	3.4%	21,437	2.7%
Total Household Income > \$25K with transit access	6,564	People	6,564	0.0%	6,650	1.3%	6,591	0.4%
<b>Environmental Justice and Title VI Populations potential impacts due to projects (2010)</b>								
Total Minority impacted	28,812	People	29,071	0.9%	28,925	0.4%	29,117	1.1%
Total 65 and over impacted	10,658	People	11,033	3.5%	10,728	0.7%	10,883	2.1%
Total Limited English-Speaking impacted	13,427	People	13,867	3.3%	13,480	0.4%	13,565	1.0%
Total Households impacted	37,119	People	38,134	2.7%	37,316	0.5%	37,690	1.5%
Total Household Income Less than \$25,000 impacted	9,287	People	9,511	2.4%	9,321	0.4%	9,457	1.8%



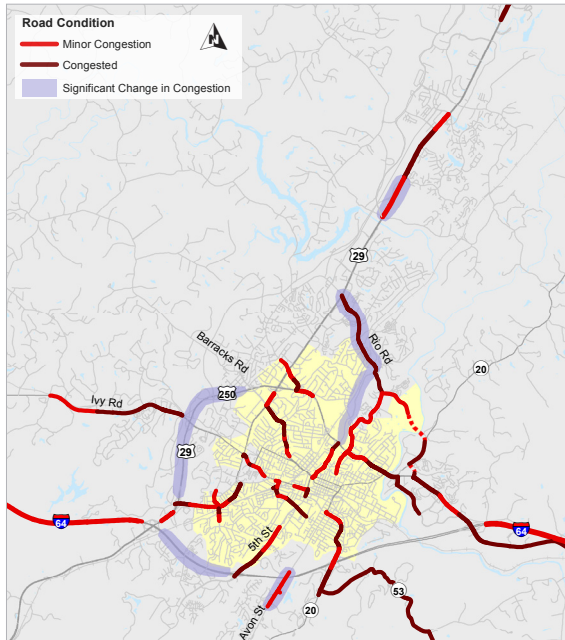
» *Roadway Congestion Analysis*

In addition to the performance measurement assessment, roadway projects were evaluated based on how they impacted congestion. The figures below illustrate the level of congestion expected with each scenario.

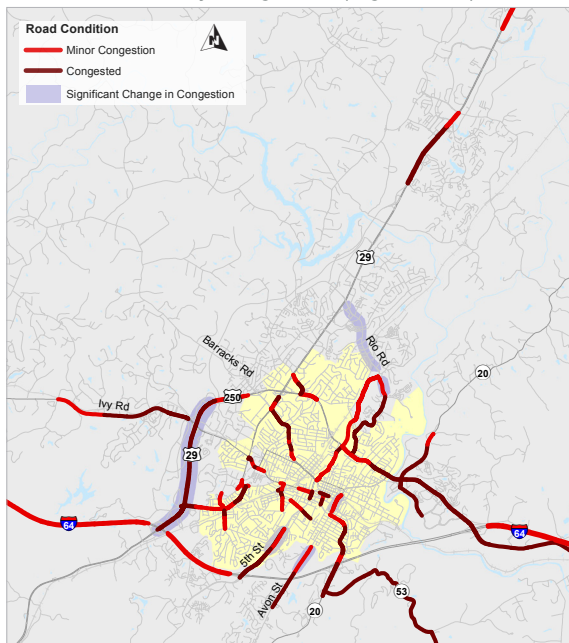
**2040 Base Scenario Daily Congestion (Figure 7-17)**



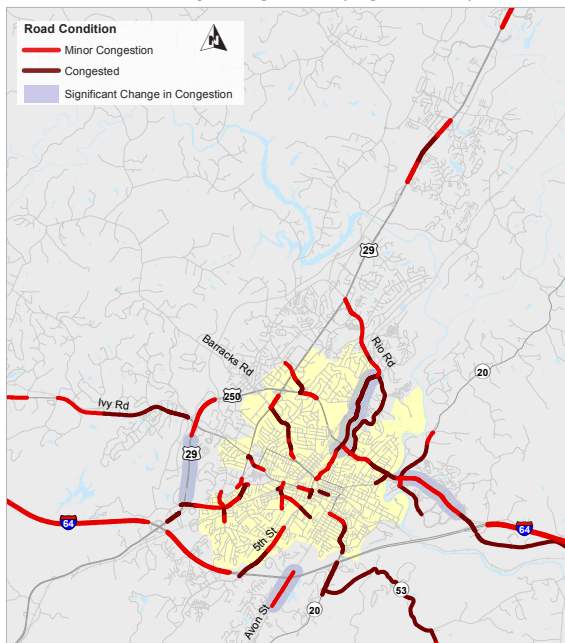
**Scenario 1A Daily Congestion (Figure 7-22)**



**Scenario 1B Daily Congestion (Figure 7-23)**



**Scenario 1C Daily Congestion (Figure 7-24)**



**i** ▶ **The light purple highlighted areas indicate roads that show significant change in congestion from the 2040 Base Scenario and the other scenarios in this round.** The thicker dark red lines on the congestion map indicate congested road links, and the thinner light red lines indicate roads that may experience congestion, especially during peak travel times (7 to 9 a.m. and 4 to 6 p.m). The purpose of this mapping is to identify roads with congestion levels unique to a particular scenario. In some scenarios, congestion in the highlighted areas improves or is completely eliminated compared with the Base or other scenarios. In contrast, the level of congestion may increase compared to the base or other scenarios.

## Transit Congestion Analysis

Transit projects were assessed based on the increase in ridership to both the proposed route and system-wide. [Table 7-8](#) compares the transit ridership for each route by scenario.

Round 1 Transit Analysis (Table 7-8)

	ROUTE	2040 BASE SCENARIO	SCENARIO 1A	SCENARIO 1B*	SCENARIO 1C
EXISTING CAT ROUTES	Route 1A	76	76	175	69
	Route 1B	192	192	424	200
	Route 2A	107	107	257	105
	Route 2B	224	224	563	236
	Route 3	80	81	151	93
	Route 4	544	551	1,184	595
	Route 5	819	820	1,542	939
	Route 6	188	187	280	211
	Route 7**	3,784	3,793	6,588	3,840
	Route 8	383	384	875	422
	Route 9	281	282	716	299
	Route 10	353	361		
	Route 11**				
	Night Route 21	50	50	67	51
	Night Route 22	92	92	142	97
	Night Route 23	27	27	39	27
	Night Route 24	17	17	24	17
Free Trolley**	2,895	2,903	6,089	3,064	
PROPOSED CAT ROUTES	Airport Route from Fashion Square Mall (15 min headway)			871	659
	US 29 BRT (UVA Hospital to Hollymead)			1,423	1,837
	Crozet Route			513	
	Meadow Creek Parkway Route			315	
	Route 10 with bridge (15/30 min)			1,147	937
	<b>Total Daily Passengers</b>	<b>10,110</b>	<b>10,147</b>	<b>23,385</b>	<b>13,697</b>

\*Note: Scenario 1B decreased the headways on the Existing CAT Routes by half \*\* Denotes changes to CAT's system as of August 3, 2013. These changes were added in the third round of scenarios.

## Round 1 Conclusions

This analysis process indicated which projects were most beneficial. It also identified areas and roadways that were congested but not being addressed by roadway or transit projects. This includes US 250 east of Interstate 64, Route 53, 5th Street, Ivy Road, and US 250/Free Bridge at Pantops. Identifying these roadways allowed MPO staff and committees to add projects in the next round of scenarios that might improve these areas.

Note that the model used in this analysis is limited to evaluating roadway and transit improvements. Improvements to interchanges or intersections cannot be modeled. The interchange improvements added to the list of projects were VDOT priorities, and remained on the list with the consent of MPO Committees and local planning staff.

## ► Round 2 Scenarios

Analysis from the first round of scenarios indicated:

- *That many of the projects considered were beneficial to the region.*
- *There are still areas that would benefit from improvements including US 250 east of Interstate 64, Route 53, 5th Street, Ivy Road, and US 250/Free Bridge at Pantops.*
- *The scenarios need to be comprised of both roadway and transit improvements.*

As a result, Scenario 2A consisted of five roadway projects and three transit projects. (Refer to [Table 7-9](#) for the list of project descriptions and [Figure 7-25](#) for a map of project locations). Scenario 2B consisted of five roadway

projects and four transit projects. (Refer to [Table 7-10](#) for the list of project descriptions and [Figure 7-26](#) for a map of project locations).

### Scenario 2A

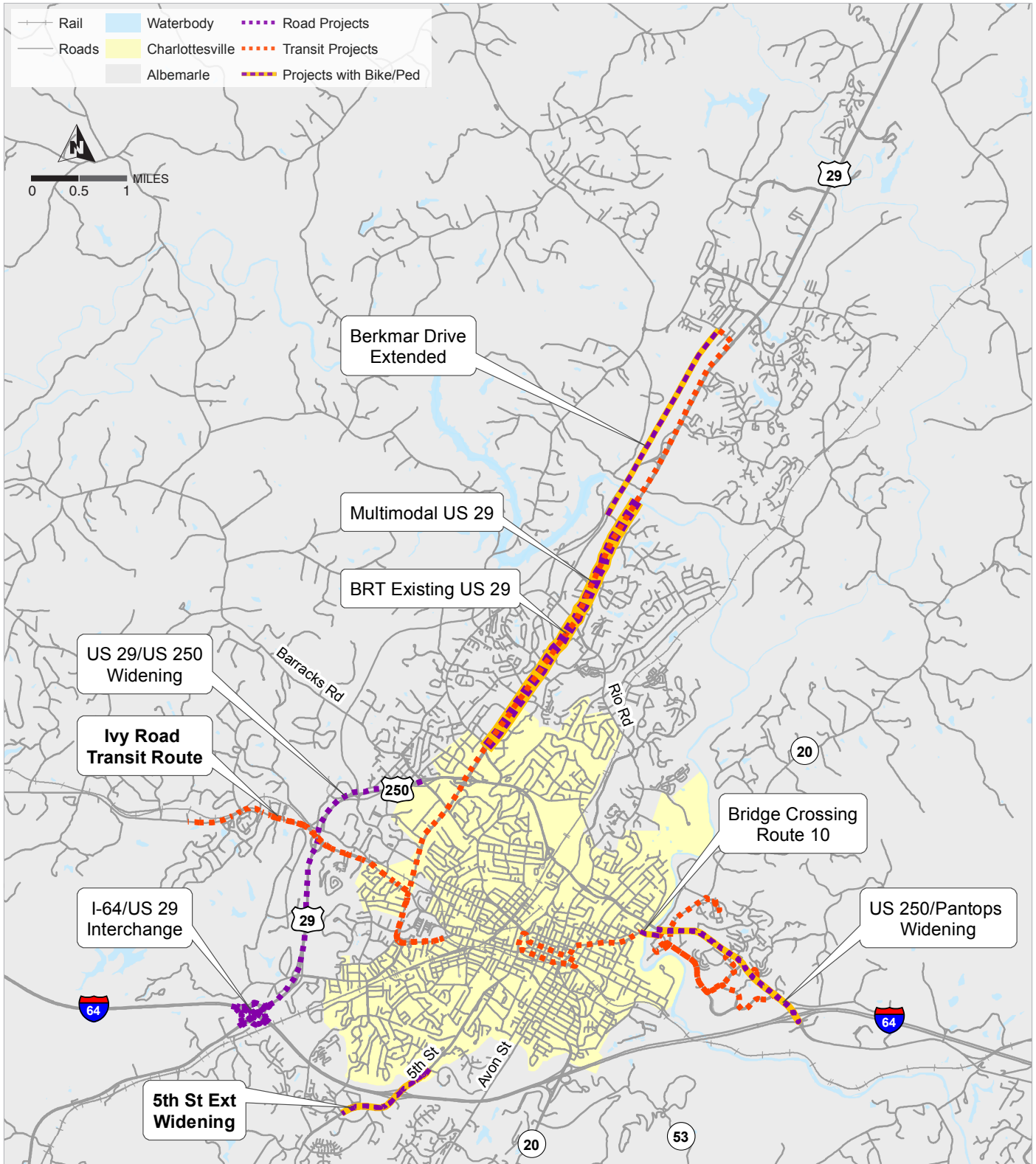
Scenario 2A was developed to analyze the impacts on the transportation system if a combination of both roadway and transit projects were developed by 2040. Given that 5th Street and Ivy Road west of US 29 remained congested with no signs of improvement in the first round of scenarios, two additional projects were added to Scenario 2A in effort to improve these areas: Widening 5th Street Extended and an Ivy Road Transit Route. (Refer to [Table 7-9](#) for the list of project descriptions and [Figure 7-25](#) for a map of project locations).

Scenario 2A Description (Table 7-9)

PROJECT	COST (MILLIONS)	DESCRIPTION
US 250/29 Widening	\$105.0	Widening US 250/29 from Barracks Rd to I-64 interchange.
I-64/29 Interchange	\$128.0	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Widening US 250 - Pantops	\$48.2	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).
Berkmar Drive Extended	\$56.9	Extend existing roadway from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River.
Multimodal US 29	\$46.9	Reshape portion of Route 29, bypassed by the western bypass and bound by the South Fork of the Rivanna River at the north and Hydraulic Road at the south, into a slower moving Boulevard. (To be modeled in combination with Transit Projects). The improvement would also include new signalization, bike and ped improvements and transit signal preference for BRT.
BRT Existing US29	\$127.0	BRT: UVA Hospital to Hollymead along Route 29 North. Every 15 minutes during Peak Hours: (7am to 10am, 4pm to 7pm). Every 30 minutes off-peak hours.
Bridge Crossing Route 10	\$5.4	Extend route 10 across Rivanna River to Pantops. Connection between High Street and River Bend Drive. Narrow transit only bridge with bike and pedestrian facilities.
<b>Ivy Road Transit Route</b>	<b>\$18.1</b>	<b>A route that would connect UVA's medical campus with UVA's Northridge Site via US250. Headways would be every 30 minutes from 7:00 AM to 8:00PM.</b>
<b>Widening of 5th St Ext.</b>	<b>\$31.1</b>	<b>Widen 5th St from Bent Creek Drive south to the entrance of the 5th St County Office Building. Would include bike and pedestrian facilities</b>

**Bold text** indicates projects that have been added to this process. \*Costs shown for road projects are planning level estimates and subject to change. Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.

Scenario 2A Projects (Figure 7-25)





## Scenario 2B

Scenario 2B was also developed to analyze the expected impacts on the transportation system if a combination of both roadway and transit projects were developed by 2040. Given that Route 53 remained congested with no signs of improvement in any of the previous scenarios, three additional road projects were added to Scenario 2B in effort to improve this area. These included geometric improvements to Black Cat Road; widening US 250 from

Interstate 64 (Exit 124) east to North Milton Road; and geometric improvements to Milton Road. Two new transit routes were also added to Scenario 2B in an effort to improve connectivity. These included extending CAT's existing Route 7 to the airport; and a new transit route from the Pantops area, along Rio Road, and north onto US 29. (Refer to [Table 7-10](#) for the list of project descriptions and [Figure 7-26](#) for a map of project locations).

Scenario 2B Description (Table 7-10)

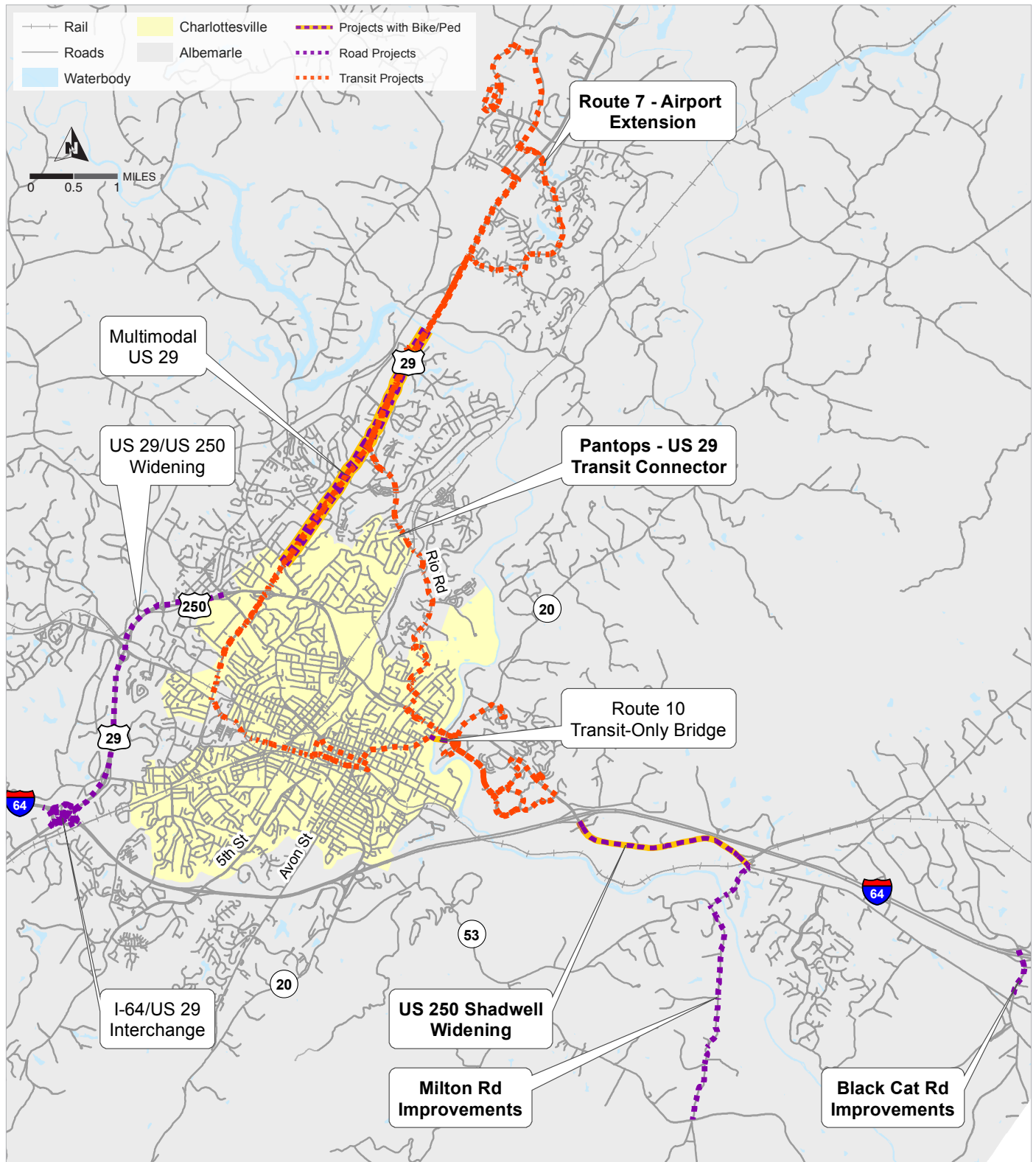
PROJECT	ESTIMATED COSTS*	DESCRIPTION
US 250/29 Widening	\$105.0	Widening US 250/29 from Barracks Rd to I-64 interchange
I-64/29 Interchange	\$128.0	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Multimodal US 29	\$46.9	Reshape portion of Route 29, bypassed by the western bypass and bound by the South Fork of the Rivanna River at the north and Hydraulic Road at the south, into a slower moving Boulevard. (To be modeled in combination with Transit Projects). The improvement would also include new signalization, bike and ped improvements and transit signal preference for BRT.
<b>Ext. Route 7 to Airport</b>	<b>\$16.8</b>	<b>Reshape Route 7 to run every 15 minutes starting at 6:00AM to Midnight. The route would extend from the Downtown Transit Center to the Airport. Decrease/Alter route 7 stops.</b>
Bridge Crossing Route 10	\$5.4	Extend route 10 across Rivanna River to Pantops. Connection between High Street and River Bend Drive. Narrow transit only bridge with bike and pedestrian facilities.
<b>Pantops – 29 Transit Route</b>	<b>\$47.1</b>	<b>Develop a transit route that would connect the State Farm/MJH with US 29 north. The route would not go to the downtown. The route would run every 30 minutes.</b>
<b>Widening Route 250 east of exit 124</b>	<b>\$21.3</b>	<b>Widen to 4 lanes, US 250 from Shadwell Exit (Exit 124) to N Milton Road, as discussed in the Village of Rivanna plan. Would include bike and pedestrian facilities.</b>
<b>Geometric Improvements to Black Cat Road</b>	<b>\$6.2</b>	<b>Make geometric improvements to Black Cat Rd, which allow higher travel speeds.</b>
<b>Geometric Improvements to Milton Rd</b>	<b>\$15.7</b>	<b>Make geometric improvements to Milton Rd, which allow higher travel speeds.</b>

*Bold text indicates projects that have been added to this process.*

*\*Costs shown for road projects are planning level estimates and subject to change. Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.*



Scenario 2B Projects (Figure 7-26)



## Round 2 Analysis: Findings

Overall, **Scenario 2A** performed well in the mobility and economy performance measures; however, it did not help meet the goals related to the environmental and community performance measures. **Scenario 2B** also performed well in the mobility, economy, and environmental justice/community performance measures, but did not help meet the goals related to the environmental and land use community performance measures.

### » *Project-specific Findings*

The success of each project in the second round of analysis is detailed in the list below. Projects with a check (✓) indicate those that were moved forward to the next rounds of scenarios. Projects with a hyphen (–) indicate those that did not move forward to the next rounds of scenarios. (Refer to [Figure 7-18](#)).

Project-specific findings from the congestion and ridership analysis of the first round of scenarios include the following:

- ✓ **Widening US 29/US 250** in both Scenarios 2A and 2B is expected to either reduce or alleviate congestion from Fontaine Avenue to Barrack Road.
- ✓ **Berkmar Drive Extended** in Scenario 2A provides additional capacity parallel to US 29. This project will likely result in slightly less congestion on US 29 than in Scenario 2B without this roadway.
- ✓ **Widening US 250 – Pantops** in Scenario 2A is expected to reduce the congestion on this portion of US 250.
- ✓ **Widening US 250 (east of Exit 124)** in Scenario 2B requires additional study. While this project is expected to reduce the traffic and congestion on this segment of US 250, the geometric improvements to Black Cat Road and Milton Road, also in this scenario, will likely attract additional trips back onto this portion of US 250.
- ✓ **Geometric Improvements to Black Cat Road** in Scenario 2B works with the geometric improvements to Milton Road and is expected to draw trips off Route 53 and onto US 250 to reduce the congestion on Route 53. While both Route 53 and US 250 are heavily congested in the 2040 Base, Route 53 is considered to be more dangerous given its alignment and terrain.
- ✓ **Geometric Improvements to Milton Road** in Scenario 2B works with the geometric improvements to Black Cat Road and will likely draw trips off Route 53 and onto US 250 to reduce the congestion on Route 53.



▶ **“Alleviate congestion”** means that roadways that were expected to experience either congestion or minor congestion are no longer expected to experience any congestion.

**“Reduce congestion”** means that roadways that were expected to experience either congestion or minor congestion are still expected to experience congestion, but to a lesser extent than in the 2040 Base Scenario.

- **Widening 5th Street Extended** in Scenario 2A is expected to reduce some of the congestion anticipated on 5th Street.
- ✓ **Multimodal US 29** in Scenarios 2A and 2B will likely result in some additional congestion on US 29. This is more apparent in Scenario 2B without Berkmar Drive Extended.
- ✓ **BRT on US 29 (UVA Hospital to Hollymead)** in Scenario 2A increased ridership system-wide.
- ✓ **Airport Route Extension (Extend Route 7 to the Airport)** in Scenario 2B is expected to draw substantial ridership from Route 7 given the overlap of the two routes, yet will likely increase ridership system-wide.
- ✓ **Route 10 Transit-only Bridge** in Scenarios 2A and 2B is expected to nearly triple the ridership on Route 10 and increase ridership system-wide.
- **Ivy Road Transit Route** in Scenario 2A will likely attract a number of passengers; however, this service was not expected to remove enough vehicles from Ivy Road to reduce the anticipated heavy congestion.
- **Pantops – US 29 Transit Route** in Scenario 2B was expected to attract a number of passengers but will not likely reduce the heavy congestion in this area.

### » *Performance Measure Analysis*

The second round of scenarios was analyzed using the same set of performance measures used for the base and first round. [Table 7-11](#) shows the results of the analysis for Round 2. Cells highlighted in shades of green indicate measures where the scenario is moving toward the region’s goals. Cells highlighted in shades of red indicate measures where the scenario is moving away from the region’s goals. The darker the shade, the further the scenario moved toward or away from the region’s goals.

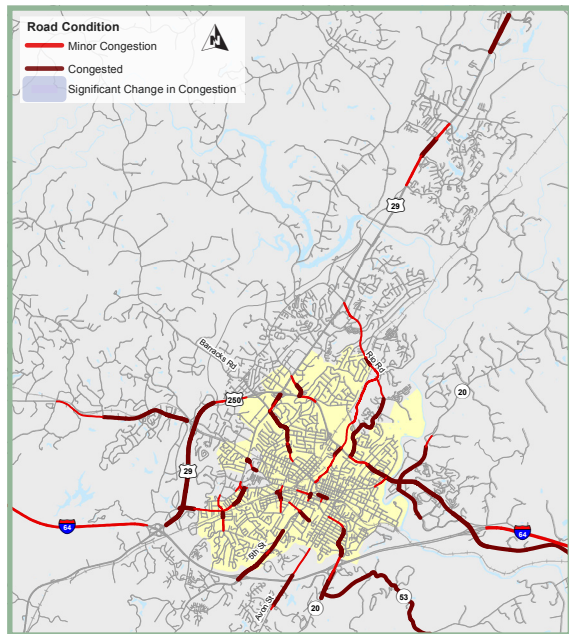
Round 2 Analysis Results (Table 7-11)

Performance Measurement	Base		Scenario 1A		Scenario 1B	
	Value	Unit of Measure	Value	% Change	Value	% Change
<b>Mobility</b>						
Congestion (% of roads at LOS E or F)	14.1%	% of Roads	12.8%	8.8%	12.5%	11.0%
Congestion (hours of delay per day)	23,181.0	Hours	20,102	13.3%	20,163	13.0%
Mode Share (percent of Trips)	759,319	Trips/Day	759,307	0.0%	759,317	0.0%
Auto	88.1%	Percent of Trips	88.0%	0.2%	88.0%	20.0%
Transit	2.5%	Percent of Trips	2.6%	6.2%	2.7%	8.1%
Bike	2.7%	Percent of Trips	2.7%	-0.2%	2.7%	-0.2%
Walk	6.7%	Percent of Trips	6.7%	0.4%	6.7%	0.3%
Vehicle Mobility (vehicle miles traveled)	6,228,031	Miles/Day	6,230,813	0.0%	6,233,887	-0.1%
Vehicle Crashes (crashes per year)	2,865.0	Crashes/Year	2,869	-0.1%	2,868	-0.1%
Bicycle Connectivity (% in largest connected area)	68.2%	% of largest area	84.3%	23.6%	79.2%	16.1%
<b>Economy</b>						
Access to Jobs (average travel time to work)	10.6	Minutes	10.1	4.6%	10.2	3.6%
Transit Accessibility (total population within ¼ mile of transit stop) (2040)	67,185	People	69,965	4.1%	70,779	5.3%
Transit Accessibility (total employment within ¼ mile of transit stop) (2040)	52,633	People	55,737	5.9%	56,717	7.8%
<b>Environment</b>						
Habitat	1,775.5	Eco Logical Score/Mile	1,784	-0.5%	1,782	-0.4%
Air Quality (tons per year)	13,321	Tons/Year	13,325	0.0%	13,366	-0.3%
Water Quality (% change in stormwater/water pollutants) (tons per year)	1,079.1	Tons/Year	1,088	-0.8%	1,083	-0.4%
Flood Plain (acres of 100 year flood plain affected)	99.1	Acres	107.0	-8.0%	105.6	-6.1%
Historical (designated historic sites within 500 ft of projects)	1,141	# of Sites	1,163	-1.9%	1,170	-2.5%
Archeological (designated archeological sites within 500 ft of projects)	264	# of Sites	287	-8.7%	269	-1.9%
<b>Community</b>						
Land Uses Affected (# of parcels within 500 ft of projects)	35,061	Parcels	35,581	-1.5%	35,435	-1.1%
Residential	32,411	Parcels	32,750	-1.0%	32,691	-0.9%
Commercial/Industrial	1,267	Parcels	1,412	-11.4%	1,320	-4.2%
Parks	42	Parcels	43	-2.4%	42	0.0%
Educational/Religious/Charitable	343	Parcels	356	-3.8%	355	-3.5%
Agriculture or undeveloped	998	Parcels	1,020	-2.2%	1,027	-2.9%
<b>Environmental Justice and Title VI Populations with Transit Access (2010), within ¼ mile of transit stops</b>						
Total Minority with transit access	18,996	People	19,566	3.0%	19,569	3.0%
Total 65 and over with transit access	5,135	People	5,377	4.7%	5,502	7.1%
Total Limited English-Speaking with transit access	8,428	People	8,798	4.4%	8,783	4.2%
Total Households with transit access	20,877	People	21,623	3.6%	21,988	5.3%
Total Household Income > \$25K with transit access	6,564	People	6,564	0.0%	6,661	1.5%
<b>Environmental Justice and Title VI Populations potential impacts due to projects (2010)</b>						
Total Minority impacted	28,812	People	29,685	3.0%	29,100	1.0%
Total 65 and over impacted	10,658	People	11,022	3.4%	10,869	2.0%
Total Limited English-Speaking impacted	13,427	People	13,866	3.3%	13,555	1.0%
Total Households impacted	37,119	People	38,264	3.1%	37,643	1.4%
Total Household Income Less than \$25,000 impacted	9,287	People	9,610	3.5%	9,446	1.7%

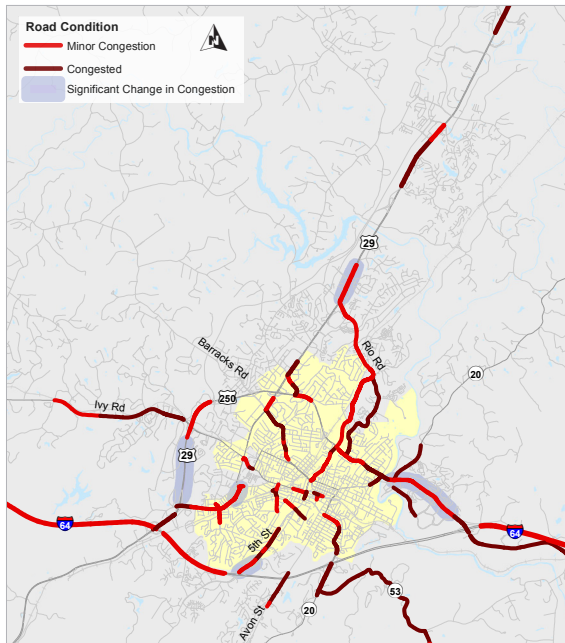
» *Roadway Congestion Analysis*

In addition to analyzing the scenarios with performance measures, roadway projects were assessed based on how they impacted congestion. Figure 7-27 and 7-28 below illustrate the level of congestion expected with each scenario.

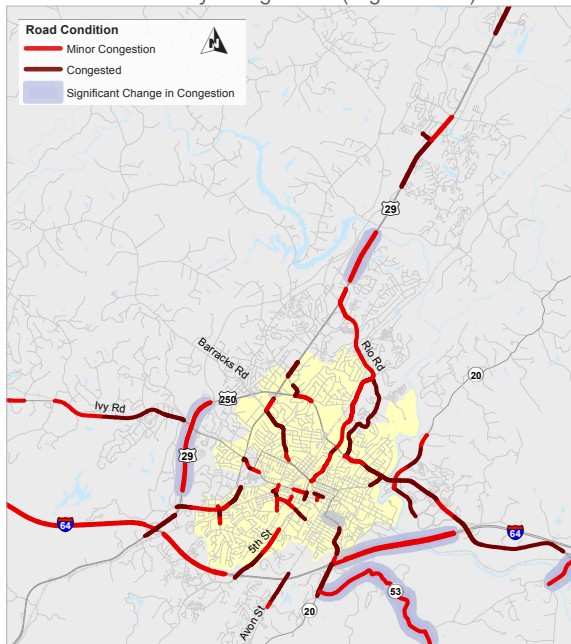
**2040 Base Scenario Daily Congestion (Figure 7-17)**



**Scenario 2A Daily Congestion (Figure 7-27)**



**Scenario 2B Daily Congestion (Figure 7-28)**



► The light purple highlighted areas indicate roads that show significant change in congestion from the 2040 Base Scenario and the other scenarios in this round.

The thicker dark red lines on the congestion map indicate congested road links, and the thinner light red lines indicate roads that may experience congestion, especially during peak travel times (7 to 9 a.m. and 4 to 6 p.m). The purpose of this mapping is to identify roads with congestion levels unique to a particular scenario. In some scenarios, congestion in the highlighted areas improves or is completely eliminated compared with the Base or other scenarios. In contrast, the level of congestion may increase compared to the base or other scenarios.



## » Transit Ridership Analysis

Transit projects were assessed based on the increase in ridership to both the proposed route and throughout the system. [Table 7-12](#) compares the transit ridership for each route by scenario.

Round 2 Transit Analysis (Table 7-12)

	ROUTE	2040 BASE SCENARIO	SCENARIO 2A	SCENARIO 2B
EXISTING CAT ROUTES	Route 1A	76	69	73
	Route 1B	192	201	206
	Route 2A	107	106	83
	Route 2B	224	235	240
	Route 3	80	93	98
	Route 4	544	597	584
	Route 5	819	820	834
	Route 6	188	209	212
	Route 7**	3,784	3,617	1,850
	Route 8	383	452	423
	Route 9	281	300	322
	Route 10	353		
	Route 11**			
	Night Route 21	50	51	53
	Night Route 22	92	98	98
	Night Route 23	27	27	28
Night Route 24	17	13	14	
PROPOSED CAT ROUTES	Free Trolley**	2,895	2,984	3,153
	US 29 BRT (UVA Hospital to Hollymead)		1,628	
	Route 10 with bridge (15/30 min)		952	958
	Ivy Road Transit Route		449	
	Pantops-US 29 Route			529
	Airport Route (30 min BRT from Downtown to the Airport)			3,254
	<b>Total Daily Passengers</b>	<b>10,110</b>	<b>12,898</b>	<b>13,014</b>

\*\* Denotes changes to CAT's system as of August 3, 2013. These changes were added in the third round of scenarios.

## » Round 2 Conclusions

This analysis process further indicated which projects were most beneficial. It also led to further refinement of both roadway and transit projects, resulting in a more detailed look at already established improvements. This modification process culminated in the next round of scenarios.

## ► Round 3 Scenarios

Staff, MPO Committees, and local planning and transit agencies felt that Scenario 2B performed strongly in the analysis. As a result, **Scenarios 3A, 3B, and 3C** contained many of the same projects as Scenario 2B, with subtle variations. The roadway projects in Scenario 3A varied slightly from the projects in Scenario 3B and 3C. (Scenarios 3B and 3C maintained the same list of roadway projects.) The main difference in the third round of scenarios was found in the transit projects included in each scenario.

During the development of these scenarios Charlottesville Area Transit (CAT) added a new transit route to their service, Route 11, and modified Route 7 and the Free Trolley route. These changes were updated in the model for the third round of scenarios to ensure the analysis was as current as possible. In addition, VDOT expressed safety concerns with the Interstate 64/US 250 interchange at exit 124. This project was added to the project lists for Scenarios 3A, 3B, and 3C.

MPO Staff met with local planning staff from the City, County, and VDOT as well as transit staff from CAT, JAUNT, and UTS, to identify which projects should be combined into new scenarios for round three. **Scenario 3A** consisted of eight roadway projects and three transit projects. (Refer to [Table 7-13](#) for the list of project descriptions and [Figure 7-29](#) for a map of project locations). **Scenario 3B** consisted of six roadway projects and four transit projects. (Refer to [Table 7-14](#) for the list of project descriptions and [Figure 7-30](#) for a map of project locations). **Scenario 3C** consisted of six roadway projects and three transit projects. (Refer to [Table 7-15](#) for the list of project descriptions and [Figure 7-31](#) for a map of project locations).

## Scenario 3A

Given the success of the roadway projects evaluated in Scenario 2B, Scenario 3A maintained many of these same projects. The analysis from the second round of scenarios indicated that while the widening of US 29/US 250 to six lanes was effective between Fontaine Avenue and Barracks Road, it did little to improve the heavy congestion expected between Interstate 64 and Fontaine Avenue. To address this in Scenario 3A, US 29 was widened to eight lanes. The success of the BRT route in Scenario 2A and the extension of Route 7 to the Airport in Scenario 2B led to the development of a BRT/Express bus service along US 29 from NGIC to downtown. This service would also stop at the airport, Fashion Square Mall, and UVA. CAT's existing Route 7 was omitted from this analysis as the BRT service overlapped with Route 7. At the request of the committees, the Crozet transit service was reintroduced in this scenario from Scenario 1B. As previously noted, Route 11 was added to the transit network to represent the changes CAT implemented on August 3, 2013. (Refer to [Table 7-13](#) and [Figure 7-29](#)).



### ► Projects Unique to Scenario 3A:

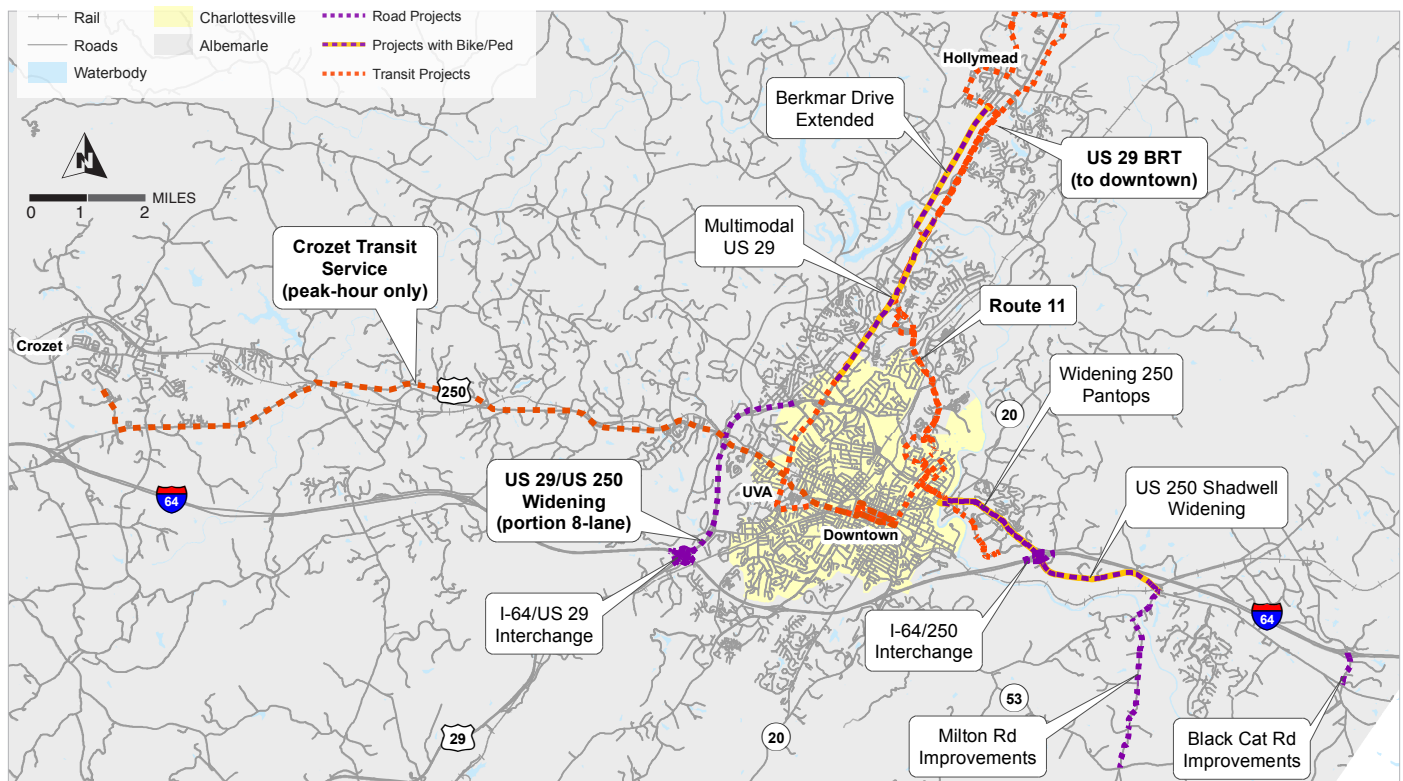
- Widen US 29 to 8 lanes between Interstate 64 and Fontaine Avenue
- Geometric Improvements to Black Cat Road and Milton Road
- BRT/Express bus on US 29 from NGIC to downtown
- Remove CAT's existing Route 7
- Peak hour service to Crozet from downtown

Scenario 3A Description (Table 7-13)

PROJECT	COST (IN MILLIONS)	DESCRIPTION
US 250/29 Widening	\$113.0	Widening US 250/29 from Barracks Rd to I-64 interchange. Including the 8-lane widening from Fontaine to the I-64 interchange.
I-64/29 Interchange	\$128.0	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Multimodal US 29	\$46.3	Reshape Route 29, bypassed by the western bypass and bound by the South Fork of the Rivanna River at the north and Hydraulic Road at the south, into a multimodal transportation corridor. The improvement would also include new signalization to facilitate bike and pedestrian movement, as well as signal preference for BRT. Bike and pedestrian improvements would be implemented on facilities adjacent to US 29. These improvements will also include bike and pedestrian crossings across US 29 at key locations (both at-grade and grade separated).
Widening US 250 - Pantops	\$44.4	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).
Widening Route 250 from exit 124	\$21.2	Widen to 4 lanes, US 250 from Shadwell Exit (Exit 124) to N Milton Rd, as discussed in the Village of Rivanna plan. Would include bike and pedestrian facilities.
<b>I-64/US 250 Interchange Exit 124</b>	<b>\$95.5</b>	<b>Increase capacity and rebuild the interchange to be safer for higher volumes of traffic.</b>
Berkmar Drive Extended	\$56.9	Extend existing roadway from northern terminus of Hilton Heights Rd over the South Fork of the Rivanna River to the North Fork of the Rivanna River.
Geometric Improvements to Black Cat Rd	\$6.1	Make geometric improvements to Black Cat Rd, which allow safer movement and more throughput.
Geometric Improvements to Milton Rd	\$15.7	Make geometric improvements to Milton Rd, which allow safer movement and more throughput.
<b>BRT US/Express Bus 29: NGIC to UVA to Downtown</b>	<b>\$112.0</b>	<b>Bus Rapid Transit (with dedicated facilities on US 29) and express bus off US29. 15 minute headways all day with key stops at NGIC, The Airport, Fashion Sq., UVA and Downtown. Preemptive signals would be located at all intersections where service passed. (This version of the BRT/Express Bus replaces existing Route 7. Costs reflect no longer having to pay for Route 7 service.)</b>
<b>Peak hour service Crozet</b>	<b>\$33.0</b>	<b>Transit Service connecting Crozet and Downtown Charlottesville. Service would only occur during peak-hours (7am to 10am) and (4pm to 7pm). Service would run on 30 minute headways.</b>
<b>New Route 11</b>	<b>N/A</b>	<b>Route 11 connects Downtown Charlottesville with Fashion Square Mall via Rio Road. The route maintains hourly headways. (This route is in service and has been added as an existing and committed project. Since it is new MPO Staff included it to show its future impacts.)</b>

*Bold text indicates projects that have been added to this process. \*Costs shown for road projects are planning level estimates and subject to change. Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.*

Scenario 3A Projects (Figure 7-29)



## Scenario 3B

Scenario 3B studied a combination of six roadway projects and four transit projects. The BRT/Express bus route from Scenario 3A was modified to run along John Warner Parkway for further evaluation. This service would also stop at the airport and Fashion Square Mall. The purpose of rerouting BRT was to determine if it would likely attract more passengers on US 29 (as tested in Scenario 3A) or on John Warner Parkway. CAT's existing Route 5 was extended to UVA Health Center to determine the impact on ridership. At the request of the committees, the transit-only bridge in Scenarios 2A and 2B was replaced with an additional lane on US 250 and Free Bridge dedicated to both transit and high occupancy vehicles with three or

more occupants. Signal preemption would be provided on US 250 in this area to allow buses and vehicles with three or more people to bypass the heavy congestion. (Refer to [Table 7-14](#) and [Figure 7-30](#)).



### Projects Unique to Scenario 3B:

- BRT/Express bus via John Warner Parkway from NGIC to downtown
- Extend CAT's existing Route 5 to UVA Health Center
- Dedicated transit and HOV3+ lane on US 250 crossing Free Bridge

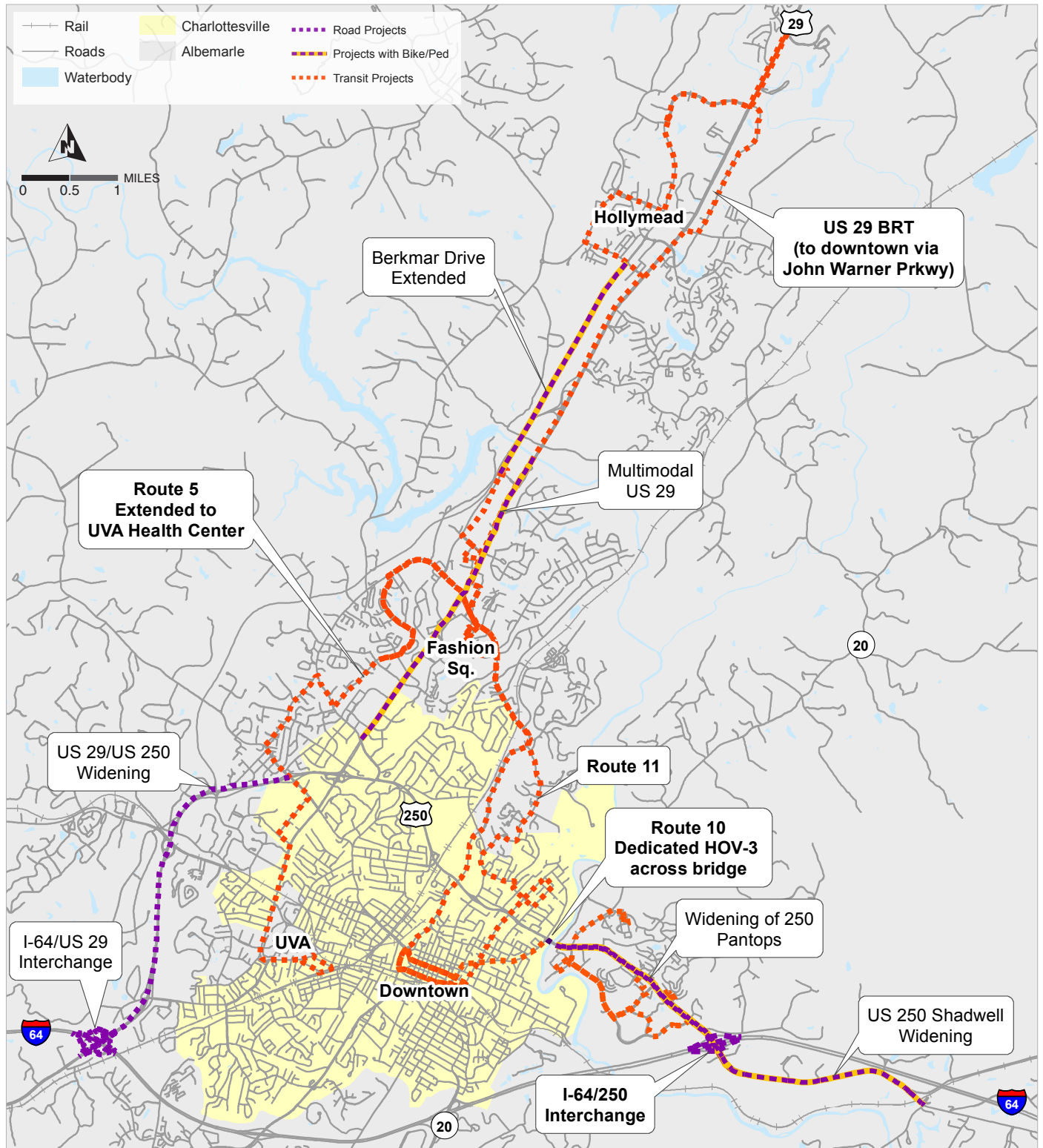
Scenario 3B Description (Table 7-14)

PROJECT	COST EST.	DESCRIPTION
US 250/29 Widening	\$105 Million	Widening US 250/29 from Barracks Rd to I-64 interchange to 6-lanes.
I-64/29 Interchange	\$128 Million	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Multimodal US 29	\$46.3 Million	Reshape Route 29, bypassed by the western bypass and bound by the South Fork of the Rivanna River at the north and Hydraulic Road at the south, into a multimodal transportation corridor. The improvement would also include new signalization to facilitate bike and pedestrian movement, as well as signal preference for BRT. Bike and pedestrian improvements would be implemented on facilities adjacent to US 29. These improvements will also include bike and pedestrian crossings across US 29 at key locations (both at-grade and grade separated).
Widening US 250 - Pantops	44.4 Million	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).
Widening Route 250 from exit 124	\$21.2 Million	Widen to 4 lanes, US 250 from Shadwell Exit (Exit 124) to N Milton Road, as discussed in the Village of Rivanna plan. Would include bike and pedestrian facilities.
<b>I-64/US 250 Interchange Exit 124</b>	<b>\$95.5 Million</b>	<b>Increase capacity and rebuild the interchange to be safer for higher volumes of traffic.</b>
Berkmar Drive Extended	\$56.9 Million	Extend existing roadway from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River.
<b>BRT/Express Bus US 29: NGIC to Downtown via John Warner Prkwy</b>	<b>\$121 Million</b>	<b>Bus Rapid Transit (with dedicated facilities on US 29) and express bus off US29. Would run at 15 minute headways all day with key stops at NGIC, The Airport, Fashion Sq., and Downtown. Preemptive signals would be located at all intersections where service passed.</b> <i>(With this version of BRT/Express Bus Route 7 would remain in service.)</i>
<b>Route 5 to Health Center</b>	<b>\$2.6 Million</b>	<b>Extend the existing Route 5 to the UVA Health system, via Emmet Street and JPA. New stops would be added at UVA's central grounds and the health Center. Service would maintain current 30-minute headways.</b> <i>(The cost listed here only reflect additional costs. The cost of running the existing Route 5 for 20 years has been subtracted out.)</i>
<b>Bridge Crossing Route 10</b>	<b>\$5.7 Million</b>	<b>Dedicated HOV-3 Lanes (one for each direction) on US 250 from High Street to Stony Point Road (also includes bike and pedestrian facilities). Also bus service signal preemption at intersections. Service would run 15 minutes during the peak hours and 30 minutes during off-peak hours.</b> <i>(The costs listed here only reflect additional costs. The cost of running the existing Route 10 for 20 years has been subtracted out.)</i>
<b>Bridge Crossing Route 10</b>	<b>\$5.7 Million</b>	<b>Dedicated HOV-3 Lanes (one for each direction) on US 250 from High Street to Stony Point Road (also includes bike and pedestrian facilities). Also bus service signal preemption at intersections. Service would run 15 minutes during the peak hours and 30 minutes during off-peak hours.</b> <i>(This route is in service and has been added as an existing and committed project. Since it is new we wanted to include it in the scenarios to show its future impacts.)</i>

*Bold text indicates projects that have been added to this process. \*Costs shown for road projects are planning level estimates and subject to change. Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.*



Scenario 3B Projects (Figure 7-30)



*Bold text indicates projects that have been added to this process.*

## Scenario 3C

Scenario 3C studied a combination of six roadway projects and three transit projects. To better evaluate the success of the BRT/Express bus service in Scenarios 3A and 3B, BRT was omitted from this scenario. However, transit service was provided to the airport from Fashion Square Mall as a new transit route. The dedicated lane on US 250 and Free Bridge in Scenario 3B was modified to only allow access for transit. This provided the opportunity to assess if the shared access with high occupancy vehicles in Scenario 3B impacted this service in any way. (Refer to [Table 7-15](#) and [Figure 7-31](#)).



### ► Projects Unique to Scenario 3C:

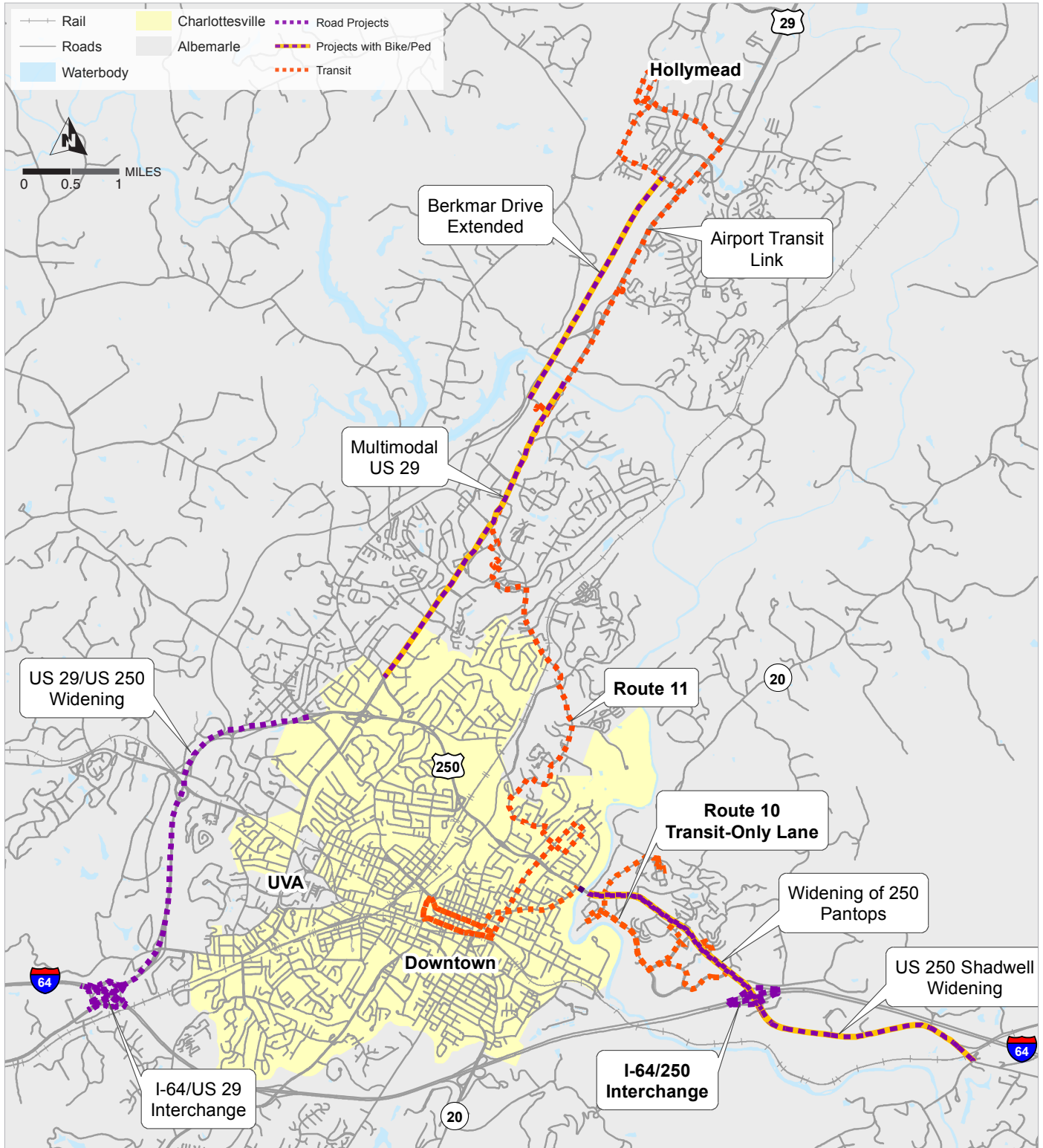
- Transit route from Fashion Square Mall to the airport
- No BRT/Express bus service
- Dedicated transit-only lane on US 250 crossing Free Bridge

Scenario 3C Description (Table 7-15)

PROJECT	COST EST.	DESCRIPTION
US 250/29 Widening	\$105 Million	Widening US 250/29 from Barracks Rd to I-64 interchange to 6-lanes.
I-64/29 Interchange	\$128 Million	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic.
Multimodal US 29	\$46.3 Million	Reshape Route 29, bypassed by the western bypass and bound by the South Fork of the Rivanna River at the north and Hydraulic Road at the south, into a multimodal transportation corridor. The improvement would also include new signalization to facilitate bike and pedestrian movement, as well as signal preference for BRT. Bike and pedestrian improvements would be implemented on facilities adjacent to US 29. These improvements will also include bike and pedestrian crossings across US 29 at key locations (both at-grade and grade separated).
Widening US 250 - Pantops	44.4 Million	Improve US 250 East corridor as recommended in the Pantops Master Plan (pedestrian crossings, widening to no more than six lanes).
Widening Route 250 from exit 124	\$21.2 Million	Widen to 4 lanes, US 250 from Shadwell Exit (Exit 124) to N Milton Road, as discussed in the Village of Rivanna plan. Would include bike and pedestrian facilities.
<b>I-64/US 250 Interchange Exit 124</b>	<b>\$95.5 Million</b>	<b>Increase capacity and rebuild the interchange to be safer for higher volumes of traffic.</b>
Berkmar Drive Extended	\$56.9 Million	Extend existing roadway from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River.
Airport Link from Fashion Sq.	\$51.6 Million	This link would extend from Fashion Square Mall to the Airport via US 29. This route would run on 15 minute headways during the peak hours and 30 minute headways during off-peak hours.
<b>Bridge Crossing Route 10</b>	<b>\$3.2 Million</b>	<b>Transit-Only Lane (one for BOTH directions) on US 250 from High Street to Stony Point Road (also includes bike and pedestrian facilities). Also bus service signal preemption at intersections. Service would run 15 minutes during the peak hours and to 30 minutes during off-peak hours.</b> <i>(The cost listed here only reflect additional costs. The cost of running the existing Route 10 for 20 years has been subtracted out.)</i>
<b>New Route 11</b>	<b>N/A</b>	<b>Route 11 connects Downtown Charlottesville with Fashion Square Mall via Rio Road. The route maintains hourly headways.</b> <i>(This route is in service and has been added as an existing and committed project. Since it is new we wanted to include it in the scenarios to show its future impacts.)</i>

*Bold text indicates projects that have been added to this process. \*Costs shown for road projects are planning level estimates and subject to change. Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.*

Scenario 3C Projects (Figure 7-31)



*Bold text indicates projects that have been added to this process.*

## Round 3 Analysis: Findings

Overall, **Scenario 3A** performs well in the mobility, economy, and the environmental justice/community performance measures; however, it does not help meet the goals related to the environmental and land use performance measures. Of the three scenarios, 3A is slightly stronger than 3B or 3C in the economy and environmental justice/community measures. **Scenario 3B** also performs well in the mobility, economy, and the environmental justice/community performance measures, but does not help meet the goals related to the environmental and land use community performance measures. Compared to Scenario 3A or 3C, it performs slightly stronger in the mobility performance measures. **Scenario 3C** performs well in the mobility, economy, and the environmental justice/community performance measures, but does not help meet the goals related to the environmental and land use community performance measures. While it does not positively contribute to meeting the land use community goals, compared to Scenario 3A or 3B, it has less of a negative impact.

### » Project-specific Findings

The success of each project in the third round of analysis is detailed in the list below. Projects with a check (✓) indicate those that were moved forward to the next rounds of scenarios. Projects with a hyphen (–) indicate those that did not move forward to the next rounds of scenarios. (Refer to [Figure 7-18](#)).

Project-specific findings from the congestion and ridership analysis of the first round of scenarios include the following:

- ✓ **US 29/US 250 Widening** in Scenarios 3A, 3B, and 3C is expected to either alleviate or reduce the congestion on this portion of the road making it a successful project. Although this project has been viewed as highly successful, the Committees were concerned by the estimated cost of the project. As it progressed to the DRAFT Preferred Scenario staff worked with VDOT to reevaluate the project and break it into phases, allowing it to remain as a priority for the region without immediately allocating significant resources to this one project.
- ✓ **Berkmar Drive Extended** in Scenarios 3A, 3B, and 3C provides additional capacity parallel to US 29. This is particularly beneficial when combined with the Multimodal US 29 project.



▶ **“Alleviate congestion”** means that roadways that were expected to experience either congestion or minor congestion are no longer expected to experience any congestion.

**“Reduce congestion”** means that roadways that were expected to experience either congestion or minor congestion are still expected to experience congestion, but to a lesser extent than in the 2040 Base Scenario.

- **Widening of 250 Pantops** in Scenarios 3A, 3B, and 3C is expected to reduce the congestion on this portion of the road. However, staff and the MPO Committees felt that widening this section of road without widening Free Bridge only resulted in a bottleneck at Free Bridge. Until the limited capacity of Free Bridge is addressed, the committees did not feel this was a logical investment of transportation funds.
- ✓ **US 250 Shadwell Widening** in Scenarios 3A, 3B, and 3C is expected to reduce the congestion on Route 53 and US 250 although these roads will likely still experience congestion. The additional capacity on this portion of US 250 should attract trips from the Lake Monticello area to US 250 and Interstate 64 rather than using Route 53 which was considered to be less safe than US 250 or Interstate 64.
- **Geometric Improvements to Black Cat Road** in Scenario 3A were expected to be unnecessary with the widening of US 250 east of exit 124. Rather than continuing north on Black Cat Road to Interstate 64, trips diverted to US 250 to travel east-west.
- **Geometric Improvements to Milton Road** in Scenario 3A were also expected to be unnecessary with the widening of US 250 east of exit 124. The additional capacity provided on US 250 attracted trips regardless of the geometric improvements on Milton Road.
- ✓ **Multimodal US 29** in Scenarios 3A, 3B, and 3C would likely result in minor congestion in a few areas of US 29 during peak-hour travel.
- ✓ **BRT/Express bus on US 29 (NGIC to downtown)** in Scenario 3A is expected to increase ridership through the US 29 corridor and system-wide. Compared to the subsequently listed BRT route via John Warner Parkway, this route would likely attract more passengers than both BRT and Route 7 in Scenario 3B. This route should be further studied with the transit improvements to Route 10 to better assess the benefit system-wide.



- **BRT/Express bus on John Warner Parkway (NGIC to downtown)** in Scenario 3B is expected to increase ridership in the US 29 corridor and system-wide, but not as much as BRT on US 29 in Scenario 2A increased ridership.
  - **Transit route to the Airport from Fashion Square Mall** in Scenario 3C increased ridership on Route 7 and system-wide. However, it is not anticipated that this project will attract the level of ridership that BRT in Scenarios 3A or 3B would likely attract.
  - ✓ **Route 10 (Transit-only lane)** in Scenario 3C is expected to attract almost three times the number of passengers on Route 10 as the Base Scenario. Although Table 7-17 indicates slightly higher ridership in Scenario 3B with the dedicated transit and HOV-3 lane, the additional ridership is due to the presence of BRT and the Route 5 extension. Allowing high occupancy vehicles to use this lane had no impact on ridership.
  - **Route 10 (Dedicated HOV-3 across bridge)** in Scenario 3B is expected to attract almost three times the number of passengers on Route 10 as the Base Scenario. In contrast, the number of HOV-3 vehicles that divert from the existing travel lanes on Free Bridge onto the HOV-3 lanes is expected to be very minimal. As a result this does not show any improvement on the congestion expected on Free Bridge. Although allowing HOV-3 access on this dedicated lane does not impact the number of passengers expected to use
- this transit service or the automobile congestion on Free Bridge, it does impact the cost. MPO Committees chose not to pursue this project given that the transit-only lane in Scenario 3C is expected to provide the same benefits at a lower cost.
- ✓ **Peak-hour service Crozet route** in Scenario 3A is expected to result in a slight increase in ridership system-wide. However, this was viewed as a successful route given the limited service provided and the number of daily passengers estimated by the model.
  - **Route 5 Extended to UVA Health Center** in Scenario 3B was expected to more than double the number of passengers on Route 5. However, further analysis showed that the increase in passengers was due to riders switching from UTS's Northline route to CAT's Route 5.
  - ✓ **New Route 11** in Scenarios 3A, 3B, and 3C was added to the third round of scenarios to more accurately represent the changes to CAT's structure. This route was not analyzed for its potential benefits as it currently operates in CAT's transit service.

### » Performance Measure Analysis

The third round of scenarios was analyzed using the performance measures. [Table 7-16](#) shows the results of the analysis. Cells highlighted in shades of green indicate measures where the scenario is moving toward the region's goals. Cells highlighted in shades of red indicate measures where the scenario is moving away the region's goals. The darker the shade, the further the scenario moved toward or away from the region's goals.



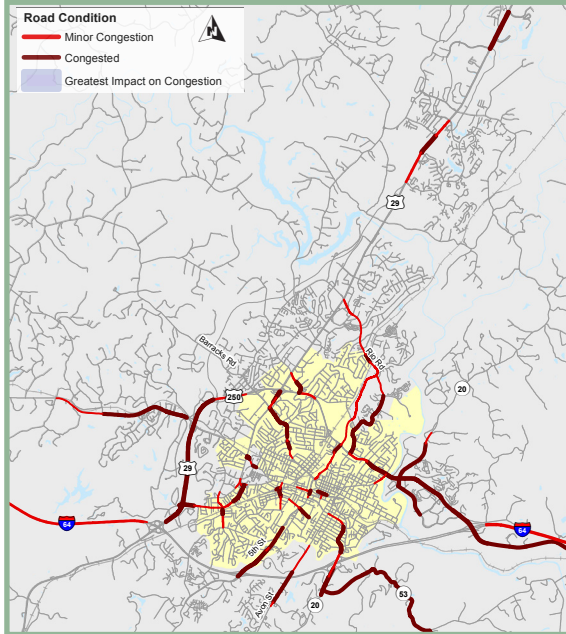
Round 3 Analysis Results (Table 7-16)

Performance Measurement	Base		Scenario 1A		Scenario 1B		Scenario 1C	
	Value	Unit of Measure	Value	% Change	Value	% Change	Value	% Change
<b>Mobility</b>								
Congestion (% of roads at LOS E or F)	14.1%	% of Roads	10.6%	24.6%	10.7%	23.9%	10.7%	24.1%
Congestion (hours of delay per day)	23,181.0	Hours	18,943	18.3%	19,162.7	17.3%	19,222	17.1%
Mode Share (percent of Trips)	759,319	Trips/Day	759,379	0.0%	759,473	0.0%	759,429	0.0%
Auto	88.1%	Percent of Trips	87.7%	0.5%	87.7%	0.5%	87.9%	0.3%
Transit	2.5%	Percent of Trips	2.9%	17.0%	2.9%	18.3%	2.7%	9.4%
Bike	2.7%	Percent of Trips	2.7%	-0.3%	2.7%	-0.2%	2.7%	0.1%
Walk	6.7%	Percent of Trips	6.7%	0.5%	6.7%	0.5%	6.7%	0.7%
Vehicle Mobility (vehicle miles traveled)	6,228,031.0	Miles/Day	6,167,134	1.0%	6,159,983	1.1%	6,166,174	1.0%
Vehicle Crashes (crashes per year)	2,865.0	Crashes/Year	2,837.0	1.0%	2,834.0	1.1%	2,837.0	1.0%
Bicycle Connectivity (% in largest connected area)	68.2%	% of largest area	80.2%	17.7%	85.3%	25.0%	85.3%	25.0%
<b>Economy</b>								
Access to Jobs (average travel time to work)	10.6	Minutes	10.4	2.0%	10.4	1.9%	10.4	1.8%
Transit Accessibility (total population within ¼ mile of transit stop) (2040)	67,185	People	71,276	6.1%	70,057	4.3%	69,677	3.7%
Transit Accessibility (total employment within ¼ mile of transit stop) (2040)	52,633	People	55,791	6.0%	55,239	5.0%	54,496	3.5%
<b>Environment</b>								
Habitat	1,775.5	Eco Logical Score/Mile	1,784.9	-0.5%	1,784.9	-0.5%	1,784.9	-0.5%
Air Quality (tons per year)	13,321.0	Tons/Year	13,239	0.6%	13,141	1.4%	13,231	0.7%
Water Quality (% change in stormwater/water pollutants) (tons per year)	1,079.1	Tons/Year	1,090.6	-1.1%	1,090.9	-1.1%	1,089.0	-0.9%
Flood Plain (acres of 100 year flood plain affected)	99.1	Acres	106.0	-7.0%	106.0	-7.0%	106.0	-7.0%
Historical (designated historic sites within 500 ft of projects)	1,141	# of Sites	1,181	-3.5%	1,182	-3.6%	1,170	-2.5%
Archeological (designated archeological sites within 500 ft of projects)	264	# of Sites	287	-8.7%	287	-8.7%	278	-5.3%
<b>Community</b>								
Land Uses Affected (# of parcels within 500 ft of projects)	35,061	Parcels	35,541	-1.4%	35,553	-1.4%	35,475	-1.2%
Residential	32,411	Parcels	32,682	-0.8%	32,690	-0.9%	32,663	-0.8%
Commercial/Industrial	1,267	Parcels	1,432	-13.0%	1,436	-13.3%	1,390	-9.7%
Parks	42	Parcels	42	0.0%	42	0.0%	42	0.0%
Educational/Religious/Charitable	343	Parcels	357	-4.1%	357	-4.1%	356	-3.8%
Agriculture or undeveloped	998	Parcels	1,028	-3.0%	1,028	-3.0%	1,024	-2.6%
<b>Environmental Justice and Title VI Populations with Transit Access (2010), within ¼ mile of transit stops</b>								
Total Minority with transit access	18,996	People	19,548	2.9%	19,495	2.6%	19,455	2.4%
Total 65 and over with transit access	5,135	People	5,564	8.4%	5,514	7.4%	5,426	5.7%
Total Limited English-Speaking with transit access	8,428	People	8,767	4.0%	8,730	3.6%	8,707	3.3%
Total Households with transit access	20,877	People	22,009	5.4%	21,895	4.9%	21,737	4.1%
Total Household Income > \$25K with transit access	6,564	People	6,682	1.8%	6,665	1.5%	6,635	1.1%
<b>Environmental Justice and Title VI Populations potential impacts due to projects (2010)</b>								
Total Minority impacted	28,812	People	29,288	1.7%	29,298	1.7%	29,175	1.3%
Total 65 and over impacted	10,658	People	11,002	3.2%	11,009	3.3%	10,942	2.7%
Total Limited English-Speaking impacted	13,427	People	13,657	1.7%	13,660	1.7%	13,595	1.3%
Total Households impacted	37,119	People	37,963	2.3%	38,026	2.4%	37,827	1.9%
Total Household Income Less than \$25,000 impacted	9,287	People	9,504	2.3%	9,509	2.4%	9,485	2.1%

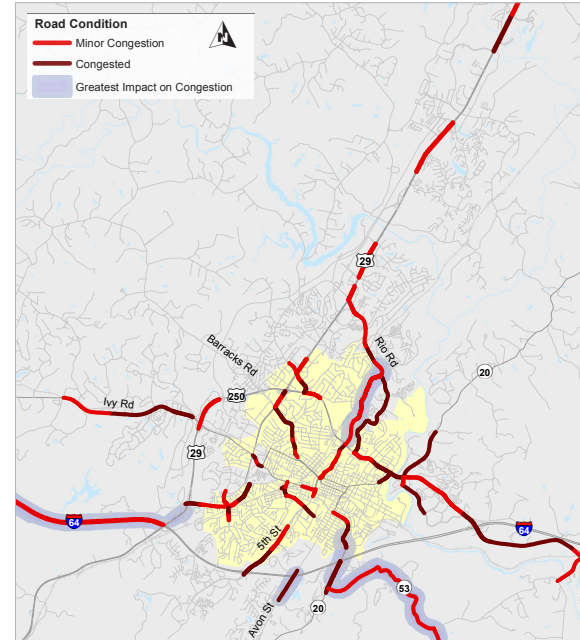
## » Roadway Congestion Analysis

In addition to the performance measurement analysis, roadway projects were assessed based on how they impacted congestion. Figures 7-32, 7-33, and 7-34 below illustrate the level of congestion expected with each scenario.

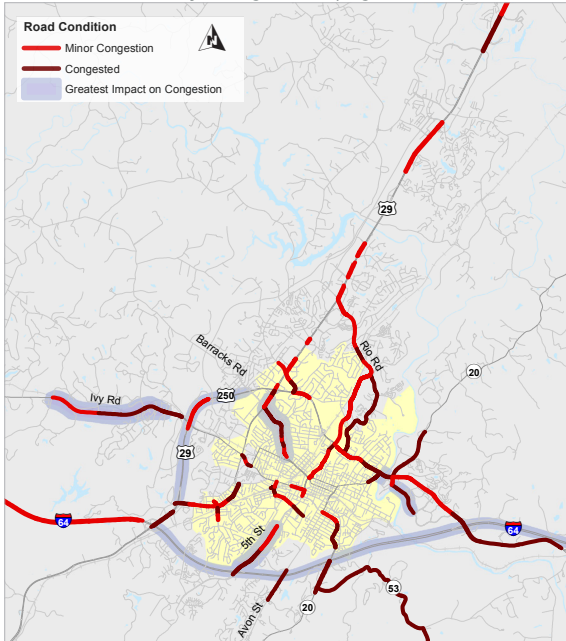
**2040 Base Scenario Daily Congestion (Figure 7-17)**



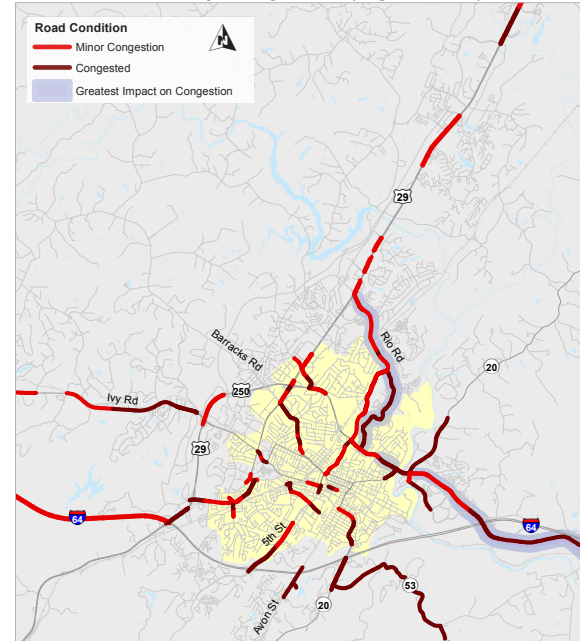
**Scenario 3A Daily Congestion (Figure 7-32)**



**Scenario3B Daily Congestion (Figure 7-33)**



**Scenario 3C Daily Congestion (Figure 7-34)**



► **The light purple highlighted areas indicate roads that show significant change in congestion from the 2040 Base Scenario and the other scenarios in this round.** The thicker dark red lines on the congestion map indicate congested road links, and the thinner light red lines indicate roads that may experience congestion, especially during peak travel times (7 to 9 a.m. and 4 to 6 p.m.). The purpose of this mapping is to identify roads with congestion levels unique to a particular scenario. In some scenarios, congestion in the highlighted areas improves or is completely eliminated compared with the Base or other scenarios. In contrast, the level of congestion may increase compared to the base or other scenarios.

## » Transit Ridership Analysis

Transit projects were assessed based on the increase in ridership to both the proposed route and system-wide. [Table 7-17](#) compares the transit ridership for each route by the scenario.

Round 3 Transit Analysis (Table 7-17)

	ROUTE	2040 BASE SCENARIO	SCENARIO 3A	SCENARIO 3B	SCENARIO 3C
EXISTING CAT ROUTES	Route 1A	76	81	68	64
	Route 1B	192	209	208	197
	Route 2A	107	151	102	95
	Route 2B	224	247	247	235
	Route 3	80	95	107	93
	Route 4	544	583	602	562
	Route 5	819	876		745
	Route 6	188	204	217	197
	Route 7**	3,784		4,698	4,759
	Route 8	383	392	439	508
	Route 9	281	285	237	270
	Route 10	353	356		
	Route 11**		253	211	254
	Night Route 21	50	54	52	50
	Night Route 22	92	103	114	107
	Night Route 23	27	29	27	27
	Night Route 24	17	15	12	12
Free Trolley**	2,895	2,633	2,784	2,776	
PROPOSED CAT ROUTES	BRT on US 29 from NGIC to downtown (15 min headway)		6,932		
	Crozet Route (peak-hour service)		155		
	BRT on John Warner Pkwy from NGIC to downtown (15 min)			2,039	
	Route 10 with dedicated lane on Free Bridge for transit and HOV3+ (15/30 min)			1,009	
	Route 5 extended to UVA's Health Center (30 min)			2,093	
	Route 10 with dedicated lane on Free Bridge for transit only (15/30 min)				923
	Airport Route from Fashion Square Mall (15/30 min headway)				880
<b>Total Daily Passengers</b>	<b>10,110</b>	<b>13,651</b>	<b>15,266</b>	<b>12,753</b>	

## » Round 3 Conclusions

This final round of the analysis process further refined successful projects, including both roadway and transit. The third round scenario analysis allowed for the honing in on which roadway and transit projects provided the most cumulative benefit for the community. Following the conclusion of these scenarios, the data obtained during the process helped shape the final Preferred Scenario.

## ► Preferred Scenario

Due to the success of the roadway projects evaluated in the third round of scenarios, the Preferred Scenario maintained many of these same projects. At the request of the MPO's Committees, the Crozet transit service was maintained from Scenario 3A. Similarly, the proposed BRT route along US 29 from NGIC to downtown generated a substantial increase in ridership in Scenario 3A, and was carried over to the Preferred Scenario. Because the existing CAT Route 7 overlaps with the proposed BRT route, it was omitted from the preferred scenario. The success of increased frequency for the Route 10 service is contingent on providing dedicated lanes and signal prioritization for transit to cross Free Bridge. If buses cannot avoid congestion and waiting at traffic signals, it will not be possible to increase the frequency of service, as the buses will be stuck too long in traffic. There was no change in transit ridership system-wide in Scenario 3B (with the transit and HOV-3 lane) or Scenario 3C (with the transit-only lane). Consequently, the less expensive alternative (the transit-only lane on Free Bridge) was selected to continue in the Preferred Scenario. (Refer to [Table 7-18](#) for the project list and descriptions and [Figure 7-35](#) for the project locations).

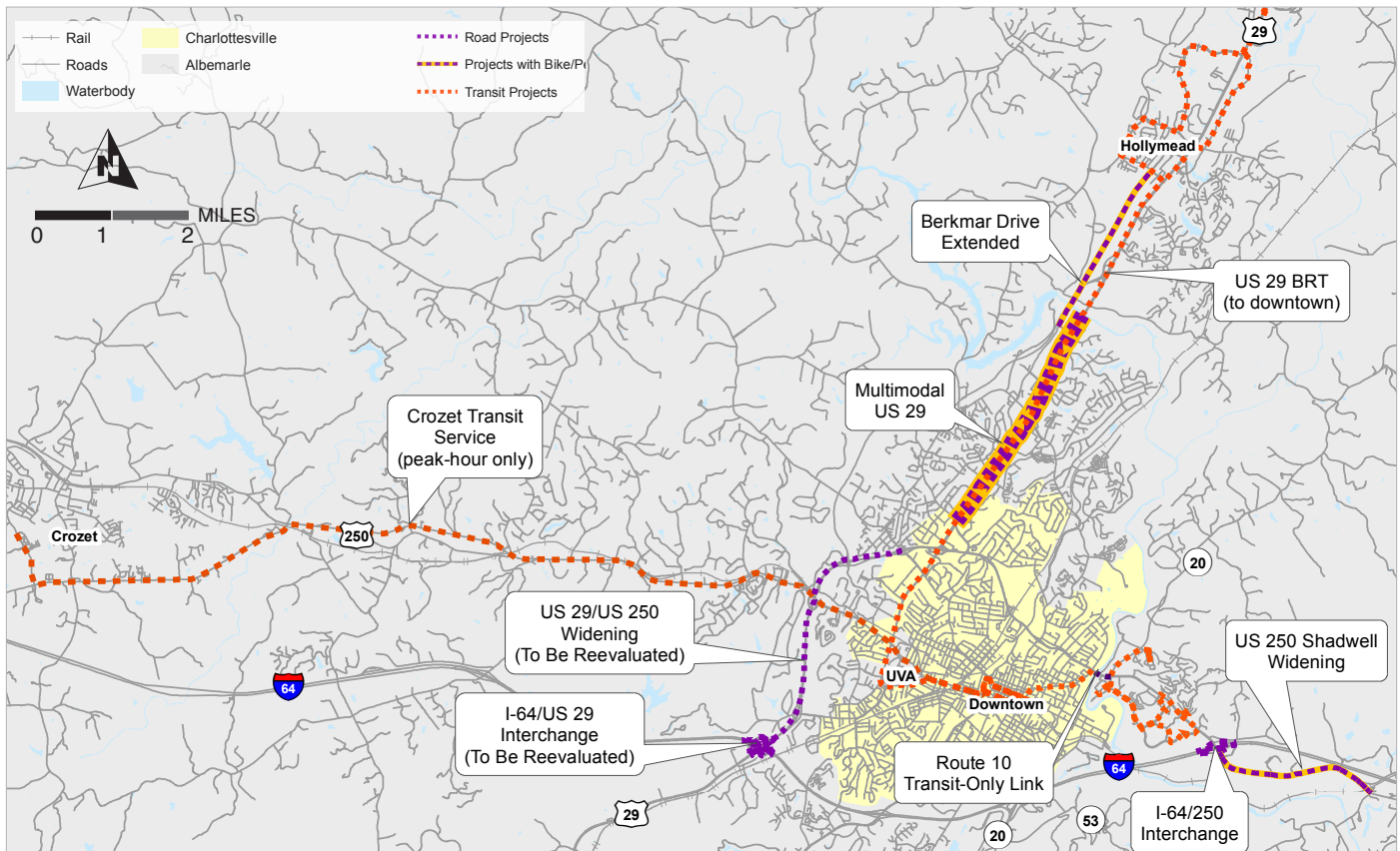
\*\* Denotes changes to CAT's system as of August 3, 2013. These changes were added in the third round of scenarios.

Preferred Scenario Description (Table 7-18)

PROJECT	COST (IN MILLIONS)	DESCRIPTION
US 250/29 Widening	To Be Reevaluated	Widening US 250/29 from Barracks Rd to I-64 interchange. This project is being reevaluated by VDOT and MPO Staff in order to have a more appropriate scope and better balanced project costs.
I-64/29 Interchange	\$128 Million	Increase capacity of the I-64/US29 interchange and rebuild the interchange to be safer for higher volumes of traffic. This project is being reevaluated by VDOT and MPO Staff in order to have a more appropriate scope and better balanced project costs.
Multimodal US 29	\$46.3 Million	Reshape Route 29, bypassed by the western bypass and bound by the South Fork of the Rivanna River at the north and Hydraulic Road at the south, into a multimodal transportation corridor. The improvement would also include new signalization to facilitate bike and pedestrian movement, as well as signal preference for BRT. Bike and pedestrian improvements would be implemented on facilities adjacent to US 29. These improvements will also include bike and pedestrian crossings across US 29 at key locations (both at-grade and grade separated).
BRT US/Express Bus 29: NGIC to UVA to Downtown	\$112 Million	Bus Rapid Transit (with dedicated facilities on US 29) and express bus off US29. Would run at 15 minute headways all day with key stops at NGIC, The Airport, Fashion Sq., UVA and Downtown. Preemptive signals would be located at all intersections where service passed. <i>(With this version of the BRT/Express Bus existing Route 7 service would be replaced. The costs here reflect no long having to pay for Route 7 service.)</i>
Widening Route 250 from exit 124	\$21.2 Million	Widen to 4 lanes, US 250 from Shadwell Exit (Exit 124) to N Milton Road, as discussed in the Village of Rivanna plan. Would include bike and pedestrian facilities.
I-64/US 250 Interchange Exit 124	\$95.5 Million	Increase capacity and rebuild the interchange to be safer for higher volumes of traffic.
Berkmar Drive Extended	\$56.9 Million	Extend existing roadway from current northern terminus of Hilton Heights Road over the South Fork of the Rivanna River to the North Fork of the Rivanna River.
Peak hour service Crozet	\$33 Million	Transit Service connecting Crozet and Downtown Charlottesville. Service would only occur during peak-hours (7am to 10am) and (4pm to 7pm). Service would run on 30 minute headways.
Bridge Crossing Route 10	\$3.2 Million	Transit-Only Lane (one for BOTH directions) on US 250 from High Street to Stony Point Road (also includes bike and pedestrian facilities). Also bus service signal preemption at intersections. Service would run 15 minutes during the peak hours and to 30 minutes during off-peak hours. <i>(The cost listed here only reflect additional costs. The cost of running the existing Route 10 for 20 years has been subtracted out.)</i>

\*Costs shown for road projects are planning level estimates and subject to change. \*\*Costs shown for transit projects are based on an estimation process developed by MPO staff. This process does not include certain kinds of funding features, such as government subsidies, because they cannot be reasonably estimated.

Preferred Scenario Projects (Figure 7-35)





## Preferred Scenario Analysis: Findings

Overall, the Preferred Scenario performs well in the mobility, economy, and Environmental Justice community performance measures.

### » *Project-specific Findings and Conclusions*

The success of each project in the first round of analysis is detailed in the list below.

- **US 29/US 250 Widening** is expected to either alleviate or reduce the congestion on this portion of the road. This project has been viewed as being highly successful; however, given the estimated cost of this project, MPO Committees and staff elected to work with VDOT to reevaluate how this project will proceed in the LRTP. It will likely be phased to make as much funding available to other projects as possible while maintaining the US 29/US 250 Widening as a priority. Therefore, the plan may only include the Preliminary Engineering and potentially Right-of-Way phases.
- **Berkmar Drive Extended** provides additional capacity parallel to US 29. This is particularly beneficial when combined with the Multimodal US 29 project that removes a lane of capacity in each direction.
- **US 250 Shadwell Widening** is expected to reduce the congestion on Route 53 and US 250 although these roads will likely still experience congestion. The additional capacity on this portion of US 250 should attract trips from the Lake Monticello area to US 250 and Interstate 64 rather than using Route 53 which was considered to be less safe than US 250 or Interstate 64.

- **Multimodal US 29** would likely result in minor congestion in a few areas of US 29 during peak-hour travel.
- **BRT/Express bus on US 29 (NGIC to downtown)** is expected to increase ridership through the US 29 corridor and system-wide.
- **Route 10 (Transit-only lane)** is expected to attract almost three times the number of passengers on Route 10 as in the Base Scenario.
- **Peak-hour service Crozet route** is expected to result in a slight increase in ridership system-wide. However, this was viewed as a successful route given the limited service provided and the number of daily passengers estimated by the model.
- **New Route 11** was added during the third round of scenarios to more accurately represent the changes to CAT's structure.

### » *Performance Measurement Analysis*

Table 7-19 illustrates the results of the Preferred Scenario analysis, based on the performance measures. Cells highlighted in shades of green indicate measures for which the scenario is moving toward the region's goals. Cells highlighted in shades of red indicate measures for which the scenario is moving away from the region's goals. The darker the shade, the further the scenario moved toward or away from the region's goals.

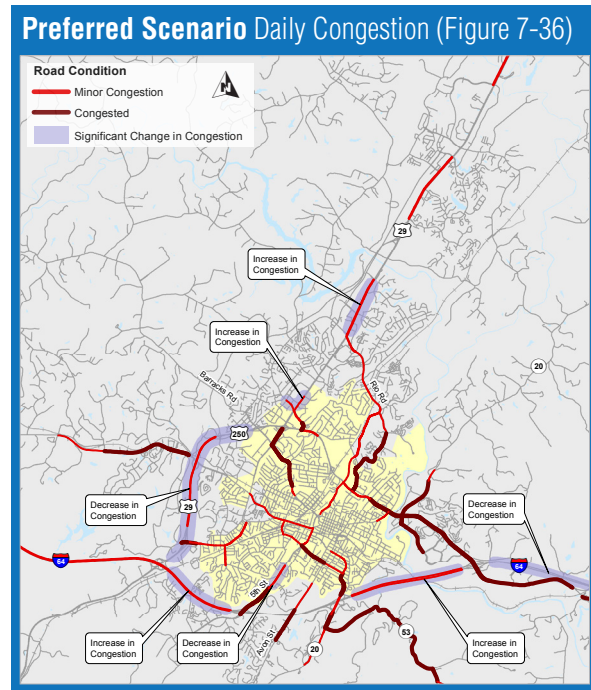
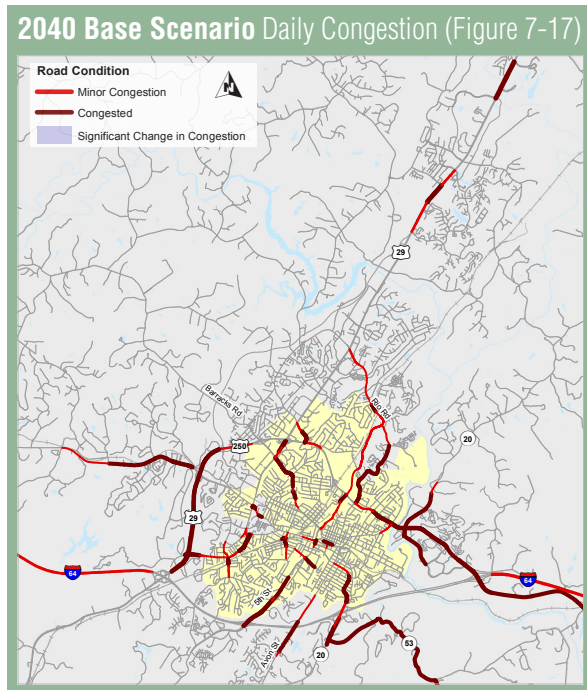


Preferred Scenario Analysis Results (Table 7-19)

Performance Measurement	Base		Preferred Scenario	
	Value	Unit of Measure	Value	% Change
<b>Mobility</b>				
Congestion (% of roads at LOS E or F)	14.1%	% of Roads	12.2%	13.0%
Congestion (hours of delay per day)	23,181.0	Hours	20,060	13.5%
Mode Share (percent of Trips)	759,319	Trips/Day	759,356	0.0%
Auto	88.1%	Percent of Trips	87.7%	0.5%
Transit	2.5%	Percent of Trips	2.9%	15.4%
Bike	2.7%	Percent of Trips	2.7%	-3.0%
Walk	6.7%	Percent of Trips	6.7%	-0.3%
Vehicle Mobility (vehicle miles traveled)	6,228,031	Miles/Day	6,198,256	0.5%
Vehicle Crashes (crashes per year)	2,865.0	Crashes/Year	2,851	0.5%
Bicycle Connectivity (% in largest connected area)	68.2%	% of largest area	81.8%	19.9%
<b>Economy</b>				
Access to Jobs (average travel time to work)	10.6	Minutes	10.5	0.9%
Transit Accessibility (total population within ¼ mile of transit stop) (2040)	67,185	People	71,276	6.1%
Transit Accessibility (total employment within ¼ mile of transit stop) (2040)	52,633	People	55,791	6.0%
<b>Environment</b>				
Habitat	1,775.5	Eco Logical Score/Mile	1,775	0.0%
Air Quality (tons per year)	13,321	Tons/Year	13,358	-0.3%
Water Quality (% change in stormwater/water pollutants) (tons per year)	1,079.1	Tons/Year	1,089	-1.0%
Flood Plain (acres of 100 year flood plain affected)	99.1	Acres	106.0	-7.0%
Historical (designated historic sites within 500 ft of projects)	1,141	# of Sites	1,175	-3.0%
Archeological (designated archeological sites within 500 ft of projects)	264	# of Sites	286	-8.3%
<b>Community</b>				
Land Uses Affected (# of parcels within 500 ft of projects)	35,061	Parcels	35,440	-1.1%
Residential	32,411	Parcels	32,646	-0.7%
Commercial/Industrial	1,267	Parcels	1,351	-6.6%
Parks	42	Parcels	42	0.0%
Educational/Religious/Charitable	343	Parcels	355	-3.5%
Agriculture or undeveloped	998	Parcels	1,042	-4.4%
<b>Environmental Justice and Title VI Populations with Transit Access (2010), within ¼ mile of transit stops</b>				
Total Minority with transit access	18,996	People	19,548	2.9%
Total 65 and over with transit access	5,135	People	5,564	8.4%
Total Limited English-Speaking with transit access	8,428	People	8,888	5.5%
Total Households with transit access	20,877	People	22,009	5.4%
Total Household Income > \$25K with transit access	6,564	People	6,682	1.8%
<b>Environmental Justice and Title VI Populations potential impacts due to projects (2010)</b>				
Total Minority impacted	28,812	People	29,176	1.3%
Total 65 and over impacted	10,658	People	10,966	2.9%
Total Limited English-Speaking impacted	13,427	People	13,516	0.7%
Total Households impacted	37,119	People	37,895	2.1%
Total Household Income Less than \$25,000 impacted	9,287	People	9,500	2.3%

## » Roadway Congestion Analysis

Similar to the previous scenarios, the Preferred Scenario was assessed based on how it was expected to impact congestion. Figure 7-36 illustrates the level of congestion expected with the Preferred Scenario.



## » Transit Ridership Analysis

Transit projects were assessed based on the increase in ridership to both the proposed route and system-wide. [Table 7-20](#) compares the transit ridership for each route by the scenario.

Preferred Scenario Transit Analysis (Table 7-20)

	ROUTE	2040 BASE SCENARIO	PREFERRED SCENARIO
EXISTING CAT ROUTES	Route 1A	76	70
	Route 1B	192	214
	Route 2A	107	118
	Route 2B	224	255
	Route 3	80	103
	Route 4	544	602
	Route 5	819	808
	Route 6	188	213
	Route 7**	3,784	
	Route 8	383	412
	Route 9	281	293
	Route 10	353	
	Route 11**		230
	Night Route 21	50	54
	Night Route 22	92	103
	Night Route 23	27	29
	Night Route 24	17	13
Free Trolley**	2,895	2,740	
PROPOSED CAT ROUTES	BRT on US 29 from NGIC to downtown (15 min headway)		7,034
	Crozet Route (peak-hour service)		174
	Route 10 with dedicated lane on Free Bridge for transit only (15/30 min)		1,005
	<b>Total Daily Passengers</b>	<b>10,110</b>	<b>14,469</b>

\*\* Denotes changes to CAT's system as of August 3, 2013. These changes were added in the third round of scenarios.

## » Preferred Scenario Conclusions

At the end of October the MPO hosted a public outreach event to gather feedback from the public. During the month of November the DRAFT Preferred Scenario analysis and comments from the public were presented to the MPO Committees for review and comments. At the Policy Board meeting November 20, 2013, the board voted to approve the DRAFT Preferred Scenario as the Approved Scenario for inclusion in the Long Range Transportation Plan. Once the Preferred Scenario was complete the processed moved forward into the fiscal-constraint analysis.

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## ► Conclusion

The seven-month iterative analysis of scenarios provided staff and decision-makers with an understanding of how various road and transit projects would potentially impact the 2040 transportation network. Eight scenarios were evaluated in three rounds of analyses prior to the development of the Preferred Scenario. As discussed in Chapter 5, sixteen performance measures were employed to evaluate each scenario. In addition, roadway projects were assessed based on how they were expected to affect congestion and transit projects were further gauged based on their anticipated benefits to the transit system. Over the course of this analysis, five roadway projects and three transit projects demonstrated potential success in accomplishing the region's future transportation vision.

The MPO Policy Board approved eight projects as their preferred scenario at their meeting on November 20, 2013. These projects will progress to the fiscal constraint process as discussed in Chapter 9. The estimated revenue forecast will not allow all eight projects to be built in their entirety. As a result, staff will work with VDOT to determine which projects or phases of projects it can reasonably afford to implement over the life of this plan. The findings from this analysis will further assist in prioritizing the projects and phasing of projects as the plan is fiscally constrained.