

Chapter V

2045 State of the System

In this chapter, the reader will find:

- **An understanding** of trends that will influence the MPO transportation network in the future
- **A vision** for emerging mobility in the region to guide MPO and local decision-making related to transportation
- **Clarity** on unknowns and how the 2045 LRTP addressed an uncertain future

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2045 State of the System

2045 recommendations respond to existing and projected transportation needs across all modes of travel. **Chapter III** explores existing conditions of the region’s transportation network, whereas the following describes future needs. The Travel Demand Model (TDM) produced 2045 forecasts that help to identify roadway needs. This model combines a digital network of roadways with forecasts of population and employment to develop estimated traffic volumes along major corridors of the region’s road network. These estimated traffic volumes are then compared with the capacity of the roads in a volume-to-capacity (V/C) ratio to identify potential roadway deficiencies.

Chapter V also explores a Regional Concept of Emerging Mobility for the Danville MPO. During the 2045 process, the Central Virginia and Danville MPOs held a joint workshop on emerging mobility, hosted by FHWA. The following documents findings from that joint discussion. These considerations are intended to guide MPO activities with the study of future transportation projects and development of policies.

Finally, this chapter acknowledges certain unknowns about future transportation needs. Changes in technology, demographics, and economic trends create uncertainties for a planning horizon that spans over twenty years. The intent of this section is to recognize unknowns and guide MPO officials with decision-making in times of uncertainty.

2045 No-Build Forecasts (E+C)

The analysis starts by evaluating the forecasted year 2045 population and employment levels with the transportation network that includes existing and programmed improvements - the No Build Network. The No-Build roadway network is the existing roadway system plus projects that are committed to be constructed based on available funding (existing + committed). Projects added to the existing network to comprise the No-Build network are typically those included in the VDOT Six-Year Improvement Program (SYIP). Since improvements are included in the travel demand model network, the programmed improvements that are included are limited to those that add capacity to the roadway system, such as additional lanes to existing roadways or roadways on new alignments.

As part of the Update to the Danville-Pittsylvania Long Range Transportation Plan, consultants developed forecasts of population and employment. Due to the decline of population in the Danville-Pittsylvania urbanized area in recent decades, the forecasts used in initial application of the travel demand model were as follows (year 2016 baseline estimates shown for comparison purposes):

Table 2 2045 TDM Forecasted Figures
Source: Danville Travel Demand Model

Data Point	2016	2045
Population	64,584	53,417
Households	27,957	22,973
Total Employment	29,364	34,647

2045 TRAVEL DEMAND MODEL



The Danville Model is a fully functional, fully calibrated model that appears to validate well at the regional level. The model is appropriate for use at all planning levels for items such as long-range plan development, corridor studies and other macro level uses.

The Danville Model is a 3-step model encompassing the trip generation, trip distribution and highway assignment steps. A Model Users’ Guide provides information on folder layout, model steps and model execution.

The model was set up and run for both the 2016 base year and the 2045 future year. No issues were encountered and all output made reasonable sense.



2045 No-Build Alternative System Deficiencies

Figure 50 shows the location of deficiencies forecasted to occur on the No-Build Alternative network. As the exhibit shows, very few links in the road network are forecasted to experience any significant level of congestion in 2045. Moderate congestion ($V/C = 0.5$ to 0.8), which is typically regarded as an acceptable level of road operation, is expected along a few of the primary corridors in the MPO. Notable examples include:

- Mount Cross Rd (Rt 750): between Womack Dr and Golf Club Rd
- Piney Forest Rd (US 29 Bus): between Piedmont Dr and Franklin Turnpike
- Richmond Blvd (US 360): between Main St and the Danville Expressway
- Franklin Turnpike (Rt 41): between Orphanage Rd and Golf Club Rd
- Berry Hill Rd (US 311): between Martinsville Hwy (US 58 Bus) and Loomfixer Lake Rd
- US 29: north of the Danville Expressway—US 29 Business interchange

Heavy congestion ($V/C > 0.8$) is only expected near the intersection of Mount Cross Rd (Rt 750) and Dimon Dr, as well as one isolated link of Mount Cross Rd leading to its intersection with Riverside Dr. Considering the scale of the modeling process, the localized links exhibiting deficient capacity by themselves do not indicate a system level need for corridor improvements. A system level need would be indicated if a corridor (comprised of several links) were to exhibit a deficient level of service. Instead, analysis of operations in the vicinity of each deficient link would be an appropriate methodology for determining if improvements are needed.

WHAT IS VOLUME TO CAPACITY RATIO?

V/C measures the number of vehicles a road segment carries compared to how many vehicles it could carry based on its design. V/C is expressed as a ratio. For example, a road with a V/C of 1.0 would be a road that carries as many vehicles as it is designed to carry, whereas a V/C ratio of 0.50 would mean that half as many vehicles move on that road as it could carry.

The Project Evaluation Tool, described in **Chapter VI**, categorized V/C according to the following thresholds:

- High Congestion: V/C greater than 1.1
- Medium Congestion: V/C between 0.8 and 1.1
- Low Congestion: V/C less than 0.08

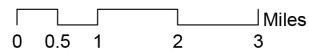
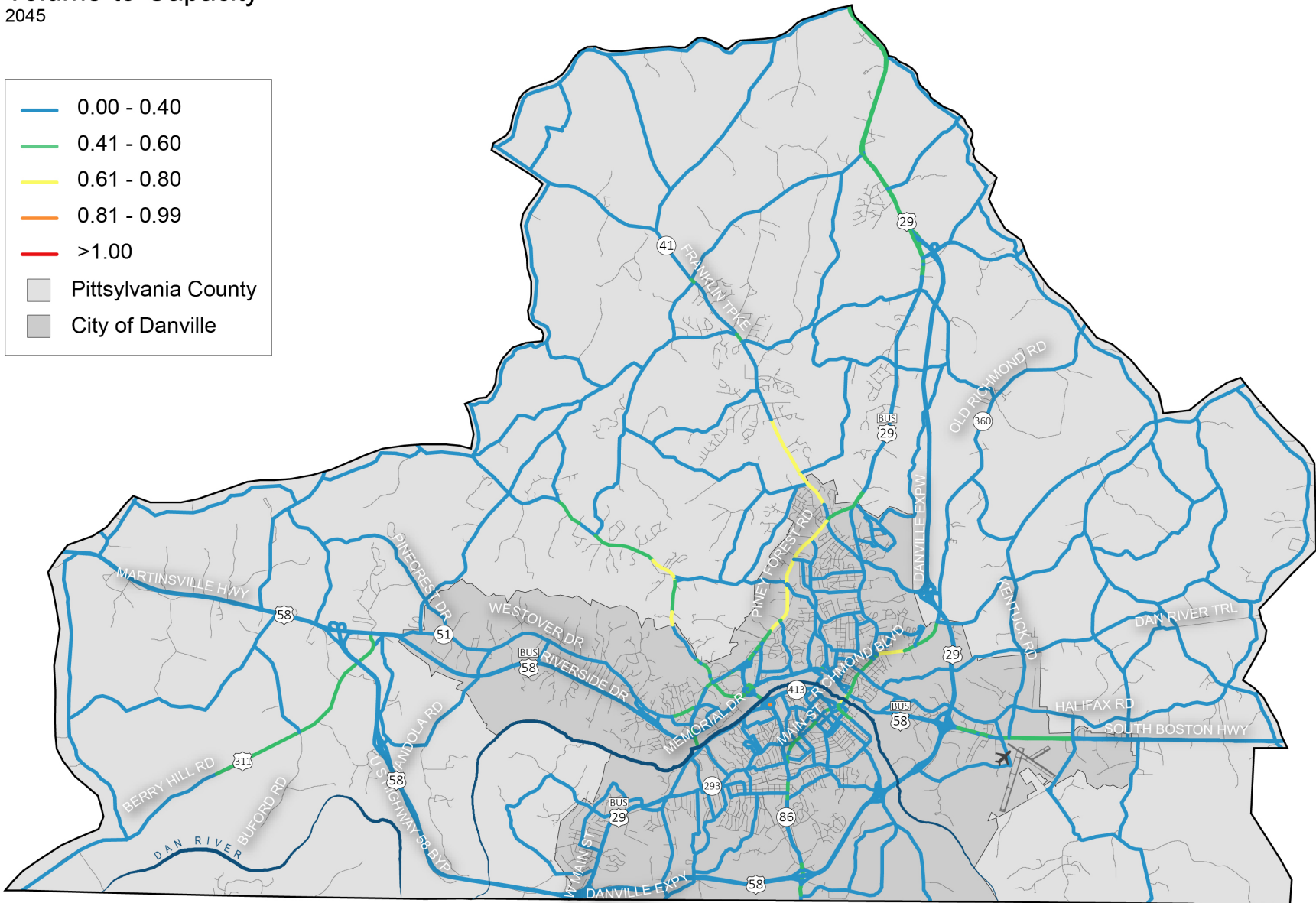
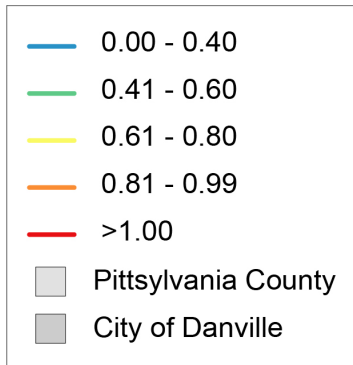
Growth Pattern Analysis

The TDM model suggests that the existing transportation infrastructure will be sufficient to facilitate traffic movement without significant congestion in 2045. This finding offers the Danville MPO a unique and important opportunity to be proactive, rather than reactive, in its selection of proposed projects. While many MPOs must direct all their available resources to responding to deficiencies in their existing network, the Danville MPO can instead direct these resources to new projects and infrastructure that will help generate new opportunities.

One strategy that can be used in this approach is to identify specific areas or locations within the MPO that are expected to help revitalize the city and the region. Two prominent examples in the Danville MPO are the downtown River District and the Southern Virginia Megasite at Berry Hill.

Figure 50 Forecasted deficiencies in the No Build Alternative
 Danville MPO Travel Demand Model

Volume-to-Capacity 2045



DANVILLE METROPOLITAN PLANNING AREA



Danville River District

The model used to assess future transportation needs predicts that most areas within the City of Danville will either experience no growth or lose population between 2020 and 2045. Nearly all of the areas that are expected to experience growth, however, are in the downtown River District and the surrounding historic neighborhoods. This growth reflects significant investments that the city and local developers have made in this area in recent years, such as the conversion of warehouses into loft apartments, the reconstruction of the Main Street Plaza, the development of attractions like the Carrington Pavilion, the Danville Science Center, and Farmer’s Market building, and the creation of the Riverwalk Trail system. The MPO can continue to support growth in these areas by providing new and improved facilities and accommodations for urban transportation modes such as biking, walking, and transit.

Another key consideration for the future of this area is the possible development of a casino in Danville. In 2019, the Virginia General Assembly passed SB 1126, which permits casino gaming in selected areas of the state, including Danville. Sites such as the Schoolfield property on West Main St and the Dan River Mills building on Memorial Dr have been proposed as possible locations for a casino (Figure 51). The MPO may not only need to invest in improvements to provide access to these sites if they are developed, but should also consider improvements that will allow visitors to easily travel between the casinos and other businesses and attractions in the River District.

Southern Virginia Mega Site at Berry Hill

Another new development strongly supported by leaders in the region is the Southern Virginia Megasite at Berry Hill, a large industrial park that is being developed adjacent to Berry Hill Rd (US 311) near Oak Hill Rd (Rt 862), approximately 15 miles west of downtown Danville (Figure 52). The Danville MPO has the opportunity to make investments that would establish this as a truly intermodal site—facilitating the movement of freight through enhanced connections between highway, air, and train travel, as well as connecting the park to Danville through modes such as transit to increase accessibility for local residents who would work there.

Figure 51 Casino Development at the Schoolfield Site on West Main Street could significantly influence the surrounding transportation network.

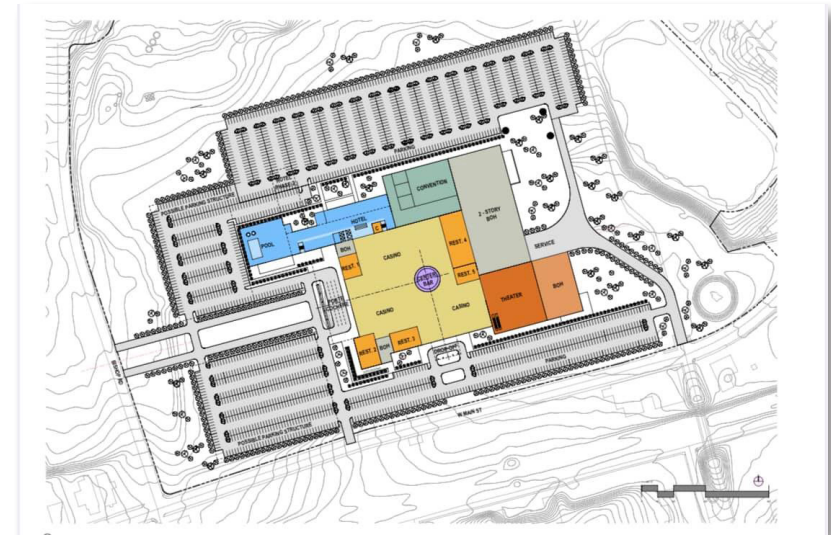
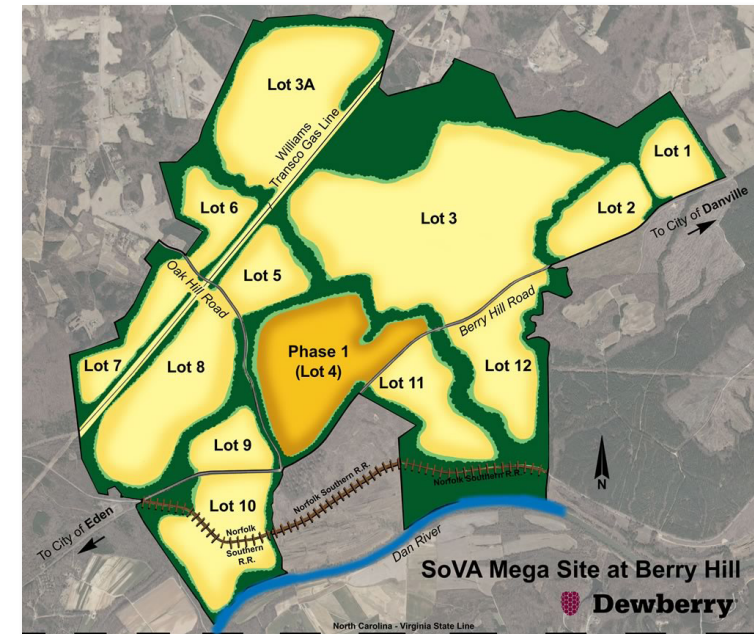


Figure 52 Transportation Improvements for the SoVA Mega Site at Berry Hill received the highest economic development score in the state for Virginia’s SMART SCALE funding methodology



A Regional Concept of Emerging Mobility

Public comments received during the LRTP study effort indicate that Danville residents support the continued enhancement of alternative modes of transportation such as biking, walking, and transit. These improvements may include new sidewalks, bike lanes, and transit stops in the city's neighborhoods and business districts, especially in areas such as the River District and its surrounding neighborhoods. Improvements might also include the continued improvement and extension of off-road trails and paths such as the Riverwalk Trail.

Emerging Mobility

Support for alternative transportation modes such as these are included within a broader discussion currently taking place in transportation planning around the subject of "emerging mobility." Emerging mobility commonly refers to innovative mobility options such as bike/scooter share, public transit, and its innovations, rideshare services such as Uber and Lyft, carpool/vanpool, and pedestrian and bicycle infrastructure. On March 5, 2020, the Danville MPO collaborated with the Lynchburg Area MPO to participate in a workshop facilitated by the Federal Highway Administration (FHWA), and that agency's consultant, ICF, for guidance on how to integrate emerging mobility with Transportation Demand Management (TDM).

Transportation Demand Management essentially refers to managing demand of the existing transportation system by intentionally shifting user trips from one mode to another, such as from the single-occupancy automobile to public transit or carpool; by reducing modal travel demand at certain time periods using strategies which include dynamic tolling, congestion pricing, or staggered work schedules; and eliminating commuter trips entirely via telework.

FHWA Mobility Workshop

In addition to MPO staff and the FHWA facilitators, the workshop was attended by representatives of Danville Transit, Greater Lynchburg Transit Company (GLTC), the City of Danville, The Health Collaborative, RIDE Solutions TDM organization, FHWA division office staff, EPR consultants, the Virginia Department of Transportation (VDOT), and the Central Virginia Alliance for Community Living, Inc.

The facilitators presented to the group the principles of combining emerging mobility with TDM, the goal of this process being the development of a Regional Concept of Emerging Mobility (RCEM) by the Danville and Lynchburg MPOs. RCEM is a blueprint for how to promote mobility within a defined area by leveraging existing resources. Two main foundations of an effective RCEM include the following:

- 1. Existing Assets:** Making the most efficient use of existing assets and resources, such as transportation infrastructure and organizational programs.
- 2. Coordination:** Numerous entities within a region often operate within a "silo" meaning that they operate independently of one another. This can result in inefficiencies, since similar entities may be duplicating efforts toward achieving certain goals when these agencies could be coordinating their individual efforts, thereby making wiser use of existing resources. For instance, in a large metro area, multiple service-related organizations serving older individuals and/or those with disabilities may operate their own vehicles and serve their own clients within the same neighborhood. If they all coordinated their activities and possibly involved the local or regional transit agency, they may be able to serve a greater number of clients utilizing the same amount of resources.

During the workshop, representatives broke out into groups according to region to create basic RCEM outlines for their respective regions. Throughout this session, the Danville group developed an RCEM outline for two aspects of the regional transportation system: more effectively integrating Danville Transit with other services and enhancing the active transportation (bicycling/pedestrian) network. The following recommendations expand on these outlines.

Vision

The Danville Metropolitan Planning Area (MPA) will evolve into a region having an interconnected multimodal transportation system to enable residents and visitors to travel within and outside of the region via various means and modes to improve the quality of life while improving the prospects to attract future residents and businesses.

Goal of Integration

Integrate multiple transportation alternatives (examples: Danville Transit's fixed-route service, Dial-a-Ride, Handivan service, and Pittsylvania/Halifax County commuter service, the new Virginia Breeze routes) to develop a coordinated, user-friendly regional and statewide transportation system. Additionally, expand on the region's efforts to promote active transportation, integrating this infrastructure with public transit, intercity services, and other modes.

Strategy 1: Approach

- **Technology:** Develop a combined smart phone/PC app which displays all coordinated transportation options including layover durations and cost per segment/mode to enable users to seamlessly plan travel within and outside of the region from trip origin to destination point. As resources permit, enhance Danville Transit's Bus Locator System to be used as a smart phone app and to show estimated arrival times of transit vehicles. Work with DRPT to encourage that agency to develop a similar system to integrate with Danville Transit.
- **Centers of Transit:** Closely align scheduled service (fixed transit routes, Virginia Breeze) to arrive at a central location (Danville Transit Center) to maximize the ease of route/mode transfer. Additionally, if Amtrak adds service more convenient to the traveling public, Danville Transit is encouraged to establish a shuttle or appropriately time an existing transit route to link the Danville Transit Center with the Danville Amtrak station (FIGURE V-3).

Strategy 2: Physical Improvements

- **Park & Rides:** Danville Transit and the City of Danville are encouraged to work with Pittsylvania County and VDOT for installation of Park & Ride facilities at or in close proximity to the towns of Chatham, Gretna, and Hurt, as well as U.S. Route 29, so as to establish central locations for Danville Transit Pittsylvania County commuter service pick-up and drop-off. The construction of such facilities is consistent with the VTrans 2045 identified need for TDM along the U.S. Route 29 corridor.

Figure 53 Sheltered Bus Stop Adjacent to Amtrak Station



- **The River District Bicycle and Pedestrian Study:** Adopted by the Danville Metropolitan Planning Organization (MPO) in May 2017, this study recommends the installation of bicycle commuter stations at key destinations of Danville's River District (FIGURE V-5). Danville Transit is encouraged to work with the City of Danville Departments of Public Works and Community Development to install a bicycle commuter station at or near the Danville Transit Center, as recommended within the Study. Additionally, the Study also recommends that a bicycle commuter station should be installed at the Danville Community Market; this should be seriously considered especially if Amtrak expands passenger rail service to include times that are more convenient for the traveling public. Furthermore, bicycle commuter stations should be located at Park & Ride lots in the towns of Chatham, Gretna, and Hurt if constructed to facilitate multimodal transportation.
- **Wayfinding & Signage:** Install and/or improve signage at strategic locations to effectively communicate locations for accessing various transportation modes/alternatives. If Park & Ride lots are constructed in the towns of Chatham, Gretna, and Hurt, RIDE Solutions is encouraged to install "Try Carpooling" signage at these locations to promote carpooling. Such signage is consistent with the VTrans 2045 identified need for TDM along the U.S. Route 29 corridor.
- **Transit Stop Improvements:** Danville Transit and the City of Danville are encouraged to install seating and shelters at bus stops, particularly those which are heavily used and located in disadvantaged communities to a) provide safe, comfortable waiting areas for transit users, and b) to further encourage use of the transit system.
- **Multimodal Focus:** The City of Danville and the urbanized portion of Pittsylvania County are encouraged to fully integrate the bicycle and pedestrian network together with transit and other modes.

- **Riverside Drive Studies:** Utilize the Riverside Drive Corridor Improvement Study as a basis to install sidewalks and bus bays along the corridor. This can be complemented with other transit improvements such as public bus shelters and seating at busy stops.
- **Westover Drive Study:** The City of Danville is encouraged to implement recommendations from the Westover Drive Road Diet Feasibility Assessment and explore opportunities to connect/extend bicycle infrastructure from this corridor to surrounding neighborhoods and roadways.
- **Riverwalk Trail Improvements:** Implement recommendations within the updated City of Danville Trails Plan to link the trail with surrounding neighborhoods and activity centers. This effort will be critical to establishing the Danville Riverwalk Trail as a transportation asset in addition to a recreational resource (FIGURE V-6). Efforts are being made by the City to obtain

Figure 54 Desired Bicycle and Pedestrian Destinations Identified in the River District Bicycle and Pedestrian Study



funding to provide pedestrian infrastructure in the Piedmont Drive shopping area; the City is also encouraged to link this retail-intensive location to the Danville Riverwalk Trail via a trail spur.

- **Bike Signage:** “Beaches to Bluegrass Trail” and/or “Share the Road” signage is recommended to be placed on the Beaches to Bluegrass Trail/Priority Corridor through western Danville and Pittsylvania County to promote utilization of the network via active transportation. Additionally, efforts should be made to connect this corridor with the developing Southern Virginia Mega Site at Berry Hill (traversing the northern fringe of the site), to promote access for active transportation to the site. Furthermore, efforts should be made to link the Beaches to Bluegrass Trail/Priority Corridor to industrial parks in eastern Danville and western Pittsylvania County to provide additional commuter options to employees. VTrans 2045 has identified Transportation Demand Management (TDM) as a need at and in the vicinity of these industrial parks. The Riverview Industrial Park is currently served by the Danville Riverwalk Trail, which also serves as the Beaches to Bluegrass Trail/Priority Corridor.
- **Connector Trail:** As resources permit, implementation of a connector trail linking the Danville Riverwalk Trail with the Ringgold Depot Trail should take place as recommended by the Trail Connector Study Dan River to Ringgold adopted June 2012. These two trails comprise the Beaches to Bluegrass Priority Corridor as established in the West Piedmont Regional Bicycle Plan adopted February 2018.
- **Safe Routes to School:** The City of Danville and Pittsylvania County are encouraged to utilize the sidewalk inventories in vicinity of schools conducted by EPR consultants, working on behalf of the Danville MPO to update the MPO Long Range Transportation Plan (located within this Plan) to identify needs and opportunities to improve pedestrian infrastructure. Efforts should also be made to coordinate transit stops with sidewalks using this inventory.

Figure 55 Riverwalk Trail at the YMCA Building



Strategy 3: Relationships and Procedures:

- **Stakeholder Group:** A regional entity should be established in the Danville-Pittsylvania County region, meeting periodically, to identify community needs as well as community/organizational initiatives and resources, to plan holistically for a comprehensive transportation system while minimizing duplicative efforts. Members should constitute a broad cross-section of the region and include:
 - » Staff of the City of Danville and Pittsylvania County (Community Development/Planning, Public Works, Transit, Social Services, and Parks & Recreation)
 - » Health care (Centra Health, SOVAH-Danville, Danville-Pittsylvania Community Services, and The Health Collaborative)
 - » The Virginia Department of Transportation (VDOT)
 - » The Altavista Community Transit System
 - » WPPDC/Danville MPO
 - » Representatives of primary and secondary education, as well as those of institutions of higher learning
 - » The private sector, such as major regional employers
 - » Transit, bicycle, and pedestrian advocates
 - » Staff of prominent and influential regional organizations such as Danville Regional Foundation (DRF) and the Danville River District Association.
 - » A member of the Danville-Pittsylvania Regional Industrial Facilities Authority (RIFA).
- **Passenger Rail:** The City of Danville, Danville Transit, VDOT, and DRPT should work closely with Amtrak to encourage additional passenger rail service at times convenient to the traveling public, as resources permit. This initiative is referenced in Chapter 3 of the Virginia Statewide Rail Plan, adopted December 2017.

- **Virginia Breeze:** Danville Transit is encouraged to work closely with DRPT to coordinate Virginia Breeze intercity bus routes with Danville Transit fixed routes, as well as with future Pittsylvania/Halifax County commuter routes.
- **Regional Service:** Danville Transit is encouraged to work with Altavista Community Transit System to establish a connection from the Danville Transit Pittsylvania County commuter service to this transit system.
- **Carpool Signage:** RIDE Solutions is encouraged to work with RIFA to place “Try Carpooling” signs in industrial parks within the MPO. Furthermore, RIDE Solutions will continue to reach out to employers in industrial parks and other areas of the MPO to promote carpooling and vanpooling among employers and their associates.

Strategy 4: Resource Arrangement

- **Job Training:** Danville Transit is encouraged to continue working with the Adult Education Center to prepare individuals to work as transit drivers while exploring collaborative relationships with other job training entities for this purpose.
- **Active Transportation:** The City of Danville and Pittsylvania County, along with their respective parks and recreation departments, are encouraged to identify City or County-owned properties, easements, and rights-of-way, as well as easily attainable private properties as means to expand and interconnect active transportation infrastructure at minimum cost. Additionally, opportunities to utilize City and County public works staff to implement various elements of this infrastructure are encouraged to be explored and identified.
- **Local Efforts:** The City of Danville and Pittsylvania County are encouraged to include/expand on policies to promote multimodal transportation and Transportation Demand Management (TDM) as part of their comprehensive plan updates and amendments. Additionally, the City of Danville is encouraged to consult its Complete Streets policy when

preparing for road maintenance and construction projects to determine if elements of Complete Streets can be included, some of which can be implemented at little to no cost.

- **RCEM Stakeholder Group:** A regional entity created to promote and coordinate the recommendations within this RCEM (as noted above, under Strategy 3) can work with schools and regional health care establishments to promote alternative modes of transportation – particularly walking and bicycling – as forms of mobility that can promote healthy, active lifestyles.
- **Bike and Pedestrian Inventories:** The City of Danville and Pittsylvania County are encouraged to take inventory of bicycle and pedestrian infrastructure, and then work with Danville Transit to create a digital map of transit routes and stops overlaying the bike/pedestrian network so as to more effectively link bus stops with the active transportation network.
- **Coordination of Planning Efforts:** Reference other regional plans, where relevant, including DRPT’s Human Resources Mobility Plan, the West Piedmont Regional Bicycle Plan, and the West Piedmont Planning District 2045 Rural Long Range Transportation Plan as guidance to implement recommendations within this RCEM.

Future Uncertainties

Any attempt to forecast future traffic conditions must acknowledge some level of uncertainty. New trends in the economy or developments that are unforeseeable today could result in significant changes to the region’s population and workforce. In turn, these new conditions could change where people will be traveling and how many vehicles will be using the network. In addition to these traditional variables, however, modern transportation planning must also account for a new uncertainty that could transform urban transportation networks: the autonomous vehicle.

Autonomous Vehicles

The term “autonomous vehicle” (AV) refers to a wide range of automotive technologies ranging from driver assistance features like adaptive cruise control to fully automated vehicles that do not even contain a steering wheel. Private companies have been developing these technologies for years, and many modern vehicles now offer some form of automated driving assistance. By 2045, most people expect AV to comprise a significant portion of the vehicles being used on the road.

As of today, though, it is impossible to know exactly what proportion of vehicles will use these features in 2045 or how advanced the technology will be. Transportation planners, however, have already begun to consider some of the potential impacts that AVs will have on their transportation networks. Some notable possibilities include:

- Increased road capacity resulting from the ability of AVs to safely travel more closely to one another than human-operated vehicles.
- Decreased lane and road widths, also resulting from the ability of AVs to safely travel more closely to one another than human-operated vehicles.
- Growth of higher-density neighborhoods and business districts resulting from the ability of users to be dropped off and picked up directly in front of their destinations, eliminating the need for stores and businesses to offer large parking lots in front of their establishments.
- The eventual elimination of traffic control features like stoplights and stop signs at intersections, resulting from the ability of AVs to communicate with one another and coordinate their movements through intersections to avoid collisions.

While it remains too early to change traffic volume and congestion projections based on these possibilities, the MPO will continue to closely monitor the development of these technologies and will be prepared to adapt future plans and strategies to respond to this new emerging reality.