

Final Report

As Amended November 19, 2020



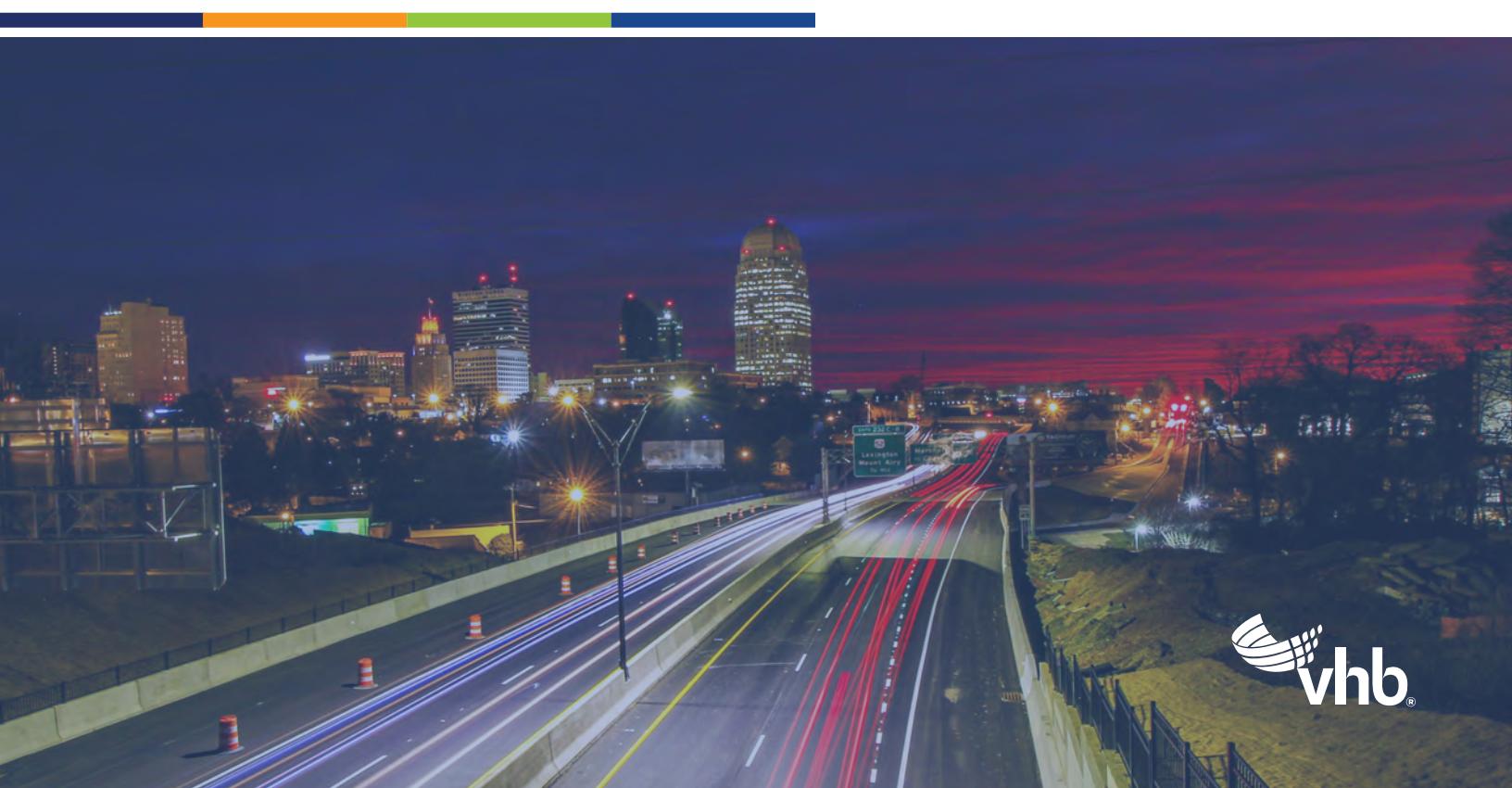
Making Connections

Winston-Salem Urban Area

Metropolitan Transportation Plan

Winston-Salem Urban Area Metropolitan Planning Organization

METROPOLITAN TRANSPORTATION PLAN





Executive Summary

Study Purpose

Making Connections 2045 updates the Metropolitan Transportation Plan (MTP) for the Winston-Salem Urban Area Metropolitan Planning Organization (WSUAMPO) planning area. An MTP is a federally-required plan for any urbanized area over 50,000 in population that looks at least 20 years out, serves as a vision for the future of the region, and includes a financial plan list of recommended transportation improvements that will be needed to support the vitality and transportation needs of the region going forward.

Study Process

The study was conducted over a seven-month period beginning in February 2020 and concluding in September 2020. The study was overseen by a Steering Committee composed of local staff and stakeholder agency representatives from across the region, including North Carolina Department of Transportation (NCDOT) staff. The Steering Committee held five meetings to discuss goals, priority projects, and community engagement strategies. Three rounds of public input meetings were held with a total of 14 virtual meetings to review the preliminary findings and draft recommendations. A public survey collected additional public input in May, July and August 2020. The draft final plan was reviewed by the WSUAMPO Transportation Advisory Committee and adopted at its September 2020 meeting.

Study Recommendations

A financial plan, Making Connections 2045 lays out roadway, transit, bicycle, and pedestrian improvements as well as recommendations for other modes (aviation, freight, innovative technologies) across the funding horizons that correspond to the adopted Piedmont Triad regional travel demand model (PTRM) horizon years: 2025, 2035 and 2045. Additional projects that were identified but not included in the financial plan project list will be carried forward as an update to the region's Comprehensive Transportation Plan (CTP).

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Chapter 1. Introduction

1.1 The MPO

The Winston-Salem Urbanized Area Metropolitan Planning Organization (WSUAMPO) is the federally designated agency that serves as the cooperative decision-making body for regional transportation planning in the Winston-Salem Urbanized Area (Figure 1).

Federal legislation requires urbanized areas with populations greater than 50,000 to have an MPO to carry out the transportation planning process among the member jurisdictions within its established planning area boundary. Further, as an urbanized area with population over 200,000 (391,024 urbanized area population as of 2010 U.S. Census data), WSUAMPO also serves as a Transportation Management Area (TMA). As a TMA, the region receives access to a set-aside of federal transportation funding (STBG-DA) and is subject to additional federal transportation planning requirements applicable to MPOs over 200,000 in population, including congestion management process.

In partnership with FHWA, NCDOT, FTA and area transit providers, the WSUAMPO provides transportation planning for the member jurisdictions which include Davidson, Davie, Forsyth, and Stokes Counties and the following MPO municipalities:

- City of Winston-Salem
- Town of Bermuda Run
- Town of Bethania
- Village of Clemmons
- Town of Kernersville
- Town of King
- Town of Lewisville
- Town of Midway
- Town of Rural Hall
- Village of Tobaccoville
- Town of Wallburg
- Town of Walkertown

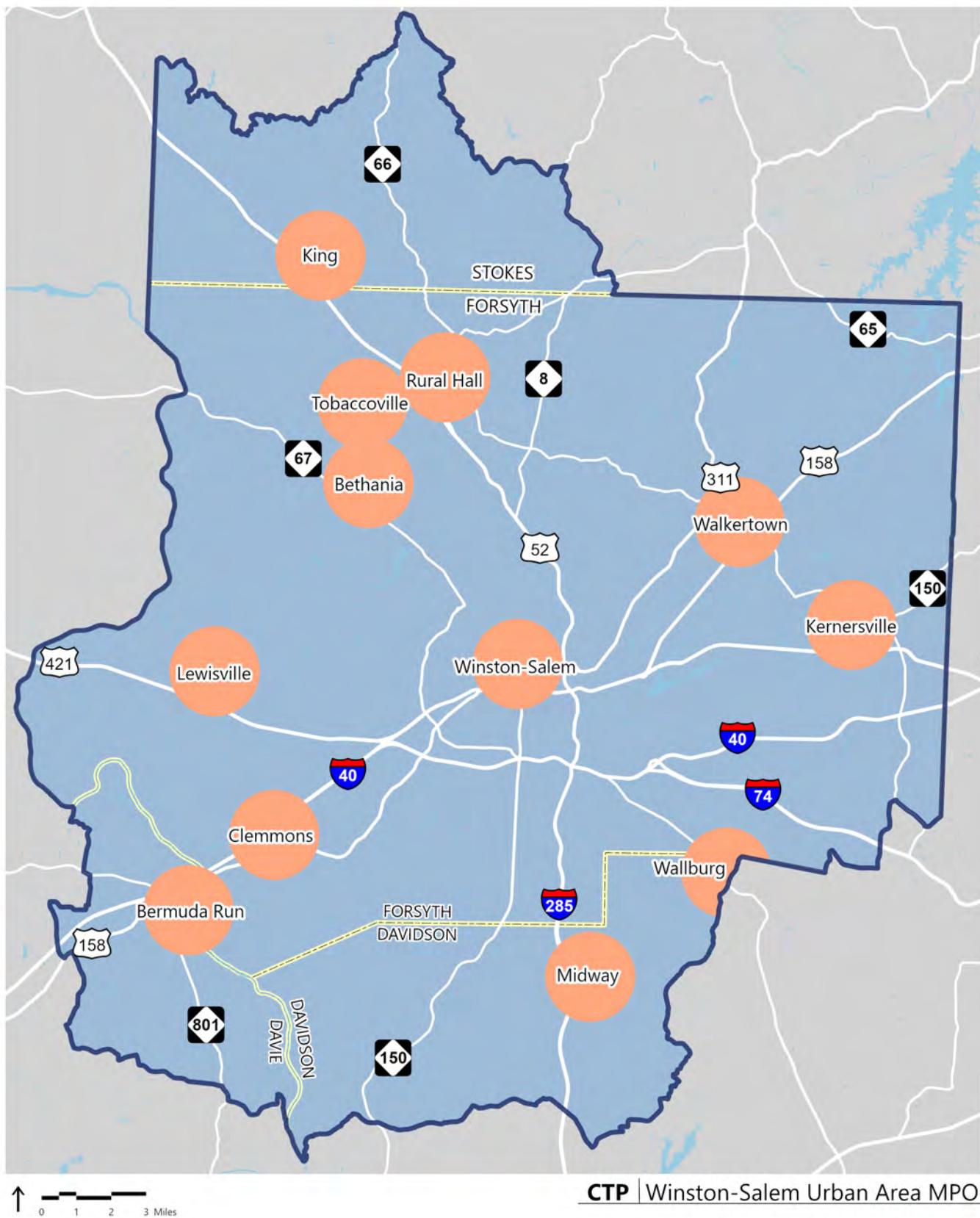


Figure 1 - Planning Area

In addition to elected representatives from those jurisdictions, non-elected officials from the City-County Planning Board, Winston-Salem Transit Authority, Smith Reynolds Airport Authority, the Federal Highway Administration (FHWA), Federal Transit Administration (FTA), and the North Carolina Department of Transportation (NCDOT) serve on the Transportation Advisory Board (TAC) for WSUAMPO. The TAC serves as a forum for regional cooperative transportation planning and decision-making for the MPO.

1.2 What is Making Connections 2045?

Making Connections 2045 is WSUAMPO's latest Metropolitan Transportation Plan (MTP). An MTP, also referred to as a Long Range Transportation Plan. It is a federally-required plan for an urbanized area that looks at least twenty years out and presents a future vision for the region as well as a financial plan with a list of recommendations across transportation modes. Those recommendations are expected to improve the transportation network and support the growth and development of the region. *Making Connections 2045* is a 25-year plan.

Adopting a financial plan and a long range transportation plan for the region is one of many steps in implementing transportation projects. Once a project is included in the MTP, it could be a seven to 15-year process in North Carolina depending on funding availability, environmental and community concerns, and project complexity. There is also a competitive process through North Carolina's strategic prioritization process. The MTP planning process helps the local jurisdictions and stakeholder agencies coordinate their approach and prioritize which projects are the most important to advance in the near term. In addition, it provides an opportunity for public review and feedback.

MTPs are one type of plan in a series of regional and smaller subarea plans that MPOs work on. A Comprehensive Transportation Plan (CTP) reflects the transportation needs of the region for a slightly longer (30-year) timeframe, without the financial plan. Unfunded projects identified as part of *Making Connections 2045* will be incorporated into the CTP for the WSUAMPO region.

Additional transportation planning studies such as corridor studies, transportation master plans for individual municipalities, bicycle and pedestrian plans, feasibility studies and other mode-specific studies and subarea plans are additional important tools that can help the local communities identify transportation needs and explore potential solutions. The WSUAMPO will continue to utilize North Carolina's strategic prioritization process to advance projects drawn from long-range plans and locally-adopted plans for funding in the Statewide Transportation Improvement Program (STIP).



Chapter 2. Winston-Salem Region

2.1 Region Overview and Economic Development Factors

The WSUAMPO area population was estimated at 429,277 in 2017. The Winston-Salem urban area is one of the three major subregions in the Piedmont Triad, situated between Charlotte and the Research Triangle. The MPO is connected to other major regions in the state and beyond by major north-south routes, including I-85 and I-74/US 52, and major east-west routes, including I-40 and US 421. The nearest large commercial airport, Piedmont Triad International Airport, is just east of the MPO boundary in Guilford County.

Forsyth County also hosts a local general aviation airport, Smith Reynolds Airport, which has a 6,655-foot primary runway and serves over 45,000 operations (take-offs and landings) per year. The airport does not currently have commercial carriers, but it maintains a Class I certificate which allows all types of air carrier operations. Norfolk Southern operates freight trains on the rail corridor through the region. There is no Amtrak passenger train station in the MPO, though the Piedmont Authority for Regional Transportation (PART) provides free bus service from the High Point station to the Clark Campbell Transportation Center in Winston-Salem for Amtrak Piedmont route riders.

Each of the top five employers in Forsyth County is a medical or educational provider - Wake Forest Baptist Medical Center, Novant Health, Forsyth Memorial Hospital, Winston-Salem/Forsyth County Schools, and Wake Forest University (Figure 2). While the region has moved away from historic major employers in the tobacco, textiles, and furniture industries, both Hanesbrands and the R J Reynolds Tobacco Company are still featured in the list of top twenty employers in the County. Other major employers include city and county governments, banks, and major retailers like Walmart and Food Lion.

The region's transitioning economy is embodied in the emergence of the Innovation Quarter, much of which is housed in redeveloped RJ Reynolds Tobacco Co warehouses. The Innovation Quarter, originally envisioned as the Piedmont Triad Research Park, is a mixed-use district adjacent to downtown Winston-Salem. It currently hosts over 90 companies in 2.1 million square feet of office, lab, and academic space, as well as multi-family housing, retail, and open space. Whitaker Park, a former Reynolds America manufacturing complex in northern Winston-Salem, is another major redevelopment opportunity.

Current plans are for the space to ultimately be a mixed-use employment center with lab, manufacturing, office space, residential units and retail space. A new development in Whitaker Park was announced in late 2019, which will include a 300-unit apartment complex, hotel, and retail space.

Employment by Industry

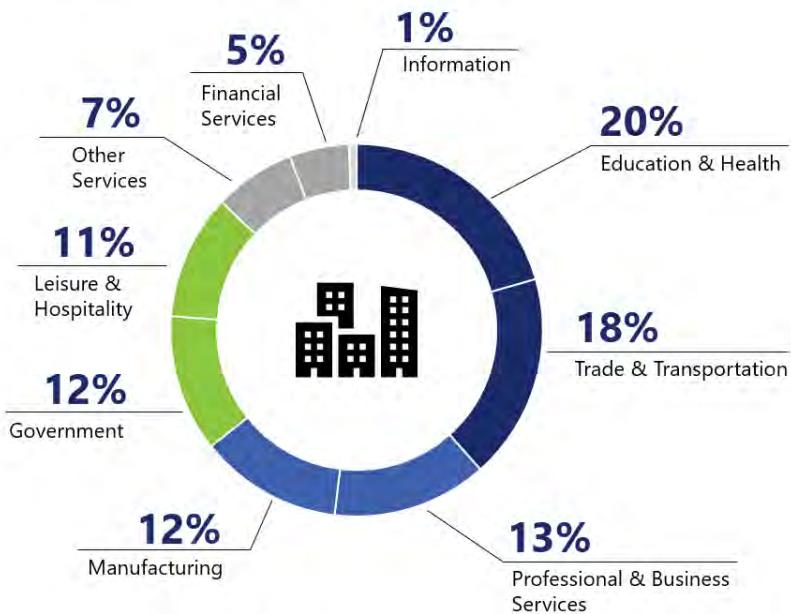


Figure 2 - Employment by Industry in Forsyth County, Source: Labor & Economic Analysis Division, NC Department of Commerce, 2019

Table 1 - Major Employers in Forsyth County, Source: Labor & Economic Analysis Division, NC Department of Commerce, 2019

Rank	Company Name	Industry
1	Wake Forest University Baptist Medical Center	Education & Health Services
2	Winston Salem Forsyth County School	Education & Health Services
3	Forsyth Memorial Hospital, Inc	Education & Health Services
4	Novant Health, Inc	Education & Health Services
5	Wake Forest University	Education & Health Services
6	City of Winston Salem	Public Administration
7	Hanesbrands, Inc	Manufacturing
8	Wal-Mart Associates Inc.	Trade, Transportation, & Utilities
9	Forsyth County	Public Administration
10	Wells Fargo Bank	Financial Activities

Forsyth County has a higher postsecondary educational attainment than the Piedmont Triad region¹ and the state.² The difference is higher for those who have obtained a Bachelor's degree or higher - 34% of Forsyth County has at least a Bachelor's degree compared to only 25% of the Piedmont Triad region (Table 2). This higher educational attainment is reflected in the median household and per capita income of the County (Table 3). Forsyth County has significantly higher household and per capita incomes than the Triad region, though household incomes are slightly below North Carolina as a whole.

Table 2 - Educational Attainment

Source: 2013-2017 & 2011-2015 American Community Survey 5-year estimates Triad Tomorrow, Piedmont Triad Regional Council

Educational Attainment

	Forsyth County	Piedmont Triad	North Carolina
High School +	89%	84%	88%
Bachelor's Degree +	34%	25%	31%

Table 3 - Median Household and Per Capita Income

Source: 2013-2017 & 2011-2015 American Community Survey 5-year estimates Triad Tomorrow, Piedmont Triad Regional Council

Median Income

	Forsyth County	Piedmont Triad	North Carolina
Household	\$50,185	\$43,376	\$52,752
Per Capita	\$28,640	\$25,510	\$28,123

The Winston-Salem urban area serves a dual role as an employment hub for smaller neighboring communities and rural areas and as a midpoint for workers commuting to Charlotte, Greensboro, or the Research Triangle (Figure 3). In 2017, 57% of WSUAMPO residents were living and working in the MPO area, while 43% were commuting to jobs outside (Table 4). In the same year, more workers living outside the MPO commuted in for work (92,841) than workers living in the MPO commuted out (80,026), highlighting the MPO's role as an economic center. Residents commuting outside the MPO area were divided among neighboring regions as follows:

- **15%** travel to Greensboro for work
- **6%** travel to the Research Triangle to work
- **about 8%** travel to the Charlotte metro area

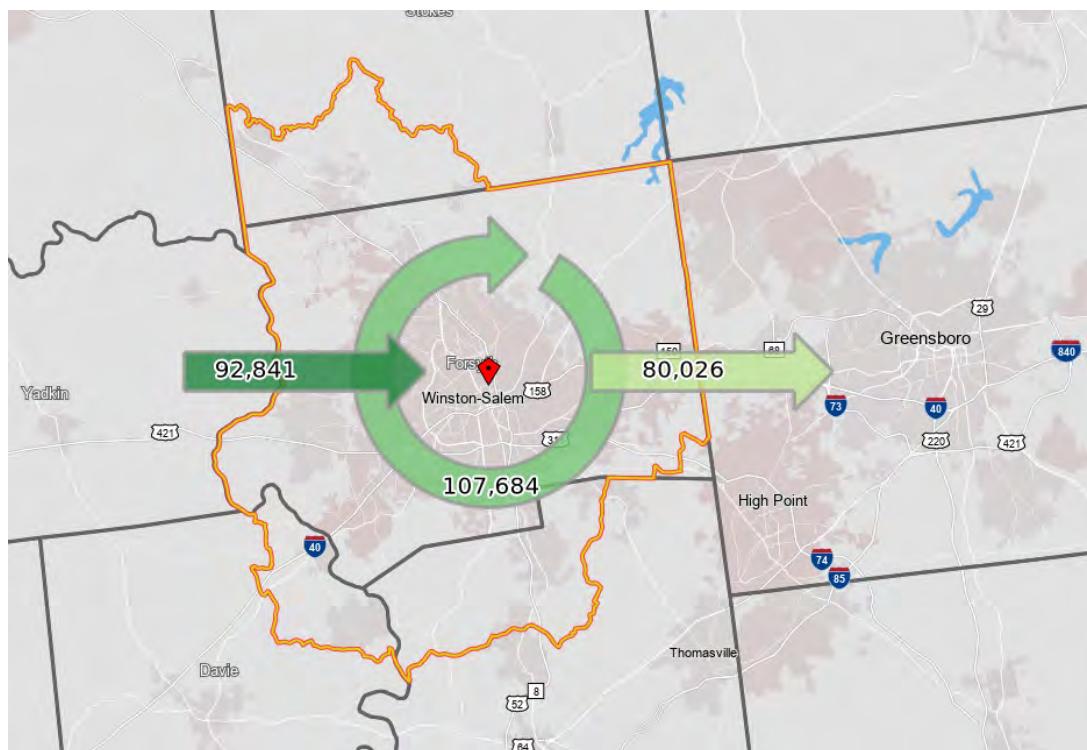


Figure 3 - Inflow and Outflow Commuting Patterns for Winston Salem Urban Area MPO, 2017,

Table 4 - 2017 Inflow/Outflow of All Jobs

Worker Totals and Flows	Count	Share
Employed in the Selection Area	200,525	100%
Employed in the Selection Area but Living Outside	92,841	46.3%
Employed and Living in the Selection Area	107,684	53.7%
Living in the Selection Area	187,710	100%
Living in the Selection Area but Employed Outside	80,026	42.6%
Living and Employed in the Selection Area	107,684	57.4%

2.2 Natural Resources and Future Growth

Development patterns in the region are largely concentrated within municipal boundaries, with a further concentration along key roadway corridors-I-40, US 421, Salem Parkway and US 52. Natural and cultural resources in the region could also have an impact on future growth and development and impose constraints on improvements to the transportation infrastructure. The Yadkin River flows through the region and several critical watershed areas and lakes are important for the region's water supply:

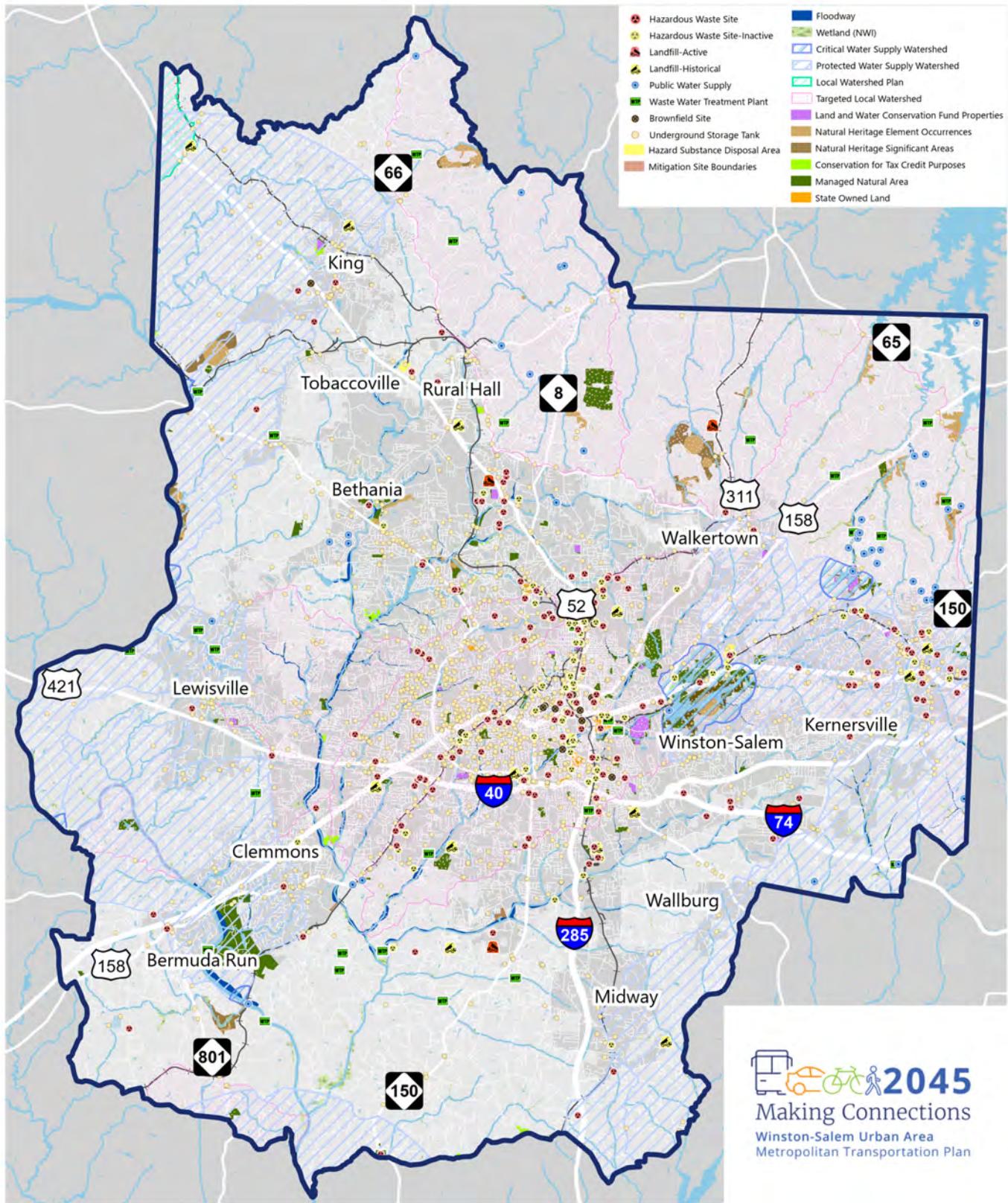
- Yadkin/ Pee-Dee River Basin
- Muddy Creek watershed
- Salem Creek watershed
- Abbott's Creek
- Cape Fear River Basin

The region's rivers represent a resource in terms of outdoor recreation, scenic beauty, and biodiversity. They can also be a constraint in terms of transportation infrastructure- roadways and greenways -crossing over the bodies of water. Yadkin River in particular is an example of natural barrier present in the region. Yadkin River contributes to limited roadway network connectivity around Bermuda Run which, in turn, puts more pressure and congestion on existing roadway links spanning both sides of the river. A recently completed bridge project, I-40 bridge widening over Yadkin River, took over two years and carried an estimated cost of \$72 million to implement.



Source: www.constructionequipmentguide.com

When considering active transportation improvements, creeks and rivers create natural corridors for locating greenways and connecting them across a longer stretch. Several examples of greenways considered in this plan include Muddy Creek Greenway and Kerners Mill Creek Greenway (part of the Piedmont Regional Greenway corridor). The figure below shows additional environmental features.



↑
0 1 2 3 Miles

Railroad Track
Stream
Waterbody

MTP 2045 | Winston-Salem Urban Area MPO

April 08, 2020



Figure 4 - Environmental Features

Historic Preservation sites and districts can be a source of community pride and provide local landmarks and a sense of place. When it comes to transportation projects, it is important to minimize negative impacts to historic districts and places. Winston-Salem MPO region historic districts and historic landmarks are numerous, including but not limited to the following districts and places:³

Winston-Salem

- Ardmore Historic District
- Bethabara Historic District
- Bethania Historic District
- Centerville Historic District
- George Black House and Brickyard
- Goler Metropolitan AME Zion Church
- Graylyn
- Nissen B
- North Cherry Street Historic District
- Old German Baptist Brethren Church
- Old Salem Historic District
- Reynoldstown Historic District
- Reynolds Building
- Winston Tower
- Wachovia Bank and Trust Company Building
- Howard Robinson Building
- Union Station
- Sunnyside-Central Terrace Historic District
- West Salem Historic District

Kernersville

- South Main Street Historic District
- Roberts-Justice House
- Korner's Folly

Other

- Win Mock Dairy, Bermuda Run
- Tanglewood Estate, Clemmons
- Waller-Joyner House, Pfafftown
- Old Richmond Schoolhouse and Gymnasium, Tobaccoville

2.3 Future Population and Employment Distribution

Future population and employment projections out to 2045 were derived from the PART Regional Travel Demand Model and socioeconomic estimates adopted in September 2019. Winston-Salem Urbanized Area MPO Planning Area population is expected to grow from 429,277 in 2017 to 544,670 in 2045—an almost 27% increase (Figure 5). The number of jobs is expected to outpace population growth, almost doubling from 209,365 in 2017 to 379,915 in 2045.

Population growth trends across the region are relatively dispersed, though there is a clear concentration of growth in Winston-Salem. More concentrated growth is also expected along key travel corridors, including in the east between I-74 and I-40, along NC 150 south of Winston-Salem, and in the west along I-40. Some growth reflects recent developments between I-40 and I-74, like the Caleb's Creek and Weldon Village developments. See Figure 6 for the expected population growth.

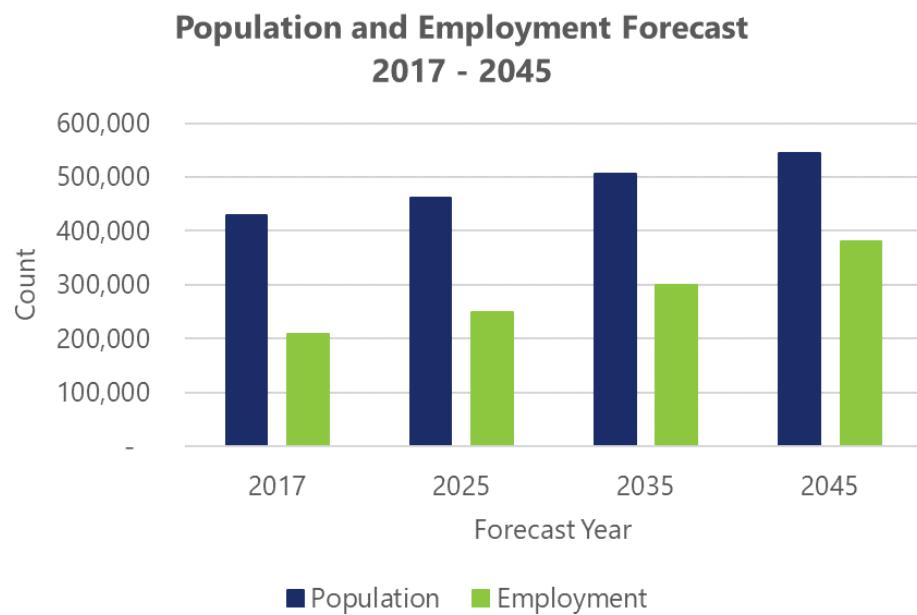


Figure 5 - WSUAMPO Planning Area Projected Population and Employment Growth, 2017-2045

Employment growth between 2017 and 2045 is projected to be largely concentrated in Winston-Salem, and smaller, existing municipalities and industrial centers like the Triad Business Park, where most recently an Amazon fulfillment center opened in 2019 (Figure 7).

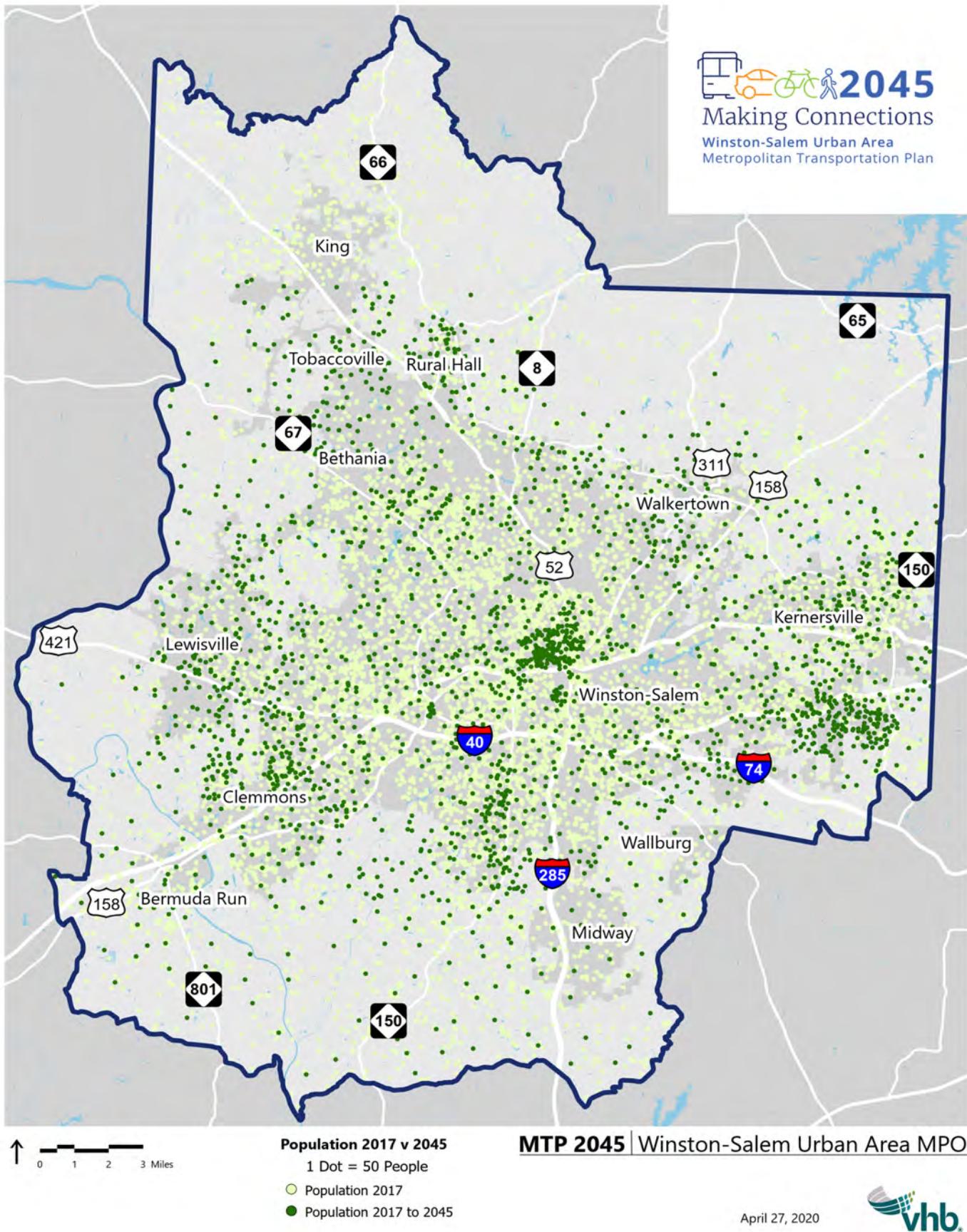


Figure 6 - Expected Population Growth, 2017 to 2045

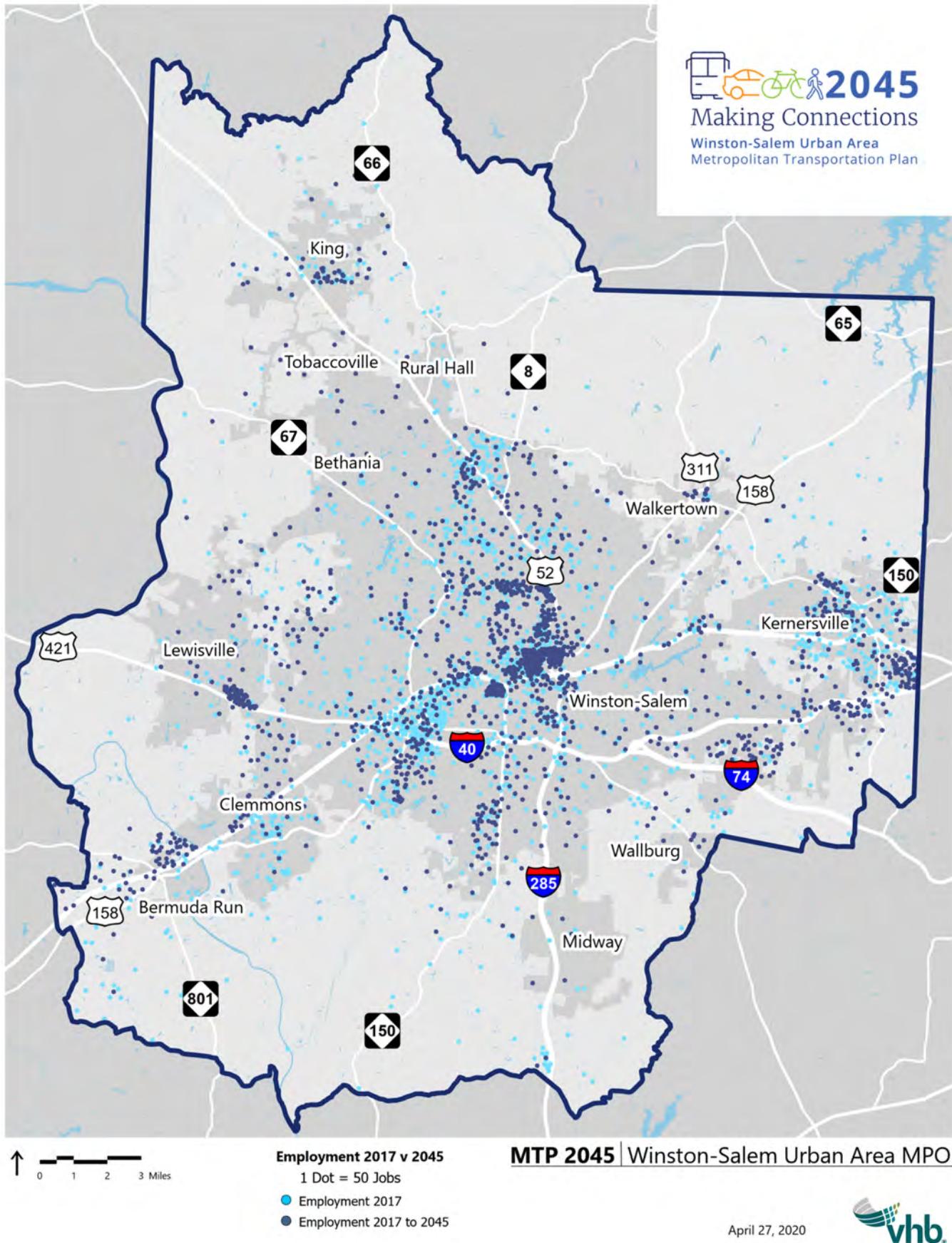


Figure 7 - Socioeconomic Comparison for Employment, 2017 to 2045



Chapter 3. Vision and Goals

3.1 Developing Vision, Goals and Objectives

Working with the 2045 Metropolitan Transportation Plan Steering Committee and with additional public input received during the first round of surveys, the study team developed a guiding Vision statement and a list of goals and objectives for the plan. The federally-required transportation planning factors were taken into account to ensure that they were addressed and included as part of the plan considerations. The goals and objectives were used to inform the project selection methodology for the plan.



Making Connections 2045 Vision

“The Winston-Salem Urban Area will be supported by strong, multimodal regional transportation infrastructure that provides safe, efficient, affordable, and accessible travel options for people and goods, while supporting healthy and resilient communities.”

Making Connections 2045 Goals and Objectives

2045 Metropolitan Transportation Plan goals and objectives were selected by the Steering Committee in consideration of public feedback submitted during the first round of survey, as well as based on existing conditions and known transportation concerns in the community (Figure 8).

Figure 8 - Making Connections 2045 Goals, Objectives

VISION

The Winston-Salem Urban Area will be supported by strong, multi-modal regional transportation infrastructure that provides safe, efficient, affordable, and accessible travel options for people and goods, while supporting healthy and resilient communities.

GOAL 1 MOBILITY & ACCESSIBILITY



Improve mobility and accessibility for people and goods across the region.

OBJECTIVES

1 Promote equitable transportation options for low-income and minority communities and the aging population

2 Reduce congestion on key interstates and arterial corridors

3 Improve freight access to industrial/distribution centers and freight terminals, such as airports and railyards

4 Support improvements to the rail infrastructure, including railroad crossing improvements and intermodal facilities

5 Improve availability of premium transit options, such as express bus routes, light rail and streetcar lines

6 Improve last mile access to public transit with enhanced pedestrian safety, bicycle and shared mobility options at major transit stops

GOAL 2 GROWTH



Support smart regional growth and economic development.

OBJECTIVES

1 Improve transportation options between urban job centers and rural and suburban places

2 Increase the number of jobs accessible within a reasonable commute travel time

3 Enhance connections between major destinations, such as employment and education centers, medical and transit facilities and neighborhoods

4 Ensure transportation infrastructure is supportive of visitor trips and tourism

Figure 8 - Making Connections 2045 Goals, Objectives Continued



Figure 8 - Making Connections 2045 Goals, Objectives Continued



3.2 Transportation Planning Factors

An MTP is required to address the transportation planning factors established by Federal transportation legislation. Eight of those factors were initially defined in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), enacted in 2005, and carried forward by MAP-21 in 2012. The FAST Act, signed into law in 2015, included the addition of two planning factors (focused on resiliency and reliability, and on tourism), for a total of ten transportation planning factors. The projects and strategies recommended in the MTP must support these planning factors. The Federal planning factors can be summarized as follows:

- Support the economic vitality of the metropolitan area
- Increase the safety of the transportation system for motorized and non-motorized users
- Increase the security of the transportation system for motorized and non-motorized users
- Increase the accessibility and mobility of people and for freight
- Protect and enhance the environment, promote energy conservation, and improve the quality of life
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight
- Promote efficient system management and operations
- Emphasize the preservation of the existing transportation system
- Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation
- Enhance travel and tourism

As can be seen in Table 5 below, the MTP goals align with the Federal planning factors to ensure that the federal guidelines are addressed throughout the 2045 Metropolitan Transportation Plan development.

The Federal planning factors introduced in Chapter 3 align with the planning goals and objectives described in that same chapter. The performance measures used in evaluating alternatives and summarized later in this chapter are derived from those goals and objectives, and support associated Federal planning factors. Progress in achieving the planning factors is described below.

Economic Vitality

In a highly competitive economy, safe, efficient, and dependable access to jobs, goods, and services (including healthcare and education) are fundamental to a vibrant, prosperous, and sustainable economy. The planning and project selection process used in updating the WSUAMPO MTP emphasizes these goals and objectives by reducing congestion and providing an appropriate range of access routes and travel modes. Careful consideration of land use and social-economic forecasts in the regional travel demand model helps establish longer-range travel needs, especially with respect to employment growth. Convenient and dependable movement of freight and goods—whether by truck, train, or plane—is essential to a diversified economy, especially given the economic necessity of just-in-time delivery, and a growing reliance on home deliveries. WSUAMPO’s MTP update addresses these needs by recommending appropriate improvements to interstates,

NHS, major arterials, truck routes, and other facilities critical for the efficient movement of commodities, commuters, and consumers. In addition to capacity expansion, the MTP also considers safety enhancements, operational improvements, and maintenance needs. The potential for bridges and rail crossings to be weak links in the system is also recognized.

Economic vitality requires a range of affordable transportation options, not only for goods movement, but for businesses to have access to employees and customers (and vice versa). Transportation costs comprise a major expenditure for households; keeping these costs down reduces the region's overall cost of living (and of doing business), making it a more attractive and competitive location.

Safety

The WSUAMPO relies on annual state and local crash inventories to target hazardous locations for analysis and mitigation. Safety at intersections and corridors is a significant factor in the project selection methodology described in Chapter 6. Recommended roadway improvement projects emphasize roadway safety through a focus on modernization and intersection and interchange improvement projects. In light of the State's multimodal policy, all roadway projects are encouraged for consideration of bicycle and pedestrian facilities. Additionally, the 2035 and 2045 horizon years include allocations for small operations and safety improvements for determination later in the planning process.

While crash reductions for bicyclists and pedestrians are emphasized in a range of project recommendations, other policies and programs should also be implemented, with special consideration for projects that:

- Border or cross block groups with a moderate or high Environmental Justice scores
- Fall within ¼-mile of fixed route transit or within ½-mile of a major transfer hub
- Border or cross designated activity centers, job centers, or medical or educational campuses
- Close a gap, overcome a barrier (e.g. river, interstate or railroad improved crossing), or improve an intersection with a multi-lane arterial
- Serve community points of interest within ½-mile of a bicycle, complete streets, or sidewalk project, or within ¼-mile of a pedestrian project
- Overlap locations with significant bicycle and pedestrian crash histories

In terms of programs and policies:

- Consider a Vision Zero plan for the largest municipalities (e.g. Winston-Salem, Kernersville) to identify safety hot spots and prioritize locations for improvement.
- Ensure NCDOT Complete Streets policy is being followed to as part of roadway project implementation and safe pedestrian crossing facilities are included in addition to linear pedestrian and bicycle facilities-especially along corridors with transit service.
- Select several corridors with top safety concerns for roadway safety audits (RSAs) to be performed with a stakeholder group representing various agencies and backgrounds; such an RSA could be done in a relatively short timeframe to identify both relatively quick and easy solutions as well as those requiring additional study and funding for implementation.

- Consider road diets and conversion of 5-lane TWLTL facilities to 4-lane median-divided facilities. This can reduce the number of conflicts and decrease crash frequency and severity along major arterials.
- Within municipalities and activity centers with a mix of uses, consider implementing a lower speed limit and adopting traffic calming measures as appropriate.
- When planning for new or expanded transit routes, consider pedestrian facilities and mid-block pedestrian crossings where needed.
- Consider adding more lighting in dense, mixed-use activity centers and around commercial centers served by transit, making pedestrians more visible to drivers at night.

Security

Transportation security covers a wide range of threats, from crimes against pedestrians and transit riders to natural disasters.

Proper design, location, and lighting of pedestrian, transit, bicycle, and even parking facilities can help reduce potential for criminal activity. Surveillance, enforcement, education, and messaging are critical factors in helping reduce threats and riskier behaviors. These steps help create a positive feedback loop or “virtuous cycle” in which a more secure environment leads to greater use and activity, which further increases both perceived and actual security. Transit agencies, parks and recreation departments, parking operators, and local police should regularly monitor crime statistics, reviewing and updating their security plans and programs. Community walks to “take back the night” and audit undesirable conditions can raise individual awareness and help inform public safety, engineering, and planning decisions, as well as educating residential, commercial, and institutional property owners and managers.

At the other end of the security spectrum are natural disasters and man-made emergencies. While disaster mitigation and emergency response are specialized fields, land use and transportation infrastructure and operations play critical roles. These roles can be negative (causing or contributing to the severity of an incident), or they can be positive (helping reduce severity or providing evacuation and emergency supply routes). At a minimum, transportation facilities should not be located in hazardous locations, or increase the potential or magnitude of a disaster. Examples include roadways in flood prone areas, or which worsen flood conditions; communities with insufficient or vulnerable access/egress routes; unsafe or poorly maintained bridges or tunnels; and inadequate or vulnerable routes for transporting hazardous materials.

Though rarely needed, the potential for safe and orderly evacuations is considered in long-term transportation infrastructure planning in the Winston-Salem Urbanized Area. It is critically important that evacuation and shelter plans accommodate vulnerable populations (including the elderly, mobility-impaired, non-English speaking, low-income, or carless); evacuation plans must include more than route identification, lane reversals, and traffic control. Forsyth County has a Multi-Jurisdictional Hazard Mitigation Plan (2011) and is also part of the Northern Piedmont Hazard Mitigation Plan (2015)⁴ which encompasses seven counties: Davie, Forsyth, Yadkin, Surry, Stokes, Rockingham and Caswell County. The regional Hazard Mitigation Plan builds on the individual County-specific hazard mitigation plans:

“Each of the seven counties and their municipal jurisdictions participating in the development of the Northern Piedmont Hazard Mitigation Plan have an existing hazard mitigation plan that has evolved over the years, as described in Section 2: Planning Process. This regional plan draws from each of the County plans to document the region’s sustained efforts to incorporate hazard mitigation principles and practices into routine government activities and functions. At its core, the Plan recommends specific actions to minimize hazard vulnerability and protect residents from losses to those hazards that pose the greatest risk.”⁵

The Regional Hazard Mitigation Plan includes a Risk Assessment divided into multiple sections: Section 4, **Hazard Identification**; Section 5, **Hazard Profiles**, and Section 6, **Vulnerability Assessment**. In combination, those sections identify, analyze and assess hazards prevalent in the Northern Piedmont Region. Table II-1 in the Plan identifies Forsyth County Multi-Jurisdictional Hazard Mitigation Action Plan.

In reviewing the table for transportation-related measures, the following measure could be improved with respect to evacuating transportation-disadvantaged populations.

Action P-8. Mitigation Actions: *“Policy and procedures related to storm damage and disconnected utility services: 1) inform public via television, radio and newspaper of the necessary steps to have utilities restored; 2) restrict travel as necessary while collecting damage assessment data; conduct inspections on first come, first serve basis; 3) work overtime to expedite utility reconnections.”*

Evacuation strategies should more explicitly include local public transportation providers, targeting communities with high concentrations of vulnerable residents (i.e. low-income neighborhoods, nursing homes, neighborhoods with high concentration of LEP populations, and zero-vehicle households) to ensure that evacuation via public transportation or an alternate means is offered to those residents in a timely and clearly-communicated manner. Public information activities identified in the regional Hazard Mitigation Plan for Forsyth County could be enhanced to ensure that LEP populations are able to access materials in a variety of languages.

From a technical standpoint, a number of elements typically used in transportation planning and traffic management can offer significant value in evacuation planning and management. Historical monitoring of traffic volumes, speeds, and congestion can help identify critical bottlenecks and viable routes with additional capacity. Variable message signs, specialized traffic signal plans, reversible lanes, real-time traffic monitoring (via cameras or other sensors), traffic control centers, and other ITS technologies can provide more flexible, efficient, and cost-effective mechanisms for implementing evacuation plans.

Accessibility and Mobility Options for People and Freight

Given the importance of freight and goods movement to the regional economy, the Piedmont Triad has made a substantial investment in freight surveys and modeling. NCDOT also has a range of statewide freight, rail, aviation, and transportation studies and plans that are incorporated in the MTP process.

MPOs around the state were involved in the development of the North Carolina Statewide Multimodal Freight Plan (November 2017). The Freight Plan was created to identify freight transportation investments that can lead

to economic growth and enhanced quality of life.

The WSUAMPO MTP identifies major freight corridors within the region and recognizes the importance of improvements to interchanges and major arterials connecting to interchanges to facilitate the movement of goods. These corridors are priorities for the region and improving the accessibility and mobility of people and freight continues to be a top priority for the region.

The WSUAMPO MTP identifies opportunities for thruway passenger rail service connecting Asheville to Greensboro, with a station proposed in Winston-Salem. This recommendation provides an alternative to the automobile for Winston-Salem residents and workers traveling to and from Asheville or Greensboro.

The Plan identifies a series of aviation improvements that were adopted in the Smith Reynolds Airport Capital Projects Ordinance. These projects may improve current operations and capacity for private and charter aircrafts and are likely to increase the region's overall accessibility to facilitate the movement of Winston-Salem residents and visitors to and from the region.

WSUAMPO understands the need to incorporate infrastructure to support autonomous vehicles. These vehicles could potentially improve freight mobility around the region. The MTP recommends infrastructure improvements along major interchanges to improve greater efficiency to the freight industry. Autonomous freight vehicles have the ability to move more goods and can more easily travel during off-peak hours, reducing congestion during peak hours.

Protect and Enhance the Environment

The Winston-Salem Urban Area MPO recognizes the role of recommended transportation projects in protecting and enhancing the environment, while also improving the quality of life of community members who live, work, or play in the region. Protection and enhancement of the environment is a core principle underlying the process used in developing this plan; it is an integral step, not an after-the-fact add-on.

The Plan prioritizes improving existing facilities and increasing connectivity over construction on new alignments. It also emphasizes multimodal options, including bicycle, pedestrian, and transit. The result helps reduce environmental impacts by minimizing the transportation infrastructure footprint and the disruption accompanying its expansion. This approach also promotes more compact development, discouraging sprawl and reducing VMT, emissions, energy consumption, and auto dependency.

By emphasizing pedestrian safety and convenience, the Plan supports a range of alternatives to driving, yielding a range of environmental benefits. The recommendation for commuter rail between Rural Hall, Winston-Salem, and Greensboro offers an alternative to the personal automobile for Winston-Salem residents and workers. This can reduce auto-ownership levels as well reduces vehicle emissions.

The region anticipates more electric vehicles and the introduction of autonomous and connected vehicles. The Plan provides recommendations for potential charging stations throughout the MPO, including shopping centers, colleges and universities, parks and community facilities, hospitals and medical centers, and more.

By relying on “cleaner” and more efficient energy sources, electric vehicles can have lower environmental impacts than current personal automobiles. Predicting the net environmental impacts of connected/autonomous vehicles is more complicated, and will vary over time. While there is potential for impact reductions—depending on implementation policies, technology, and market acceptance—more study is needed.

Promote Energy Conservation

Reducing overall vehicle-miles traveled (VMT) and/or vehicle-hours of delay (VHD) or congestion typically lowers transportation-related energy consumption. Shifting trips from personal vehicles (especially single occupancy) to other modes also conserves energy.

The WSUAMPO MTP also recommends locations for electric vehicle charging stations. While EVs are not necessarily more energy efficient than other vehicles, they have the potential to be more energy efficient, depending on the generating source of the electricity used for charging. Over time, improved technology, increases in renewable energy sources, and widespread EV market penetration should result in overall energy savings.

Improve Quality of Life for the Community

In general, quality of life benefits will result from progress in the other transportation planning factors. Improvements in economic vitality; safe, convenient, and reliable access to goods, services, and opportunities; a well-preserved and satisfying natural and cultural environment; and a range of travel options all contribute to enhance a community’s quality of life. The specific challenge of this factor is ensuring that these quality-of-life benefits are equitably distributed throughout the community, including vulnerable or disadvantaged populations. Chapter 7 addresses the MTP’s approach to dealing with these equity issues, from public engagement to the distribution of costs and negative impacts, to the distribution of project benefits.

Another point of emphasis in promoting quality of life issues is distinguishing between access and mobility. Increasing mobility in and of itself--for the sake of greater mobility-- does not enhance quality of life; in fact, it probably degrades it. However, increasing access to employment, health care, education, recreation, and other goods and services does offer fundamental benefits. Offering a range of affordable options is critical.

Consistency Between Transportation Improvements and Planned State and Local Growth and Economic Development Patterns

The plan acknowledges and integrates the WSUAMPO’s planned transit, bicycle, pedestrian, rail, freight, aviation, and roadway projects from the local level through the STIP. The Plan also incorporates the region’s existing and anticipated land use patterns and associated population and economic growth areas. These socio-economic forecasts were developed by local jurisdictions in coordination with state demographic forecasts. An iterative, consultative process led to approval of growth distribution assumptions for use in the adopted regional travel demand model (PTRM). This model was used to test alternative transportation improvement scenarios and analyze respective outcomes. Evaluation of these results led to development of a preferred scenario for more detailed analysis and implementation planning.

Integration and Connectivity for All Modes

All connectivity and integration - regardless of mode - ultimately depends on walkability. This fundamental principle is reflected in the goals, objectives, and performance measures employed in developing this Plan, and in the recommendations it yields.

Beyond walkability, however, are other factors critical to successful multimodal networks and intermodal connections. The importance of efficient access to Piedmont Triad International Airport and the surrounding development that supports this unique passenger, maintenance, and cargo center is reflected in the Plan, as is connectivity consistent with the expanding role of Smith Reynolds Airport.

Access to both passenger and freight rail service is also addressed in the Plan. Winston-Salem currently depends on a connector bus service (or personal or shared vehicles) to access passenger rail service, but a direct rail connection is discussed. The Plan recognizes the need for quality intermodal connections for goods movement by rail, as well as improved track conditions. The issue of at-grade rail crossings is highlighted, since these conflict points are sources of infrequent but serious crashes, worsening traffic delays, and ongoing maintenance costs.

Ongoing planning for transit stations and stops (or hubs, or centers) is critical, especially given the decentralized nature of the Piedmont Triad and the presence of multiple service providers.

Efficient System Management and Operations

The City of Winston-Salem operates a Traffic Management Center in downtown that relies on computerized traffic control to coordinate the timing and operation of approximately 400 traffic signals citywide. Vehicle detectors collect real-time data and activate signals to synchronize traffic flow. Both fiber-optic and wireless communications are employed. This signal coordination reduces driver delays, vehicle emissions, and fuel consumption. Timing plans are evaluated every six months and specific locations are evaluated based on citizen concerns and complaints.

NCDOT's Piedmont Triad Traffic Management Center is located in Greensboro. It relies on camera surveillance, dynamic message signs, highway advisory radios, and incident management assistance patrols to monitor conditions, collecting, analyzing, and distributing information to optimize traffic flow in the region. The Center coordinates closely with Integration with local law enforcement and 911 communications centers, as well as other traffic operations centers across the region, sharing information and resources to provide more timely and effective incident response. There are more than 50 remote cameras providing traffic surveillance in the WSUAMPO region.

The MPO and local DOTs also work with NCDOT's Transportation Mobility and Safety Unit:

- The Congestion Management Unit develops and implements strategies for managing congestion on NCDOT roads
- The Intelligent Transportation Systems and Signals Unit oversees the planning, analysis, design and imple-

mentation of traffic signals, computerized signal systems, and intelligent transportation system technologies on the North Carolina highway system.

- The NCDOT Work Zone Control Section to implement carefully designed work zone management plans and detours to minimize delay and crashes during roadway-based construction. This work includes bicycle, pedestrian, and transit modes
- The Traffic Safety Unit provides ongoing crash data, and implements and evaluates strategies to reduce crashes frequency and severity. Responsibilities include investigating fatal crashes, establishing speed limits, parking restrictions and truck restrictions and prohibitions, as well as administering the federally mandated and funded Highway Safety Improvement Program.
- The Traffic Systems Operations Unit uses signal system timing, incident management, intelligent transportation systems, and public information strategies to improve the flow of traffic on the state's roads.

Preservation of Existing Transportation System

At its most fundamental level, this Plan preserves the existing transportation system through The Financial Plan identifying and allocating maintenance funding for transportation infrastructure. This MTP also encourages preservation through its focus on roadway modernization and intersection improvement projects. The public engagement process and project selection methodology promoted roadway safety improvements and congestion relief by emphasizing incremental roadway upgrades and capacity improvements along existing alignments. Intersection enhancements are a major source of improved operational efficiency and congestion mitigation.

NCDOT Division 9, WSUAMPO, and local municipalities should coordinate on an annual basis to review the upcoming roadway maintenance list for the next three years to identify opportunities for implementing bicycle lanes or other quick-and-easy bicycle and pedestrian improvements at the time of resurfacing.

Resilience and Reliability

A resilient and reliable transportation system recovers quickly—or continues to function adequately—even under severe and unexpected conditions, such as natural disasters, severe weather, changing climate, fuel shortages, economic crises, or other disruptions. Such a robust system may be achieved through redundancy, or building excess capacity; however, as a general strategy, this is an expensive option that may not always work, and which can have significant negative impacts on communities and the environment. A more effective and efficient alternative incorporates careful planning and risk analysis to identify and mitigate significant hazards. The goal is to build smarter—or sometimes not to build at all. Careful coordination between land use and transportation infrastructure is critical to minimize risk exposure and the high costs of both lost investments and post-event recovery.

Resiliency planning involves both existing infrastructure and new construction, though in different contexts. As environmental risks increase, it may not be practical to maintain, modify, or rebuild existing facilities. Planning decisions may include abandonment and repurposing as alternatives. Uncertain environmental risks must be carefully considered with respect to the anticipated service life of new construction, and reflected in design decisions and life cycle costs.

A robust transportation system must almost by definition be multimodal, thereby distributing risks and increasing overall reliability and resilience. Over-dependence on a single mode, facility, or even fuel source is a long-term vulnerability. At the same time, intermodal and multimodal nodes, junctions, or corridors can be weak links in the overall transportation system if not carefully planned and designed.

There is significant overlap between security and resilience/reliability goals. Many of the same strategies and agencies are involved, and planning for these two factors should be closely coordinated. Additionally, this planning must be multi-jurisdictional, multimodal, and encompass both public and private sectors. Fortunately, many of the goals, objectives, and performance measures used in developing a transportation plan and projects for “typical” conditions also apply to “exceptional” conditions, as long as parameters are appropriately adjusted to reflect future conditions.

In planning for the future of our communities, increases in extreme weather, flooding events, or wildfires may be a given. The following stormwater and transportation policies and practices are recommended for the WSUAMPO region to incorporate as part of local and regional plans, initiatives and projects.

Transportation Infrastructure Upgrades

- As part of roadway widening and bridge replacement, consider bridge and culvert size and height; resize or raise elevation as warranted
- If implementing curb-and-gutter cross-sections, ensure adequate height differential between roadways and sidewalks and ensure properly designed drainage to avoid sidewalks covered in standing water during rain events as much as possible
- For transit corridors, consider covered shelters to provide protection from the rain and the elements for passengers waiting to board a bus; consider shade implications as part of shelter design due to expected increase in heatwaves occurrence
- For greenways and multi-use paths in low-lying areas that serve as key transportation corridors consider flood warning features and alternate/bypass sections for detours during storm and flooding events

ITS and Advanced Warning Systems

- Implement additional electronic signage and warning systems on highway corridors prone to flooding to alert motorists to watch for standing water or flooding ahead and detour if needed
- Set up alert systems to text area residents when specific roadways are closed, or transit routes altered, rescheduled, or cancelled due to flooding or other event

Stormwater Management

- Incorporate stormwater infrastructure improvements as part of major roadway projects
- Include pervious pavers, bioswales and rain gardens as part of roadway improvements/complete streets implementation, where the green buffer zone between the travel lanes and the sidewalks can also serve to improve stormwater retention
- Consider incorporating “green street” concepts and features into Complete Street projects. The two approaches are often compatible and even synergistic

Travel and Tourism

A safe, efficient, convenient, user-friendly transportation system can contribute significantly to a community's appeal to travelers and tourists who chose where to visit and spend their hard-earned discretionary dollars. At the same time, very few visitors come to a city solely because of its efficient traffic flow. On the contrary, travelers are discouraged by confusing, congested, hazardous roads with few options for walking or biking or otherwise getting around without a car. In fact, walkable mixed-use districts are increasingly essential ingredients for a vital tourism industry.

Many of this Plan's bicycle and pedestrian recommendations connect to activity centers, historic and cultural sites, recreation areas, event venues, and additional transportation options that would be of interest to visitors. A comprehensive, high-quality network of shared bicycle/pedestrian paths, sidepaths, or greenways accessing interesting sites can itself be a tourist attraction, and a significant economic engine.

Other transportation services that can enhance the visitor experience include bike share and a free circulator bus/trolley. Parking availability, location, cost, and directional signage are also important elements supporting visitor and tourist travel.

Municipalities can work with NCDOT's Signing and Delineation Unit, which oversees the Department's Tourist-Oriented Directional Signing Program, to develop and implement directional signage related to tourist attractions.

The addition of rail service connecting Winston-Salem with Raleigh and Charlotte would facilitate travel and tourism and expand travel options, especially if existing service is improved and expanded, and high-speed rail is initiated. Reviving rail service to Asheville could also be considered.

Table 5 - MTP Goals and Objectives and Federally-Required Transportation Planning Factors

WSUAMPO MTP GOALS AND OBJECTIVES						
Federal Planning Factors	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6
	Improve mobility and accessibility for people and goods across the region	Support smart regional growth and economic development	Create vibrant, healthy and resilient communities	Improve safety and security of the transportation network	Support transportation for tomorrow	Ensure maintenance of existing infrastructure and services and state of good repair
	Support the economic vitality of the metropolitan area					
	●	●	●	○	●	●
	Increase the safety of the transportation system for motorized and non-motorized users					
	●	●	●	●	●	●
	Increase the security of the transportation system for motorized and non-motorized users					
	○	○	●	●	●	○
	Increase the accessibility and mobility of people and freight					
	●	●	●	●	●	○
Protect and enhance the environment, promote energy conservation, and improve the quality of life						
	○	●	●	●	●	○
Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight						
	●	●	●	●	●	○
Promote efficient system management and operations						
	●	●	○	●	○	○
Emphasize the preservation of the existing transportation system						
	○	●	●	●	●	●
Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation						
	○	●	●	○	●	○
Enhance travel and tourism						
	●	●	○	○	●	
Number of Federal Planning Factors Addressed Fully or Partially by Goal						
	10	10	10	10	10	9

KEY: ○ Partial ● Full



Chapter 4. Public and Stakeholder Outreach

4.1 COVID-19 Impacts and Virtual Public Engagement

In the spring and summer of 2020, COVID-19 pandemic and resulting social distancing measures meant a significant change to public gathering protocols and acceptable public outreach strategies. While a robust program of in-person public outreach meetings was initially planned for Making Connections 2045, those plans had to change quickly as the state of North Carolina effectively had to shut down in late March and then initiated a slow reopening in May of 2020. On March 27, 2020 Governor Roy Cooper ordered people in the state of North Carolina to stay at home for thirty days until April 29, 2020. Only essential businesses were allowed to remain open. Gatherings of more than 10 people were prohibited. On April 23, 2020, the stay-at-home order was extended through May 8, 2020. On May 9, 2020, North Carolina entered Safer at Home Phase 1 reopening. As of August 2020, North Carolina remained in Safer at Home Phase 2 of lifting COVID-19 restrictions, expected to last until Friday, September 11, 2020. As part of Safer at Home Phase 2, outdoor gatherings were limited to 25 people and indoor gatherings were limited to ten people. Wearing masks was required in most situations where distancing of six feet was not always possible. As of mid-August 2020, North Carolina had 144,952 reported COVID-19 cases and 2,347 COVID-19 related deaths, underscoring the importance of continued social distancing⁶. Under those circumstances typical in-person public meetings were not feasible. Instead, the study team and Winston-Salem staff had to quickly pivot the public engagement strategy to be based on virtual webinar meetings and web presence.

4.2 Public and Stakeholder Outreach Overview

Public and stakeholder engagement was a critical component in developing Making Connections 2045. The following elements helped ensure the study team heard from a variety of stakeholders and members of the public:

- A Steering Committee was formed for the plan update, including representatives from local governments, transit agencies, and railroad and aviation representatives; five meetings were held with the Steering Committee between April-June 2020

- Stakeholder interviews were conducted to ensure that the perspective of various additional groups and agencies was captured
- Three rounds of online public survey took place during the study in May, July and August-September 2020
- Three rounds of public input meetings were held during the plan process, including the first series of virtual meetings between May 5-20, 2020; a second round with a virtual public meeting posted between July 23-August 9, 2020, and a third round of virtual meetings held from August 25 - September 3, 2020.
- The draft MTP report was posted for public review from August 17-September 16, 2020
- A public hearing was held for the MTP adoption during the TAC Meeting on September 17, 2020

4.3 Stakeholder Interviews

As part of Making Connections 2045, interviews were conducted with four stakeholder groups in July and August of 2020. These groups were selected with the guidance of WSUAMPO and represent the diverse economic and transportation interests and needs of the planning area. Interviews were conducted via Zoom Conference call. The summary of comments is included below and grouped by major theme. While all stakeholders were asked a similar set of questions, some questions were tailored to capture the specific needs of certain populations. The following groups participated in the stakeholder interviews and were able to provide a response within the time constraints:

- City-County Planning Board
- Downtown Winston-Salem Partnership
- Technical Advisory Committee
- NCDOT Division 9

The following are themes that were repeated over the course of the interviews. Specific information on responses can be found in the Public and Stakeholder Outreach Appendix.

- All participants are **familiar** with the WSUAMPO, its functions and the MTP process and want to continue to be involved in transportation planning processes.
- Stakeholders agreed that there is a **shortage of funding** to keep up with the priorities of the region.
- There is a need for **more diversity on what transportation funds are spent on**. Mass transit, bicycle/pedestrian, and streetscape projects should not require a blend of private dollars when roadway projects do not require them.
- Respondents feel the region's transportation network generally provides acceptable services, though it caters to automobiles.
- The **completion of the Beltway project** is a priority for the Triad region and NCDOT Division 9.
- There is a **lack of adequate transit infrastructure**. The current transit system is **too infrequent and unreliable** to convince residents to use it over their personal vehicles.
- **Connected/autonomous and electric vehicles may become common sooner than is generally expected**, and the region needs to begin preparing for these technologies.

4.4 Online Survey Results

There were three Making Connections 2045 surveys administered during the plan update process. The first survey was posted for response from May 5, 2020 through June 3, 2020. The MetroQuest platform was utilized for the first survey and 419 unique surveys were received. Respondents were able to indicate their preferences regarding overall MTP priorities, identify MTP spending priorities by project type and add markers to the map to identify a location of particular concern or issue.

The second survey was posted for response from July 23 through August 9, 2020. A total of nine responses were received. Participants were asked to provide feedback regarding the draft roadway recommendations (Scenario 1 with an emphasis on capacity improvements and Scenario 2 with an emphasis on modernization and safety), as well as transit and bicycle and pedestrian recommendations. With regards to roadway improvements, the respondents mostly preferred Scenario 2 with a focus on modernization and safety or a hybrid between some modernization and some roadway capacity projects.

The third survey was posted for public feedback and response from August 17 through September 16, 2020 and asked for more specific feedback regarding draft roadway, transit, bicycle and pedestrian recommendations as well as regarding EV charging station desired locations.

Please see the Public and Stakeholder Outreach Appendix for additional details.

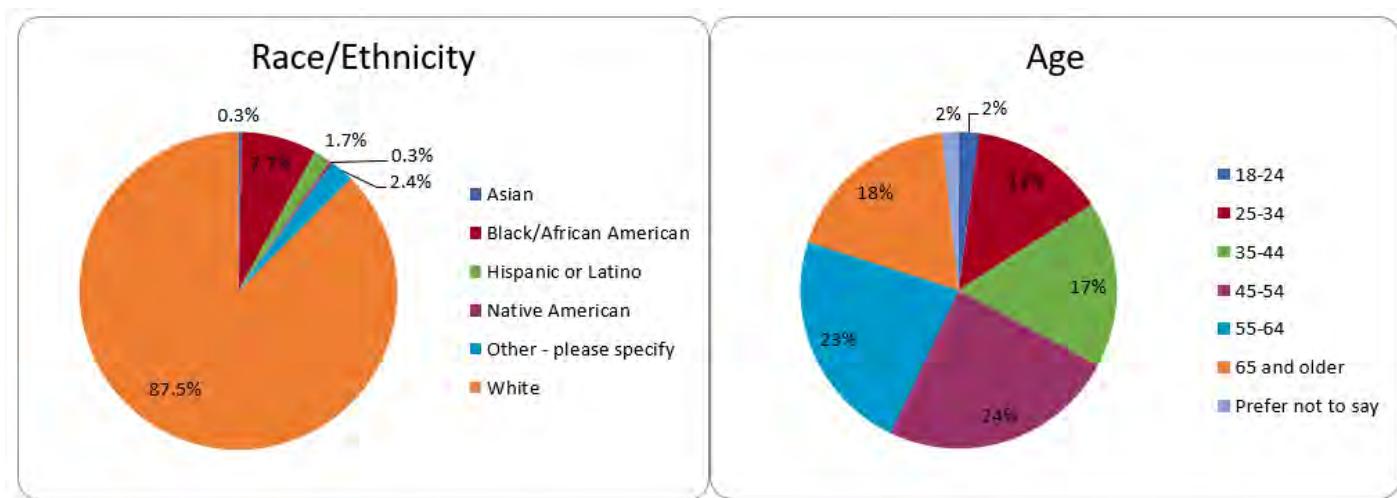


Figure 9 - Survey Round 1 Participants Demographics

4.5 Public Input Meetings

Round 1: May 2020 Virtual Public Meetings

During the first round of public involvement, five virtual (zoom webinar) public meetings were held between May 5 and May 20, 2020. Those virtual public meetings were held at different times - typically either mid-morning or in the early evening. The same materials were presented at each of the five sessions.

Approximately 60 people participated in the virtual public meeting sessions. Participants were provided with an overview of the study process and encouraged to fill out the online survey. They were able to ask questions during the live Q&A sessions. A recording of one of the presentations was posted afterwards on the study website.

Round 2: July 23–August 9 Virtual Public Meetings

The second round of public involvement included a virtual meeting room (or lobby) where handout materials were posted, see images in Figure 10 below. In addition to the virtual meeting, four simultaneous virtual (zoom webinar) break-out sessions were held during the second round of public meetings, focused on the following topics:

- Roadway Congestion and Draft Recommendations
- Transit Draft Recommendations
- Bicycle and Pedestrian Draft Recommendations
- Freight, Rail, Aviation and Innovative Technologies Draft Recommendations

Approximately 26 people participated in the virtual break-out sessions on July 23; over 550 people visited the virtual meeting room between July 23 and August 9, 2020.

Roadway Congestion and Draft Recommendations Webinar

Thirteen unique participants joined the webinar on roadway congestion and draft recommendations. The following questions/comments were brought up during the Q&A portion of the webinar:

- Is the MTP a financially constrained plan?
- Will each breakout sessions' recording be available online afterwards?
- Where can we see the CTP?
- The Reynolda Connector goes through the Children's Home property but appears to be blocked by the new middle school. How would that get built?
- I'm not sure if this was asked or answered- but the bridge that goes over US-421 (Jonestown Rd)- what thoughts are being considered to widen that bridge because every time I am on that bridge, I always feel like I could be side-swiped.
- Are feasibility studies and estimates being done for each project on the MTP?
- Have the construction sequencing for the Northern Beltway Western section been finished
- I think the Northern Beltway Western Section from US 158 to Interstate 40 is a very good project and would, help Lewisville Clemmons Road congestion.

Transit Draft Recommendations Webinar

Twelve unique participants joined the webinar on transit recommendations. The following questions/comments were brought up during the Q&A portion of the webinar:

- There is no 30-minute headway now. Have you seen this <https://www.blindspot.city/2020/06/wsta-prominent-transit-corridors-report.html>?
- Concern: I have a concern with the transit recommendations not servicing areas of higher EJ needs.
- Yes, east Winston and the Winston-Salem State University area to Reynolds Park should be considered. Thanks!
- That StreetLight data that you had, is that all people moving?

Bicycle/Pedestrian Draft Recommendations Webinar

This webinar was joined by 13 unique participants. The following questions/comments were brought up during the Q&A portion of the webinar:

- For the sidepath along Stratford Road...would that leverage the railroad track area or the other side of the street?
- In addition to safety, what factors drive which recommendations are made and prioritized?
- How long will the second survey be open for submission?
- You've mentioned that this plan overlaps with other existing plans (like W-S's Bicycle Master Plan). Can you speak to how these will actually be used together to implement projects?
- Is there a "bicycle boulevard" part of the recommended projects? If so, where?

Freight, Rail, Aviation, and Innovative Technologies

Five unique participants joined the webinar on Freight, Rail, Aviation and Innovative Technologies draft recommendations. The following questions/comments were brought up during the Q&A portion of the webinar:

- With Electric Vehicle charging locations- those mapped are said to be priority locations. How would we be able to offer up new locations that are not listed on the map? Can those locations change to better suit both populations that already have those types of cars and those that will possibly have them in the future?
- I'm on my office computer so no video or mic, but I can potentially gather other locations and submit them via email?



Figure 10 - Virtual Public Meeting Lobby Set up with Posters and Links to Break-out Sessions for Round 3

Round 3: August 17–September 16

Public Meetings and Public Comment Period

During the third round of public involvement, a virtual public meeting room or lobby, similar to what was created for round two, was set up with links to handouts, break-out sessions and a survey. The draft MTP plan was posted for a 30-day public comment starting on August 17, 2020. The announcement was shared with the study Steering Committee and interested members of the public via email; additional notice was posted to the City of Winston-Salem website and social media platforms. The virtual public meeting space with handouts was made available to the public starting on August 20, 2020 and remained open through September 16. Spanish translations of handouts were provided, as well as a link to a survey in Spanish. Five virtual (zoom webinar) public meetings were held during the third round of public meetings between August 25 and September 3, 2020. Three virtual public meetings focused on roadway improvements, one virtual public meeting focused on bicycle and pedestrian improvements, and one virtual public meeting focused on transit improvements. Virtual public meetings were held at different times-either mid-morning or early evening. Please see the Public and Stakeholder Outreach Appendix for additional details regarding the number of attendees during the third round of public involvement sessions.

Chapter 5. Transportation System

5.1 Roadway

Traffic Volumes and Congestion

The WSUAMPO planning region major corridors include:

- Interstate facilities: I-40, I-40 Business, I-285, I-74
- Four US routes: US 421, US 52, US 158, US 311
- Six NC routes: NC 65, NC 66, NC 67, NC 109, NC 150, NC 801

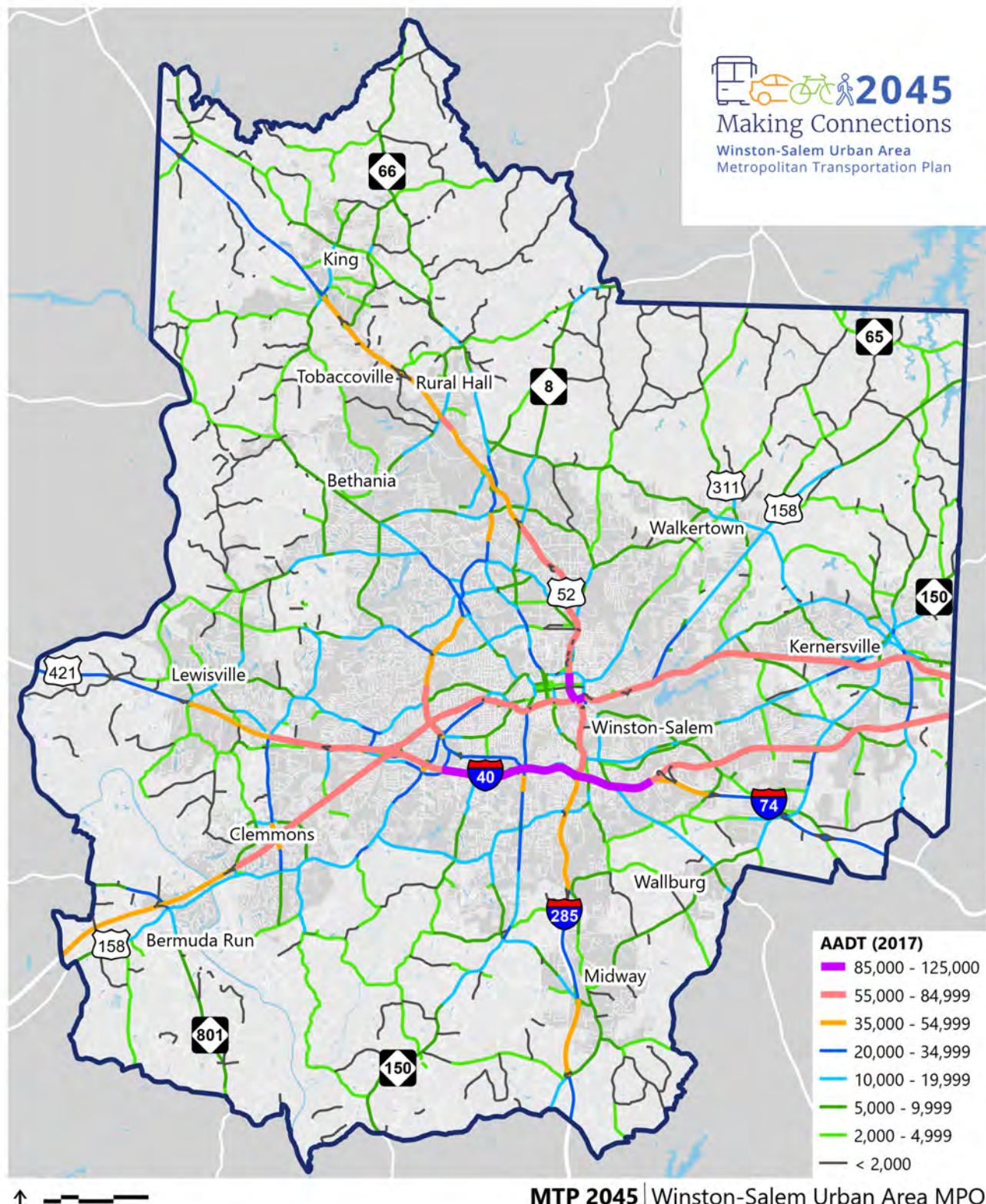
When looking at traffic volumes and congestion, I-40 carries the highest traffic volumes in the region, particularly where it runs closest to Winston-Salem. The average annual daily traffic (AADT) on I-40 reaches up to 111,000 vehicles per day where I-40 meets US 52/I-285. The section of US 52 just north of US 421 (Salem Parkway/former I-40 Business) carries the second highest volume of traffic in the region, up to 90,000 vehicles per day. Other parts of US 52/I-285 also carry relatively high volumes ranging between 50,000-70,000 vehicles per day through Winston-Salem. Other high volume roads include US 421 Salem Parkway through downtown Winston-Salem with volumes between 60,000-80,000 vehicles per day and US 421 east of Lewisville and west of Winston-Salem downtown, with volumes up to 66,000 vehicles per day. Figure 11 below illustrates the existing traffic volumes in the area.

Traffic congestion during the PM peak period, 4 PM-6 PM, was analyzed using real-time HERE data from 2018. Congestion appears to be most frequent and severe along key sections of major arterial corridors, many of them running in the north-south direction and connecting to I-40, US 421 and US 52. Congested arterials include segments of Silas Creek Parkway and Martin Luther King, Jr. Dr. See Figure 12 below for PM Peak congestion hot spots based on HERE data.

There is a significant number of bridges and culverts throughout the WSUAMPO region. There are no bridges within Forsyth County identified by NCDOT, which are bridges where some deficiencies and weight limitations are in place. As a service to the freight industry, law enforcement and local state and federal agencies, NCDOT indicates the maximum amount of weight a bridge can safely support.

Projects Funded in the STIP

A variety of interstate, roadway improvements, aviation, bicycle and pedestrian, transit, and passenger rail improvements in the WSUAMPO region are included for funding in the 2020-2029 STIP. As a result of the latest two-year prioritization process, P 5.0, 42 new projects have been added to the 2020-2029 STIP, including a variety of intersection, interchange improvement and modernization projects. The figure and tables below illustrate those projects, with the map showing only those projects considered “committed” (funded for right of way [ROW] or preliminary engineering [PE] in FY 2025 or earlier). The tables exclude pavement rehabilitation and transit operations projects.



April 07, 2020



Figure 11 - Traffic Volume- 2017 Annual Average Daily Traffic (AADT)

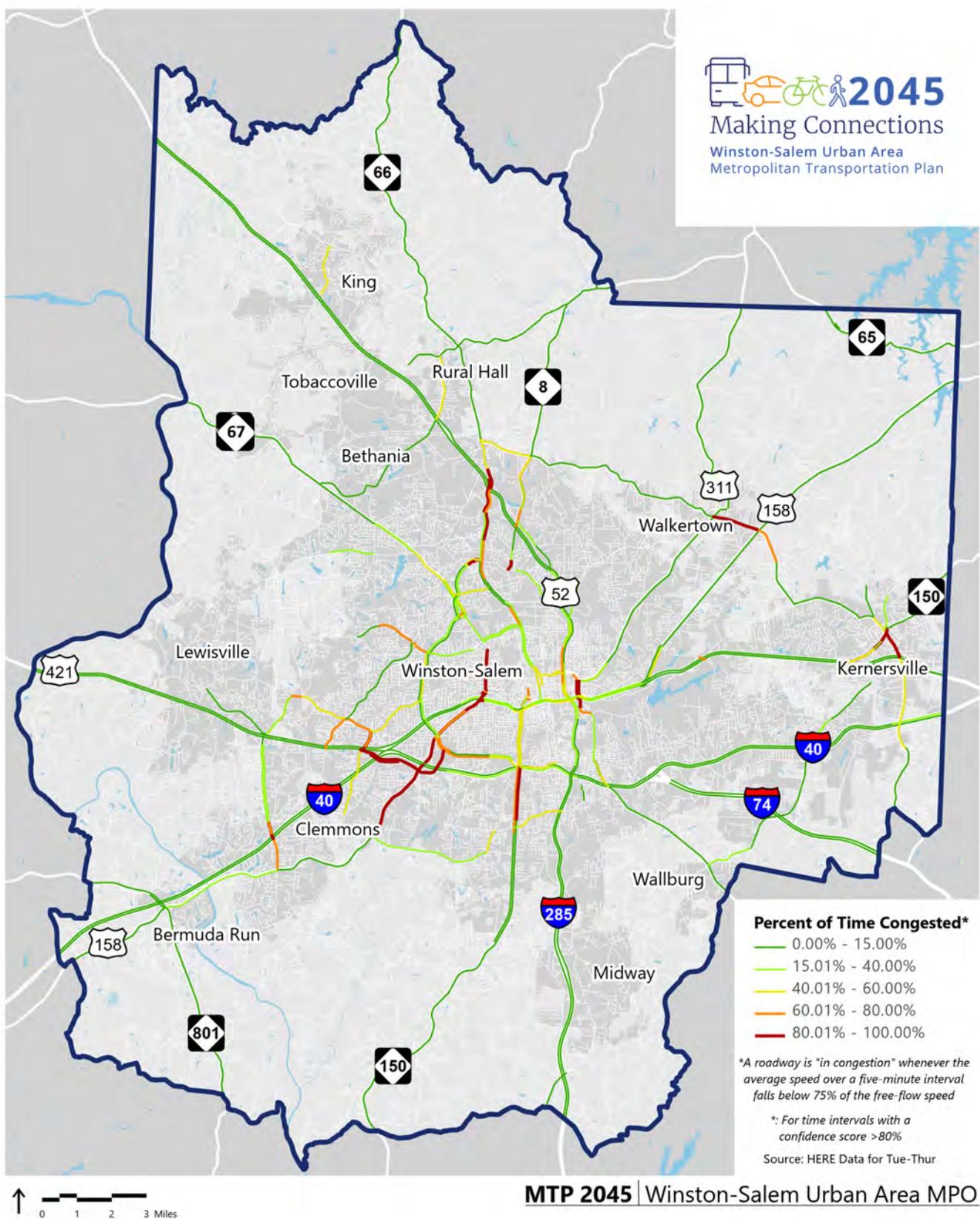


Figure 12 - Percent of Time Congested, PM Peak Conditions

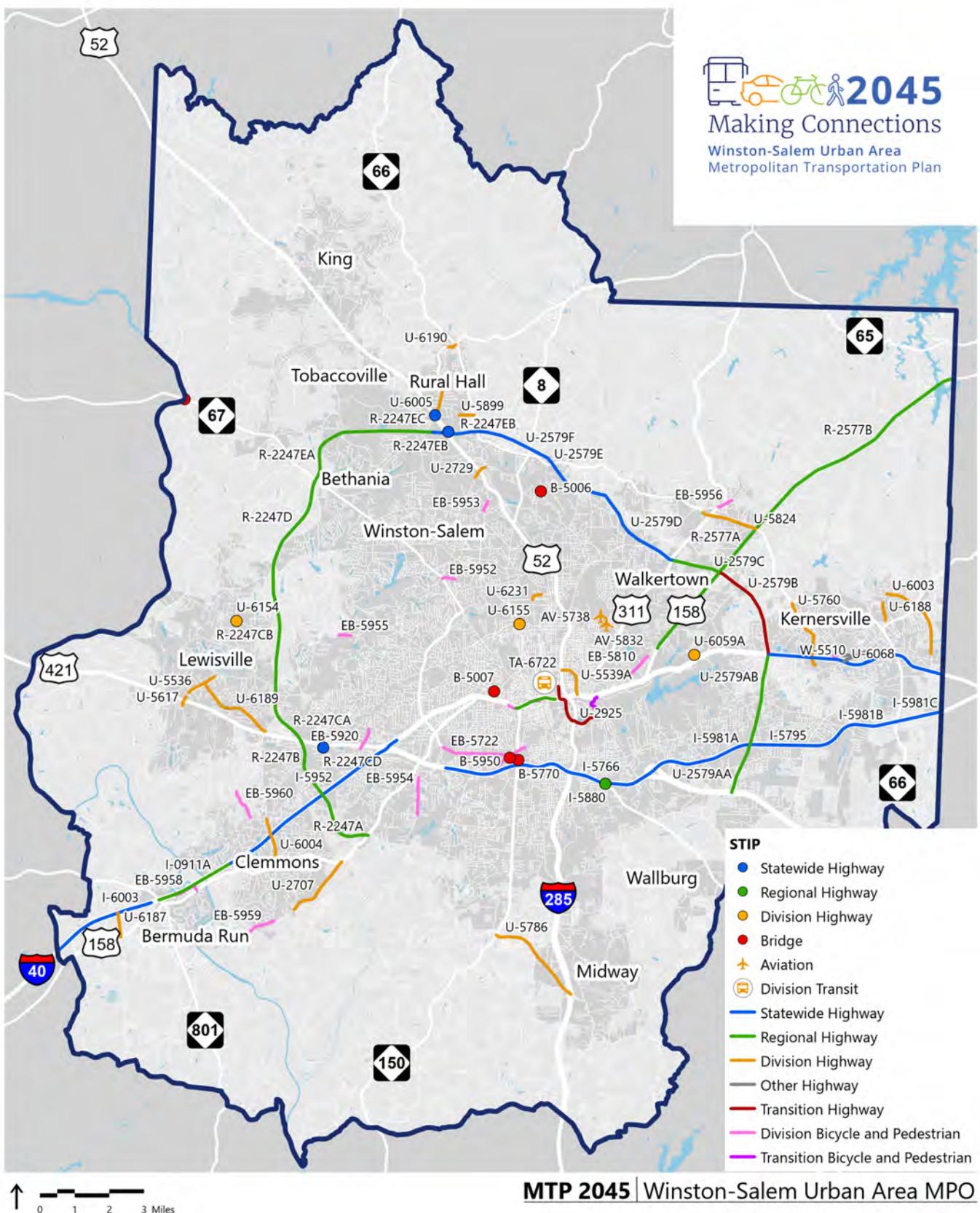


Figure 13 - Projects Committed for Funding in 2020-2029 STIP

April 06, 2020



Table 6 - Projects Included in the Draft 2020-2029 STIP (Repaving and Transit Operations on Existing Routes not Included)

WSUAMPO MAJOR ROADWAY PROJECTS COMMITTED IN 2020-2029 TIP						
TIP	Route	Description	Cost Schedule Year	Project Cost	Counties	Status
I-0911A	I-40	W of NC 801 in Davie Co to SR 1101 (Harper Rd) in Forsyth Co		\$26,156,000	Davie, Forsyth	Under construction; Design-Build
I-5766	I-40	1.3 Mi East of NC 150 (Peters Creek Parkway) to NC 109 (Thomasville Rd) in Winston-Salem. Pavement Rehabilitation.		\$-	Forsyth	Under construction-coordinate with I-5857
I-5795	I-40	0.3 mi East of SR 3153 (Hanes Mall Blvd) to 0.9 Mile East of NC 150 (Peters Creek Parkway) in Winston-Salem and SR 2747 (Clemmonsburg Rd) in Winston-Salem to Guilford County Line. Pavement Rehabilitation.	2021	\$14,563,000	Forsyth	Committed
I-5952	I-40	SR 1101 (Harper Rd) in Clemmons to East of US 421 / BUS 40 in Winston-Salem. Pavement Rehabilitation.		\$-	Forsyth	Under construction
I-6003	I-40	SR 1436 (Pinebrook School Rd) to West of NC 801. Pavement Rehabilitation.	2023	\$2,900,000	Davie	Committed
R-2247EA	New Route (Future NC 452)	Winston-Salem Northern Beltway, Western Section, NC 67 to South of US 52	2023	\$44,119,000	Forsyth	Committed
R-2247EB	New Route (Future NC 452)	Winston-Salem Northern Beltway, Western Section, Interchange at US 52		\$83,655,000	Forsyth	Under construction; Design-Build
R-2577A	US 158	North of US 421 / I-40 BUS to SR 1965 (Belews Creek Rd), Multi-lanes	2022	\$62,279,000	Forsyth	Committed
U-2579AA	Future I-74	Winston-Salem Northern Beltway, Eastern Section, I-74 / US 311 to I-40	2021	\$121,420,000	Forsyth	ROW in progress; GARVEE BONDS: \$60 mil. for CST
U-2579AB	Future I-74	Winston-Salem Northern Beltway, Eastern Section, I-40 to US 421 / NC 150 / BUS 40	2020	\$201,415,000	Forsyth	ROW in progress; GARVEE Bonds: \$114 mil. for CST
U-2579B	Future I-74	Winston-Salem Northern Beltway, Eastern Section, US 421 / NC 150 / BUS 40 to US 158		\$68,971,000	Forsyth	Under construction; Design-Build; GARVEE Bonds: \$96 mil. for CST
U-2579C	Future I-74	Winston-Salem Northern Beltway, Eastern Section, US 158 to US 311		\$36,888,000	Forsyth	Under construction; Design-Build; GARVEE bonds: \$6.5 mil. for ROW
U-2579D	Future I-74	Winston-Salem Northern Beltway, Eastern Section, US 311 to SR 2211 (Baux Mountain Rd)		\$53,534,000	Forsyth	Under construction; Design-Build; GARVEE BONDS: \$48 mil. for CST - PAYBACK 2018-2032
U-2579E	Future I-74	Winston-Salem Northern Beltway, Eastern Section, SR 2211 (Baux Mountain Rd) to NC 8		\$33,462,000	Forsyth	Under construction; Design-Build; GARVEE BONDS: \$30 mil. for CST
U-2579F	Future I-74	Winston-Salem Northern Beltway, Eastern Section, NC 8 to West of NC 66 (University Parkway)		\$26,767,000	Forsyth	Under construction; Design-Build; GARVEE bonds: \$24 mil. for CST
U-2707	SR 3000 (Idols Rd)	SR 2999 (Hampton Rd) to US 158 in Clemmons. Construct Two-lane Shoulder on New Location and Replace Bridge 330109 over Norfolk Southern RR		\$-	Forsyth	Under construction

WSUAMPO MAJOR ROADWAY PROJECTS COMMITTED IN 2020-2029 TIP CONT...

TIP	Route	Description	Cost Schedule Year	Project Cost	Counties	Status
U-2729	SR 1672 (Hanes Mill Rd)	Museum Dr to SR 4000 (University Pkwy) in Winston-Salem. Widen to multilanes.	2021	\$19,800,000	Forsyth	ROW in progress; BUILD NC bonds: \$778,000 for PE/\$6 Mil. ROW
U-2827B	US 158 / US 421 / NC 150 / BUS 40	West of Fourth St to East of Church St		\$-	Forsyth	Under construction; Design-Build
U-2925	New Route	Salem Creek ConnectoR, SR 4326 (Rams Dr) to SR 4325 (Martin Luther King, JR. Dr) in Winston-Salem. Multilane Facility on New Location.		\$-	Forsyth	Under construction; Design-Build
U-4734	New Route	Macy Grove Rd Extension, SR 1005 (East Mountain St) to NC 150 (North Main St) in Kernersville. Four-lane Dividied Facility on New Location.		\$-	Forsyth	Under construction
U-5536	New Route	Proposed Great Wagon Rd from Shallowford Rd (SR 1001) to Lewisville-Vienna Rd (SR 1308) in Lewisville. Multilane Facility on New Location with Bicycle and Pedestrian Accommodations	2023	\$14,201,000	Forsyth	Non-State-System Facility-Local match - Lewisville
U-5539A	US 311; SR 4394 (Martin Luther King, JR. Blvd)	US 158 / US 421 / NC 150 / Business 40 to US 52 / NC 8 in Winston-Salem. Streetscape improvements.	2021	\$2,788,000	Forsyth	Committed
U-5617	SR 1173 (Williams Rd)	Improve Roundabouts West & East of Bridge over US 421. Widen to Multilanes East of Bridge to West of Roundabout at SR 1001 (Shallowford Rd) with sidewalks on both sides. Town of Lewisville.	2020	\$1,160,000	Forsyth	ROW in progress by town of Lewisville
U-5760	Kernersville Southern Loop (Ph I)	US 421 / BUS 40 to NC 66 (West Mountain St) in Kernersville. Widen Big Mill Farm Rd and SR 2649 (HopkinS Rd) and Construct Interchange at US 421 / NC 150 / BUS 40.	2023	\$28,746,000	Forsyth	BUILD NC BONDS: \$12 mil. for CST
U-5786	SR 1508 (Hickory Tree Rd)	US 52 / NC 8 / Future I-285 to NC 150. Widen to multilanes.	2023	\$21,833,000	Davidson	Committed
U-5824	NC 66 (Old Hollow Rd)	Harley Dr to US 158 in Walkertown. Widen to multilanes.	2023	\$23,902,000	Forsyth	Committed
U-5899	New Route	forum Pkwy Connector, SR 3955 (forum Pkwy) to NC 66 (University Parkway) in Rural Hall. Construct 2-lane roadway on new location.	2024	\$11,613,000	Forsyth	Committed
U-6003	New Route	SR 1969 (PinEY GROVE Rd) to NC 150 (North MAin St) in Kernersville. Construct Two-lane Divided Facility with Bicycle/Pedestrian Accommodations.	2022	\$8,100,000	Forsyth	ROW in progress
U-6004	SR 1103 (Lewisville-Clemmons Rd)	US 158 to SR 1891 (Peace Haven Rd) in Clemmons. Access Management and Operational Improvements	2025	\$26,038,000	Forsyth	Committed; BUILD NC BONDS: \$12 mil. for ROW - payback 2023-2037
U-6005	NC 65 (Bethania-Rural Hall Rd)	US 52 to SR 3983 (Northridge Dr) in Rural Hall. Widen to multilanes.	2023	\$21,200,000	Forsyth	Committed

WSUAMPO MAJOR ROADWAY PROJECTS COMMITTED IN 2020-2029 TIP CONT...

TIP	Route	Description	Cost Schedule Year	Project Cost	Counties	Status
U-6187	New Route	SR 1630 (Baltimore Rd) to I-40. Construct 2-Ln Extension of Baltimore Rd and Interchange at I-40.	2024	\$24,500,000	Davie	Committed
U-6231	New Route	SR 4001 (Reynolds Blvd) to SR 2264 (Akron Dr) at inters. of SR 1763 (Indiana Ave) in Winston-Salem, Construct access rd	2020	\$4,000,000	Forsyth	Economic Development project
W-5510	SR 4315 (South Main St); SR 2648 (Old Winston Rd)	SR 4315 (S Main St), BUS 40 / US 421 / NC 150 to N of SR 4278 (S Cherry St), and SR 2648 (Old Winston Rd), W of S Cherry St to S Main St in Kernersville. Safety improvements including raised median, turn lane		\$-	Forsyth	Under construction
I-5880	I-40 / US 311	NC 109 (Thomasville Rd) / Clemmonserville Rd Split-diamond interchange in Winston-Salem. Convert half-diamond Interchange at NC 109 to full diamond and remove connector rds and half diamond Interchange at Clemmonserville Rd	2022	\$14,000,000	Forsyth	Committed
R-2247CD	SR 1891 / Non-System (Peace Haven Rd)	SR 1891 / non-system (Peace Haven Rd) - US 421 Interchange and approaches		\$-	Forsyth	Design-Build; in progress - Let with R-2247EC
R-2247EB	New Route (Future NC 452)	Winston-Salem Northern Beltway, Western Section, Interchange at US 52		\$83,655,000	Forsyth	Design-Build; Under Construction
R-2247EC	US 52 / Future I-74	NC 65 Interchange. Reconstruct Interchange.		\$-	Forsyth	Design-Build; in progress - Let with R-2247CD
TA-6722	PART	Purchase Vehicles for Vanpool Fleet Expansion	2021	\$100,000	Forsyth, Guilford, Randolph	Committed
U-6154	SR 1308 (Lewisville-Vienna Rd)	SR 1348 (Robinhood Rd) in Lewisville. Convert Existing Signalized intersection to a Sinngle lane roundabout	2021	\$1,150,000	Forsyth	Committed
U-6155	SR 1725 (University Parkway)	Coliseum Dr in Winston-Salem. Construct intersection Improvements for Pedestrian Safety.	2021	\$206,000	Forsyth	In progress
B-5825	NC 67	Rebuilding bridge over Yadkin River to modern standards, includes realigning the interSection of N.C. 67 and Donnaha Rd in Forsyth County.		\$-	Yadkin	ROW in progress. CST expected in fall 2020 BUILD NC Bond funding \$8M for CST

5.2 Public Transportation

Existing Transit Service

Three public transit systems providing fixed-route, vanpool, commuter express bus, and demand response services partly funded by WSUAMPO:

- Piedmont Authority for Regional Transportation (regional commuter/express bus) (PART)
- Winston-Salem Transit Authority (WSTA)
- Davidson County Transportation (DC Rides)



PART provides five routes operating through Winston-Salem which provide regional commuter and express service. In addition to fixed route service PART offers a regional vanpool program and a regional carpool matching program. The fixed route service through Winston-Salem includes:

- Route 1 – Connecting Downtown Winston-Salem, the Innovation Quarter, and Coble Transport Center (CTC) with 30-minute peak and hourly off-peak headways.
- Route 5 – Connecting Winston-Salem with High Point Amtrak Station for timed connections with train arrivals and departures.
- Route 6 – Connecting Mount Airy, Pilot Mountain, King, and Winston-Salem with peak hour commuter-oriented service pattern.
- Route 17 – Connecting Winston-Salem, Kernersville, and CTC with hourly peak hour service.
- Route 28 – Connecting Clemmons, Lewisville, and Winston-Salem with peak hour commuter-oriented service pattern (recently eliminated).

To mitigate increased congestion due to the construction of I-40 Business in downtown Winston-Salem, multiple PART routes received funding for enhanced service. Three routes were affected by the reduction in funding due to the reopening of I-40 Business. Service and financial modifications were proposed to be implemented in August 2020. Route 6 (Surry County) lost funding, but to maintain service levels, will receive replacement funding through a different source. Route 17 (Kernersville Express) lost funding but the shortfall will be absorbed into the PART budget to maintain service levels. Route 28 (West Forsyth Express) lost funding and will subsequently discontinue service.

WSTA provides 32 fixed bus routes throughout the Winston-Salem area with the majority of routes operating at hourly headways throughout the day. In addition to fixed route service, WSTA offers a ride sharing transportation service (Trans-Aid) for eligible riders who are older and/or have a disability that prevents them from utilizing the fixed route service.

One additional public transit system, Davidson County Transportation (DC Rides), operates outside the WSMPO region but receives funding from the MPO for two deviated fixed routes in the City of Lexington. The two routes in Lexington operate Monday through Friday with hourly headways between 6 AM and 6 PM.

Park-and-Ride Lots



Davidson County Transportation Vehicle

There are currently five Park-and-Ride lots in the WSUAMPO Region based on information shared on the PART website (<https://www.partnc.org/162/Park-Ride-Locations>) and WSTA website (<https://wstransit.com/services/>):

- Kernersville Medical Center Park-and-Ride:
Located at 1750 Kernersville Medical Parkway (Novant Health). This park-and-ride is served by PART Route 17 (Kernersville Express).
- Kernersville Town Hall Park-and-Ride: Located at 134 E Mountain Street. This park-and-ride is served by PART Route 17 (Kernersville Express).
- Downtown Winston-Salem: Located at the parking deck on 4th Street between North Church Street and North Chestnut Street. This park-and-ride is served by PART Routes 1 (Winston-Salem Express), 5 (NC Amtrak Connector), 6 (Surry County Express), 17 (Kernersville Express), as well as multiple WSTA routes within quick walking distance.
- Peters Creek Parkway Walmart Park-and-Ride:
Located at the Walmart off of Peters Creek Parkway. This park-and-ride is served by WSTA Route 83.

Carpooling and Vanpooling

PART currently supports 20 registered 15-passenger vanpools that originate in the triad region. Prior to COVID-19, PART was supporting 54 vanpools. PART's vanpool programs is based out of Winston-Salem and was one of PART's first regional programs. Conversation and coordination will be critical among stakeholders to rebuild the vanpool program post COVID-19. In addition to the vanpool program, carpoolers can register through the PART website, but no official count of active carpools exists. The vanpool and carpool programs can be a strong tool in the suite of Transportation Demand Management (TDM) measures for the Winston-Salem region.

Ridership on Transit

Piedmont Authority for Regional Transportation (PART)

PART systemwide ridership has varied over the previous seven years, as seen in Table 7. PART had been following national transit trends with decreasing ridership until 2018 when the system began regaining ridership. A more refined look at ridership by routes serving the WSUAMPO area is shown in Table 8.

Table 7 - PART Ridership Over Time

PART EXPRESS TOTAL RIDERSHIP								
Month	Year							
	2013	2014	2015	2016	2017	2018	2019	
	January	35,272	41,150	38,890	35,072	34,169	36,030	39,424
	February	38,854	37,069	32,743	35,619	38,894	38,219	37,781
	March	44,626	37,576	42,637	40,143	39,179	37,796	39,106
	April	39,014	41,912	51,069	37,406	31,270	37,665	38,336
	May	41,453	35,957	43,908	35,199	33,328	35,152	38,983
	June	30,642	38,819	40,903	36,951	30,320	36,223	36,306
	July	40,700	37,623	42,217	33,665	27,038	35,622	40,313
	August	39,343	41,734	41,663	42,621	37,181	43,673	39,440
	September	44,042	51,649	41,937	41,519	29,805	33,241	37,175
	October	48,088	53,283	43,472	40,415	38,927	43,326	43,298
	November	37,243	36,293	38,399	38,128	35,815	35,465	36,012
	December	37,749	40,523	39,055	34,225	28,470	27,161	34,650
Annual Totals		477,026	493,588	496,893	450,963	404,396	439,573	460,824
Monthly Avg.		39,752	41,132	41,408	37,580	33,700	36,631	38,402

Table 8 - PART Route Service Statistics

2019 PART EXPRESS					
Route Type	Rt. #	Rt. Designation	Ridership	Revenue Hours	Revenue Miles
Urban	1	Winston-Salem	82,255	6,368.5	234,512.4
	2	Greensboro	115,495	6,533.7	178,317.2
	3	High Point	74,677	6,369.5	141,674.8
Hybrid	4	Burlington-Alamance	62,770	7,216.2	261,802.4
Specialty	5	Amtrak Connector	6,760	3,051.5	59,848.8
	6	Surry	24,440	6,290.3	211,394.8
	9	Davidson	7,575	2,332.0	60,003.1
	10	Randolph	7,011	3,304.8	271,397.9
Circulator	17	Kernersville	12,946	4,924.3	108,453.0
Shuttles	20	NW Pleasant Ridge ¹	9,563	1,557.5	7,263.2
	21	NE Chimney Rock ¹	7,276	1,557.5	29,961.0
	22	SW Sandy Ridge ¹	10,302	1,557.5	57,224.2
	23	SE Piedmont Parkway ¹	12,627	1,556.5	32,774.0
	24	Burgess/Regional ¹	4,246	1,557.5	9,101.1
		Airport Shuttle ²	-	-	
		Totals	460,824	54,177.3	1,614,008.8

1 Midday and Saturday service on this route are not included in individual attribute totals.

2 This service began in August 2020.

**Table 9 - WSTA Ridership by Route
(October 2019)**

Route Number	Ridership
80	5,845
81	5,705
82	1,398
83	12,652
83 express	3,142
84	7,357
85	6,516
86	8,985
87	23,948
88	4,243
89	9,786
90	6,619
91	9,830
92	12,893
93	11,067
94	7,648
95	3,130
96	13,563
97	4,182
98	3,686
99	878
100	1,164
101	5,575
102	1,236
103	7,725
104	6,055
105	10,358
106	7,365
107	6,808
108	3,132
109	5,283
110	900

Winston-Salem Transit Authority (WSTA)

WSTA has followed similar national bus ridership trends with decreasing passenger volumes. Table 9 to the left shows the ridership by route for October 2019.

Davidson County Transportation (DC Rides)

DC Rides has been able to expand its service in recent years and has seen increasing ridership. Table 10 below shows the ridership by route serving Lexington for 2019.

Table 10 - DC Rider Ridership by route (2019)

Route	Ridership
Blue	58,210
Orange	24,219

Transit Improvements-MTP 2045 Funded List

The following transit projects were identified as part of the 2045 MTP funded list of projects. Projects were selected based on local agency coordination, analysis of existing service characteristics (e.g., ridership), and public input.

Upgrade WSTA Administrative and Maintenance Building

The existing WSTA Administrative and Maintenance Building, located at 1060 Trade Street in Winston-Salem, is in need of modernization and capacity enhancements to further WSTA's mission. Design services for the new building are anticipated to be procured in Fall 2020. The estimated planning-level cost estimate for this facility is \$20 million, pending a feasibility study.

Improve WSTA Route 96 Service

This project would improve WSTA Route 96 all day headways from 60-minutes to 30-minutes. Route 96 is the second highest ridership

route in the WSTA system, serving 13,563 customers in October 2019. Route 96 serves Downtown Winston-Salem, New Walkertown Rd. & Dellabrook Rd., Teresa Ave. & Carver School Rd., and Butterfield Dr. & Oak Ridge Dr. Improving the headway of this route can lead to increased ridership by allowing customers to better fit their transit trip to their schedule, whether getting to a job, shopping for groceries, or visiting friends. It is estimated that one additional bus and operator will be needed to operate Route 96 with 30-minute headways. The capital cost of one

additional WSTA bus is \$800,000 while annual operating expenses were calculated to be approximately \$500,000.

Improve WSTA Route 92 Service

This project would improve WSTA Route 92 all day headways from 60-minutes to 30-minutes. Route 92 is the third highest ridership route in the WSTA system, serving 12,893 customers in October 2019. Route 92 serves Downtown Winston-Salem, Cleveland Ave & 25th St., Patterson Ave. & Indiana Ave., and Oak Summit Rd. & Old Rural Hall Rd. Improving the headway of this route can lead to increased ridership by allowing customers to better fit their transit trip to their schedule, whether getting to a job, shopping for groceries, or visiting friends. It is estimated that one additional bus and operator will be needed to operate Route 92 with 30-minute headways. The capital cost of one additional WSTA bus is \$800,000 while annual operating expenses were calculated to be approximately \$500,000.

Improve PART Route 1 Mid-Day Service

PART has identified the need to improve their urban express routes including Route 1 (Winston-Salem Express), Route 2 (Greensboro Express), and Route 3 (High Point Express). All three routes meet near the Piedmont Triad Airport at the CTC. These three routes currently operate with 30-minute peak headways and hourly off-peak headways. Enhancing midday service will allow for improved regional transit connections throughout the day. PART estimated that the improvement to these three routes would result in 5,904 additional operating hours per year and would necessitate additional annual operating funds of \$820,990.56.

The table below includes a listing of fiscally-constrained transit project recommendations by horizon year 2035 and 2045. Those projects are expected to be reasonable to fund and include ongoing operations and maintenance for existing service providers. The study identified funding (primarily in CMAQ and STBG-DA funding sources) not yet allocated to specific projects which could be used for major capital or transit expansion needs. A significant local match amount is required to bring forward new service expansion even when federal grants are available. Additional local funding sources for transit (such as a local sales tax) could be a key part in enabling local communities to best take advantage of federal grant funding available to increase service frequency and improve the transit rider experience.

Table 11 - Financial Plan Transit Recommendations

WSUAMPO FINANCIAL PLAN TRANSIT RECOMMENDATIONS BY HORIZON YEAR 2035														
Project Information				Funding Sources (Millions USD)										
MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Combined Regional and Division (State/STI)	CMAQ	STBG-DA	5307	5303	5339 Bus and Bus Facilities	5310	Combined Federal Transit Funding Sources (5307, 5303, 5339, 5310)	All Years Local/State Match (non-STI)	
2035 PROJECTS	WS-Tran-PL2035	Regional	TP-5101	Transit Planning Assistance-5303 (FY 2026-2035)	\$1.030	\$-				\$0.830			\$0.830	\$0.200
	WS-Tran-102A	PART	TG-6783	PART Routine Capital, Passenger Shelters, Passenger Amenities, Shop Equipment, Spare Parts	\$1.978	\$-			\$1.580				\$1.580	\$0.398
	WS-Tran-103A	PART	TO-6150	PART Transit Operating Assistance	\$8.460	\$-			\$4.730				\$4.730	\$3.730
	WS-Tran-108A	Winston-Salem	TD-5303	FTA Section 5339 Bus and Bus Facilities Grant, Winston-Salem UA	\$7.848	\$-				\$6.665			\$6.665	\$1.183
	WS-Tran-055A	Regional (PART)	N/A	PART Express Bus Route 1-expand frequency to 30 minutes all day, 2026-2035	\$8.210	\$-	\$4.568		\$2.000				\$2.000	\$1.642
	WS-Tran-054A	City of Winston-Salem	N/A	Winston-Salem Transit (WSTA) Route 92 Increase Frequency to 30 minutes headways, 2026-2035	\$5.000	\$-	\$2.300		\$1.700				\$1.700	\$1.000
	WS-Tran-047A	City of Winston-Salem	N/A	Winston-Salem Transit (WSTA Route 96 Increase Frequency to 30 minute headways, 2026-2035	\$5.000	\$-	\$2.300		\$1.700				\$1.700	\$1.000
	WS-Tran-104	Winston-Salem	N/A	Winston-Salem Transit (WSTA) Expansion Vehicles to Support Expanded Frequency	\$1.600	\$-		\$1.280					\$-	\$0.320
	WS-Tran-105A	Davidson County	TG-6809	Davidson County Transportation. Routine Capital-Passenger shelters, passenger amenities, shop equipment, spare parts, capital cost of contracting, etc.	\$0.988	\$-			\$0.790				\$0.790	\$0.198
	WS-Tran-106A	Davidson County	TG-6808B	Davidson County Transportation. Transit Capital Preventative Maintenance.	\$1.975	\$-			\$1.580				\$1.580	\$0.395
	WS-Tran-107A	Davidson County	TO-6165	Davidson County Transportation. Transit Operating Assistance.	\$1.580	\$-			\$0.790				\$0.790	\$0.790
	WS-Tran-109A	Regional	TQ-6782	FTA Section 5310 Winston-Salem Allocation Set Aside for Compete Grant to Eligible Agencies to Assist in Meeting the Needs of Low Income, Disabled, and Elderly Populations	\$4.816	\$-						\$3.849	\$3.849	\$0.968
	WS-Tran-111A	Winston-Salem	TO-5126	Transit Operating Assistance, Winston-Salem Transit	\$26.101	\$-			\$13.051				\$13.051	\$13.051
	WS-Tran-112A	Winston-Salem	TG-4805	Transit Capital-Bus Stop Shelters, Benches, Shop Equipment, Spare Parts, Engines, Fareboxes, Services Vehicles, Etc.	\$8.987	\$-			\$7.192				\$7.192	\$1.795
	WS-Tran-113A	Winston-Salem	TG-5241	Transit Capital-Preventive Maintenance, Winston-Salem Transit	\$31.412	\$-			\$25.123				\$25.123	\$6.289
	WS-Tran-114A	Winston-Salem	TS-5120	Safety & Security-Min. 1% set aside	\$0.441	\$-			\$0.355				\$0.355	\$0.086
	WS-Tran-053	Winston-Salem	N/A	WSTA Administration and Maintenance Facility Upgrade (Combination of STI and STBG-DA Funds)	\$20.000	\$3.120		\$12.880					\$-	\$4.000
	WS-Tran-101A	Regional (WSTA, PART, Davidson County Transportation)	N/A	Urban Transit in Winston-Salem Urbanized Area-additional major capital, expansion vehicles and service frequency expansion (combination of CMAQ and STBG-DA Funding with local match)	\$23.119	\$-	\$13.226	\$5.269					\$-	\$4.624

* see Full Financial Plan in Appendix.

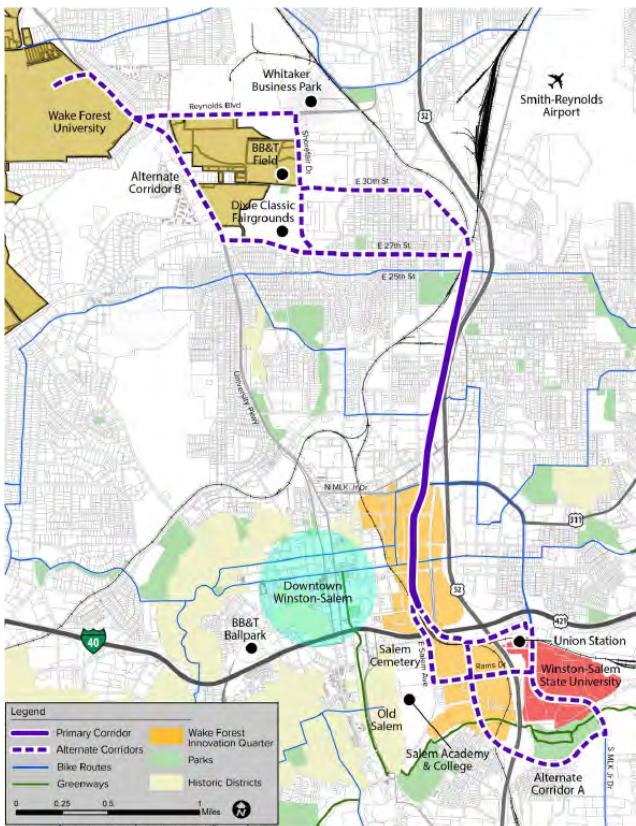
Table 11 - Financial Plan Transit Recommendations Continued...

WSUAMPO FINANCIAL PLAN TRANSIT RECOMMENDATIONS BY HORIZON YEAR 2045														
Project Information				Funding Sources (Millions USD)										
MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Combined Regional and Division (State/STI)	CMAQ	STBG-DA	5307	5303	5339 Bus and Bus Facilities	5310	Combined Federal Transit Funding Sources (5307, 5303, 5339, 5310)	All Years Local/State Match (non-STI)	
2045 PROJECTS	WS-Tran-PL2045	Regional	TP-5101 Transit Planning Assistance-5303 (FY 2036-2045)	\$1.030	\$-				\$0.830			\$0.830	\$0.200	
	WS-Tran-055B	Regional	N/A PART Express Bus Route 1-expand frequency to 30 minutes all day, 2036-2045	\$8.210	\$-	\$4.568						\$2.000	\$1.642	
	WS-Tran-054B	Winston-Salem	N/A Winston-Salem Transit (WSTA) Route 92 Increase Frequency to 30 minutes headways, 2036-2045	\$5.000	\$-	\$2.300						\$1.700	\$1.000	
	WS-Tran-047B	Winston-Salem	N/A Winston-Salem Transit (WSTA Route 96 Increase Frequency to 30 minute headways, 2036-2045	\$5.000	\$-	\$2.300						\$1.700	\$1.000	
	WS-Tran-102B	PART	TG-6783 PART Routine Capital, Passenger Shelters, Passenger Amenities, Shop Equipment, Spare Parts	\$2.190	\$-							\$1.749	\$0.440	
	WS-Tran-103B	PART	TO-6150 PART Transit Operating Assistance	\$9.365	\$-							\$5.236	\$4.129	
	WS-Tran-105B	Davidson County	TG-6809 Davidson County Transportation. Routine Capital-Passenger shelters, passenger amenities, shop equipment, spare parts, capital cost of contracting, etc.	\$1.093	\$-							\$0.875	\$0.219	
	WS-Tran-106B	Davidson County	TG-6808B Davidson County Transportation. Transit Capital Preventative Maintenance.	\$2.186	\$-							\$1.749	\$0.437	
	WS-Tran-107B	Davidson County	TO-6165 Davidson County Transportation. Transit Operating Assistance.	\$1.749	\$-							\$0.875	\$0.875	
	WS-Tran-108B	Winston-Salem	TD-5303 FTA Section 5339 Bus and Bus Facilities Grant, Winston-Salem UA	\$8.687	\$-				\$7.378			\$7.378	\$1.309	
	WS-Tran-111B	Winston-Salem	TO-5126 Transit Operating Assistance, Winston-Salem Transit	\$28.893	\$-							\$14.447	\$14.447	
	WS-Tran-112B	Winston-Salem	TG-4805 Transit Capital-Bus Stop Shelters, Benches, Shop Equipment, Spare Parts, Engines, Fareboxes, Services Vehicles, Etc.	\$9.948	\$-							\$7.961	\$1.987	
	WS-Tran-113B	Winston-Salem	TG-5241 Transit Capital-Preventive Maintenance, Winston-Salem Transit	\$34.772	\$-							\$27.810	\$6.962	
	WS-Tran-114B	Winston-Salem	TS-5120 Safety & Security-Min. 1% set aside	\$0.410	\$-							\$0.330	\$0.080	
	WS-Tran-109B	Regional	TQ-6782 FTA Section 5310 Winston-Salem Allocation Set Aside for Compete Grant to Eligible Agencies to Assist in Meeting the Needs of Low Income, Disabled, and Elderly Populations	\$5.331	\$-						\$4.265	\$4.265	\$1.066	
	WS-Tran-101B	Regional (WSTA, PART, Davidson County Transportation)	N/A Urban Transit in Winston-Salem Urbanized Area-additional major capital, expansion vehicles and service frequency expansion (combination of STI Prioritization, CMAQ and STBG-DA Funding with local match)	\$54.537	\$3.518	\$3.518	\$20.996	\$18.412				\$-	\$11.611	

* see Full Financial Plan in Appendix.

Transit Improvements-MTP 2045 Unfunded List

Through input from transit agency staff, Steering Committee members, and the public, the following additional public transportation projects were identified for inclusion in the unfunded category. While these projects and initiatives would be valuable and generate additional transit ridership and/or an improvement in the quality of service for transit customers, they require additional study, new funding streams, and/or policy changes to make them competitive for the next steps towards implementation.



Streetcar Potential Route, WFU to WSSU.
Source: Winston-Salem Streetcar Viability Assessment, 2019.

Winston-Salem Streetcar (Urban Circulator).

Continue planning for future implementation of the Winston-Salem streetcar. The City of Winston-Salem has long considered implementing an urban circulator, utilizing either a streetcar or an enhanced bus technology. This project was first considered in the Winston-Salem 2006 Streetcar Feasibility Study. The Winston-Salem Urban Circulator Study developed and evaluated alternatives for an urban circulator and selected a preferred alternative. The study identified streetcar as the preferred mode and identified a preferred alignment connecting Wake Forest University, Wake Forest Innovation Quarter, Downtown, and Winston-Salem State University. Most recently, the Winston-Salem Streetcar Viability Assessment was completed in 2019. This assessment analyzed the high level viability of a north-south running streetcar service connecting Wake Forest University, Downtown, and Winston-Salem State University (as shown in picture). An autonomous vehicle shuttle could also be considered as a less-expensive option to better connect those campus locations with downtown Winston-Salem while avoiding costly investment in rail infrastructure.

Implement Transit Emphasis Corridors on key routes. As ridership grows, and demand for frequent, reliable, urban transit grows, transit emphasis corridors can play a key role in moving transit customers safely and quickly through key corridors. Transit emphasis corridors can consist of frequent service (15-minute headways or better), traffic signal priority, dedicated bus lanes, and enhanced rider amenities. Corridors for implementation may include between Downtown and Hanes Mall, Wake Forest University, Peters Creek, and Liberty.

Lexington-Welcome – Implement New Route. As part of the discussions held with Davidson County Transportation, the Welcome, NC business park area was identified as an area for future transit service. Service could consist of three peak period round trips between Lexington and Welcome. The new service would provide enhanced access to jobs. Longer term, there is a desire to extend the route to the Peter's Creek Walmart in Winston-Salem, where WSTA service currently terminates. This would result in more direct transit routing for those wishing to travel between Winston-Salem and Lexington.

Lexington-Salisbury – Implement New Route. As part of the discussions held with Davidson County Transportation, there is a desire to connect Lexington and Salisbury with transit service. This connection would connect two urban areas and provide access to the Salisbury Amtrak Station where ten trains stop daily.

Lexington Access to Transit Improvements. As part of the discussions held with Davidson County Transportation, a need was identified to improve pedestrian and bicyclist facilities connecting to transit stops. Currently many stops have no connecting facilities limiting the effectiveness of the stop. These enhancements would increase the accessibility to the existing transit routes in Lexington.

Davidson County Transportation Electric Bus Acquisition. As part of the discussions held with Davidson County Transportation, a need was identified for larger transit vehicles to support the growing customer demand. DC Rides currently operates 25-foot vehicles that can sometimes run at 100% loading within Lexington. DC Rides would like to expand its fleet of vehicles with larger 30-foot, electric vehicles.

PART Route 5 Improve Service. Current Route 5 service connects Winston-Salem with Amtrak service in High Point. The route operates four round trips based on the scheduled arrival of trains to the High Point Station. Enhancing this route to 45-minute peak headways would allow for additional trips to be made by customers wanting to travel between Winston-Salem and High Point. It is estimated that this improvement would result in an additional 4,393 revenue hours of service per year and implementation would require \$610,875.94 of additional operating funds per year.

Clemmons-Winston-Salem – Implement New Route. During Business 40 mitigation, PART provided express service connecting Clemmons and Downtown Winston-Salem. A new route to Clemmons would provide regional coverage and connectivity to the southwest portion of Forsyth County. The NCDOT Commuter Transit Study identified the Clemmons area as a potential market for commuter-oriented transit.

Expand On-Demand Transit Service. As populations grow and age, and as activity centers evolve or develop, it is important that on-demand services not only continue but expand for those who do not have access to fixed route service. The following service initiatives are recommended for the region to consider and identify funding opportunities to implement:

- Pilot projects to test partnerships with rideshare providers
- Micro-transit solutions

Some potential transit users might not be able to safely or easily walk to their nearest bus stop, yet their life obligations and scheduling constraints do not fit the typical on-demand transit service model that requires a 24-hour reservation notice. More responsive on-demand public transportation models are being tested across the country. Several agencies in North Carolina and across the Southeast have been experimenting with partnerships with private ridesharing companies such as Uber/Lyft to cover the first part of a transit trip for potential transit riders who cannot easily access their closest fixed route bus stop (e.g., CATS in Mecklenburg County). Other agencies are implementing micro-transit pilots to allow more responsive on-demand public transportation with real time on-demand reservation request capabilities (e.g., City of Wilson in Wilson County, NC; Town of Snellville in Gwinnett County, Georgia). Those innovative public transportation solutions can mean a better quality of service for riders. These areas for on-demand service can replace low efficiency fixed routes, providing a more cost-effective solution while serving those who depend on transit. A pilot for Forsyth County is recommended to test these approaches. In the long term, additional funding streams are required to make those types of services sustainable beyond a short-term pilot.

Public Transportation Policy and Planning Recommendations

Policy, planning, and agency structure changes could have a large impact on the feasibility of future transit improvements in the region. The recommendations listed below are policy- and planning-oriented recommendations that do not have a quantified ridership or cost associated with them at this time. They have been identified as needs or recommended strategies in one of the existing local and regional transit plans, or have emerged as a recommendation during the MTP process.

Explore the potential of a Forsyth County ¼-cent sales tax referendum for transit. North Carolina law allows for urban counties to take a local sales tax referendum to the ballot. Discussion, planning, and preparation should take place prior to putting the measure on the ballot to explore what improvements could be made if the additional funding were to become available. Previous PART analysis found that an additional \$14 million per year would become available for transit in Forsyth County if the measure were to pass.

Enhance WSUAMPO Transportation Demand Management (TDM) strategies. As the Winston-Salem region continues to grow, TDM education, advocacy, and strategies will need to continue and increase to reduce the number of single occupant vehicles on the region's roadways. Promoting transit, carpooling, biking, and walking will be important for a healthier, more vibrant community.

Investigate Mobile Fare Collection, Fare-Free Transit and Regional Fare Transfers Interoperability. Davidson County Transportation is fare-free for riders and PART now accepts mobile fare collection. WSTA should consider investing in Mobile Fare Collection to allow for easier payment options for riders and to reduce delays on buses. Additionally, improvements to fare collection to allow better interoperability and seamless transfer between systems could benefit passengers who currently have to use different fare systems when transferring. Coordination between WSTA and PART for interoperability would be key. In addition, if desired by city council or other stakeholders, WSTA could consider a fare free trial where fare free transit could be tested to see the effect on ridership and system performance.

5.3 Bicycle and Pedestrian Infrastructure

Existing Bicycle and Pedestrian Plans and Facilities

Winston-Salem region has a significant number of existing bicycle, pedestrian and greenways studies. Existing local and regional plans were reviewed as part of the MTP update to both identify potential projects for consideration, as well as to review high-level themes.

The following themes that emerged from review of existing plans are particularly relevant to bicycle and pedestrian recommendations development:

- Main Street Improvements: The Winston-Salem MPO has bustling urban and charming small-town main streets. As destination sites for retail, dining, and entertainment, improvements are recommended along these main streets such as enhanced walkability, streetscaping, gateway treatments, and improved parking efficiency.
- Balance Traffic Flow with Welcoming Downtowns: Cities and towns within the MPO strive to balance improving traffic flow within their jurisdiction while also creating pedestrian and bicycle friendly downtowns.
- Building Greenways and Multi-Use Paths: Recommended facilities for pedestrians and bicyclists throughout the MPO are primarily greenways and multi-use paths. These proposed facilities connect through downtowns but are mostly planned in less dense areas and in areas not suitable for development. Sidewalks and some on-road bicycle facilities are recommended in downtowns.
- Notable Projects:
 - Salem Parkway (I-40 Business) Improvements included a variety of bicycle, pedestrian and greenway improvements which are still under construction or expected to be implemented in the near future (2020-2025 timeframe)
 - Peters Creek Parkway Corridor Study in Winston-Salem recommended addition of bicycle and pedestrian enhancements
 - Multiple key greenway corridors recognized as a priority across the region to continue implementation and expansion of existing networks--including Salem Creek Greenway, Muddy Creek Greenway, Long Branch Trail, Mill Creek Trail and Kerner's Mill Creek Greenway/Piedmont Regional Greenway segments

In addition to reviewing existing bicycle and pedestrian planning studies, data on existing and planned pedestrian facilities were collected based on the following:

- All planned/proposed mileage is based on Pedestrian and Bicycle Information Network geodatabase (PBIN; data initially collected by the North Carolina State University Institute for Transportation Research and Education (ITRE); updates subject to data submitted by local government staff⁷)
- All existing facilities data have been collected for NCDOT through project ATLAS: Advancing Transportation through Linkages Automation and Screening⁸
- Existing on-road bike facilities include roadways with bikeable (wide) shoulders
- Regional trails data is gathered from stakeholder agencies and shared through NC OneMap

Looking at the map of existing and planned pedestrian facilities in the region (Figure 14), Winston-Salem and Kernersville account for the bulk of existing 550 miles of sidewalk facilities (Table 12). There is also nearly 30 miles of shared use paths and greenways. The table below summarizes existing sidewalks, multi-use path and on-road bicycle facilities. The dashed green line on the map, traveling west from Kernersville to Winston-Salem and then north towards King, shows the current proposed route for the statewide Mountains-to-Sea Trail in the region. Note: where a sidewalk is present on both sides of a road, it is counted as twice the road mileage.

Table 12 - Existing Pedestrian and Bicycle Facilities in Winston-Salem Urban Area MPO Region

Facility Type	Existing (mi.)
Sidewalks	550
Shared Use Paths/Greenways/Regional Trails	29
On-Road Bike Facilities - bicycle lanes	16
On-Road bicycle facilities-bikeable shoulder sharrow, share the road conditions	36

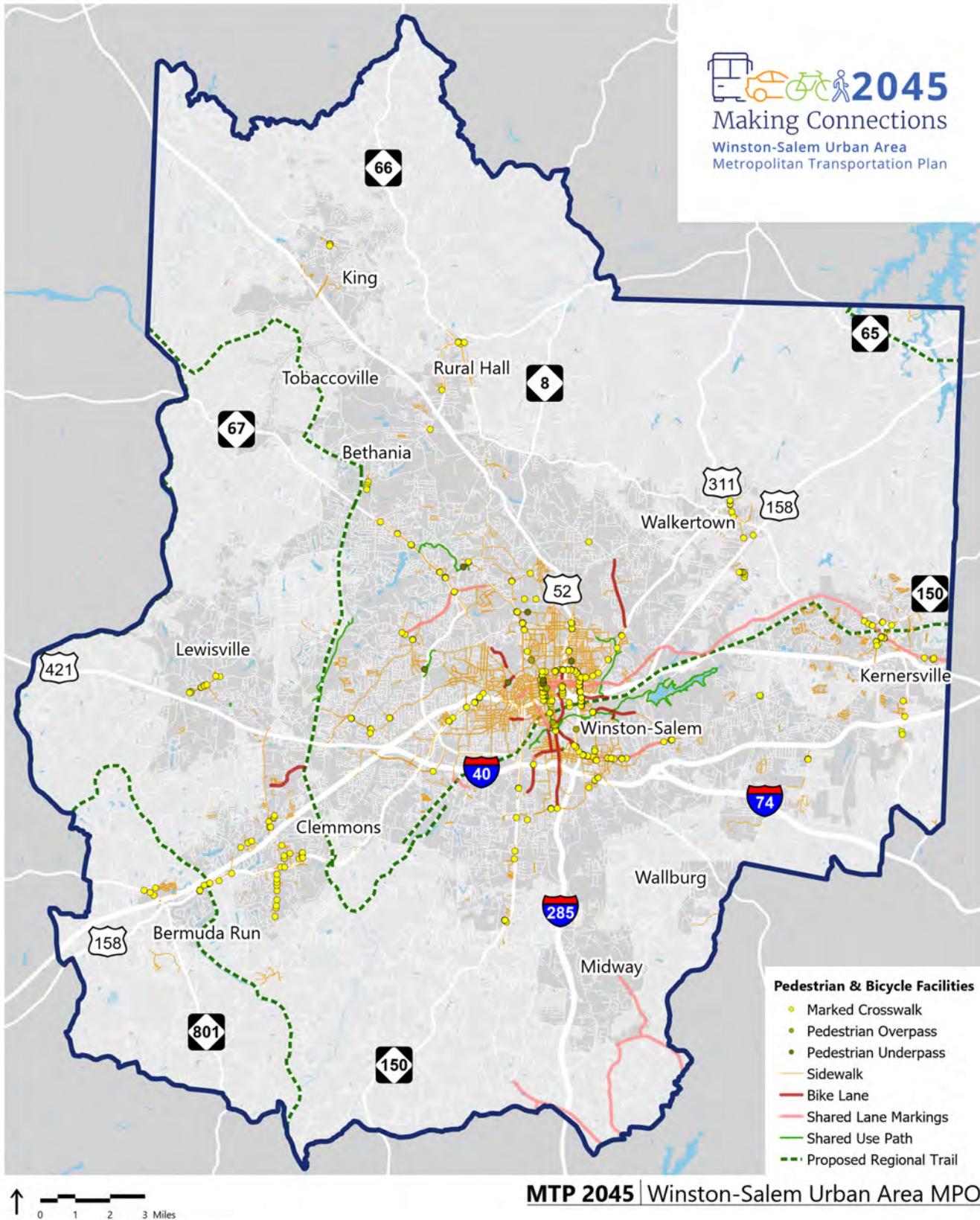


Figure 14 - Existing and Planned Bicycle and Pedestrian Facilities

Bicycle and Pedestrian Financial Plan Project Recommendations



The section below summarizes the bicycle and pedestrian projects selected for WSUAMPO MTP 2045 financial plan list of projects by year of construction. Some projects, indicated by an asterisk in the tables, overlap with recommended roadway projects, which may allow them to be implemented as part of the roadway project at an earlier date.

In addition to those projects, priority projects from locally adopted bicycle and pedestrian plans have been mapped and are considered part of the unfunded MTP 2045 plan, to be carried forward as part of WSUAMPO Comprehensive Transportation Plan update.

Table 13 - Bicycle and Pedestrian Projects Included in the 2020-2029 STIP

WSUAMPO BICYCLE AND PEDESTRIAN PROJECTS COMMITTED IN 2020-2029 STIP							
STIP ID	Project Type	Project Name	Municipality	Facility	From	To	Construction Year
EB-5722	Pedestrian Improvements	Silas Creek Parkway Sidewalk	Winston-Salem	Silas Creek Pkwy	Bolton St	Lockland Ave	2021
EB-5959	Pedestrian Improvements	Idols Road Sidewalk	Forsyth County	Idols Rd	Middlebrook Dr	Tanglewood Park Rd	2021
EB-5958	Greenway	Blue Heron Trail	Bermuda Run	Blue Heron Trail	Twins Way	I-40 Pedestrian Tunnel	2020
EB-6040	Pedestrian Improvements	Harper Road Pedestrian Improvements	Forsyth County	Harper Rd	Village Point Dr	I-40 Interchange	2021
EB-5960	Pedestrian Improvements	Harper Road Pedestrian Sidewalk	Clemmons	Harper Rd	Peace Haven Rd	Roundabout west of Morgan Elementary	2021
EB-5920	Pedestrian Improvements	Jonestown Road Sidewalk	Winston-Salem	Jonestown Rd	Hanes Mall Blvd	Country Club Rd	2024
EB-5954	Pedestrian Improvements	Griffith Road Sidewalk	Winston-Salem	Griffith Rd	Kimwell Dr	Burke Mill Rd	2021
EB-5812	Greenway	Salem Creek Greenway	Winston-Salem	Salem Creek Greenway	Forsyth Tech	Greenway at Marketplace Mall	2022
EB-6008	Sidepath	Salem Parkway Sidepath	Winston-Salem	US 421	Lockland Ave	Peters Creek Pkwy	2022
EB-5840	Sidepath	Salem Parkway Sidepath	Winston-Salem	US 421	Green St	The Strollway	2020
EB-4020C	Greenway	Brushy Fork Greenway	Winston-Salem	Brushy Fork Greenway	Lowery St	Reynolds Park Rd	2020
EB-5810	Pedestrian Improvements	Barbara Jane Avenue Sidewalk	Winston-Salem	Barbara Jane Ave	Old Greensboro Rd	Woodrow Powell Dr	2020
EB-5955	Pedestrian Improvements	Robinhood Road Sidewalk	Winston-Salem	Robinhood Rd	Speaks Farm Rd	Muddy Creek Greenway	2021
EB-5952	Pedestrian Improvements	Fairlawn Drive Sidewalk	Winston-Salem	Fairlawn Dr	Reynolda Rd	Silas Creek Pkwy	2021
EB-5953	Pedestrian Improvements	University Parkway Sidewalk	Winston-Salem	University Pkwy	Shattalon Dr	Robin Wood Ln	2021
EB-5956	Complete Streets	Sullivantown Road Complete Streets Improvements	Walkertown	Sullivantown Rd	US 311	Walkertown High School	2020
EB-5957	Pedestrian Improvements	Old Winston Road Sidewalk	Kernersville	Old Winston Rd	Existing Sidewalk on South Side	Hopkins Rd	2021

Table 14 - Financial Plan Bicycle and Pedesterian Projects

WSUAMPO BICYCLE AND PEDESTRIAN PROJECTS HORIZON YEAR 2035								
STIP ID	Project Type	Project Name	Municipality	Facility	From	To	Miles	Estimated Cost
WS-Bike-036D	Bike Boulevard	Trade St Bicycle Boulevard	Winston Salem	Trade St	S Glenn Ave	W 4th St	1.11	\$173,000
WS-Bike-036E	Bike Boulevard	Forsyth Medical Bicycle Boulevard	Winston Salem	Various	S Stratford Rd	Strollway	1.15	\$179,500
WS-Bike-128E	Complete Streets	MLK Jr Blvd Complete Streets - E	Winston Salem	Martin Luther King Jr Dr	Highland Ave	N Marshall St	0.93	\$13,990,000
WS-Bike-128D	Complete Streets	MLK Jr Blvd Complete Streets - D	Winston Salem	Martin Luther King Jr Dr	E 1st St	Highland Ave	0.77	\$6,075,000
WS-Bike-198	Complete Streets	Waughtown St Complete Streets	Winston Salem	Waughton St	S Main St	Reynolds Park Rd	3.76	\$23,730,000
WS-Bike-576B	Cycle Track	Downtown Connector - Sixth St Cycle Track	Winston-Salem	E Sixth St	Summit St	NW Patterson St	0.92	\$4,845,000
WS-Bike-576D	Cycle Track	Downtown Connector - Third St Cycle Track	Winston-Salem	E 3rd St	N Cherry St	Metropolitan Dr	0.66	\$4,800,000
WS-Bike-019	Cycle Track	Sprague Rd Protected Cycle Track	Winston-Salem	E Sprague Rd	S Main St	Cline St	2.68	\$2,988,455
WS-Bike-036A	Bike Boulevard	Reynolda Link Bicycle Boulevard	Winston-Salem	Neighborhood Streets	N Hawthorne Rd	Reynolda Rd	2.28	\$356,000
WS-Bike-576A	Cycle Track	Downtown Connector - Broad St Cycle Track	Winston-Salem	Broad St	West End Blvd	Ballpark Way	0.71	\$3,815,000
WS-Bike-018B	Bike Lanes	Lewisville Connector - B	Winston-Salem	Country Club Rd	Ketner Rd	Old Vineyard Rd	3.30	\$885,000
Total							2035	\$61,836,955

Table 15 - Bicycle and Pedestrian Projects Horizon Year 2045

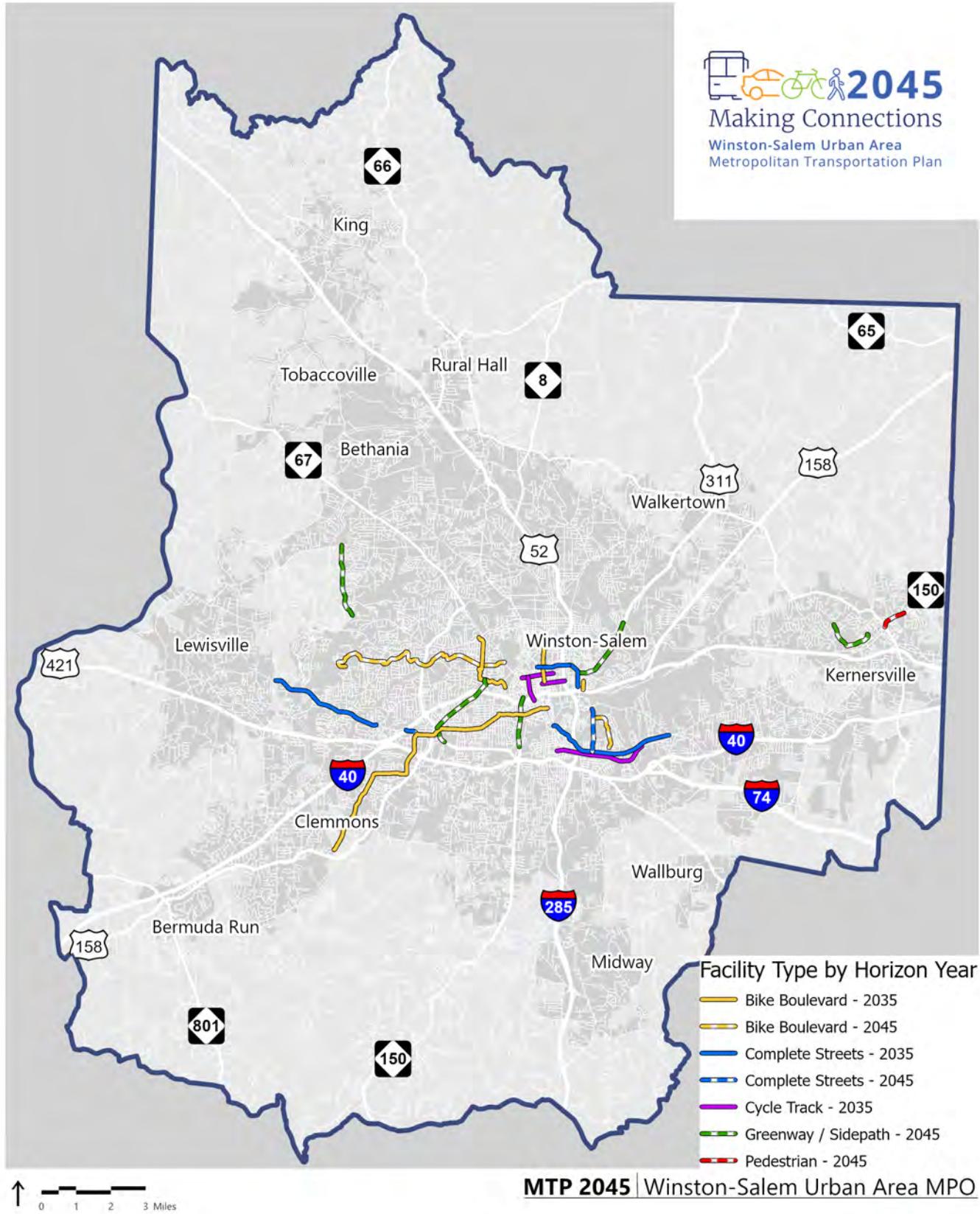
WSUAMPO BICYCLE AND PEDESTRIAN PROJECTS HORIZON YEAR 2045								
STIP ID	Project Type	Project Name	Municipality	Facility	From	To	Miles	Estimated Cost
WS-Bike-478	Greenway	Muddy Creek Trail Phase II	Winston-Salem	Muddy Creek Trail - Phase II	Robinhood Road	Yadkinville Road	2.11	\$5,415,000
WS-Bike-083A	Sidepath	Stratford Rd Sidepath - A	Winston-Salem	Stratford Rd	Warwick Rd	Silas Creek Pkwy	2.05	\$7,840,000
WS-Bike-080	Sidepath	New Walkertown Rd Sidepath	Winston-Salem	New Walkertown Rd	MLK JR DR	Winston Lake Rd	2.10	\$6,610,000
WS-Bike-224A	Sidepath	Peters Creek Pkwy Sidepath - A	Winston-Salem	Peters Creek Pkwy	Ballpark Way	Salem Creek Greenway	1.44	\$12,080,000
WS-Ped-190	Pedestrian Improvements	Kernersville Pedestrian Improvements	Kernersville	NC 150	Bodenhamer St	Gralin St	0.73	\$1,210,000
WS-Bike-020	Complete Streets	Forsyth Medical Complete Streets Improvements	Winston-Salem	Healy Dr	US 421	Silas Creek Pkwy	1.04	\$7,070,000
WS-Bike-079A	Sidepath	Silas Creek Parkway Sidepath - A	Winston-Salem	Silas Creek Pkwy	Hanes Mall Blvd	S Stratford Rd	0.48	\$3,125,000
WS-Bike-128A	Complete Streets	MLK Jr Blvd Complete Streets - A	Winston-Salem	Martin Luther King Jr Dr	Waughton St	Salem Creek Greenway	1.24	\$7,900,000
WS-Bike-036F	Bike Boulevard	Westside Bicycle Boulevard	Winston-Salem	Various	Cedar Trail	Reynolda Rd	2.76	\$430,500
WS-Bike-036C	Bike Boulevard	Argonne Blvd Bicycle Boulevard	Winston-Salem	Argonne Blvd	Longview Dr	MLK Jr Dr	1.96	\$306,000
WS-Bike-569B	Greenway	Kerners Mill Creek Greenway Phase II	Kernersville	Piedmont Regional Trail (Kerners Mill Creek)	Maxine St	Oakhurst St	1.59	\$4,075,000
WS-Bike-036B	Bike Boulevard	Jackson Ave Bicycle Boulevard	Winston-Salem	Jackson Ave	E Third St	End of facility	2.14	\$334,000
							Total	2045
							Total	\$56,395,500
								\$118,232,455

WSUAMPO OTHER PRIORITY BICYCLE AND PEDESTRIAN PROJECTS NOT INCLUDED IN FINANCIAL PLAN

MTP ID	Project Type	Project Name	Municipality	Facility	From	To	Miles	Estimated Cost
WS-Bike-128B	Complete Streets	MLK Jr Blvd Complete Streets - B	Winston Salem	Martin Luther King Jr Dr	Salem Creek Greenway	Cromartie St	0.62	\$5,560,000
WS-Bike-570	Complete Streets	Rams Drive Complete Streets Improvements	Winston Salem	Rams Dr	E Salem Ave	MLK JR DR	0.54	\$6,520,000
WS-Bike-079C	Sidepath	Silas Creek Parkway Sidepath - C	Winston Salem	Silas Creek Pkwy	Robinhood Rd	University Pkwy	3.41	\$23,140,000
WS-Bike-128C	Complete Streets	MLK Jr Blvd Complete Streets - C	Winston Salem	Martin Luther King Jr Dr	Cromartie St	E 1st Street	0.29	\$6,590,000
WS-Bike-018A	Bike Lanes	Lewisville Connector - A	Winston-Salem	Country Club Rd	Old Vineyard Rd	1st St	3.72	\$9,570,000
WS-Bike-083B*	Sidepath	Stratford Rd Sidepath - B	Winston Salem	Stratford Rd	Silas Creek Pkwy	Burke Mill Rd	1.57	\$7,520,000
WS-Bike-130	Complete Streets	Queen St Complete Streets	Winston Salem	Queen St	Leisure Ln	Hawthorne Rd	0.86	\$5,400,000
WS-Bike-224B	Sidepath	Peters Creek Pkwy Sidepath - B	Winston Salem	Peters Creek Pkwy	Salem Creek Greenway	Stafford Village Blvd	2.85	\$21,320,000
WS-Bike-576C	Cycle Track	Downtown Connector - Main St Cycle Track	Winston-Salem	N Main St	N Liberty St	Brookstown Ave	0.92	\$6,380,000
WS-Bike-196	Complete Streets	Thirtieth St and Deacon Blvd Complete Streets	Winston Salem	Thirtieth St / Deacon Blvd	University Pkwy	Gilmer Ave	0.94	\$5,705,000
WS-Bike-083C*	Sidepath	Stratford Rd Sidepath - C	Winston Salem	Stratford Rd	Burke Mill Rd	Lockwood Dr	2.20	\$6,487,500
WS-Bike-459A	Greenway	Mill Creek Greenway	Winston-Salem	Mill Creek Greenway North	Bethabara Trail	Existing Mill Creek Trail	2.76	\$7,800,000
WS-Ped-189A*	Pedestrian Improvements	Reynolda Road/ NC 67 Pedestrian Improvements - A	Winston Salem	NC 67	Shattalon Dr	Yadkinville Rd	2.08	\$8,260,000
WS-Ped-189B*	Pedestrian Improvements	Reynolda Road/ NC 67 Pedestrian Improvements - B	Winston Salem	Reynolda Rd	Polo Rd	Old Town Dr	1.63	\$6,395,000
WS-Bike-439	Greenway	Beltway Greenway (Piedmont Regional Trail)	Kernersville	Beltway Greenway (Piedmont Regional Trail)	Hastings Hill Road	E. Mountain Street	1.44	\$3,970,000
WS-Bike-569B	Greenway	Kerners Mill Creek Greenway Phase II	Kernersville	Piedmont Regional Trail (Kerners Mill Creek)	Maxine St	Oakhurst St	1.59	\$4,075,000
WS-Bike-569A	Greenway	Kerners Mill Creek Greenway Phase I	Kernersville	Piedmont Regional Trail (Kerners Mill Creek)	Windsor Park Rd	Maxine St	1.99	\$5,095,000
WS-Bike-437	Greenway	Salem Creek Trail	Winston-Salem	Salem Creek Trail Extension	Salem Creek Trail	Forsyth Technical Community College	1.15	\$3,370,000
WS-Ped-189C	Pedestrian Improvements	Reynolda Road/ NC 67 Pedestrian Improvements - C	Winston Salem	Reynolda Rd	Northwest Blvd	Coliseum	1.41	\$7,330,000

WSUAMPO OTHER PRIORITY BICYCLE AND PEDESTRIAN PROJECTS NOT INCLUDED IN FINANCIAL PLAN CONT...

MTP ID	Project Type	Project Name	Municipality	Facility	From	To	Miles	Estimated Cost
WS-Bike-079B	Sidepath	Silas Creek Parkway Sidepath - B	Winston Salem	Silas Creek Pkwy	S Stratford Rd	Robinhood Rd	2.57	\$17,695,000
WS-Bike-459B	Greenway	Mill Creek Greenway - B	Winston-Salem	Mill Creek Greenway	Reynolda Rd	Rosebriar Ln	1.51	\$4,365,000
WS-Ped-189D	Pedestrian Improvements	Reynolda Road/ NC 67 Pedestrian Improvements - D	Winston Salem	Reynolda Rd	Coliseum Dr	Polo Rd	1.61	\$7,305,000
WS-Bike-409A	Greenway	Triad Park Reedy Fork Greenway - A	Kernersville	Tirad Park Reedy Fork Greenway	Main St	Kernersville Town Limit	1.11	\$3,030,000
WS-Bike-468	Greenway	Muddy Creek Trail	Winston-Salem	Muddy Creek Trail (Black Walnut Bottom Trail)	Yadkinville Road	Reynolda Road (Bethania)	1.60	\$4,600,000
WS-Bike-459C	Greenway	Mill Creek Greenway - C	Winston-Salem	Mill Creek Greenway	Rosebriar Ln	Existing Greenway	1.74	\$4,640,000
WS-Bike-083X	Sidepath	Stratford Rd Sidepath - C	Winston Salem	Stratford Rd	Burke Mill Rd	Kinnamon Rd	4.40	\$12,975,000
WS-Bike-018C	Complete Streets	Lewisville Connector - C	Lewisville	Shallowford Rd	Lewisville-Clemmons Rd	Ketner Rd	2.14	\$13,615,000
WS-Bike-354	Sidepath	Blue Heron Trail	Bermuda Run	Sidepath	Hwy 158	Hwy 158	1.96	\$9,095,000
WS-Ped-186	Pedestrian Improvements	Lewisville-Clemmons Rd Pedestrian Improvements	Clemmons	Lewisville-Clemmons Rd	I-40	Stadium Dr	0.32	\$1,585,000
WS-Bike-409B	Greenway	Triad Park Reedy Fork Greenway - B	Kernersville	Triad Park Reedy Fork Greenway	Kernersville Town Limit	Triad Park	1.05	\$2,855,000



September 15, 2020



Figure 15 - Financial Plan Bicycle and Pedestrian Recommendations 2025 - 2045

The highest priority stand-alone bicycle and pedestrian projects recommended for horizon year 2035 or 2045 are described below. Projects were prioritized based on the forecasted budget for each horizon year, feedback from the public and stakeholders, and a project score. Each project score was based on the number of points the project received for the following criteria:

- Borders or crosses block groups with a moderate or high Environmental Justice score
- Within ¼ mile of fixed route transit or within ½ mile of a major transfer hub
- Borders or crosses designated activity centers, job centers, and medical or educational campus locations
- Closes a gap or overcomes a barrier (e.g. river, interstate or railroad improved crossing) or improves intersections of a 4+ lane arterial
- Number of community points of interest within ½ a mile of a bicycle, complete streets, or sidepath project or within ¼ mile of a pedestrian project
- Overlaps bicycle and pedestrian crashes from the most recent 10 years of available crash data

It should be noted that bicycle and pedestrian design guidance has been changing very quickly in recent years, and the latest available design guidance should be used when deciding on the preferred facility type when those projects are funded and moving through design to implementation.

Horizon Year 2035

Reynolda Link, Trade Street, and Forsyth Medical Bicycle Boulevards (WS-Bike-036 A,D,E)

There are three streets recommended for bicycle boulevards for the 2035 horizon. The first is the Reynolda Link bicycle boulevard, 2.28 miles traveling north-south on various neighborhood streets between Hawthorne Road and Reynolda Road. The projects estimated cost is \$356,000. The second is a 1.11-mile stretch of Trade Street between South Glenn Avenue and West Fourth Street with an estimated cost of \$173,000. Finally, the Forsyth Medical bicycle boulevard is 1.15-miles of various roads that parallel and provide a safer alternative to Hawthorne Avenue between South Stratford Road and the Strollway. The estimated cost is \$179,500. These bicycle boulevards are outlined in the Winston-Salem Bicycle Plan. The projects scored between 60 and 100 and each provides a safer alternative to corridors with a high crash risk and connect various points of interest and activity centers.

MLK, Jr. Blvd. Complete Streets - E (WS-Bike-128E)

Section E of the MLK Jr Blvd complete streets improvement is 0.93-miles of bicycle and pedestrian facilities located in Winston-Salem. The project runs along MLK, Jr. Boulevard between Highland Avenue and North Marshall Street. The project is newly recommended for the 2045 MTP Update plan and is the northern-most section of a series of projects that will connect southern Winston-Salem neighborhoods and Winston-Salem State University with downtown. It has an estimated construction cost of \$13,990,000. The project scores highly at 85 because it closes a critical gap, provides connections to areas of high environmental justice concern, and provides access to transit, numerous points of interest, and activity centers.

MLK, Jr. Blvd Complete Streets - D (WS-Bike-128D)

Section D of the MLK, Jr. Boulevard complete streets improvement is 0.77-miles of bicycle and pedestrian facilities located in Winston-Salem. The project will travel along MLK, Jr. Boulevard between East First Street and Highland Avenue. The project is newly recommended for the 2045 MTP Update plan and runs from downtown to East Winston. It is part of a series of projects that will connect southern Winston-Salem neighborhoods and Winston-Salem State University with downtown. The project has an estimated construction cost of \$6,075,000. The project scores highly at 80 as it improves bicycle and pedestrian accommodations at arterial intersections, provides connections to areas of high environmental justice concern, and gives access to numerous points of interest and activity centers.

Waughtown St. Complete Streets (WS-Bike-198)

The Waughtown Street complete streets bundle is 3.76-miles of bicycle and pedestrian facilities located in Winston-Salem. The project extends along Waughton Street between South Main Street and Reynolds Park Road. The project has an estimated construction cost of \$28,605,000, partially due to the narrow right-of-way available. The project scores an 80 due to connecting areas of high environmental justice concern, enhancing safety in a historic crash location, and improving access to points of interest and activity centers.

Downtown Connector - Sixth St. Cycle Track (WS-Bike-576B)

The Sixth Street cycle track is a 0.92-mile separated bike facility located in Winston-Salem. The project traverses Sixth Street from Summit Street to Northwest Patterson St. This project was originally recommended in the Winston-Salem Bike Plan and has an estimated construction cost of \$11,725,000. The project scores the maximum 100 points, as it closes a critical gap, provides a safe facility in a crash hot spot, connects areas of high environmental justice concern and provides access to transit and numerous points of interest and activity centers.

Downtown Connector - Third St. Cycle Track (WS-Bike-576D)

The Third St. cycle track is a 0.66-mile separated bicycle facility located in downtown Winston-Salem. The project runs along Third Street from North Cherry Street to Metropolitan Drive. The project was originally recommended in the Winston-Salem Bicycle Plan and has an estimated construction cost of \$8,340,000. The project scores highly at 85 as it closes a critical gap and connects various points of interests and activity centers.

Sprague Rd Protected Cycle Track (WS-Bike-019)

The Sprague Rd Protected cycle track is a 2.68-mile pedestrian facility located in southern Winston-Salem. The project runs along Sprague Road between South Main Street and Cline Street. The project was originally recommended in the Winston-Salem Bicycle Plan and has an estimated construction cost of \$31,125,000. The project scores highly at 80, as it connects area of high environmental justice concerns, provides a facility in a historic crash location, closes a critical gap, and connects numerous points of interest and activity centers.

Downtown Connector - Broad St Cycle Track (WS-Bike-576A)

The Broad Street cycle track is 0.71-mile separated bicycle facility located in Winston-Salem. The project traverses Haggard Avenue between Westend Boulevard and Ballpark Way. The bike lane was recommended in

the Winston-Salem Bicycle Plan and has an estimated construction cost of \$10,820,000. The project scores well with an 80, connecting areas of moderate environmental justice concern, enhancing safety where crashes are already prevalent, and providing access to a variety of points of interest and activity centers.

Lewisville Connector - B (WS-Bike-018B)

Section B of the Lewisville Connector includes 3.3 miles of bicycle lanes on Country Club Road between Ketner Road and Old Vineyard Road. The bike lanes were first recommended in the Winston-Salem Bicycle Plan and has an estimated cost of \$885,000. The project scores well with a 65 and provides a new facility in a crash hot spot, connects areas of high environmental justice concern and provides access to transit and activity centers.

Horizon Year 2045

Muddy Creek Trail Phase II (WS-Bike-478)

Phase II of Muddy Creek Trail is a newly constructed greenway along Muddy Creek between Robinhood Road and Yadkinville Road. The greenway was recommended in the West Suburban Area Plan and has already been the subject of a feasibility study. The project has an estimated construction cost of \$5,415,000. The project did not score highly but is prioritized because a completed feasibility study puts it substantially further along in the process than other similar projects.

Stratford Road Sidepath- A (WS-Bike-083A)

Section A of the Stratford sidepath is a 2.05-mile bicycle and pedestrian facility located in Winston-Salem. The project travels along Stratford Road from Warwick Road to Silas Creek Parkway. The project has an estimated construction cost of \$7,840,000. The project scores highly at 90 as it closes a critical gap, connects areas of high environmental justice concern, and provides connections to numerous points of interest and activity centers.

New Walkertown Rd Sidepath (WS-Bike-080)

The New Walkertown Road sidepath is a 2.10-mile bicycle and pedestrian facility located in Winston-Salem. The project runs along US 311/New Walkertown Road between MLK, Jr. Drive and Winston Lake Road. Bicycle improvements along this corridor were originally recommended in the 2012 Comprehensive Transportation Plan. The project has an estimated construction cost of \$6,610,000. The sidepath scores highly at 80, since it provides connections to areas of high environmental justice concern and gives access to numerous points of interest and activity centers.

Peters Creek Pkwy Sidepath - A (WS-Bike-224A)

Section A of the Peters Creek Parkway sidepath is a 1.44-mile bicycle and pedestrian facility located in Winston-Salem. The project is the first section of an extended sidepath recommended along Peters Creek Parkway, between Ballpark Way and the Salem Creek Greenway. The project has an estimated construction cost of \$12,080,000. The sidepath scores well at 80. It closes a critical gap and connects numerous points of interest and activity centers.

Kernersville Pedestrian Improvements (WS-Bike-190)

The Kernersville pedestrian improvements are along a 0.73 mile stretch of NC 150/North Main Street between Bodenhamer Street and Gralin Street. The improvements include filling in gaps in the existing sidewalk, improved pedestrian crossings, and pedestrian signals at intersections. The project has an estimated cost of \$1,210,000. The project scores well with a 75 as it closes a critical gap, provides connections to areas of environmental justice concern, gives access to numerous points of interest and transit, and provides accommodations in an area with a history of pedestrian crashes.

Forsyth Medical Complete Streets Improvements (WS-Bike-020)

The Forsyth Medical complete streets improvements is 1.04-miles of bicycle and pedestrian facilities located in Winston-Salem. The project extends along Healy Drive between US 421 and Silas Creek Parkway. The improvements were first recommended the Winston-Salem Bicycle Plan and have an estimated construction cost of \$7,070,000. The project scores a 75 and will provide accommodations for bicyclists and pedestrians near a major employment center and transit and where there is a history of multiple pedestrian crashes.

Silas Creek Parkway Sidepath - A (WS-Bike-079A)

Section A of the Silas Creek Parkway sidepath is a 0.48-mile bicycle and pedestrian facility that will run along both sides of Silas Creek Parkway between Hanes Mall Boulevard and Stratford Road. The project has an estimated cost of \$3,125,000. The project scores a 70, and connects areas of environmental justice concern, provides access to transit, and provides access to activity centers.

MLK Jr Blvd Complete Streets - A (WS-Bike-128A)

Section A of the MLK, Jr. Boulevard complete streets improvement is 1.24-miles of bicycle and pedestrian facilities located in Winston-Salem. The project will make improvements on MLK Jr Boulevard between Waughton Street and Salem Creek Greenway. The project is newly recommended for the 2045 MTP Update plan and it is part of a series of projects that will connect southern Winston-Salem neighborhoods and Winston-Salem State University with downtown. The project has an estimated construction cost of \$7,900,000. The project scores well at 70 as it provides connections to areas of high environmental justice concern, provides access to transit, numerous community destinations, and activity centers. It also provides bicycle and pedestrian accommodations at arterial intersections and in a location with a history of bicycle and pedestrian crashes.

Jackson, Argonne, and Westside Bicycle Boulevards (WS-Bike-036 B,C,F)

There are three streets recommended for bicycle boulevards for the 2045 horizon. The first is a 2.14-mile stretch of Jackson Avenue from East Third Street south to where the road dead ends. The project's estimated cost is \$334,000. The second is a 1.96-mile stretch of Argonne Boulevard between Longview Drive and Martin Luther King Jr Boulevard, with an estimated cost of \$306,000. Finally, the Westside bicycle boulevard is 2.75-miles of various roads that wind through the Sherwood Forest and Buena Vista neighborhoods between Cedar Trail and Reynolda Road. The estimated cost is \$430,500. These bicycle boulevards are outlined in the Winston-Salem Bicycle Plan. The projects scored between 60 and 45 and each crosses an area of environmental justice concern, provides access to transit and connects various community points of interest.

Kerners Mill Creek Greenway Phase II (WS-Bike-569B)

Phase II of the Kerners Mill Creek Greenway is a 1.59-mile stretch of greenway in western Kernersville along Kerners Mill Creek between Maxine Street and Oakhurst Street. The project originated in the Kernersville Comprehensive Plan and is a section of the Piedmont Regional Trail. The project has an estimated construction cost of \$4,075,000. The project will help build out the regional trail network, provide connections to an area of environmental justice concern, and provide access to a variety of community destinations.



Zagster Bike Share Station in Winston-Salem

Bicycle and Pedestrian Policy and Planning Recommendations

Additional policy and planning initiatives are recommended to ensure that the implementation of complete streets continues and that a safer, well-connected network for pedestrians and bicyclists is complemented with outreach and education strategies to encourage and strengthen the culture of active transportation in the region.

- Coordinate between Winston-Salem, other municipalities, and Forsyth County to better study, plan for, and construct bicycle and pedestrian facilities that run through multiple jurisdictions. This will be particularly important as the region builds out its greenway and trail network.
- Work with WSTA and PART transit agencies to improve pedestrian and bicyclist access to transit stops. Locations where there are transit stops without any bicycle or pedestrian facilities or facilities are in poor conditions should be identified and prioritized for improvement. Particular care should be given to ensure bicyclists and pedestrians trying to access transit stops have safe places to cross the roadway nearby.

- Work to update local bicycle, pedestrian and greenways plans on at least a 10-year cycle; consider more frequent updates due to design recommendations changing quite rapidly for bicycle and pedestrian infrastructure.
- Coordinate between NCDOT Division 9, MPO staff and local municipalities staff on an annual basis to review the upcoming roadway maintenance list for the next three years and identify opportunities to implement bicycle lanes or other quick and easy bicycle and pedestrian improvements at the time of resurfacing.
- Implement bicycle education events for children similar to bicycle rodeos and “Learn to Ride” events; take advantage of NCDOT bicycle helmet giveaway program to give away helmets to children as part of bicycle rodeos and “Learn to Ride” events.
- Hold walkability and bikeability audits around key community destinations.
- Support local municipalities in their application for bicycle-friendly and walk-friendly status, to review outstanding infrastructure, policy and programming gaps.
- Continue to implement bicycle and pedestrian facilities as part of roadway projects through NCDOT complete streets policy - including along and across major arterial corridors. A shared-use path or sidepath along an arterial can provide accommodation for both bicyclists and pedestrians, including less-experienced bicyclists who are less likely to feel confident riding in traffic.

5.4 Freight and Rail

In November 2017, NCDOT completed the first North Carolina Statewide Multimodal Freight Plan. The plan identifies freight investments that can lead to economic growth, support NCDOT’s 25-year vision, and address the criteria in the Strategic Transportation Investments (STI) prioritization process. NCDOT developed a vision, and defined goals and objectives to meet the vision. The goals of the freight plan are:

- Enhance economic development opportunities and competitiveness
- Improve freight system efficiency, reliability, and resiliency
- Enhance freight transportation safety and security
- Support adoption and deployment of new freight technologies
- Improve freight infrastructure conditions and preservation
- Protect and enhance the natural environment
- Foster public-private partnerships and collaboration with freight stakeholders
- Ensure good fiscal management and sustainable funding for the State’s freight network

As North Carolina adapts to the changing demands of its freight infrastructure, the freight plan addresses current and future challenges and opportunities and provides a variety of recommended freight investments.

The I-40 corridor remains a priority for freight movement across the state and through the WSUAMPO region. Interchange improvements as well as major arterial improvements connecting to interchanges will help support movement of goods within and across the Winston-Salem MPO region.

The North Carolina Railroad corridor passes through High Point and Greensboro. PART Route 5, the Amtrak Connector, is a bus route that connects Winston-Salem to High Point Amtrak station. While the route is open to the public, the bulk of its ridership is Amtrak passengers. PART has a Thruway agreement with Amtrak that

provides a train ticket that includes a connecting bus ticket to select cities. Route 5's schedule is tied to the train schedule. To ensure connections with the Amtrak train the Route 5 must wait a maximum of 60 minutes before heading to Winston-Salem if any delays are experienced by the Amtrak service Carolinian and Piedmont. In 2019, Route 5 saw 6,760 passenger trips. From the station in High Point, eight trains travel between Charlotte and Raleigh daily. The number of trains is expected to go up to ten in the near future.

The Charlotte to Raleigh passenger rail corridor is part of the larger Southeast High-Speed Rail corridor; however, Winston-Salem is outside of the Southeast High-Speed Rail corridor. Figure 16 below highlights I-40 as the primary freight corridor and other railroad lines.

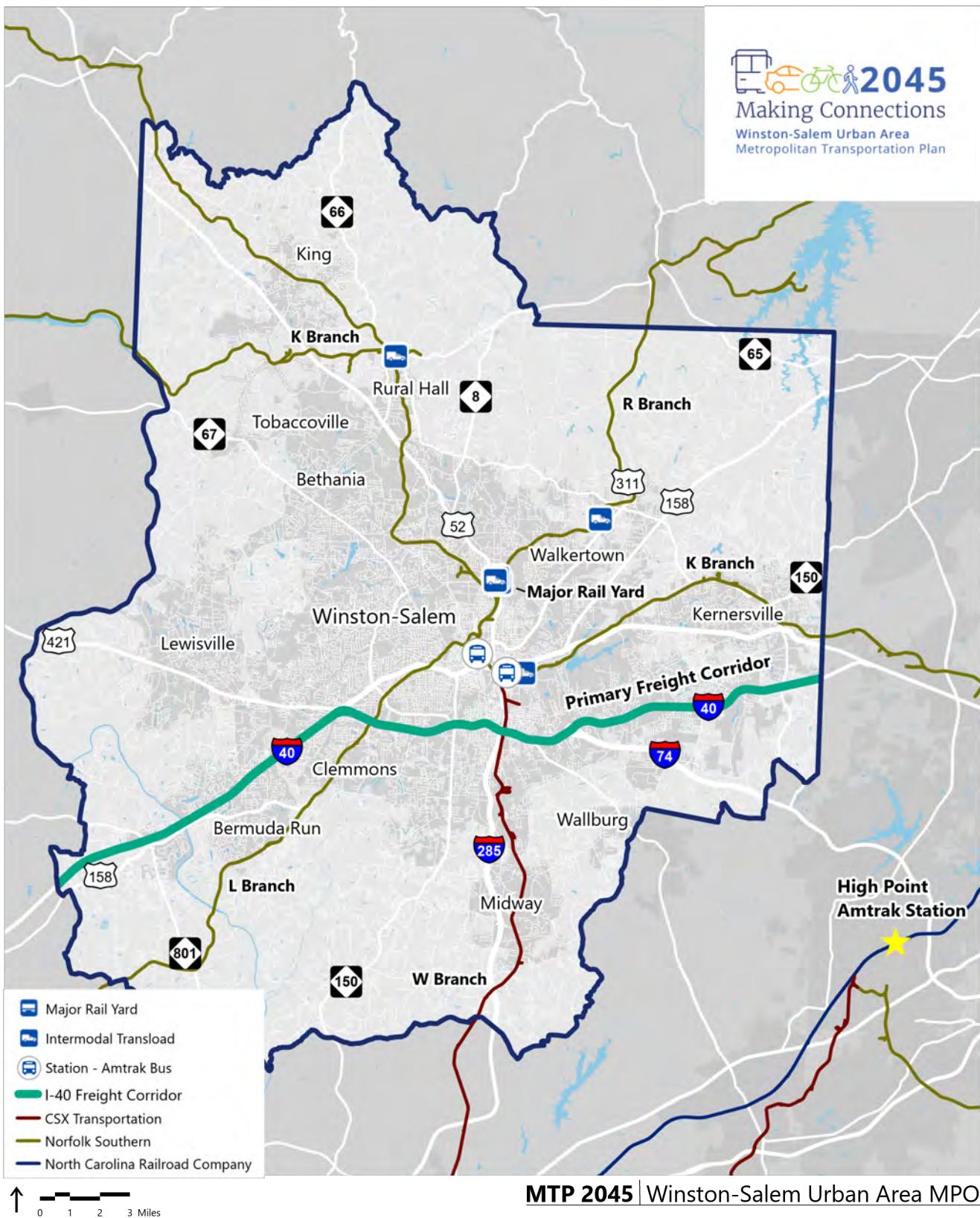


Figure 16 - Freight and Rail Corridors

May 01, 2020



Freight and Rail Recommendations

Freight and rail recommendations were identified in both the Statewide Rail Plan and Freight Plan to improve the passenger and freight rail systems and the movement of people and goods through the MPO area. The tables below give an overview of the freight and rail projects identified in each of the statewide plans. A map of the existing freight and rail infrastructure and proposed improvements is shown in the map below (Figure 17).

Table 16 - Freight Recommendations

WSUAMPO FREIGHT RECOMMENDATIONS						
Project #	Corridor	Corridor Description		Type	Cost	Year
I-0911A	I-40	West of NC 801 in Davie County to SR 1101 (Harper Road) in Forsyth County		Mobility and Reliability	\$78.47M	2017
I-5952	I-40	SR 1101 (Harper Road) in Clemmons to East of US 421/Business 40 in Winston-Salem.		Asset Management and Utilization (Pavement Rehabilitation)	\$6.09M	2019
I-5795	I-40	0.3 Mile East of SR 3153 (Hanes Mall Boulevard) to 0.9 Mile East of NC 150 (Peters Creek Parkway) in Winston-Salem and SR 2747 (Clemmonsville Road) in Winston-Salem to Guilford County Line		Asset Management and Utilization (Pavement Rehabilitation)	\$22.20M	2020
WS-RR-01	I-40/I-77/US 311	Charlotte to Winston-Salem to VA State Line		Evaluate separation of freight rail line from local streets in Mooresville and/or planning for at-grade crossing separation along corridor in order to relocate traffic movement from existing substandard crossings	-	-
WS-RR-02	I-40	Greensboro to Winston-Salem to Rural Hall		Construct a rail spur at Piedmont Triad International Airport, Greensboro, Guilford County	-	-
WS-RR-03	I-85/US 29	SC state line to VA State Line		Traffic Separation Study along Corridor 05 (K Line) from Corridor 06 (NS Mainline) west towards Forsyth County	-	-

Table 17 - Rail Recommendations

WSUAMPO RAIL RECOMMENDATIONS					
Project ID	Service	Description	Corridor Route	Railroad	Project
WS-RR-04	Piedmont Corridor	Charlotte to Greensboro	SC state line to VA state line	NCRR/NS	Travel time improvements New stops Station Improvements
WS-44-05	Statewide Thruway Service	Asheville to Winston-Salem to Greensboro	Rowan County to Winston-Salem to Greensboro	NS	Motorcoach service expansion
WS-RR-06	Commuter Rail	Winston-Salem to Greensboro	Rural Hall to Winston-Salem to Greensboro	NS	Commuter Rail
WS-RR-07	High Speed Rail	FRA-Designated Route	Washington DC-Richmond-Raleigh-Greensboro-High Point-Charlotte		High Speed Rail

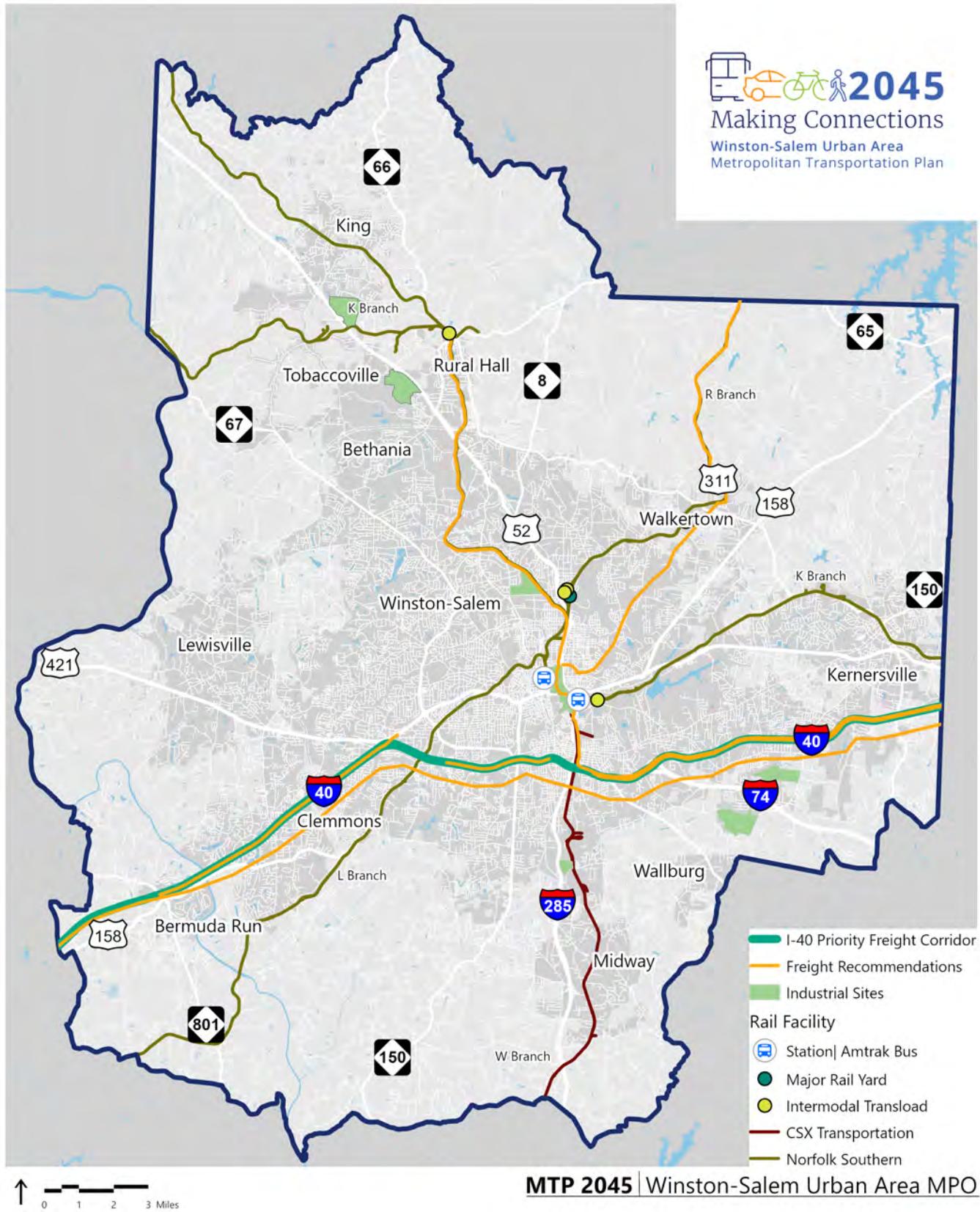


Figure 17 - Freight and Rail Recommendations

July 21, 2020



5.5 Aviation

A large commercial, international airport is located just outside of Winston-Salem Urban area: Piedmont Triad International Airport west of Greensboro is the third largest airports in the state. A general aviation airport, Z. Smith Reynolds Airport is located inside the region.

Z. Smith Reynolds Regional Airport

Z. Smith Reynolds Airport is a general aviation airport located just north of downtown Winston-Salem. The airport has a 6,655-foot primary runway and serves over 45,000 operations (take-offs and landings) per year. The airport does not currently have commercial carriers, but it maintains a Class I certificate which allows all types of air carrier operations.

Z. Smith Reynolds Airport has gone through a series of improvements since the 2009 Master Plan Update. On December 20, 2018, the Forsyth County Board of Commissioners adopted the 2018 Smith Reynolds Airport Capital Projects Ordinance, which would account for the projects listed in Table 18 below.

Table 18 - Smith Reynolds Airport Improvements

WSUAMPO SMITH REYNOLDS AIRPORT IMPROVEMENTS				
Project	Status	Budget	Funding Source	Year
Forsyth Tech Mazie S. Woodruff Aviation Technology Lab	Under Construction	\$16,000,000	2016 Bond Referendum	2020
Acquire Land and Clear Terrain Obstructions East of RW 15-33	Ongoing	\$2,250,000	NCDOT STI 100%	2023
Taxilane Lima and Ramp	Design	\$14,550,000	NCDOT STI 100%	2024
Taxiway A or Taxiway Quebec	Design	\$26,550,000	NCDOT and FAA Discretionary 90% Local 10%	2024
Terminal Area Improvements	Planning and Funding	\$21,500,000	NCDOT STI and limited obligation bonds	2022
Runway 15-33 Rehabilitation	Design	\$8,500,000	NCDOT and FAA Discretionary 90% Local 10%	2022
Airfield Drainage Improvements Phase II	Ongoing	\$500,000	NCDOT and FAA Discretionary 90% Local 10%	2021

Piedmont Triad International Airport

Piedmont Triad International Airport (GSO) is located west of Greensboro, between I-40 and I-73. It provides commercial service on five airlines, serving over 1.7 million passengers annually. The airport also moves more air freight cargo than any North Carolina airport, at over 300,000 tons annually. ITRE's most recent public airport economic analysis estimates that the airport supports over 25,000 jobs, generating over \$190 million in state and local taxes, with an overall economic output of nearly \$6 billion.

5.6 Electric, Autonomous and Connected Vehicles

The future of travel is expected to change as more people purchase electric and autonomous vehicles and as the region is being introduced to new technologies like connected vehicles.

Electric Vehicles

Electric vehicles (EV) run on an electric motor powered by electric batteries. These vehicles must be charged through charging stations at home, work, or while traveling. With more auto manufacturers adding EVs to their product lines, charging stations need to be more readily available along major roadways to allow for vehicle charging. Plug-In NC was established in 2011 to promote EVs throughout the state. According to www.pluginnc.com, the WSUAMPO region currently has approximately 30 charging locations. Of the 30 charging stations, eight stations offer Level 1 Charging, 20 stations provide Level 2 Charging, and two offer DC Fast Charging. Figure 18 below shows a comparison of the three charging station types.

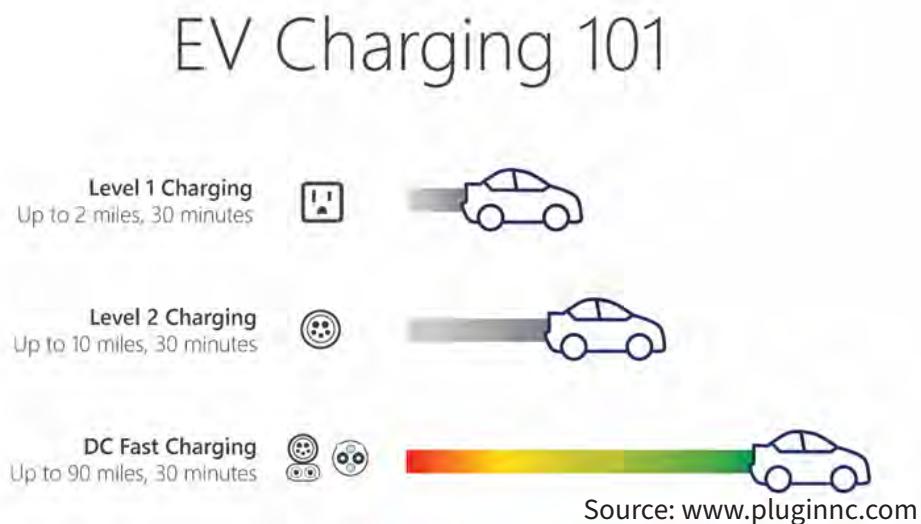
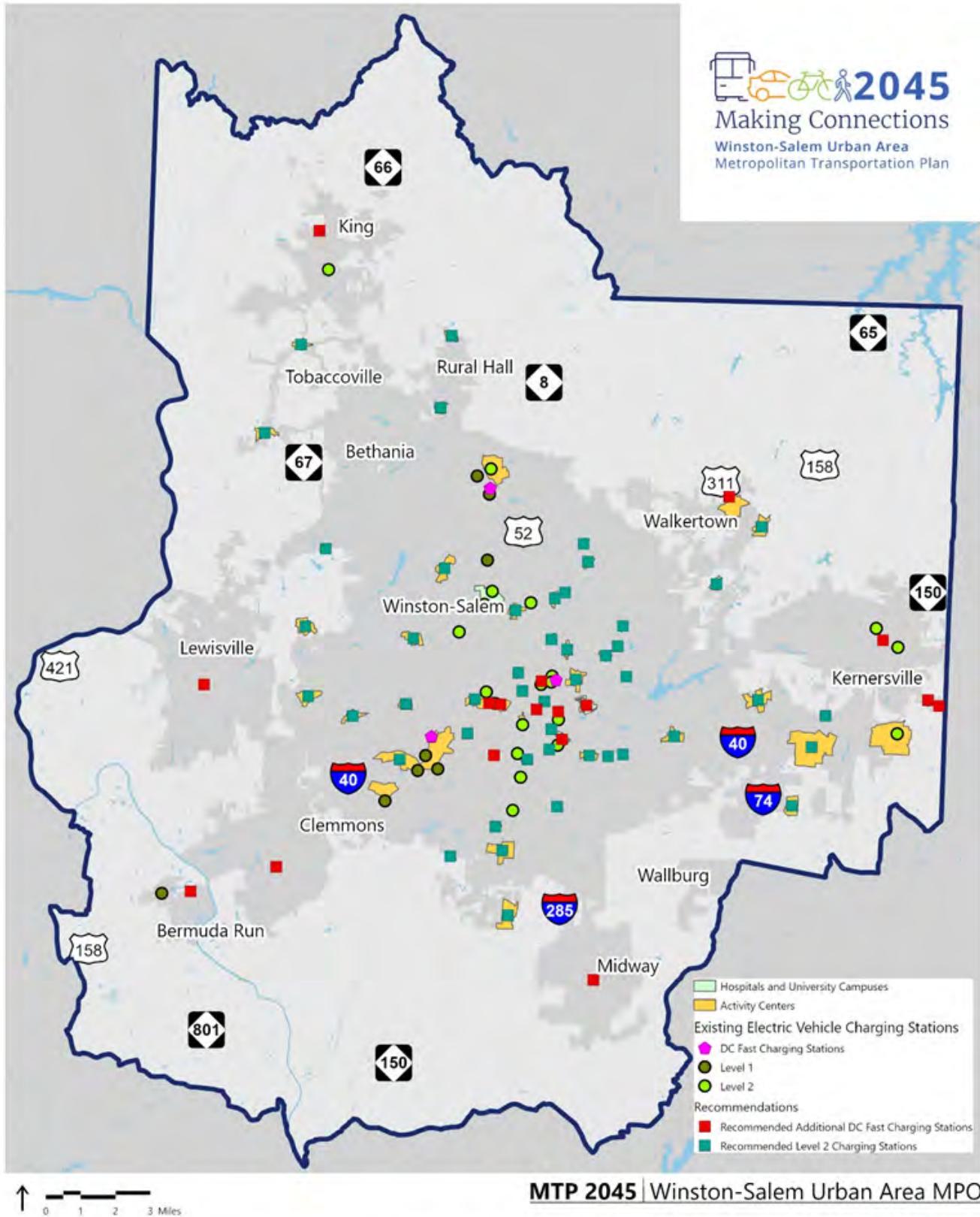


Figure 18 - EV Charging Station Types

The Piedmont-Triad Region developed the Piedmont Triad Community Plug-In Electric Vehicle (PEV) Readiness Plan in 2016. This plan was developed to increase awareness of the uses and benefits of PEVs and improve availability and accessibility of charging stations, as the region moves toward EVs. According to the Electric Power Research Institute (EPRI), the Piedmont Triad region is expected to have more than 145,000 PEVs on its roads by 2030. In order to prepare for the increase in PEVs, more charging stations need to be made available. The Plan identified priority locations for PEV infrastructure within the Triad region, as shown in Figure 18.



Existing EV Stations Data Source: <https://plugginc.com>, August 2020

September 04, 2020



Figure 19 - Potential Electric Vehicle Charging Station Locations

Locations specific to the planning area include:

- Shopping Centers
 - Parkway Plaza
 - Oak Summit Plaza
 - Hanes Mall
- Colleges & Universities
 - Winston-Salem State University
 - Wake Forest University
- Parks & Community Facilities
 - Sci-Works
 - State Parks
- Park and Ride Lots
- Hospitals & Medical Centers
 - Forsyth Medical Center
 - Wake Forest Baptist
 - Cones Hospital
- Employment Centers
 - Hanes Corporation
 - BB&T
- Downtowns and CBDs
- BB&T Ballpark
- Apartment Complexes
- Truck Stops and rest stops

The table below identifies the destination or closest destination of each existing and recommended charging station in the WSUAMPO region. The 66 recommended locations were obtained through the PEV Readiness Plan or identified by the general public during outreach efforts.

Table 19 - WSUAMPO Electric Vehicle Charging Station Locations

WSUAMPO ELECTRIC VEHICLE CHARGING STATION LOCATIONS					
Municipality	Destination	Address	Destination Type	Charging Station Type	Existing/Recommended
Bermuda Run	Hampton Inn - Bermuda Run	196 NC Highway 801 N, Advance, NC 27006	Hotel	Level 1	Existing
Winston-Salem	Sheetz	2505 Somerset Center Dr, Winston-Salem, NC 27103	Gas Station	Level 1	Existing
Winston-Salem	Fairfield Inn near Haynes Mall (Winston-Salem, NC)	1680 Westbrook Plaza Drive, Winston-Salem, NC 27103	Hotel	Level 1	Existing
Winston-Salem	La Quinta	2020 Griffith Rd Winston-Salem, NC 27103	Hotel	Level 1	Existing
Winston-Salem	Microtel Inn Winston-Salem	100 Capitol Lodging Ct, Winston-Salem, NC	Hotel	Level 1	Existing
Winston-Salem	Flow Automotive Center	1400 S Stratford Rd, Winston-Salem, NC 27103	Auto Dealer	DC Fast Charging	Existing
Winston-Salem	Publix Super Market	34 Miller St, Winston-Salem, NC 27104	Grocery Store	Level 2	Existing
Winston-Salem	Wake Forest Baptist Medical Center	1 Medical Center Blvd, Winston-Salem, NC 27157	Hospital/Medical Center	Level 2	Existing
Winston-Salem	Embassy Suites	420 N Marshall St, Winston-Salem NC 27101	Hotel	Level 2	Existing
Winston-Salem	Link Innovation Quarter	217 E 6th St, Winston-Salem, NC 27101, USA	Apartment	Level 2	Existing
Winston-Salem	4th Church Street Parking Desk	455 N Chestnut St, Winston-Salem, NC 27101	Parking Deck	Level 2	Existing
Winston-Salem	Volvo Cars Winston-Salem	701 Peters Creek Pkwy, Winston-Salem, NC 27103	Auto Dealer	Level 2	Existing
Winston-Salem	Central Park	801 E Salem Ave, Winston-Salem, NC, 27101	Park	Level 2	Existing
Winston-Salem	Parkway Ford Lincoln South	2104 Peters Creek Pkwy, Winston-Salem, NC 27127	Auto Dealer	Level 2	Existing
Winston-Salem	UNC School of the Arts - Faculty and Staff Parking	1919 S Main St Winston Salem, NC 27127	College/University	Level 2	Existing
Winston-Salem	Flow Mini	2575 Peters Creek Pkwy, Winston-Salem, NC 27127	Auto Dealer	Level 2	Existing
Winston-Salem	Modern Toyota	1275 South Park Blvd, Winston-Salem, NC 27127	Auto Dealer	Level 2	Existing
Winston-Salem	Southeastern Center for Contemporary Art (SECCA)	750 Marguerite Dr, Winston-Salem NC 27106	Art Center	Level 2	Existing
Winston-Salem	Residence Inn Winston Salem	7835 North Point Blvd, Winston-Salem, NC 27106	Hotel	Level 1	Existing
Winston-Salem	Wake Forest University - Lot W1	1833 Wake Forest Rd, Winston Salem, NC 27109	College/University	Level 2	Existing
Winston-Salem	Wake Forest University	Gulley Dr, Winston-Salem NC 27109	College/University	Level 2	Existing
Winston-Salem	University Corporate Center - Wake Forest	near 353-443 W 32nd St, Winston-Salem, NC 27105	College/University	Level 2	Existing

WSUAMPO ELECTRIC VEHICLE CHARGING STATION LOCATIONS CONT...

Municipality	Destination	Address	Destination Type	Charging Station Type	Existing/ Recommended
Winston-Salem	Kaleideum North	400 W Hanes Mill RD, Winston-Salem, NC 27105	Museum	Level 1	Existing
Winston-Salem	Modern Chevrolet	5955 University Parkway Winston Salem NC, 27105	Auto Dealer	Level 2	Existing
Winston-Salem	University Parkway	5660 University Parkway Winston-Salem NC 27105	College/University	Level 1	Existing
Winston-Salem	Modern Nissan, LLC	5795 University Pkwy, Winston-Salem NC 27105	Auto Dealer	DC Fast Charging	Existing
King	Stokes Pharmacy	547 S Main St, King, NC 27021	Pharmacy	Level 2	Existing
Kernersville	Carmine's Import Service	318 W Mountain St, Kernersville, NC 27284	Auto Repair	Level 2	Existing
Kernersville	Parks Chevrolet	615 NC-66, Kernersville, NC 27284	Auto Dealer	Level 2	Existing
Kernersville	Piedmont Triad Regional Council	1398 Carrollton Crossing Dr, Kernersville, NC 27284	Government Office	Level 2	Existing
Winston-Salem	Cloverdale Plaza (Coming Soon)	2235 Cloverdale Ave, Winston-Salem, NC 27103	Retail	DC Fast Charging	Recommended
Winston-Salem	Benton M C Jr Convention Center	301 W 5th St, Winston-Salem, NC 27101	Downtown Winston-Salem	DC Fast Charging	Recommended
Clemmons	Clemmons Town Hall	3715 Clemmons Rd, Clemmons, NC 27012	Downtown Clemmons	DC Fast Charging	Recommended
Lewisville	Lewisville Town Hall	6510 Shallowford Rd, Lewisville, NC 27023	Downtown Lewisville	DC Fast Charging	Recommended
Kernersville	Kernersville Town Hall	134 E Mountain St, Kernersville, NC 27284	Downtown Kernersville	DC Fast Charging	Recommended
Bermuda Run	Bermuda Run Town Hall	120 Kinderton Blvd # 100, Bermuda Run, NC 27006	Downtown Bermuda Run	DC Fast Charging	Recommended
Walkertown	Walkertown Town Office	5177 Main St, Walkertown, NC 27051	Downtown Walkertown	DC Fast Charging	Recommended
Winston-Salem	Sherwood Forest	Sherwood Forest Road	Neighborhood/Community	Level 2	Recommended
Tobaccoville	Village of Tobaccoville Community	4225 Tobaccoville Road, Tobaccoville, NC 27050	Downtown Tobaccoville	Level 2	Recommended
Tobaccoville	Reynolda Road / Tobaccoville Road	Reynolda Road / Tobaccoville Road	Neighborhood/Community	Level 2	Recommended
Kernersville	Union Cross Station	Union Cross Road / I-40	Retail	Level 2	Recommended
Winston-Salem/ Kernersville	Union Cross	Union Cross Road / High Point Road	Neighborhood/Community	Level 2	Recommended
Horneytown	Horneytown	Horneytown Road / High Point Road	Neighborhood/Community	Level 2	Recommended
Winston-Salem	Waughtown Neighborhood/ Waughtown Commercial Corridor	Waughtown St / Thomasville Rd	Neighborhood/Community	Level 2	Recommended

WSUAMPO ELECTRIC VEHICLE CHARGING STATION LOCATIONS CONT...

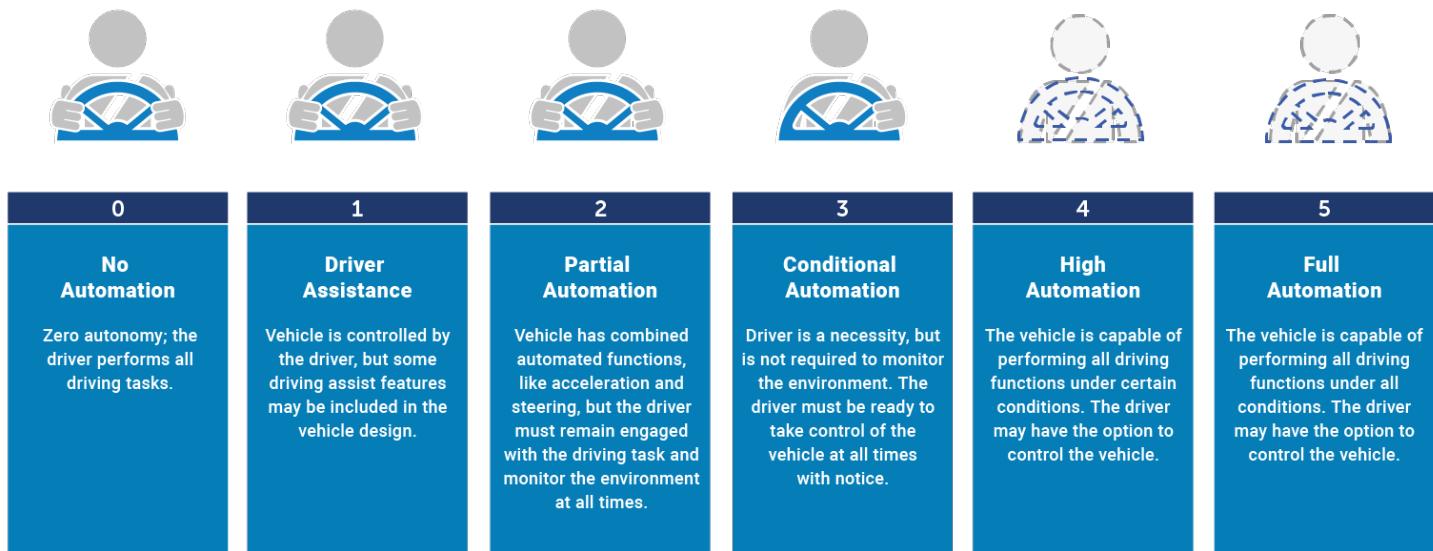
Municipality	Destination	Address	Destination Type	Charging Station Type	Existing/ Recommended
Winston-Salem	Waughtown-Forest Park Neighborhood	Waughtown St / Peachtree St	Neighborhood/Community	Level 2	Recommended
Winston-Salem	Waughtown-Forest Park Neighborhood (near Sprague Street Park)	Waughtown St / Pleasant St	Neighborhood/Community	Level 2	Recommended
Winston-Salem	SouthEast Plaza Shopping Center	3067 Waughtown St, Winston-Salem, NC 27107	Retail	Level 2	Recommended
Walkertown	Walkertown Commons	US 158 / NC 66	Retail	Level 2	Recommended
Winston-Salem	Lowery Mill Creek	Old Belews Creek Road	Creek	Level 2	Recommended
Winston-Salem	Pine Ridge Plaza	Reynolda Road / Fairlawn Drive	Retail	Level 2	Recommended
Winston-Salem	Parkway Plaza	1183 Silas Creek Pkwy, Winston-Salem, NC 7127	Retail	Level 2	Recommended
Winston-Salem	Burke Street Corridor	Fourth / Burke	Retail	Level 2	Recommended
Winston-Salem	Brookstown Avenue Corridor	Brookstown / Marshall	Retail/Commercial	Level 2	Recommended
Winston-Salem	Southeast Gateway	Between Salem Ave and YMCA Way	Residential/Commercial	Level 2	Recommended
Winston-Salem	Washington Park	1490 Broad St, Winston-Salem, NC 27127	Park	Level 2	Recommended
Winston-Salem	West End	near Canal St and Bridge St	Retail/Commercial	Level 2	Recommended
Winston-Salem	Garden View Neighborhood	Kernersville Road / Northern Beltway	Neighborhood/Community	Level 2	Recommended
Kernersville	Walmart Neighborhood Market	Union Cross / Sedge Garden	Residential/Commercial	Level 2	Recommended
Winston-Salem	Ardmore Village	Hawthorne Rd / Knollwood St	Neighborhood/Community	Level 2	Recommended
Winston-Salem	Thruway Shopping Center	300 S. Stratford Road, Winston-Salem, NC 27103	Retail/Commercial	Level 2	Recommended
Rural Hall	Downtown Rural Hall	near Depot Street	Downtown Rural Hall	Level 2	Recommended
Rural Hall	Village Shopping Center	US 52 / Bethania-Rural Hall Road	Retail/Commercial	Level 2	Recommended
Winston-Salem	Ogburn Station	Glenn / Ogburn	Freight/Industrial	Level 2	Recommended
Winston-Salem	Jetway Business Center	2825 New Walkertown Rd, Winston-Salem, NC 27105	Retail	Level 2	Recommended
Winston-Salem	City View	Old Greensboro / Barbara Jane	Neighborhood/Community	Level 2	Recommended
Winston-Salem	East Winston	east of Downtown Winston-Salem	Neighborhood/Community	Level 2	Recommended

Autonomous and Connected Vehicles

Autonomous and connected vehicles have the potential to increase safety, improve mobility and reduce environmental impacts. Autonomous vehicles (AV) are vehicles in which some aspect of the vehicle's control is automated by the car. Figure 19 shows the different levels of automation.

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS

Full Automation



Source: nhtsa.gov, 2017

Figure 20 – Levels of Vehicle Automation

Level 1 automation is fairly common in new vehicles that have adaptive cruise control and parking assist. Level 2 automation is available, but very limited, in Tesla models for example. More widespread use beyond Driver Assistance will take some time to fully implement due to the cost, legal, and insurance issues associated with partial automation. AVs might reach 50% of new vehicle sales by 2045; public transit and freight are likely to see high autonomous vehicle usage in the future. Some of the benefits of AVs include congestion and emission reductions, but this is dependent on platooning, which requires dedicated highway lanes.

Based on forecast travel demand, five corridors have been identified as priorities for AVs around Winston-Salem, as shown in Figure 20 below. These corridors and the feasibility of platooning are recommended for additional study and analysis.

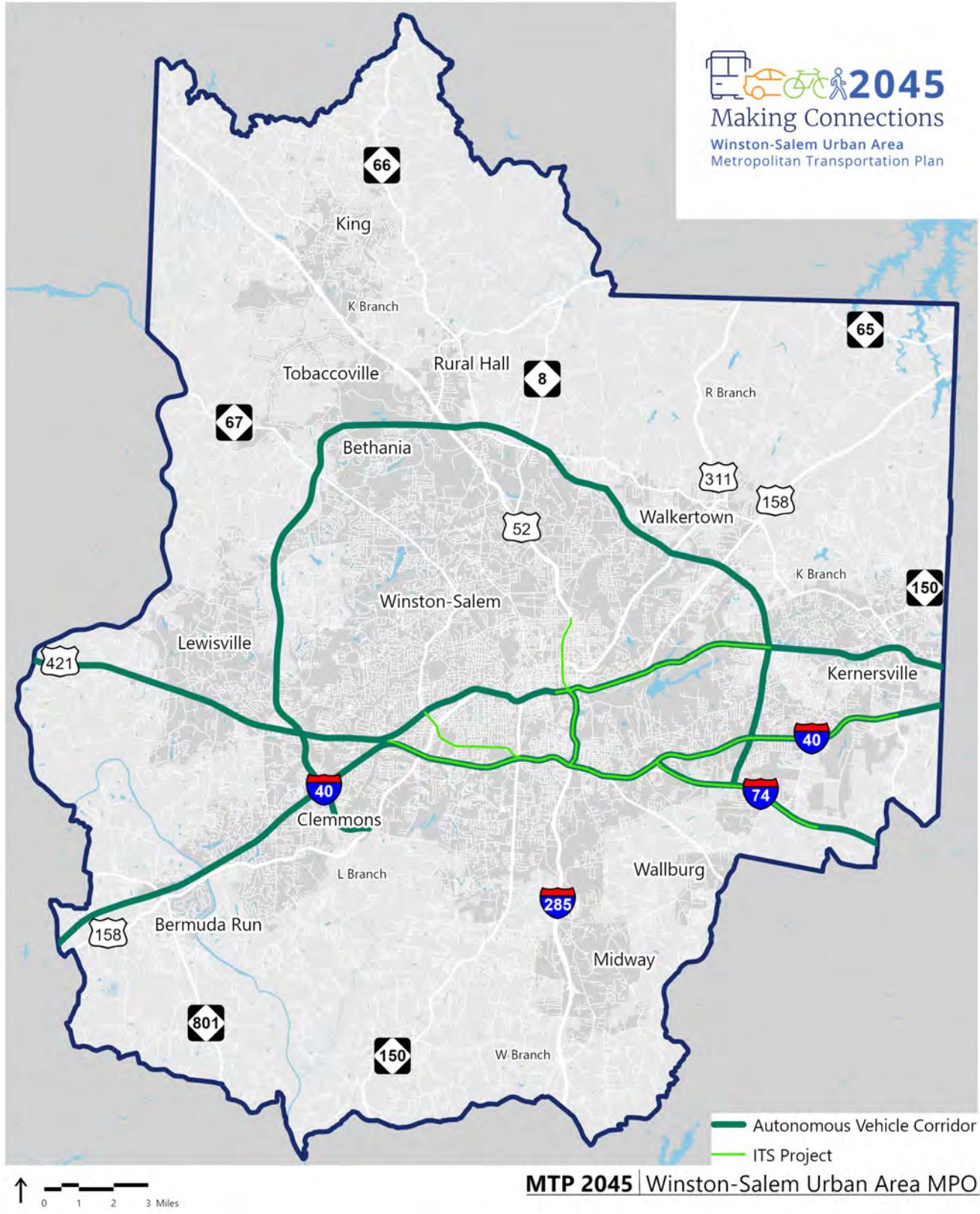


Figure 21 - Autonomous Vehicle and ITS Project Corridors

July 21, 2020



Connected vehicles (CV) have advanced technology that enable cars, trucks, buses and other vehicles to communicate with each other with in-vehicle or aftermarket devices that continuously share important safety and mobility information. CVs could dramatically reduce the number of fatalities and serious injuries caused by accidents on roads and highways. CVs could have more immediate and significant impacts, but this will require very high penetration rates.

5.7 Safety

In looking at existing safety conditions, two primary types of data from NCDOT were considered: safety section scores and total crash frequency by intersection. Points for highway section projects are scored based on three, evenly weighted components: 1) Class Density Ratio – The crash density of the study area versus the average crash density of similar facilities; 2) Severity Index; and 3) Critical Crash Rate Ratio – The actual crash rate for the study area versus the critical crash rate. The project areas with the higher scores are considered to have the poorer highway safety performance. In the Winston-Salem MPO region, most roads considered to have the poorest safety performance are high traffic volume roads like US 421/I-40 BUS, I-40, US 52, and major arterials like University Parkway (SR 4000), NC 66, and Peters Creek Parkway/ NC 150, and Silas Creek Parkway/ NC 67.

Areas of concern highlighted in the safety section scores are mirrored in the intersections with the highest density of crashes. The central, more developed part of the region has more pronounced safety concerns along key corridors such as I-40, I-40 BUS, US 158, NC 150, NC 66. The top ten high crash frequency intersections in the Winston-Salem MPO have been identified based on the number of crashes -see Table 20 below. Figure 21 and Figure 22 illustrate the safety concerns reflected in NCDOT section safety scores (for NCDOT-maintained roadways only) and locations of intersections with high frequency of crashes.

Table 20 - Top 10 High Crash Frequency Intersections, 2014-2018

Rank	Intersection	Total Crashes (2014-2018)	Fatality & Type A Injury Crashes (2014 - 2018)
1	I 40 BUS at US 52	462	0
2	NC 67 at NC 150	174	0
3	I 40 at I 285	139	1
4	I 40 at NC 150	130	0
5	I 40 at SR 1103 (Lewisville Clemons Road)	124	0
6	US 158 at SR 3153 (Hanes Mall Boulevard)	118	0
7	SR 1528 (Silas Creek Parkway) at SR 4000 (University Parkway)	110	1
8	I 40 at US 158	104	0
9	US 158 at NC 66	101	3
10	US 421 at SR 1103 (Lewisville Clemons Road)	89	0

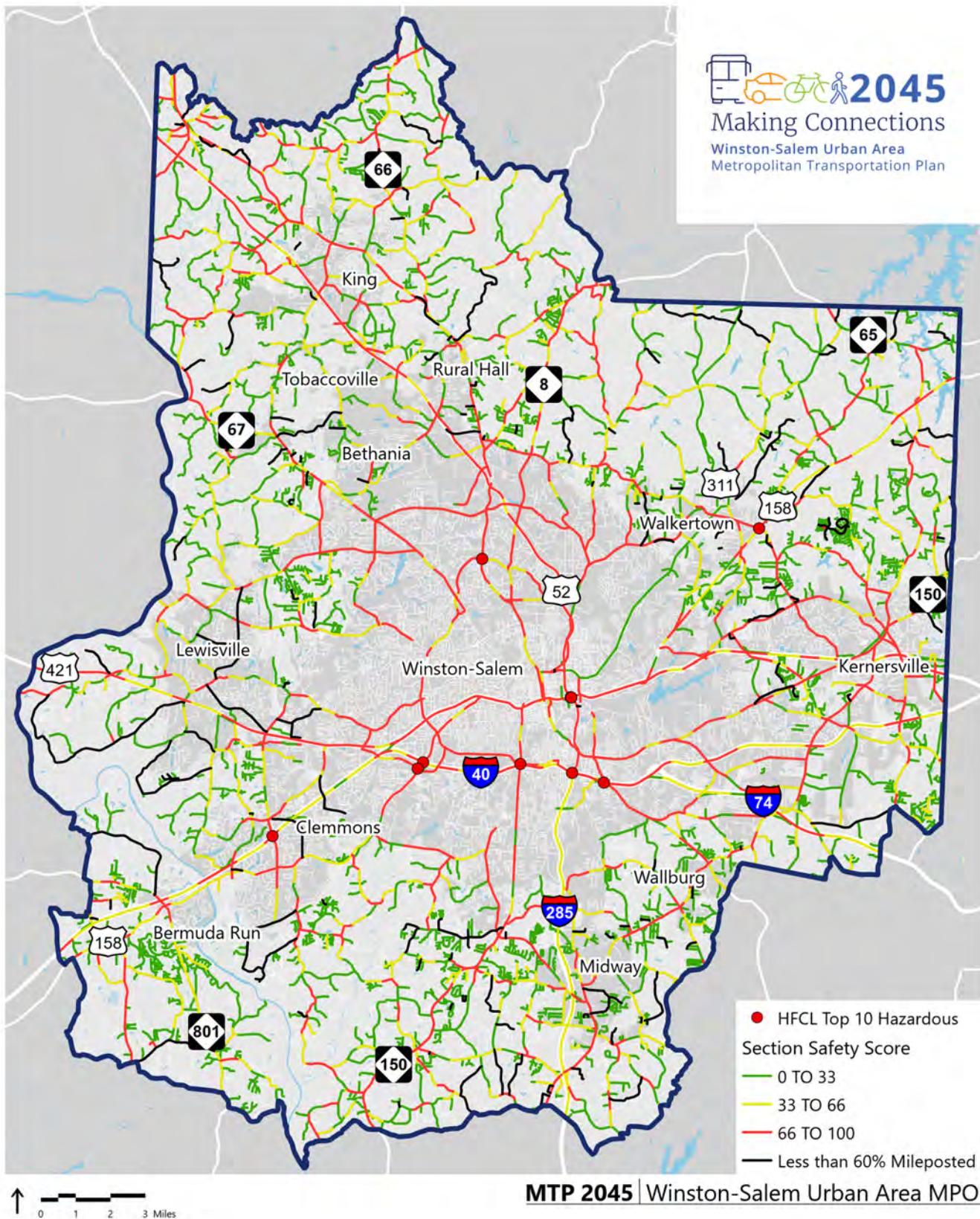
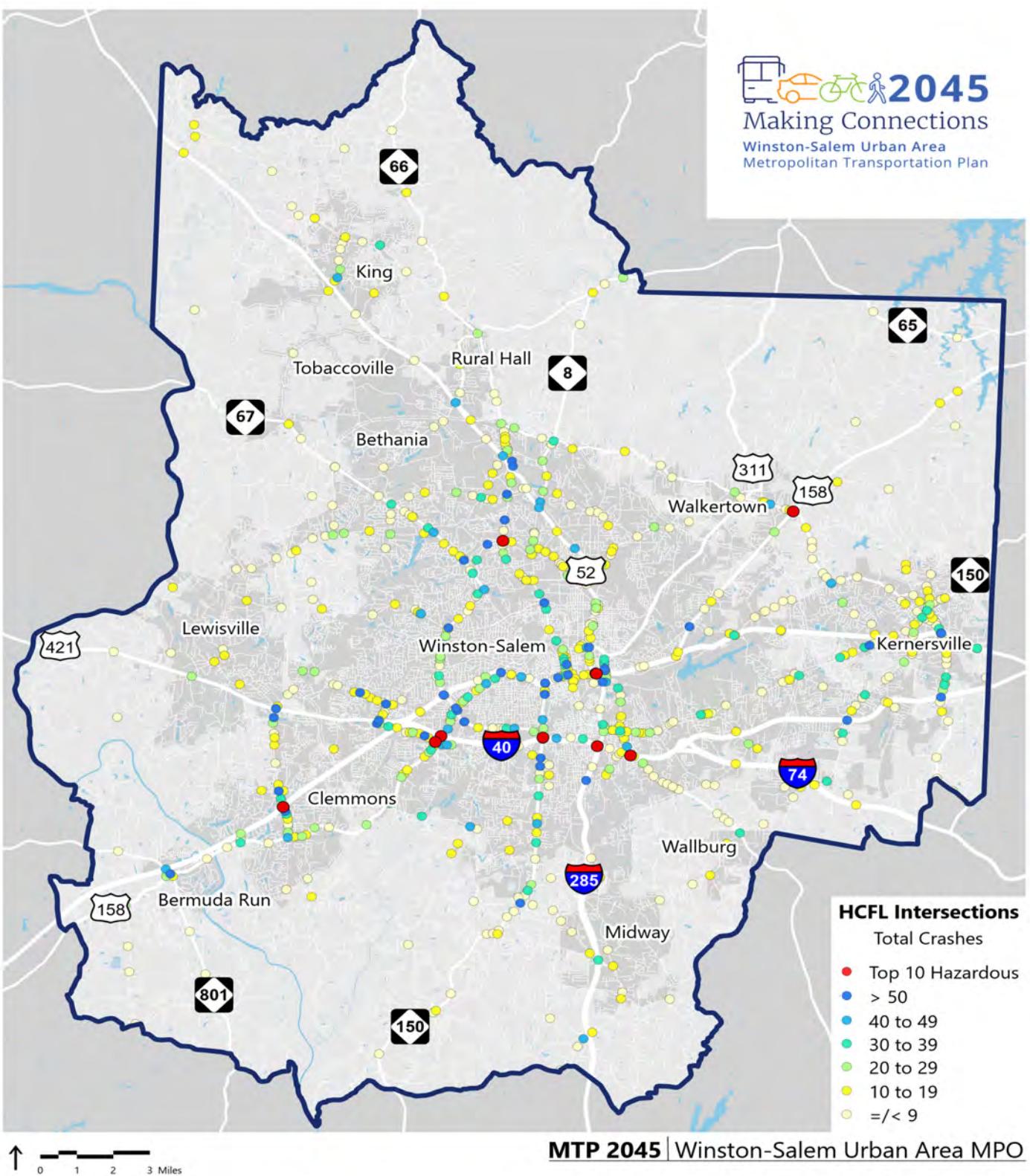


Figure 22 - NCDOT Maintained Roadways Section Safety Score



April 27, 2020



Figure 23 - High Crash Frequency Intersections

Over the most recent past five years of available crash data (2014-2018), fatal vehicle crashes in the region have remained relatively flat, though they decreased slightly in the past year. Serious injuries have generally increased over time, though they also decreased slightly in the past year. The increase in serious injury crashes likely reflects an overall increase in crashes as vehicle miles traveled increase across the state.

Bicycle and Pedestrian Safety

Trends in pedestrian and bicycle crashes in the Winston-Salem MPO over ten years of data (2009-2018) are shown below. Pedestrian crashes have been steadily climbing since 2015 and nearly doubled between 2016 and 2018. Bicycle crashes, on the other hand, remained relatively flat until 2018, when they started to increase. The number of fatal and serious injury non-motorized crashes started to grow in 2016; however, the percent of fatal and serious crashes has remained flat.

Visualizing pedestrian crashes on the Figure 24, it is apparent that major arterials including US 421, NC 150, Silas Creek Parkway and University Parkway, Glenn Avenue and the urban core of the region have the highest concentration of pedestrian crashes resulting in fatalities and serious injuries. Bicycle crashes are more dispersed, the majority of all crashes are in Winston-Salem. However, the two fatal bicycle crashes that occurred in the past ten years of data both occurred in more rural areas.

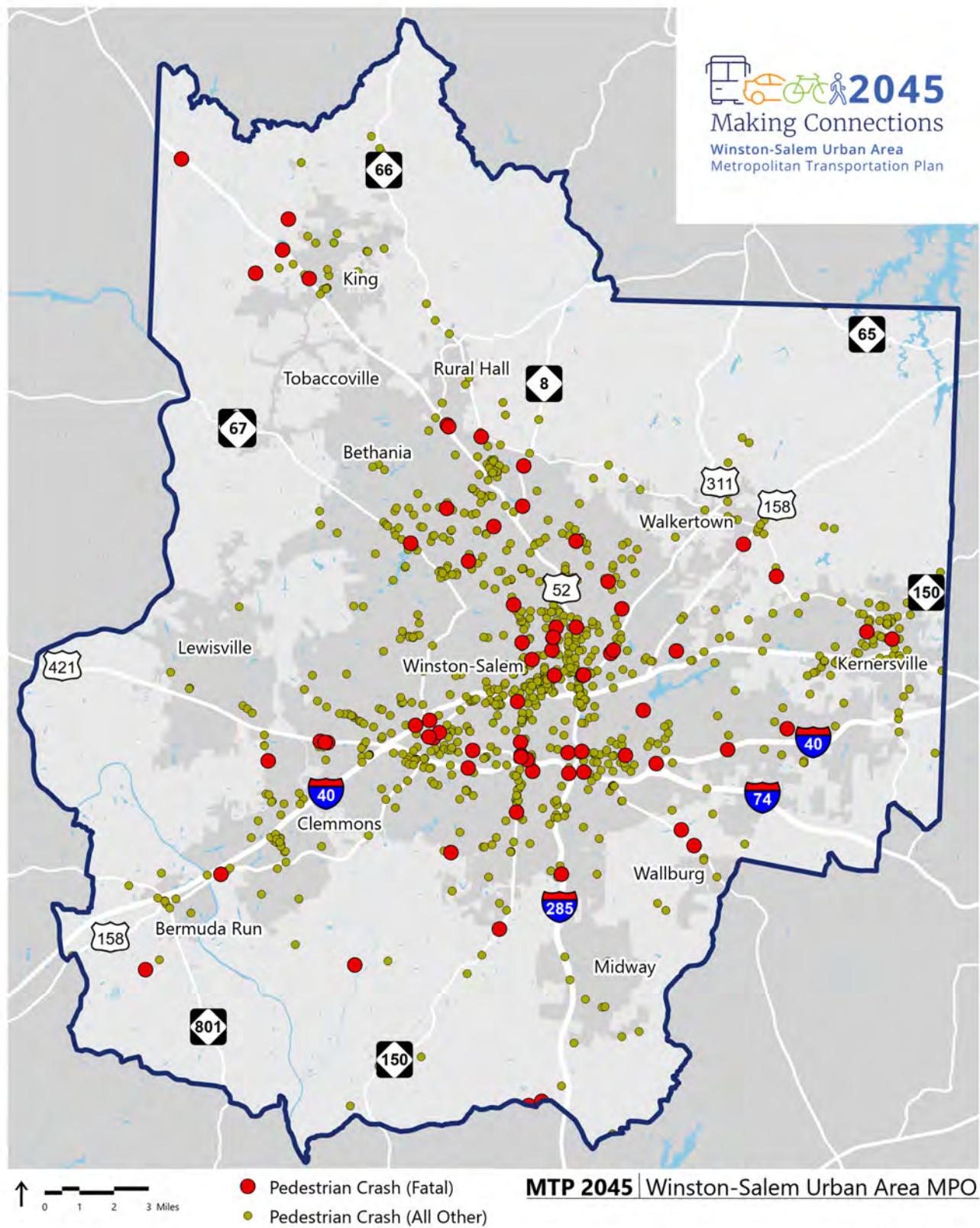


Figure 24 - Bicycle and Pedestrian Crashes, Fatalities and Serious Injuries, 2009-2018

Safety Policy and Planning Recommendations

While a small number of improvements can be funded in the Transportation Improvement Program with safety-specific federal and state dollars, a comprehensive approach to safety in transportation project planning and design could have a much more significant impact. North Carolina's Strategic Highway Safety Plan highlights pedestrians and bicyclists as an emphasis area. Many of the following policy and planning recommendations for the region align with strategies found in the Statewide Plan.

- Consider a Vision Zero plan for the largest municipalities (e.g. Winston-Salem, Kernersville) to identify safety hot spots and prioritize locations for improvement.
- Ensure NCDOT Complete Streets policy is being followed to as part of roadway project implementation and safe pedestrian crossing facilities are included in addition to linear pedestrian and bicycle facilities-especially along corridors with transit service.
- Select several corridors with top safety concerns for a roadway safety audit (RSA) to be performed with a stakeholder group representing various agencies and backgrounds; such an RSA could be done on a relatively quick timeframe and identify both relatively quick and easy solutions as well as those requiring additional study and funding for implementation.
- Consider road diets and conversion of 5-lane TWLTL facilities to 4-lane median-divided facilities. This can reduce the number of conflicts and to decrease the frequency of crashes on major arterials.
- Within municipalities and activity centers with a mix of uses, consider implementing a lower speed limit and adopting traffic calming measures as appropriate
- When planning for new or expanded transit routes, consider pedestrian facilities and mid-block pedestrian crossings where needed.
- Consider adding more lighting in dense, mixed-use activity centers and around commercial centers served by transit, making pedestrians crossing major arterials more visible to drivers at night.



April 28, 2020



Figure 25 - All Pedestrian Crashes, 2009-2018

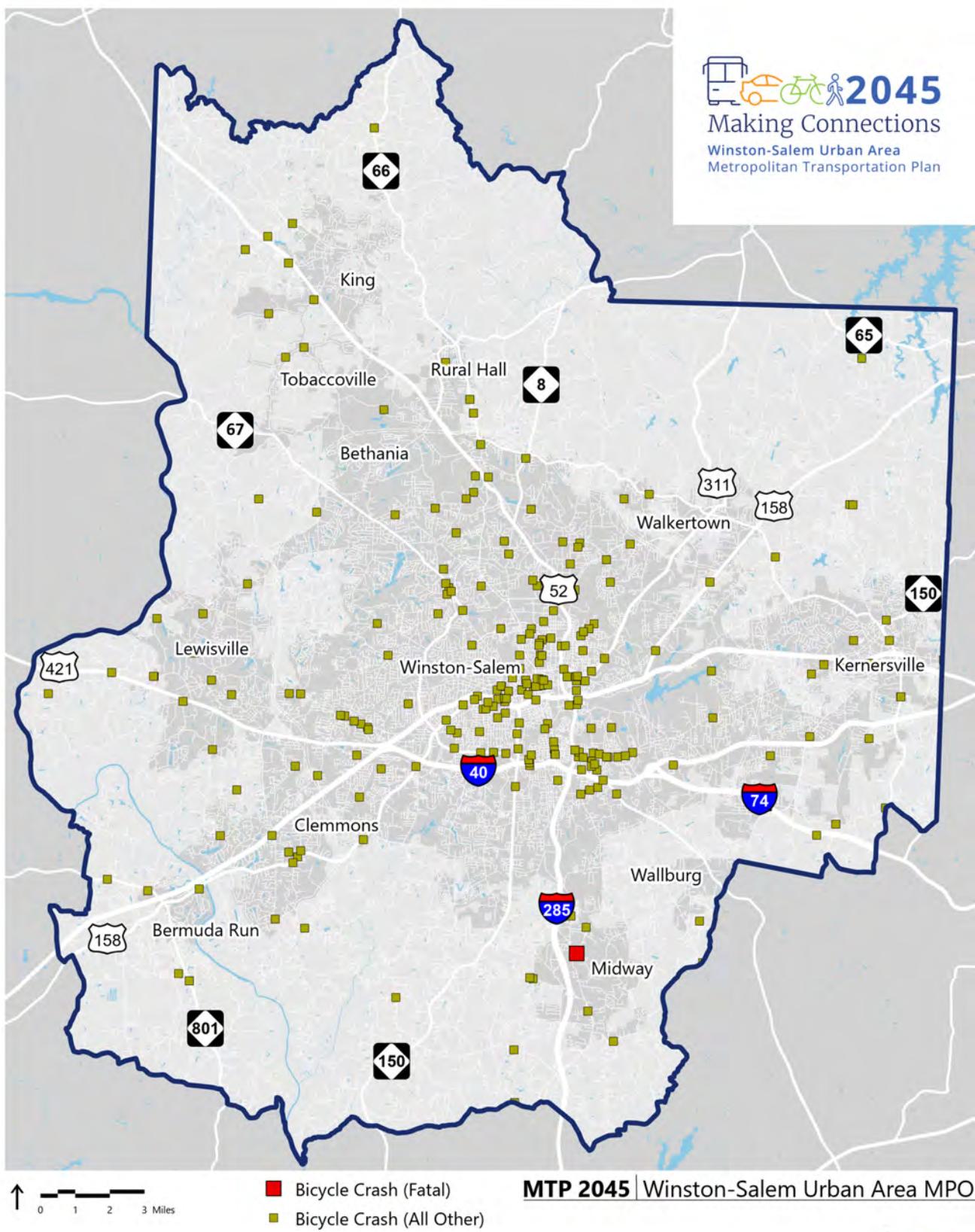


Figure 26 - All Bicycle Crashes, 2009-2018

April 27, 2020





Chapter 6. Financial Plan Recommendations

6.1 Roadway Projects

The Winston-Salem region is dependent on roadway infrastructure and the vehicular transportation system to support the region's economic activities, enhance residents' quality of life, and promote successful business operations. An efficient, safe, and dependable roadway infrastructure is critical for commuters traveling to and from surrounding metro areas, as well for workers and residents traveling for work, school, shopping, and other activities within the MPO area. The roadway network also serves as the foundation for the region's freight, transit, pedestrian, and bicycle travel.



Figure 27 - Roadway Improvements under Construction in Winston-Salem

Travel Demand Model

As part of Making Connections 2045, an evaluation of existing and likely future roadway deficiencies was performed. Utilizing the Piedmont Triad Regional Travel Model (PTRM), a list of committed projects funded for construction in the 2020-2029 State Transportation Improvement Program by 2026, and socioeconomic data (population and employment projections) for 2045, the study team identified and addressed anticipated roadway network deficiencies in the region.

A travel demand model is a standard tool used in long-range transportation planning to review existing and future expected deficiencies of the transportation system. The latest version of the Piedmont Triad Regional Travel Model (PTRM) was developed by the Piedmont Authority for Regional Transportation (PART) in cooperation with the four MPOs: Greensboro, Burlington-Graham, High Point, and Winston-Salem. The latest version of the regional model was released in October 2019 for the 2045 MTP. As part of the regional travel demand model update, PART worked with the four Triad MPOs to adopt updated socio-economic data forecasts (population, housing, and employment) for years 2025, 2035, and 2045.

The travel model estimates values like traffic volumes, congestion, and travel time for the base year and future horizon years of 2025, 2035, and 2045. PTRM is based on the four-step modeling process: trip generation, trip distribution, mode choice, and trip assignment. The PTRM area is made up of three full counties and parts of six additional counties. With 1,718 transportation analysis zones (TAZs) and four Metropolitan Planning Organizations included, the PTRM covers a large and complex region. The PTRM is multi-modal and designed to support detailed analyses for air quality conformity, travel forecasts, long-range transportation planning, multi-modal alternatives analysis, comprehensive transportation plan development, and additional regional sub-area analysis as needed for local MPOs and jurisdictions. A brief overview of the model is available online from the Piedmont Area Transit Authority; full documentation on the travel model can be found in Piedmont Triad Regional Model Version 5.1 Model User Guide⁹.

When the project team analyzed the MPO's Existing plus Committed (E + C) projects with 2045 population and employment forecasts, the PTRM model highlighted congestion problems in the region particularly along I-40, I-40 Business, NC-158, and US-421, among other locations (Figure 27). Several interchanges also appeared as congested in the Existing plus Committed scenario. Other general areas that anticipate congestion include the north-south and east-west corridors near Bermuda Run, east-west corridors near Clemmons and Lewisville, and routes through Kernersville. While the travel demand model is able to estimate delay along roadways, it is not well suited to forecast congestion or delay especially at signalized intersections. Other factors, such as public comments and safety data, can assist in identifying poorly performing intersections.

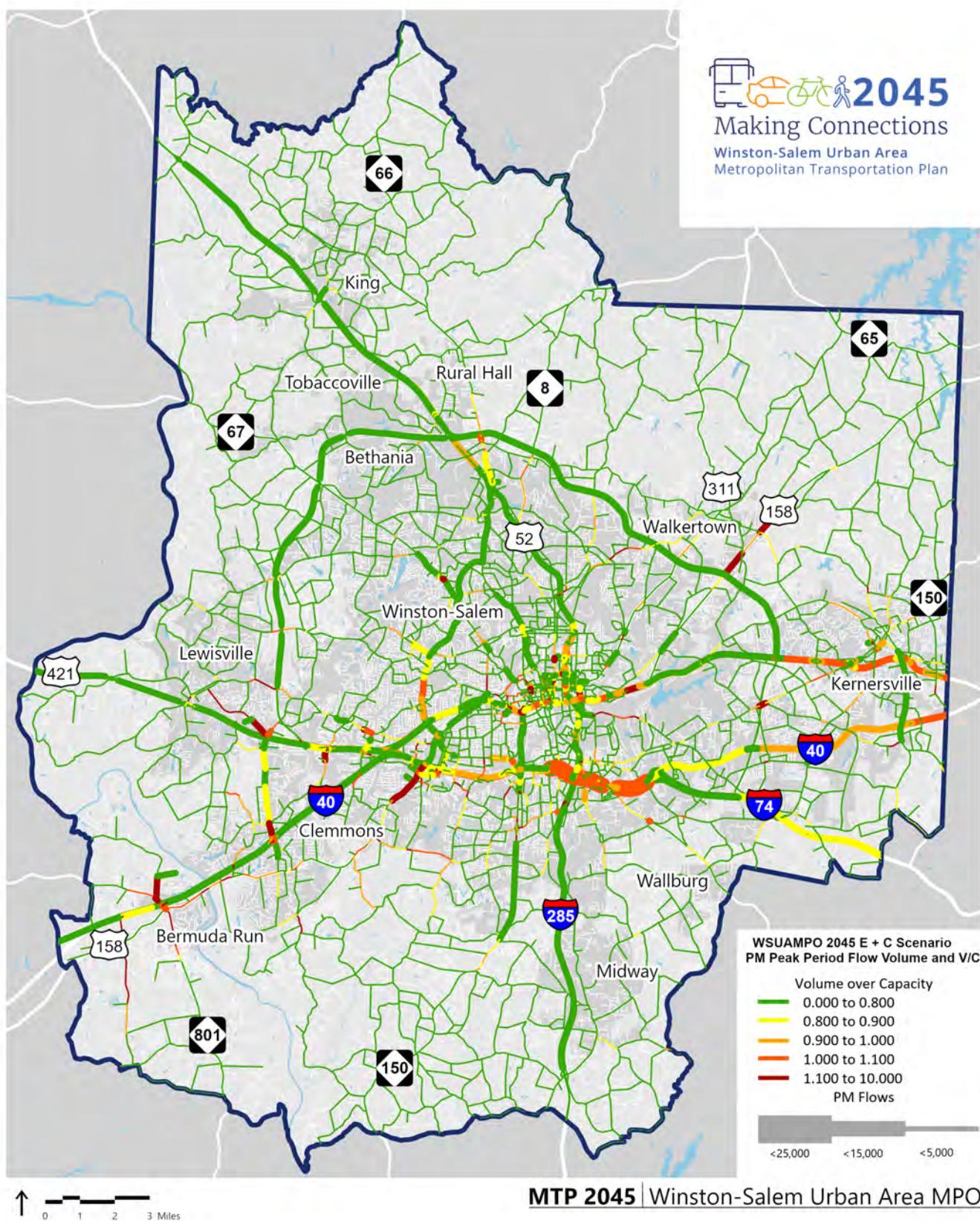


Figure 28 - E+C 2045 Scenario Travel Demand Model Output Map (PM Period)



6.2 Project Selection Methodology

The Study Team worked closely with the Steering Committee to craft a Vision for the MTP process, supported by an integrated, comprehensive set of Goals and Objectives that informed the project scoring methodology. The project selection methodology for roadway projects was based on the scoring criteria summarized in Table 21 below:

Table 21 - Project Scoring Methodology for Roadway Projects

Roadway Scoring Component	Description of Scoring Component	Points Assignment (out of 120 Total)
Congestion	A combination of congestion parameters will be considered to identify corridors and intersections/interchanges that are a priority to address, based on Travel Demand Model, to arrive at the combination of metrics that is most sensitive to variations in combinations of projects. Possibly to include average travel speed during peak period, VMT, trip length, VHT, delay, annual delay/person or per HHLD, lane-miles	30 points for V/C in 2045 greater than 1.1; 20 points for V/C in 2045 greater than 1; 10 points for V/C in 2045 greater than 0.95; new routes measure congestion on nearest parallel roadway
Economic Development	Roadway projects connecting to or crossing a TAZ that is in the top tier for expected employment growth numbers out to 2045	Add 20 points: Project within 1/4 mile of TAZ with top 10 job growth by total number between 2017-2045; Add 10 points if project within 1/4 mile of TAZ with top 20 job growth between 2017-2045 by total number Activity Center/University or Medical Campus: Add 10 points for roadway projects within 1/4 mile of designated activity center or medical/institutional campus locations Add 10 points: project within 1/4 mile of airport, known industrial park, intermodal yard
Accessibility and Mobility	Prioritizing roadway improvements that are located near areas with anticipated population growth relative to the region	Add 20 points: project within 1/4 mile of a TAZ with top 10 pop growth between 2017-2045 by number; Add 10 points if within 1/4 mile of a TAZ in the top 20 by pop growth (total number) 2017-2045
Safety	Prioritizing roadway projects that address known high-risk intersections and roadway segments	HSIP Intersection: 10 points for roadway intersecting a top 10 HSIP intersection Add 10 points for roadway projects addressing safety concerns in less dense areas: NCDOT section score of 67+ and outside of Winston-Salem municipal limits
Total Roadway Projects Score		Out of 120

In addition to the scoring methodology referenced above, the projects selected for the WSUAMPO MTP 2045 addressed the following target areas:

1. Incorporate public feedback and preference for operational improvements with projects like targeted roadway widenings, modernization, intersection upgrades to improve travel conditions, safety, and multi-modal use instead of new roadway construction
2. Modernize the region's roadways to improve traffic flow and update roadways to modern standards, including complete streets elements, and provide a safer experience for all modes
3. Implement technology like Intelligent Transportation Systems (ITS) to increase capacity and improve safety along roadways where widening is limited or not feasible
4. Support implementation of projects recommended in corridor studies and recently-adopted plans, such as the Kernersville Comprehensive Plan, the Statewide Commuter Bus Study, and the Triad ITS Plan
5. Consider geographic equity
6. Consider feasibility of funding over the next twenty-five years under performance-based programming approach utilized in North Carolina

Results from the Preferred Financial Plan 2045 Scenario, including volumes, congestion, vehicle-miles traveled (VMT), vehicle-hours traveled (VHT), and delay are included in the Appendix.

Financial Plan and Performance-Based Planning and Programming in North Carolina

North Carolina is a state where state transportation funding plays a particularly important role. County funding for transportation is largely non-existent outside of limited public transportation programs, economic development-related roadway improvements, and greenway and sidewalk projects. State taxes and fees from the Motor Fuel Tax, Department of Motor Vehicles (DMV) Fees and Highway Use Tax are appropriated into the Highway Fund (primarily designated for maintenance purposes) and Highway Trust Fund (Figure 30). These source the bulk of funding for new transportation improvements. The graphic below illustrates the importance of Highway Trust Fund in terms of both providing a local match for federal transportation dollars coming into the state, as well as providing additional funding for needed transportation investments.

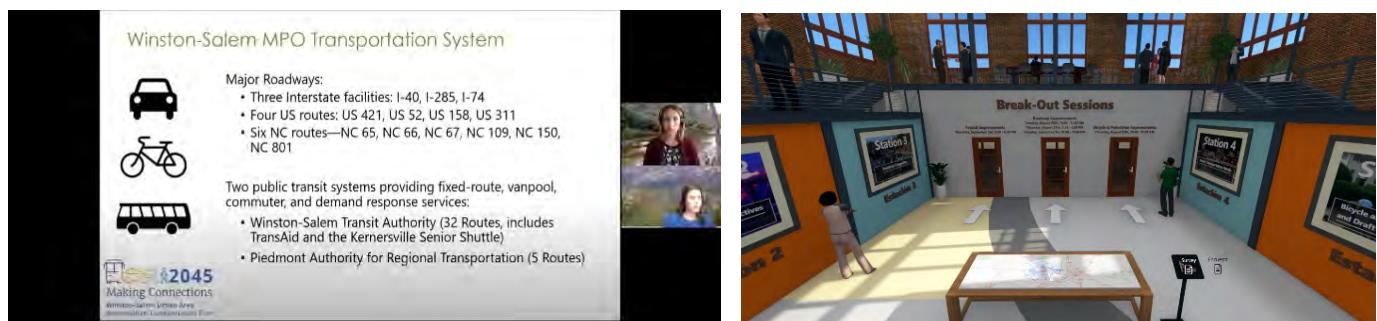


Figure 29 - Examples of Virtual Public Engagement Events - May and July 2020

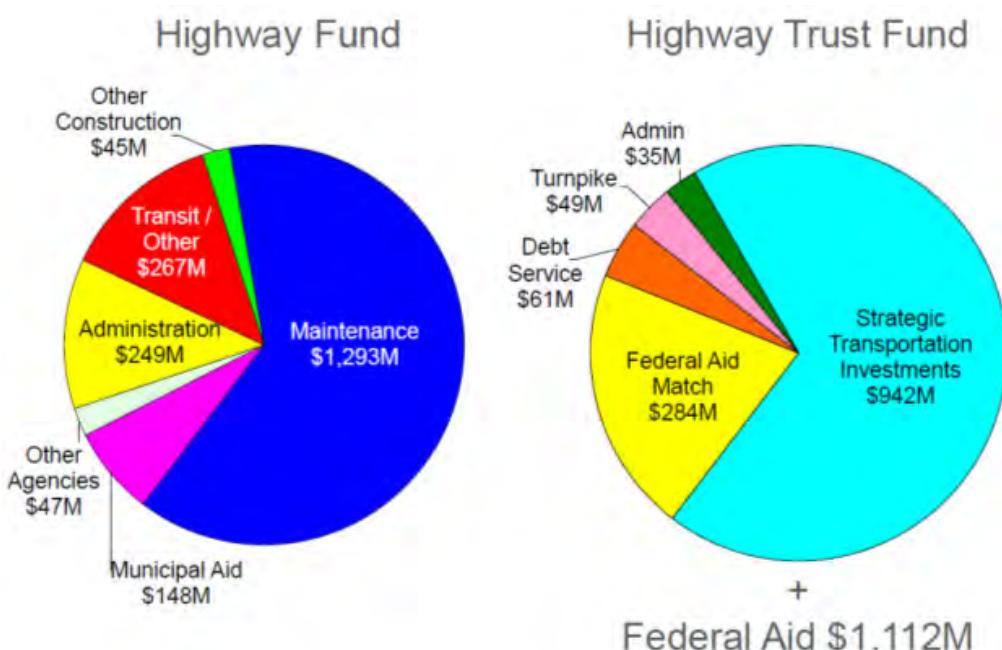


Figure 30 - North Carolina Transportation Funding by Category from the Highway Fund (Maintenance-Oriented) and Highway Trust Fund (New Investment-Oriented) Gas Tax.

Source: NCDOT Division of Planning and Programming, from a Presentation by David Wasserman Feb. 2019

The Strategic Prioritization Process is a data-driven approach guiding selection of projects for funding in the Transportation Improvement Program in the WSUAMPO region and across the State. The Strategic Prioritization Process is a statewide approach led by NCDOT with input and coordination from MPOs, RPOs, and NCDOT Divisions. The process was refined with the passage of House Bill 817, known as the STI. The bill established funding tiers (Statewide, Regional, and Division) and allocations across all modes. The prioritization process relies on a data-driven process to allocate limited funding to projects with the highest need. Each of six recognized modes of transportation in North Carolina (highway, ferry, rail, public transportation, bicycle and pedestrian, and aviation) go through a data-driven methodology for ranking projects. The outcome of the strategic prioritization process serves as input to the Draft State Transportation Improvement Program. The 2045 MTP fiscal estimates are based in part on the region's prior and programmed funding allocations. Anticipated funding amounts across the three tiers are forecasted for the 2020-2045 timeframe.

Figure 31 below summarizes the STI Prioritization process's division of funds distributed to transportation improvement projects. It is anticipated that interstate projects in the WSUAMPO region would compete for Statewide Mobility dollars; NC and US route projects could qualify for the Regional Impact funding category, and projects on minor arterial, collector and SR roadways that are not NC or US routes could qualify for Division Needs funding. Division Needs funding is also where public transportation expansion capital projects, ferry and bicycle and pedestrian projects could also qualify for funding. Within each funding category, a cap of 10% can be set aside for all non-roadway modes. Winston-Salem is eligible for Surface Transportation Block Grant-Directly Attributable funds (STBG-DA) that provide urbanized areas of over 200,000 population access to a set-aside pot of federal funds that are subject to the MPO TAC discretion in terms of project selection.

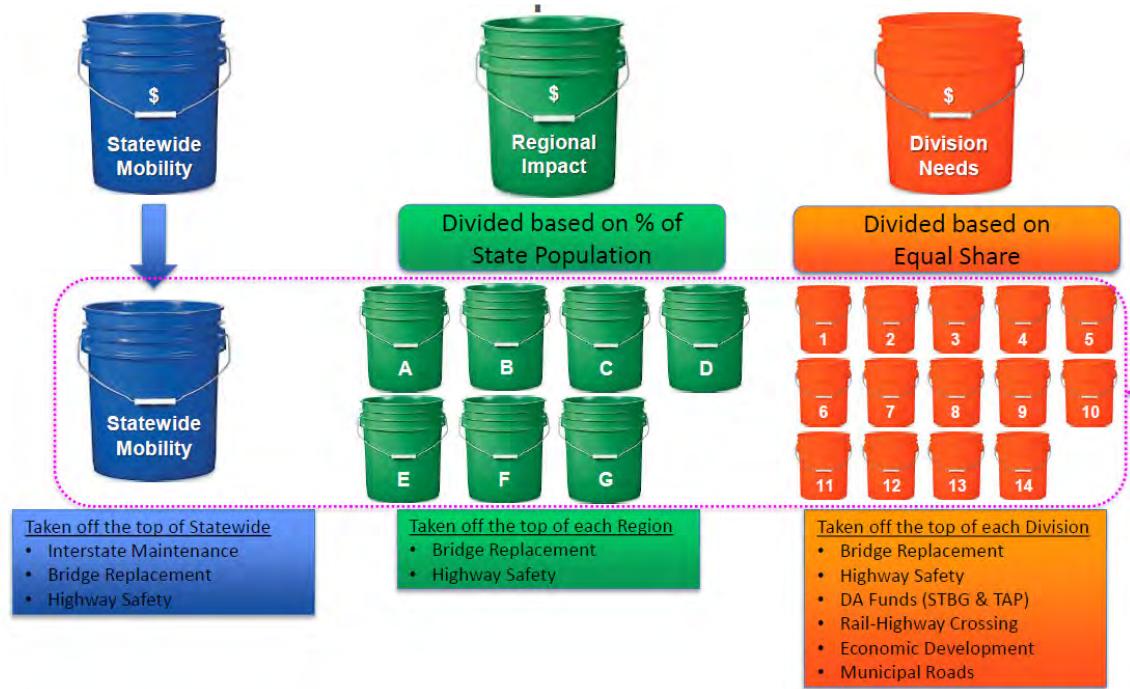


Figure 31 - STI Prioritization Process Division of Funding by Statewide Mobility, Regional Impact and Division Needs.

Source: NCDOT Division of Planning and Programming, from a Presentation by David Wasserman February 13, 2019

Table 22 below summarizes projected funding for the WSUAMPO region for the 2025, 2035, and 2045 horizons. Amounts are adjusted to reflect inflation (discussed below) for the year of expenditure. The funding categories below reflect anticipated funding categories, such as routine maintenance (including State Street Aid Allocations), bridge replacement, HSIP safety funds, federal public transportation funds allocated by formula, and revenue from local bond sales.

The fiscal forecast includes several assumptions that support multi-modal project development, anticipated improvements, and select cost escalations. First, the WSUAMPO's Regional Impact and Division Needs totals include a 5% allocation for bicycle, pedestrian, and transit improvements. Second, each horizon year includes an estimated \$20-60 million in non-project specific allocation for small operations and safety improvement projects (projects WS-Rdwy-OPS-35 and WS-Rdwy-OPS-45). Finally, to account for uncertainty surrounding large projects, the cost estimates for non-STIP interstate widening projects were increased 30%; these additional costs are reflected in the cost estimates below.

Table 22 - WSUAMPO Funding Forecast by Program and Horizon Year, (Adjusted for Inflation)

WSUAMPO FUNDING FORECAST BY PROGRAM AND HORIZON YEAR (MILLIONS USD, ADJUSTED FOR INFLATION IN YOE)				
		Horizon Year		
Programs	WSUAMPO Total	2025	2035	2045
Statewide Mobility	\$1,476.345	\$361.493	\$410.484	\$704.367
Regional & Division Combined	\$2,179.282	\$335.783	\$792.570	\$1,050.929
Highway Safety Improvement Program (HSIP)	\$160.573	\$23.010	\$59.852	\$77.711
Maintenance	\$1,628.301	\$42.091	\$717.919	\$868.292
<i>Roadway Maintenance</i>	\$874.111	\$42.091	\$374.369	\$457.651
<i>Bridge Maintenance and Preservation</i>	\$474.463	-	\$214.138	\$260.325
<i>Federal Interstate Maintenance</i>	\$279.728	-	\$129.411	\$150.316
Congestion Mitigation and Air Quality Improvement Program (CMAQ)	\$105.845	\$1.782	\$43.384	\$60.678
Surface Transportation Block Grant - Direct Allocation (STBG-DA)	\$127.895	\$15.172	\$53.152	\$59.571
Federal Transit Funds (5307, 5303, 5339, 5310)	\$260.666	\$49.388	\$93.090	\$118.188
Bond Revenue	\$69.015	\$-	\$35.211	\$33.804
Other Local Funds	\$156.859	\$32.026	\$53.922	\$70.912
Totals	\$6,164.782	\$860.744	\$2,259.584	\$3,044.453

Financial Plan

The Financial Plan describes the anticipated funding sources, project timelines, and project costs for all MTP projects. The full Financial Plan table is located in Appendix C, and the Financial Plan's assumptions are noted below.

Revenue Estimates

Revenue estimates were developed in consultation with the MPO, NCDOT, WSUAMPO 2045 Steering Committee, public transportation agencies, and participating communities. These parties submitted historical and anticipated funding sources and levels. The Fiscal Forecast was reviewed and approved by the parties noted above and discussed during the public engagement process. The revenue estimates include committed and reasonably anticipated funding from municipal (i.e. bond sales revenue and local match), state, and federal sources to support the implementation of the projects within the Financial Plan. Inflationary effects are described in the section below. Table 23 below includes summarizes the revenue and costs estimates by horizon year and category. WSUAMPO and its member municipalities could pursue additional revenue sources to supplement those sources identified in the Financial Plan. However, innovative and new funding sources were not estimated for the purposes of the 2045 MTP update.

Cost Estimation

Each project in the 2045 MTP has a base cost estimate in 2020 dollars that is then adjusted for inflation. Project cost estimates were created utilizing accepted project development tools from NCDOT and historical sources. Roadway project cost estimates were either derived from published costs from those within the 2020-2029 STIP or developed through the NCDOT Planning Level Per-Mile Cost Estimation Tool. New bicycle and pedestrian project costs were developed with the NCDOT Bicycle & Pedestrian Cost Estimation Tool. Transit project cost estimates were reached through a review of comparable PART and WSTA procurement costs for rolling stock, service expansions, facility expansion and siting, and published WSTA and PART estimates. Costs estimates were reviewed by the MTP Steering Committee, WSUAMPO member communities, and the public during formal outreach events and during the draft report review period.

Inflation Effects

Projects costs and revenues beyond 2020 are both escalated by an annual two (2) percent rate of inflation as shown in the Financial Plan. This rate was reached through a 20-year review of the Consumer Price Index (CPI-U) for urban consumers in the South Area (inclusive of North Carolina) from 1999 through 2019. The current low interest-rate environment and recession spurred by the COVID-19 public health crisis are also anticipated to apply downward inflationary pressure. Project costs and associated revenues are shown with their Year of Expenditure (YOE). Projects within the first 10 years of the MTP display the specific YOE (or mid-point YOE for complex multi-year projects), and projects from 2031 through 2035, and 2036 through 2045, are banded as 2035 and 2045 Horizon Years, respectively. MTP projects that are within the first 10 years and have YOE's between 2026 and 2035 are shown within the 2035 Horizon Year.

Maintenance Estimates

The financial plan also includes estimates for roadway system maintenance to 2045. This includes both maintenance for roadways and interstates; roadway maintenance estimates were reached through a historical review and forecast of NCDOT Division 9 state-funded maintenance, and Powell Bill allocations to the MPO's municipalities, while interstate maintenance estimates were determined through a similar review of historical funding. These past funding levels were forecasted based on population, anticipated state funding, and adjusted for inflation based upon their estimated project or horizon year.

Table 23 WSUAMPO Financial Plan Project Costs and Revenues

WSUAMPO FINANCIAL PLAN PROJECT COSTS AND REVENUES (ADJUSTED FOR INFLATION)				
		Horizon Year		
Cost Category (Millions USD in YOE)	WSUAMPO Total	2025	2035	2045
Roadways - Total	\$5,146.920	\$731.004	\$1,890.557	\$2,525.359
Roadways	\$3,518.619	\$688.913	\$1,172.638	\$1,657.067
Maintenance	\$1,628.301	\$42.091	\$717.919	\$868.292
Transit - Total	\$549.416	\$77.791	\$205.174	\$266.451
Transit (Capital & Operations)	\$427.538	\$57.599	\$160.688	\$209.251
Transit (Maintenance)	\$121.878	\$20.193	\$44.486	\$57.200
Other - Total	\$468.445	\$51.949	\$163.853	\$252.642
Pedestrian/Bicycle	\$184.043	\$19.247	\$80.024	\$84.772
Aviation and Rail	\$26.558	\$8.271	\$7.765	\$10.522
Transportation Demand Management	\$1.218	\$1.218	-	-
Intelligent Transportation Systems	\$5.795	-	\$5.795	-
Small Operations and Safety Improvements	\$250.831	\$23.213	\$70.270	\$157.349
Cost Total	\$6,164.782	\$860.744	\$2,259.584	\$3,044.453

		Horizon Year		
Revenue Category (Millions USD in YOE)	WSUAMPO Total	2025	2035	2045
Roadways, Bike, Ped, Transit, Aviation - Total	\$6,164.782	\$860.744	\$2,259.584	\$3,044.453
State and Federal Funding	\$4,310.606	\$786.628	\$1,452.533	\$2,071.445
Maintenance	\$1,628.301	\$42.091	\$717.919	\$868.292
Local Funding - Safety	\$0.203	\$0.203	\$-	-
Local Funding - Transportation Demand Management	\$0.246	\$0.246	-	-
Local Funding - Transit	\$152.335	\$27.502	\$53.922	\$70.912
Local Funding - Bicycle/Pedestrian	\$73.090	\$4.075	\$35.211	\$33.804
Revenue Total	\$6,164.782	\$860.744	\$2,259.584	\$3,044.453

Note: revenue and costs estimates reflect inflationary effects for the YOE.

6.3 Financial Plan Roadway Project List

The roadway projects selected for the MTP were organized into 2025, 2035, and 2045 horizon year groupings (Table 24). Some projects within the 2025 horizon are already under construction. Within the 2035 horizon year, some projects were considered committed if funded in the 2020-2029 TIP for construction by 2026 or sooner. Other projects were not yet committed, although included in developmental section of the STIP. All the selected roadway projects in the Preferred Financial Plan Scenario are shown by horizon year in Figure 31 and by project type in Figure 32. Figures 33 through 39 display the selected roadway projects by the MPOs municipal areas.

Table 24 - Financial Plan Projects by Horizon Year

WSUAMPO 2025 HORIZON YEAR ROADWAY PROJECTS							
MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-015	U-6154	Intersection Improvements	Lewisville	SR 1308 (Lewisville-Vienna Rd)	--	--	1.27
WS-Rdwy-016	U-6155	Intersection Improvements	Winston-Salem	SR 1725 (University Parkway)	--	--	4.50
WS-Rdwy-018	I-5880	Access Management	Winston-Salem	I-40 / US 311	Thomasville Rd	East Clemmons Rd	4.50
WS-Rdwy-021	U-5760	Interchange Improvements	Kernersville	Salem Pkwy	--	--	21.53
WS-Rdwy-026	R-2247CD	Interchange Improvements	Winston-Salem	Salem Parkway	--	--	21.50
WS-Rdwy-061	I-0911A	Roadway Widening	Clemmons	I-40	Harper Rd	NC Hwy 810	29.37
WS-Rdwy-062	I-5766	Pavement Rehabilitation	Winston-Salem	I-40	Thomasville Rd	Silas Creek Pkwy Ramp to I-40	12.14
WS-Rdwy-063	I-5795	Pavement Rehabilitation	Winston-Salem	I-40	1650 ft west of Macy Grove Rd	East Ramp from Hanes Mall Blvd	88.66
WS-Rdwy-064	I-5952	Pavement Rehabilitation	Bermuda Run	I-40	I-40 BR W Ramp	Harper Rd	38.68
WS-Rdwy-068	I-6003	Pavement Rehabilitation	Mocksville	I-40	NC Hwy 801 S	Pinebrook School Rd	30.89
WS-Rdwy-076	R-2577A	Widen to Multilanes	Walkertown	US 158	Belews Creek Rd	Old Greensboro Rd	65.66
WS-Rdwy-078	U-2579AA	New Location	Winston-Salem	Future I-74	Glenn Hi Rd	I-74	12.76
WS-Rdwy-079	U-2579AB	New Location	Winston-Salem	Future I-74	U.S. 421	Glenn Hi Rd	47.95
WS-Rdwy-080	U-2579B	New Location	Winston-Salem	Future I-74	Reidsville Rd	U.S. 421	42.82
WS-Rdwy-081	U-2579C	New Location	Walkertown	Future I-74	New Walkertown Rd NE	Reidsville Rd	20.67
WS-Rdwy-086	U-2729	Roadway Widening	Winston-Salem	SR 1672 (Hanes Mill Rd)	University Pkwy	150 ft north of Museum Dr	5.29
WS-Rdwy-087	U-2827B	Pavement Rehabilitation	Winston-Salem	US 158 / US 421 / NC 150 / Business 40	Water St	Taylor St	7.79
WS-Rdwy-088	U-2925	New Location	Winston-Salem	New Route	E 3rd St	S Martin Luther King Jr Dr	20.74
WS-Rdwy-089	U-4734	New Location	Kernersville	New Route	N Main St	Macy Grove Rd	17.30
WS-Rdwy-090	U-5536	New Location	Lewisville	New Route	Lewisville-Vienna Rd	Shallowford Rd	10.08

WSUAMPO 2025 HORIZON YEAR ROADWAY PROJECTS CONT...							
MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-091	U-5539A	Roadway Modernization	Winston-Salem	N Martin Luther King Jr Dr	U.S. 311/John M Gold Fwy	I-40/U.S. 421	6.56
WS-Rdwy-092	U-5617	Roadway Widening	Lewisville	SR 1173 (Williams Rd)	700 ft south of Heritage Dr	300 ft north of Senoa Dr	3.53
WS-Rdwy-093	U-5760	Roadway Widening	Kernersville	Kernersville Southern Loop (Phase I)	W Mountain St	Harmon Creek Rd	25.84
WS-Rdwy-094	U-5786	Roadway Widening	Winston-Salem	SR 1508 (Hickory Tree Rd)	Peters Creek Pkwy	I-285	36.68
WS-Rdwy-095	U-5824	Roadway Widening	Walkertown	NC 66 (Old Hollow Rd)	Reidsville Rd	Harley Dr	20.29
WS-Rdwy-096	U-5899	New Location	Rural-Hall	New Route	University Pkwy	Forum Pkwy	5.04
WS-Rdwy-097	U-6003	New Location	Kernersville	New Route	N Main St	Piney Grove Rd	10.77
WS-Rdwy-098	U-6004	Access Management	Clemmons	SR 1103 (Lewisville-Clemmons Rd)	Peace Haven Rd	Clemmons Rd	9.22
WS-Rdwy-099	U-6005	Roadway Widening	Rural-Hall	NC 65 (Bethania-Rural Hall Rd)	Northridge Park Dr	John M Gold Fwy	14.75
WS-Rdwy-101	U-6187	New Location	Winston-Salem	New Route	I-40	U.S. Hwy 158	8.14
WS-Rdwy-105	U-6231	New Location	Winston-Salem	New Route	Indiana Ave	Reynolds Blvd	3.90
WS-Rdwy-106	W-5510	Roadway Modernization	Kernersville	S Main St/Old Winston Rd	Pineview Dr	Salem Pkwy	6.04
Transit	--	Various Improvements	--	--	--	--	See Chapter 5 for funding details
Bicycle and Pedestrian	--	Various Improvements	--	--	--	--	
2025 HORIZON YEAR ESTIMATED ROADWAY PROJECT COST						Total	Funded
							654.84

WSUAMPO 2035 HORIZON YEAR ROADWAY PROJECTS							
MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-003	N/A	Intersection Improvements	Lewisville	Yadkinville Road	--	--	4.50
WS-Rdwy-004	N/A	Intersection Improvements	Bermuda Run	US 158	--	--	4.50
WS-Rdwy-009	B-5950	Bridge Improvements	Winston-Salem	NC 67 Westbound - Silas Creek Parkway	--	--	8.26
WS-Rdwy-010	B-5770	Bridge Improvements	Winston-Salem	Salisbury Ridge Road	--	--	4.50
WS-Rdwy-013	U-6059A	Bridge Improvements	Winston-Salem	SR 2377 (Old Greensboro Rd NE)	--	--	2.86
WS-Rdwy-017	B-5006	Bridge Improvements	Winston-Salem	Novack St	--	--	4.50
WS-Rdwy-019	N/A	Intersection Improvements	Winston-Salem	S Peace Haven Rd	--	--	21.53
WS-Rdwy-024	N/A	Interchange Improvements	Winston-Salem	John M Gold Fwy	--	--	21.53
WS-Rdwy-028	N/A	Roadway Modernization	Kernersville	North Main St	Gralin Rd	E Boderhamer ST	3.89
WS-Rdwy-031	N/A	Roadway Modernization	Kernersville	W Mountain St	Cherry St	W Bodenhamer	5.58
WS-Rdwy-037	N/A	Roadway Modernization	Winston-Salem	New Route - Stratford-Ebert Connector Section 1	Griffith Road	Somerset Drive	8.76
WS-Rdwy-040	N/A	Roadway Modernization	Winston-Salem	Brewer Road	Buchanan Street	Old Salisbury Road	3.63
WS-Rdwy-043	N/A	Roadway Modernization	Winston-Salem	Silas Creek Parkway	Bethabara Road	Fairlawn Drive	3.63
WS-Rdwy-048	N/A	Roadway Modernization	Kernersville	E Bodenhamer St	E Mountain St	N Cherry St	3.96
WS-Rdwy-050	N/A	Roadway Modernization	Kernersville	S Main St	E Bodenhamer St	S Cherry St	7.01
WS-Rdwy-051	N/A	Roadway Modernization	Kernersville	NC 66	I-40 Bus	E Mountain St	1.56
WS-Rdwy-057	N/A	Roadway Modernization and New Location	Clemmons	Peace Haven/Styers Ferry Rd	Lasater Rd	S Peace Haven Rd	22.91
WS-Rdwy-059	N/A	Roadway Modernization	Clemmons	Clemmons Rd	Harper Rd	Middlebrook Dr	8.76
WS-Rdwy-071	R-2247CA	New Location	Winston-Salem	Northern Beltway New Route (Future NC 452)	550 ft west of Ridings Rd	2000 ft south of 421	14.66
WS-Rdwy-072	R-2247CB	New Location	Winston-Salem	Northern Beltway New Route (Future NC 452)	Birchdale Dr	550 ft west of Ridings Rd	47.51

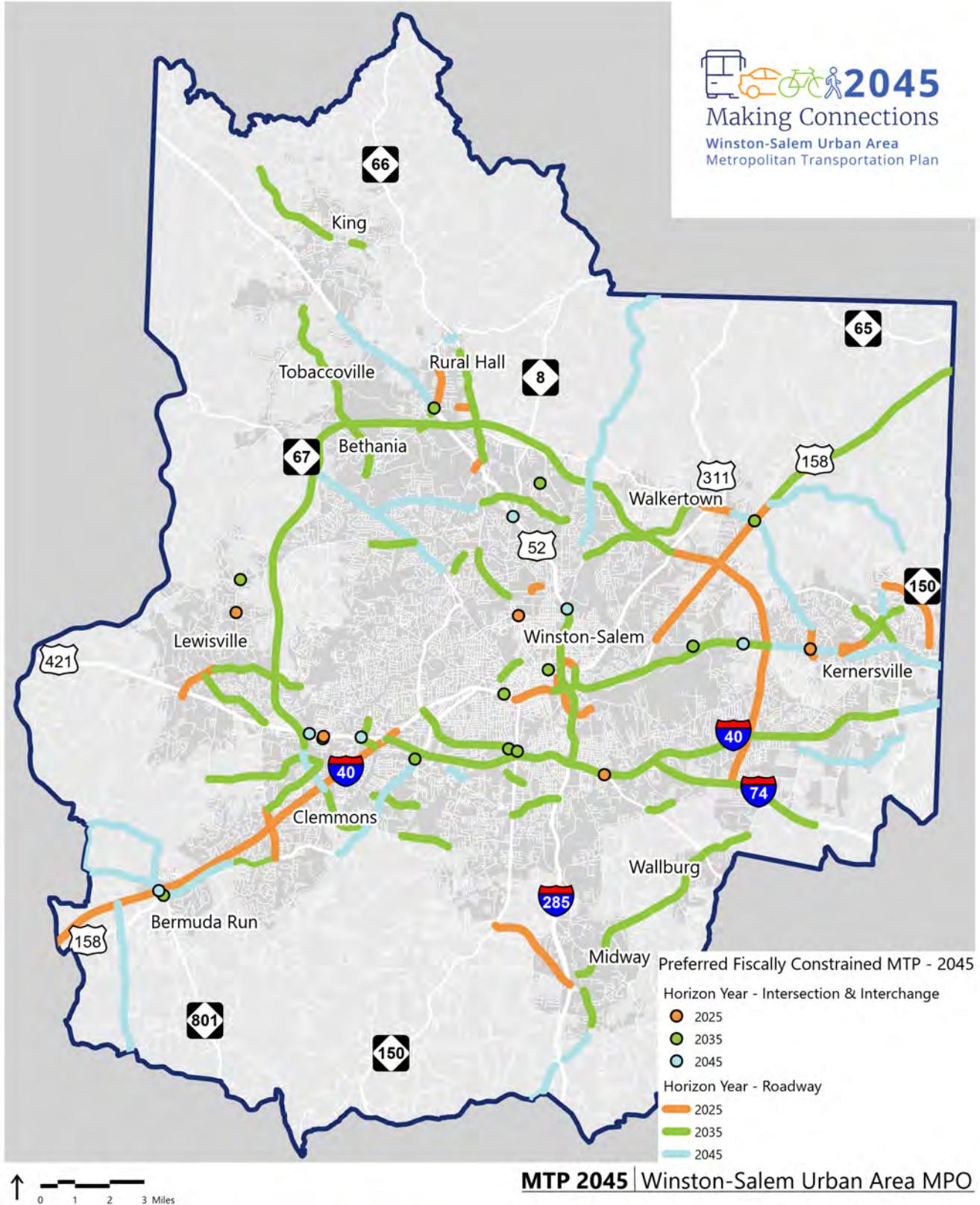
WSUAMPO 2035 HORIZON YEAR ROADWAY PROJECTS CONT...							
MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-073	R-2247D	New Location	Winston-Salem	Northern Beltway New Route (Future NC 452)	1300 ft north of Reynolda Rd	Birchdale Dr	67.45
WS-Rdwy-074	R-2247EA	New Location	Tobaccoville	Northern Beltway New Route (Future NC 452)	John M Gold Fwy	1300 ft north of Reynolda Rd	66.42
WS-Rdwy-075	R-2247EB	New Location	Winston-Salem	Northern Beltway New Route (Future NC 452)	2000 ft east of John M Gold Fwy	900 ft east of Bethania-Rural Hall Rd	12.61
WS-Rdwy-077	R-2577B	Widen to Multilanes	Forsyth County	US 158	Anthony Rd	Belews Creek Rd	94.90
WS-Rdwy-082	U-2579D	New Location	Winston-Salem	Northern Beltway Future I-74	Baux Mountain Rd	New Walkertown Rd	47.07
WS-Rdwy-083	U-2579E	New Location	Winston-Salem	Northern Beltway Future I-74	Germanton Rd	Baux Mountain Rd	32.40
WS-Rdwy-084	U-2579F	New Location	Winston-Salem	Northern Beltway Future I-74	John W Gold Fwy	Germanton Rd	35.78
WS-Rdwy-103	U-6189	Roadway Widening	Lewisville	SR 1156 (Lewisville-Clemmons Rd)	Shallowford Rd	Styers Ferry Rd	29.11
WS-Rdwy-110	N/A	Roadway Modernization	Winston-Salem	University Parkway (SR 4000)	Cherry St Intersection	North Point Blvd	10.84
WS-Rdwy-123	N/A	Roadway Modernization	Stokes County	N Old US 52 Road (SR 1236)	Main St	Chestnut Grove Rd	19.34
WS-Rdwy-140	N/A	Roadway Modernization	Walkertown	Old Walkertown Road (SR 2456)	Old Hollow Rd	Old Rural Hall Rd	25.44
WS-Rdwy-144	N/A	Roadway Modernization	Forsyth County	Gumtree Road (SR 2692)	Wallburg Rd	Old US-52	44.27
WS-Rdwy-149	N/A	Roadway Modernization	Winston-Salem	NC 66 (University Parkway)	Park St	Old Hollow Rd	15.71
WS-Rdwy-151	N/A	Roadway Modernization	Winston-Salem	University Parkway (SR 4000)	Old Hollow Rd	Hanes Mill Rd	5.13
WS-Rdwy-152	N/A	Roadway Modernization	Winston-Salem	Bethania-Rural Hall Road (SR 4002)	US 52	Ziglar Rd	2.86
WS-Rdwy-155	N/A	Roadway Modernization	King	E King Street (SR 1236)	Moore Rd/Mountain View Rd	Kirby Rd	2.01
WS-Rdwy-156	N/A	Roadway Modernization	Winston-Salem	S Martin Luther King Jr. Drive (SR 4394)	New Walkertown Rd/311	Salem Pkwy	3.18
WS-Rdwy-160	N/A	Roadway Modernization	Winston-Salem	Oak Summit Road (SR 1686)	Old Rural Hall Rd	University Pkwy	17.33
WS-Rdwy-187	N/A	Roadway Modernization	Lewisville	Shallowford Road (SR 1001)	Meadowlark Dr	Lewisville-Vienna Rd	17.39

WSUAMPO 2035 HORIZON YEAR ROADWAY PROJECTS CONT...							
MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-191	N/A	Roadway Modernization	Clemmons	S Peace Haven Road (SR 1891)	McGregor Rd	Lewisville Clemmons Rd	12.59
WS-Rdwy-193	N/A	Roadway Modernization	Winston-Salem	Hanes Mall Boulevard (SR 3153)	I-40	Jonestown Rd	3.12
WS-Rdwy-194	N/A	Roadway Modernization	Winston-Salem	Jonestown Road (SR 1122)	Country Club Rd	Hanes Mall Blvd	4.15
WS-Rdwy-201	N/A	Roadway Modernization	Midway	Old US Highway 52 (SR 2932)	Hickory Tree Rd	Midway School Rd	6.75
WS-Rdwy-211	N/A	Roadway Modernization	Bermuda Run	Main Street [Bethania] (SR 1611)	Spainhour Mill Rd	Bethania Rural Hall Rd	36.67
WS-Rdwy-219	N/A	Roadway Modernization	Winston-Salem	Union Cross Road (SR 2643)	Willard Rd	Thomasville Rd	4.74
WS-Rdwy-225	N/A	Roadway Modernization	Forsyth County	US 158 (S Stratford Road)	I-40	Idols Rd	24.99
WS-Rdwy-294	N/A	Roadway Modernization	Winston-Salem	Yadkinville Road (SR 1525)	Valley Rd	Shattaloon Dr	7.85
WS-ITS-Rdwy-402	N/A	ITS	Winston-Salem	Silas Creek Pkwy	Salem Pkwy	Peters Creek Pkwy	0.12
WS-ITS-Rdwy-403	N/A	ITS	Winston-Salem	Salem Parkway (US 421)	Winston Salem Northern Beltway	2000' west of John Gold Fwy	0.58
WS-ITS-Rdwy-404	N/A	ITS	Winston-Salem	US 52	I-40	E 28th St	0.30
WS-ITS-Rdwy-406	N/A	ITS	Winston-Salem	I-40	US 421	NC 66	0.38
WS-ITS-Rdwy-407	N/A	ITS	Winston-Salem	I-74	High Point Rd	I-40	3.10
WS-Rdwy-410	N/A	Modernization	Winston-Salem	W Clemmonsburg Rd	I-285	NC 150	9.35
WS-Rdwy-413	N/A	Modernization	Winston-Salem	W Clemmonsburg Rd	Ebert Rd	Salem Creek/Griffith Rd	8.89
WS-Rdwy-416	N/A	Modernization	Winston-Salem	Northwest Blvd	N Hawthorne Rd	N Broad St	4.80
WS-Rdwy-420	N/A	Intersection Improvements	Walkertown	US-158	--	--	4.50
WS-Rdwy-421	N/A	Intersection Improvements	Winston-Salem	E 6th St / N Chestnut St	--	--	21.53
WS-Rdwy-422	N/A	Intersection Improvements	Winston-Salem	Lockland Ave / Hawthorne Rd	--	--	21.53
WS-Rdwy-424	N/A	Intersection Improvements	Winston-Salem	US-158	--	--	21.53
WS-Rdwy-OPS-35		Operations and Safety Improvements					8.05
Transit	--	Various Improvements	--	--	--	--	See Chapter 5 for funding details
Bicycle and Pedestrian	--	Various Improvements	--	--	--	--	
2035 HORIZON YEAR ESTIMATED ROADWAY PROJECT COST					Total	Funded	958.86

WSUAMPO 2045 HORIZON YEAR ROADWAY PROJECTS							
MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-100	U-6068	Roadway Widening	Kernersville	US 421 (Salem Parkway)	I-40	Winston-Salem Northern Bltwy	84.32
WS-Rdwy-005	N/A	Improve Interchange	Winston-Salem	US 421	--	--	21.53
WS-Rdwy-022	U-2579G	Interchange Improvements	Winston-Salem	Salem Pkwy	--	--	21.53
WS-Rdwy-023	U-2826A	Interchange Improvements	Winston-Salem	John M Gold Fwy	--	--	21.53
WS-Rdwy-025	R-2247CA	Interchange Improvements	Winston-Salem	Salem Pkwy	--	--	55.20
WS-Rdwy-030	N/A	New Location	Kernersville	Future Glenn Hi Road Extension	NC 66	Union Cross Rd	37.59
WS-Rdwy-035	N/A	Roadway Widening	Rural-Hall	I-74, US 52	Moore / RJR Drive Exit 122	NC 65 (WNB) Ext 118	48.65
WS-Rdwy-065	I-5981A	Roadway Widening	Winston-Salem	I-40	Union Cross Rd	I-74 Ramp to I-40 W	73.73
WS-Rdwy-066	I-5981B	Roadway Widening	Kernersville	I-40	NC Hwy 66 S	Union Cross Rd	45.88
WS-Rdwy-067	I-5981C	Roadway Widening	Kernersville	I-40	I-40 BR W	NC Hwy 66 S	46.37
WS-Rdwy-069	R-2247A	New Location	Winston-Salem	Northern Beltway New Route (Future NC 452)	S Stratford Rd	550 ft south of I-40	28.59
WS-Rdwy-070	R-2247B	New Location	Winston-Salem	Northern Beltway New Route (Future NC 452)	2000 ft south of 421	550 ft South of I-40	20.97
WS-Rdwy-102	U-6188	Roadway Widening	Kernersville	SR 1969 (Piney Grove Rd)	Brown Rd	Nelson St	6.55
WS-Rdwy-104	U-6190	Roadway Widening	Rural-Hall	NC 65 (Bethania-Rural Hall Rd)	Broad St	Jackson St	3.15
WS-Rdwy-107	N/A	Roadway Widening	Winston-Salem	I-40	I-40/Intersection with 74	I-40/Salem Pkwy	134.19
WS-Rdwy-119	N/A	Roadway Modernization	Clemmons	NC 801	Yadkin Valley Road	US 158	16.23
WS-Rdwy-124	N/A	Roadway Modernization	Forsyth County	Baux Mountain Road (SR 2211)	Old Rural Hall Rd	Dennis Rd	55.10
WS-Rdwy-137	N/A	Widen to Multilanes	Kernersville	NC 66 (Old Hollow Road)	W Mountain St	Darrow Rd	39.70
WS-Rdwy-166	N/A	Roadway Modernization	Winston-Salem	NC 67 (Reynolda Road)	Seward Cir	Fairlawn Dr	32.58

WSUAMPO 2045 HORIZON YEAR ROADWAY PROJECTS CONT...

MTP 2045 ID	STIP ID (If Applicable)	Project Type	Municipality	Facility	To	From	Estimated Cost (Millions USD)
WS-Rdwy-180	N/A	Modernization	Kernersville	Hopkins Road (SR 2649)	Bluff School Rd	W Mountain St	7.46
WS-Rdwy-290	N/A	Roadway Modernization	Winston-Salem	Shattalon Drive (SR 1686)	North Forsyth High School	Reynolda Rd	19.21
WS-Rdwy-303	N/A	Roadway Widening	Midway	Old US Highway 52 (SR 2932)	Ralph Miller Rd	I-285 Northbound Ramp	12.23
WS-Rdwy-309	N/A	Roadway Widening	Davie County	Baltimore Road (SR 1630)	US 158	Cornatzer Rd	45.25
WS-Rdwy-368	N/A	Roadway Widening	Forsyth County	Vance Road (SR 2014)	Piney Grove Rd	Reidsville Rd	62.76
WS-Rdwy-392	N/A	Roadway Widening	Davie County	Old US Highway 52 (SR 3010)	Craver Rd	Welcome Center Blvd	15.50
WS-Rdwy-409	N/A	Roadway Modernization	Clemmons	Yadkin Valley Rd	NC 801	NC 801	29.21
WS-Rdwy-411	N/A	Widen to Multilanes	Bermuda Run	US-158	Harper Rd	NC 801	46.26
WS-Rdwy-414	N/A	Modernization, add turn lanes, complete streets improvements	Winston-Salem	London Lane	Ebert Rd	Burke Mill Rd	6.55
WS-Rdwy-423	N/A	Interchange Improvements	Davie County	I-40 on Ramp	--	--	21.53
WS-Rdwy-427	N/A	Interchange Improvements	Bermuda Run	I-40	--	--	21.53
WS-Rdwy-430	N/A	Interchange Improvements	Clemmons	Germanton Rd/US 52 Interchange	--	--	21.53
WS-Rdwy-OPS-45		Operations and Safety Improvements					52.98
Transit	--	Various Improvements	--	--	--	--	See Chapter 5 for funding details
Bicycle and Pedestrian	--	Various Improvements	--	--	--	--	
2045 HORIZON YEAR ESTIMATED ROADWAY PROJECT COST						Total	Funded
							1,155.4



September 08, 2020



Figure 32 - Financial Plan Roadway Projects by Horizon Year

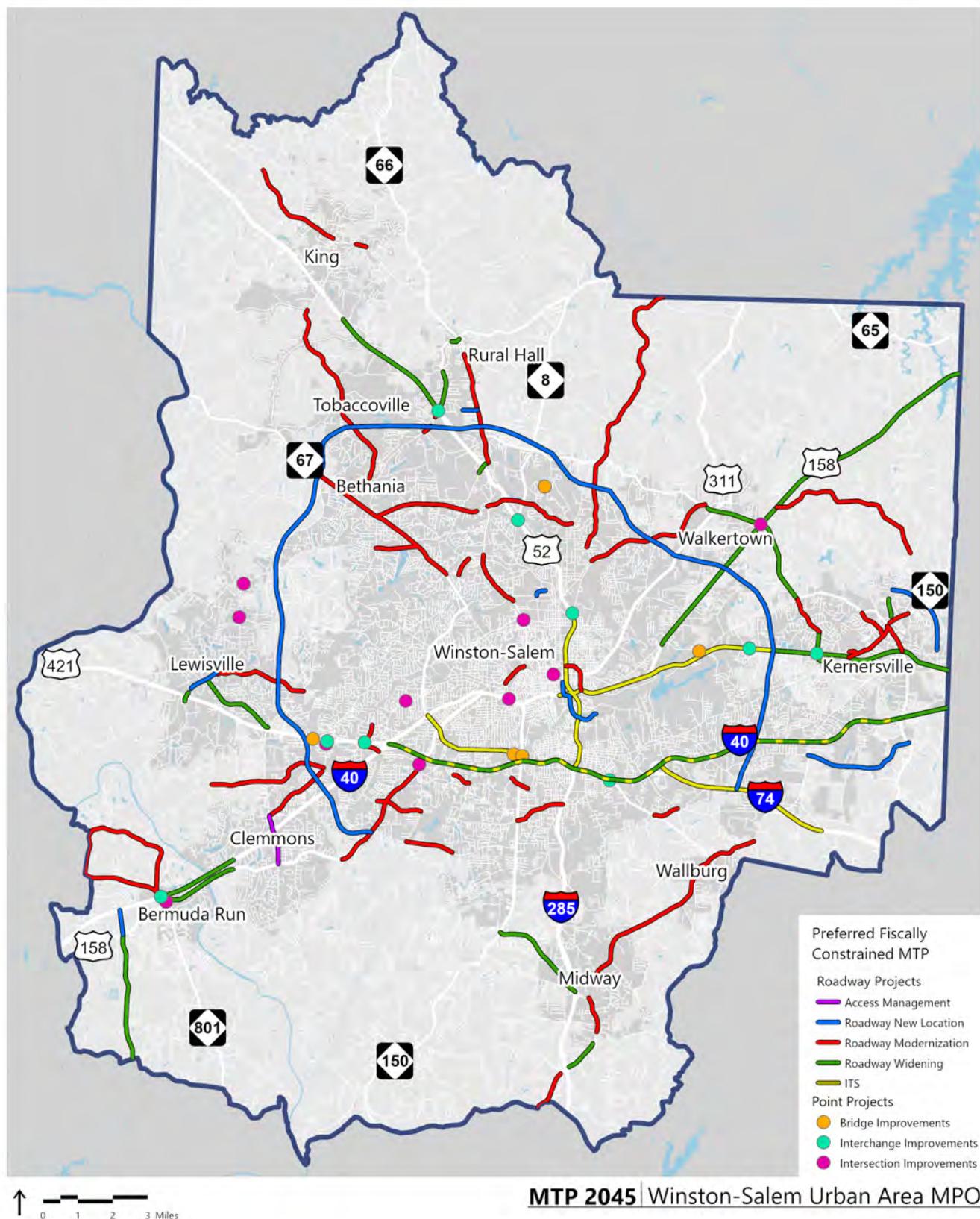


Figure 33 - 2020 - 2045 Preferred Financial Plan Roadway Projects

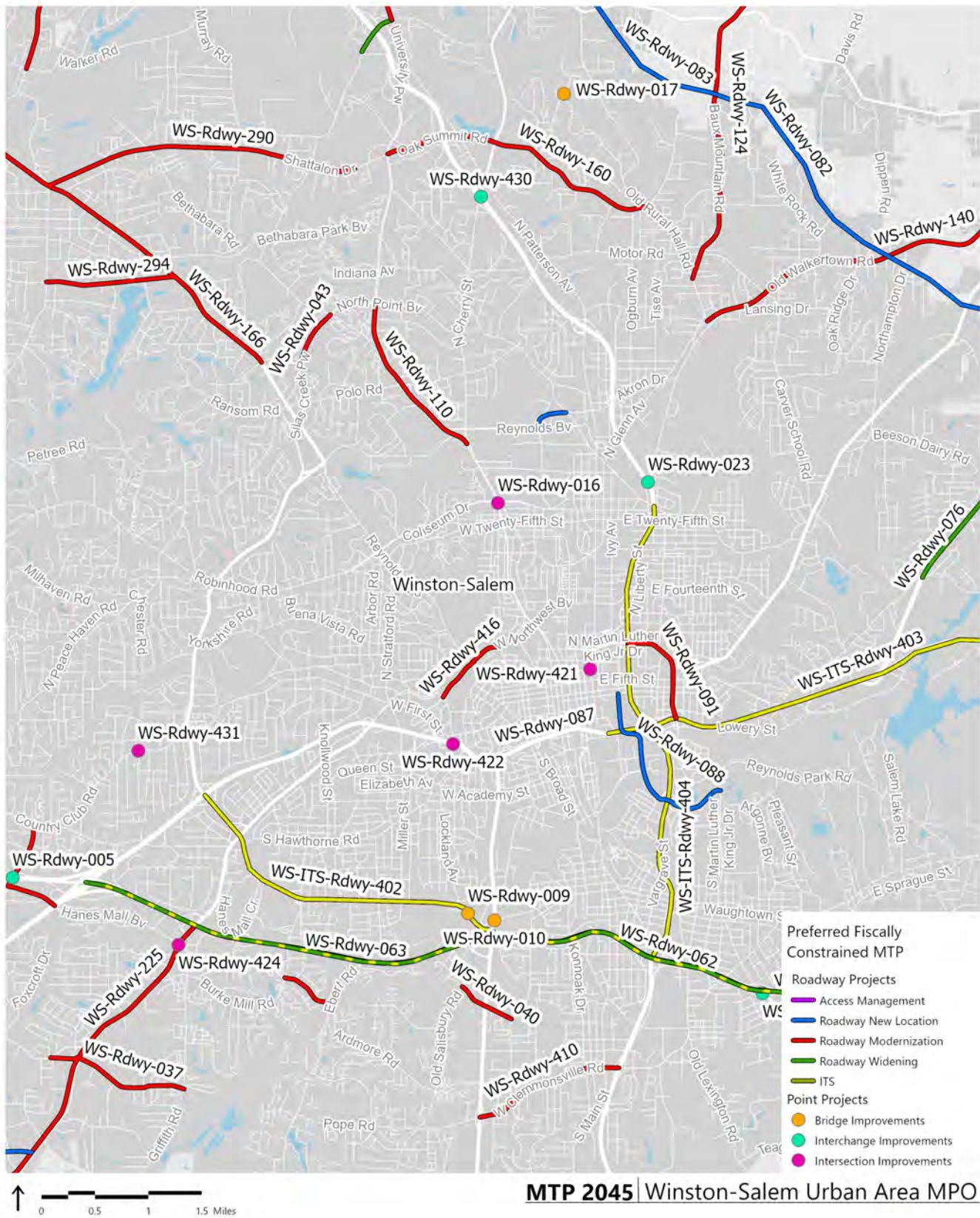


Figure 34 - MTP Roadway Projects, Central Area (Winston Salem)



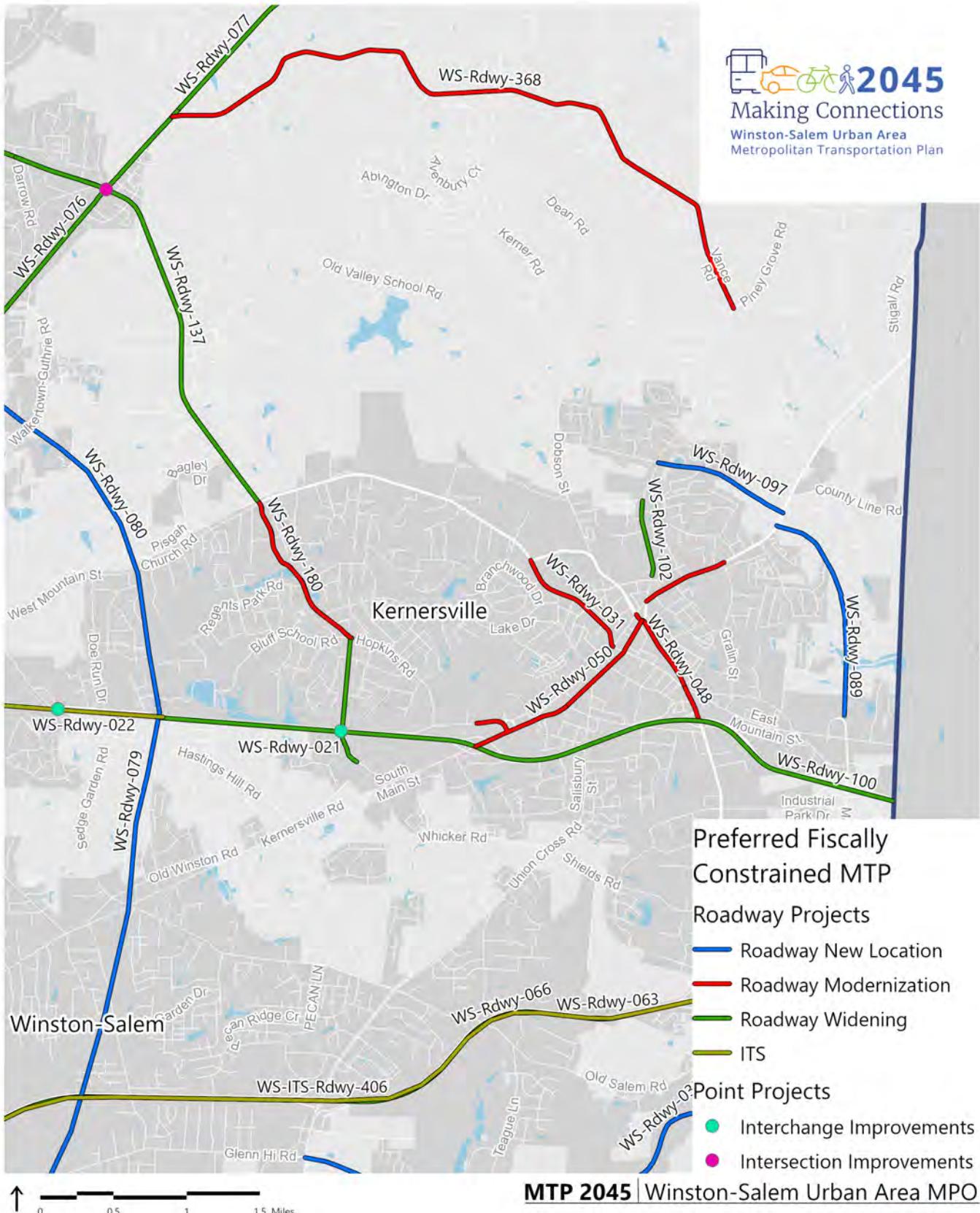
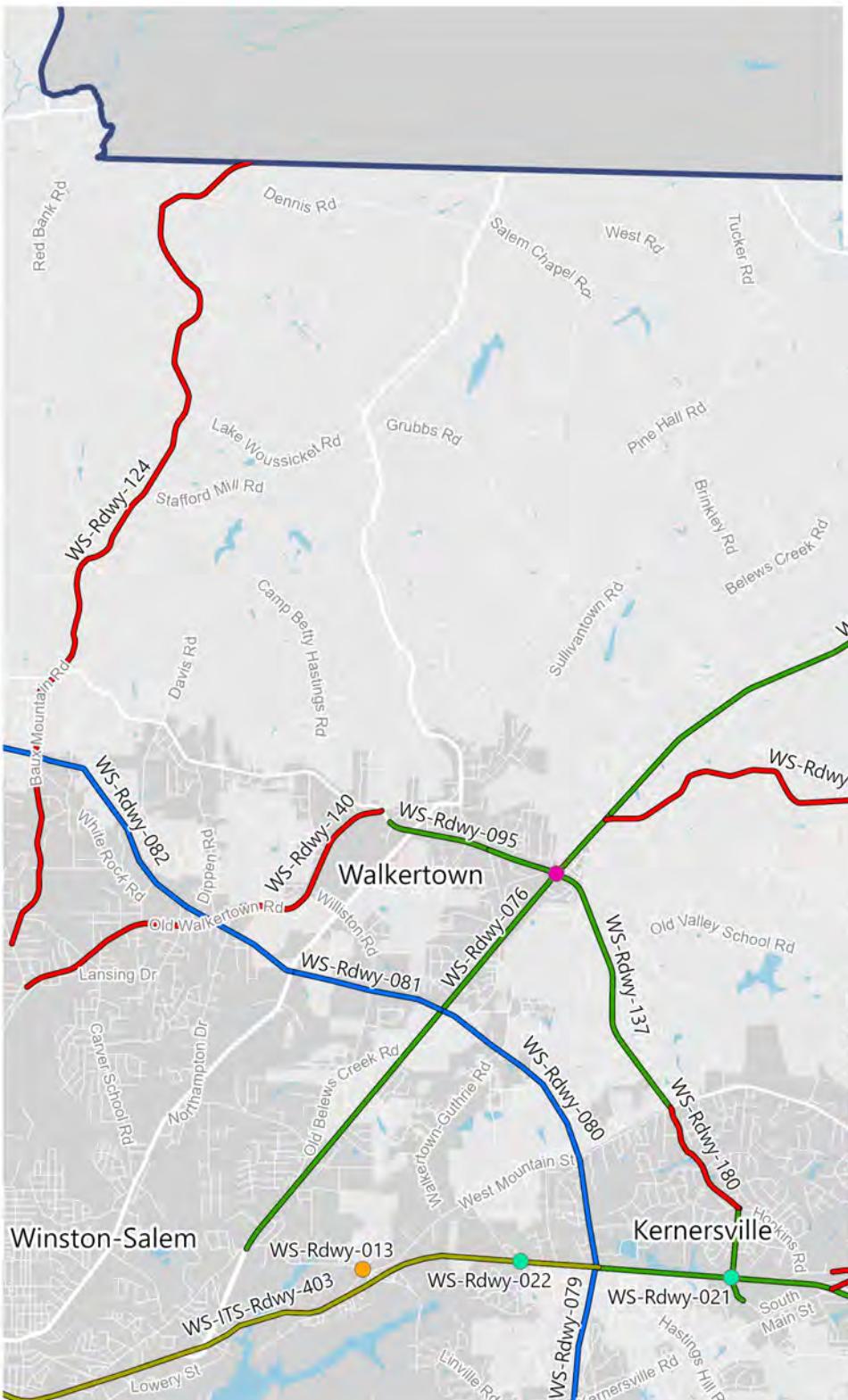


Figure 35 - MTP Roadway Projects, Kernersville Area

September 14, 2020





MTP 2045 | Winston-Salem Urban Area MPO

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Figure 36 - MTP Roadway Projects, Northeast Area (Walkertown, Kernersville)

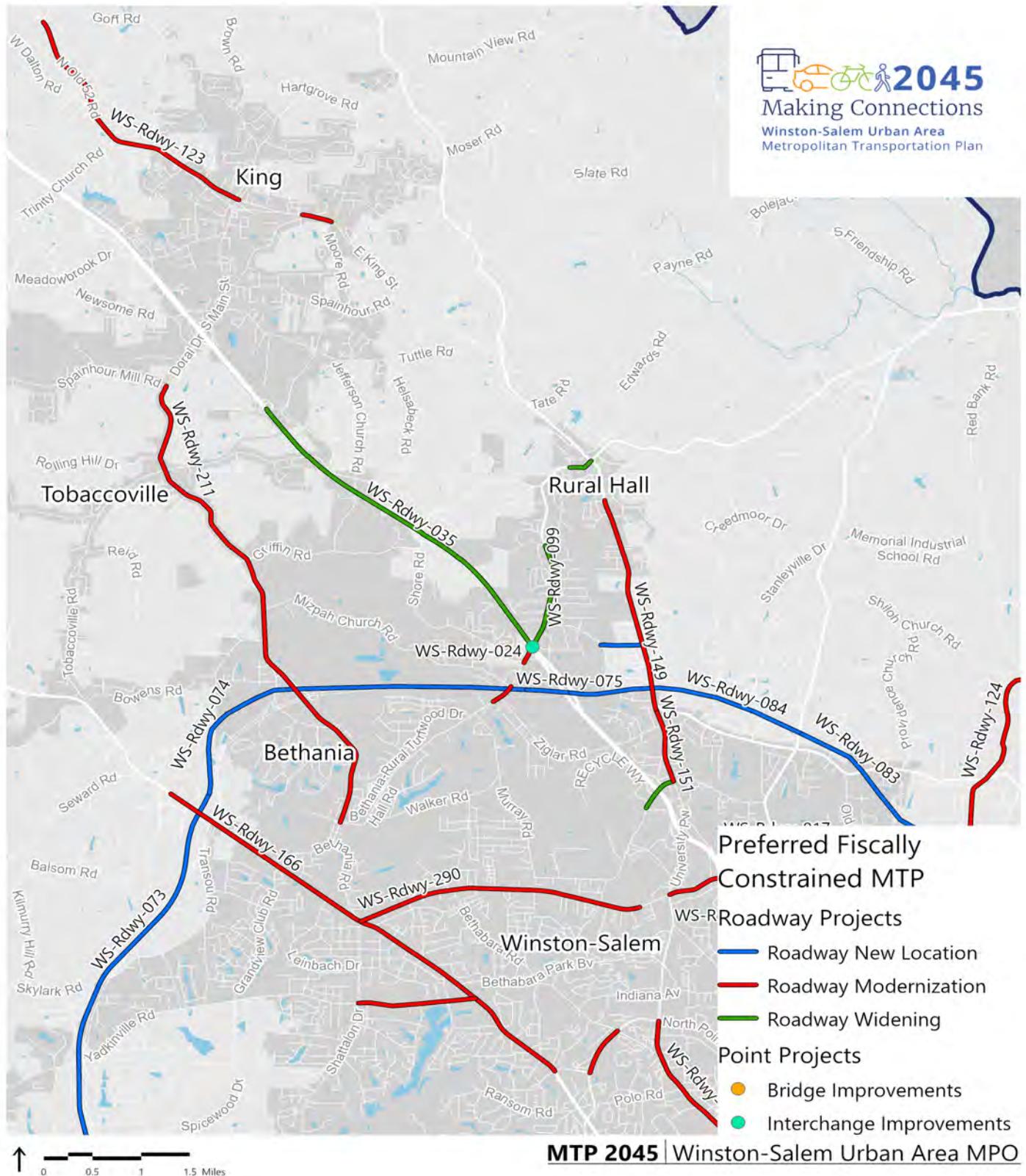


Figure 37 - MTP Roadway Projects, Northwest Area (Rural Hall, Bethania, King, Tobaccoville)

September 11, 2020



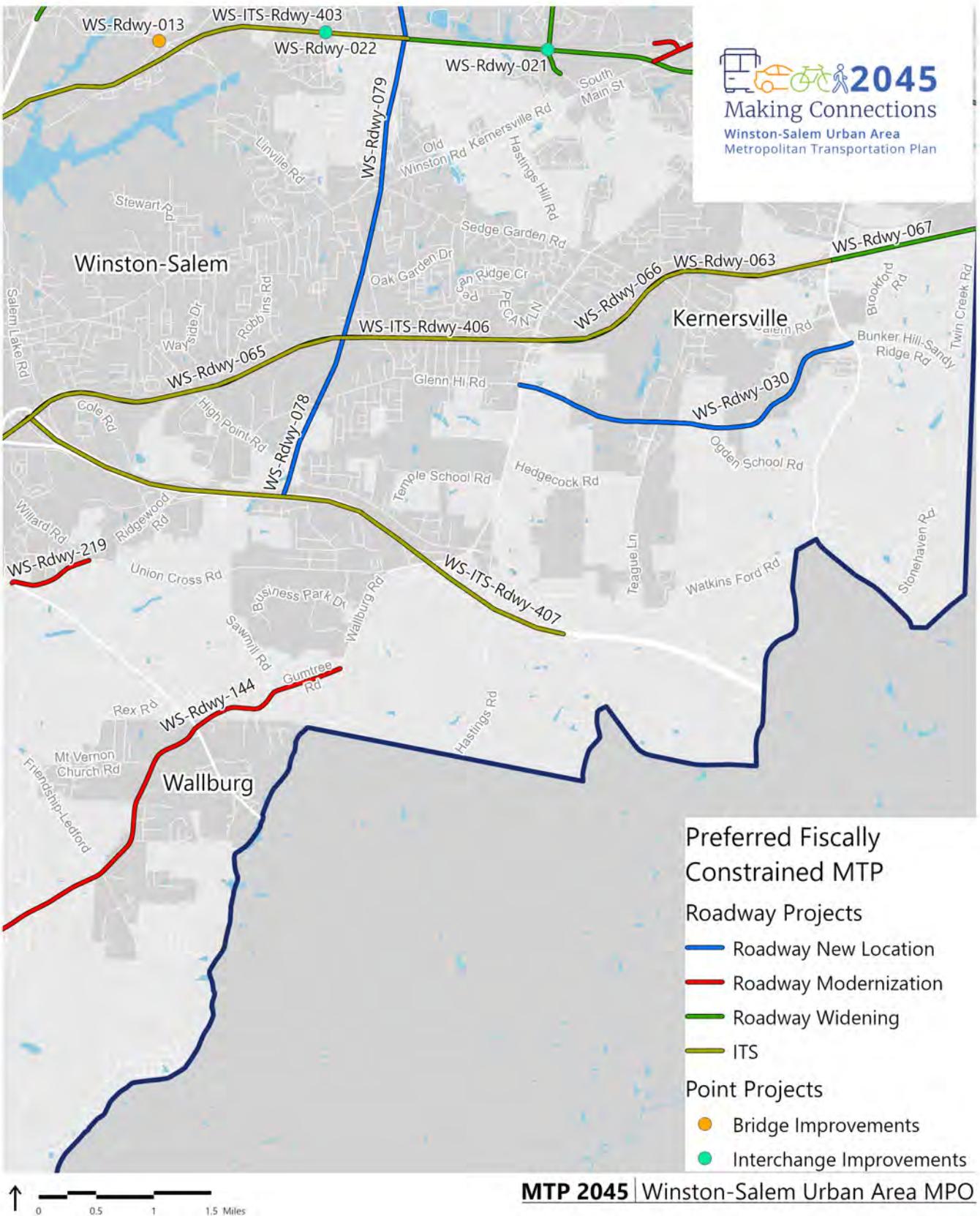
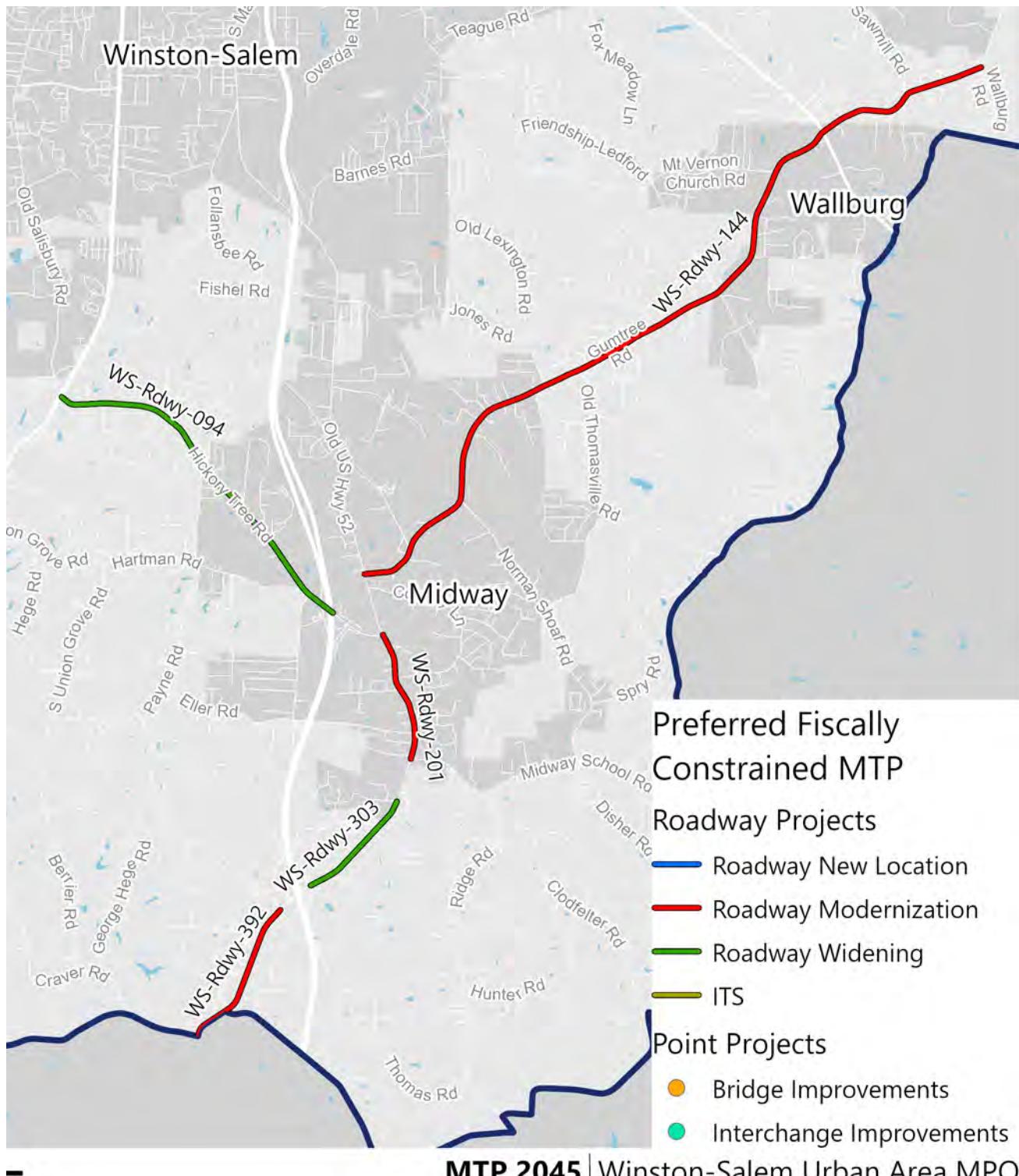


Figure 38 - MTP Roadway Projects, Southeast Area

September 03, 2020

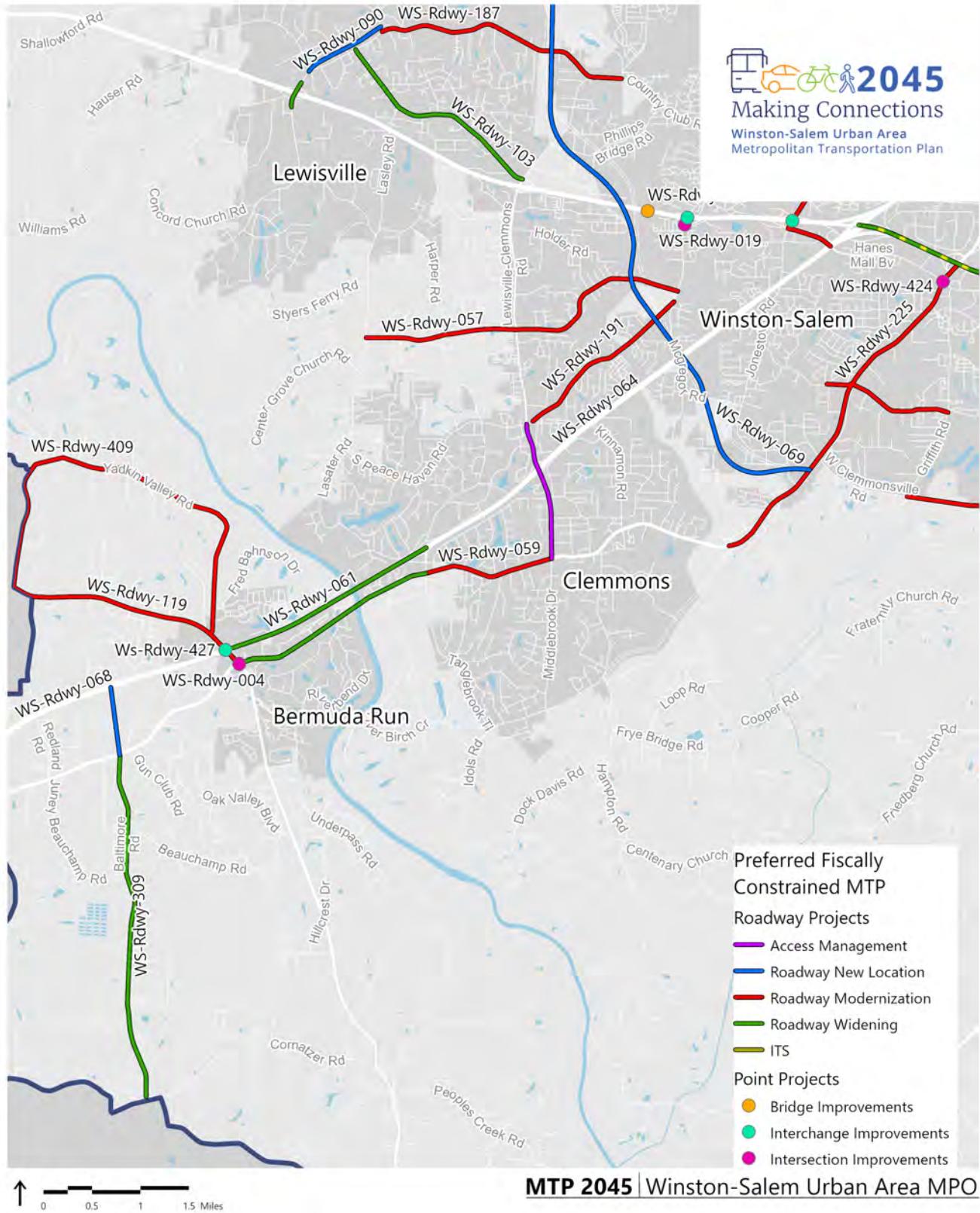




September 03, 2020



Figure 39 - MTP Roadway Projects, Southern Area (Wallburg, Midway)



October 12, 2020



Figure 40 - MTP Roadway Projects, Southwest Area (Clemmons, Bermuda Run, Lewisville)



Chapter 7. Environmental Justice

7.1 Background

Transportation improvements can have a significant negative effect on some local communities, even as the benefits are shared by the larger region. In the history of interstate highway system construction, too often low-income and African-American neighborhoods bore the brunt of interstate construction, decimating and dividing successful, vibrant communities¹⁰. A 1994 Presidential Executive Order (Executive Order 12898 of February 11, 1994, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) directed federal agencies to incorporate environmental justice into their mission, and to identify and address the effects of their policies and activities on minority and low-income communities.

Environmental Justice (EJ), in the Federal Highway Administration definition, means “identifying and addressing disproportionately high and adverse effects of the agency’s programs, policies, and activities on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens¹⁰”.

The US Department of Transportation (USDOT) promotes environmental justice as an integral part of various transportation planning stages—from the long-range planning and MTP update process through individual project development.

Getting There 2045 incorporates environmental justice by adhering to the following fundamental principles developed by USDOT:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority and low-income populations;
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process; and
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

7.2 Degree of Impact

The Degree of Impact (DOI) analysis utilized for Making Connections 2045 is based on the need to appropriately identify populations and geographic areas where residents have traditionally not been involved in the planning process or might have been disproportionately impacted negatively by transportation decisions. These populations have commonly been identified as environmental justice (EJ) populations. This Degree of Impact analysis highlights where it may be necessary to conduct enhanced follow-up studies of either the proposed transportation network or specific projects, should disproportionate negative impact be deemed likely. The DOI analysis is expected to be the first step in additional analysis and planning to refine recommendations on plans, programs, and projects.

The Degree of Impact analysis utilized for Making Connections 2045 involved identifying four transportation disadvantaged populations within the WSUAMPO planning boundary (see Table 25 and Table 26 for percentage of those populations as part of the total population within Winston-Salem Urban Area MPO planning area).

These special populations are:

- Minority populations
- Households in poverty
- Limited English Proficiency (LEP)
- Households with no vehicle
- Black population
- Minority population other than Black
- Hispanic ethnicity population

Population groups to be considered for Environmental Justice analysis were selected based on review of Environmental Justice analysis performed for other larger MPOs in North Carolina. The list of population groups was also reviewed with the Steering Committee and the study Project Team members. Based on input received, multiple categories for race and ethnicity were considered.

Table 25 - Race and Ethnicity Distribution, Winston-Salem Urban Area MPO

Winston-Salem Urban Area MPO Race and Ethnicity Distribution	
White	64.3%
Black	20.7%
Native American	0.2%
Asian	2.1%
Pacific Islander	0.1%
Other Race	0.3%
2 or more Races	3.0%
Ethnicity - Hispanic	10.8%

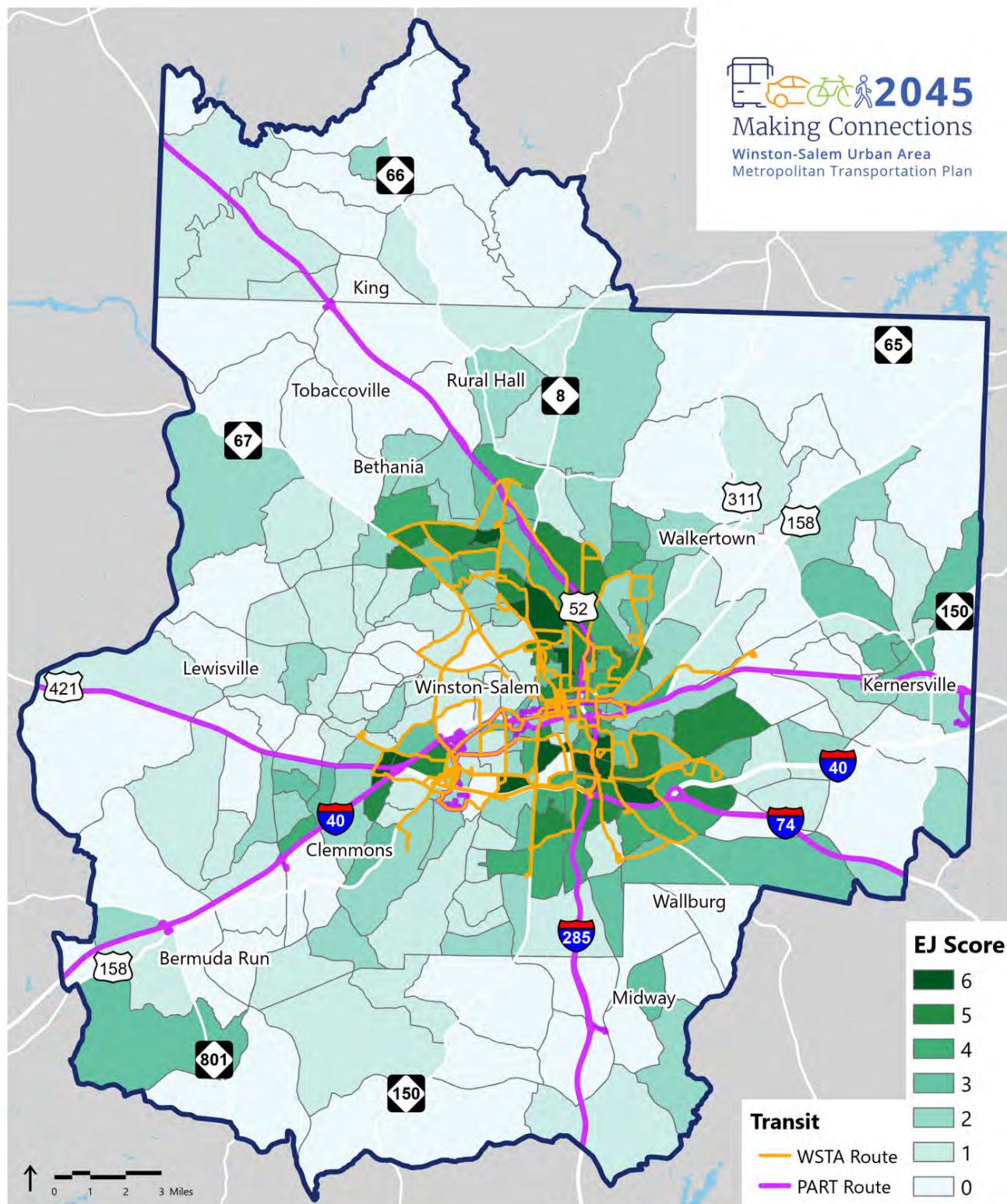
**Table 26 -Environmental Justice Components, Averages Values across the Region's Population,
Winston-Salem Urban Area MPO**

Winston-Salem Urban Area MPO Environmental Justice Averages	
Households in Poverty	21.7%
Limited English Proficiency	5.8%
Zero Car Households	10.2%
Minority Races - All	39.3%
Race - Black	20.7%
Race - Others	5.5%
Ethnicity - Hispanic	10.8%

American Community Survey data were analyzed at the Census Block Group level and used to establish MPO planning area averages. Block Groups with EJ populations exceeding the planning area average were identified and a four-level DOI assessment scale is applied:

- Block Groups with 0 EJ groups exceeding area averages denote No Concentration
- Block Groups with 1-2 EJ groups exceeding area averages denote Low Concentration
- Block Groups with 3-4 EJ groups exceeding area averages denote Moderate Concentration
- Block Groups with 5-6 EJ groups exceeding area averages denote High Concentration

Those block groups scoring a six (6) on the combined EJ score were determined to have the highest presence of transportation-disadvantaged populations overall. Figure 40 below illustrates the overlap of existing fixed route transit service routes with transportation-disadvantaged populations in the region based on a combined EJ score at the block group level.



Environmental Justice (EJ) scores were calculated from six criteria. A block group was assigned an EJ index point if they had a larger than regional concentration of poverty, limited English proficiency, or zero car households. Block groups were also assigned a point if racial minority concentrations of African Americans, other races, or Hispanic ethnicity exceeded the regional average.

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Figure 41 - Environmental Justice Score and Existing Transit Routes

Proposed roadway, transit, and bicycle and pedestrian improvements were mapped over the Environmental Justice map to help illustrate for decision makers where it may be necessary to conduct enhanced study of either the proposed transportation network, or specific projects. Table 27 below documents the breakdown of projects in the financial plan list by impact on block groups with a low, moderate, or high EJ score.

Table 27 – WSUAMPO Financial Plan Scenario Projects by Type, by EJ Score of Block Groups Potentially Impacted

WSUAMPO FISCALLY CONSTRAINED MTP PROJECTS BY TYPE				
EJ Level	All BGs (score of 0-6)	BGs with Low Score (0-2)	BGs with Moderate Score (3-4)	BGs with High Score (5-6)
Block Group Count, WSUAMPO Planning Area	293 (100%)	193 (66% of BGs)	64 (22% of BGs)	36 (12% of BGs)
All New Projects	190 (78%)	116 (73% of BGs impacted)	48 (88% of BGs impacted)	26 (92% of BGs impacted)
Roadway New Location	52 (19%)	38 (22% of BGs impacted)	12 (19% of BGs impacted)	2 (6% of BGs impacted)
Roadway Widening	62 (20%)	48 (24% of BGs impacted)	7 (11% of projects)	7 (19% of BGs impacted)
Roadway Modernization/ Access Management	119 (41%)	76 (39% of BGs impacted)	31 (48% of BGs impacted)	12 (33% of BGs impacted)
Interchange/ Intersection/ Bridge	20 (8%)	13 (8% of BGs impacted)	3 (6% of BGs impacted)	4 (11% of BGs impacted)
Roadway ITS	46 (16%)	20 (10% of BGs impacted)	16 (25% of BGs impacted)	10 (28% of BGs impacted)
Bicycle	60 (20%)	35 (18% of BGs impacted)	13 (20% of BGs impacted)	12 (33% of BGs impacted)
Complete Streets/ Greenway	71 (24%)	30(16% of BGs impacted)	23 (36% of BGs impacted)	18 (50% of BGs impacted)
Pedestrian	5 (9%)	2 (7% of BGs impacted)	8 (13% of BGs impacted)	4(11% of BGs impacted)
Transit	23 (8%)	2 (1% of BGs impacted)	13 (20% of BGs impacted)	8 (22% of BGs impacted)

*Percentages and counts based on project type intersection EJ score classification.

Based on the analysis performed, there is an even distribution of projects that are associated with expected positive and negative impacts to the neighborhoods immediately adjacent to the project. This is especially seen with respect to new roadway locations, where only a small count of high scoring EJ block groups are affected by new roadways. Two out of 52 block groups impacted by new location roadway projects, or approximately 3.8% of block groups impacted by projects of this type had a high EJ score as compared to 12.3% of all block groups in the planning area carrying a high EJ score (score of 5 or 6). Out of roadway widening projects (also expected to bring higher potential negative impacts to immediately-adjacent neighborhoods) 7 projects or 11.1% of all block groups impacted by this type of project were block groups with a high EJ score, which is slightly lower than the percentage of block groups with a high EJ score in the planning area. A large proportion of high scoring EJ block groups will see active transportation improvements. Block groups with a score of 5 or 6 accounted for 28.9% of block groups impacted by complete streets and greenway improvements projects, 0% of block groups with overlapping pedestrian projects and 22.9% of all block groups with overlapping bicycle projects. The transit routes recommended for expansion that overlap with highly scoring block groups account for 34.8% of all block groups overlapping with transit routes recommended for service expansion.

Modernization and access management projects are expected to bring more benefits than negative impacts to surrounding neighborhoods due to expected improvements in the safety of travel conditions. Distribution of block groups impacted by modernization and access management roadway projects resulted in a slightly smaller percentage of highly scoring block groups for EJ cumulative score than the region's overall percentage of those block groups (9.9 % of all block groups impacted by modernization and access management had a high EJ score.) This is related to the fact that the geographic distribution of modernization and access management projects was fairly spread out across the planning area, and block groups with a high EJ score tend to concentrate closer to the urban core of the region. However, when looking at block groups with a moderate score as well as block groups with a high EJ score in combination, 35.5% of all block groups impacted by modernization and access management projects had either a moderate or a high EJ score. This is slightly higher than 34.1% of all block groups in the planning area that have a moderate or high EJ score.

Figure 41 below overlays the financial plan Roadway Projects with Environmental Justice score by block group. Figure 42 overlays the financial plan Transit Projects with Environmental Justice score by block group. And Figure 43 overlays the financial plan Bicycle and Pedestrian Projects with Environmental Justice score by block group.

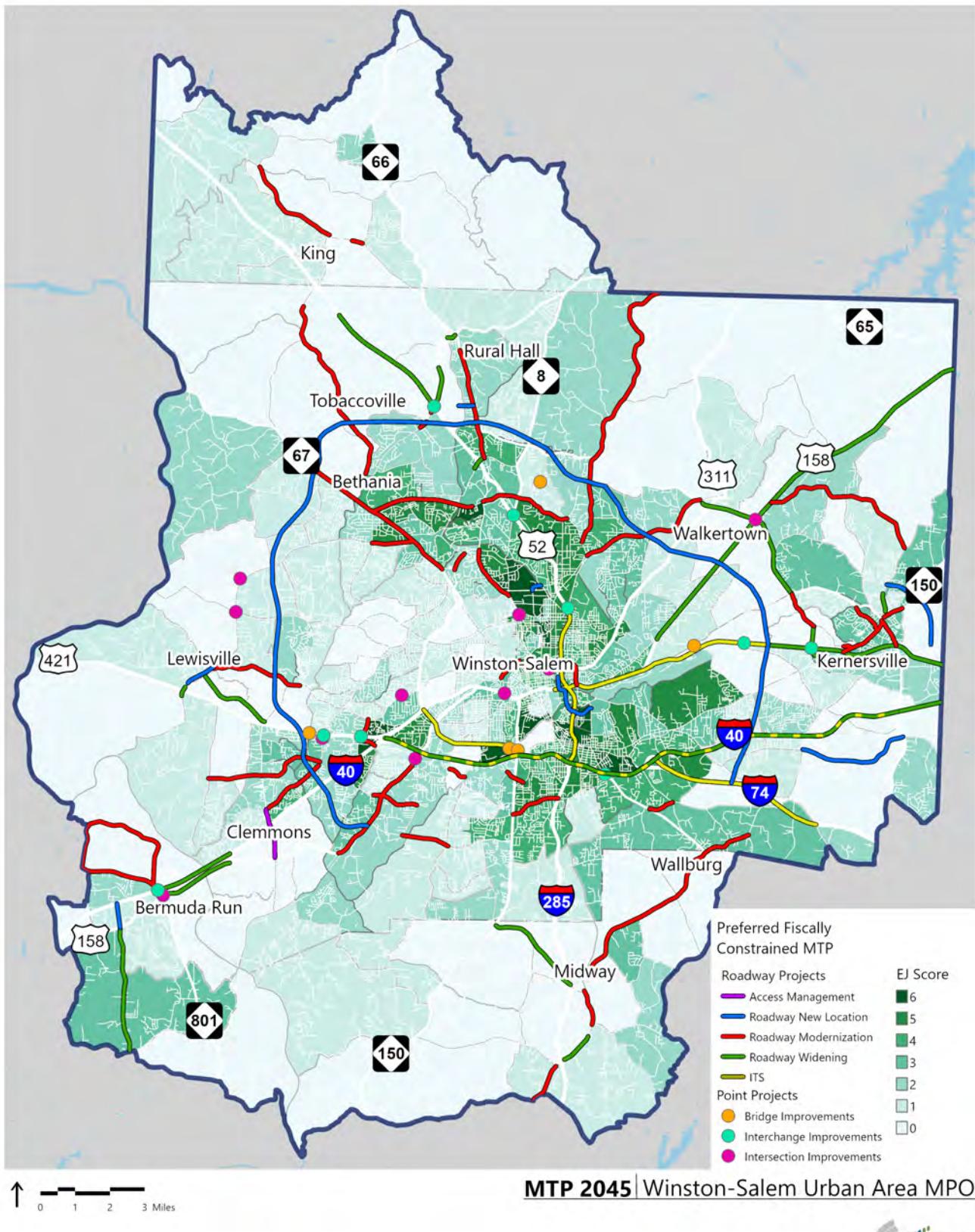
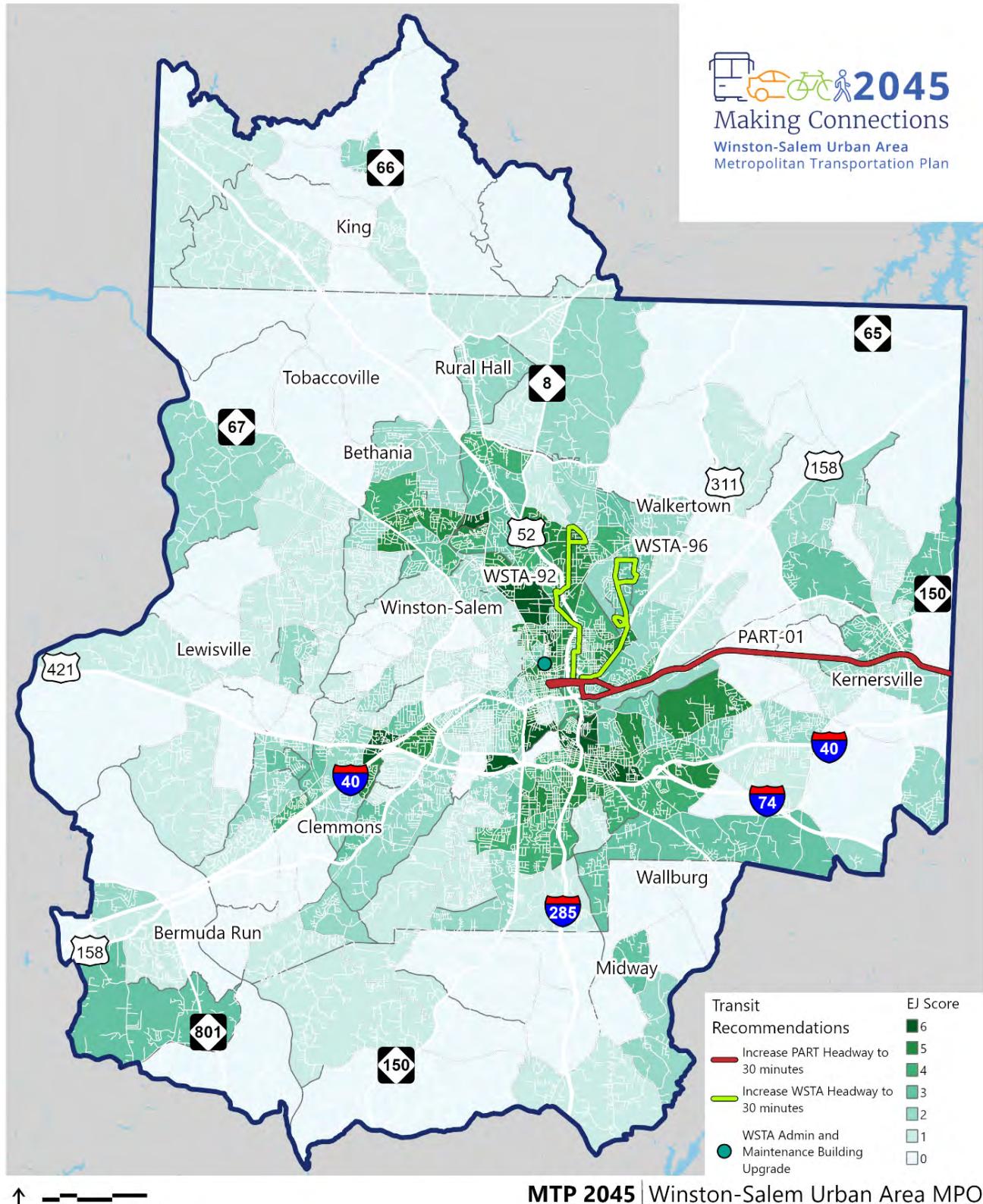


Figure 42 - Environmental Justice score and Financial Plan Roadway Projects

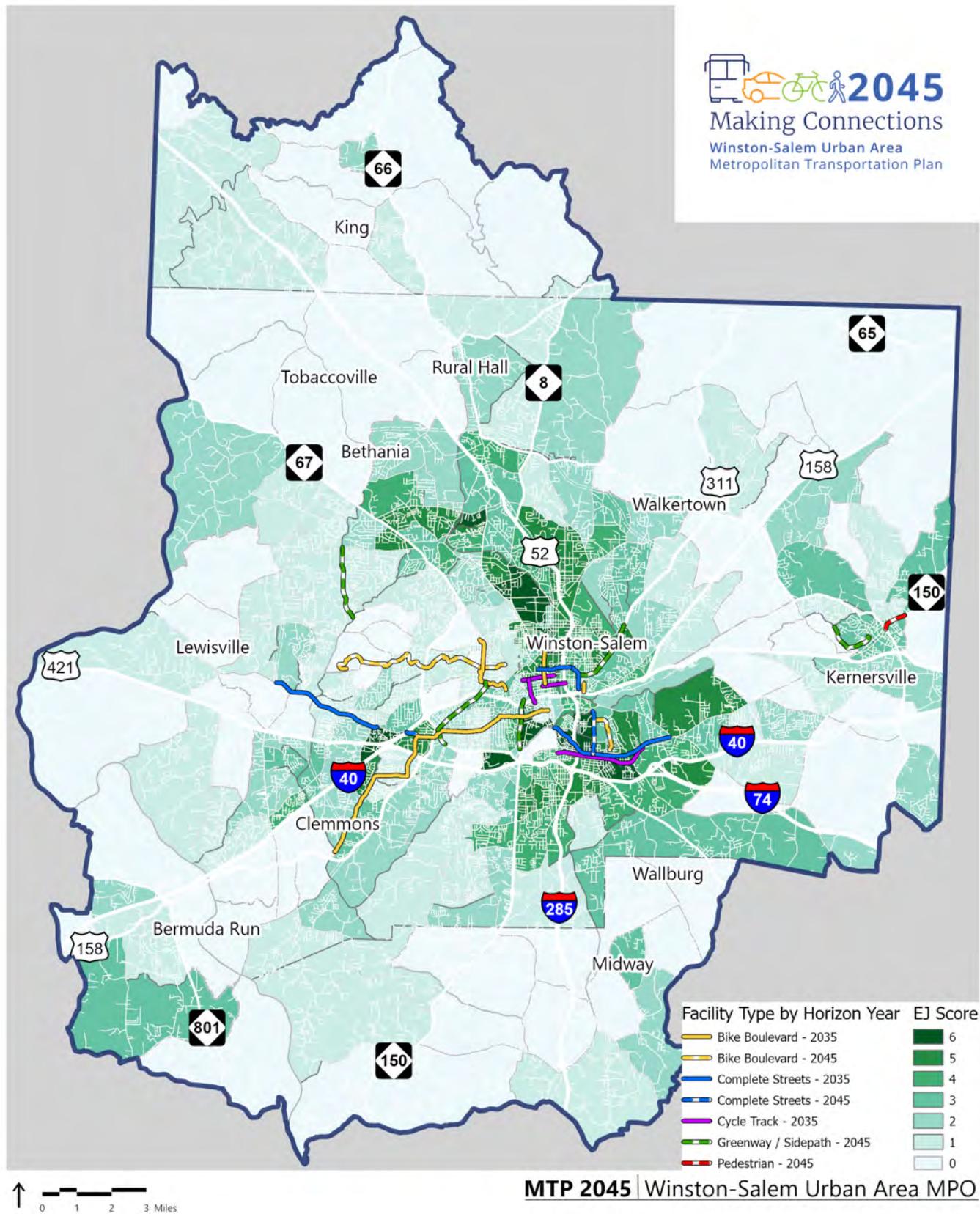


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Figure 43 – Environmental Justice Score and Financial Plan Transit Projects



September 15, 2020



Figure 44 – Environmental Justice Score and Financial Plan Bicycle and Pedestrian Projects

Chapter 8. System Performance Report

8.1 Background

Pursuant to the Moving Ahead for Progress in the 21st Century Act (MAP-21) Act enacted in 2012 and the Fixing America's Surface Transportation Act (FAST Act) enacted in 2015, state Departments of Transportation (DOT), Metropolitan Planning Organizations (MPO), and public transportation providers must apply a transportation performance management approach in carrying out their federally-required transportation planning and programming activities. The process requires the establishment and use of a coordinated performance-based approach to transportation decision-making to support national goals for the federal-aid highway and public transportation programs.

On May 27, 2016, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) issued the Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning Final Rule (The Planning Rule)¹⁰. This regulation implements the transportation planning and transportation performance management provisions of MAP-21 and the FAST Act.

In accordance with 23 CFR 450.324(f)(3)-(4)(i)(ii) of the Planning Rule, and the North Carolina Performance Management Agreement between the North Carolina Department of Transportation (NCDOT), the WSUAMPO, and public transportation providers, NCDOT and each North Carolina MPO must include a description of the applicable performance measures and targets and a System Performance Report for the performance measures in their respective statewide and metropolitan transportation plans. The System Performance Report presents the condition and performance of the transportation system with respect to required performance measures and approved performance targets, and reports on progress achieved in meeting the targets in comparison with previous reports and the baseline. The Planning Rule specifies the following timeframes for when a state or MPO must include the System Performance Report:

- Highway Safety/PM1 - In any statewide or metropolitan transportation plan amended or adopted on or after May 27, 2018;

- Pavement and Bridge Condition/PM2 - In any statewide or metropolitan transportation plan amended or adopted on or after May 20, 2019;
- System Performance, Freight, and Congestion Mitigation and Air Quality/PM3 - In any statewide or metropolitan transportation plan amended or adopted on or after May 20, 2019;
- Transit Assets - In any statewide or metropolitan transportation plan amended or adopted on or after October 1, 2018;

The WSUAMPO 2045 Metropolitan Transportation Plan (MTP), Making Connections 2045, is scheduled for adoption on September 17th, 2020. Per the Planning Rule and the North Carolina Performance Management Agreement, the System Performance Report for the WSUAMPO MTP is included, herein, for the required performance Measures.

The WSUAMPO recognizes the importance of linking goals, objectives, and investment priorities to stated performance objectives, and that establishing this link is critical to the achievement of national transportation goals and statewide and regional performance targets. As such, the Making Connections 2045 planning process directly reflects the goals, objectives, performance measures, and targets as they are available and described in other State and public transportation plans and processes; specifically, the North Carolina Strategic Highway Safety Plan (SHSP), the HSIP, the Transportation Asset Management Plan (TAMP), the North Carolina Multimodal Statewide Freight Plan, the NCDOT Group Transit Asset Management Plan, and the current 2040 North Carolina Statewide Long Range Transportation Plan (SL RTP).

- The 2040 SL RTP provides a 30-year transportation blueprint for the state. The Plan summarizes the state's highest priorities for ensuring safety and preserving the existing transportation systems and focusing on services and facilities with statewide significance. Investment strategies identified in the 2040 SL RTP are intended to meet the mobility needs, ensuring safety and promote economic growth for the state, and reflect optimal performance impacts across each investment program given anticipated transportation revenues.
- The North Carolina SHSP is intended to articulate the way forward to achieve Vision Zero, where even one fatality is too many on North Carolina roads. The SHSP's vision, mission, and goals guide the development and implementation of strategies and actions to achieve Vision Zero for the MPOs and other safety partners in addressing safety and defines a framework for implementation activities to be carried out across North Carolina.
- The HSIP annual report provide for a continuous and systematic process that identifies and reviews traffic safety issues across the state to identify locations with potential for improvement. The goal of the HSIP process is to reduce the number of crashes, injuries and fatalities by eliminating certain predominant types of crashes through the implementation of engineering solutions.
- MAP-21 requires States to develop a TAMP for all NHS pavements and bridges within the state. North Carolina's TAMP includes investment strategies leading to a program of projects that would make progress toward achievement of a State's pavement and bridge condition targets.
- The North Carolina Multimodal Statewide Freight Plan defines the conditions and performance of the state freight system and identifies the policies and investments that will enhance highway freight mobility well into the future. The Plan identifies freight needs and the criteria used to determine investments in freight, and prioritizes freight investments across modes.

The sections that follow provide detail regarding the performance measures and associated targets, as well as, information/discussion by WSUAMPO regarding how projects programmed in their TIP are helping the NCDOT achieve their targets.

8.2 Highway Safety/PM1

Effective April 14, 2016, the FHWA established five highway safety performance measures¹³ to carry out the Highway Safety Improvement Program (HSIP). The HSIP is a federal-aid funding program intended to achieve a significant reduction in traffic fatalities and serious injuries on all public roads. These performance measures are:

- 1. Number of fatalities;**
- 2. Rate of fatalities per 100 million vehicle miles traveled;**
- 3. Number of serious injuries;**
- 4. Rate of serious injuries per 100 million vehicle miles traveled; and**
- 5. Number of combined non-motorized fatalities and non-motorized serious injuries.**

Safety performance targets are established annually by the State DOTs for each safety performance measure and reported to FHWA in the HSIP Annual Report. MPOs then establish annual targets for each measure by either agreeing to program projects that will support the statewide targets or setting quantifiable targets for the metropolitan planning area.

Current statewide safety targets address calendar year 2020 and are based on a five-year rolling average of historical data and anticipated trends. The statewide targets for 2020 are included in Table 28, along with statewide safety performance for the three most recent reporting periods (2013-2017, 2014-2018, and 2015-2019). The WSUAMPO adopted/approved the 2020 North Carolina statewide safety performance targets on January 16th, 2020. Safety targets are updated on an annual basis. By February 27, 2021, WSUAMPO will adopt 2021 safety targets for the MPO area or support the statewide targets.

Table 28 - Highway Safety/PM1, Statewide System Conditions and Performance

HIGHWAY SAFETY/PM1, STATEWIDE SYSTEM CONDITIONS AND PERFORMANCE				
Performance Measures	2017 (2013-2017 Average)	2018 (2014-2018 Average)	2019 (2015-2019 Average)	2020 Targets (2016-2020 Average)
Number of Fatalities	1,359.0	1,392.4	1,427.2	1,227.8
Rate of Fatalities per 100 Million Vehicle Miles Traveled	1.214	1.206	1.208	1.084
Number of Serious Injuries	2,860.8	3,537.6	3,905.0	2,812.8
Rate of Serious Injuries per 100 Million Vehicle Miles Traveled	2.524	3.028	3.281	2.462
Number of Combined Non- Motorized Fatalities and Non- Motorized Serious Injuries	431.4	473.6	543.4	426.6

As shown in Table 27, the five-year rolling average of four of the five measures, with the exception of fatality rate, increased between 2017 and 2019. The 2020 targets are based on a goal of reducing fatalities and serious injuries by a certain percentage by December 31, 2020.

In early 2020, FHWA completed an assessment of target achievement for NCDOT's 2018 safety targets, based on the 5-year averages for 2014-2018 for each measure. Per FHWA's PM1 rule, a state has met or made significant progress toward its safety targets when at least four of the targets have been met or the actual outcome is better than the baseline performance. Based on FHWA's review, North Carolina did not make significant progress toward achieving its safety targets. As a result, NCDOT must ensure that all HSIP safety funds are obligated, and must develop an HSIP Implementation Plan that describes actions the State will take to meet or make significant progress toward achieving its targets.

The latest safety conditions will be updated annually on a rolling 5-year average basis, and will be reflected within each subsequent System Performance Report, to track performance over time in relation to baseline conditions and established targets.

The Making Connections 2045 will increase the safety of the transportation system for motorized and non-motorized users as required by the Planning Rule. The Making Connections 2045 carries forward HSIP and safety improvements projects funding based on past funding trends and fiscal forecast; as part of MTP preferred

scenario development an emphasis was made on roadway project targeting intersection improvements, operations and access management improvements-those improvements are expected to improve safety on the region's highways and streets; implementing bicycle and pedestrian improvements as part of NCDOT complete streets policy as well as investment in stand-alone bicycle and pedestrian projects is expected to improve safety for active transportation users.

8.3 Pavement and Bridge Condition/PM2

Effective May 20, 2017, FHWA established performance measures to assess pavement condition¹⁴ and bridge condition¹⁵ for the National Highway Performance Program. This second FHWA performance measure rule (PM2) established six performance measures:

1. Percent of Interstate pavements in good condition;
2. Percent of Interstate pavements in poor condition;
3. Percent of non-Interstate National Highway System (NHS) pavements in good condition;
4. Percent of non-Interstate NHS pavements in poor condition;
5. Percent of NHS bridges by deck area classified as in good condition; and
6. Percent of NHS bridges by deck area classified as in poor condition.

Pavement Conditions Measures

The pavement condition measures represent the percentage of lane-miles on the Interstate or non-Interstate NHS that are in good condition or poor condition. FHWA established five metrics to assess pavement condition: International Roughness Index (IRI), applicable to asphalt and concrete pavements; cracking percent, applicable to asphalt and concrete pavements; rutting, applicable only to asphalt pavements; faulting applicable only to certain types of concrete pavements; and Present Serviceability Rating (PSR), applicable only to roads with lower posted speeds and used in lieu of the other metrics at the option of the state. For each metric, a threshold is used to establish good, fair, or poor condition.

Pavement condition is assessed using the applicable metrics and thresholds. A pavement section is rated in good condition if two or three of the applicable metric ratings are good, and in poor condition if two or more applicable metric ratings are poor. If a state reports PSR for any pavement segments, those segments are rated according to a single PSR scale. For all pavement types, sections that are not good or poor are rated as fair.

The pavement condition measures are expressed as a percentage of all applicable roads in good or poor condition. Pavement in good condition suggests that no major investment is needed. Pavement in poor condition suggests major reconstruction investment is needed due to either ride quality or a structural deficiency.

Bridge Condition Measures

The bridge condition measures represent the percentage of bridges, by deck area, on the NHS that are in good condition or poor condition. The condition of each bridge is evaluated by assessing four bridge components: deck, superstructure, substructure, and culverts. FHWA created a metric rating threshold for each component to establish good, fair, or poor condition. Every bridge on the NHS is evaluated using these component ratings. If the lowest rating of the four metrics is greater than or equal to seven, the structure is classified as good. If the lowest rating is less than or equal to four, the structure is classified as poor. If the lowest rating is five or six, it is classified as fair.

To determine the percent of bridges in good or in poor condition, the sum of total deck area of good or poor NHS bridges is divided by the total deck area of bridges carrying the NHS. Deck area is computed using structure length and either deck width or approach roadway width. Good condition suggests that no major investment is needed. Bridges in poor condition are safe to drive on; however, they are nearing a point where substantial reconstruction or replacement is needed.

Pavement and Bridge Targets

Pavement and bridge condition performance is assessed and reported over a four-year performance period. The first performance period began on January 1, 2018, and runs through December 31, 2021. NCDOT reported baseline PM2 performance and targets to FHWA on October 1, 2018, and will report updated performance information at the midpoint and end of the performance period. The second four-year performance period will cover January 1, 2022, to December 31, 2025, with additional performance periods following every four years.

The PM2 rule requires states and MPOs to establish two-year and/or four-year performance targets for each PM2 measure. Current two-year targets represent expected pavement and bridge condition at the end of calendar year 2019, while the current four-year targets represent expected condition at the end of calendar year 2021.

States establish targets as follows:

- Percent of Interstate pavements in good and poor condition – four-year targets;
- Percent of non-Interstate NHS pavements in good and poor condition – two-year and four- year targets; and
- Percent of NHS bridges by deck area in good and poor condition – two-year and four-year targets.

MPOs establish four-year targets for each measure by either agreeing to program projects that will support the statewide targets, or setting quantifiable targets for the metropolitan planning area.

NCDOT established current statewide two-year and four-year PM2 targets on May 16, 2018. The WSUAMPO adopted/approved the statewide PM2 targets on November 15, 2018. Table 29 presents statewide baseline and 2019 performance for each PM2 measure as well as the current two-year and four-year statewide targets established by NCDOT. As shown in Table 28, 2019 performance for each measure is improved over the baseline and all 2-year targets have been met.

Table 29 - Statewide Pavement and Bridge Condition/PM2 Performance and Targets

STATEWIDE PAVEMENT AND BRIDGE CONDITION/PM2 PERFORMANCE AND TARGETS				
Performance Measures	Statewide Performance		2- year Target (2019)	4- year Target (2021)
	2017 Baseline	2019 Actual		
Percent of Interstate pavements in good condition	63.6%	70.3%	Not required	37.0%
Percent of Interstate pavements in poor condition	0.15%	0.1%	Not required	2.2%
Percent of non-Interstate NHS pavements in good condition	36.1%	36.6%	27.0%	21.0%
Percent of non-Interstate NHS pavements in poor condition	1.2%	1.0%	4.2%	4.7%
Percent of NHS bridges (by deck area) in good condition	38.2%	41.0%	33.0%	30.0%
Percent of NHS bridges (by deck area) in poor condition	6.6%	4.2%	8.0%	9.0%

The WSUAMPO 2045 MTP addresses infrastructure preservation and identifies pavement and bridge infrastructure needs within the metropolitan planning area, and allocates funding for targeted infrastructure improvements. MTP financial plan recommended projects list includes ongoing maintenance funding for bridge maintenance, interstate maintenance and general roadway maintenance; this funding is expected to contribute to achieving and maintaining a required percentage of pavement on the region's roadways in good condition.

The WSUAMPO recognizes the importance of linking goals, objectives, and investment priorities to stated performance objectives, and that establishing this link is critical to the achievement of national transportation goals and statewide and regional performance targets. As such, the Making Connections 2045 planning process directly reflects the goals, objectives, performance measures, and targets as they are available and described in other State and public transportation plans and processes; specifically, the Transportation Asset Management Plan (TAMP) and the current 2040 Statewide Long Range Transportation Plan.

- MAP-21 requires States to develop a TAMP for all NHS pavements and bridges within the state. North Carolina's TAMP includes investment strategies leading to a program of projects that would make progress toward achievement of a State's pavement and bridge condition targets.
- The 2040 SL RTP summarizes transportation deficiencies across the state and defines an investment portfolio across all modes, highway preservation, highway safety, and highway operations over the 30-year plan horizon. Investment priorities reflect optimal performance impacts across each investment program given anticipated transportation revenues.

8.4 System Performance, Freight, and Congestion Mitigation & Air Quality Improvement Program (PM3)

Effective May 20, 2017, FHWA established measures to assess performance of the National Highway System¹⁶, freight movement on the Interstate system¹⁷, and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program¹⁸. This third FHWA performance measure rule (PM3) established six performance measures, described below.

National Highway System Performance:

1. Percent of person-miles on the Interstate system that are reliable;
2. Percent of person-miles on the non-Interstate NHS that are reliable;

Freight Movement on the Interstate:

3. Truck Travel Time Reliability Index (TTTR);

Congestion Mitigation and Air Quality Improvement (CMAQ) Program:

4. Annual hours of peak hour excessive delay per capita (PHED);
5. Percent of non-single occupant vehicle travel (Non-SOV); and
6. Cumulative two-year and four-year reduction of on-road mobile source emissions for CMAQ funded projects (CMAQ Emission Reduction).

The CMAQ performance measures apply to states and MPOs with projects financed with CMAQ funds whose boundary contains any part of a nonattainment or maintenance area for ozone, carbon monoxide or particulate matter.

The WSUAMPO meets air quality standards, therefore, the CMAQ measures do not apply and are not reflected in the System Performance Report.

Systems Performance Measures

The two System Performance measures assess the reliability of travel times on the Interstate or non-Interstate NHS system. The performance metric used to calculate reliability is the Level of Travel Time Reliability (LOTTR). LOTTR is defined as the ratio of longer travel times (80th percentile) to a normal travel time (50th percentile) over all applicable roads during four time periods (AM peak, Mid-day, PM peak, and weekends) that cover the hours of 6 AM to 8 PM each day.

The LOTTR ratio is calculated for each segment of applicable roadway, essentially comparing the segment with itself. A segment is deemed to be reliable if its LOTTR is less than 1.5 during all four time periods. If one or more time periods has a LOTTR of 1.5 or above, that segment is unreliable.

The measures are expressed as the percent of person-miles traveled on the Interstate or non- Interstate NHS system that are reliable. Person-miles take into account the number of people traveling in buses, cars, and trucks over these roadway segments. To determine total person miles traveled, the vehicle miles traveled (VMT) on each segment is multiplied by average vehicle occupancy. To calculate the percent of person miles traveled that are reliable, the sum of the number of reliable person miles traveled is divided by the sum of total person miles traveled.

Freight Movement Performance Measure

The Freight Movement performance measure assesses reliability for trucks traveling on the Interstate. A TTTR ratio is generated by dividing the 95th percentile truck travel time by a normal travel time (50th percentile) for each segment of the Interstate system over five time periods throughout weekdays and weekends (AM peak, Mid-day, PM peak, weekend, and overnight) that cover all hours of the day. For each segment, the highest TTTR value among the five time periods is multiplied by the length of the segment. The sum of all length-weighted segments is then divided by the total length of Interstate to generate the TTTR Index.

PM3 Performance Targets

Performance for the PM3 measures is assessed and reported over a four-year performance period. For all PM3 measures, the first performance period began on January 1, 2018, and will end on December 31, 2021. North Carolina reported baseline PM3 performance and targets to FHWA on October 1, 2018, and will report updated performance information at the midpoint (October 1, 2020) and end of the performance period. The second four-year performance period will cover January 1, 2022, to December 31, 2025, with additional performance periods following every four years.

The PM3 rule requires state DOTs and MPOs to establish two-year and/or four-year performance targets for each PM3 measure. The current two-year and four-year targets represent expected performance at the end of calendar years 2019 and 2021, respectively.

States establish targets as follows:

- Percent of person-miles on the Interstate system that are reliable – two-year and four-year targets;
- Percent of person-miles on the non-Interstate NHS that are reliable – four-year targets;
- Truck Travel Time Reliability – two-year and four-year targets;

MPOs establish four-year targets for the System Performance, Freight Movement, and PHED measures, and two-year and four-year targets for the Non-SOV and CMAQ Emission Reduction measures. MPOs establish targets by either agreeing to program projects that will support the statewide targets, or setting quantifiable targets for the MPO's planning area that differ from the state targets.

NCDOT established statewide PM3 targets on May 16, 2018. The WSUAMPO adopted the statewide PM3 targets on November 15, 2018. Table 30 presents statewide baseline and 2019 performance for each PM3 measure as well as the current two-year (2019) and four-year (2021) statewide targets established by NCDOT. As shown in Table 30, all 2-year (2019) targets have been achieved.

Table 30 - System Performance/Freight Movement/CMAQ (PM3) Performance and Targets

SYSTEM PERFORMANCE/FREIGHT MOVEMENT/CMAQ (PM3) PERFORMANCE AND TARGETS				
Performance Measures	Statewide Performance		2- year Target (2019)	4- year Target (2021)
	2017 Baseline	2019 Actual		
Percent of person-miles on the Interstate system that are reliable	88.1%	88.7%	80.0%	75.0%
Percent of person-miles on the non-Interstate NHS that are reliable	88.4%	91.8%	Not Required	70.0%
Truck Travel Time Reliability Index	1.39	1.43	1.65	1.70

The WSUAMPO 2045 MTP addresses reliability, freight movement, and congestion and identifies needs for each of these issues within the metropolitan planning area and allocates funding for targeted improvements. MTP financial plan recommended projects list includes implementation of ITS projects WS-ITS-RdwY-402 (Silas Creek Pkwy), WS-ITS-RdwY-403 (Salem Pkwy), WS-ITS-RdwY-404 (US 52), WS-ITS-RdwY-406 (I-40) and WS-ITS-RdwY-407 (I-74); interstate and other roadway widening, interchange improvements, new roadway alignment and operations improvements projects throughout the region that are expected to reduce future congestion. In particular, I-40 widening from US 421/Salem Parkway Interchange to I-74 Interchange (WS-RdwY-107) is expected to bring significant reduction in congestion on I-40 corridor and reduce vehicle miles traveled and hours of travel in the region as compared with the alternative scenarios tested without I-40 widening for 2045.

The WSUAMPO recognizes the importance of linking goals, objectives, and investment priorities to stated performance objectives, and that establishing this link is critical to the achievement of national transportation goals and statewide and regional performance targets. As such, the Making Connections 2045 planning process directly reflects the goals, objectives, performance measures, and targets as they are available and described in other State and public transportation plans and processes; specifically, the North Carolina Multimodal Statewide Freight Plan and the current 2040 North Carolina Statewide Transportation Plan (SL RTP).

- The North Carolina Multimodal Statewide Freight Plan defines the conditions and performance of the state freight system and identifies the policies and investments that will enhance highway freight mobility well into the future. The Plan identifies freight needs and the criteria used to determine investments in freight, and prioritizes freight investments across modes.
- The SL RTP summarizes transportation deficiencies across the state and defines an investment portfolio across highway and transit capacity, highway preservation, highway safety, and highway operations over the 25-year plan horizon. Investment priorities reflect optimal performance impacts across each investment program given anticipated transportation revenues.

8.5 Transit Asset Management Performance

On July 26, 2016, FTA published the final Transit Asset Management rule. This rule applies to all recipients and subrecipients of Federal transit funding that own, operate, or manage public transportation capital assets. The rule defines the term “state of good repair,” requires that public transportation providers develop and implement transit asset management (TAM) plans, and establishes state of good repair standards and performance measures for four asset categories: transit equipment, rolling stock, transit infrastructure, and facilities. The rule became effective on October 1, 2018. Table 31 below identifies performance measures outlined in the final rule for transit asset management.

Table 31 - FTA TAM Performance Measures

FTA TAM PERFORMANCE MEASURES	
Asset Category	Performance Measure and Asset Class
1 Equipment	Percentage of non-revenue, support-service and maintenance vehicles that have met or exceeded their useful life benchmark
2 Rolling Stock	Percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark
3 Infrastructure	Percentage of track segments with performance restrictions
4 Facilities	Percentage of facilities within an asset class rated below condition 3 on the TERM scale

For equipment and rolling stock asset categories, useful life benchmark (ULB) is defined as the expected lifecycle of a capital asset, or the acceptable period of use in service, for a particular transit provider's operating environment. ULB considers a provider's unique operating environment such as geography and service frequency and is not the same as an asset's useful life.

8.6 Public Transportation Provider Coordination with States and MPOs for TAM Targets

Following are key TAM considerations for NCDOT, MPOs, and transit providers:

- Public transportation providers are required to establish and report transit asset management targets annually for the following fiscal year.
- To the maximum extent practicable, transit providers, states, and MPOs must coordinate with each other in the selection of performance targets.
- Each provider or its sponsors must share its targets, TAM plan, and asset condition information with each MPO in which the provider's projects and services are programmed in the MPO's TIP.
- MPOs are required to establish initial transit asset management targets within 180 days of the date that public transportation providers establish initial targets. However, MPOs are not required to establish transit asset management targets annually each time the transit provider establishes targets. Instead, subsequent MPO targets must be established when the MPO updates the TIP or MTP.
- When establishing transit asset management targets, the MPO can either agree to program projects that will support the provider targets or establish its own regional transit asset management targets for the MPO planning area.
- In cases where two or more providers operate in an MPO planning area and the providers establish different targets for the same measure and asset class, the MPO has the option of coordinating with the providers to establish a single asset class target for the MPO planning area, or establishing a set of targets for the MPO planning area that reflects the differing transit provider targets.
- MPOs and states must reference the transit asset targets in their long-range transportation plans, and describe the anticipated effect of their respective transportation improvement programs toward achieving their targets.

8.7 Tier I and Tier II Providers

The TAM rule defines two tiers of public transportation providers based on size parameters. Tier I providers are those that operate rail service or more than 100 vehicles in all fixed route modes, or more than 100 vehicles in one non-fixed route mode. Tier II providers are those that are a subrecipient of FTA 5311 funds, or an American Indian Tribe, or have 100 or less vehicles across all fixed route modes, or have 100 vehicles or less in one non-fixed route mode. A Tier I provider must establish its own TAM plan and transit asset targets, as well as report performance and other data to FTA. A Tier II provider has the option to establish its own TAM plan and targets, or to participate in a group plan with other Tier II providers whereby the TAM plan and annual targets are

established by a plan sponsor, typically a state DOT, for the entire group. NCDOT adopted a Group TAM Plan on October 17, 2017.

The following Tier I and Tier II public transportation providers operate in the WSUAMPO planning area:

The WSUAMPO planning area is served by Winston-Salem Transit Authority (WSTA), Piedmont Authority for Regional Transportation (PART), and Davidson County Transportation (DC Rides). WSTA and PART are Tier I providers, and as such, develop their own TAM plan. Davidson County Transportation is a Tier II provider and thus is included in NCDOT's Group TAM Plan.

8.8 Transit Asset Targets in the WSUAMPO Planning Area

On October 18, 2018, the WSUAMPO approved supporting WSTA and PART transit asset management targets, thus agreeing to program projects that, once implemented, will make progress toward achieving the transit providers targets.

The WSTA and PART have established the transit asset targets identified in Table 32 and Table 33 in 2018.

The transit asset management targets are based on the condition of existing transit assets and planned investments in equipment, rolling stock, infrastructure, and facilities. The targets reflect the most recent data available on the number, age, and condition of transit assets, and expectations and capital investment plans for improving these assets. The table summarizes both existing conditions for the most recent year available, and the targets for 2020.

Table 32 - FTA TAM Targets WSTA

FTA TAM TARGETS WSTA		
Asset Category Performance Measure	FY 2019 Performance	FY 2020 Target
ROLLING STOCK		
Age - % of revenue vehicles within a particular asset class that have met or exceeded their ULB	42%	41%
EQUIPMENT		
Age - % of non-revenue vehicles within a particular asset class that have met or exceeded their ULB	60%	47%
FACILITIES		
Condition - % of facilities with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale	75%	75%

Table 33 - FTA TAM Targets for PART

FTA TAM TARGETS FOR PART		
Asset Category Performance Measure	Asset Class	FY 2020 Target
ROLLING STOCK		
Age - % of revenue vehicles within a particular asset class that have met or exceeded their ULB	Bus	19%
	Cutaway Bus	0%
	Mini-Van	0%
	Van	27%
EQUIPMENT		
Age - % of non-revenue vehicles within a particular asset class that have met or exceeded their ULB	--	0%
FACILITIES		
Condition - % of facilities with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale	--	0%

Davidson County Transportation is part of the Group TAM Plan developed by NCDOT for Tier II providers in North Carolina. The 2020 targets for the Tier II providers are shown in Table 34.

The statewide group TAM targets are based on the condition of existing transit assets and planned investments in equipment, rolling stock, infrastructure, and facilities over the next year. The targets reflect the most recent data available on the number, age, and condition of transit assets, and expectations and capital investment plans for improving these assets during the next fiscal year, using the asset inventory and investment prioritization process incorporated in the Group TAM Plan.

A performance target of 20 percent was set for all asset categories, meaning that 80 percent of the assets in each category meet or exceed the asset management performance measure. Twenty-percent was selected to account for delays in acquiring the local match, the grant cycle, procurement process, and asset delivery.

As required by FTA, NCDOT will update the Group TAM Plan at least once every four years. NCDOT will update the performance targets for the participating agencies on an annual basis, and will notify the participating transit agencies and the MPOs in which they operate when the targets are updated.

Table 34 - Group TAM Targets for Tier II Providers Participating in NCDOT's Group TAM Plan

GROUP TAM TARGETS FOR TIER II PROVIDERS PARTICIPATING IN NCDOT'S GROUP TAM PLAN			
Asset Category Performance Measure	Asset Class	FY 2020 Target	
ROLLING STOCK			
Age - % of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)	Automobile	8	20%
	Bus	14	20%
	Cutaway Bus	10	20%
	Mini-Bus	10	20%
	Mini-Van	8	20%
	SUV	8	20%
	Van	8	20%
	Other	8	20%
EQUIPMENT			
Age - % of equipment or non-revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)	Non Revenue/Service Automobile	8	20%
	Steel Wheel Vehicles	8	20%
	Trucks and other Rubber Tire Vehicles	8	20%
	Maintenance Equipment	Agency determined	20%
	Computer Software	Agency determined	20%
	Custom 1	Agency determined	20%
FACILITIES			
Condition - % of facilities with a condition rating below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale	Administration	n/a	20%
	Maintenance	n/a	20%
	Parking Structures	n/a	20%
	Passenger Facilities	n/a	20%
	Shelter	n/a	20%
	Storage	n/a	20%
	Custom 1	n/a	20%

Endnotes

- 1 Triad Tomorrow, Piedmont Triad Regional Council, 2017
- 2 US Census Bureau, 2013-2017 & 2011-2015 American Community Survey 5-year estimates
- 3 A selection of historic districts and landmarks obtained from <https://www.ncdcr.gov/about/history/division-historical-resources/nc-state-historic-preservation-office/architectural-0>
- 4 Northern Piedmont Regional Hazard Mitigation Plan 2015. Retrieved from http://www.readyforsyth.org/wp-content/uploads/Northern-Piedmont-Hazard-Mitigation-Plan_General-Plan.pdf
- 5 Northern Piedmont Regional Hazard Mitigation Plan 2015. Retrieved from http://www.readyforsyth.org/wp-content/uploads/Northern-Piedmont-Hazard-Mitigation-Plan_General-Plan.pdf
- 6 John Hopkins Coronavirus Resource Center. Data retrieved August 17, 2020 from <https://coronavirus.jhu.edu/region/us/north-carolina>
- 7 Additional information about PBIN available at <https://connect.ncdot.gov/projects/BikePed/Pages/PBIN.aspx>
- 8 Additional information about ATLAS available at <https://connect.ncdot.gov/resources/Environmental/Project%20ATLAS/Forms/AllItems.aspx>
- 9 Piedmont Area Regional Transit Authority. Regional Travel Demand Model. <https://www.partnc.org/228/Regional-Travel-Demand-Model>
- 10 Karas, D. (2015). Highway to Inequity: The Disparate Impact of the Interstate Highway System on Poor and Minority Communities in American Cities. New Visions for Public Affairs, Vol. 7, April 2015. Retrieved from https://www.nashville.gov/Portals/0/SiteContent/Planning/docs/trans/EveryPlaceCounts/1_Highway%20to%20Inequity.pdf
- 11 FHWA, Environmental Justice. https://www.fhwa.dot.gov/Environment/environmental_justice
- 12 23 CFR 450.314

- 13 23 CFR Part 490, Subpart B
- 14 23 CFR Part 490, Subpart C
- 15 23 CFR Part 490, Subpart D
- 16 23 CFR Part 490, Subpart E
- 17 23 CFR Part 490, Subpart F
- 18 23 CFR Part 490, Subpart G and H

Appendix A:

Transportation Terms and Acronyms

Term/Acronym	Definition
AADT	Annual Average Daily Traffic: total volume of vehicle traffic on a highway or roadway for one year divided by 365 days.
ADA	Americans with Disabilities Act of 1990: a civil rights law that prohibits discrimination against persons with disabilities in all areas of public life, including employment, education, transportation, and all public and private places that are open to the general public.
ARRA	American Recovery and Reinvestment Act: law passed by Congress in response to the Great Recession of 2008. The stimulus package included a series of federal government expenditures aimed at countering the job losses in 2008.
ATLAS	Advancing Transportation through Linkages, Automation, and Screening: an NCDOT tool that is a “one stop shop” for all project-related final deliverables, workflow and GIS-based data needed to assist project managers and technical experts in project delivery.
AV	Autonomous Vehicle: vehicle in which some aspect of the vehicle’s control is automated.
CMP	Congestion Management Process: Congestion management is the application of strategies to improve transportation system performance and reliability by reducing the adverse impacts of congestion on the movement of people and goods. A congestion management process (CMP) is a systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs.
CTC	Coble Transportation Center: PART-owned bus transfer facility and park-and-ride lot in Greensboro.
CTP	CTP stands for a Comprehensive Transportation Plan, which is a long range multimodal plan that identifies transportation improvement need and proposes solutions for the next 25 to 30 years. Unlike a Metropolitan Transportation Plan (MTP), there is no requirement for a CTP to be a fiscally-constrained plan.
DC Rides	Davidson County Transportation provides on-demand public transportation service as well as several deviated-fixed routes in Davidson County.

Term/Acronym	Definition
DOI	Degree of Impact: analysis used to appropriately identify populations and geographical areas where residents have traditionally not been involved in the planning process, or have been negatively impacted by past transportation decisions.
E+C	Existing Roads plus Committed Projects
EJ	Environmental Justice: the fair treatment and meaningful involvement of all people regardless of race, color, national origin, nor income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.
EPRI	Electric Power Research Institute: independent nonprofit organization that conducts research and development related to the generation, delivery, and use of electricity to help address challenges in electricity.
EV	Electric Vehicle: vehicle that runs on an electric motor powered by electric batteries.
FAST Act	Fixing America's Surface Transportation: funding and authorization bill to govern United States federal surface transportation spending.
FHWA	Federal Highway Administration: provides stewardship over the constructions, maintenance, and preservation of the nation's highways, bridges and tunnels.
Fiscally-Constrained	Funding sources are reasonably available over the life of the plan to cover the capital and operating cost of the proposed improvement
FRA	Federal Railroad Administration: an agency under the US Department of Transportation that develops and enforces rail safety regulations, administers railroad assistance programs, conducts research and development in support of improved railroad safety and national rail safety policy.
FTA	Federal Transit Administration: an agency under the US Department of Transportation that provides financial and technical assistance to local public transportation systems.
GSO	Piedmont Triad International Airport: airport west of Greensboro, NC that serves the Piedmont Triad region.
HERE	Real-time cell phone data
HSIP	Highway Safety Improvement Plan: provides funding for eligible improvements that reduce fatalities and serious injuries on public roads.
ICM	Integrated Corridor Management: the management of a corridor as a system, rather than the management of individual transportation networks within a corridor.
ITRE	Institute for Transportation Research and Education: NC State University research center that conducts multi-modal transportation research, trains transportation professional, and provides educational opportunities.
ITS	Intelligent Transportation Systems: innovative technologies related to public transit and traffic management that enables users to be better informed and facilitate safer, more coordinated transportation systems.
K Line	Norfolk Southern railway line from Winston-Salem to Greensboro along US 421 and I-40.
LEP	Limited English Proficiency: a person who is not fluent in the English language.
LRTP (see also MTP)	Long Range Transportation Plan, see MTP or Metropolitan Transportation Plan

Term/Acronym	Definition
MAP-21	Moving Ahead for Progress in the 21st Century: a funding and authorization bill to govern federal surface transportation spending.
MIS	Major Investment Study: a high level study to begin to further refine a major transit project.
MPO	Metropolitan Planning Organization: the policy board of an organization created and designated to carry out the metropolitan transportation planning process.
MTP	Metropolitan Transportation Plan (previously known as Long Range Transportation Plan or LRTP): Each Metropolitan Planning Organization (MPO) must prepare a Metropolitan Transportation Plan (MTP), in accordance with 49 USC 5303(i). This plan identifies how the metropolitan area will manage and operate a multi-modal transportation system (including transit, highway, bicycle, pedestrian, and accessible transportation) to meet the region's economic, transportation, development and sustainability goals – among others. An MTP is required to include at least a 20-year planning horizon and be fiscally constrained.
NCDOT	North Carolina Department of Transportation: agency responsible for building, repairing, and operating highways, bridges, and other modes of transportation in the state of North Carolina.
NCRR	North Carolina Railroad: owner and manager of the 317-mile rail corridor that stretches from Charlotte to the Port Terminal in Morehead City.
NS	Norfolk Southern: a Class I freight railroad in the United States and it the current name of the former Southern Railway.
PART	Piedmont Authority for Regional Transportation: intercity and regional public transportation provider for the Piedmont Triad region.
PBIN	Pedestrian and Bicycle Infrastructure Network: geodatabase that includes data on existing and proposed bicycle and pedestrian facilities throughout North Carolina.
PE	Preliminary Engineering: analysis and design work to produce construction plans, specifications, and cost estimates.
PEV	Plug-In Electric Vehicle: any vehicle that can be recharged from an external source of electricity.
PIP	Public Involvement Plan: provides guidance, techniques and examples for interacting with, informing and involving all members of the public throughout the transportation planning process, design, construction, and implementation.
POP	Program of Projects: list of projects programmed in the MPO's transportation improvement program.
Powell Bill Funds	State of North Carolina funds to build and maintain major city streets
PSA	Pedestrian Safety Audit: safety performance examination of an existing or future road or intersection
PTRM	Piedmont Triad Regional Travel Demand Model: PART-owned model that predicts future travel patterns.
RSA	Roadway Safety Audit: safety performance examination of an existing or future road or intersection.
SAFETY-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
Smith Reynolds Airport (INT)	Smith Reynolds Airport is a general aviation airport located 3 miles (5 km) northeast of Winston-Salem in Forsyth County, North Carolina. The airport has two runways. Passenger service to Smith Reynolds Airport has been discontinued as of 2000.

Term/Acronym	Definition
SPOT, also see STI Prioritization	Strategic Prioritization Office of Transportation (SPOT/ see also STI Prioritization) is a data-driven, transparent method for prioritizing state and federal transportation funding for projects in North Carolina that is used to develop the State Transportation Improvement Program. This prioritization process is typically repeated on a two-year cycle.
STI Prioritization, also see SPOT	Strategic Transportation Investments law (STI) passed in 2013 directs the North Carolina Department of Transportation to allocate transportation funding through a data-driven process. STI Prioritization, also known as SPOT, is a data-driven, transparent method for prioritizing state and federal transportation funding for projects in North Carolina that is used to develop the State Transportation Improvement Program. This prioritization process is typically repeated on a two-year cycle.
STIP	State Transportation Improvement Program: a 10-year state and federal mandated plan that identifies the construction funding for and scheduling of transportation projects throughout the state.
SUP	Shared Use Path, also known as Multi-Use Path: exclusive right-of-way separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users.
TAC	Transportation Advisory Committee: serves as a forum for cooperative transportation planning and decision-making for the MPO.
TAZ	Traffic Analysis Zone: unit of geography used in transportation planning models.
TDM	Transportation Demand Management: set of strategies aimed at maximizing alternative commuting options.
TIP	Transportation Improvement Plan: a federally mandated requirement for MPO's to list all transportation projects within the MPO planning area that seek federal funding within a four-year horizon.
Title VI	Part of the Civil Rights Act of 1964, prohibits discrimination in any program receiving federal assistance
TMA	Transportation Management Area: urbanized area with a population of over 200,000.
TOD	Transit Oriented Development: maximizes the amount of residential, business and leisure space within walking distance to public transportation.
TPM	Transportation Performance Management: a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals.
TTI	Travel Time Index: ratio of the travel time during the peak period to the time required to make the same trip during off-peak periods.
UPWP	Unified Planning Work Program: an annual or biennial statement of work identifying the planning priorities and activities to be carried out within a metropolitan planning area.
USDOT	United States Department of Transportation: responsible for planning and coordinating federal transportation projects.
V/C	Volume-to-Capacity Ratio: measures the level of congestion on a roadway by dividing the volume of traffic by the capacity.
WSTA	Winston-Salem Transit Authority: public transportation provider for Winston-Salem and Forsyth County.
WSUAMPO	Winston-Salem Urban Area Metropolitan Planning Organization: responsible for coordinating transportation planning within the region.

Appendix B:

Public and Stakeholder Outreach Summary

Stakeholder Interviews

Familiarity with the MPO and its MTP process

Interviewees were asked how familiar or involved they are with the WSUAMPO and its MTP process.

- The City-County Planning Board (CCPB) is quite familiar with the MPO and the MTP process, but their involvement is fairly limited. The MPO will brief CCPB on current projects and initiatives. Before the MTP is adopted, the MPO may brief the CCPB on the process and draft recommendations, but they will not be looking for any decisions to come out of it.
- NCDOT Division 9 is very familiar with the MTP process and has many discussions with the staff (not necessarily MTP related).
- The Downtown Winston-Salem Partnership (DWSP) knows about MPOs and knows that there is an MPO in the Winston-Salem area. They are aware of the planning work that the MPO does and they are quite familiar with the MPO and its purposes. DWSP has seen a few things on the MTP process but they have not delved into it.

Concerns about the area's transportation system and perceived deficiencies

Interviewees were asked what concerned them most about the WSUAMPO's existing transportation system and its impact on their organization's ability to fulfill its mission.

- The biggest challenge for the CCPB is the lack of adequate public transportation infrastructure. Current transit is infrequent and irregular to convince residents to use it over a personal vehicle.
- CCPB believe that public transit does not exist far enough from the city center. If transit were to extend to other municipalities, building at a higher density could be further justified.
- DWSP identified MLK Avenue and the pedestrian crossings at Trade Street as the biggest concerns. The City is seeing a development trend to the north of MLK that was not anticipated. Pedestrians are observed walking to and from the traditional downtown boundaries to north of MLK and there is an inability to safely walk across the roads.
- The biggest concerns of the TAC is that there is a shortage of funding to get intersection improvements and bicycle/pedestrian improvements done relatively quickly. There are many other projects that need to be completed, but are often dependent on other projects that need to be completed first. There is also a lack of funding for more rapid construction of projects. The region has experienced many projects being approved and then the project somehow slips and that is another major concern.

Interviewees were asked if the WSUAMPO's transportation system adequately supports travel to destinations in Winston-Salem and Forsyth County. Specific critical issues were noted.

- Major destinations are well-serviced by the existing transportation system, but the headways could be adjusted to offer more frequent service.
- There is a lack of service to second-tier destinations, like Oliver's Crossing, which is projected to experience population and development growth over the years.
- The transportation system adequately supports travel to downtown destinations.

- The City has not done much to support other modes outside of the single vehicle.
- With such an unreliable transit system, residents opt to drive, even though they do not like the cost of parking near their businesses.

Interviewees were asked if their jurisdiction is experiencing any specific transportation problems/challenges or if they are expecting to deal with any in the future. Interviewees noted specific problems and challenges.

- The beltway project has stalled for so many years and now costs more than it was originally projected to.
- One of the biggest challenges is that funding does not keep up with the priorities of region.

Interviewees were asked if there were any transportation needs beyond those included in any previous plans to address future needs.

- Outside of the Downtown Plan, there are no additional transportation needs for Downtown Winston-Salem.
- Last mile connections are needed in major jurisdictions, like High Point and outside of Downtown Winston-Salem. Unfortunately, jurisdictions will not consider last mile options until the current public transit issues are resolved and transit is utilized.
- Interviewees were asked to discuss the Winston-Salem Beltway project.
- The Eastern Beltway project is a top priority for the NCDOT Division 9 and for the region.
- Interviewees were asked about the transportation-related issues in the WSUAMPO that would most significantly impact their organization over the next 25 years.
- In 25 years, we would hope that the City starts to take back some of the space that was dedicated to vehicle space and convert it to private or public use for residents, workers and visitors.
- Investment needed for mass transit has to occur. The region is maxed out on their roads. Widening can continue but it is not going to solve the congestion issues.

Interviewees were asked how changes in the area's transportation system over the last 5-10 years have impacted the region. What has been done to adjust to those changes was noted.

- Three big changes have impacted the region over the years, including:
 - Beltway
 - Improvements to BUS 40
 - Upgrade of 52 to interstate status

Interviewees were asked what should be included and emphasized in the Making Connections 2045 plan to improve the walking and cycling environments for Downtown Winston-Salem residents, employers, employees and visitors.

- The MPO has done a great job at doing everything they can to improve walking and cycling conditions around the Downtown area. There needs to be a change in the mindset of the public, but how would we go about doing that? Unfortunately, the government cannot lead us to more pedestrian and bike lane activity, but they can help us get there.

Interviewees were asked about the lessons learned or aha moments from the I-40 business improvements project.

- NCDOT worked on the project for over a decade before it was actually constructed. The Division worked with a great public involvement consultant. The biggest issue was how to build project as opposed to how they were going to move traffic. What made this project so successful was having one public involvement and outreach consultant on board since the beginning and through final construction. The Division will be looking at the same model for Public Involvement on US 52.
- During the I-40 Business project, DWSP experienced a lot of pain from business owners in downtown Winston-Salem. Business owners and residents had expectations in marketing and advertising, that did not occur. The lesson is, some construction projects have to happen, and these projects will shut down the community temporarily. There is no way to avoid shutting down roadways. Overall, this was a successful effort and the end product is aesthetically pleasing. The cooperation with creative corridors was executed excellently. The process was painful to go through, especially the closure, but in the end, it was a success. The I-40 Business project came at a time of explosive growth around downtown. The project was exacerbated by social media. COVID-19 came a month after the road opened back up after a 14-month closure. Since then there has been a significant drop in business and people dismiss this as a non-issue in the city.

Funding

Interviewees were asked if they see the County becoming more or less involved in greenway or transit improvements in the future and if the County already has a sales tax or vehicle registration fee dedicated to transit.

- Barring any changes to the CCPB, there won't be any changes to any contributions to transportation projects. The Planning Board is more focused on countywide services, like Sheriff's Offices, schools, etc. The Board is less interested in transit and greenways. These areas are viewed as city issues and money is better used elsewhere to keep tax rates lower.

Interviewees were asked if they believe that public-private partnerships (PPP) should be pursued as a means of easing the strain on federal and state budgets for transportation improvements. Interviewers also mentioned the types of projects that would be successful PPP ventures.

- Interviewees opposed to public-private partnerships, but they believe that it's all about the priorities that funding is spent on. Roadway projects receive most of the transportation funds. There needs to be more diversity on what money is spent on. Mass transit, bicycling, pedestrian, and beautification projects should not require a blend of private dollars when roadway projects do not require them.
- Road construction and adding tolls have been successfully PPP projects. Some interviewees were not sure how PPP could be pursued for other transportation improvements. There have been PPPs that have occurred, but the issue arises when parties cannot decide who gets ownership of the facility and when the community asks how a project benefits them.

Increased Economic Growth

Interviewees were asked if there were any activity centers that are positioned for growth and need special attention.

- Looking at the Legacy 2030 maps, there are some areas that are best-positioned to support transit in the future. These areas include:
 - Peters Creek and Stafford Village Blvd: good use for transit, last bus stop on the line serves this area, several new multifamily developments are planned for this area
 - Peters Creek and Oliver's Crossing: along the same corridor as the areas identified above, a lot of commercial and multifamily development is planned for this area
 - Academy Street and Parkway Plaza (on Peters Creek): as downtown Winston-Salem continues to spread, this could be a candidate for redevelopment
 - Hanes Mall Blvd: there are plans to continue to utilize undeveloped land along this corridor
 - Thruway Shopping Center
 - MLK Drive and 5th Street: downtown Winston-Salem is expanding to the east around East End

Interviewers were asked if there were any new industry growth nodes/freight-oriented hubs that the study team should be made aware of.

- There is a concentration of industrial along Highway 311. At Highway 311 and NC 66, it is starting to become industrial and will continue at Union Cross to I-40. There is potential for industrial along Highway 52, especially in Tobaccoville and Rural Hall. More requests for industrial development are anticipated from the southeast part of the county.

Interviewees were asked what the most prominent transportation-related detriments to attracting new businesses and development in the region.

- The biggest problem is the lack of a diverse transportation system to serve the area. Some would say that we need to complete the beltway, but for Downtown Winston-Salem, the eastern half of the beltway needs to be completed. There is a need to get manufacturing to and from some of the major areas. With leadership in pushing funding formulas to road construction, this will show how progressive the city is to newer technologies that are forthcoming. The City needs to prepare for these technologies. We would like to see a study on Autonomous Vehicles subsidized by a city that focuses on minority and low income communities, where they could use snap and benefits.
- The region is attacking transportation deficiencies as they can. It won't be any different in the future with tackling these transportation issues.
 - Existing capacity
 - Improving traffic flow
 - Getting people out of their cars and getting more people into ridesharing options.

Interviewees were asked if they have a sense of customers' chosen modes for reaching businesses and if there are any particular mobility issues for these customers.

- The TAC believes that Winston-Salem has put a tremendous focus on residential. With all of the residential options downtown, there is a walkable demand for small businesses.

Interviewees were asked if more access to non-roadway facilities, like transit service or bicycle and pedestrian amenities, would impact small businesses in the region.

- The TAC does not believe that small businesses are going to be any more successful with new bicycle or pedestrian infrastructure. Mass transit will definitely have an impact, but it will be a challenge to attract suburban residents to use public transit to get to small businesses. These individuals will most likely hop in their cars before using transit to get to downtown.

Electric and Autonomous Vehicles

Interviewers were asked if there are particular corridors/locations that should be prioritized for electric vehicle charging facilities and connected and autonomous vehicles infrastructure.

- The Downtown area where the biggest concentration of workers are located would be a great candidate for this type of infrastructure. Other areas that could benefit from this infrastructure include:
 - Hanes Mall
 - Stratford Road
 - Joel Memorial Coliseum
 - Whitaker Park
 - University Parkway
 - Peters Creek Parkway
- The City Planning staff has done research on these topics as they are in the beginning stages of redoing the comprehensive plan. This will be on the short list of policies to include.
- NCDOT continues to hear more and more about this. These technologies are moving much quicker than we had anticipated. Within 5 years, it will no longer be economically beneficial to purchase internal combustion vehicles. Even with more electric and autonomous vehicles, we will still need highways, as traffic volumes will likely increase. The biggest issue with electric vehicles is the fact that our primary source of revenue is derived from the federal and state gas tax. We will need to actively look for alternative funds for transportation that do not rely on gas tax. I-40 and US 52 need to focus on what technology needs to be built into those projects to help facilitate the deployment of more electric and autonomous vehicles in the future. Ridesharing will be impacted as well, as they will rely heavily on autonomous vehicles.
- The corridors where this infrastructure will be put in place need to be warehousing spots for cars that are separate from commerce. The preferred location would be along the peripheral edge of downtown. This spaces need to be retrofitted for large capacities.
- The TAC knows that these technologies are coming but they cannot envision AV technology being beneficial for short trips, like running errands. For AV to be worthwhile, they must be used for longer commutes. There is in fact a huge future for electric vehicles. If there were more charging stations around the country, there may be a substantial increase in use. This is the big investment that we should be making.

Program and Policy Improvements

Interviewers were asked if there were any program or policy improvements that are needed to support the quality of life of Winston-Salem and Forsyth County residents.

- There are no policy changes needed at the moment, but several program improvements could be implemented. Areas of improvement could be in the existing transit and bicycle/pedestrian programs. The City and County have the building blocks in place to expand, but the lack of funding gets in the way of potential expansions.

NCDOT Division 9 Questions

The NCDOT Division 9 Engineer was asked if and how the new Complete Streets Policy is going to change projects going into SPOT.

At this time, NCDOT is unsure how the new Complete Streets Policy will change projects going into SPOT. Moving forward, all new projects need to have Complete Streets features included, if requested by the MPOs. Projects that have already been submitted, will not be impacted, but additional costs could impact the scoring of the projects, which would impact whether they are included in the final document.

The NCDOT Division 9 Engineer was asked how they expect the NCDOT budget shortfalls to delay projects being proposed in the Making Connections 2045 Plan.

- There will likely be some delays with the significant revenue reduction, prior to the pandemic with the MAP Act. The pandemic has resulted in some \$300 million shortfalls. NCDOT plans to meet with the MPOs to update them on the anticipated budget constraints.

The NCDOT Division 9 Engineer was asked what some of deficiencies are relative to other divisions.

- Division 9 and Forsyth County have had to overcome the fact that many of the major freeways were all constructed at the same time in the 1940s and 1950s. The problem is that all of these major freeways will need to be repaired and replaced around the same time. The transportation network is pretty good in Forsyth County and the City of Winston-Salem, this is evident in the BUS 40 project. Some of the older freeways like NC-52 and BUS 40 will be more expensive to repair. I-85 in Davidson and Rowan Counties, the widening has taken up a significant amount of funding from the Division. STI was a significant boost to Forsyth County.

The NCDOT Division 9 Engineer was asked about the Division's challenges and assets relative to other divisions.

- One of the Division's assets is a very good street network, especially in Forsyth County. Some major drawbacks that the Division is trying to work toward:
 - Completion of Northern Beltway – the Division is trying to get the remainder of Eastern Beltway completely funded and under construction.
 - Western Beltway – this is a major priority for the Division, but the challenge is keeping funding in place to keep the project on pace.
 - US 52 needs to be upgraded to interstate highway standards. Yes there are several challenges, but the experience gained through the BUS 40 project, the Division has a roadmap on a way to move

forward. US 52 will need to be done in phases. Feedback from the BUS 40 project has been an overwhelming success. The only negative was that people complained that there weren't additions to capacity as far as through lanes.

Additional Goals for the MTP

Interviewees were asked if they had to develop one goal for the Making Connections 2045 plan that would best address the mission of their organization.

- Provide a variety of efficient and easy transportation options for all county residents. More transit riders of necessity rather than choice. Looking at peer communities, the CCPB hopes to have more choice riders in the future. Most county residents have at least one car to use to get around the area.
- The one goal would be to promote downtown and generally advocate for a moving list of things that are constantly changing in the City. Promotions of downtown would include marketing. DWSP currently lends a hand in bond elections and zoning, but would like to continue to partner with the City in advocating to improve the downtown area to prosper.
- The TAC believes that it all comes back to more funding. Projects cannot happen without more funding that is reliable.

Future Involvement in the MTP process

Interviewees were asked how they would like to be further engaged in WSUAMPO's transportation planning process.

- CCPB would like to continue to receive emails and will continue to participate online when they can. The Planning Board is usually aware of MPO events, but to date, no one on the planning board has participated.
- DWSP is not as engaged but would love to be engaged from here on. If there are any ways that they can be engaged, please reach out. They would like to participate in any future meetings and receive emails. Interested in participating in the virtual public meeting on July 23, 2020. If they receive a copy of the flyer, they will include an advertisement in their newsletter, on their website and on their social media platforms.

Public Survey Responses

Three WSUAMPO Making Connections 2045 surveys were administered during the plan update process.

Survey Round 1

The first survey was administered as an online survey hosted on the MetroQuest platform. Survey respondents were able to respond through the web or on a mobile device. The survey recorded 419 unique survey responses. 734 visitors were recorded to the survey site, but not every visitor filled out a survey (Figure 1). Representatives from a variety of municipalities took the survey, with the majority of respondents being residents of Winston-Salem and Kernersville (Figure 2).

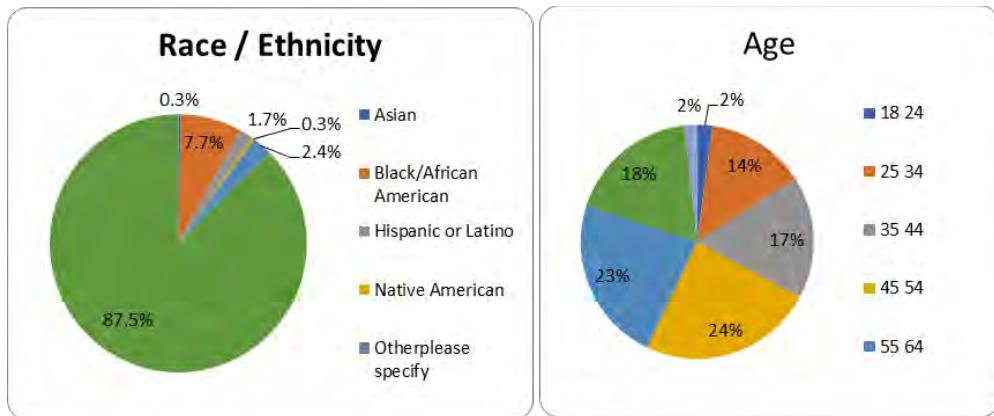


Figure 1 - Survey Round 1 Participants Demographics

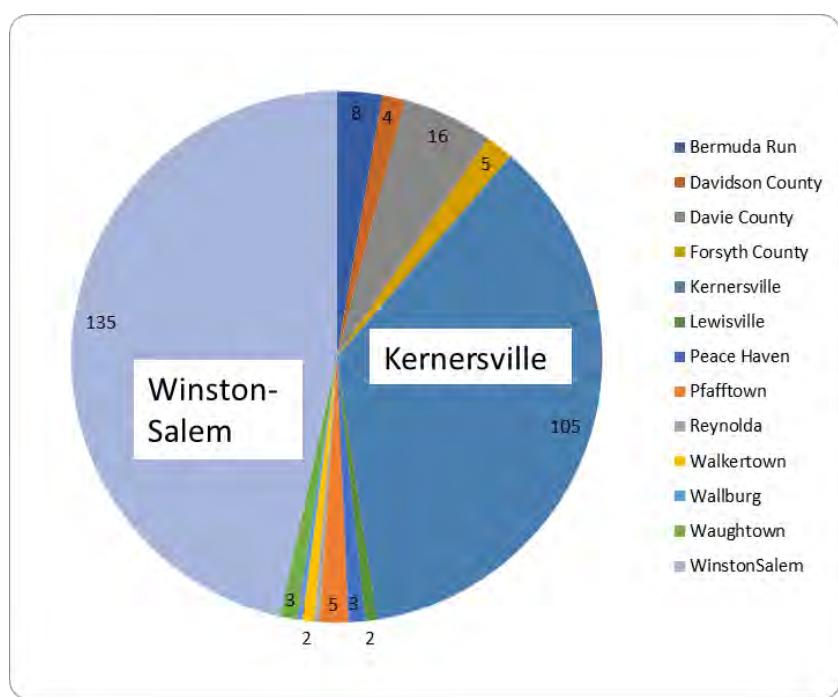


Figure 2 -Survey Round 1 Participants Home Community

The WSUAMPO MTP 2045 survey was posted on the wsmtputupdate.com website, Winston-Salem social media and shared by Steering Committee members.

When asked about what types of projects they would consider to be a priority for the MTP plan update, respondents indicated that the following categories were in the top five:

- Safe and Complete Streets
- Roadway Improvements
- Bicycle and Pedestrian improvements
- Supporting economic development
- Public or private transit services

Figure 3 below further illustrates the highest priorities selected by survey participants.

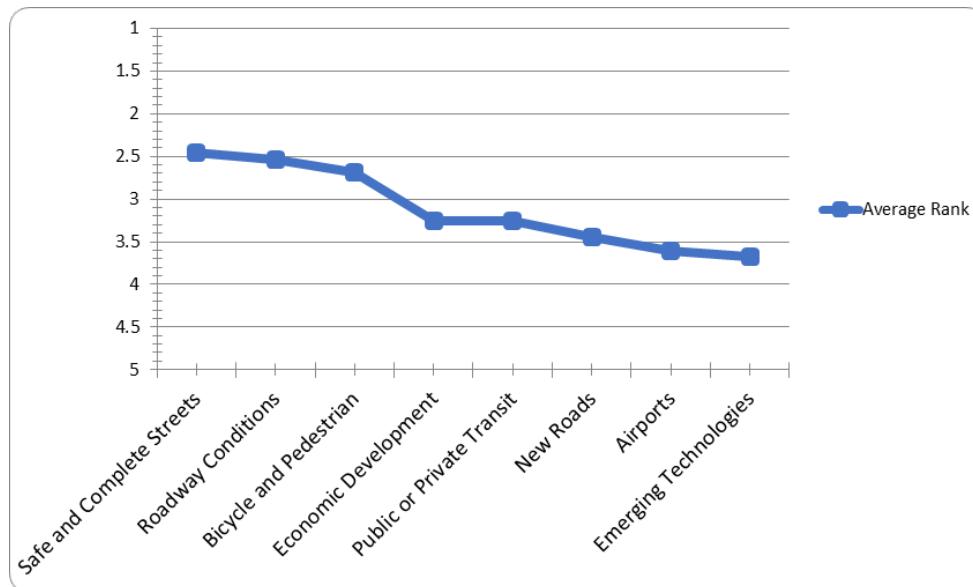


Figure 3 - Survey Round 1 Priorities for Project Selection

When participants were asked about priorities in a slightly different way-how they would allocate a share of transportation budget between different types of projects, Maintenance and Repair came in first place, followed by bicycle and pedestrian projects and safety in third place. See Figure 4 below.

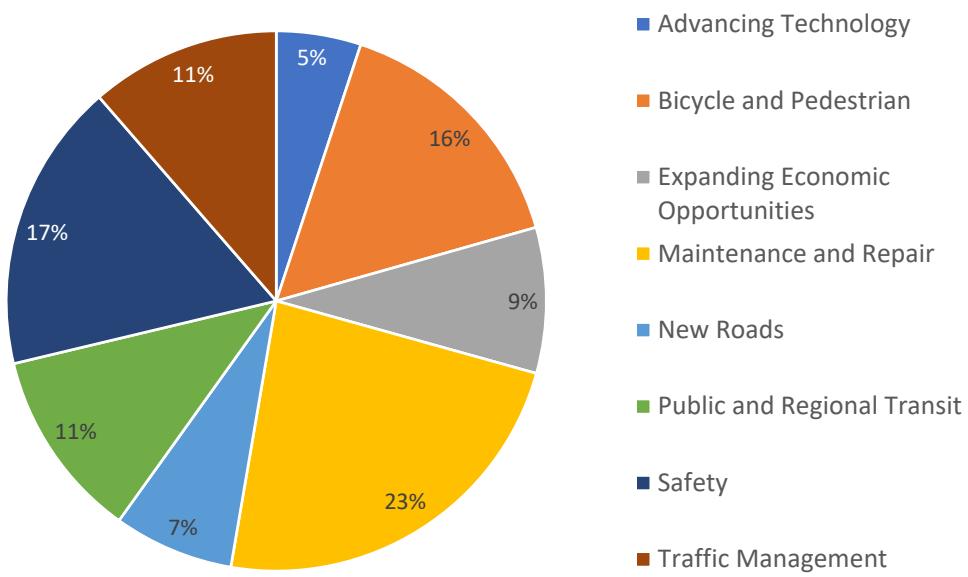


Figure 4 - Survey Round 1- Budget Allocation by Project Type Preference

Survey Round 2

The second round of public involvement via survey response was held from July 23 through August 9, 2020. During this period, a total of nine responses were received. Survey participants were asked to complete a total of four questions designed to gauge support for a project scenario list in addition to understanding the level of support for each recommendation type.

Based on feedback during this time period, survey participants preferred Roadway Improvements Scenario 2 – with a focus on operations and safety, or a hybrid scenario which would include some widening and capacity projects (similar to Scenario 1) in addition to operations and safety improvements (similar to Scenario 2) (Figure 5). One comment received expressed a concern with the capacity scenario due to possible induced demand and requested a modernization of Meadowlark Drive from Country Club Rd to Robinhood Rd with bicycle and pedestrian facilities. Another suggested the use of roundabouts as part of roadway modernization to keep traffic flowing at regularly congested intersections.

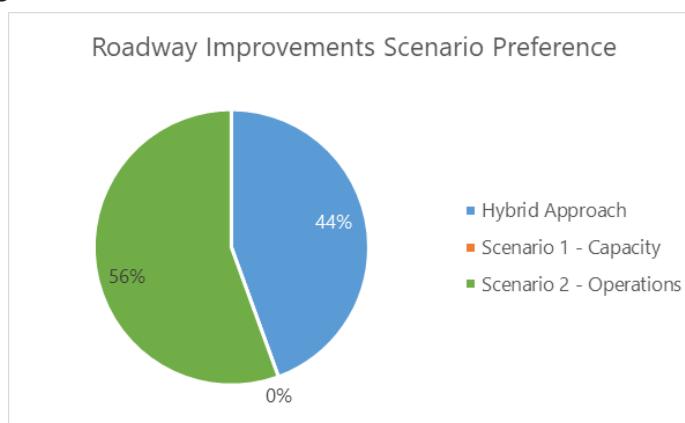


Figure 5 - Survey Round 2 Roadway Improvements Scenario Preference

Transit recommendations received modest support with 22% of respondents supporting the current draft of recommendations (Figure 6). Nearly half (44%) were neither in support of nor opposed to the draft transit recommendations, while a third were generally opposed current recommendations and were in favor of allocating more funding for public transit. A comment was made that more transit connections were needed and to increase frequencies, especially in areas of high social need.

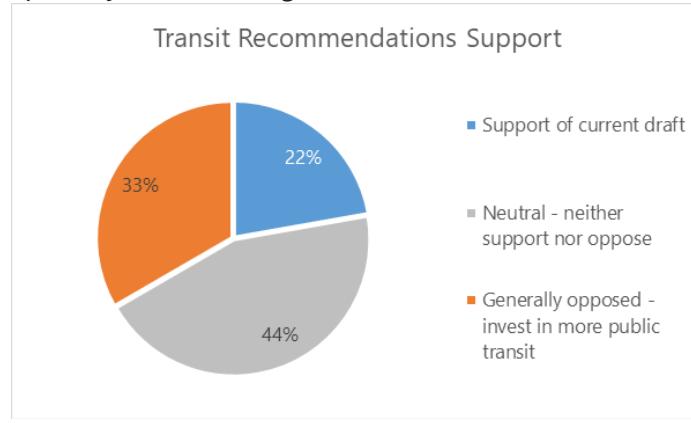


Figure 6 - Survey Round 2 Transit Improvements Response

In response to draft bicycle and pedestrian recommendations, 78 percent of respondents had concerns with the recommendation list and wanted to see more investment in bicycle and pedestrian facilities (Figure 7). This sentiment was echoed in open-ended comments in which a respondent noted many sidewalks ended abruptly, with a special need for pedestrian facilities along Reynolds Road. An additional concern area identified was the intersection of Hawthorne Road and Elizabeth Avenue due to pedestrian demand and safety.

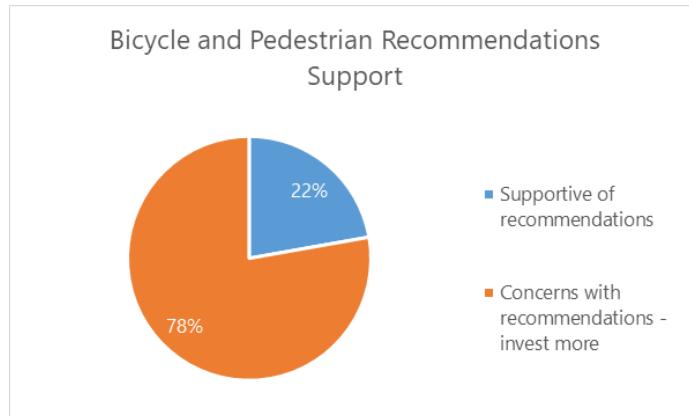


Figure 7 - Survey Round 2 Bicycle and Pedestrian Improvements Feedback

The draft recommendations for freight, rail, aviation, and innovative technologies received mixed feedback (Figure 8). A third of respondents were generally supportive of the draft recommendations and just 11% neither supported nor opposed the recommendations. However, over half had some concerns with the draft recommendations. Around 11% of respondents would like to see more investment in aviation while 22% would like to see a greater investment in both rail and innovative technologies.



Figure 8 - Survey Round 2 Other Modules and Innovative Technologies Feedback

Additional public comments recorded in Round 2 were as follows:

- The need for better connectivity between the Smith Reynolds International Airport, downtown Winston-Salem, Winston-Salem State University, and Whitaker Park
- Concern with current NCDOT pause on projects—the region needs to prioritize restarting those projects over the addition of new projects
- Concern for repairing and upkeeping existing infrastructure

- Opposition to Northern Beltway western section

Overall, the response to the draft recommendations for transit, bicycle and pedestrian, and freight, rail, aviation, and innovative technologies was mixed. Survey respondents largely wanted to see a greater investment in public transit, bicycle and pedestrian projects, and other modes. In regard to roadway scenarios, respondents were mostly in favor of the operations scenario (Scenario 2) or a hybrid approach.

Survey Round 3

The third round of public involvement via survey response was held from August 18 through September 16, 2020. During this period, a total of 24 responses were received. Survey respondents were asked to complete a total of four questions designed to gauge support for the draft recommendations for roadway, transit, bicycle/pedestrian and electric vehicles.

Based on feedback received during this time period, about 2/3 of survey participants were at least somewhat in support of the draft roadway recommendations (Figure 9 Below).

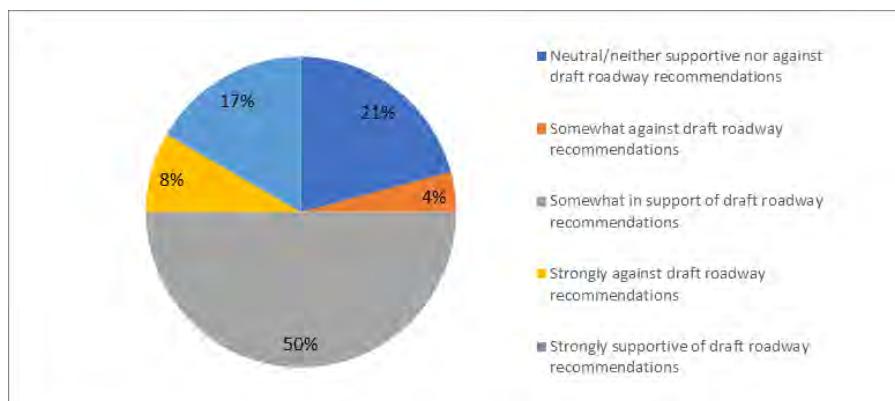


Figure 9 - Survey Round 3 Opinion on Draft Roadway Recommendations

Survey participants were asked about their overall opinion of the transit project recommendations. Nearly 60% of survey respondents are somewhat supportive or strongly supportive of the draft transit recommendations. Nearly 20% of respondents were against the transit recommendations and about a quarter of the respondents were neither supportive of or against the recommendations. See Figure 10 below.

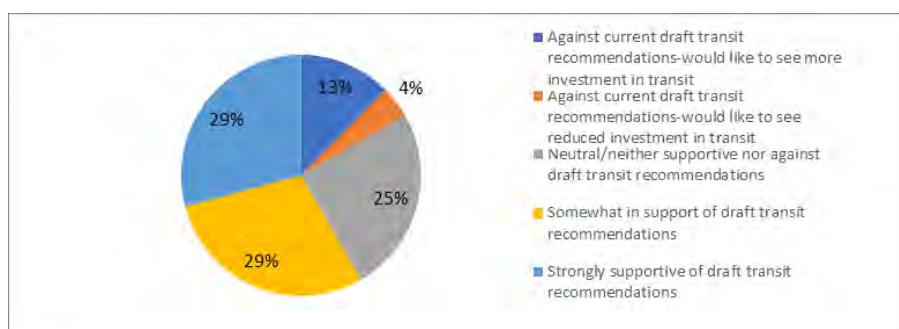


Figure 10 - Survey Round 3 Opinion on Draft Transit Recommendations

Some survey participants are strongly in support of a station in Winston-Salem that is along the proposed high speed rail alignment. Although there are recommendations for streetcar, several respondents expressed disapproval of streetcar. Comments were made that there is a need for improved frequencies on WSTA routes, to attract more choice riders.

When participants were asked about their overall opinion of the bicycle, pedestrian, and greenway recommendations. 75% of the participants are somewhat in support or strongly in support of the draft recommendations. Over 20% of respondents were against the proposed bicycle and pedestrian recommendations. See Figure 11 below.

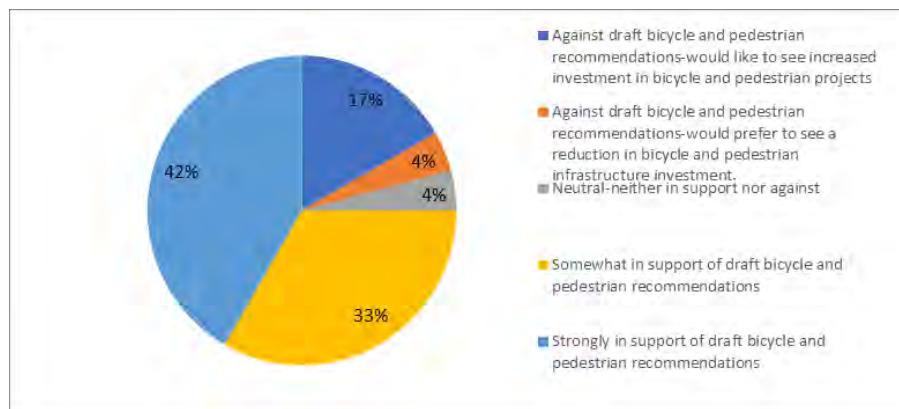


Figure 11 - Survey Round 3 Opinion on Draft Bicycle, Pedestrian, Greenway Recommendations

In thinking about specific locations for EV charging stations, survey respondents would like to see EV charging stations at the following locations:

- Shopping Malls/Shopping Centers
- Grocery Stores
- Downtown Winston-Salem
- Employment Centers
- Colleges/Universities
- Parking Garages
- Greenways
- Residential Neighborhoods/Apartment Complexes
- Gas Stations
- Sports/Recreation/Entertainment Centers
- Airport

These locations seem to coincide with proposed locations included in the draft plan.

Additional public comments recorded in Round 3 are shown in the word cloud below. A larger text size indicates higher frequency of comments received for this particular topic.



Figure 12 - Additional Comments Received

Survey participants would like to see more focus on walking and biking and more electric vehicle charging stations throughout the region. There were several comments on investments in alternative modes of transportation to close the socioeconomic gaps in communities.

Overall, the response to the draft recommendations for roadway, transit, and bicycle, pedestrian and greenway was generally supportive. Survey respondents want to see more pedestrian infrastructure incorporated in roadway projects, increased frequencies on WSTA routes to attract more choice riders, and more bicycle infrastructure to encourage more bicycle usage and a safer experience for bicyclists.

The third survey is expected to be posted between August 17 and September 12, 2020.

Public Input Meetings

Three rounds of public input meetings were held throughout the Making Connections 2045 Plan update process.

Round 1: May 2019 Meetings

Five virtual (zoom webinar) public meetings were held between May 5 and May 20, 2020. Those virtual public meetings were held at different times-typically either mid-morning or in the early evening.

Approximately 60 people participated in the virtual public meeting sessions. The study team provided an overview of the study process, existing conditions and encouraged participants to fill out the online survey. A link to the online survey was provided to the participants and posted to the project website. They were able to ask questions during the live Q&A sessions. A recording of one of the presentations was posted afterwards on the study website.

Round 2: July 23-August 9 Virtual Public Meeting

Four simultaneous virtual (zoom webinar) break-out sessions were held during the second round of public meetings. In addition, a virtual meeting room or lobby (see Figure 13 below) was set up with links to handouts, break-out sessions and a survey. Approximately 26 people participated in the virtual break-out sessions on July 23; over 550 people visited the virtual meeting room between July 23 and August 9th.

Roadway Congestion and Draft Recommendations Webinar



Figure 13 - Virtual Public Meeting Lobby Set up with Posters and Links to Break-out sessions for Round 2

Thirteen unique participants joined the webinar on roadway congestion and draft recommendations. The following questions/comments were brought up during the Q&A portion of the webinar:

- Is the MTP a financially constrained plan?
- Will each breakout sessions' recording be available online afterwards?
- Where can we see the CTP?
- The Reynolda Connector goes through the Children's Home property but appears to be blocked by the new middle school. How would that get built?
- I'm not sure if this was asked or answered- but the bridge that goes over US-421 (Jonestown Rd)- what thoughts are being considered to widen that bridge because every time I am on that bridge, I always feel like I could be side-swiped.
- Are feasibility studies and estimates being done for each project on the MTP?
- Have the construction sequencing for the Northern Beltway Western section been finished
- I think the Northern Beltway Western Section from US 158 to Interstate 40 is a very good project and would, help Lewisville Clemmons Road congestion.

Transit Draft Recommendations Webinar

Twelve unique participants joined the webinar on transit recommendations. The following questions/comments were brought up during the Q&A portion of the webinar:

- There is no 30 minute headway now. Have you seen this <https://www.blindspot.city/2020/06/wsta-prominent-transit-corridors-report.html>?
- Concern: I have a concern with the transit recommendations not servicing areas of higher EJ needs.
- Yes, east Winston and the W-S State University area to Reynolds Park should be considered. Thanks!
- That StreetLight data that you had, is that like (inclusive of), all people moving?

Bicycle/Pedestrian Draft Recommendations Webinar

This webinar was joined by 13 unique participants. The following questions/comments were brought up during the Q&A portion of the webinar:

- For the sidepath along Stratford Road...would that leverage the railroad track area or the other side of the

street?

- In addition to safety, what factors drive which recommendations are made and prioritized?
- How long will the second survey be open for submission?
- You've mentioned that this plan overlaps with other existing plans (like W-S's Bicycle Master Plan). Can you speak to how these will actually be used together to implement projects?
- Is there a "bicycle blvd" part of the recommended projects? If so, where?

Freight, Rail, Aviation, and Innovative Technologies

Five unique participants joined the webinar on Freight, Rail, Aviation and Innovative Technologies draft recommendations. The following questions/comments were brought up during the Q&A portion of the webinar:

- With Electric Vehicle charging locations- those mapped are said to be priority locations. How would we be able to offer up new locations that are not listed on the map? Can those locations change to better suit both populations that already have those types are cars and those that will possibly have them in the future?
- I'm on my office computer so no video or mic, but I can potentially gather other locations and submit them via email?

Round 3: August 19-September 16

Five virtual (zoom webinar) public meetings were held during the third round of public meetings between August 25 and September 3, 2020. Three virtual public meetings focused on roadway improvements, one virtual public meeting focused on bicycle and pedestrian improvements, and one virtual public meeting focused on transit improvements. Virtual public meetings were held at different times-either mid-morning or early evening. A virtual public meeting room or lobby, similar to what was created for round 2, was set up with links to handouts, break-out sessions and a survey. Approximately 19 people participated in the virtual break-out sessions. 129 people visited the virtual meeting room between August 19, 2020 and September 16, 2020.

Round 3: August 25-September 3 Virtual Public Meeting

Roadway Improvements Webinars

Three virtual (zoom webinar) break-out sessions focusing on roadway improvements were held during the third round of public meetings. Three people participated in the session held on August 25, 2020 at 10:00AM, one person participated in the session held on August 27, 2020 at 5:30PM, and four people participated in the session held on September 1, 2020 at 10:00AM. During the August 25th webinar, the following comment was brought up during the live Q&A portion of the webinar:



Figure 14 - Virtual Public Meeting Lobby Set up with Posters and Links to Break-out Sessions for Round 3

- Thanks. I need to study everything before I may have questions.

No additional questions or comments were brought up during the Q&A portion of the other two roadway improvements webinar.

Bicycle and Pedestrian Improvements Webinar

Seven participants joined the webinar on bicycle and pedestrian improvements. The following questions/comments were brought up during the live Q&A portion of the webinar:

- How did cycletrack costs go from \$1million/mile in last year's bike plan to \$12 million in this plan and how much bigger could the network be at last year's estimated costs?

The question was answered live during the webinar.

Transit Improvements Webinar

Four participants joined the webinar on transit improvements. The following questions/comments were brought up during the live Q&A portion of the webinar:

- Route 28 of PART was cut due to funding issues. Ridership was also low, roughly 20 passengers a day. What are ways to address low ridership in suburban municipalities?

The question was answered live during the webinar. It was indicated that the MTP cost estimation approach used STI Prioritization Bicycle and Pedestrian Cost Estimation tool, which generally assumes some changes to curb lines and ROW impacts. The City's Bicycle Plan assumed that no curb lines would be moved and no ROW impacts would be needed. The costs for cycle track projects in downtown Winston-Salem were further evaluated and updated for the final version of the plan.

Public Comment Period for the Draft Plan, August 17 – September 16, 2020

Online Survey Responses

Draft WSUAMPO MTP plan was posted for public comment from August 17-September 16, 2020 on the website, wsmtputupdate.com; notice was also posted to the WSUAMPO website. Interested stakeholders and members of the public could submit comments via email in addition to filling out a survey or participating in a break-out webinar session. Several stakeholder agency comments were received via email. No public comments were submitted via email. Additionally, members of the public had an opportunity to call in during the TCC and TAC meetings on Thursday, September 17th to make a comment prior to MTP plan adoption. No members of the public called in to make a comment during the TCC meeting or during the public hearing at the TAC meeting.

Appendix C:

Financial Plan

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
2025 PROJECTS																						
WS-Rdwy-015	SR 1308 (Lewisville-Vienna Rd)	U-6154	Intersection Improvements	\$1.270	2021	\$1.295	--	\$1.295	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.295	\$-					
WS-Rdwy-016	SR 1725 (University Parkway)	U-6155	Roadway Modernization	\$4.500	2021	\$4.590	--	\$4.590	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.590	\$-					
WS-Rdwy-018	I-40 / US 311	I-5880	Access Management	\$4.500	2024	\$4.871	\$4.871	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.871	\$-					
WS-Rdwy-021	Salem Pkwy	U-5760	Interchange Improvements	\$21.528	2024	\$23.302	--	\$23.302	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$23.302	\$-					
WS-Rdwy-026	Salem Parkway	R-2247CD	Interchange Improvements	\$21.500	2020	\$21.500	\$21.500	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$21.500	\$-					
WS-Rdwy-061	I-40	I-0911A	Roadway Widening	\$29.366	2020	\$29.366	\$29.366	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$29.366	\$-					
WS-Rdwy-062	I-40	I-5766	Pavement Rehabilitation	\$12.137	2020	\$12.137	\$12.137	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$12.137	\$-					
WS-Rdwy-063	I-40	I-5795	Pavement Rehabilitation	\$88.660	2021	\$90.434	\$90.434	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$90.434	\$-					
WS-Rdwy-064	I-40	I-5952	Pavement Rehabilitation	\$38.683	2021	\$39.457	\$39.457	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$39.457	\$-					
WS-Rdwy-068	I-40	I-6003	Pavement Rehabilitation	\$30.895	2023	\$32.786	\$32.786	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.786	\$-					
WS-Rdwy-076	US 158	R-2577A	Widen to Multilanes	\$65.663	2025	\$72.497	--	\$72.497	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$72.497	\$-					
WS-Rdwy-078	Future I-74	U-2579AA	New Location	\$12.757	2023	\$13.537	\$13.537	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$13.537	\$-					
WS-Rdwy-079	Future I-74	U-2579AB	New Location	\$47.947	2023	\$50.882	\$50.882	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$50.882	\$-					
WS-Rdwy-080	Future I-74	U-2579B	New Location	\$42.815	2023	\$45.436	\$45.436	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$45.436	\$-					
WS-Rdwy-081	Future I-74	U-2579C	New Location	\$20.674	2021	\$21.088	\$21.088	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$21.088	\$-					
WS-Rdwy-086	SR 1672 (Hanes Mill Rd)	U-2729	Roadway Widening	\$5.293	2023	\$5.617	--	\$5.617	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.617	\$-					
WS-Rdwy-087	US 158 / US 421 / NC 150 / Business 40	U-2827B	Pavement Rehabilitation	\$7.789	2020	\$7.789	--	\$7.789	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$7.789	\$-					
WS-Rdwy-088	New Route	U-2925	New Location	\$20.741	2020	\$20.741	--	\$20.741	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$20.741	\$-					
WS-Rdwy-089	New Route	U-4734	New Location	\$17.303	2025	\$19.104	--	\$19.104	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$19.104	\$-					
WS-Rdwy-090	New Route	U-5536	New Location	\$10.084	2024	\$10.915	--	\$10.915	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$10.915	\$-					
WS-Rdwy-091	N Martin Luther King Jr Dr	U-5539A	Roadway Modernization	\$6.555	2022	\$6.820	--	\$6.820	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.820	\$-					
WS-Rdwy-092	SR 1173 (Williams Rd)	U-5617	Roadway Widening	\$3.529	2020	\$3.529	--	\$3.529	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3.529	\$-					
WS-Rdwy-093	Kernersville Southern Loop (Phase I)	U-5760	Roadway Widening	\$25.837	2024	\$27.966	--	\$27.966	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$27.966	\$-					
WS-Rdwy-094	SR 1508 (Hickory Tree Rd)	U-5786	Roadway Widening	\$36.675	2024	\$39.699	--	\$39.699	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$39.699	\$-					

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local	
2025 PROJECTS CONT...																							
WS-Rdwy-095	NC 66 (Old Hollow Rd)	U-5824	Roadway Widening	\$20.291	2024	\$21.964	--	\$21.964	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$21.964	\$-					
WS-Rdwy-096	New Route	U-5899	New Location	\$5.042	2025	\$5.567	--	\$5.567	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.567	\$-					
WS-Rdwy-097	New Route	U-6003	New Location	\$10.772	2022	\$11.207	--	\$11.207	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.207	\$-					
WS-Rdwy-098	SR 1103 (Lewisville-Clemmons Rd)	U-6004	Access Management	\$9.217	2025	\$10.176	--	\$10.176	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$10.176	\$-					
WS-Rdwy-099	NC 65 (Bethania-Rural Hall Rd)	U-6005	Roadway Widening	\$14.746	2023	\$15.648	--	\$15.648	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$15.648	\$-					
WS-Rdwy-101	New Route	U-6187	New Location	\$8.136	2025	\$8.983	--	\$8.983	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$8.983	\$-					
WS-Rdwy-105	New Route	U-6231	New Location	\$3.896	2021	\$3.974	--	\$3.974	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3.974	\$-					
WS-Rdwy-106	S Main St/Old Winston Rd	W-5510	Roadway Modernization	\$6.036	2020	\$6.036	--	\$6.036	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.036	\$-					
EB-5722	Silas Creek Pkwy	EB-5722	Pedestrian Improvements	\$1.488	2021	\$1.518	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.987	\$-	\$-	\$-	\$0.987		\$0.531	
EB-5959	Idols Rd	EB-5959	Pedestrian Improvements	\$0.897	2021	\$0.915	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.714	\$-	\$-	\$-	\$0.714		\$0.201	
EB-5958	Blue Heron Trail	EB-5958	Greenway	\$2.089	2020	\$2.089	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.671	\$-	\$-	\$-	\$1.671		\$0.418	
EB-6040	Harper Rd	EB-6040	Pedestrian Improvements	\$0.664	2021	\$0.677	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.562	\$-	\$-	\$-	\$0.562		\$0.115	
EB-5960	Harper Rd	EB-5960	Pedestrian Improvements	\$1.126	2021	\$1.149	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.919	\$-	\$-	\$-	\$0.919		\$0.230	
EB-5920	Jonestown Rd	EB-5920	Pedestrian Improvements	\$0.500	2024	\$0.541	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.433	\$-	\$-	\$-	\$0.433		\$0.108	
EB-5954	Griffith Rd	EB-5954	Pedestrian Improvements	\$1.662	2021	\$1.695	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.356	\$-	\$-	\$-	\$1.356		\$0.339	
EB-5812	Salem Creek Greenway	EB-5812	Greenway	\$1.650	2022	\$1.717	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.373	\$-	\$-	\$-	\$1.373		\$0.343	
EB-6008	US 421	EB-6008	Sidepath	\$2.704	2022	\$2.813	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.251	\$-	\$-	\$-	\$2.251		\$0.563	
EB-5840	US 421	EB-5840	Sidepath	\$1.621	2020	\$1.621	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.297	\$-	\$-	\$-	\$1.297		\$0.324	
EB-4020C	Brushy Fork Greenway	EB-4020C	Greenway	\$1.250	2020	\$1.250	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.000	\$-	\$-	\$-	\$1.000		\$0.250	
EB-5810	Barbara Jane Ave	EB-5810	Pedestrian Improvements	\$0.226	2020	\$0.226	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.181	\$-	\$-	\$-	\$0.181		\$0.045	
EB-5955	Robinhood Rd	EB-5955	Pedestrian Improvements	\$0.536	2021	\$0.547	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.437	\$-	\$-	\$-	\$0.437		\$0.109	
EB-5952	Fairlawn Dr	EB-5952	Pedestrian Improvements	\$0.989	2021	\$1.009	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.807	\$-	\$-	\$-	\$0.807		\$0.202	
EB-5953	University Pkwy	EB-5953	Pedestrian Improvements	\$0.635	2021	\$0.648	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.518	\$-	\$-	\$-	\$0.518		\$0.130	
EB-5956	Sullivantown Rd	EB-5956	Complete Streets	\$0.560	2020	\$0.560	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.448	\$-	\$-	\$-	\$0.448		\$0.112	
EB-5957	Old Winston Rd	EB-5957	Pedestrian Improvements	\$0.268	2021	\$0.273	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.219	\$-	\$-	\$-	\$0.219		\$0.055	
TP-5105	Regional	TP-5101	Transit Planning Assistance-5303	\$0.618	2025	\$0.682	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.550	\$-	\$0.682				\$0.132	

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
2025 PROJECTS CONT...																						
TG-6809	Davidson County	TG-6809	Davidson County Transportation. Routine Capital-Passenger shelters, passenger amenities, shop equipment, spare parts, capital cost of contracting, etc.	\$0.204	2021	\$0.208	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.167	\$-	\$0.208				\$0.042
TG-6808B	Davidson County	TG-6808B	Davidson County Transportation. Transit Capital Preventative Maintenance.	\$0.408	2021	\$0.417	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.333	\$-	\$0.417				\$0.083
TO-6165	Davidson County	TO-6165	Davidson County Transportation. Transit Operating Assistance.	\$0.490	2025	\$0.541	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.361	\$-	\$0.541				\$0.180
TA-6722	PART	TA-6722	Purchase vehicles for vanpool fleet expansion	\$0.100	2021	\$0.102	\$-	\$0.092	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.092	\$0.010					\$0.010
TG-6783	PART	TG-6783	PART Routine Capital, Passenger Shelters, Passenger Amenities, Shop Equipment, Spare Parts	\$0.948	2024	\$1.026	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.822	\$-	\$1.026				\$0.205
TS-5115	PART	TS-5115	PART Safety and Security-Min. 1% Set Aside	\$0.008	2022	\$0.008	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.008	\$-	\$0.008				\$-
TO-6150	PART	TO-6150	PART Transit Operating Assistance	\$5.565	2025	\$6.144	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3.226	\$-	\$6.144				\$2.918
TA-6681	PART	TA-6681	Purchase Expansion Fleet Vehicle to Expand Service on PART Surry Express #1	\$0.466	2020	\$0.466	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.372	\$-	\$0.466				\$0.094
TG-6187	Statewide/ Davidson County	TG-6187	Urbanized Formula Program Funds Managed by NCDOT for Orange, Alamance, Davidson, Guilford, Cabarrus, Iredell, Hoke, Cumberland, Harnett, Union, Mecklenburg Transportation Systems-Capital Program	\$2.438	2021	\$2.487	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.989	\$-	\$2.487				\$0.498
TO-6142	Statewide/ Davidson County	TO-6142	Urbanized Formula Program Funds Managed by NCDOT for Orange, Alamance, Davidson, Guilford, Cabarrus, Iredell, Hoke, Cumberland, Harnett, Union, Mecklenburg Transportation Systems-Operating	\$11.230	2021	\$11.455	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.727	\$-	\$11.455				\$5.727
TD-5303	Winston-Salem	TD-5303	FTA Section 5339 Bus and Bus Facilities Grant, Winston-Salem UA	\$4.380	2024	\$4.741	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.027	\$-	\$4.741				\$0.714

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local	
2025 PROJECTS CONT...																							
TO-5126	Winston-Salem	TO-5126	Transit Operating Assistance, Winston-Salem Transit	\$5.802	2025	\$6.406	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3.203	\$-	\$6.406				\$3.203	
TG-5126	Winston-Salem	TG-5126	Transit Operating Assistance, Winston-Salem Transit	\$14.568	2025	\$16.084	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$8.042	\$-	\$16.084				\$8.042	
TG-4805	Winston-Salem	TG-4805	Transit Capital-Bus Stop Shelters, Benches, Shop Equipment, Spare Parts, Engines, Fareboxes, Services Vehicles, Etc.	\$2.508	2025	\$2.769	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.216	\$-	\$2.769				\$0.553	
TG-5241	Winston-Salem	TG-5241	Transit Capital-Preventive Maintenance, Winston-Salem Transit	\$17.796	2024	\$19.263	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$15.382	\$-	\$19.263				\$3.881	
TS-5120	Winston-Salem	TS-5120	Safety & Security-Min. 1% set aside	\$0.266	2023	\$0.282	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.227	\$-	\$0.282				\$0.055	
TQ-6782	Regional	TQ-6782	FTA Section 5310 Winston-Salem Allocation Set Aside for Compete Grant to Eligible Agencies to Assist in Meeting the Needs of Low Income, Disabled, and Elderly Populations	\$2.688	2025	\$2.968	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.372	\$-	\$2.968				\$0.596	
TM-5309	Regional	TM-5309	FTA Section 5307 Winston-Salem Urbanized Area Set Aside for Job Access Reverse Commute (JARC) Projects	\$0.660	2025	\$0.729	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.364	\$-	\$0.729				\$0.364	
TO-6161	Winston-Salem	TO-6161	CMAQ Extended Night, Saturday and Sunday Services for WSTA	\$1.013	2020	\$1.013	\$-	\$-	\$-	\$-	\$-	\$0.810	\$-	\$-	\$-	\$-	\$-	\$1.013				\$0.203	
W-5709	Division 9, various locations	W-5709	Safety Improvements at Various Locations in Division 9	\$2.532	2020	\$2.532	\$-	\$-	\$-	\$-	\$2.329	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.532				\$0.203
AV-5738	Smith Reynolds Airport (INT), Forsyth County	AV-5738	Acquire Land and Clear Terrain Obstructions East of Runway 15-33 to Drain and Grade Material in Place	\$1.909	2021	\$1.947	\$-	\$1.947	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.947	\$-					\$-	
AV-5832	Smith Reynolds Airport (INT), Forsyth County	AV-5832	Construct New Taxiway	\$6.200	2021	\$6.324	\$-	\$6.324	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.324	\$-				\$-	
C-5620	Regional	C-5620	Projects to improve congestion and air quality in the Winston-Salem Urban Area MPO	\$1.218	2020	\$1.218	\$-	\$-	\$-	\$-	\$-	\$0.972	\$-	\$-	\$-	\$-	\$-	\$1.218				\$0.246	
WS-Safety-100	Regional	W-999	Safety Improvements in Winston-Salem Urban Area MPO Region	\$18.731	2025	\$20.681	\$-	\$-	\$-	\$-	\$20.681	\$-	\$-	\$-	\$-	\$-	\$-	\$20.681				\$-	
WS-Maint-99A	Regional	N/A	Roadway Maintenance in the Winston-Salem Urban Area MPO Region, 2021-2025	\$38.123	2025	\$42.091	\$-	\$-	\$-	\$42.091	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$42.091				\$-	

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2035 PROJECTS																						
WS-Rdwy-003	Yadkinville Road	N/A	Intersection Improvements	\$4.500	2035	\$5.824	--	\$5.824	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.824	\$-	\$-	\$5.824	
WS-Rdwy-004	US 158	N/A	Intersection Improvements	\$4.500	2035	\$5.824	--	\$5.824	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.824	\$-	\$-	\$5.824	
WS-Rdwy-009	NC 67 Westbound - Silas Creek Parkway	B-5950	Bridge Improvements	\$8.260	2027	\$9.488	--	\$9.488	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$9.488	\$-	\$-	\$9.488	
WS-Rdwy-010	Salisbury Ridge Road	B-5770	Bridge Improvements	\$4.500	2035	\$5.824	--	\$5.824	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.824	\$-	\$-	\$5.824	
WS-Rdwy-013	SR 2377 (Old Greensboro Rd NE)	U-6059A	Roadway Modernization	\$2.859	2027	\$3.284	--	\$3.284	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3.284	\$-	\$-	\$3.284	
WS-Rdwy-017	Novack St	B-5006	Bridge Improvements	\$4.500	2035	\$5.824	--	\$5.824	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.824	\$-	\$-	\$5.824	
WS-Rdwy-019	S Peace Haven Rd	N/A	Intersection Improvements	\$21.528	2035	\$27.859	--	\$27.859	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$27.859	\$-	\$-	\$27.859	
WS-Rdwy-024	John M Gold Fwy	R-2247EC	Interchange Improvements	\$21.528	2031	\$27.859	\$27.859	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$27.859	\$-	\$-	\$27.859	
WS-Rdwy-028	North Main St	N/A	Roadway Modernization	\$3.894	2035	\$5.040	--	\$5.040	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.040	\$-	\$-	\$5.040	
WS-Rdwy-031	W Mountain St	N/A	Roadway Modernization	\$5.582	2035	\$7.224	--	\$7.224	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$7.224	\$-	\$-	\$7.224	
WS-Rdwy-037	New Route - Stratford-Ebert Connector Section 1	N/A	Roadway Modernization	\$8.762	2035	\$11.339	--	\$11.339	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.339	\$-	\$-	\$11.339	
WS-Rdwy-040	Brewer Road	N/A	Roadway Modernization	\$3.635	2035	\$4.704	--	\$4.704	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.704	\$-	\$-	\$4.704	
WS-Rdwy-043	Silas Creek Parkway	N/A	Roadway Modernization	\$3.635	2035	\$4.704	--	\$4.704	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.704	\$-	\$-	\$4.704	
WS-Rdwy-048	E Bodenhamer St	N/A	Roadway Modernization	\$3.959	2035	\$5.124	--	\$5.124	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.124	\$-	\$-	\$5.124	
WS-Rdwy-050	S Main St	N/A	Roadway Modernization	\$7.010	2035	\$9.071	--	\$9.071	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$9.071	\$-	\$-	\$9.071	
WS-Rdwy-051	NC 66	N/A	Roadway Modernization	\$1.558	2035	\$2.016	--	\$2.016	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.016	\$-	\$-	\$2.016	
WS-Rdwy-057	Peace Haven/Styers Ferry Rd	N/A	Roadway Modernization (adding turn lane) and extension	\$22.912	2035	\$29.650	--	\$29.650	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$29.650	\$-	\$-	\$29.650	
WS-Rdwy-059	Clemmons Rd	N/A	Roadway Modernization	\$8.762	2035	\$11.339	--	\$11.339	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.339	\$-	\$-	\$11.339	
WS-Rdwy-071	New Route (Future NC 452)	R-2247CA	New Location	\$14.663	2031	\$18.975	\$18.975	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$18.975	\$-	\$-	\$18.975	
WS-Rdwy-072	New Route (Future NC 452)	R-2247CB	New Location	\$47.507	2031	\$61.480	\$61.480	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$61.480	\$-	\$-	\$61.480	
WS-Rdwy-073	New Route (Future NC 452)	R-2247D	New Location	\$67.449	2028	\$79.027	\$79.027	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$79.027	\$-	\$-	\$79.027	
WS-Rdwy-074	New Route (Future NC 452)	R-2247EA	New Location	\$66.422	2026	\$73.335	\$73.335	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$73.335	\$-	\$-	\$73.335	
WS-Rdwy-075	New Route (Future NC 452)	R-2247EB	New Location	\$12.610	2028	\$14.775	\$14.775	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$14.775	\$-	\$-	\$14.775	

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2035 PROJECTS CONT...																							
WS-Rdwy-077	US 158	R-2577B	Widen to Multilanes	\$94.902	2027	\$109.013	--	\$109.013	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$109.013	\$-	\$-	\$109.013		
WS-Rdwy-082	Future I-74	U-2579D	New Location	\$47.067	2028	\$55.147	\$55.147	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$55.147	\$-	\$-	\$55.147		
WS-Rdwy-083	Future I-74	U-2579E	New Location	\$32.405	2028	\$37.967	\$37.967	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$37.967	\$-	\$-	\$37.967		
WS-Rdwy-084	Future I-74	U-2579F	New Location	\$35.777	2028	\$41.919	\$41.919	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$41.919	\$-	\$-	\$41.919		
WS-Rdwy-103	SR 1156 (Lewisville-Clemmons Rd)	U-6189	Roadway Widening	\$29.113	2031	\$37.676	--	\$37.676	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$37.676	\$-	\$-	\$37.676		
WS-Rdwy-110	University Parkway (SR 4000)	N/A	Roadway Modernization	\$10.839	2035	\$14.027	--	\$14.027	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$14.027	\$-	\$-	\$14.027		
WS-Rdwy-123	N Old US 52 Road (SR 1236)	N/A	Roadway Modernization	\$19.342	2035	\$25.030	--	\$25.030	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$25.030	\$-	\$-	\$25.030		
WS-Rdwy-140	Old Walkertown Road (SR 2456)	N/A	Roadway Modernization	\$25.443	2035	\$32.926	--	\$32.926	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.926	\$-	\$-	\$32.926		
WS-Rdwy-144	Gumtree Road (SR 2692)	N/A	Roadway Modernization	\$44.265	2035	\$57.284	--	\$57.284	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$57.284	\$-	\$-	\$57.284		
WS-Rdwy-149	NC 66 (University Parkway)	N/A	Roadway Modernization	\$15.707	2035	\$20.327	--	\$20.327	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$20.327	\$-	\$-	\$20.327		
WS-Rdwy-151	University Parkway (SR 4000)	N/A	Roadway Modernization	\$5.128	2035	\$6.636	--	\$6.636	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.636	\$-	\$-	\$6.636		
WS-Rdwy-152	Bethania-Rural Hall Road (SR 4002)	N/A	Roadway Modernization	\$2.856	2035	\$3.696	--	\$3.696	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$3.696	\$-	\$-	\$3.696		
WS-Rdwy-155	E King Street (SR 1236)	N/A	Roadway Modernization	\$2.012	2035	\$2.604	--	\$2.604	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.604	\$-	\$-	\$2.604		
WS-Rdwy-156	S Martin Luther King Jr. Drive (SR 4394)	N/A	Roadway Modernization	\$3.180	2035	\$4.116	--	\$4.116	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.116	\$-	\$-	\$4.116		
WS-Rdwy-160	Oak Summit Road (SR 1686)	N/A	Roadway Modernization	\$17.330	2035	\$22.427	--	\$22.427	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$22.427	\$-	\$-	\$22.427		
WS-Rdwy-187	Shallowford Road (SR 1001)	N/A	Roadway Modernization	\$17.395	2035	\$22.511	--	\$22.511	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$22.511	\$-	\$-	\$22.511		
WS-Rdwy-191	S Peace Haven Road (SR 1891)	N/A	Roadway Modernization	\$12.592	2035	\$16.295	--	\$16.295	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$16.295	\$-	\$-	\$16.295		
WS-Rdwy-193	Hanes Mall Boulevard (SR 3153)	N/A	Roadway Modernization	\$3.115	2035	\$4.032	--	\$4.032	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.032	\$-	\$-	\$4.032		
WS-Rdwy-194	Jonestown Road (SR 1122)	N/A	Roadway Modernization	\$4.154	2035	\$5.376	--	\$5.376	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.376	\$-	\$-	\$5.376		
WS-Rdwy-201	Old US Highway 52 (SR 2932)	N/A	Roadway Modernization	\$6.750	2035	\$8.735	--	\$8.735	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$8.735	\$-	\$-	\$8.735		
WS-Rdwy-211	Main Street [Bethania] (SR 1611)	N/A	Roadway Modernization	\$36.671	2035	\$47.457	--	\$47.457	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$47.457	\$-	\$-	\$47.457		

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local	
2035 PROJECTS CONT...																							
WS-Rdwy-219	Union Cross Road (SR 2643)	N/A	Roadway Modernization	\$4.738	2035	\$6.132	--	\$6.132	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.132	\$-	\$-	\$6.132				
WS-Rdwy-225	US 158 (S Stratford Road)	N/A	Roadway Modernization	\$24.988	2035	\$32.338	--	\$32.338	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.338	\$-	\$-	\$32.338				
WS-Rdwy-294	Yadkinville Road (SR 1525)	N/A	Roadway Modernization	\$7.854	2035	\$10.163	--	\$10.163	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$10.163	\$-	\$-	\$10.163				
WS-ITS-Rdwy-402	Silas Creek Pkwy	N/A	ITS	\$0.120	2035	\$0.155	--	\$0.155	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.155	\$-	\$-	\$0.155				
WS-ITS-Rdwy-403	Business 40	N/A	ITS	\$0.578	2035	\$0.748	--	\$0.748	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.748	\$-	\$-	\$0.748				
WS-ITS-Rdwy-404	US 52	N/A	ITS	\$0.304	2035	\$0.393	--	\$0.393	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.393	\$-	\$-	\$0.393				
WS-ITS-Rdwy-406	I-40	N/A	ITS	\$0.380	2035	\$0.491	--	\$0.491	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.491	\$-	\$-	\$0.491				
WS-ITS-Rdwy-407	I-74	N/A	ITS	\$3.097	2035	\$4.008	--	\$4.008	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.008	\$-	\$-	\$4.008				
WS-Rdwy-410	W Clemmonsburg Rd	N/A	Modernization	\$9.346	2035	\$12.095	--	\$12.095	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$12.095	\$-	\$-	\$12.095				
WS-Rdwy-413	W Clemmonsburg Rd	N/A	Modernization	\$8.892	2035	\$11.507	--	\$11.507	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.507	\$-	\$-	\$11.507				
WS-Rdwy-416	Northwest Blvd	N/A	Modernization	\$4.803	2035	\$6.216	--	\$6.216	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.216	\$-	\$-	\$6.216				
WS-Rdwy-420	US-158	N/A	Intersection Improvements	\$4.500	2035	\$5.824	--	\$5.824	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$5.824	\$-	\$-	\$5.824				
WS-Rdwy-421	E 6th St / N Chestnut St	N/A	Intersection Improvements	\$21.528	2035	\$27.859	--	\$27.859	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$27.859	\$-	\$-	\$27.859				
WS-Rdwy-422	Lockland Ave / Hawthorne Rd	N/A	Intersection Improvements	\$21.528	2035	\$27.859	--	\$27.859	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$27.859	\$-	\$-	\$27.859				
WS-Rdwy-424	US-158	N/A	Intersection Improvements	\$21.528	2035	\$27.859	--	\$27.859	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$27.859	\$-	\$-	\$27.859				
WS-Rdwy-OPS-35	N/A	N/A	Operations and Safety Improvements	\$8.050	2035	\$10.418	\$-	\$10.418	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$10.418	\$-	\$-	\$10.418				
WS-Bike-036D	Trade St	N/A	Bike Boulevard	\$0.173	2035	\$0.224	\$-	\$0.007	\$-	\$-	\$-	\$-	\$0.040	\$0.078	\$0.099	\$-	\$0.007	\$0.217	\$0.119	\$0.007		\$0.099	
WS-Bike-036E	Various	N/A	Bike Boulevard	\$0.180	2035	\$0.232	\$-	\$0.007	\$-	\$-	\$-	\$-	\$0.042	\$0.081	\$0.102	\$-	\$0.007	\$0.225	\$0.123	\$0.007		\$0.102	
WS-Bike-128E	Martin Luther King Jr Dr	N/A	Complete Streets	\$13.990	2035	\$18.105	\$-	\$0.543	\$-	\$-	\$-	\$-	\$3.259	\$6.337	\$7.966	\$-	\$0.543	\$17.562	\$9.595	\$0.543		\$7.966	
WS-Bike-128D	Martin Luther King Jr Dr	N/A	Complete Streets	\$6.075	2035	\$7.862	\$-	\$0.236	\$-	\$-	\$-	\$-	\$1.415	\$2.752	\$3.459	\$-	\$0.236	\$7.626	\$4.167	\$0.236		\$3.459	
WS-Bike-198	Waughton St	N/A	Complete Streets	\$23.730	2035	\$30.709	\$-	\$0.921	\$-	\$-	\$-	\$-	\$5.528	\$10.748	\$13.512	\$-	\$0.921	\$29.788	\$16.276	\$0.921		\$13.512	
WS-Bike-576B	E Sixth St	N/A	Cycle Track	\$4.845	2035	\$6.270	\$-	\$0.188	\$-	\$-	\$-	\$-	\$1.129	\$2.194	\$2.759	\$-	\$0.188	\$6.082	\$3.323	\$0.188		\$2.759	
WS-Bike-576D	E 3rd St	N/A	Cycle Track	\$4.800	2035	\$6.212	\$-	\$0.186	\$-	\$-	\$-	\$-	\$1.118	\$2.174	\$2.733	\$-	\$0.186	\$6.025	\$3.292	\$0.186		\$2.733	
WS-Bike-019	E Sprague Rd	N/A	Cycle Track	\$2.988	2035	\$3.867	\$-	\$0.116	\$-	\$-	\$-	\$-	\$0.696	\$1.354	\$1.702	\$-	\$0.116	\$3.751	\$2.050	\$0.116		\$1.702	
WS-Bike-036A	Neighborhood Streets	N/A	Bike Boulevard	\$0.356	2035	\$0.461	\$-	\$0.014	\$-	\$-	\$-	\$-	\$0.083	\$0.161	\$0.203	\$-	\$0.014	\$0.447	\$0.244	\$0.014		\$0.203	SE 180

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
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2035 PROJECTS CONT...

WS-Bike-576A	Broad St	N/A	Cycle Track	\$3.815	2035	\$4.937	\$-	\$0.148	\$-	\$-	\$-	\$0.889	\$1.728	\$2.172	\$-	\$0.148	\$4.789	\$2.617	\$0.148			\$2.172	
WS-Bike-018B	Country Club Rd	N/A	Bike Lanes	\$0.885	2035	\$1.145	\$-	\$0.034	\$-	\$-	\$-	\$0.206	\$0.401	\$0.504	\$-	\$0.034	\$1.111	\$0.607	\$0.034			\$0.504	
WS-Tran-PL2035	Regional	TP-5101	Transit Planning Assistance-5303 (FY 2026-2035)	\$1.030	2035	\$1.333	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.074	\$-	\$1.333	\$1.074	\$-			\$0.259	
WS-Tran-102A	PART	TG-6783	PART Routine Capital, Passenger Shelters, Passenger Amenities, Shop Equipment, Spare Parts	\$1.978	2035	\$2.560	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.045	\$-	\$2.560	\$2.045	\$-			\$0.515	
WS-Tran-103A	PART	TO-6150	PART Transit Operating Assistance	\$8.460	2035	\$10.949	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.121	\$-	\$10.949	\$6.121	\$-			\$4.827	
WS-Tran-108A	Winston-Salem	TD-5303	FTA Section 5339 Bus and Bus Facilities Grant, Winston-Salem UA	\$7.848	2035	\$10.156	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$8.625	\$-	\$10.156	\$8.625	\$-			\$1.530	
WS-Tran-055A	Regional (PART)	N/A	PART Express Bus Route 1-expand frequency to 30 minutes all day, 2026-2035	\$8.210	2035	\$10.625	\$-	\$-	\$-	\$-	\$-	\$5.911	\$-	\$-	\$2.588	\$-	\$10.625	\$8.500	\$-			\$2.125	
WS-Tran-054A	City of Winston-Salem	N/A	Winston-Salem Transit (WSTA) Route 92 Increase Frequency to 30 minutes headways, 2026-2035	\$5.000	2035	\$6.471	\$-	\$-	\$-	\$-	\$-	\$2.976	\$-	\$-	\$2.200	\$-	\$6.471	\$5.176	\$-			\$1.294	
WS-Tran-047A	City of Winston-Salem	N/A	Winston-Salem Transit (WSTA) Route 96 Increase Frequency to 30 minute headways, 2026-2035	\$5.000	2035	\$6.471	\$-	\$-	\$-	\$-	\$-	\$2.976	\$-	\$-	\$2.200	\$-	\$6.471	\$5.176	\$-			\$1.294	
WS-Tran-104	Winston-Salem	N/A	Winston-Salem Transit (WSTA) Expansion Vehicles to Support Expanded Frequency	\$1.600	2035	\$2.071	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.656	\$-	\$-	\$-	\$2.071	\$1.656	\$-			\$0.414
WS-Tran-105A	Davidson County	TG-6809	Davidson County Transportation. Routine Capital-Passenger shelters, passenger amenities, shop equipment, spare parts, capital cost of contracting, etc.	\$0.988	2035	\$1.278	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.022	\$-	\$1.278	\$1.022	\$-			\$0.256	
WS-Tran-106A	Davidson County	TG-6808B	Davidson County Transportation. Transit Capital Preventative Maintenance.	\$1.975	2035	\$2.556	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.045	\$-	\$2.556	\$2.045	\$-			\$0.511	
WS-Tran-107A	Davidson County	TO-6165	Davidson County Transportation. Transit Operating Assistance.	\$1.580	2035	\$2.045	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.022	\$-	\$2.045	\$1.022	\$-			\$1.022	
WS-Tran-109A	Regional	TQ-6782	FTA Section 5310 Winston-Salem Allocation Set Aside for Compete Grant to Eligible Agencies to Assist in Meeting the Needs of Low Income, Disabled, and Elderly Populations	\$4.816	2035	\$6.232	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.980	\$-	\$6.232	\$4.980	\$-			\$1.252	

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2035 PROJECTS CONT...

WS-Tran-111A	Winston-Salem	TO-5126	Transit Operating Assistance, Winston-Salem Transit	\$26.101	2035	\$33.778	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$16.889	\$-	\$33.778	\$16.889	\$-			\$16.889	
WS-Tran-112A	Winston-Salem	TG-4805	Transit Capital-Bus Stop Shelters, Benches, Shop Equipment, Spare Parts, Engines, Fareboxes, Services Vehicles, Etc.	\$8.987	2035	\$11.630	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$9.307	\$-	\$11.630	\$9.307	\$-			\$2.323	
WS-Tran-113A	Winston-Salem	TG-5241	Transit Capital-Preventive Maintenance, Winston-Salem Transit	\$31.412	2035	\$40.650	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.512	\$-	\$40.650	\$32.512	\$-			\$8.138	
WS-Tran-114A	Winston-Salem	TS-5120	Safety & Security-Min. 1% set aside	\$0.441	2035	\$0.570	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.459	\$-	\$0.570	\$0.459	\$-			\$0.111	
WS-Tran-053	Winston-Salem	N/A	WSTA Administration and Maintenance Facility Upgrade (Combination of STI and STBG-DA Funds)	\$20.000	2035	\$25.882	\$-	\$4.038	\$-	\$-	\$-	\$-	\$-	\$16.668	\$-	\$-	\$4.038	\$21.845	\$16.668	\$4.038			\$5.176
WS-Tran-101A	Regional (WSTA, PART, Davidson County Transportation)	N/A	Urban Transit in Winston-Salem Urbanized Area-additional major capital, expansion vehicles and service frequency expansion (combination of CMAQ and STBG-DA Funding with local match)	\$23.119	2035	\$29.919	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$17.116	\$6.819	\$-	\$-	\$-	\$29.919	\$23.935	\$-		\$5.984
WS-Other-100A	Regional	N/A	Funding for Rail and Aviation Improvements in the Winston Salem Urban Area to be Allocated through STI Prioritization	\$6.000	2035	\$7.765	\$-	\$7.765	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$7.765	\$-	\$-	\$7.765			\$-	
WS-Safety-110	Regional	N/A	Safety Improvements in Winston-Salem Urban Area MPO Region, 2026-2035	\$46.250	2035	\$59.852	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$59.852	\$59.852	\$-			\$-
WS-Bridge-100A	Regional	N/A	Bridge Replacements and Maintenance in the Winston-Salem Urban Area MPO Region, 2026-2035	\$165.471	2035	\$214.138	\$-	\$-	\$-	\$214.138	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$214.138	\$-	\$214.138			\$-
WS-Maint-100A	Regional	N/A	Interstate Maintenance in the Winston-Salem Urban Area MPO Region, 2026-2035	\$100.000	2035	\$129.411	\$-	\$-	\$-	\$129.411	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$129.411	\$-	\$129.411			\$-
WS-Maint-200A	Regional	N/A	Roadway Maintenance in the Winston-Salem Urban Area MPO Region, 2026-2035	\$289.286	2035	\$374.369	\$-	\$-	\$-	\$374.369	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$374.369	\$-	\$374.369			\$-

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
2045 PROJECTS																						
WS-Rdwy-100	US 421 (Salem Parkway)	U-6068	Roadway Widening	\$84.316	2045	\$126.740	--	\$126.740	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$126.740
WS-Rdwy-005	US 421	N/A	Improve Interchange	\$21.528	2045	\$32.360	\$32.360	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.360
WS-Rdwy-022	Salem Pkwy	U-2579G	Interchange Improvements	\$21.528	2045	\$32.360	--	\$32.360	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.360
WS-Rdwy-023	John M Gold Fwy	U-2826A	Interchange Improvements	\$21.528	2045	\$32.360	--	\$32.360	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.360
WS-Rdwy-025	Salem Pkwy	R-2247CA	Interchange Improvements	\$55.200	2045	\$82.975	\$82.975	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$82.975
WS-Rdwy-030	Future Glenn Hi Road Extension	N/A	New Location	\$37.586	2045	\$56.498	--	\$56.498	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$56.498
WS-Rdwy-035	I-74, US 52	N/A	Roadway Widening	\$48.649	2045	\$73.127	\$73.127	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$73.127
WS-Rdwy-065	I-40	I-5981A	Roadway Widening	\$73.729	2045	\$110.827	\$110.827	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$110.827
WS-Rdwy-066	I-40	I-5981B	Roadway Widening	\$45.876	2045	\$68.959	\$68.959	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$68.959
WS-Rdwy-067	I-40	I-5981C	Roadway Widening	\$46.367	2045	\$69.698	\$69.698	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$69.698
WS-Rdwy-069	New Route (Future NC 452)	R-2247A	New Location	\$28.592	2045	\$42.979	--	\$42.979	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$42.979
WS-Rdwy-070	New Route (Future NC 452)	R-2247B	New Location	\$20.968	2045	\$31.518	--	\$31.518	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$31.518
WS-Rdwy-102	SR 1969 (Piney Grove Rd)	U-6188	Roadway Widening	\$6.554	2045	\$9.851	--	\$9.851	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$9.851
WS-Rdwy-104	NC 65 (Bethania-Rural Hall Rd)	U-6190	Roadway Widening	\$3.151	2045	\$4.736	--	\$4.736	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$4.736
WS-Rdwy-107	I-40	N/A	Roadway Widening	\$134.187	2045	\$201.704	\$201.704	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$201.704
WS-Rdwy-119	NC 801	N/A	Roadway Modernization	\$16.226	2045	\$24.391	--	\$24.391	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$24.391
WS-Rdwy-124	Baux Mountain Road (SR 2211)	N/A	Roadway Modernization	\$55.104	2045	\$82.831	--	\$82.831	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$82.831
WS-Rdwy-137	NC 66 (Old Hollow Road)	N/A	Widen to Multilanes	\$39.700	2045	\$59.676	--	\$59.676	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$59.676
WS-Rdwy-166	NC 67 (Reynolda Road)	N/A	Roadway Modernization	\$32.582	2045	\$48.977	--	\$48.977	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$48.977
WS-Rdwy-180	Hopkins Road (SR 2649)	N/A	Modernization	\$7.464	2045	\$11.220	--	\$11.220	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.220
WS-Rdwy-290	Shattalon Drive (SR 1686)	N/A	Roadway Modernization	\$19.212	2045	\$28.879	--	\$28.879	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$28.879
WS-Rdwy-303	Old US Highway 52 (SR 2932)	N/A	Roadway Widening	\$12.225	2045	\$18.376	--	\$18.376	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$18.376
WS-Rdwy-309	Baltimore Road (SR 1630)	N/A	Roadway Widening	\$45.246	2045	\$68.012	--	\$68.012	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$68.012
WS-Rdwy-368	Vance Road (SR 2014)	N/A	Roadway Widening	\$62.764	2045	\$94.345	--	\$94.345	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$94.345
WS-Rdwy-392	Old US Highway 52 (SR 3010)	N/A	Roadway Widening	\$15.502	2045	\$23.302	--	\$23.302	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$23.302

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintainance	HSIP/ Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
2045 PROJECTS CONT...																						
WS-Rdwy-409	Yadkin Valley Rd	N/A	Roadway Modernization	\$29.207	2045	\$43.903	--	\$43.903	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$43.903	\$-			\$-	\$43.903	
WS-Rdwy-411	US-158	N/A	Widen to Multilanes	\$46.261	2045	\$69.537	--	\$69.537	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$69.537	\$-			\$-	\$69.537	
WS-Rdwy-414	London Lane	N/A	Modernization, turn lanes, and complete streets	\$6.554	2045	\$9.851	--	\$9.851	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$9.851	\$-			\$-	\$9.851	
WS-Rdwy-423	I-40 on Ramp	N/A	Interchange Improvements	\$21.528	2045	\$32.360	\$32.360	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.360	\$-			\$-	\$32.360	
WS-Rdwy-427	I-40	N/A	Interchange Improvements	\$21.528	2045	\$32.360	\$32.360	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.360	\$-			\$-	\$32.360	
WS-Rdwy-430	Germanton Rd/US 52 Interchange	N/A	Interchange Improvements	\$21.528	2045	\$32.360	--	\$32.360	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$32.360	\$-			\$-	\$32.360	
WS-Rdwy-OPS-45	N/A	N/A	Operations and Safety Improvements	\$52.980	2045	\$79.638	\$-	\$79.638	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$79.638	\$-			\$-	\$79.638	
WS-Bike-478	Muddy Creek Trail - Phase II	N/A	Greenway	\$5.415	2045	\$8.140	\$-	\$0.244	\$-	\$-	\$-	\$1.465	\$2.849	\$3.581	\$-	\$0.244	\$7.895			\$4.314	\$0.244	\$3.581
WS-Bike-083A	Stratford Rd	N/A	Sidepath	\$7.840	2045	\$11.785	\$-	\$0.354	\$-	\$-	\$-	\$2.121	\$4.125	\$5.185	\$-	\$0.354	\$11.431			\$6.246	\$0.354	\$5.185
WS-Bike-080	New Walkertown Rd	N/A	Sidepath	\$6.610	2045	\$9.936	\$-	\$0.298	\$-	\$-	\$-	\$1.788	\$3.478	\$4.372	\$-	\$0.298	\$9.638			\$5.266	\$0.298	\$4.372
WS-Bike-224A	Peters Creek Pkwy	N/A	Sidepath	\$12.080	2045	\$18.158	\$-	\$0.545	\$-	\$-	\$-	\$3.268	\$6.355	\$7.990	\$-	\$0.545	\$17.613			\$9.624	\$0.545	\$7.990
WS-Ped-190	NC 150	N/A	Pedestrian Improvements	\$1.210	2045	\$1.819	\$-	\$0.109	\$-	\$-	\$-	\$0.564	\$1.146	\$-	\$-	\$0.109	\$1.710			\$1.710	\$0.109	\$-
WS-Bike-020	Healy Dr	N/A	Complete Streets	\$7.070	2045	\$10.627	\$-	\$0.319	\$-	\$-	\$-	\$1.913	\$3.720	\$4.676	\$-	\$0.319	\$10.309			\$5.632	\$0.319	\$4.676
WS-Bike-079A	Silas Creek Pkwy	N/A	Sidepath	\$3.125	2045	\$4.697	\$-	\$0.141	\$-	\$-	\$-	\$0.846	\$1.644	\$2.067	\$-	\$0.141	\$4.556			\$2.490	\$0.141	\$2.067
WS-Bike-128A	Martin Luther King Jr Dr	N/A	Complete Streets	\$7.900	2045	\$11.875	\$-	\$0.356	\$-	\$-	\$-	\$2.137	\$4.156	\$5.225	\$-	\$0.356	\$11.519			\$6.294	\$0.356	\$5.225
WS-Bike-036F	Various	N/A	Bike Boulevard	\$0.431	2045	\$0.647	\$-	\$0.019	\$-	\$-	\$-	\$0.116	\$0.226	\$0.285	\$-	\$0.019	\$0.628			\$0.343	\$0.019	\$0.285
WS-Bike-036C	Argonne Blvd	N/A	Bike Boulevard	\$0.306	2045	\$0.460	\$-	\$0.014	\$-	\$-	\$-	\$0.083	\$0.161	\$0.202	\$-	\$0.014	\$0.446			\$0.244	\$0.014	\$0.202
WS-Bike-569B	Piedmont Regional Trail (Kerners Mill Creek)	N/A	Greenway	\$4.075	2045	\$6.125	\$-	\$0.368	\$-	\$-	\$-	\$1.899	\$3.859	\$-	\$-	\$0.368	\$5.758			\$5.758	\$0.368	\$-
WS-Bike-036B	Jackson Ave	N/A	Bike Boulevard	\$0.334	2045	\$0.502	\$-	\$0.015	\$-	\$-	\$-	\$0.090	\$0.176	\$0.221	\$-	\$0.015	\$0.487			\$0.266	\$0.015	\$0.221
WS-Tran-PL2045	Regional	TP-5101	Transit Planning Assistance-5303 (FY 2036-2045)	\$1.030	2045	\$1.548	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.248	\$-	\$1.548			\$1.248	\$-	\$0.301
WS-Tran-055B	Regional	N/A	PART Express Bus Route 1-expand frequency to 30 minutes all day, 2036-2045	\$8.210	2045	\$10.625	\$-	\$-	\$-	\$-	\$-	\$5.911	\$-	\$-	\$2.588	\$-	\$10.625			\$8.500	\$-	\$2.125
WS-Tran-054B	Winston-Salem	N/A	Winston-Salem Transit (WSTA) Route 92 Increase Frequency to 30 minutes headways, 2036-2045	\$5.000	2045	\$7.516	\$-	\$-	\$-	\$-	\$-	\$3.457	\$-	\$-	\$2.555	\$-	\$7.516			\$6.013	\$-	\$1.503

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/ Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
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2045 PROJECTS CONT...

WS-Tran-047B	Winston-Salem	N/A	Winston-Salem Transit (WSTA Route 96 Increase Frequency to 30 minute headways, 2036-2045	\$5.000	2045	\$7.516	\$-	\$-	\$-	\$-	\$-	\$3.457	\$-	\$-	\$2.555	\$-	\$7.516			\$6.013	\$-	\$1.503
WS-Tran-102B	PART	TG-6783	PART Routine Capital, Passenger Shelters, Passenger Amenities, Shop Equipment, Spare Parts	\$2.190	2045	\$3.291	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.629	\$-	\$3.291			\$2.629	\$-	\$0.662
WS-Tran-103B	PART	TO-6150	PART Transit Operating Assistance	\$9.365	2045	\$14.078	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$7.871	\$-	\$14.078			\$7.871	\$-	\$6.207
WS-Tran-105B	Davidson County	TG-6809	Davidson County Transportation. Routine Capital-Passenger shelters, passenger amenities, shop equipment, spare parts, capital cost of contracting, etc.	\$1.093	2045	\$1.643	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.315	\$-	\$1.643			\$1.315	\$-	\$0.329
WS-Tran-106B	Davidson County	TG-6808B	Davidson County Transportation. Transit Capital Preventative Maintenance.	\$2.186	2045	\$3.286	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$2.629	\$-	\$3.286			\$2.629	\$-	\$0.657
WS-Tran-107B	Davidson County	TO-6165	Davidson County Transportation. Transit Operating Assistance.	\$1.749	2045	\$2.629	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$1.315	\$-	\$2.629			\$1.315	\$-	\$1.315
WS-Tran-108B	Winston-Salem	TD-5303	FTA Section 5339 Bus and Bus Facilities Grant, Winston-Salem UA	\$8.687	2045	\$13.058	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.090	\$-	\$13.058			\$11.090	\$-	\$1.968
WS-Tran-111B	Winston-Salem	TO-5126	Transit Operating Assistance, Winston-Salem Transit	\$28.893	2045	\$43.431	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$21.716	\$-	\$43.431			\$21.716	\$-	\$21.716
WS-Tran-112B	Winston-Salem	TG-4805	Transit Capital-Bus Stop Shelters, Benches, Shop Equipment, Spare Parts, Engines, Fareboxes, Services Vehicles, Etc.	\$9.948	2045	\$14.954	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$11.967	\$-	\$14.954			\$11.967	\$-	\$2.987
WS-Tran-113B	Winston-Salem	TG-5241	Transit Capital-Preventive Maintenance, Winston-Salem Transit	\$34.772	2045	\$52.268	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$41.803	\$-	\$52.268			\$41.803	\$-	\$10.464
WS-Tran-114B	Winston-Salem	TS-5120	Safety & Security-Min. 1% set aside	\$0.410	2045	\$0.616	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$0.496	\$-	\$0.616			\$0.496	\$-	\$0.120
WS-Tran-109B	Regional	TQ-6782	FTA Section 5310 Winston-Salem Allocation Set Aside for Compete Grant to Eligible Agencies to Assist in Meeting the Needs of Low Income, Disabled, and Elderly Populations	\$5.331	2045	\$8.014	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$6.411	\$-	\$8.014			\$6.411	\$-	\$1.603

MTP_ID	Facility	STIP ID	Project Description	Estimated Cost (Millions USD)	Estimated Completion Date or Horizon Year	Adjusted Estimated Cost in YOE (millions USD)	Statewide Mobility	Combined Regional & Division	Discretionary	Maintenance	HSIP/ Safety	CMAQ	STBG-DA	Bond	Federal Transit Funds (5307, 5303, 5339, 5310)	STIP Funding Sources	Non-STIP	By 2035 Federal	By 2035 State	By 2045 Federal	By 2045 State	All Years Local
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2045 PROJECTS CONT...

WS-Tran-101B	Regional (WSTA, PART, Davidson County Transportation)	N/A	Urban Transit in Winston-Salem Urbanized Area-additional major capital, expansion vehicles and service frequency expansion (combination of STI Prioritization, CMAQ and STBG-DA Funding with local match)	\$54.537	2045	\$81.978	\$-	\$5.288	\$-	\$-	\$-	\$31.561	\$27.676	\$-	\$-	\$5.288	\$76.690			\$59.237	\$5.288	\$17.453	
WS-Other-100B	Regional	N/A	Funding for Rail and Aviation Improvements in the Winston Salem Urban Area to be Allocated through STI Prioritization	\$7.000	2045	\$10.522	\$-	\$10.522	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$10.522	\$-		\$-	\$10.522	\$-		
WS-Safety-120	Regional	N/A	Safety Improvements in Winston-Salem Urban Area MPO Region, 2036-2045	\$51.70	2045	\$77.711	\$-	\$-	\$-	\$-	\$-	\$77.711	\$-	\$-	\$-	\$-	\$77.711			\$77.711	\$-	\$-	
WS-Bridge-100B	Regional	N/A	Bridge Replacements and Maintenance in the Winston-Salem Urban Area MPO Region, 2036-2045	\$173.18	2045	\$260.325	\$-	\$-	\$-	\$-	\$260.325	\$-	\$-	\$-	\$-	\$-	\$260.325			\$-	\$260.325	\$-	
WS-NHPIM-100B	Regional	N/A	Interstate Maintenance in the Winston-Salem Urban Area MPO Region, 2036-2045	\$100.00	2045	\$150.316	\$-	\$-	\$-	\$150.316	\$-	\$-	\$-	\$-	\$-	\$-	\$150.316			\$-	\$150.316	\$-	
WS-Maint-200B	Regional	N/A	Roadway Maintenance in the Winston-Salem Urban Area MPO Region, 2036-2045	\$304.46	2045	\$457.651	\$-	\$-	\$-	\$457.651	\$-	\$-	\$-	\$-	\$-	\$-	\$457.651			\$-	\$457.651	\$-	

Appendix D:

Congestion Management Process

Winston-Salem Urban Area Congestion Management Process

Introduction.

Traffic Congestion describes a transportation cost incurred by users where as a road reaches its capacity, each additional vehicle imposes more total delay on others than they bear, resulting in economically excessive traffic volumes.¹ Congestion can be recurrent (occurring on a regular basis) or non-recurrent (for example, due to a traffic accident.) Congestion Management Process allows urban regions to identify congestion hot spots and key corridors, and to recommend solutions in dealing with congestion.

Winston-Salem Urban Area MPO is a transportation management area (TMA), defined as an urbanized area with a population of over 200,000 individuals. As a TMA, WSUAMPO is required to update the region's Congestion Management Process (CMP) on a regular basis.

Federal Highways Administration Congestion Management Process Guidebook² defines CMP as follows:

A congestion management process (CMP) is a systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meet state and local needs.

Congestion Management Process was first introduced as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, under the term Congestion Management System (CMS). Congestion Management requirements were continued under the Transportation Equity Act for the 21st Century (TEA-21). The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) transitioned to the concept of treating congestion management as a process, recognizing that the CMP is not intended to be a stand-alone document, but rather part of an overall metropolitan transportation planning process³.

Under the FAST Act, Congestion Management Process requirements previously in place for an urban area over 200,000 in population were retained. In addition, the FAST Act identified the following specific examples of travel demand reduction strategies for a congestion management process for MPOs that serve a TMA [23 U.S.C. 134(k)(3)] :

- Intercity bus operators

¹ Victoria Transport Policy Institute (2020). Transportation Cost and Benefit Analysis II-Congestion Costs. Retrieved from <https://www.vtpi.org/tca/tca0505.pdf>

² FHWA (2011). Congestion Management Process: A Guidebook. FHWA-HEP-11-011. Retrieved from https://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/cmpguidebk.pdf

³ Ibid

- Employer-based commuting programs such as a carpool program, vanpool program, transit benefit program, parking cash-out program, shuttle program or telework program
- Job access projects
- Operational management strategies

Congestion has a real effect on everyday lives and businesses, increasing the delay in shipments and adding hours to time spent commuting. TTI Urban Mobility Report, 2019⁴ indicates that congestion in the U.S. has been consistently growing from 1982 to 2017, with the following congestion-related negative impacts identified:

- In 2017, congestion caused urban Americans to travel an extra 8.8 billion hours and purchase an extra 3.3 billion gallons of fuel for a congestion cost of \$166 billion.
- Trucks account for \$20 billion (11 percent) of the cost, a bigger share than their 7 percent of traffic.
- The average auto commuter spends 54 hours in congestion and wastes 21 gallons of fuel due to congestion at a cost of \$1,080 in wasted time and fuel.
- 2017 Congestion costs were at \$179 billion based on cost of delay and additional fuel cost; 11 percent (\$20 billion) of the delay cost was the effect of congestion on truck operations
- The cost to the average auto commuter was \$1,080; it was an inflation-adjusted \$610 in 1982.

The Texas Transportation Institute Urban Mobility Report 2019⁵ also includes specific congestion metrics for Winston-Salem region and indicates that by 2017, annual total delay per commuter in the Winston-Salem region has increased to 27 hours per auto commuter, making it 167th highest region by commuter delay. Based on 7,930,000 hours of total annual delay, an estimated annual congestion cost of \$159,000,000 has been calculated by TTI researchers for Winston-Salem region, resulting in 2,618,000 gallons of excessive fuel consumption. This amounts to an annual congestion cost of \$487 per average auto commuter in the region.

⁴ Texas A&M Transportation Institute, Urban Mobility Report 2019. Retrieved from <https://mobility.tamu.edu/umr/congestion-data/>

⁵ Ibid.

URBAN MOBILITY REPORT 2019

Winston-Salem, NC

Texas A&M Transportation Institute

Year:
2017

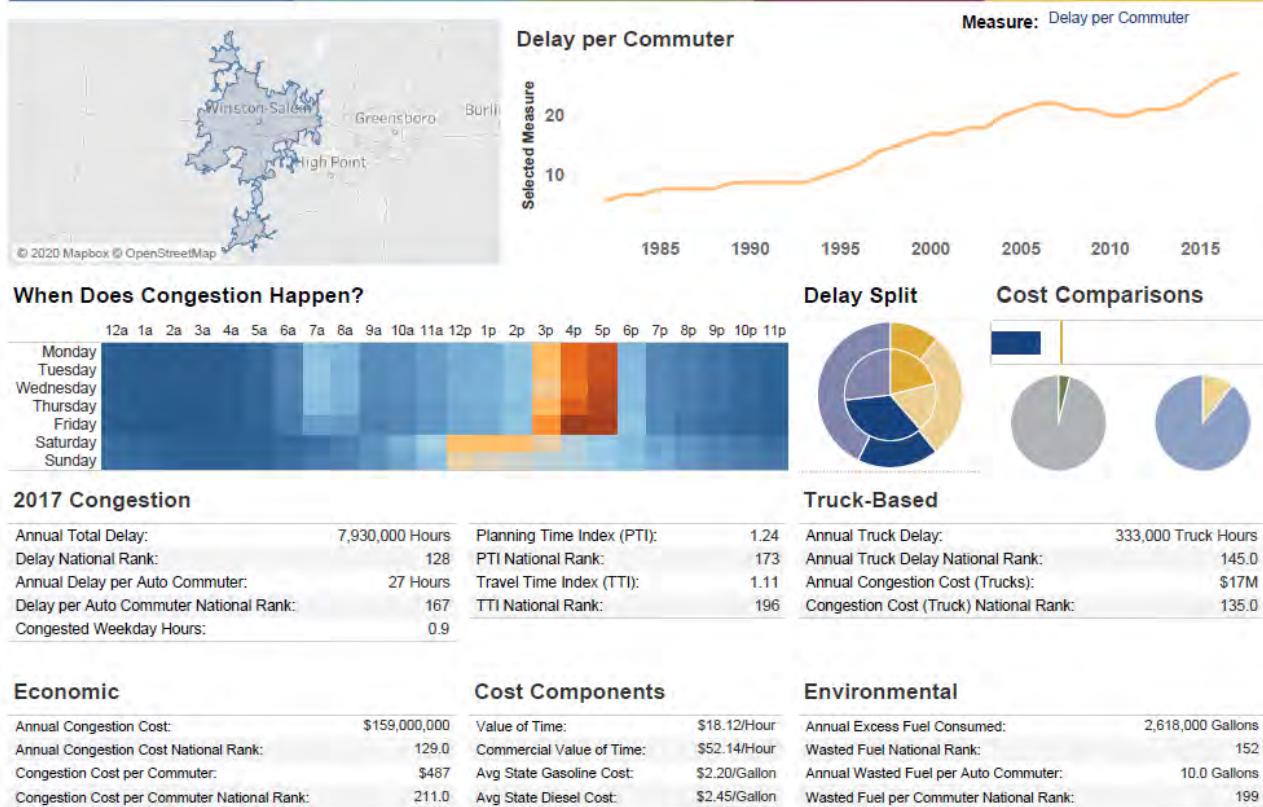


Figure D1: Winston-Salem Urban Area Congestion and Delay Summary Fact Sheet. Source: Texas A&M Transportation Institute, Urban Mobility Report 2019. Retrieved from <https://mobility.tamu.edu/umr/congestion-data/>

While COVID has temporarily put a pause on increase in congestion, typical travel and congestion is likely to return to its trajectory of upward climb when the post-COVID conditions normalize and economic activity is back to where it was prior to the start of the Pandemic.

The Process

In working with the Steering Committee for the Metropolitan Transportation Plan, and with additional feedback from the public input received through an online survey, the following goals and objectives have been identified for the MTP and have been carried forward into the CMP update process.

Table D1: Winston-Salem Urban Area MPO MTP 2045 Goals and Objectives

Goals	Objectives
I. Improve mobility and accessibility for people and goods across the region	<ul style="list-style-type: none"> 1) Promote equitable transportation options for low-income and minority communities, and the aging population 2) Reduce congestion on key interstates and arterial corridors 3) Improve freight access to industrial/distribution centers and freight terminals, such as airports and railyards 4) Support improvements to the rail infrastructure including railroad crossing improvements and intermodal facilities 5) Improve availability of premium transit options such as express bus routes, light rail and streetcar lines 6) Improve last mile access to public transit with enhanced pedestrian safety, bicycle and shared mobility options at major transit stops
II. Support smart regional growth and economic development	<ul style="list-style-type: none"> 1) Improve transportation options between urban job centers and rural and suburban places 2) Increase the number of jobs accessible within a reasonable commute travel time 3) Enhance connections between major destinations such as employment and education centers, medical and transit facilities and neighborhoods 4) Ensure transportation infrastructure is supportive of visitor trips and tourism
III. Create Vibrant, Healthy, and Resilient Communities	<ul style="list-style-type: none"> 1) Improve the connectivity of walking, bicycling and greenway network 2) Protect and strengthen a sense of place and vibrancy of downtowns and walkable mixed-use activity centers 3) Retrofit arterial corridors and major roadways to be consistent with complete streets principles 4) Integrate land use and transportation planning 5) Incorporate resilience concepts into transportation projects by planning for extreme weather and stormwater impacts as part of transportation projects
IV. Improve safety and security of the transportation network	<ul style="list-style-type: none"> 1) Prioritize safety improvements at intersection locations with high frequency of crashes and fatalities 2) Reduce the number and severity of crashes and safety incidents on major arterial corridors 3) Reduce the number and severity of bicycle and pedestrian crashes 4) Enable improved safety through ITS improvements 5) Improve transportation network connectivity and redundancy for more efficient emergency response

V. Support transportation for tomorrow	<ul style="list-style-type: none"> 1) Reduce Greenhouse Gas Emissions associated with transportation sector through increased use of alternative fuels, TDM strategies, transit, walking and bicycling 2) Support alternative fuels and autonomous and connected vehicles infrastructure improvements 3) Prioritize Intelligent Transportation Systems (ITS) infrastructure to address congestion and travel time reliability 4) Designate “feet first” areas where walkability, bicycling and transit service is prioritized ahead of mobility for autonomous vehicles
VI. Ensure maintenance of existing infrastructure and services	<ul style="list-style-type: none"> 1) Ensure adequate funding to preserve and maintain the integrity of the existing transportation infrastructure 2) Prioritize funding to support existing transit services and transit state of good repair 3) Promote public-private partnerships in addressing transportation needs

During the May 5-May 21, 2020 timeframe, an online public survey was held as part of the Metropolitan Transportation Plan update process. During this period, a total of 419 unique responses were received. Survey participants were asked to complete various questions and tasks to gauge problem locations, areas of high demand, budget allocation, project type prioritization, and sociodemographic information.

As part of the survey, participants were asked to place interactive map markers to document their frequent destinations or areas of concern. Under “roadway/traffic” category for interactive map exercise performed as part of the survey, congestion was the most frequent choice. Figure D2 below illustrates the types of concerns noted for roadway/traffic category.

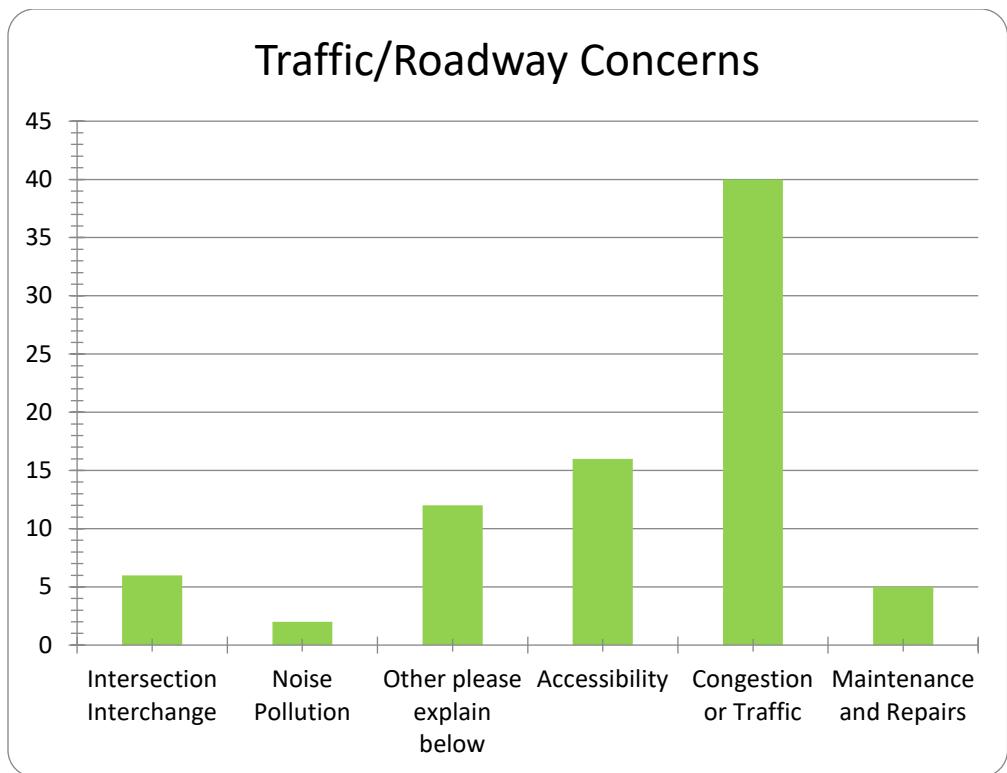


Figure D2: Public Survey Responses (May 2020) Indicating Roadway and Traffic Concerns, by Specific Type of Concern

Figure D3 below provides a map of locations for roadway concerns noted by survey participants. There are several notable concentrations for roadway congestion concerns—in the area around Bermuda Run, south and southwest of Kernersville, along Hanes Mall Boulevard, and along key east-west and north-south corridors in Winston-Salem.

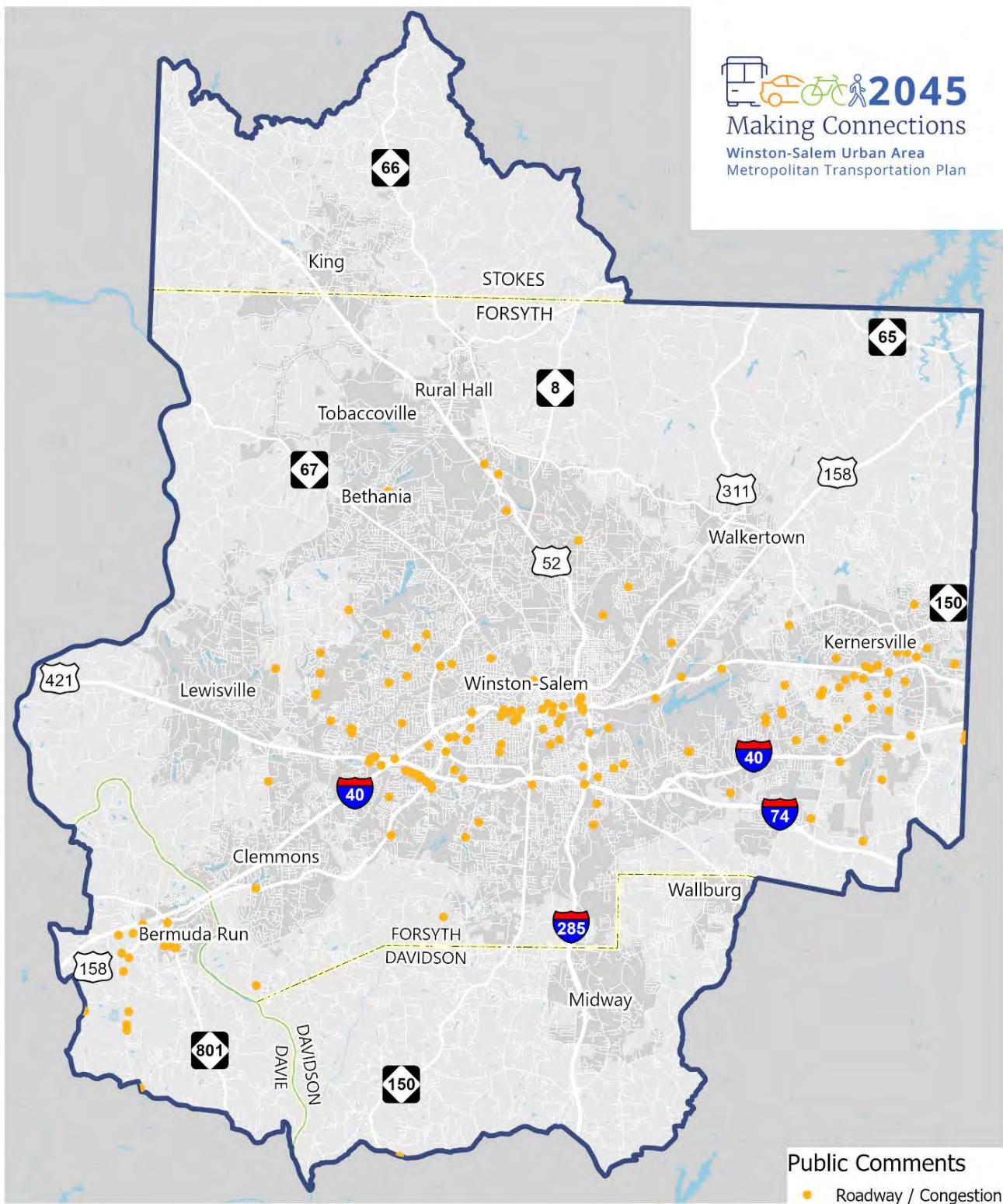


Figure D3: Public Survey Responses (May 2020) Roadway Concerns Locations

Identifying Priority Congested Corridors

The MTP includes several approaches to identifying and addressing congestion along corridors and in key areas. These included an analysis of HERE data (probe and Bluetooth data) and the region's travel demand model for the baseline year—referred to as Existing Conditions—and forecasted to 2045 with the regional travel demand model. The congested corridors are identified below, and while both methods indicate overlapping areas, their methodologies are different and provide contrasting perspectives.

Traffic congestion during the PM peak period was analyzed using real-time HERE data from 2018. Congestion appears to be most frequent and severe along key sections of major arterial corridors, many of them running in the north-south direction and connecting to I-40, US 421, and US 52. Congested arterials include segments of Silas Creek Parkway and Martin Luther King, Jr. Dr. See Figure D4 below for PM Peak congestion hotspots based on HERE data.

The PART PTRM model was used to identify priority congested corridors for the baseline 2017 and final MTP horizon year of 2045. Corridors of approximately one mile or longer with functional classifications of Principal Arterial or higher were selected if the volume over congestion (Volume/Capacity) exceeded the threshold of 0.90 during the PM Peak Period (3PM-6PM). These corridors are listed in Table D3 and shown for the baseline and year 2045 in Figure D5 and Figure D6, respectively.

There are several projects within the 2045 MTP that are anticipated to reduce congestion along the identified corridors in 2045. These improvements are not able to be modeled in PTRM due to the model's limitations. The adoption of ITS along the I-40, Silas Creek Parkway, US-52, and I-74 is likely to reduce congestion through improving incident response times, improving safety, and improved traffic flow. Additionally, the 2045 MTP includes intersection and interchange improvement projects along these corridors that—while unable to be modeled—will also likely address congestion issues. Congestion-reduction strategies are explained in greater detail below.

Table D2 - List of Congested Corridors by Scenario during PM Peak Period

2017 Congested Corridors	2045 Congested Corridors
Salem Parkway (US 158, 421, NC 150): Reidsville Road to Hawthorne Road SW	Salem Parkway (US 158, 421, NC 150): Reidsville Road to Hawthorne Road SW
Clemmons Road (US 158): Twins Way to Harper Road	Germanton Road (NC 8, SR 1725): Oak Summit Road to Old Hollow Road
Interstate 40: E Clemmons Road through S Main Street (Winston-Salem)	Interstate 40: Jonestown Road through S Peace Haven Road
US 421: Silas Creek Parkway to I-40	Interstate 40: I-74 through S Main Street
Kernersville Road (SR 4315): Masten Drive to Hastings Hill Road	NC 801: Andrew Road to I-40
Peters Creek Parkway (NC 150): Lumber Lane to Brewer Road	Peters Creek Parkway (NC 150): Lumber Lane to I-40
Silas Creek Parkway (NC 67): Salem Parkway to Pennington Lane	Reidsville Road (US 158): Winston-Salem Northern Beltway to Old Hollow Road
Stratford Road (South) (US 158): I-40 to Kimwell Drive	Silas Creek Parkway (NC 67): Salem Parkway to Kirklees Road
US 52 (NC 8): US 421 to E 25th Street	Stratford Road (South) (US 158): W Clemmons Road to Idols Road
	Stratford Road (South) (US 158): I-40 to Kimwell Drive
	US 158: Baltimore Road to Laird Road
	US 421 (West): Silas Creek Parkway to I-40
	US 52 (NC 8): Waughton Street to Rams Drive
	US 52 (NC 8): US 421 to E 25th Street

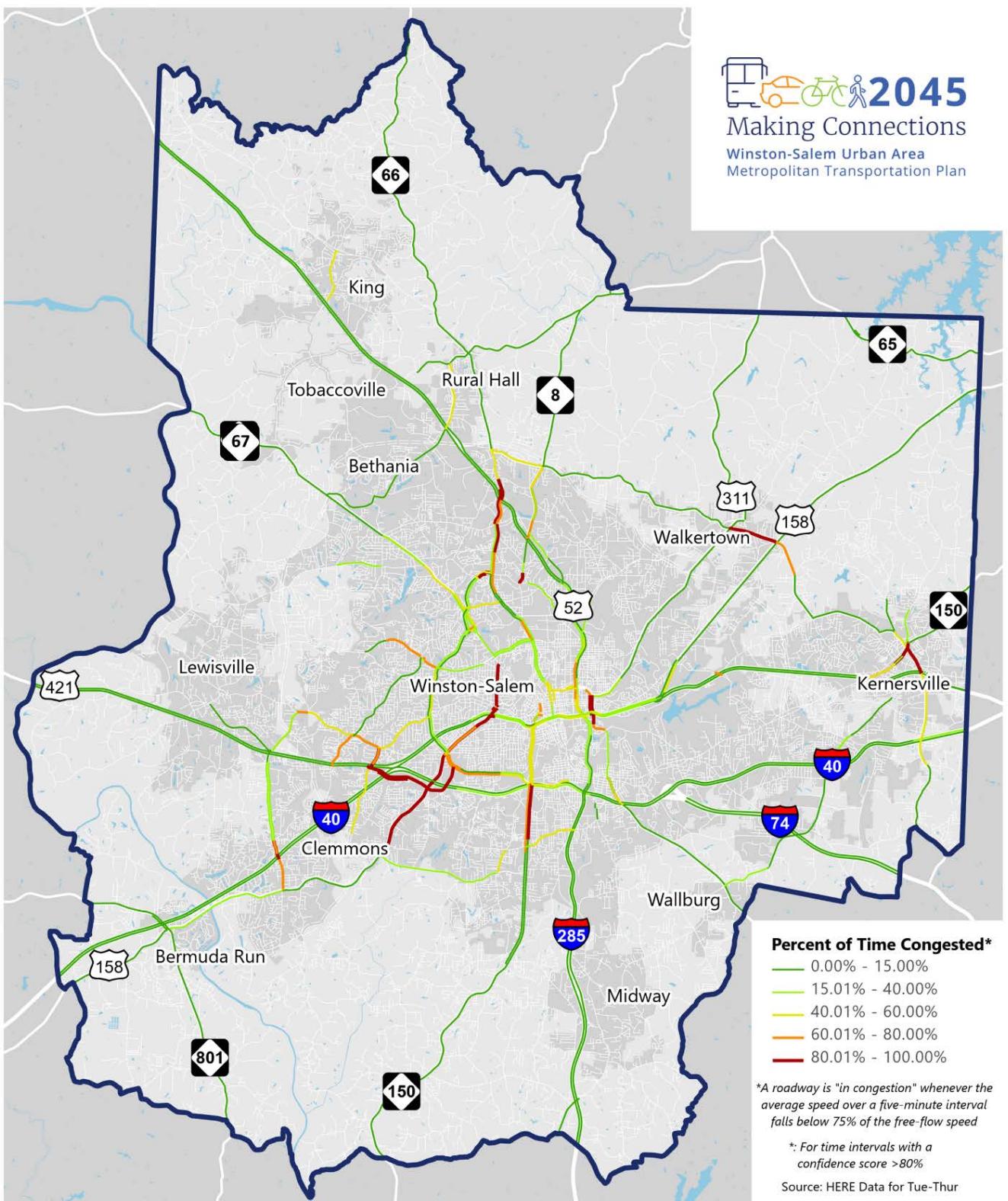


Figure D4 - Percent of Time Roadway Corridors are Congested during PM Peak, based on 2018 HERE Data for Tuesday-Thursday

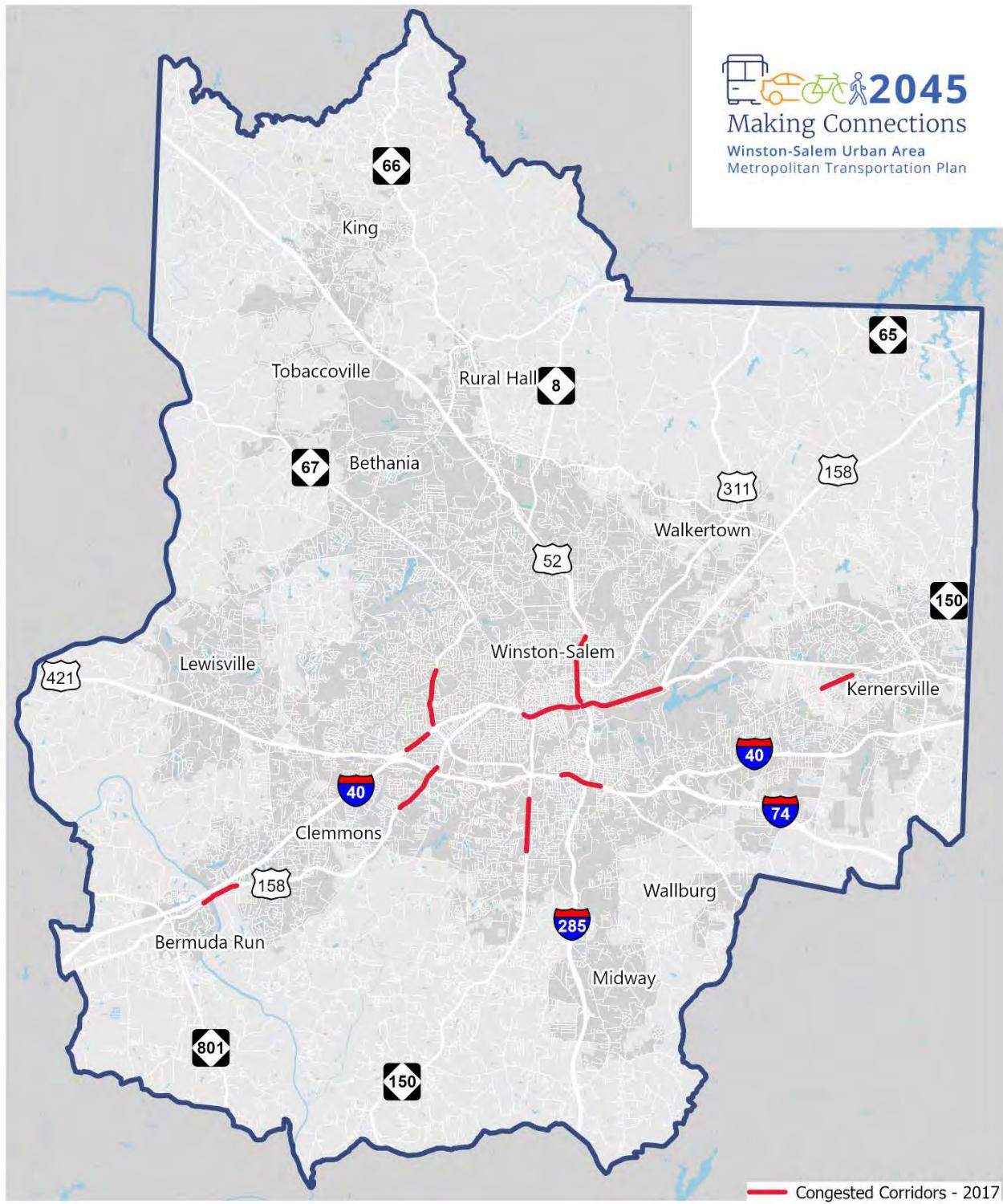


Figure D5 - Congested Corridors for 2017 Baseline during PM Peak Period

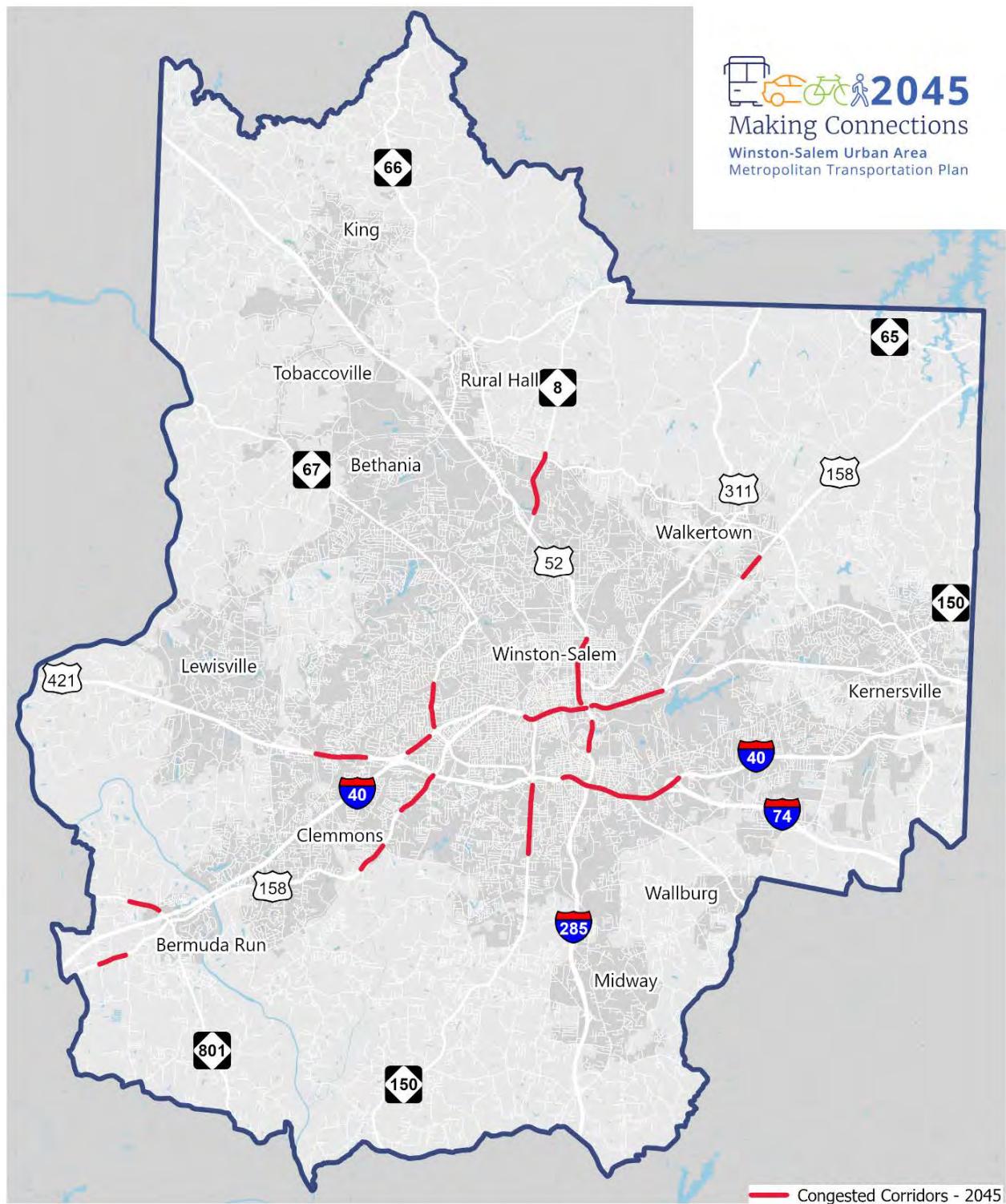


Figure D6 - Congested Corridors for 2045 Horizon Year during PM Peak Period

Strategies for Relieving Congestion

Addressing recurring congestion in the Winston-Salem Urban Area may include but is not limited to the following strategies:

- Transportation Demand Management
- Public Transportation
- Improvements to Bicycle and Pedestrian Infrastructure
- Parking Management and Pricing
- Intelligent Transportation Systems (ITS)
- Roadway Modernization and Operational Improvements, Access Management and Innovative Intersections
- Roadway Capacity Expansion

Transportation Demand Management

PART's Commuter Operations Department manages the Transportation Demand Management (TDM) program for the greater Triad region. The department works to educate, advocate, and provide alternative transportation strategies to reduce single-occupancy vehicle trips in the Triad. The department serves as a resource for commuters interested in riding transit, carpooling, or vanpooling.

Vanpool Program

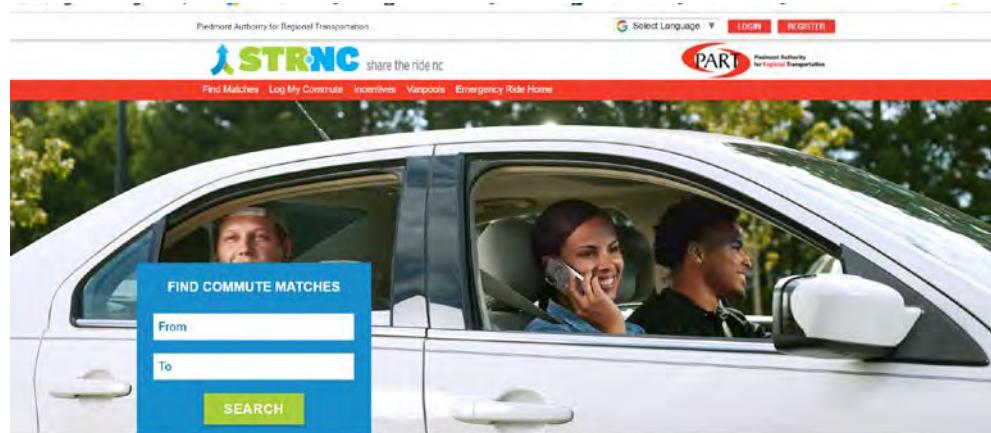
The PART Vanpool Program provides eligible groups of five or more commuters with a 7 or 15 passenger van to use to commute to and from work. The month-to-month lease includes the vehicle, insurance, maintenance, gas, and in some cases an Emergency Ride Home. The vanpool fare is determined by the size of the van and the number of miles the van travels per month. The fare is then split evenly by the number of participants. What makes the vanpool program unique is that it is operated by members of the group and travels based on the schedules developed by the group. As of calendar year 2019, the vanpool program is averaging 54 leased vans per month. This equates to more than 13 Million miles of reduced single occupancy travel on our roadways each year with a PART fleet of 65 vans.



PART Vanpool Vehicle. Image Courtesy of PART

Carpool Support

PART plays an active role in promoting carpooling in the region through a partnership with the Share the Ride NC (STRNC) statewide rideshare matching platform. STRNC, which is accessible on [PART's website](#), allows commuters in North Carolina to quickly and securely find other individuals who share similar commutes and work hours, and are interested in carpooling or vanpooling. Commuters simply create a profile, identify and communicate with matches, and start sharing the ride. As of January 2020, there are 177 individuals registered in the STRNC platform.



Share the Ride NC Website, sharetheridenc.org/

PARTnership Program for Employers

In 2018, the Commuter Resources Department implemented the PARTnership Program. The PARTnership is a free full-service resource for employers in the Triad. The goal of the program is to improve mobility for employees by identifying alternatives to driving alone, marketing sustainable options, and reporting results. As a member of the PARTnership, employers are eligible to take advantage of incentives such as PART's Triad XPass Employer Discount Program. The XPass program provides a 30% discount off the cost of a PART 31-Day and 10-Ride bus pass through PART's TouchPass Mobile & Smartcard faring system.

Public Transportation

Continuing and Expanding Frequency and Service Area of Existing Public Transportation Services

Public Transportation services bring a variety of benefits not just to users who have improved mobility options, but to the society as a whole. Todd Littman in [Evaluating Public Transit Benefits](#)

and Costs: Best Practices Guidebook identifies the following public transit project benefits categories: improved transit service, increased transit travel, reduced automobile travel and transit-oriented development⁶ Under the umbrella of reduced automobile travel, the following benefits to the society at large and to the traveling public are recognized:

Reduced Automobile Travel Benefits:

- Reduced traffic congestion
- Road and parking facility cost savings
- Consumer savings
- Reduced chauffeuring burdens
- Increased traffic safety
- Energy conservation

WSUAMPO MTP 2045 included the following funded public transportation improvements as part of the financial plan. Additional improvements to local and express bus routes and new public transportation modes were identified as part of the unfunded MTP/Comprehensive Transportation Plan.

- **WS-Tran-040 Upgrade WSTA Administrative and Maintenance Building** The existing WSTA Administrative and Maintenance Building, located at 1060 Trade Street in Winston-Salem, is in need of modernization and capacity enhancements to further WSTA's mission. Design services for the new building are anticipated to be procured in Fall 2020. The estimated planning-level cost estimate for this facility is \$20 million, pending a feasibility study.
- **WS-Tran-047 Increase Frequency on WSTA Route 96** This project would improve WSTA Route 96 all day headways from 60-minutes to 30-minutes. Route 96 is the second highest ridership route in the WSTA system, serving 13,563 customers in October 2019. Route 96 serves Downtown Winston-Salem, New Walkertown Rd. & Dellabrook Rd., Teresa Ave. & Carver School Rd., and Butterfield Dr. & Oak Ridge Dr. Improving the headway of this route can lead to increased ridership by allowing customers to better fit their transit trip to their schedule, whether getting to a job, shopping for groceries, or visiting friends. It is estimated that one additional bus and operator will be needed to operate Route 96 with 30-minute headways. The capital cost of one additional WSTA bus is \$800,000 while annual operating expenses were calculated to be approximately \$500,000.
- **WS-Tran-054 Increase Frequency on WSTA Route 92** This project would improve WSTA Route 92 all day headways from 60-minutes to 30-minutes. Route 92 is the third highest ridership route in the WSTA system, serving 12,893 customers in October 2019. Route 92 serves Downtown Winston-Salem, Cleveland Ave & 25th St., Patterson Ave. & Indiana Ave., and Oak Summit Rd. & Old Rural Hall Rd. Improving the headway of this route can lead to increased ridership by allowing

⁶ Littman, Todd (2020, June 5). Evaluating Public Transit Benefits and Costs: Best Practices Guidebook. Victoria Transport Policy Institute. Retrieved from <https://www.vtpi.org/tranben.pdf>

customers to better fit their transit trip to their schedule, whether getting to a job, shopping for groceries, or visiting friends. It is estimated that one additional bus and operator will be needed to operate Route 92 with 30-minute headways. The capital cost of one additional WSTA bus is \$800,000 while annual operating expenses were calculated to be approximately \$500,000.

- **WS-Tran-055 Improve PART Route 1 Mid-Day Service**

PART has identified the need to improve their urban express routes including Route 1 (Winston-Salem Express), Route 2 (Greensboro Express), and Route 3 (High Point Express). All three routes meet near the Piedmont Triad Airport at the CTC. These three routes currently operate with 30-minute peak headways and hourly off-peak headways. Enhancing midday service will allow for improved regional transit connections throughout the day. PART estimated that the improvement to these three routes would result in 5,904 additional operating hours per year and would necessitate additional annual operating funds of \$820,990.56.

Electronic Fare Collection and Fare Free Transit

PART launched TouchPass fare collection system-wide in August 2019. TouchPass uses electronic fare collection to replace the use of paper magstripe passes. Passengers no longer have to wait in line at the ticket window to buy a pass but can purchase their pass over the internet using the secure TouchPass system. Along with the implementation of TouchPass, PART Express added daily and monthly Fare Capping to its fare structure. The TouchPass system is administered through the Commuter Resources Department Regional Call Center. During its first year of implementation 75% of PART Express passengers were taking advantage of the TouchPass platform.

Bicycle and Pedestrian Infrastructure

Bicycle and pedestrian trips can help reduce congestion on highway corridors where it is feasible and safe to make shorter trips on foot and by bicycle. Littman (2020) notes that in urban areas, between 10-30% of trips are short trips that could be potentially shifted to active transportation; poor walking and bicycling conditions are likely to result in additional vehicular trips in the following circumstances:

- Poor walking and cycling conditions force people to drive for even short trips, for example across a driveway
- Poor walking and cycling conditions increase chauffeuring trips (special trips made to transport a non-driver)
- Poor walking and cycling conditions discourage public transit and rideshare travel (car- and vanpooling), which reduces longer vehicle trips.⁷

⁷ Littman, Todd. (2020, June 5). Evaluating Active Transport Benefits and Costs Guide to Valuing Walking and Cycling Improvements and Encouragement Programs. Victoria Transport Policy Institute Retrieved from <https://www.vtpi.org/nmt-tdm.pdf>

Littman notes that bicycling trips on narrow, congested roadways with faster speeds without a dedicated bicycle facility could cause additional congestion by slowing down traffic; however, where adequate on-road or off-road bicycle facilities are provided, active transportation is unlikely to cause significant congestion impacts⁸.

WSUAMPO MTP 2045 identifies a number of stand-alone bicycle, pedestrian and greenway projects as part of the financial plan. Additional bicycle and pedestrian infrastructure improvements are expected to be implemented as part of roadway projects under the NCDOT Complete Streets Policy.

Parking Management and Pricing

Winston-Salem Urban Area MPO planning region includes a number of vibrant downtowns with a mix of land uses. As the region continue to grow and develop, managing parking in downtown areas is important to support congestion management goals while ensuring that local businesses can still thrive and their customers can access the parking they need. The transportation system is seeing an evolution from simple parking pricing and management to a curb space management approach to divide space by time and zones among on-street parking, goods delivery, ride-hailing, transit stops, bike lanes, and other elements of complete streets design creates conflicts that must be actively managed. Designs and policies along active main street corridors can have a significant impact on travel behavior and first-mile/last-mile options for passenger trips and deliveries. WSUAMPO member jurisdictions are encouraged to consider the following curbside management policy ideas and planning strategies in downtown areas:

- *Off-Street Parking and Wayfinding:* On-street and off-street parking serve different needs and can affect traffic demand on the street network. Off-street parking can influence on-street parking usage where higher turnover is desired for customers making short-term trips. Improved wayfinding to off-street parking improves the drivers experience. With higher reliance on cell phone navigation apps, drivers can consider parking options as part of their route planning, rather than after arriving at their destination. Parking lot signage and wayfinding can reduce the congestion caused by vehicles cruising for on-street parking.
- *On-Street Parking Turnover and Pricing:* Most main streets in the WSUAMPO have free on-street parking. If a jurisdiction desires higher turnover in these spaces, increasing enforcement adherence to time limits or charging a parking fee are two options. Increasing on-street parking turnover ensures adequate parking spaces are available for individuals making short trips or visiting a retail shop or restaurant. Recent technology

⁸ Littman, Todd. (2020, June 5). Evaluating Active Transport Benefits and Costs Guide to Valuing Walking and Cycling Improvements and Encouragement Programs. Victoria Transport Policy Institute Retrieved from <https://www.vtpi.org/nmt-tdm.pdf>

improvements have made it more affordable for municipalities to acquire parking payment infrastructure such as multi-space meters and parking apps.

- *Loading Zones and Dual Use Zones:* Delivery vehicles of all sizes must navigate the limited spaces within historical downtowns and limited loading zones. Owners of locally owned small businesses often load out of their personal vehicles. Planning for adequate loading zones ensures space is available as deliveries increase. Dual use of zones (such as on-street parking and commercial loading zones) by time-of-day and day-of-week can also increase loading space capacity. Pedestrian and vehicular conflicts can be reduced by designating dual use space for ride-hailing and taxis during weekends and evenings.
- *Complete Streets at the Curb:* Bicycles, pedestrian, and transit mix at the curb with delivery trucks and on-street parking. Safety considerations such as appropriate spacing between transit stops (such as the potential Graham and Mebane circulator stops) and commercial loading zones, driveways, crosswalks, and intersections are needed to improve visibility. Bicycle facilities such as bike lanes or lane reconfigurations can create space for a variety of street uses. Streetscaping enhancements that widen sidewalks or provide pedestrian bulb outs make space for transit shelters and outdoor dining, yielding a more welcoming and pedestrian-oriented environment. ADA compliance for adequate handicap on-street parking spaces per block and curb cuts improve accessibility and safety for all users.
- *Community Prioritization and Pilot Programs:* Each main street is unique, so understanding local stakeholders' priorities along each block helps determine how curb space should be used and managed. Pilot programs are great ways to test out new strategies before installing them. Dual use zones and bike lanes are suitable pilot projects.

Intelligent Transportation Systems (ITS)

The 2045 MTP recommends the adoption of the Intelligent Transportation Systems (ITS) throughout the WSUAMPO area as described in the Triad Regional Intelligent Transportation Systems Strategic Deployment Plan. The Strategic Deployment Plan (SDP) "establishes the foundation for the SDP through stakeholder engagement and a regional gap assessment; follows the process into the project development, prioritization, and creation of the regional ITS architecture; and, consolidates the outputs of the SDP and provides details related to implementing a project, along with processes for maintaining and updating the SDP."⁹ ITS technology treatments include advanced signal technologies, enhanced surveillance, en-route traveler information, Bus on Shoulder support, ramp metering, transit signal priority, and incident response (see Table D3). These types of improvements can decrease congestion, reduce travel times, improve transit on time performance, and increase safety.

⁹ Triad Regional Intelligent Transportation Systems Strategic Deployment Plan, May 2020.

Table D3 - ITS Treatment Strategies

Treatment Strategy	Description
En-Route Traveler Information Improvements	Real time updates broadcast to the vehicle (e.g. Dynamic Message Signs (DMS), X2V communications).
Advanced Signal Technology	Optimized coordination for signal operations (e.g. ATSPM, adaptive signals).
Bus on Shoulder	Use of the shoulder as a travel lane by buses when mainline travel speeds drop below specific thresholds.
Hard Shoulder Running	Use of the shoulder as a travel lane by all vehicles during specific scenarios such as peak periods or during a major incident.
Ramp Metering	Traffic signals operated at freeway on-ramps to control the rate and impact of vehicles entering mainline traffic.
Transit Signal Priority	Operational improvements that can extend the green time of a traffic signal when transit vehicles are behind schedule.
Enhanced Surveillance	Increased surveillance coverage to provide continuous monitoring capabilities on a roadway. Includes both blind spot and new corridor coverage.
Integrated Corridor Management	Management of a corridor as a system rather than as individual transportation networks.
Communication Upgrades	Improved communication for resiliency and redundancy through either additional connections or expanded bandwidth.

The 2045 MTP incorporates the recommended corridors from the Triad Regional ITS Strategic Deployment Plan. These projects are shown in Table D4 and are included as funded in the 2035 Horizon Year. They are also shown as part of the recommended Autonomous Vehicle (AV) Corridor network in see Figure D7 (the AV and ITS concepts are also described in 2045 MTP Chapter 5.6).

Table D4 - ITS Projects in MTP

MTP_ID	Facility	STIP ID	Project Description	Estimated Base Cost (2020 Millions USD)	Estimated YOE or Horizon Year	Future Cost in YOE (Millions USD)
WS-ITS-Rdwy-402	Silas Creek Pkwy from Hanes Mall Blvd to Robinhood Rd	N/A	ITS: Advanced Signal Technology	\$ 0.120	2035	\$ 0.155
WS-ITS-Rdwy-403	US 421 Salem Parkway from NC 68 to US 158	N/A	ITS: Bus on Shoulder, Enhanced Surveillance	\$ 0.578	2035	\$ 0.748
WS-ITS-Rdwy-404	US 52 from US 421 to Patterson Ave	N/A	ITS: Bus on Shoulder	\$ 0.304	2035	\$ 0.393
WS-ITS-Rdwy-406	I-40 from US 421 to Oak Grove Church Rd	N/A	ITS: Bus on Shoulder, Ramp Metering, Enhanced Surveillance	\$ 0.380	2035	\$ 0.491
WS-ITS-Rdwy-407	I-74 from I-40 to High Point Rd	N/A	ITS: Bus on Shoulder	\$ 3.097	2035	\$ 4.008

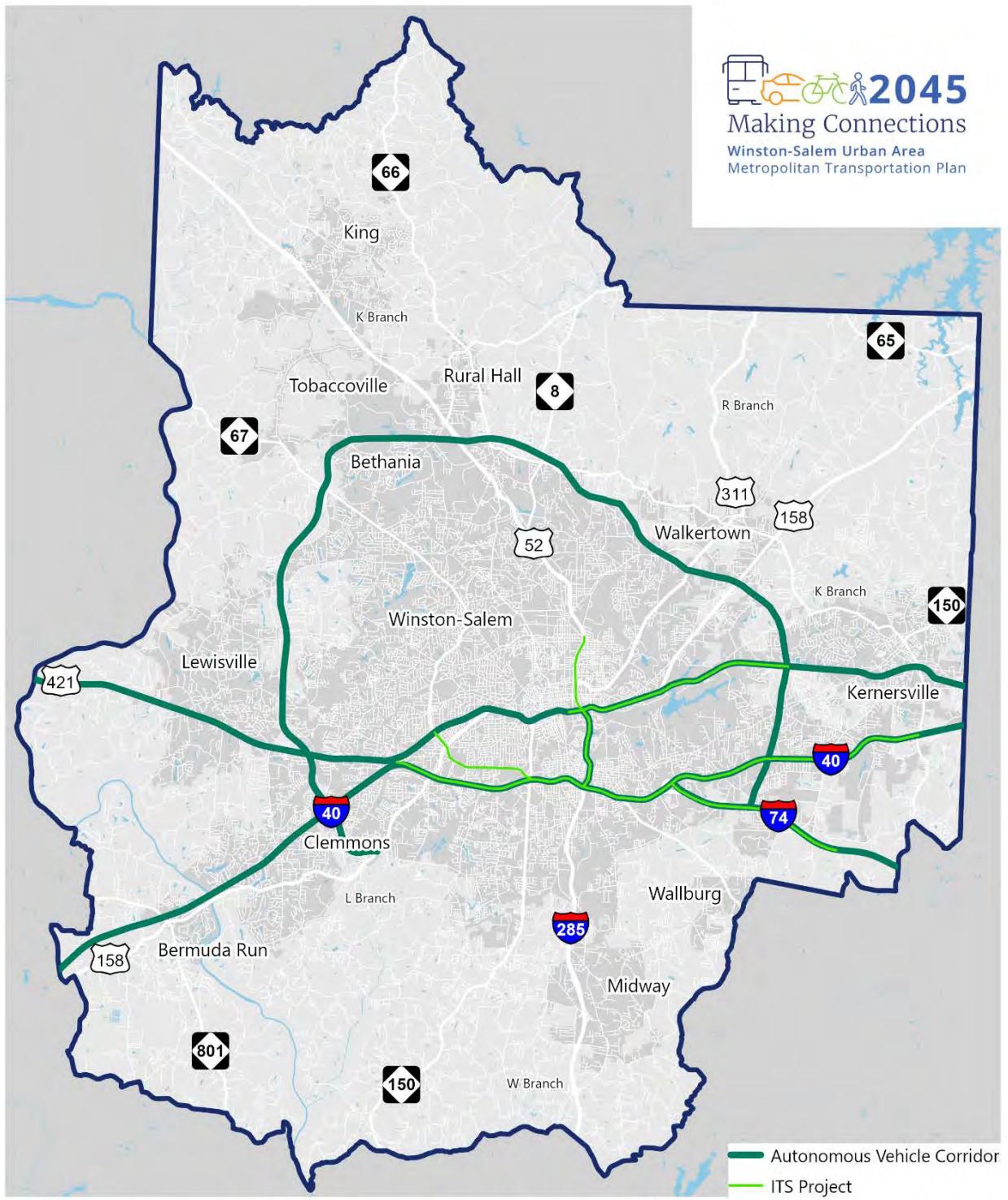


Figure D7 - ITS Project and Autonomous Vehicle Corridor Networks, as Identified in MTP 2045

Roadway Modernization and Operational Improvements, Access Management and Innovative Intersections

Access Management

Access Management is a term used to describe changing land use planning and roadway design practices to limit the number of driveways and intersections on arterials and highways, constructing medians to control turning movements, encouraging clustered development, and creating more pedestrian-oriented street designs; Access Management tends to increase traffic speeds, reduce congestion delays and reduce crashes¹⁰.

The Federal Highway Administration identifies the following Access Management techniques:

- Access Spacing: increasing the distance between traffic signals improves the flow of traffic on major arterials, reduces congestion, and improves air quality for heavily traveled corridors.
- Driveway Spacing: Fewer driveways spaced further apart allows for more orderly merging of traffic and present fewer challenges to drivers.
- Safe Turning Lanes: dedicated left- and right-turn, indirect left-turns and U-turns, and roundabouts keep through-traffic flowing. Roundabouts represent an opportunity to reduce an intersection with many conflict points or a severe crash history (T-bone crashes) to one that operates with fewer conflict points and less severe crashes (sideswipes) if they occur.
- Median Treatments: two-way left-turn lanes (TWLTL) and nontraversable, raised medians are examples of some of the most effective means to regulate access and reduce crashes.
- Right-of-Way Management: as it pertains to R/W reservation for future widenings, good sight distance, access location, and other access-related issues.

The goals of access management are to create a system that focuses on effective ingress and egress to a facility, efficient spacing and design to preserve the functional integrity, and overall operational viability of street and road systems.¹¹

Roadway Modernization and Operational Improvements

Roadway modernization attempts to maintain the transportation network while enhancing facilities that may not currently meet standards. This includes upgrades to the traveled way, signal system, transit facilities, and pedestrian/bicycle facilities to modernize transportation infrastructure for all modes. The implementation of roadway modernization allows enhancements to the transportation system that will enhance safety, improve efficiency, and

¹⁰ VTPI (2017). TDM Encyclopedia. Congestion Reduction Strategies: Identifying and Evaluating Strategies to Reduce Traffic Congestion. Retrieved from <https://www.vtpi.org/tdm/tdm96.htm>

¹¹ FHWA Office of Operations. What is Access Management. Retrieved from https://ops.fhwa.dot.gov/access_mgmt/what_is_acsmgmt.htm

address operational concerns without making major changes such as roadway widening or the construction of new roadway facilities.

Operational Improvements could include smaller improvements at particular intersections or interchange locations to improve the traffic flow while avoiding a major widening. Examples of operational improvements could include the following project types:

- Ramp Metering
- Ramp Closures
- Congestion Pricing
- Signal Retiming
- Signal Coordination
- Reversible Lanes
- Adaptive Signals
- Raised medians
- Right/Left Turn Channelization

Operational Improvements can often address the worst congestion issues along a corridor while carrying a lower cost than a major widening project.

Innovative Intersections

The implementation of innovative intersections address complex conditions to reduce delay, enhance efficiency, and improve safety at locations where traditional countermeasures do not adequately address operational and safety concerns. Innovative intersections attempt to enhance the traveled way for all roadway users and seek to integrate all modes of transportation in the design. Innovative intersections may convey the following additional benefits compared to conventional intersection treatments:

- Improved safety
- Increased efficiency
- Increased capacity
- Shorter wait times
- Long-term cost effectiveness

The following types of at-grade innovative intersection designs may be considered when conventional treatments do not adequately mitigate existing and future transportation problems¹²:

- Bowtie: left-turn movements from the mainline and side street are completed at an adjacent roundabout

¹² VDOT (2020). Innovative Intersections and Interchanges. Retrieved from <https://www.virginiadot.org/innovativeintersections/default.asp>

- Continuous Green-T: One major street through movement passes through the intersection without stopping, and the opposite major street is typically controlled by a traffic signal. Left-turn movements from the side street use a channelized receiving lane on the major street to merge into the flow of traffic.
- Displaced Left Turn (DLT): Left-turn movements cross to the other side of opposing through-traffic in advance of the main intersection. Left turns and opposing through movements occur simultaneously at the main intersection.
- Median U-Turn (MUT): Left-turn movements from one or both roadways make U-turns at dedicated median openings.
- Quadrant Roadway (QR): One main intersection and two secondary intersections that are linked by a connector road in any quadrant of the intersection. All left-turn movements use the secondary intersections and connector road to complete left-turn movements.
- Restricted Crossing U-Turn (RCUT): All side street movements make a right turn at the intersection. Side street left-turn and through movements turn right and make a U-turn at a dedicated downstream median opening to complete the desired movement.
- Split Intersection: Divides the major street into two one-way streets that meet the side street at separate intersections.
- Roundabout and Mini Roundabout: A circular intersection where traffic moves counterclockwise around a center island. A mini roundabout operates under the same traffic flow principles, but the center island is fully traversable for large vehicles.



Roundabouts Can Serve as Gateway Features in Addition to Providing Improved Traffic Flow Benefits. Example from Davidson, NC.

The State of North Carolina has analyzed and constructed many of the above referenced intersection designs and additional innovative interchange designs across the state. As the Winston-Salem Urban Area MPO planning region grows and traffic congestion increases,

innovative intersections may be needed to alleviate the growing congestion and balance the accommodations for all modes of transportation.

Roadway Capacity Expansion

Roadway widening and strategic new location roadway projects can help address significant roadway congestion problems where the other strategies considered are insufficient. While the 2045 MTP emphasizes modernization and multimodal improvements, it includes several significant capacity improvement projects. These projects are described below:

- I-40 Widening (WS-RdwY-107) – This 2045 Horizon Year project is the addition of travel lanes from six to eight on Interstate 40 from I-40/Salem Parkway to the connection with I-74. The project would improve direct routes for both local and through traffic and provide a critical connection to the Northern Beltway. This project would also reduce VMT, VHT, and preserve the value of existing infrastructure investments and projects. Finally, the widening and additional capacity could be utilized for managed lanes when coupled with the ITS improvements noted above.
- I-74, US 52 Widening (WS-RdwY-035) – This 2045 Horizon Year project is the addition of travel lanes from four to six on Interstate 74 from NC 65 (WNB) Ext 118 to Moore / RJR Drive Exit 122. The project would improve direct routes for both local and through traffic. This project would also reduce VMT, VHT, and preserve the value of existing infrastructure investments and projects.
- Northern Beltway (MTP project series WS-RdwY-(69 through 75, 78-79, and 80 through 84) – This project series is a new location four-lane median divided freeway facility from US 311 around the east, north, and west of Winston-Salem to US 157 (Stratford Road). This project diverts general and truck traffic off of congested routes needed by local trips. It is also anticipated to reduce congestion on Silas Creek Parkway, US 52, US 421, NC 66, University Parkway/Cherry Street, and NC 158 (Stratford Road). The project's Horizon Years span from the 2025 through 2045.

Monitoring Congestion Over Time

It is expected that the region will continue to monitor congestion both for priority congested corridors, and along other key freeway and principal arterial facilities over time. Tables D5 and D6 below illustrate the difference in Vehicular Miles Traveled and Vehicle Hours Traveled during PM Peak, by scenario, out to 2045. Metropolitan Transportation Plan 2045 recommended list of projects results in a decrease in the trips and travel time spent during PM peak that occurs under congested conditions (volume to capacity ratio of over 0.9), as compared with 2045 Existing plus Committed Scenario (2045 expected population and employment growth paired with improvements committed in the 2020-2029 STIP).

Table D5 PM Peak Period VMT and VHT Under Congested Conditions by County, by Scenario

County	VMT Under Congested PM Conditions (Max VoC >.90)					VHT Under Congested PM Conditions (Max VoC >.90)				
	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
Davidson	1,915	1,958	2,075	2,385	1,992	56	61	72	74	67
Davie	16,721	16,382	23,801	43,288	23,942	982	1,054	1,941	3,369	1,987
Forsyth	210,560	383,414	417,366	756,042	374,226	8,951	14,214	16,665	32,899	17,797
Stokes	-	-	-	-	-	-	-	-	-	-
Yadkin	-	-	-	-	-	-	-	-	-	-
PM Period Total	229,195	401,753	443,241	801,714	400,160	9,990	15,329	18,678	36,342	19,851
% of Total	7.52%	12.18%	12.09%	19.36%	9.68%	12.60%	17.53%	19.19%	30.28%	18.09%

Table D6 PM Peak Period VMT and VHT Under Congested Conditions by Roadway Type, by Scenario

WSUAMPO PM PERFORMANCE UNDER CONGESTED CONDITIONS (MAX VOC > .90) BY FUNCTIONAL CLASSIFICATION										
Functional Class	PM VMT					PM VHT				
	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
Local Roads	18,781	24,794	42,456	64,410	54,106	1,398	1,833	3,384	6,429	5,382
Collectors	50,654	69,534	74,474	124,320	88,629	2,439	3,386	3,829	6,414	4,262
Minor Arterials	9,304	9,560	13,350	19,355	13,656	487	534	795	1,118	682
Principal Arterials	59,309	68,377	67,852	109,746	74,327	2,562	2,864	2,855	4,808	2,915
Other Freeways or Expressways	72,055	107,439	92,193	205,109	99,292	2,149	3,298	3,147	7,543	3,620
Interstates	13,985	115,354	141,120	265,918	58,183	337	2,741	3,541	8,447	1,738
Ramps	5,108	6,695	11,796	12,855	11,968	618	673	1,126	1,583	1,251
WS - Total	229,195	401,753	443,241	801,714	400,160	9,990	15,329	18,678	36,342	19,851

Appendix E:

Environmental Justice Additional Maps

Transportation-disadvantaged population maps were mapped out separately in addition to combined Environmental Justice impact maps, to review the distribution of disadvantaged communities across the region. While there is a lot of overlap between multiple disadvantaged communities centered in the urban core of the region, there are also some notable differences. For example, the Towns of Kernersville and Clemmons have higher proportions of African American, Hispanic, and other racial and ethnic minorities than other towns inside the MPO, excluding Winston-Salem. Midway, Clemmons, and Kernersville also have block groups ranking above the MPO average for households in poverty. Both Clemmons and Kernersville contain block groups with above average zero car households, which may positively correlate to households in poverty. Above regional average limited English proficiency block groups were observed in many areas outside of Winston-Salem including, Bermuda Run, Clemmons, Lewisville, Rural Hall, Walkertown, Kernersville, and Midway.

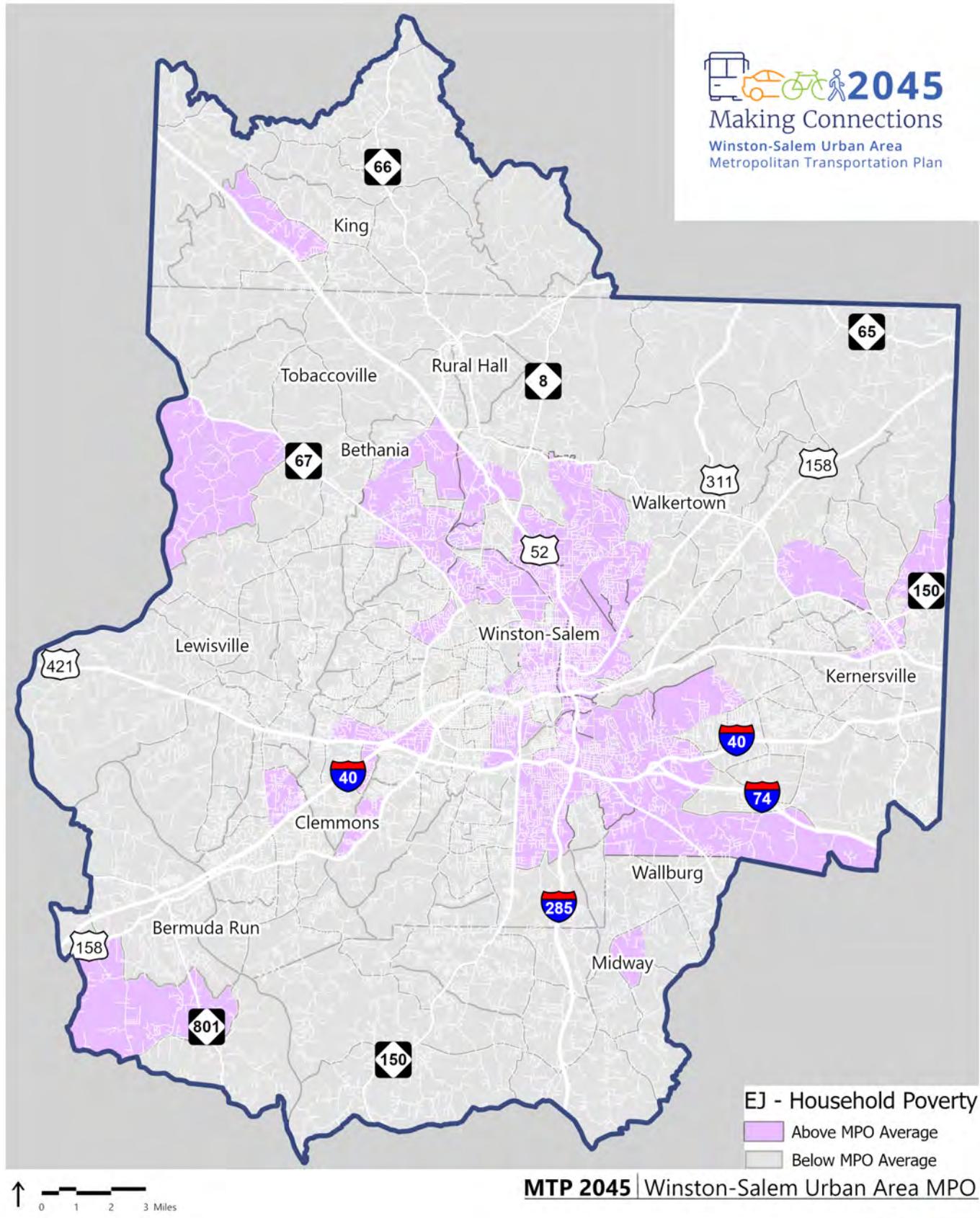


Figure 1 - Environmental Justice Component - Poverty



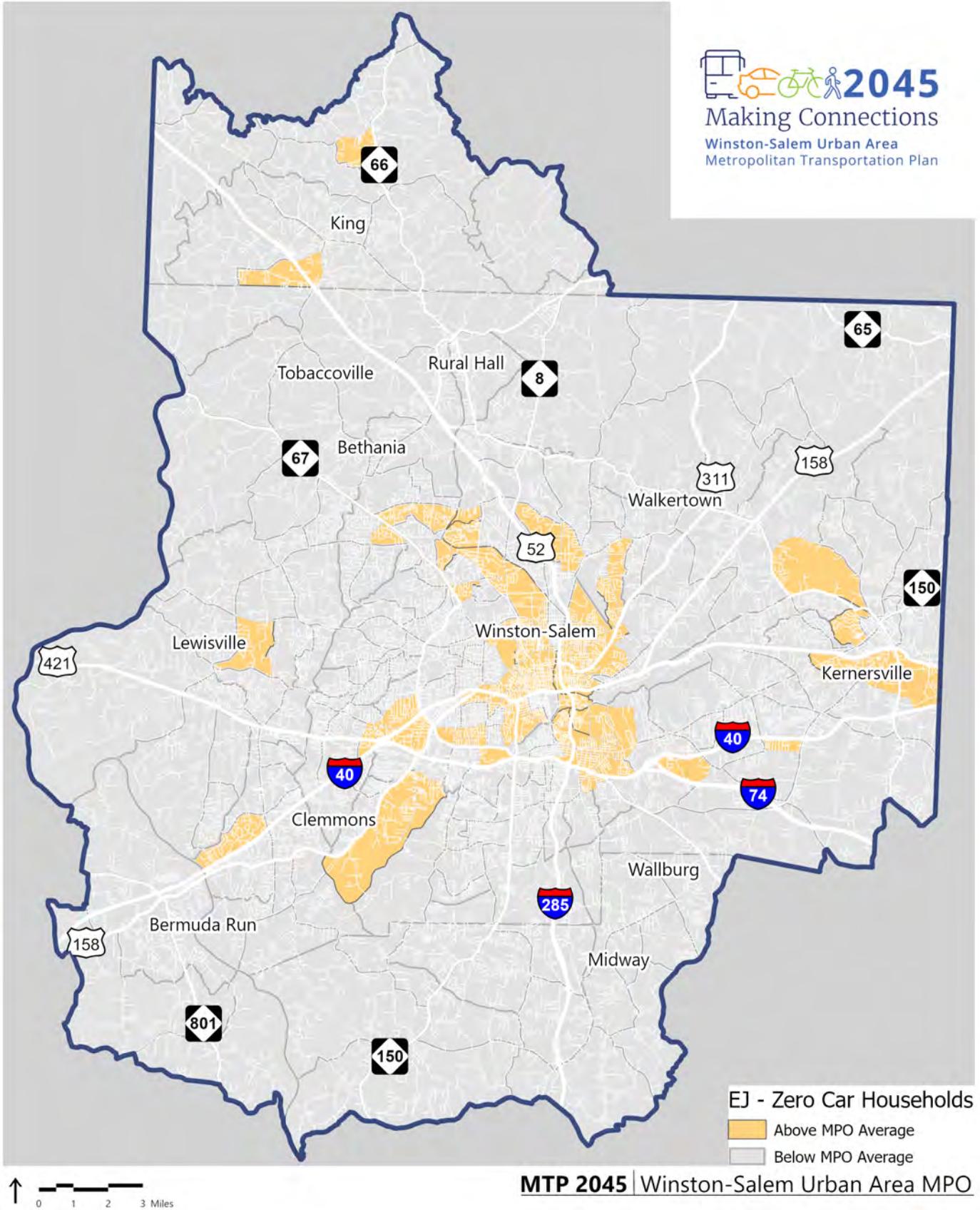


Figure 2 - Environmental Justice Component - Zero Car Households



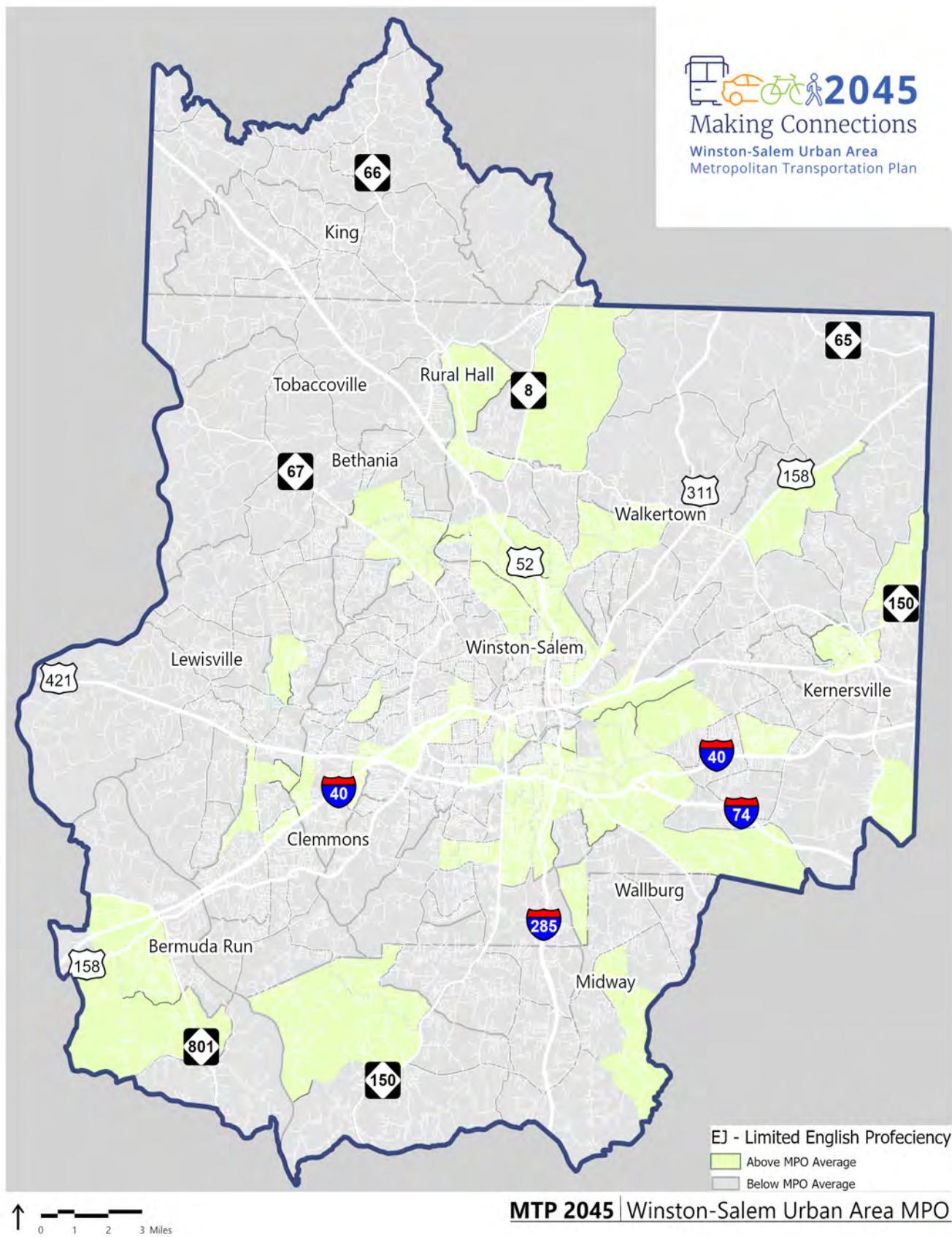


Figure 3 - Environmental Justice Component - Limited English Proficiency



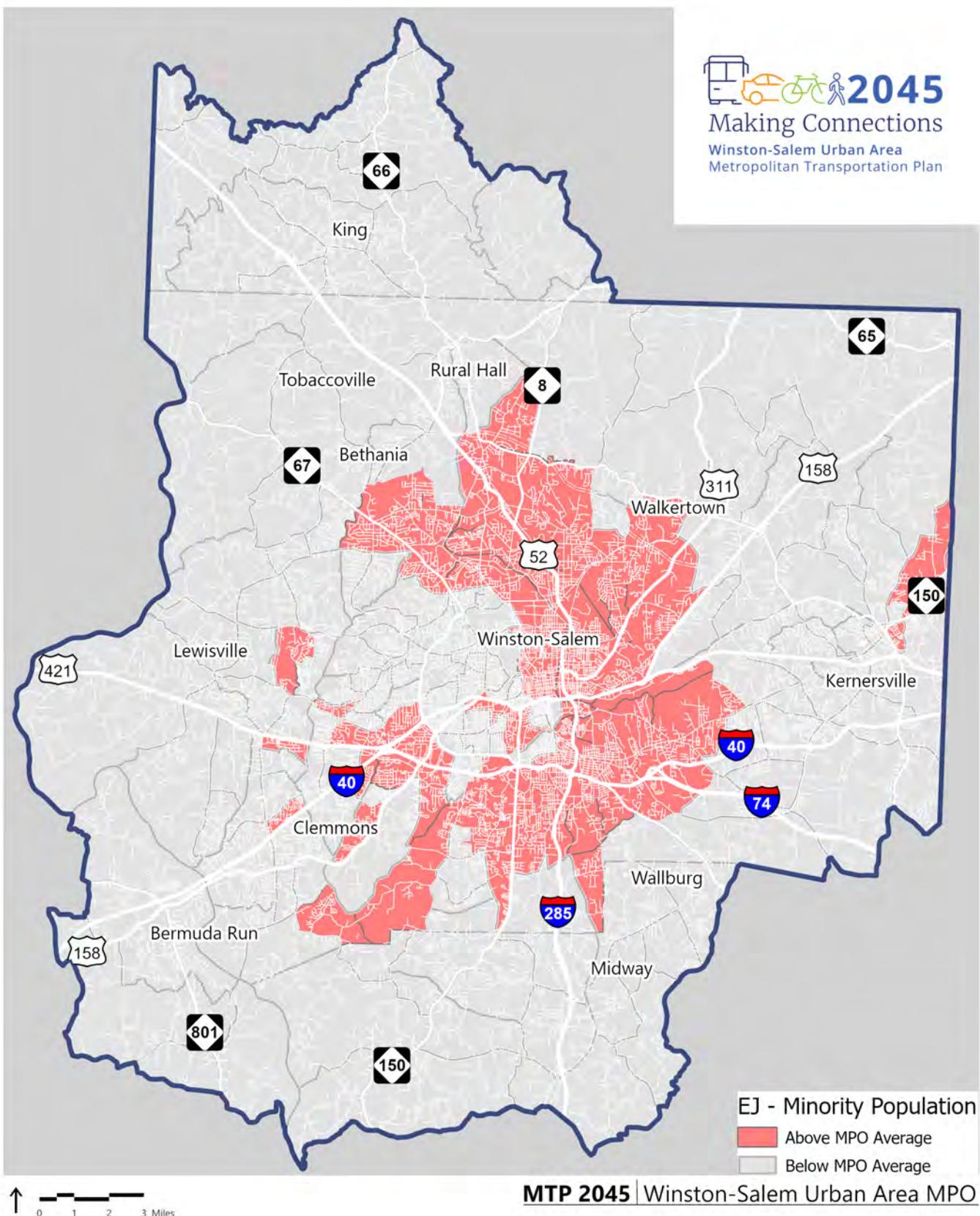


Figure 4 - Environmental Justice Component - Minority Population

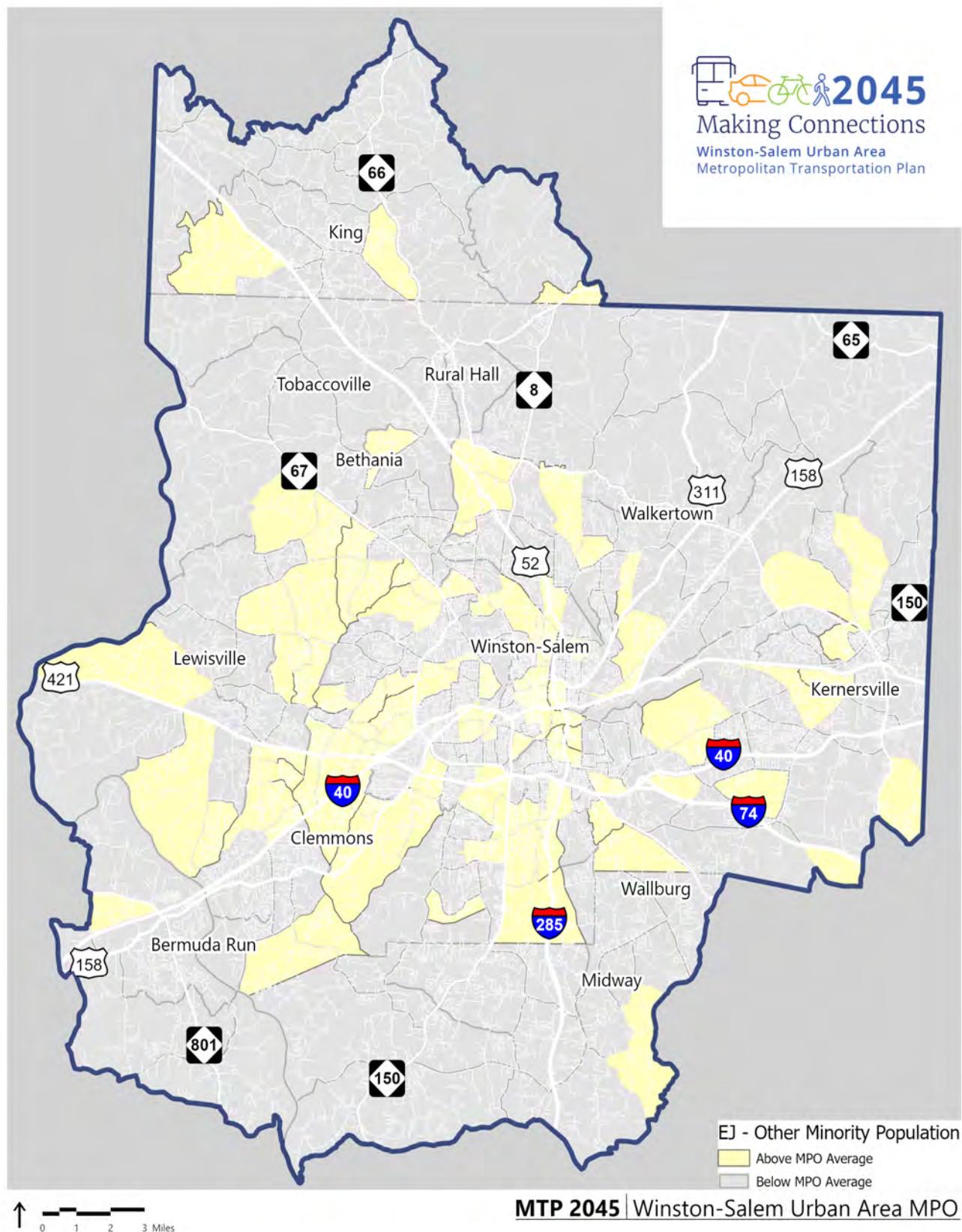




2045

Making Connections

Winston-Salem Urban Area
Metropolitan Transportation Plan



MTP 2045 | Winston-Salem Urban Area MPO



Figure 5 - Environmental Justice Component - Other Minority Population

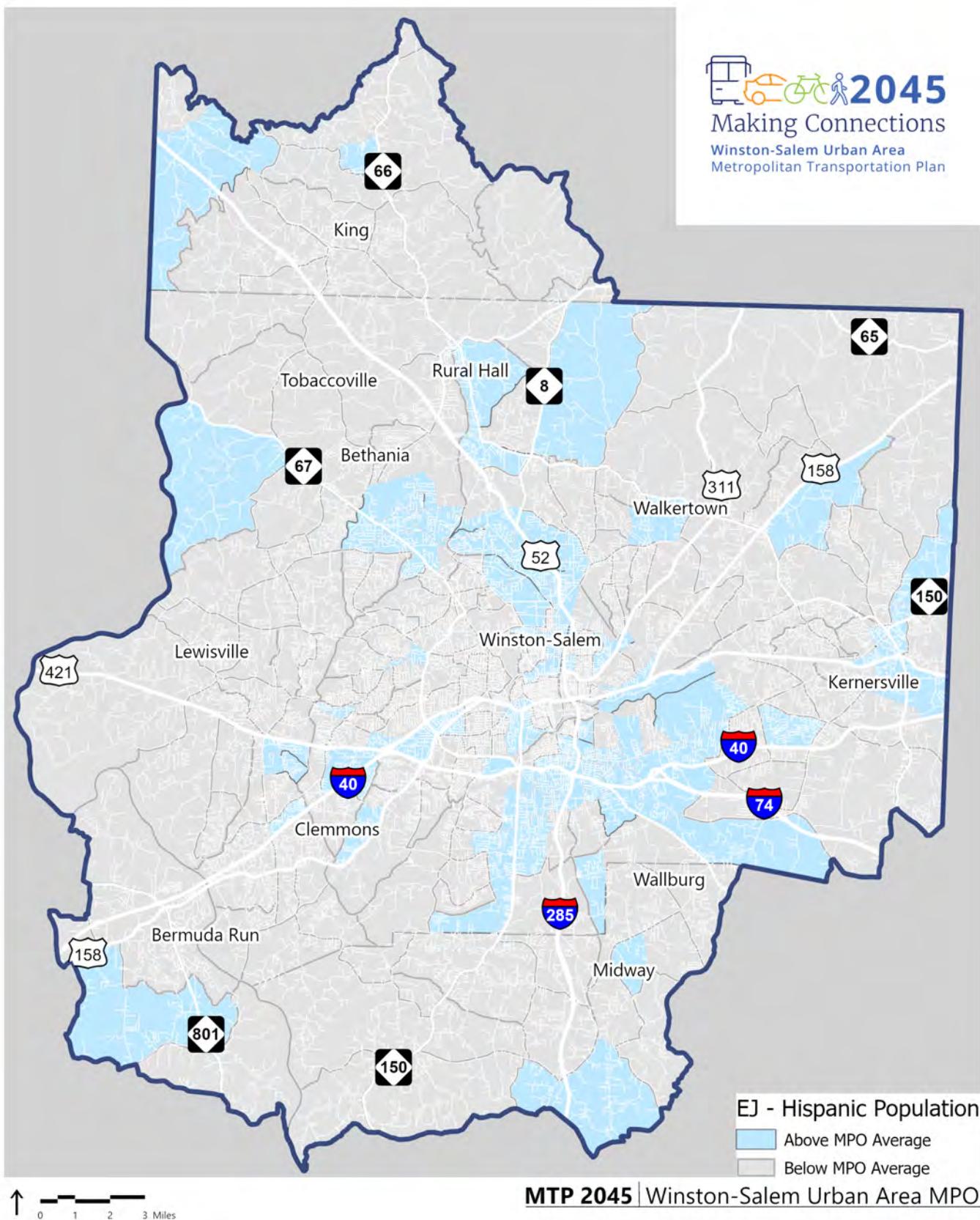


Figure 6 - Environmental Justice Component - Hispanic Population



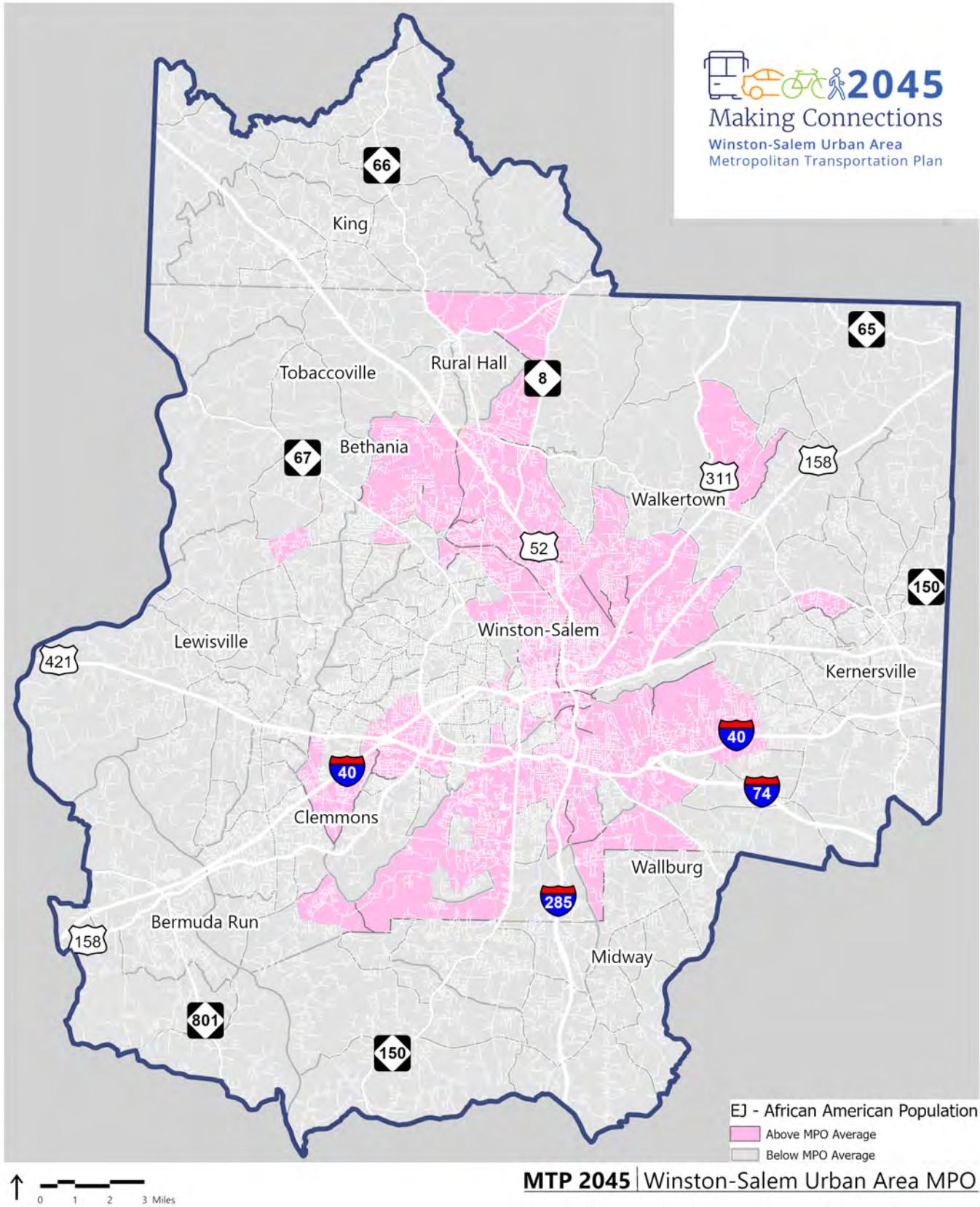


Figure 7 - Environmental Justice Component - African American Population



An additional set of maps that follows illustrates the distribution of transportation-disadvantaged population groups across the region in combination with MTP Roadway projects mapped out.

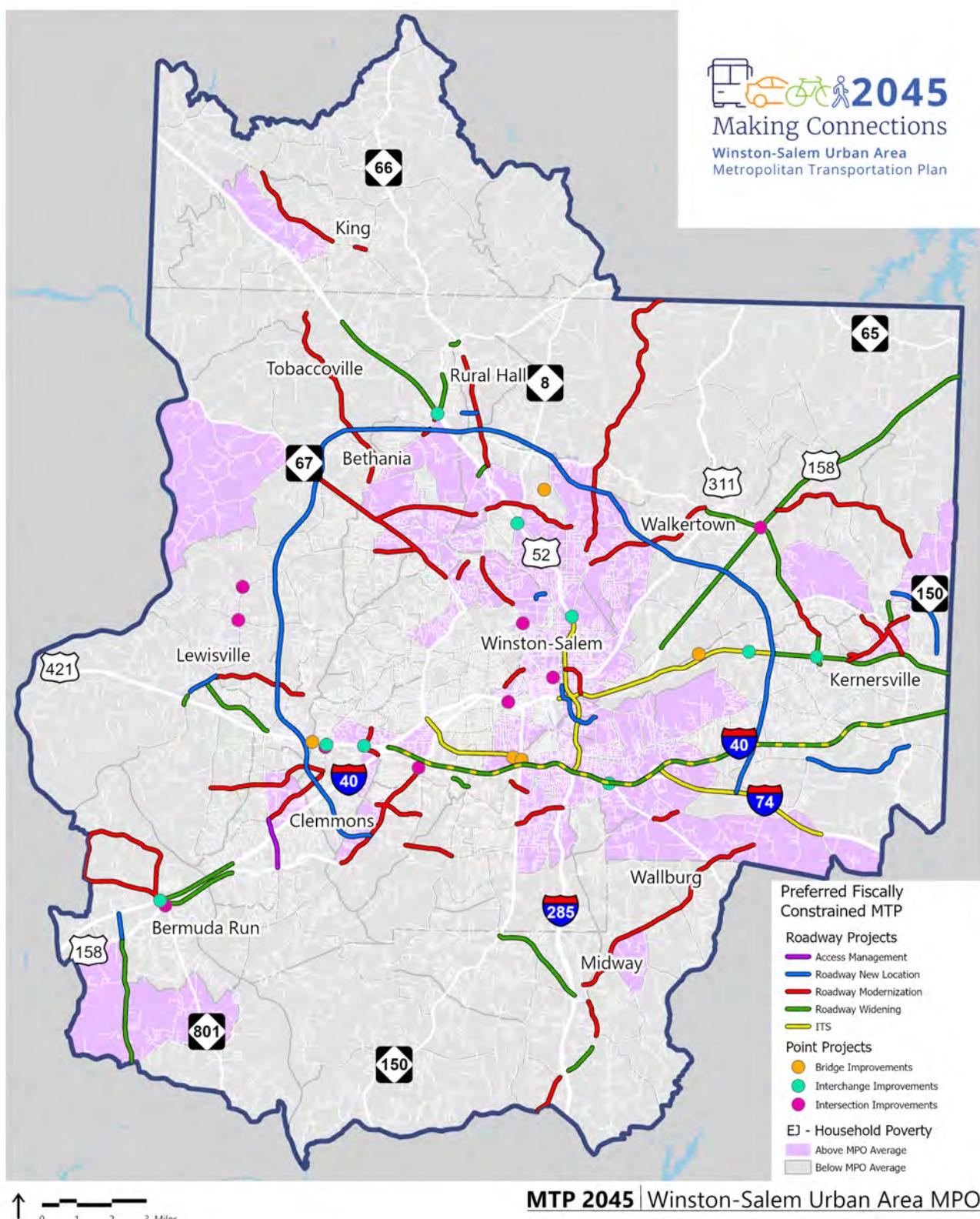


Figure 9 - Environmental Justice Component - Poverty and Fiscally Constrained Roadway Projects



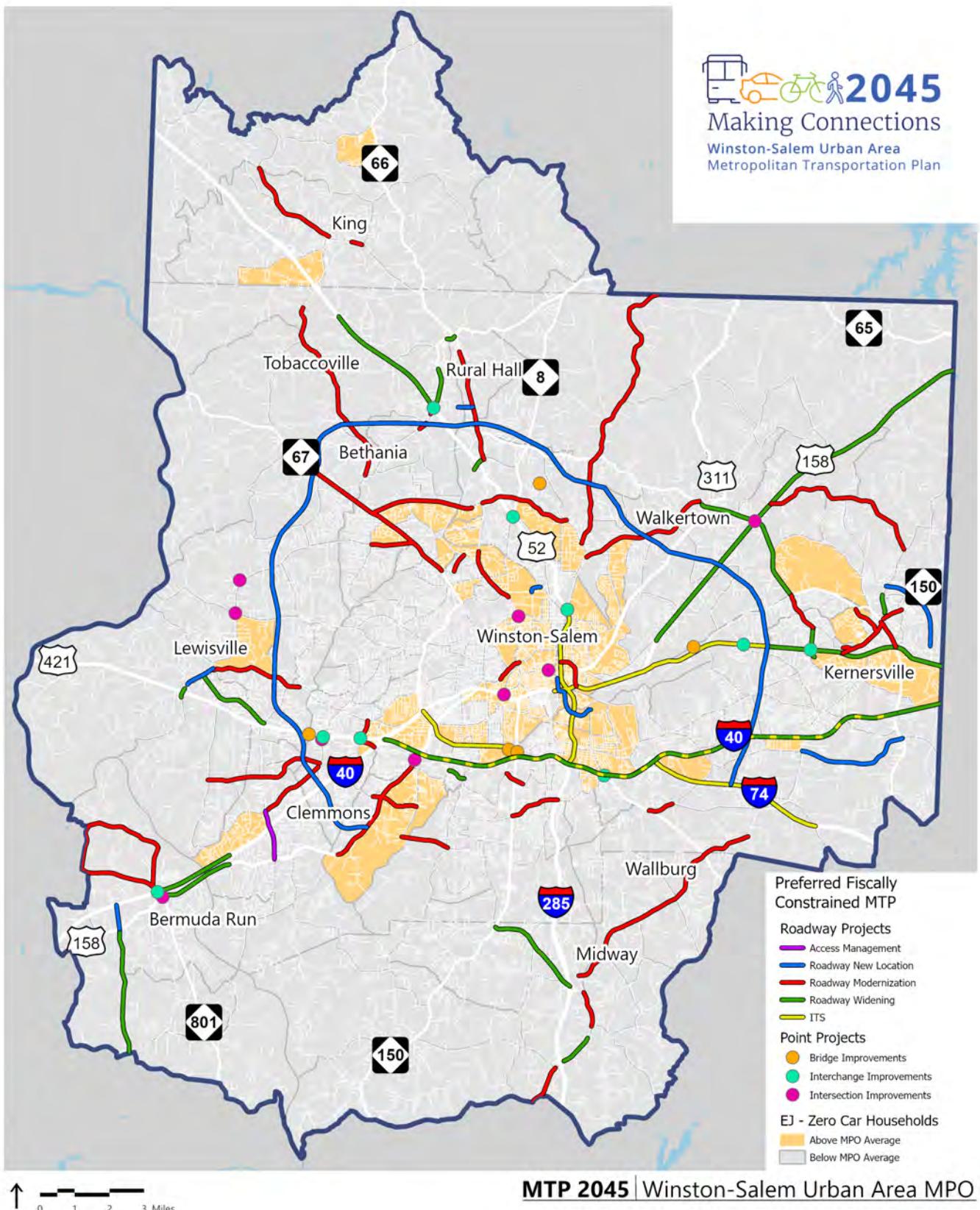


Figure 11 - Environmental Justice Component - Zero Car Household and Fiscally Constrained Roadway Projects



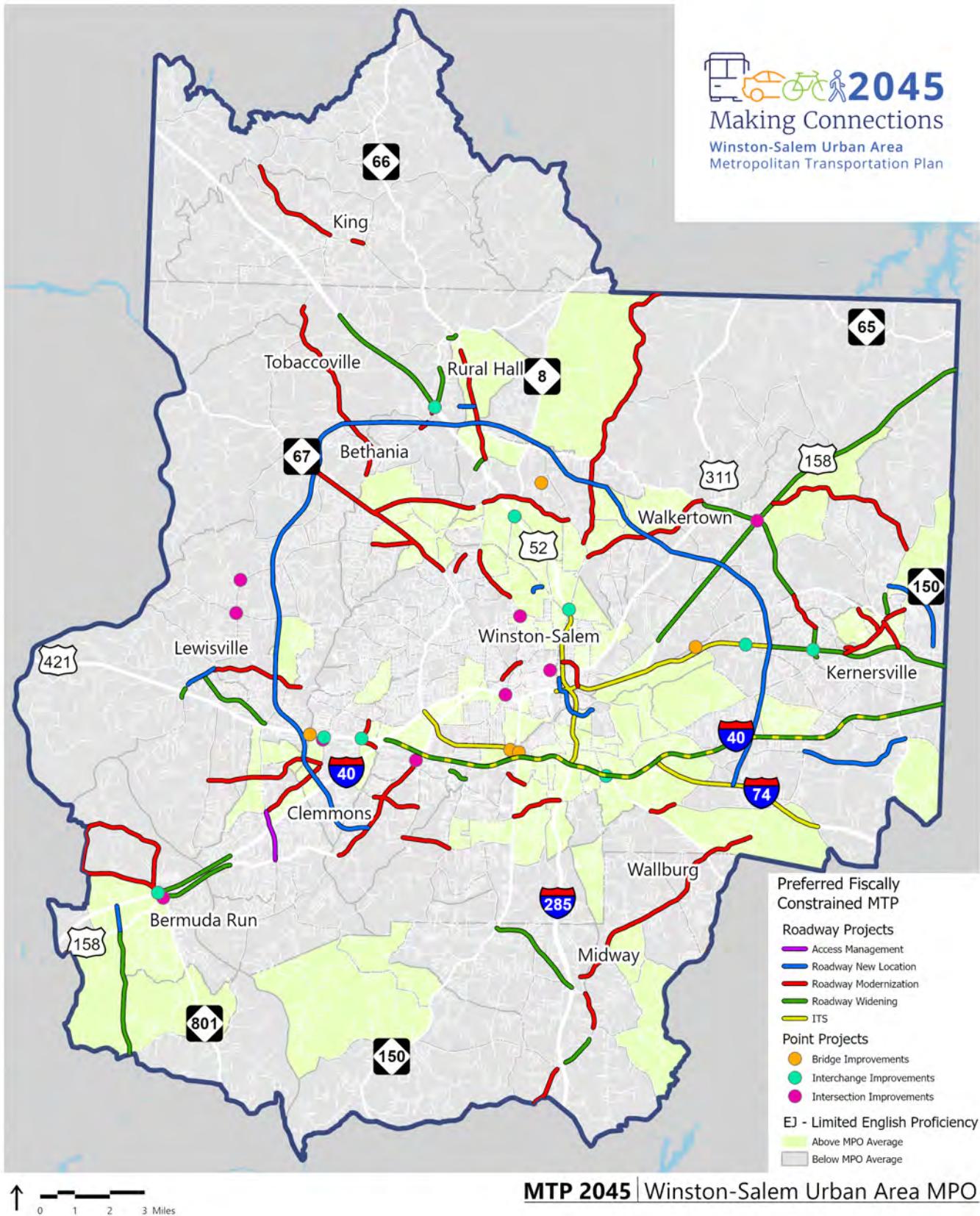


Figure 10 - Environmental Justice Component - Limited English Proficiency and Fiscally Constrained Roadway Projects



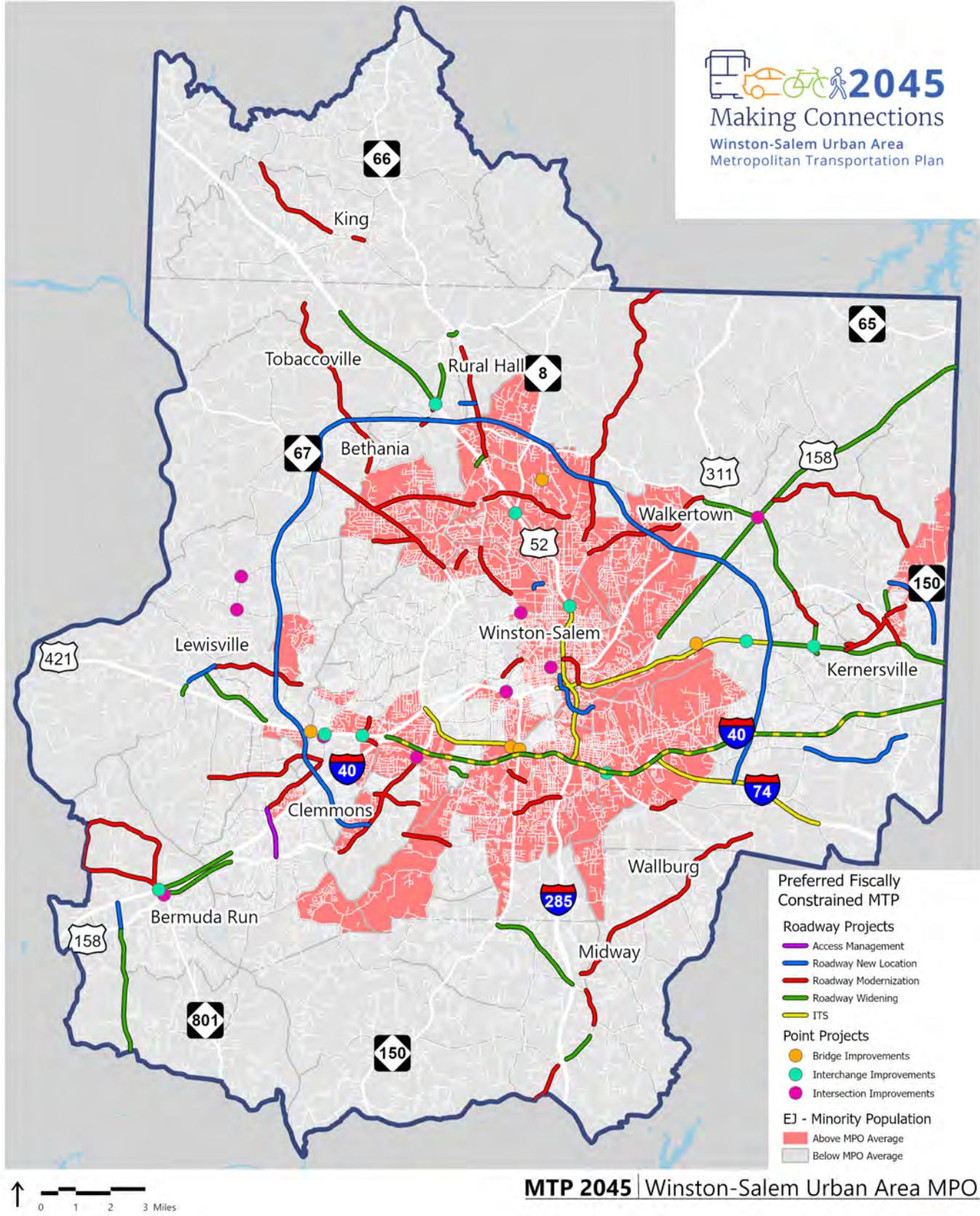


Figure 12 - Environmental Justice Component - Minority Population and Fiscally Constrained Roadway Projects

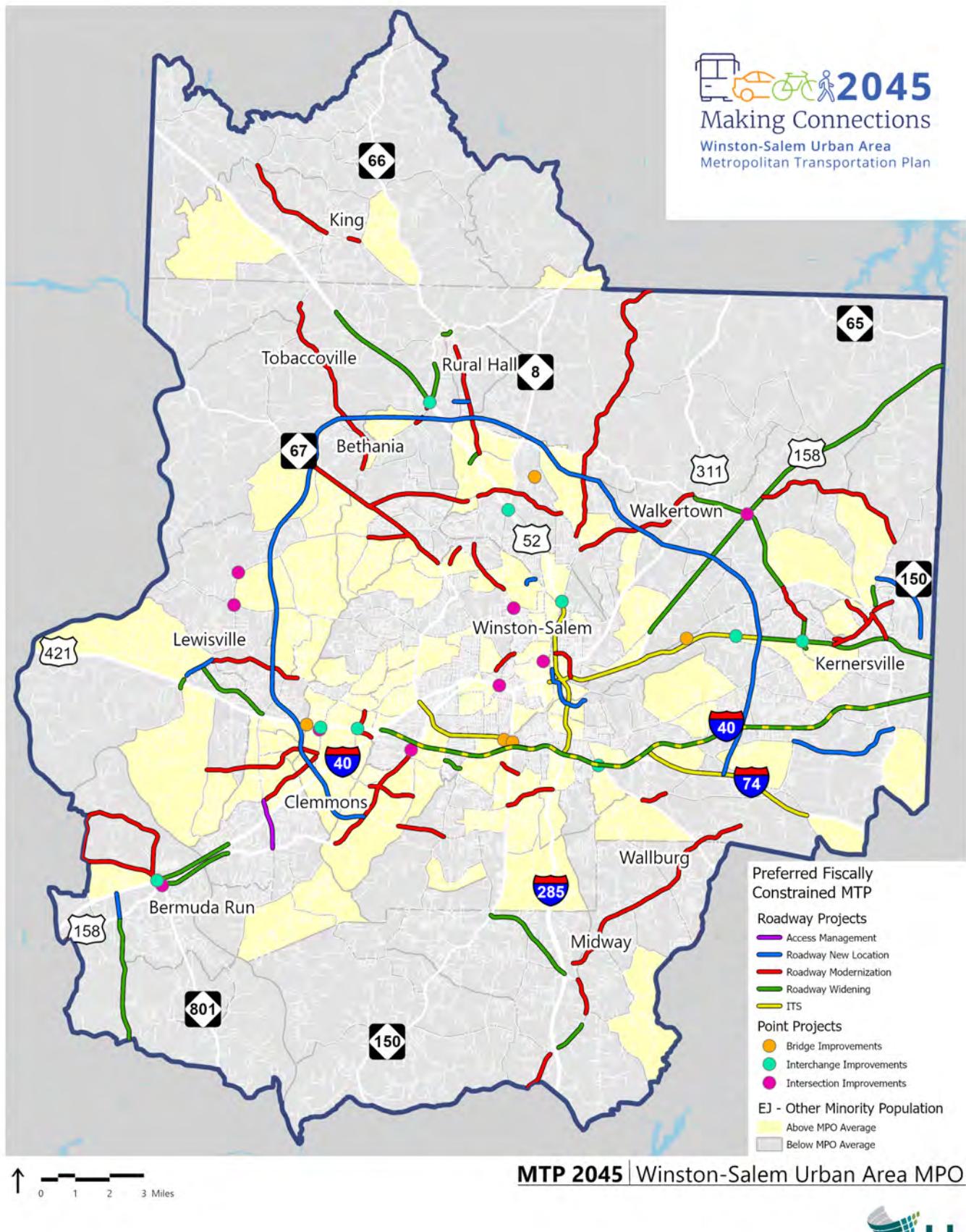


Figure 13 - Environmental Justice Component - Other Minority Population and Fiscally Constrained Roadway Projects

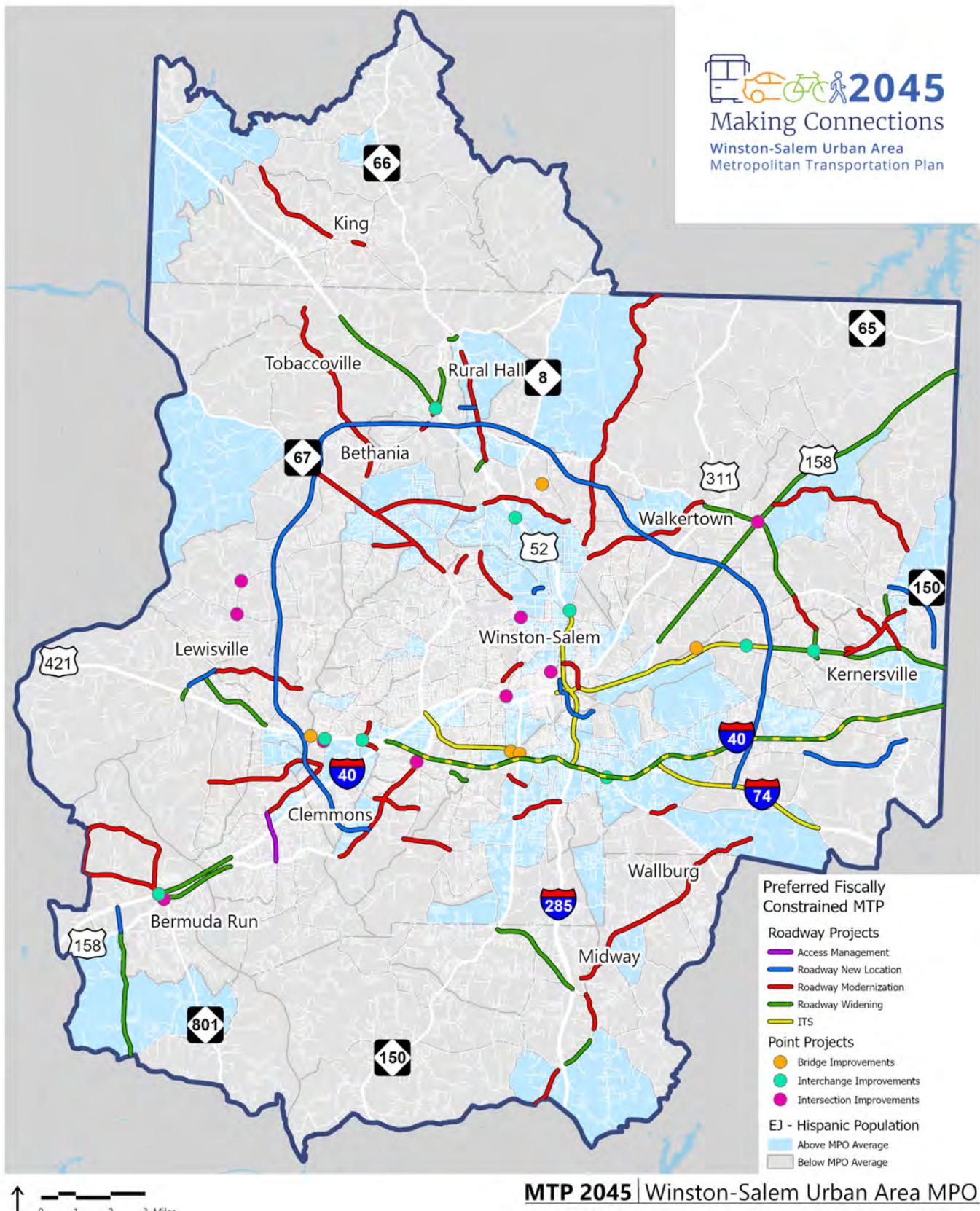


Figure 14 - Environmental Justice Component - Hispanic Population and Fiscally Constrained Roadway Projects



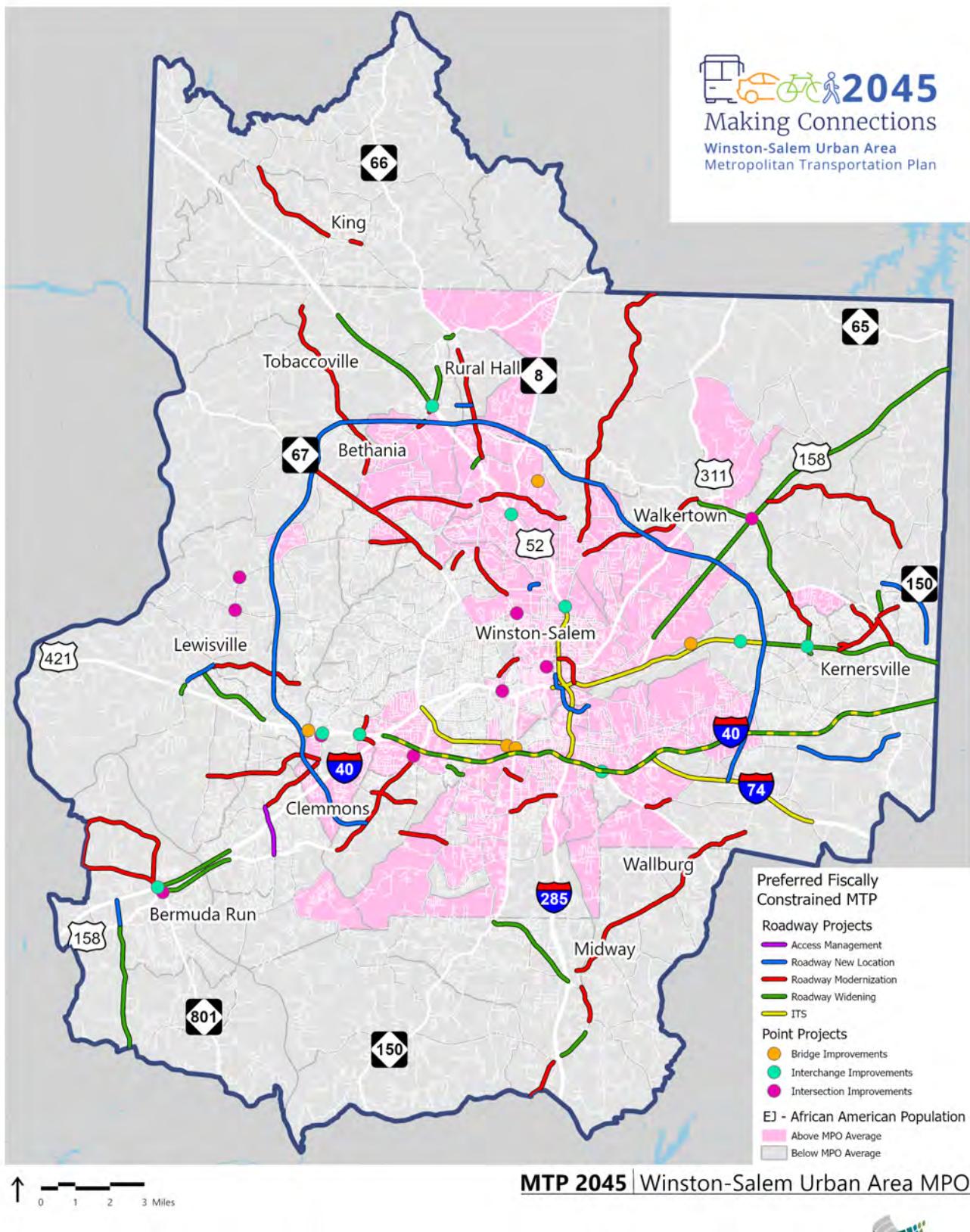


Figure 8 - Environmental Justice Component - African American Population and Fiscally Constrained Roadway Projects



Appendix F:

Travel Demand Model Outputs

The Piedmont Triad Regional Travel Model (PTRM) was utilized to test and develop project alternatives for the final list of fiscally-constrained preferred recommendations. The scenario model runs used the latest PTRM model (v5.1) version, adopted 2020-2029 State Transportation Improvement Program list, and the regionally adopted socioeconomic forecasts for the years 2017, 2025, 2035, and 2045. The MTP model network and associated outputs were provided to WSUAMPO upon conclusion of the 2045 MTP development process.

The financial plan preferred recommendations are included in Horizon Years that reflect their anticipated year of opening. These bands include the following years : 2025 Horizon Year (2020-2025), 2035 Horizon Year (2026-2035), and 2045 Horizon Year (2036-2045). The year 2017 is shown as a baseline, and the 2045 Existing plus Committed (“E+C”) reflects the existing roadway projects as of 2020 and those considered as Committed in the STIP (or through local authority) combined with socioeconomic levels for the year 2045.

Table 1 below displays the modeled daily VMT and VHT for WSUAMPO’s five counties for each of the model scenarios. Table 2 also displays the modeled daily VMT and VHT for WSUAMPO but instead VMT and VHT are categorized by the model network’s functional classification. Finally, Table 3 and Table 4 illustrate the anticipated VMT and VHT during the PM Period (3 PM to 6 PM) when Volume over Capacity (VoC) is estimated to exceed 0.90 (referred to as congested conditions). These tables are shown by the MPO’s counties and functional classification.

Figure 1, Figure 2, Figure 3, Figure 4, and Figure 5 display modeled roadway volumes and VoC for the 2017 baseline, each of the Horizon Years, and the 2045 E+C scenarios, for PM Peak Period Conditions (3 PM to 6 PM). Traffic flow volumes illustrated in Figures 1 through 5 are for the PM Peak Period. PM Peak Period flows are estimated to represent 27 percent of total average daily flows.

Table 1 – Scenario Daily VMT and VHT by County

County	Daily VMT					Daily VHT				
	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
<i>Davidson</i>	561,040	589,442	649,798	683,792	673,212	12,439	13,075	14,432	15,473	15,087
<i>Davie</i>	470,280	472,165	549,050	619,754	620,664	12,221	12,436	15,666	19,690	18,279
<i>Forsyth</i>	9,769,140	10,650,760	12,041,404	13,045,280	13,135,568	237,121	262,102	293,998	338,570	321,205
<i>Stokes</i>	637,766	660,417	686,850	716,748	717,016	15,538	16,088	16,705	17,456	17,464
<i>Yadkin</i>	55,639	60,959	67,609	74,606	74,606	2,226	2,438	2,704	2,984	2,984
MPO Total	11,493,865	12,433,744	13,994,711	15,140,181	15,221,067	279,544	306,139	343,505	394,173	375,020

Table 2 – Scenario Daily VMT and VHT by Functional Classification and County

WSUAMPO VMT AND VHT BY FUNCTIONAL CLASSIFICATION AND COUNTY										
Functional Class and County	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
Local Roads (total)	1,077,967	1,186,809	1,249,373	1,432,005	1,370,409	33,257	37,329	41,819	53,261	49,819
Davidson	72,445	75,707	80,898	88,564	85,391	1,681	1,763	1,900	2,107	2,018
Davie	11,306	14,618	23,529	38,663	37,815	263	370	1,366	3,435	3,416
Forsyth	923,829	1,024,918	1,072,921	1,230,547	1,173,064	29,581	33,423	36,769	45,856	42,525
Stokes	70,387	71,567	72,025	74,231	74,140	1,732	1,772	1,784	1,862	1,860
Yadkin	-	-	-	-	-	-	-	-	-	-
Collectors (total)	2,348,587	2,478,671	2,602,193	2,866,207	2,735,582	64,532	69,334	73,572	84,327	77,841
Davidson	161,248	175,887	192,502	213,282	204,930	3,875	4,187	4,616	5,266	4,976
Davie	49,564	53,343	55,880	56,617	63,428	1,548	1,818	2,064	1,963	1,428
Forsyth	2,040,345	2,151,138	2,256,669	2,498,237	2,369,406	56,863	61,059	64,642	74,821	69,167
Stokes	97,431	98,303	97,142	98,071	97,818	2,247	2,270	2,250	2,277	2,270
Yadkin	-	-	-	-	-	-	-	-	-	-
Minor Arterials (total)	237,460	233,130	256,951	272,502	262,957	6,866	6,862	7,818	8,662	7,872
Davidson	25,831	27,695	30,382	32,921	32,132	531	571	627	694	667
Davie	60,467	47,293	55,327	59,580	59,269	1,728	1,470	1,901	2,131	1,874
Forsyth	132,050	138,195	150,579	158,576	149,810	4,002	4,189	4,633	5,152	4,636
Stokes	19,113	19,947	20,664	21,424	21,746	605	632	657	685	695
Yadkin	-	-	-	-	-	-	-	-	-	-
Principal Arterials (total)	1,724,441	1,802,913	1,942,141	2,018,492	2,027,357	41,780	43,799	46,654	51,167	48,652
Davidson	90,150	93,336	98,880	98,985	99,597	1,799	1,875	2,012	2,012	2,020
Davie	87,270	88,263	101,470	113,838	117,117	1,825	1,843	2,182	2,651	2,553
Forsyth	1,447,599	1,519,379	1,636,944	1,697,061	1,701,927	36,055	37,920	40,234	44,188	41,759
Stokes	99,423	101,934	104,847	108,608	108,717	2,101	2,160	2,225	2,316	2,319
Yadkin	-	-	-	-	-	-	-	-	-	-
Other Freeways or Expressways (total)	2,836,269	3,038,481	3,449,689	3,675,834	3,801,907	51,941	57,250	64,240	72,628	70,566
Davidson	164,197	168,046	196,027	196,664	198,111	2,590	2,652	3,143	3,169	3,195

WSUAMPO VMT AND VHT BY FUNCTIONAL CLASSIFICATION AND COUNTY

Functional Class and County	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
Davie	-	-	-	-	-	-	-	-	-	-
Forsyth	2,463,357	2,649,667	3,016,087	3,226,168	3,350,628	46,159	51,212	57,437	65,544	63,454
Stokes	208,715	220,768	237,575	253,002	253,167	3,193	3,387	3,660	3,915	3,918
Yadkin	-	-	-	-	-	-	-	-	-	-
Interstates (total)	2,094,623	2,424,056	3,053,511	3,334,531	3,467,332	35,000	42,066	52,921	63,359	59,300
Davidson	-	-	-	-	-	-	-	-	-	-
Davie	164,347	164,596	193,231	217,713	210,019	2,580	2,550	3,040	3,516	3,343
Forsyth	1,930,276	2,259,461	2,860,280	3,116,818	3,257,313	32,419	39,516	49,881	59,843	55,956
Stokes	-	-	-	-	-	-	-	-	-	-
Yadkin	-	-	-	-	-	-	-	-	-	-
Ramps (total)	266,180	292,676	368,085	378,671	392,737	9,859	10,443	13,594	14,314	14,481
Davidson	3,728	3,977	4,511	4,520	4,322	226	234	269	271	262
Davie	5,760	3,848	5,292	6,677	6,009	614	376	540	927	583
Forsyth	252,231	280,185	352,800	362,012	376,954	8,888	9,695	12,621	12,953	13,473
Stokes	4,461	4,666	5,482	5,463	5,451	131	138	163	163	163
Yadkin	-	-	-	-	-	-	-	-	-	-
Total	11,493,865	12,433,744	13,994,711	15,140,181	15,221,067	279,544	306,139	343,505	394,173	375,020

**Note, functional classifications will not add up to total due to exclusion of centroid connectors

Table 3 - Scenario PM Period VMT and VHT Under Congested Conditions by County

County	VMT Under Congested PM Conditions (Max VoC >.90)					VHT Under Congested PM Conditions (Max VoC >.90)				
	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
Davidson	1,915	1,958	2,075	2,385	1,992	56	61	72	74	67
Davie	16,721	16,382	23,801	43,288	23,942	982	1,054	1,941	3,369	1,987
Forsyth	210,560	383,414	417,366	756,042	374,226	8,951	14,214	16,665	32,899	17,797
Stokes	-	-	-	-	-	-	-	-	-	-
Yadkin	-	-	-	-	-	-	-	-	-	-
PM Period Total	229,195	401,753	443,241	801,714	400,160	9,990	15,329	18,678	36,342	19,851
% of Total	7.52%	12.18%	12.09%	19.36%	9.68%	12.60%	17.53%	19.19%	30.28%	18.09%

Table 4 - Scenario PM Period VMT and VHT Under Congested Conditions by Functional Classification

WSUAMPO PM PERFORMANCE UNDER CONGESTED CONDITIONS (MAX VOC > .90) BY FUNCTIONAL CLASSIFICATION										
	PM VMT					PM VHT				
Functional Class	2017	2025	2035	2045 E+C	2045	2017	2025	2035	2045 E+C	2045
Local Roads	18,781	24,794	42,456	64,410	54,106	1,398	1,833	3,384	6,429	5,382
Collectors	50,654	69,534	74,474	124,320	88,629	2,439	3,386	3,829	6,414	4,262
Minor Arterials	9,304	9,560	13,350	19,355	13,656	487	534	795	1,118	682
Principal Arterials	59,309	68,377	67,852	109,746	74,327	2,562	2,864	2,855	4,808	2,915
Other Freeways or Expressways	72,055	107,439	92,193	205,109	99,292	2,149	3,298	3,147	7,543	3,620
Interstates	13,985	115,354	141,120	265,918	58,183	337	2,741	3,541	8,447	1,738
Ramps	5,108	6,695	11,796	12,855	11,968	618	673	1,126	1,583	1,251
WS - Total	229,195	401,753	443,241	801,714	400,160	9,990	15,329	18,678	36,342	19,851

Figure 1 - 2017 Baseline PM Period Volume and VoC

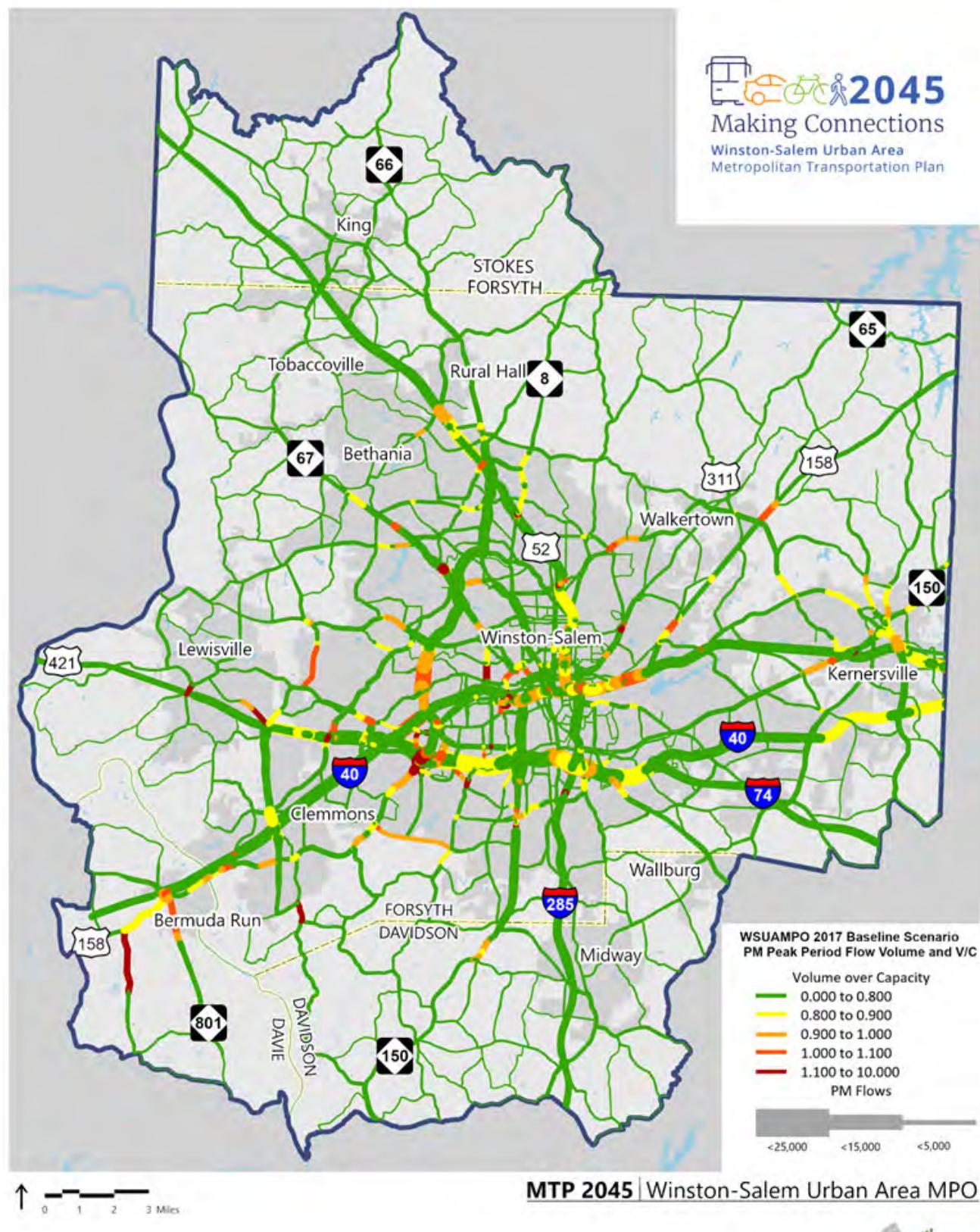


Figure 2 - 2025 Horizon Year PM Period Volume and VoC

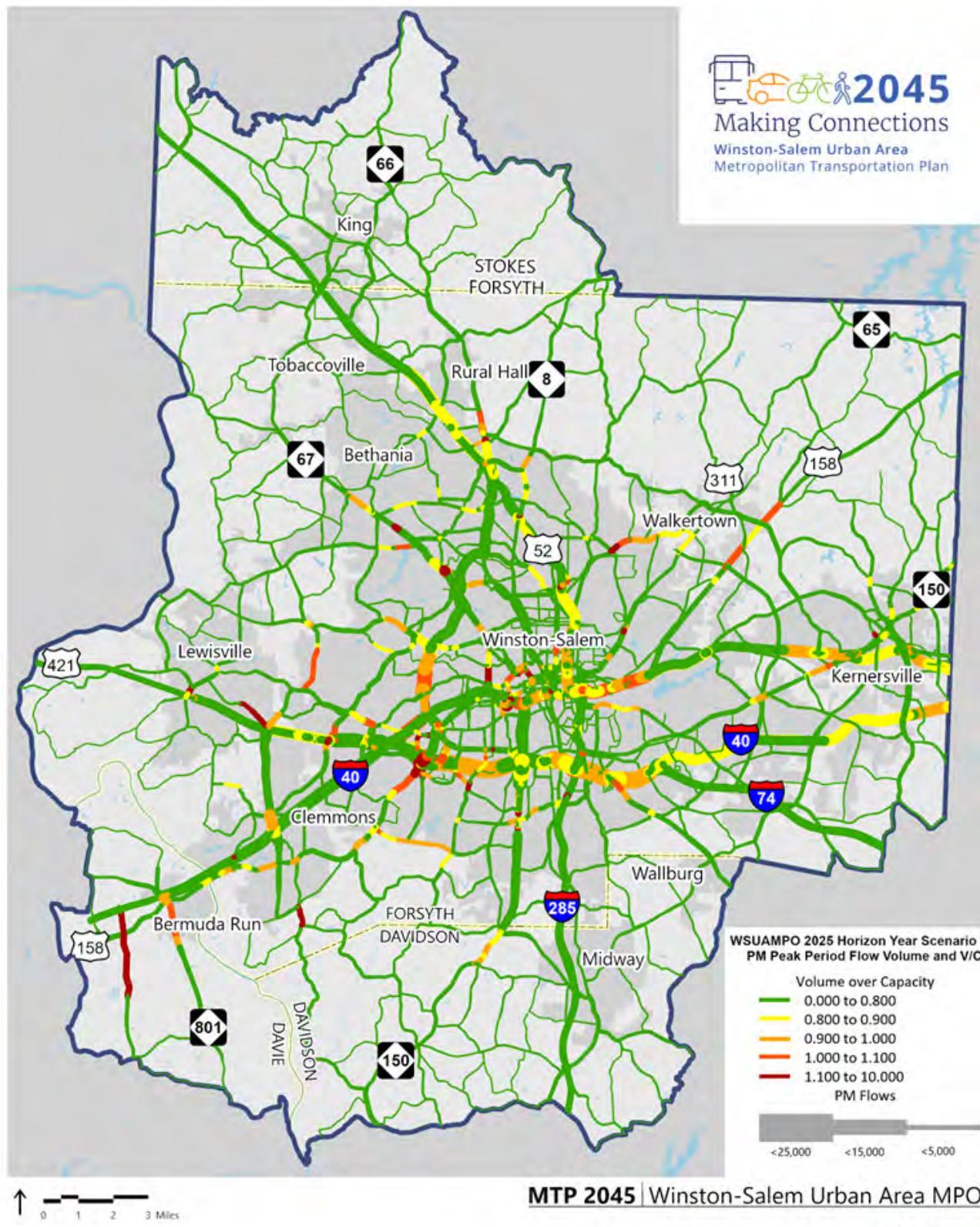


Figure 3 - 2035 Horizon Year PM Period Volume and VoC

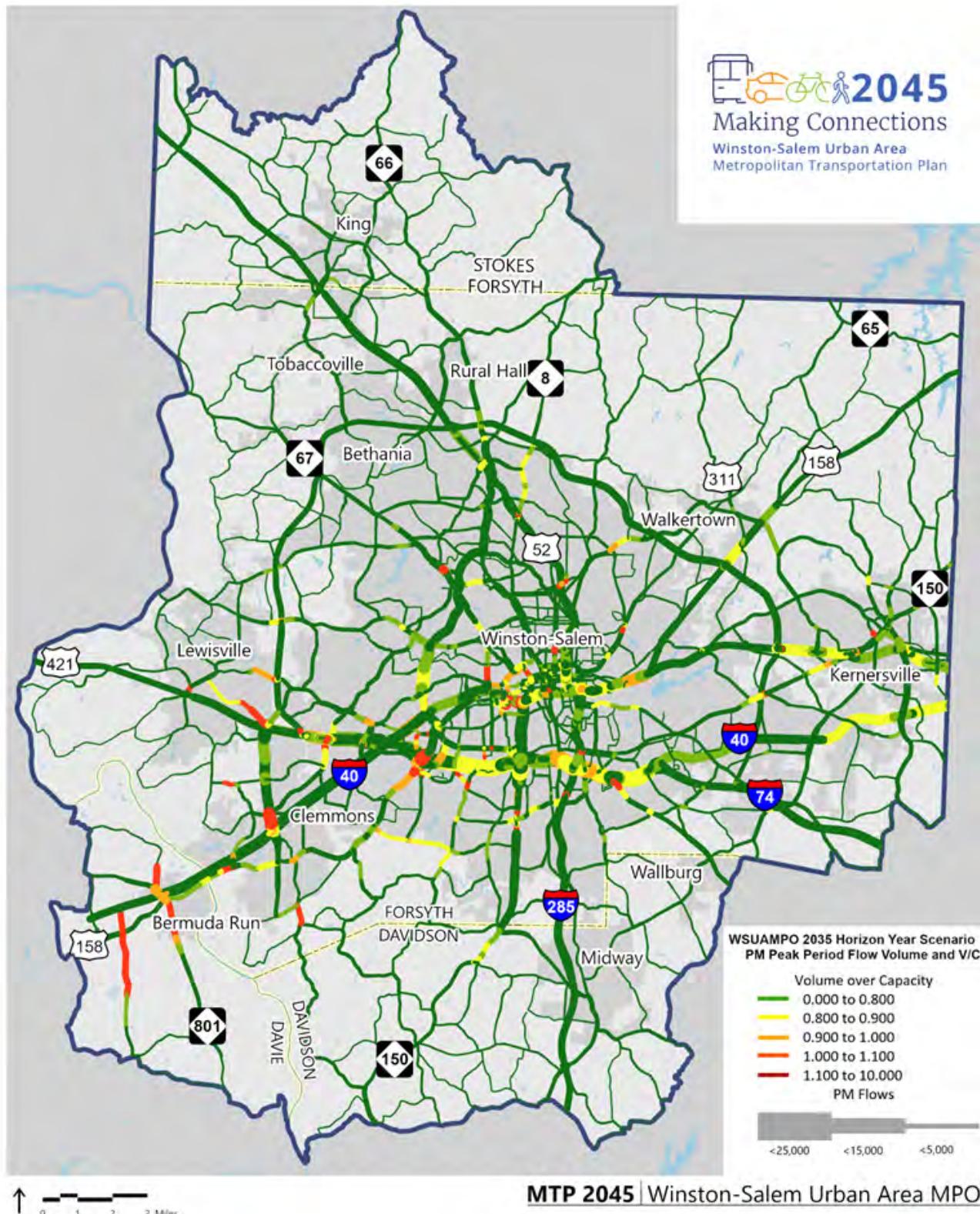
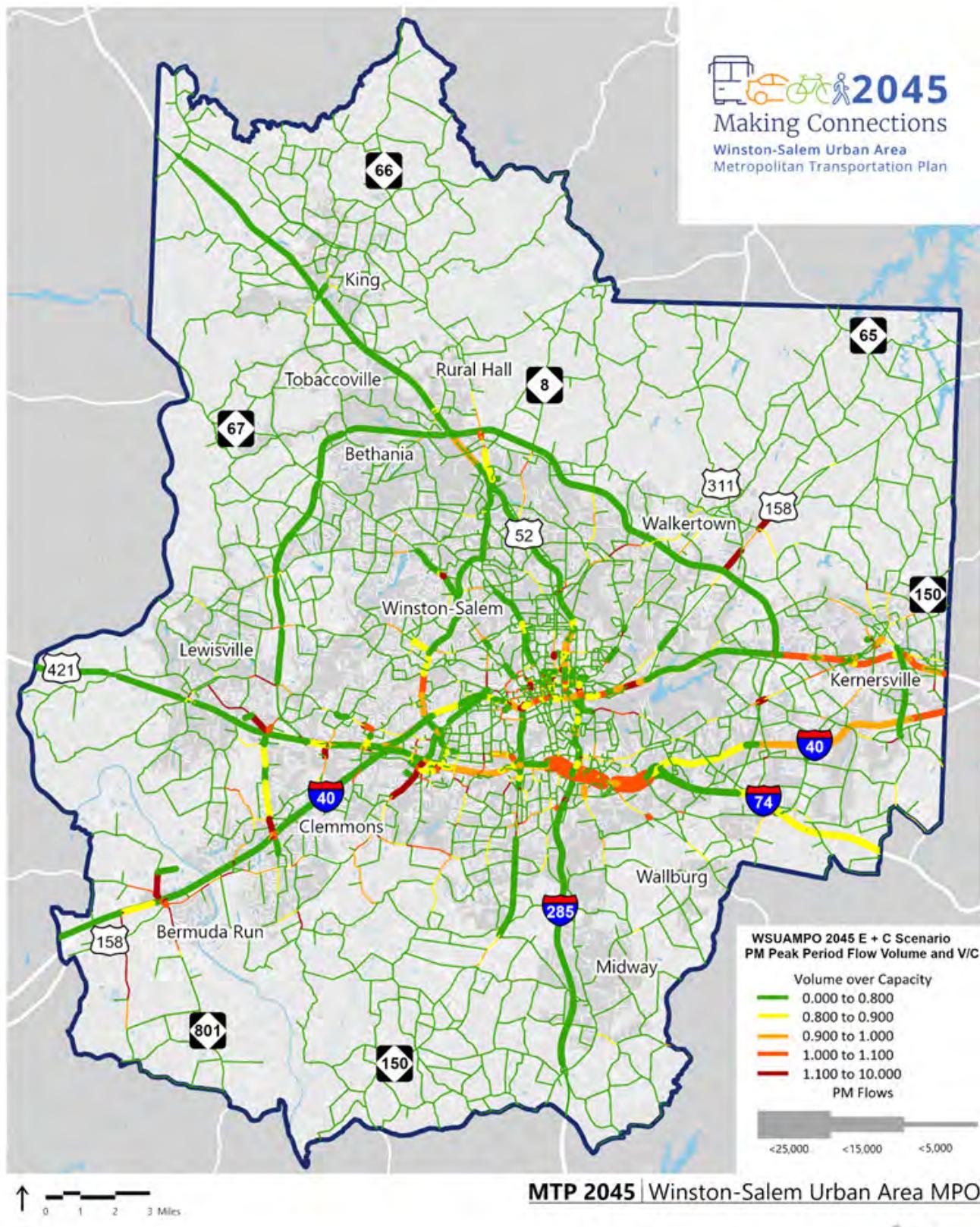


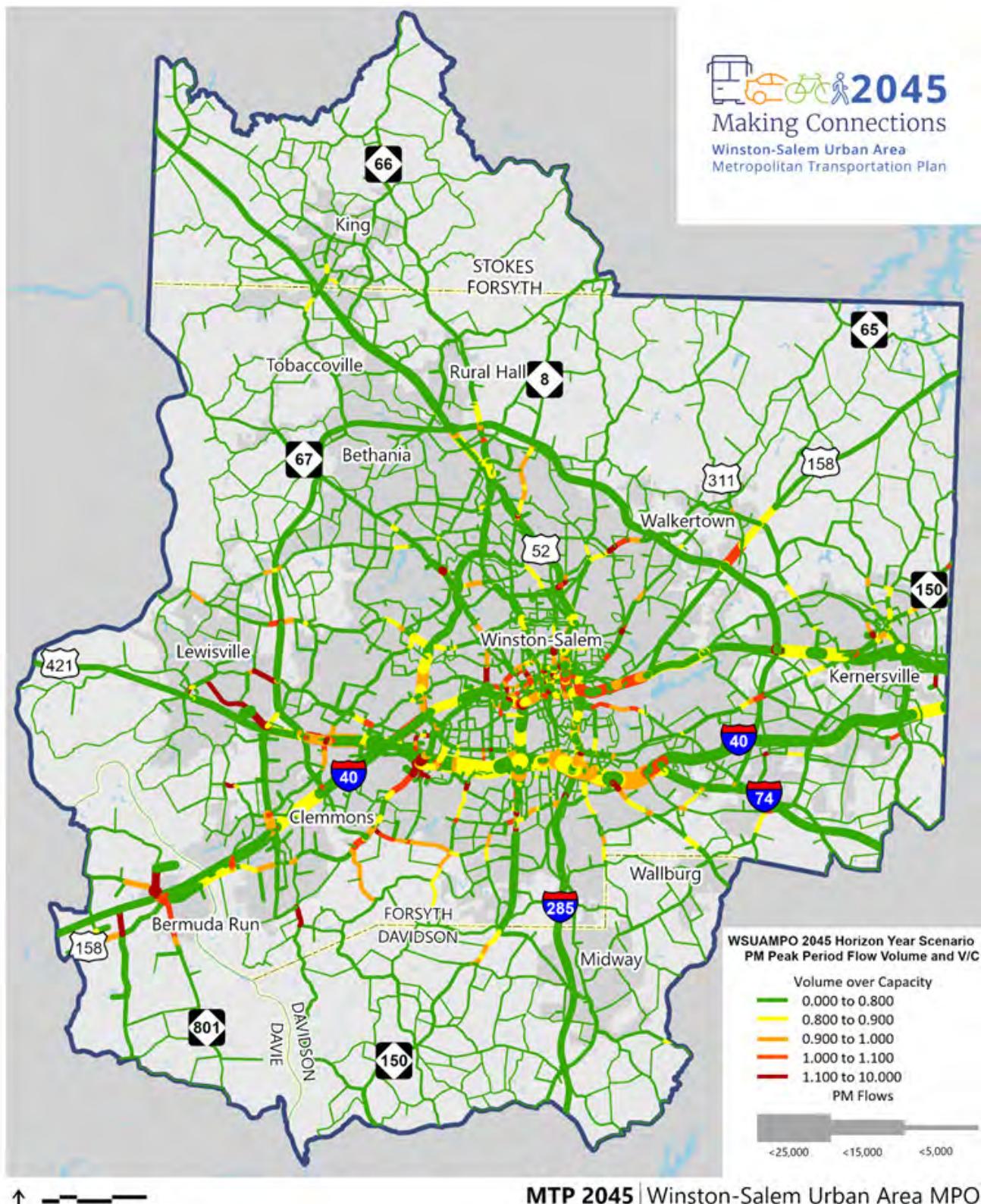
Figure 4 - 2045 E+C PM Period Volume and VoC



July 14, 2020



Figure 5 - 2045 Horizon Year PM Period Volume and VoC



Appendix G:

Existing and Prior Plans Summary

Winston-Salem MPO Existing Plans Summary

The Winston-Salem MPO includes Forsyth, Davidson, Davie, and Stokes Counties. Cities and towns within the MPO include Bermuda Run, Clemmons, Greensboro, High Point, Kernersville, King, Lewisville, Midway, Mocksville, Rural Hall, Tobaccoville, Walkertown, and Winston Salem. Plans focused on transportation and mobility from these jurisdictions are summarized below.

Bermuda Run

Bermuda Run Comprehensive Plan (update 2017)

The Bermuda Run Comprehensive Plan (update 2017) includes the possibility of a large, mixed-use development on 120 acres of undeveloped land southwest of the US 158/NC 801 intersection. The plan also identifies development opportunities for a boutique hotel near the WinMock Dairy/Kinderton Village and a business center with a mix of office, flex space, and light manufacturing west of NC 801 between I-40 and US 158. A multi-use path, called the Blue Heron Trail is planned and funded for construction along US 158 between Kinderton Village and the soccer complex.

Clemmons

Clemmons Comprehensive Plan (2019)

The Clemmons Comprehensive Plan is a long-range plan used as a blueprint for the Village toward 2040. Through public engagement, existing plans, and existing conditions, the plan identified four themes. The highest ranked theme is transportation and linear parks. Explicit recommendations within this theme include sidewalks, bike paths, and greenways. Within the Village the theme highlights the need for reduced congestion, increased safety, and improvement connectivity.

Transportation issues and proposed improvements follow those identified in the Clemmons Village Transportation Plan. Proposed roadway projects include improving I-40 through downtown and into Winston-Salem, adding a northern beltway, widening segments of a north-south connector, and adding three minor thoroughfares. Proposed active transportation projects include adding sidewalk along Lewisville-Clemmons Road, installing north-south multi-use paths east and west of downtown, and creating signed bike routes within the village. The Piedmont Authority for Regional Transportation (PART) connects to the Clemmons Medical Plaza during the Business 40 closure – it is recommended PART service is continued and expanded.

Peace Haven Road/Styers Ferry Road Connector Study (2018)

The Peace Haven Road/Styers Ferry Road Connector Study identifies options for a road addition connecting Peace Haven Road and Styers Ferry Road. The proposed corridor seeks to meet east-west connectivity demands from Clemmons to western Forsyth and parts of Winston Salem. Three alternatives were designed with the preferred option combining elements of two alternatives. The preferred alternative is a total of 3.6 miles, using 1.89 miles of existing road, and 1.71 miles of new road. Sidewalk and bike lanes would be added to 1.22-miles of an existing portion.

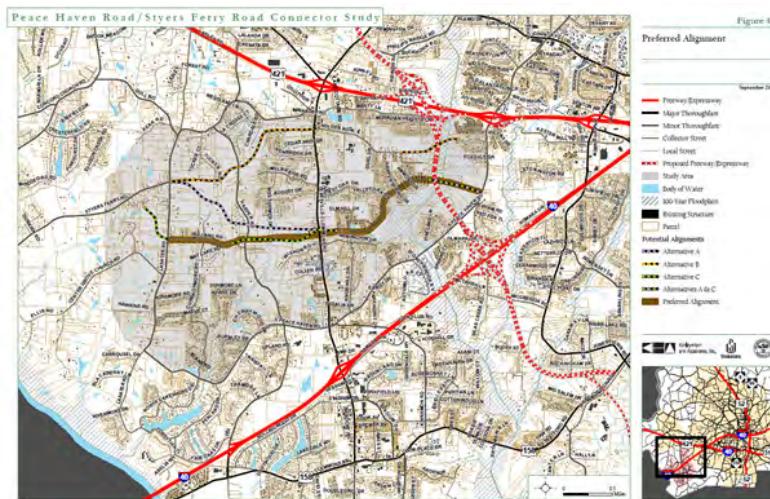


Figure 1: Peace Haven Road Styers Ferry Road Connector - Preferred Design

Davidson County

Davidson County Blueway Plan

The Davidson County Blueway Plan outlines waterway access sites along the Yadkin River and lakes in Davidson County. Waterway access sites include public boat ramps, paddle access locations, and public fishing areas. The plan includes an inventory of 14 current sites, sites in need of improvements, and 13 potential new access sites.

Davidson County Master Greenway Plan

The Davidson County Master Greenway Plan outlines two pilot projects for implementation. The first greenway project consists of the two-phase Abbots Creek Greenway. The greenway will run from Lake Thom-A-Lex to The Lexington Water Treatment Plant with the second phase picking up from the Old Landfill to Finch Park, with a gap in between the two portions with an unidentified phase portion. The second project is the Yadkin River “Blueway” Pilot project, which consists of proposed river access locations for recreational maritime use, such as kayaking or paddle boarding.

Davidson County Transportation Plan (2011)

The Davidson County Transportation Plan outlines improvement recommendations for highway, public transit, bicycle, and pedestrian mobility. Highway widening is recommended for segments along I-85/US 29-52-70, US 64, NC 8 (Lexington), NC 8 (South), NC 49, NC 109, NC 150, East 10th Avenue, East Center Street, Hargrave Road, South Main Street, and Old US 52 (SR 3010). Highway upgrades for segments of Business I-85/US 29-70 and Business I-85/US 29-70 are included. A new southwestern connector, U-2545, and extension are recommended between South Main Street to Fairview Drive.

Two fixed-routes bus routes are recommended; one route connecting north Lexington to southwest Lexington and the hospital, and another route connecting northwest and south Lexington. The inner-city circular is recommended to connect with the proposed intermodal connector and the proposed Amtrak train stop.

The CTP endorses seven county and connector bicycle routes from the 2005 Regional Bicycle Study. Sidewalks are recommended within Lexington, Denton, Tyro and Welcome.

Davidson County Land Development Plan (2009)

The Davidson County Land Development Plan includes a transportation section outlining recommendation improvements and policies. Project recommendations include widening segments of Highway 8, NC Highway 109, and NC Highway 150. Transportation policies in the plan look to improve connectivity of the area, address air quality issues, improve automobile alternatives, increase safety, and expand the airport.

Davie County

Davie County Land Use Plan (2019)

The Davie County Land Use Plan provides a summary of transportation conditions in Davie County. The plan stresses the multimodal and regional connectivity of the county. Current and future considerations per mode include freight, bicycle and pedestrian, aviation, rail, and transit. Specific improvements include a proposed interchange added at I-40 and Juney Beauchamp Road and US 601 which will both facilitate better freight access. The plan also references aesthetic improvements at gateways and intersections.

Davie County Comprehensive Transportation Plan

The Davie County CTP covers recommended improvements throughout Davie County. There are two primary roadway projects and other mode projects recommended. The first primary project is to widen US 158 to 3-lanes with a center turn lane and bicycle and pedestrian facilities, from Farmington Road to US 64/US 601. The second primary roadway recommendation is to widen US 601 (and include center left turn lane and bicycle and pedestrian facilities) to 3-lanes from Liberty Church Road to Main Church Road, to 5-lanes from Main Church Road to Fairfield Roach, and to 3-lanes from Fairfield Road to NC 801.

Other project recommendations include a proposed US 64 bypass south of Mocksville, and improvements along I-40, and major thoroughfares such as NC 801, US 64, and US 158. Multi-use paths are recommended around Mocksville and connecting southward toward Cooleemee. Pedestrian facilities such as sidewalks, multi-use paths, and off-road trials are recommended within Mocksville, Cooleemee, and the South Yadkin River. No new bus or rail facilities are recommended.

Davie Country Transportation Alternatives Feasibility Study (2016)

The Davie County Transportation Alternatives Feasibility Study identifies alternative scenarios that would support mobility of eastern Davie County as growing population demands from nearby areas add pressure to the current transportation network. The area houses a growing number of warehouses, light manufacturing, and distribution centers, but freight truck access is limited, and commuter traffic can hinder freight delivery schedules. Through an interchange feasibility study three locations were identified along I-40 as candidates for a new interchange. Additionally, the following interchanges or intersections were recommended for improvement: NC 801 and US 158 (a roundabout proposed), I-40 at Farmington Road (roundabouts at both eastbound and westbound ramps), and US 158 at Baltimore Road (signalized intersection or roundabout).

Greensboro

Greensboro Comprehensive Plan (2003)

The Greensboro Comprehensive Plan highlights goals for Greensboro to achieve by 2025. Within the transportation section, goals include maintaining a safe and efficient road network, developing a comprehensive pedestrian and bicycle network, improving local transit, improving regional transit, creating a comprehensive parking strategy, and modifying development standards to better accommodate the connection between land use and transportation. The two largest proposed changes are the completion of the Urban Loop and a bus rapid transit system.

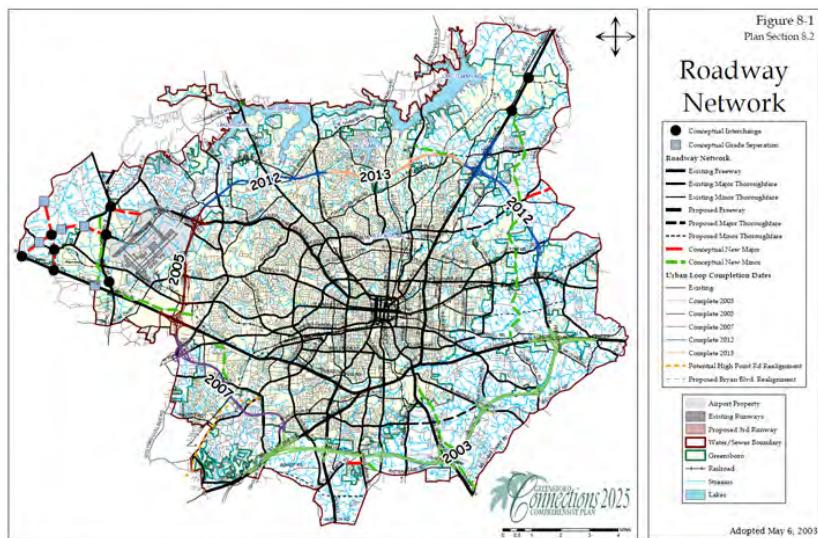


Figure 2: Greensboro Urban Loop

High Point

High Point Comprehensive Transportation Plan (2010)

The High Point Comprehensive Transportation Plan gives a snapshot of existing facilities, facilities in need of improvement, and recommended facilities for highways, bicycles, pedestrians, public transportation, and rail. CTP information is shared through a series of maps by mode. Highway recommendations include an extension of I-74 to the southeast, and new minor and major thoroughfares southwest and south of High Point. Bicycle and pedestrian recommendations have the most expansion across the High Point MPO, with a noticeable amount of recommended multi-use paths. Public transit and rail recommendations are confined to a corridor traveling southwest to northeast. A high-speed rail is proposed along this corridor, as well as, proposed bus routes connecting within the southwest region. A bus route extension from the Archdale Park and Ride and heading southeast is also recommended.

High Point Metropolitan Transportation Improvement Plan (2017)

The High Point Metropolitan Transportation Improvement Plan (2018 -2027) lists projects across the High Point MPO that are within the five-year work program (2018 – 2022) or in the development program (2023 – 2027). Project categories include interstate, rural, urban, bridge, congestion mitigation, enhancement, aviation, bike and pedestrian, public transportation, freight rail, passenger rail, mitigation, and highway safety

High Point Metropolitan Transportation Plan (2017)

The High Point Metropolitan Transportation Plan Update includes five new projects to be added to the MTP. The MTP and update includes thirty-five projects in total. Of the 35 projects, 22 incorporate lane or roadway widening, two of which include intersection upgrades. Four of the 22 widening projects incorporate bicycle and/or pedestrian facilities. Eleven of the 35 projects replace bridges, and the remaining two projects construct new or replace existing interchanges.

High Point Project Prioritization Process Plan (2018)

The High Point Project Prioritization Process Plan lists projects across the MPO that are ranked and scored as part of the state's Strategic Improvement Program law. Projects categories include aviation (1 scored project), bicycle and pedestrian (13 scored projects), highway (40 scored projects), and rail (8 scored projects).

High Point Downtown – Multi-modal Plan (2017)

The Downtown Multimodal Plan highlights six priority projects that would improve pedestrian and bicycle mobility in downtown High Point. The first proposed project is pedestrianizing main street by reducing travel lanes, adding landscaping and curb extensions, and adding angled parking. The second priority project would add gateway features to main street such as art and murals. The third proposed project is upgrading Elm Street with bike lanes, wider sidewalks, on-street parking, and street trees. Proposed project number four is installing a cross-town greenway connecting southern neighborhoods with High Point Station and High Point University. The fifth proposed project is a pedestrian esplanade along the downtown railroad. Downtown redevelopment is also recommended.

Kernersville

Kernersville Development Plan (2014)

The Kernersville Development Plan is an update to the original plan responding to the 1997 strategic plan - Kernersville 2020. The plan attempts to include all existing relevant plans such as the Transportation Capital Improvement Program, Land Use Plan, Thoroughfare & Street Plan, Parks & Recreation Master Plan, and the Pedestrian and Bike Plan. The Kernersville Development Plan also includes Goals, Development Potential, and Overlay Districts.

The Pedestrian & Bike Plan primarily addresses these facilities through proposed greenways, trails, and parkways. It is recommended these paths are placed in natural areas that are undevelopable.

Kernersville Thoroughfare & Street Plan (2017)

The Kernersville Thoroughfare & Street Plan is a map identifying the current transportation network and proposed interchanges, freeway, major and minor thoroughfares, and streets such as collector, industrial, marginal, and residential. Proposed items include four new interchanges, a freeway connecting I-74 to the northwest part of town, major thoroughfares connecting gaps in the northern loop around downtown, and minor thoroughfares and collector streets in the southeast region of town.

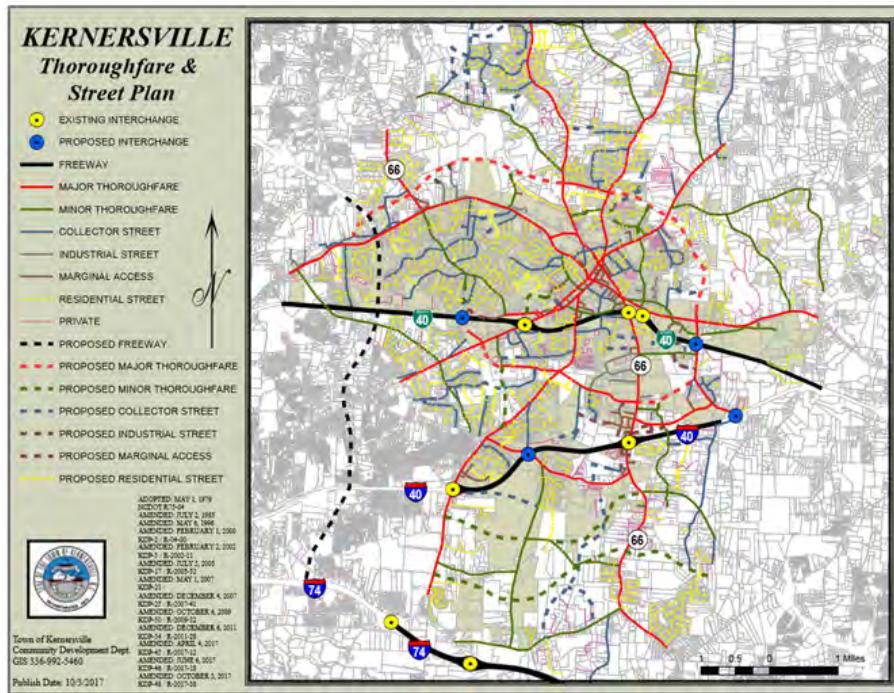


Figure 3: Kernersville Thoroughfare & Street Plan Map

Kernersville Transportation Study (2018)

The Kernersville Transportation Study takes a step back from implementing existing plans. As a transportation study it aims to assess the visions and needs of the community around transportation and access. As part of the Kernersville Transportation Plan, the study is phase one of three.

Through public engagement, citizens identified areas of the transportation network that were a strength, a weakness, or an opportunity. Goals from public engagement and the study indicated Kernersville wants transportation safety and security, mobility, multimodal options, to preserve culture and the environment through transportation, and a network that encourages local growth and development. Other goals include network preservation at the NCDOT and local level, as well as improving town gateways, streetscaping, and corridor.

Six example projects demonstrate how the vision and goals will be implemented. Proposed project examples include improving S. Main Street to the Business 40 interchange, connecting Union Cross Road to the intersection of Whicker Road and Masten Drive with a new north-south roadway, improving Bodenhamer

Street through downtown, and extending Glenn Hi Road east toward the NC 66/Bunker Hill Road intersection. The study also addresses the need for completing the downtown sidewalk network, implementing proposed greenways connecting residential neighborhoods to commercial and job centers, and continuing support of transit operations.

Kernersville Study Storymap (2018)

The Kernersville Study Storymap replicates the information listed in the Kernersville Transportation Study. As a storymap, visitors to the online map can click on results from public engagement events, proposed projects, and example projects. The interactive storymap allows users to read content about a location while gaining visual context about the project on the map. As mentioned in the Kernersville Transportation Study, the storymap highlights the vision and goals identified through public engagement events and the study about the Kernersville transportation network.

King

Stokes 2035 Comprehensive Plan (Draft) (2015)

The Stokes 2035 Comprehensive Plan is a draft that focuses on recommending policies and projects for Stokes County. Project proposals include adding an interchange at the intersection of Trinity Church Road and US-52, widen lanes and improve shoulders on Highways 311, 772, 704, 268, 66, 8, and 65, and improving pedestrian amenities and streetscaping in downtown Danbury, Walnut Cover, King and Meadows. Other recommendations include encouraging the use of public transit between Stokes County and Winston-Salem and enhancing partnerships in the transportation planning process.

Lewisville

Lewisville Comprehensive Plan (2015)

The Lewisville Comprehensive Plan addresses goals around improving the transportation network in Lewisville. The two primary goals are developing more bicycle and pedestrian facilities that follow Complete Street principles, and creating the Great Wagon Road, a road parallel to Shallowford Road. Potential Greenway routes have been identified as future potential projects.

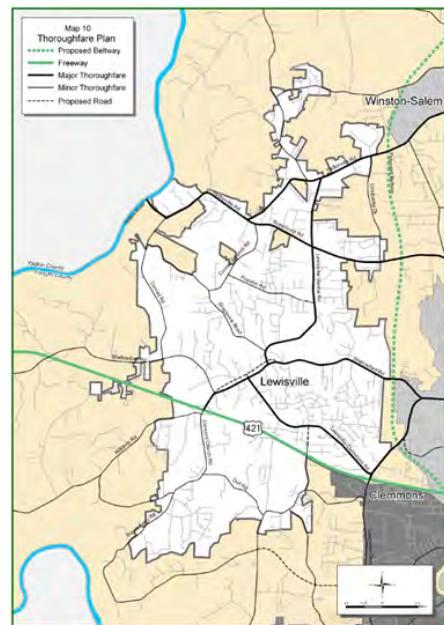


Figure 4: Lewisville Proposed Roads

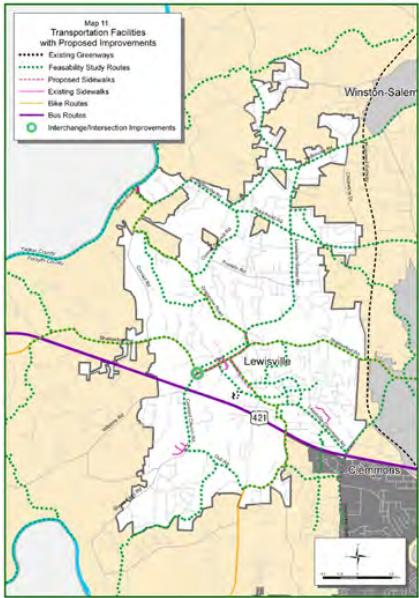


Figure 5: Lewisville Feasible Greenways

Midway

Town of Midway Transportation Evaluation (2013)

The Town of Midway Transportation Evaluation plan gives an overview of proposed transportation improvements. Proposed changes were identified through community input, safety analysis, and planning and engineering work. Improvements are recommended for the following intersections: Gumtree Road at Old US 52, Hartman and David Smith Roads at US 52 ramp, and Hickory Tree Road at Old US 52. Network connections to improve east-west mobility in town are recommended. Reducing the right-of-way width at Hickory Tree Road as the gateway into town is also proposed.

Mocksville

Mocksville Comprehensive Plan – Draft (2019)

The Mocksville Comprehensive Plan is a draft plan outlining existing conditions and proposed vision and goals for Mocksville. In its draft format there are limited new proposed projects. A strategy within the plan is to develop a Transportation Plan for Mocksville that would include road improvements and maintenance plans, transit plans, and bicycle, pedestrian, and greenway trail plans. Within transportation existing conditions, the 2011 Mocksville Comprehensive Transportation Plan is listed which includes proposed projects such as widening areas of I-40, US-64, US-158, and US-601, installing a multi-use path along a segment of US-601 and adding a sidewalk along a segment of US-601.

Rural Hall

Northeast Area Plan - Town Of Lewisville (2017)

The Northeast Area Plan for the Town of Lewisville is a small area plan for a region in the northeast of Lewisville. Primarily focused on preparing the area for a future school, the plan proposes road improvements along Lewisville Vienna Road, Robinhood Road and connector streets just south of Robinhood Road. The plan also recommends a future greenway within the small area, creating a loop and connecting north-south toward downtown.

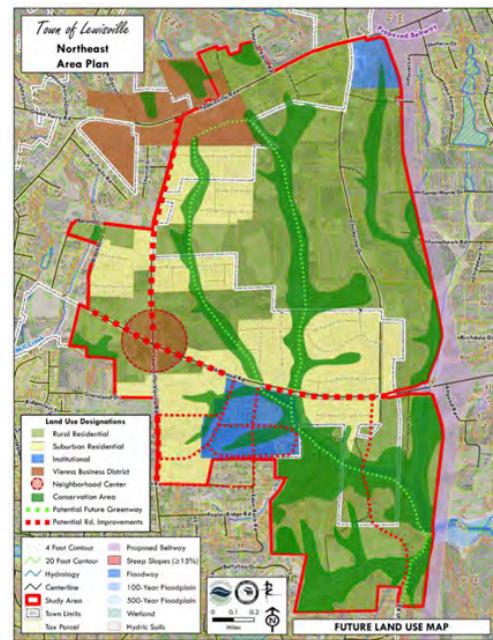


Figure 6: Lewisville Northeast Small Area Plan Proposed Road Improvements and Greenways

Rural Hall Area Plan Update (2016)

The Rural Hall Area Plan Update provides an overview of the small area in Forsyth County. The plan outlines current conditions and recommended changes for road, bridges, pedestrian and bicycle facilities, and greenways from the Forsyth County CTP. New roadways that are programmed as part of this plan include the Forum Parkway Connector from Forum Parkway to University Parkway, Northern Beltway and Interchange at US-52, and Northern Beltway from US 82 to NC 8 (Germanton Road). Roadway widenings and improvements include replacing the Northern Beltway US 52 Interchange with NC 65 (Bethania-Rural Hall Road) and improve its approaches and Widen NC 65 (Bethania-Rural Hall Road) to multiple lanes from US 52 to NC 66.

Pedestrian and bicycle improvements include adding five additional sidewalks, five new bicycle facilities, and three proposed greenways within the area. Recommended sidewalks have been identified on Lindley Street from NC 66 to Academy Street, NC 65 from NC 66 to town limits, NC 65 from Runningbrook Lane to Norvase Street, Academy Street from Lindley Street to town limits, and Wall Street from Providence Manor Apartments to Broad Street. Bicycle facilities include on-road bicycle facilities, sidepaths, paved shoulders, and signed bicycle routes. The Grassy Fork Greenway Phase 1, Forum Trail, and Railroad Park greenways are all long-range facilities.

There is one growth corridor in the area. The University Parkway/Broad Street growth corridor is focused on urban/suburban style single-family residential form. There are two activity centers within the area: US 52/Bethania-Rural Hall Road Activity Center and Downtown Rural Hall Activity Center. The center will focus on redeveloping existing facilities with mixed-use and encouraging low-intensity commercial around pedestrian-friendly design elements. The Downtown Rural Hall Activity Center will focus on creating a more pedestrian friendly environment, historic preservation, and increasing light-commercial and shopping areas.

Tobaccoville

Tobaccoville Area Plan Update (2013)

The Tobaccoville Area Plan Update provides an overview of the small area in Forsyth County. The plan outlines current conditions and recommended changes for road, bridges, pedestrian and bicycle facilities, and greenways. New roadway projects are recommended for the Northern Beltway from South Stratford Road to US 52/I-74 and Spainhour Mill Road Extension from Doral Drive to Moore-RJR Drive. Two collector streets are proposed pending developer participation. US 52/I-74 roadway is to be upgraded to interstate standards to complete the I-74 corridor through the Piedmont Triad Region. The Spainhour Mill Road over the Little Yadkin River and Waller Road over Fries Creek were to be replaced with the US 52/I-74 bridge over Tobaccoville Road to be rehabilitated.

Pedestrian and bicycle improvements include adding additional sidewalks in activity centers and nine new bicycle facilities. Bicycle facilities include paved shoulders and on-road bikeway connectors. There are no greenways recommended for this area.

There are no identified growth corridors in this area, however there are four identified activity centers. These activity centers include: The Tobaccoville Village Center, Reynolda Road/Tobaccoville Road, Shore Road Industrial Center, and Moore Road Industrial Area. The former two activity centers are mixed use in nature with

a focus on bringing in commercial and office space and improving pedestrian connectivity. Industrial areas are primarily for business park layout developments with additional housing and commercial centers surrounding the development. Industrial areas will be more auto oriented than their activity center counterparts.

Tobaccoville Area Plan - Proposed Land Use (2013)

The Tobaccoville Area Plan – Proposed Land Use outlines future recommended land uses for Tobaccoville. The proposed beltway around Winston-Salem travels through this area plan. The land use plan proposes low-density residential along the proposed beltway.

Walkertown

Walkertown Area Plan Update (2014)

The Walkertown Area Plan Update provides an overview of the small area in Forsyth County. The plan outlines current conditions and recommended changes for road, bridges, pedestrian facilities, and greenways.

Roadway widening projects are recommended for Reidsville Road from I-40 Business to Guilford County Line and NC 66 (Old Hollow Road) from US 158 (Reidsville Road) to Whitehall Village Lane (2015 completion). New roadways are recommended for the Northern Beltway from I-40 Business to US 158 and from I-74 to US 52, the Walkertown Bypass, and Williston Road Extension with six collector roads to be constructed based on developer participation.

Pedestrian and bicycle improvements include adding three additional sidewalks, no new bicycle facilities, three proposed greenways, and multiple greenway connectors within the area. Sidewalks are recommended on Sullivantown Road from Main Street to Depot Street, Old Belews Creek Road from Ramseur Drive to Gospel Light Church Road, and Darrow Road from Old Hollow Road to Reidsville Road. Proposed greenways include the Lowery Mill Creek, Martin Mill Creek, and Frazier Creek greenways. Projects are not anticipated to begin construction for at least ten to fifteen years.

There are no growth corridors within this area, however there are three identified activity centers. These activity centers include: Walkertown Town Center, US 158/NC 66, and Old Belews Creek Road. Development within these centers focuses on mixed use, commercial, and low-density housing. The Walkertown Town Center activity center calls for improved pedestrian environments whereas the other two appear to be more auto oriented.

Winston-Salem

West Suburban Area Plan Update (2018)

The West Suburban Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian and bicycle facilities, and greenways. Roadway widening projects include Meadowlark Drive from Country Club Road to Robinhood Road. Roadway improvements include Jonestown Road to upgrade the interchange at US 421 and to construct sidewalks from US 421 to Country Club Road on Jonestown Road. New roadways include the Northern Beltway from Robinhood Road/Meadowlark Drive to NC 67/Reynolda Road and from US 421 to Robinhood Road. Interchange improvements include the US 421 interchange and approaches with Northern Beltway and US

421/S. Peace Haven Road Interchange with Northern Beltway. Bridge replacements will occur on Country Club Road over Silas Creek Parkway, Robinhood Road over Silas Creek Parkway, and Yadkinville Road over Muddy Creek.

Pedestrian and bicycle improvements include adding five additional sidewalks, 17 new bicycle facilities, eight proposed greenways, and three greenway connectors within the area. Bicycle facilities include bike lanes, sidepaths, on-road bikeway connectors, and paved shoulders. Muddy Creek Greenway Phases 2, 3, and 5A are listed as Tier 1, programmed, and Tier 2, respectively.

Growth corridors in this area include: Country Club Road, Robinhood Road, Silas Creek Parkway, Reynolda Road, and Shallowford Road. These growth corridors are ripe for development with either urban or suburban form with a focus on commercial, office, and multifamily uses. The plan identifies seven activity centers: Robinhood Village, Country Club Road/Meadowlark Drive, Sherwood Forest, Harper Hill Commons, Reynolda Road/Fairlawn Drive, Gordon Manor, and Yadkinville Road/Transou Road. Recommendations along these corridors include streetscape improvements, bicycle and pedestrian facilities, modifying development standards to be pedestrian-oriented, and generating a mix of land uses.

Winston-Salem Downtown Plan (2013)

The Downtown Plan identifies goals for improved mobility within downtown Winston-Salem. Priorities for the downtown plan are walkability and managing traffic diversion during the Business I-40 closure. Crosswalks and walking lanes are recommended, as well as streetscape enhancements. Completing projects such as Research Park Boulevard, reconstructing the downtown interchanges along US-52, the Salem Creek connector, and the MLK extension are recommended. Constructing the Creative Corridors bridge and converting W. Third street from one-way to two-way is recommended.

Adding bike racks and a repair station, constructing two bicycle and pedestrian paths, installing bicycle lanes, and investing in a bikeshare program are proposed in the plan. Parking proposals include wrapping parking decks at ground level, discouraging more or new surface lots, encouraging shared parking methods, and improving wayfinding. Studying a potential Urban Circulator or streetcar is suggested.

Winston-Salem East/ Northeast Area Plan Update (2015)

The East/Northeast Area Plan update provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for streets, highways, pedestrian and bicycle facilities, greenways, and public transit. Street and highway recommendations include widening Reidsville Road/US 158 from Old Greensboro Road to NC 66 from two/three to four lanes, widening US 52 from the proposed Northern Beltway to I-40 from four to six lanes, and building a new four-lane expressway connecting Business 40/US 421 to US 311.

Sidewalks are recommended for all thoroughfare and collector streets, except freeways and expressways. Five greenways are proposed within the area. Bicycle lanes with bond funding identification are recommended on six streets. Growth corridors, 311 and New Walkertown Road to MLK and N Liberty Street, are expected

to see increased development. Streetscape improvements, bicycle and pedestrian facilities, and modifying development standards to increase mixture of land uses are recommended along these corridors. A potential streetcar/circulator is proposed to connect Wake Forest Baptist Medical Center from the west to Winston-Salem State University on the east.

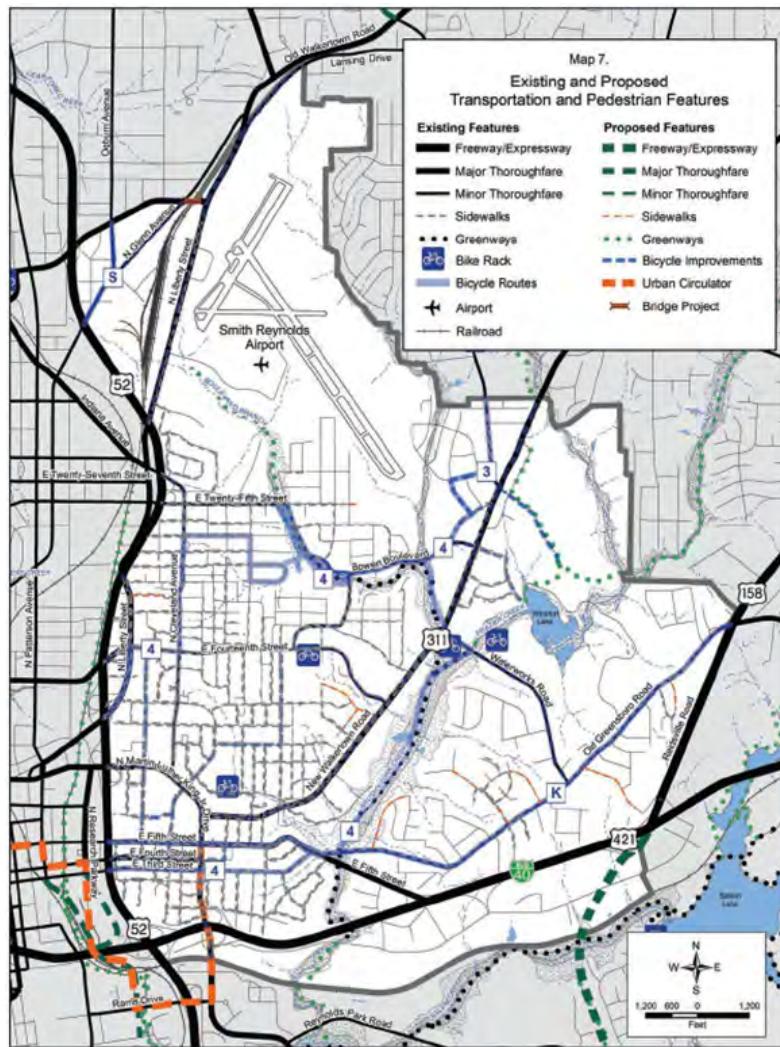


Figure 7: WS N/NE Small Area Plan Recommendations

Winston-Salem North Central Area Plan Update (2015)

The North Central Area Plan update provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for streets, highways, pedestrian and bicycle facilities, and greenways. Street and highway recommendations include the MLK Drive extension and the Reynolda Road Connector.

A new sidewalk to connect University Parkway and Twentieth Street is recommended, as a worn path

demonstrates the demand for the connection. Four greenways and one greenway connector are proposed within the area. Bicycle lanes are proposed on seven streets. Growth corridors, Coliseum Drive, University Parkway, N Liberty Street, and N Patterson Avenue are ripe for improvement. Streetscape improvements, bicycle and pedestrian facilities, modifying development standards to be pedestrian-oriented, and developing activity centers are recommended along these corridors.

Winston-Salem Northwest Area Plan (2017)

The Northwest Area Plan update provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for streets, highways, pedestrian and bicycle facilities, and greenways. Street and highway recommendations include replacing the following bridges: West First Street, County Club Road, and Robinhood Road. A proposal to widen the following roads to add pedestrian and bicycle facilities include, Silas Street Parkway, South Stratford Road, and North Stratford Road. Building the Reynolda Road Connector is also recommended.

Sidewalks are recommended for all thoroughfare and collector streets, except freeways and expressways, including four sidewalk projects. Two greenways and two greenway connectors are proposed within the area. Bicycle lanes or shared lane markings are proposed on nine streets. A sidewalk, multi-use path, and greenway have also been proposed within or connecting to Wake Forest University's campus.

Winston-Salem South Central Area Plan Update (2014)

The South Central Area Plan update provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for streets, highways, pedestrian and bicycle facilities, and public transit. Street and highway recommendations include Business 40 improvements, widening US 52, the MLK extension, and building the Salem Creek Connector to connect Winston-Salem State University to Wake Forest Innovation Quarter. Glade Street Bridge and S Broad Street Bridge are recommended for replacement.

The Peters Creek Parkway corridor is proposed for improvement. Proposed changes include lane reduction, adding bicycle and pedestrian facilities, modifying development standards to be creative and flexible, and intensify concentrated development with retrofitting and infill. A potential streetcar/circulator is proposed to connect Wake Forest Baptist Medical Center from the west to Winston-Salem State University on the east.

The Business 40 multipath is the largest pedestrian recommendation. Sidewalks are recommended for all thoroughfare and collector streets, except freeways and expressways, including ten sidewalk projects. Three greenways have been proposed in the area. Bicycle lanes have been recommended for 10 street segments.

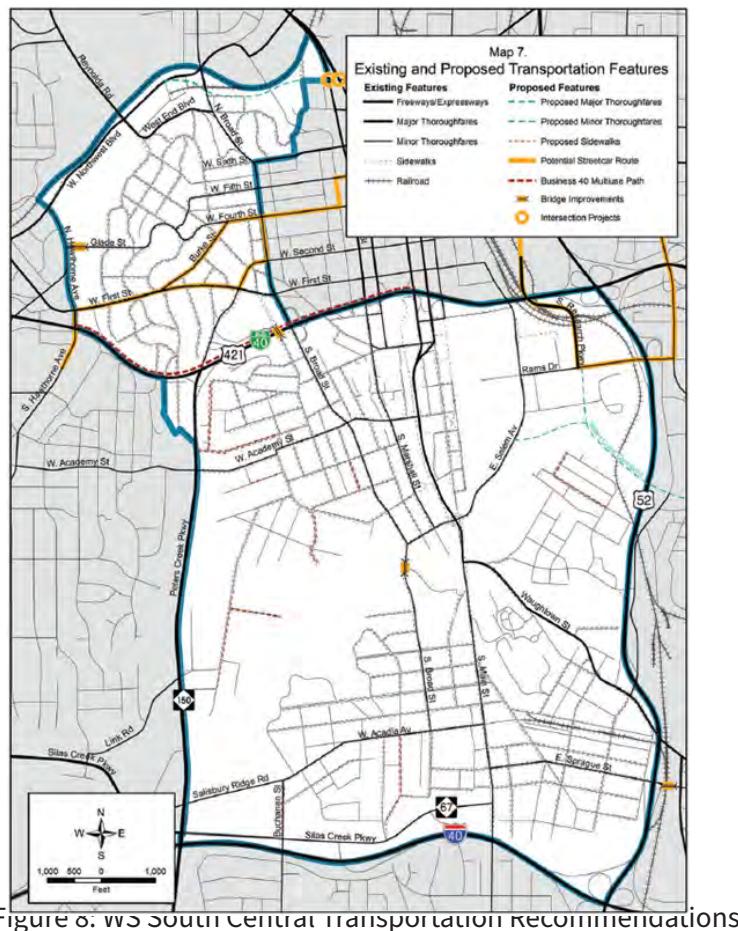


Figure 8: WS South Central Transportation Recommendations

Winston-Salem Southeast Area Plan Update (2013)

The Southeast Area Plan update provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian and bicycle facilities, and greenways. Road widening is recommended for US 52 from Rams Drive to Akron Drive, and US 52 from I-40 to Northern Beltway. The Salem Creek Connector and the I-74 connector are recommended new roads. The Reynolds Park Road Bridge and Sprague Street Bridge are recommended for replacement.

Sidewalks are recommended for all thoroughfare and collector streets, except freeways and expressways, including twenty sidewalk projects. Two greenways have been proposed in the area. Bicycle lanes have been recommended for four street segments.

Winston-Salem Southwest Area Plan Update (2016)

The Southwest Area Plan update provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian and bicycle facilities, greenways, and public transit. The plan states that NCDOT will replace the Salisbury Ridge Road Bridge. The plan recommends enhancements along Peters Creek Parkway Corridor, with superstreet design, four travel lanes, roundabouts, sidewalks, multiuse paths, and landscaping.

Pedestrian improvements include enhancing the Safe Routes to School program with three sidewalk projects. The plan recommends following the listed improvements in the Cloverdale Avenue Pedestrian Design Study.

The largest pedestrian improvement is the future Business 40 multiuse path. Sidewalks are recommended for all thoroughfare and collector streets, except freeways and expressways, including ten sidewalk projects. One greenway has been proposed in the area. Bicycle lanes have been recommended for six street segments.

Growth corridors, Silas Creek Parkway, Peters Creek Parkway, and Stratford Road are ripe for improvement. Streetscape improvements, bicycle and pedestrian facilities, modifying development standards to be pedestrian-oriented, and generate a mix of land uses are recommended along these corridors. A potential streetcar/circulator is proposed to connect Wake Forest Baptist Medical Center from the west to Winston-Salem State University on the east. The proposal of a potential future light rail connecting Forsyth and Guilford Counties is listed in the plan.

North Suburban Area Plan (2014)

The North Suburban Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for road, pedestrian and bicycle facilities, and greenways. The plan identifies widening Hanes Mill Road to multi-lanes, widen and upgrade roadway and interchanges for US 52, widen University Parkway, and realign Motor Road to North Point Boulevard. Additional new roadway construction includes the Western and Eastern Beltways plus the Sweetbriar Road extension.

Pedestrian and bicycle improvements include adding seven additional sidewalks, five new bicycle lanes, and four proposed greenways within the area. The Mill Creek Greenway North is a Tier 2 priority project, with the other three projects listed as Tier 3.

The plan calls for the creation of mixed-use developments and activity centers. Mixed-use areas will be centered at University Parkway and Home Road and Silas Creek Parkway at Fairlawn Drive. New activity centers will include the Reynolda/Fairlawn area and the University/Hanes Mill area.

Northeast Suburban Area Plan (2017)

The Northeast Suburban Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges pedestrian and bicycle facilities, and greenways. Roadway widening is recommended for US 52 from Clemmons Road to the Northern Beltway and US 158 from US 421/B-40 to Belews Creek Road. New roads to be constructed include the Northern Beltway, Beeson Dairy Road Extension from Old Belews Creek to Reidsville Road, Hanes Mill Road Extension to Old Rural Hall Road, Westmoreland Drive Extension to Novack Street, Tulip Drive Extension to Northampton Drive, Gaither Road Extension to Walkertown-Guthrie Road, Kittering Lane Extension to Blaine Street, and Brown Street Extension to Davis Road. Several Bridges will be replaced including Akron Drive over Norfolk Southern Railroad, Old Greensboro Road NE over Salem Creek/Lowery Mill Creek, and Old Greensboro Road over Norfolk Southern Railroad.

Pedestrian and bicycle improvements include adding two additional sidewalks, two new bicycle lanes, six shared lane marking routes, and four proposed greenways within the area.

Growth corridors along New Walkertown Road east and west of Northampton Drive are designed for residential use, primarily single family residential. Two activity centers are planned: Old Rural Hall Road/Baux Mountain Road and Ogburn Station. These locations will encourage pedestrian usage through sidewalks, crosswalks, and connections and improve transit stops with shelters or benches.

South Suburban Area Plan (2017)

The South Suburban Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian and bicycle facilities, and greenways. Roadway widening is recommended for US 52 from Clemmons Road to Winston-Salem Northern Beltway. Interchange modifications of I-40/US 311 are recommended at NC 109 (Thomasville Road). New Roadways include Ebert Road- Stratford Road Connector and the Southern Beltway. Thomasville Road/NC 109 will be widened from south of I-85 Business in Thomasville to I-40/US 331 in Winston-Salem, with a bypass of Wallburg. Bridges to be replaced include Salisbury Ridge Road over Peters Creek Parkway and Silas Creek Parkway over Salem Creek.

Pedestrian and bicycle improvements include adding six sidewalks from a previous bond, ten new bicycle facilities, and four proposed greenways within the area. The Salem Creek Greenway Extension will encompass Marketplace Mall to Forsyth Tech as a Tier 1 Priority project.

Growth corridors include Silas Creek Parkway, Peters Creek Parkway, and Thomas Ville Road. All growth corridors look to develop new commercial, office, and multifamily uses with a suburban form. Peters Creek Parkway also seeks to develop new single-family housing while Thomasville Road looks to develop large-lot rural residential. There are five activity centers that are recommended, including: Peters Creek, Oliver's Crossing, West Clemmons Road/South Main Street, West Clemmons Road/Old Salisbury Road, and West Clemmons Road/Ebert Road.

Southeast Forsyth County Area Plan Update (2013)

The Southeast Forsyth County Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian facilities, and greenways. New roadway construction is recommended for the Winston-Salem Southern Beltway, North-South Airport Connector, Glenn Hi Road Extension, NC 66-Skeet Club Road Connector, and 10 collector streets (based on developer participation). Roadway widening is recommended for Union Cross Road from Wallburg Road to Sedge Garden Road (completion 2014). Additional improvements include enhancing intersections on Gumtree Road with Sawmill Road and Reid Road and replace the bridge on High Point Road over Abbotts Creek.

Pedestrian and bicycle improvements include adding sidewalks in activity centers, no new bicycle facilities, and three proposed long-range greenways within the area. Greenway feasibility studies will be conducted along Abbotts Creek, West Fork of the Deep River, and Fiddlers Creek.

There are no growth corridors within this area, however there are four identified activity centers. These activity centers include: Union Cross Road/I-40, Union Cross Road/High Point Road, Horneytown Rod/High Point Road,

and NC 66/Old Salem Road activity centers. These activity centers are large, ranging from 10 acres to 530 acres in size. The smallest, Horneytown Road/High Point Road activity center recommends commercial and institutional uses. NC 66/Old Salem Road calls for mixed use and low density residential. The other two call for a wide mixing of zoning uses.

Southeast Suburban Area Plan Update (2016)

The Southeast Suburban Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian and bicycle facilities, and greenways. New roadway construction is recommended for the Northern Beltway and Thomasville Road. Roadway widening is already completed for Union Cross Road and Gumtree Road. The US 311 Connector project will be a four-lane expressway from the interchange at Business 40/US 421 and US 158 to the interchange at I-40 and I-74. The project is just outside the study area, but will have an impact on area residents.

There are no bicycle or pedestrian facilities recommended for this area, however four greenways have been proposed. Sidewalks are recommended for all thoroughfares and collector streets, except for freeways and expressways. The Piedmont Regional Greenway Trail will connect Salem Lake Trail to Hastings Hill Road and construction was slated to begin in 2017-2018.

Growth corridors in this area include Kernersville Road between Linville Road and Sedge Garden Road and Thomasville Road between Willard Road and Baden Road. Both are to develop new commercial, office, and multifamily uses with a suburban form. Thomasville Road should also develop large-lot rural residential forms. Recommended activity centers include Union Cross Road/Sedge Garden Road and Kernersville Road/I-74 Beltway. Areas should be pedestrian friendly with mix of commercial and office use for Union Cross/Sedge Garden and retail, office, and residential for Kernersville Road/I-74 Beltway.

Southwest Suburban Area Plan Update (2015)

The Southwest Suburban Area Plan provides an overview of the small area in Winston-Salem. The plan outlines current conditions and recommended changes for roads, bridges, pedestrian and bicycle facilities, and greenways. New roadway construction includes: Idols Road Extension from existing Idols Road to South Stratford Road, Western Beltway from US 52 to I-40 and I-40 to South Stratford Road, Northern Beltway from terminus of current Northern Beltway to Western Section at South Stratford Road, Ebert Road – Stratford Connector, and Peace Haven – Styers Ferry Connector. New interchange will occur on the Western Beltway at US 421 with Peace Haven Road.

Pedestrian and bicycle improvements include adding ten sidewalks, one new bicycle lane, several general bicycle improvements, and six proposed greenways within the area. Additional bicycle improvements include upgrading roads to include sidepaths or shoulders, improve bicycle signage, and improve street intersections. Little Creek Greenway Phase 2A is a Tier 2 project and will extend Little Creek Greenway from Atwood Rod to Somerset Drive.

Growth corridors in this area include the South Stratford Road corridor between Hanes Mall Boulevard and

West Clemmons Road. This area is to develop new commercial, office, and multifamily uses in suburban form and large-lot residential form between West Clemmons Road and the western boundary of the area. There are four activity centers in this area: South Stratford Road, Hanes Mall Boulevard, Hillcrest/Somerset Drive, and West Clemmons Road/Ebert Road. Streetscape improvements, bicycle and pedestrian facilities, modifying development standards to be pedestrian-oriented, and generate a mix of land uses are recommended along these corridors. A mixed-use development at South Stratford Road/Burke Mill Road is recommended for commercial and multifamily use.

Winston-Salem Urban Area Comprehensive Transportation Plan (2012)

The Winston-Salem Urban Area CTP covers recommended improvements throughout the urban region of Winston-Salem and nearby jurisdictions. Four primary projects are highlighted: construct a 3-lane road from Carver School Road to Motor Road and widen Motor Road to 3-lanes to Baux Mountain Road, construct a 3-lane road with bicycle and pedestrian facilities from Williams Road to the Great Wagon Road, construct a 4-lane divided road with bicycle and pedestrian facilities from NC 150 to Piney Road, and widen University Parkway to a 6-lane expressway from North Point Boulevard to US 52 and widen University Parkway to a 6-lane boulevard from US 52 to Hanes Mill Road.

Other project recommendations include a freeway loop around the metropolitan area, and a few expressway segments east and southeast of downtown. Bus routes connecting further out from downtown are proposed. Regarding rail, a fixed guideway is recommended along the current southwest-northeast rail line. A high-speed rail is recommended along the south to northeast rail line. Multi-use trails are recommended throughout the planning area, but primarily east, south, and west of downtown. Multi-use paths serve pedestrians, but further pedestrian amenities such as sidewalks are recommended throughout the urban planning area.

2012-2018 Metro Transportation Plan

Smith Reynolds Airport Master Plan (2012)

The Smith Reynolds Airport Master Plan identifies deficiencies at the current airport, and expected growth demand. As the airport is expected to see increased demand and the facilities need improvement, three alternative scenarios are presented. The preferred development alternative is a blend of two scenarios that include building three large hangers, an automobile parking lot, developing land for t-hangers and box hangers, and improving access with a new access road. The new access 1.75-mile access road would be two-lanes and connect Lansing Drive toward Conrad Street. Noise, emissions, and environmental impacts as a result of the preferred alternative are discussed.

Transit Plans

Regionalization in the Piedmont Triad in North Carolina – 2003

Regionalization of transit systems in the Triad has long been a top priority to promote cooperation and coordination. As a result, the transit agencies decided to move their fixed route and demand response scheduling software into to a single database. This allowed the Triad transit systems to be more reliable and

customer friendly.

Piedmont Triad Seamless Mobility Study - 2008

The Piedmont Triad Seamless Mobility Study provided a review of all participating area transit services and identified opportunities for consolidation, coordination, and communication amongst agencies. A suite of long-range transit concept plan recommendations was created including consolidation of functions, regional branding, new regional funding, and increased transit service.

WSUAMPO Public Transportation – Human Services Transportation Plan – 2010

The Winston-Salem Urban Area MPO developed a coordinated public transportation-human services transportation plan for all FTA human services transportation programs. The plan coordinates transportation resources provided by multiple federal programs that improve transportation services for persons with disabilities, older adults, and people with lower incomes.

Regional Transit Development Plan (RTDP) - 2010

The Piedmont Authority for Regional Transportation (PART) led the Regional Transit Development Plan (RTDP) in 2010 to explore a transit vision for 2025 in Forsyth and Guilford Counties. The RTDP includes a Transit Development Plan, Strategic Corridor Analysis, Financial Plans, and Public Outreach. The scope of Forsyth County recommendations includes service enhancements, new routes and extensions, transit emphasis corridors, Piedmont Gold Line BRT, Streetcar in downtown Winston-Salem, and capital improvements. The maps below illustrate some of the recommended routes for Forsyth County-TEC stands for Transit Emphasis Corridors.

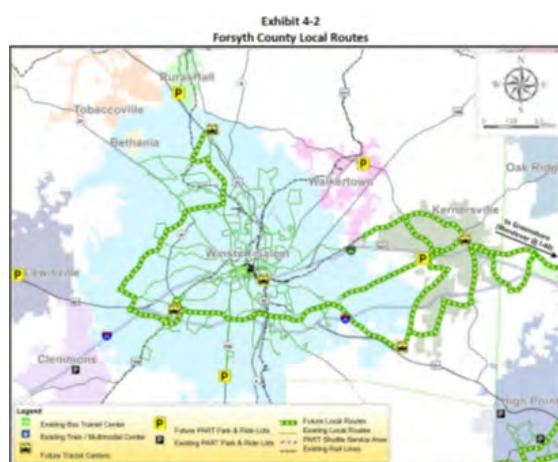
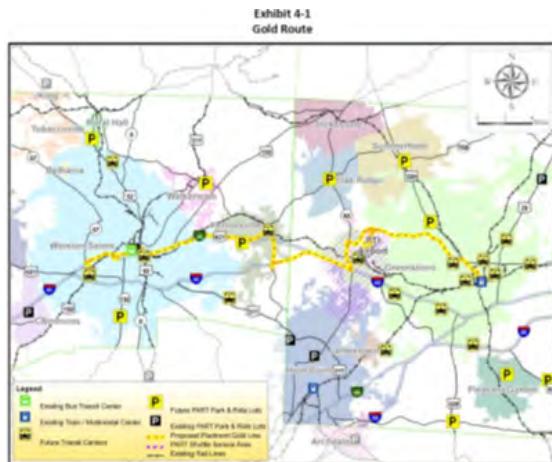




Exhibit 4-4
Forsyth County TEC



Transit Emphasis Corridors (WSTA)					
Route	Operating Hours	Days of Service	Service Frequency	Daily Bus Hours	Notes
Hanes Mall to Downtown	6am-8pm	Mon.-Fri.	30 min. peak, 60 min. non-peak	15 hours	Service supplementing local routes along corridor.
		Sat.-Sun.	60 min.	10.5 hours	
Wake Forest University to	6am-8pm	Mon.-Fri.	30 min. peak, 60 min. non-peak	20 hours	Service supplementing local routes along corridor.
		Sat.-Sun.	60 min.	14 hours	
Peters Creek to Downtown	6am-8pm	Mon.-Fri.	30 min. peak, 60 min. non-peak	15 hours	Service supplementing local routes along corridor.
		Sat.-Sun.	60 min.	10.5 hours	
Liberty to Downtown	6am-8pm	Mon.-Fri.	30 min. peak, 60 min. non-peak	10 hours	Service supplementing local routes along corridor from Akron Rd
		Sat.-Sun.	60 min.	7 hours	

Winston-Salem Urban Circulator Study - 2014

The City of Winston-Salem has long considered implementing an urban circulator, a streetcar or enhanced bus, since the Winston-Salem 2006 Streetcar Feasibility Study. The Winston-Salem Urban Circulator Study developed and evaluated alternatives for an urban circulator and selected a preferred alternative. The study identified streetcar as the preferred mode and identified a preferred east-west alignment connecting Wake Forest University Baptist Medical Center, Downtown, and Winston-Salem State University.

Winston-Salem Bus Stop Improvement Study – 2015

The goal of the Winston-Salem Bus Stop Improvement Study was to create a standard for future bus stops system wide while improving efficiency, rider experience, and accessibility.

PART Express Proposed Service Changes – Implementation Scheduled for August 2020

PART is planning to undergo service changes in August of 2020 due to the reopening of Business 40, performance concerns, public comments, and expiration of CMAQ funds. Affected routes within the study area include Route 6 – Surry County, Route 17 – Kernersville Express, and Route 28 – West Forsyth Express.

Bicycle, Pedestrian and Greenways Plans

Winston-Salem Comprehensive Bicycle Master Plan

The Winston-Salem Comprehensive Bicycle Master Plan calls for 415 miles of bicycle network consisting of shared use paths, dedicated bike lanes, bicycle boulevards, and protected cycle tracks. The plan identified 17 priority routes that have various levels of completion and facility types (Figure 9). Bicycle routes identified as high priority provide an opportunity to make bus route connections, encouraging multimodal transportation, and make use of connecting various destinations including job centers, educational, and recreational activity centers. The plan also calls for an extensive bike boulevard network to connect the prioritized projects and various other neighborhoods within the city. A regional rail transit stop is to be established on South Stratford Road between Hanes Mall Boulevard and Silas Creek Parkway.



Figure 9: Winston-Salem Bicycle Master Plan - Priority Routes

Connect Davie Greenway Master Plan

The Connect Davie Greenway Master Plan provides a broad summary of recommendations for greenway improvements throughout Davie County. The plan calls for Bermuda Run to create the Lakeside Greenway north of I-40, Farmington to create three greenways with parallel equestrian routes along the Dutchman, Bryant, and Cedar Creek floodplains, the implementation of the GreenRing 3-phase greenway around Mocksville, and the Town Greenway and Northern Loop Greenway within Cooleemee.

High Point Regional Bike Plan Draft

The High Point MPO Regional Bike Plan highlights fifteen priority bicycle projects throughout the region. Projects typically consist of shared use paths, bike lanes, and (un)signed bike routes. The W. Lexington and Friendship-Ledford Rd state bike route NC 2B connect the two MPOs. Further, the Yadkin River proposed unpaved shared use trail could connect the two MPOs. NC150 north of US 64 is scheduled for widening as part of U-5902A with recommended sidepaths that would serve as a Segway. Lastly, the NC 10WS state bike route would serve as another point of transfer between the two MPOs. None of the projects that link the MPOs are part of the priority bicycle projects.

High Point Pedestrian Plan

The City of High Point Pedestrian Plan details a series of proposed and programmed sidewalk and greenway facilities within the city. There are no interregional significant plans within this study that would affect the WSUAMPO.