7. Our Long Range Transportation Plan

Section 7 is the heart of our region's Metropolitan Transportation Plan. This section describes the investments we plan to make, when we intend to make them, and the associated land use development activities that promote an effective and efficient transportation system.

The transportation investments are summarized in the following categories:

- Roadways (with accompanying project list in Appendix 1)
- Public Transportation
- Bicycle and pedestrian projects
- Freight movement
- Aviation and Intercity Rail
- System Optimization including:
    - Programs to manage transportation demand
    - Intelligent transportation systems: technology investments
    - Transportation/congestion systems management: lower-cost roadway projects that do not add more travel lanes, but improve safety and/or operational efficiency.

7.1 Land Use & Development

Land use in the Triangle is the responsibility of each local government, not the MPOs. But few things influence the functionality and effectiveness of our transportation system as much as the locations, types, intensities and designs of existing and new developments in our region. If we are to successfully provide for the mobility needs of the 1.6 million people here today and the additional 1.3 million expected to be added over the timeframe of this plan, we will need to do a top-notch job of matching our land use decisions with our transportation investments.

The ties between regional transportation interests and local land use decisions are most pronounced in three cases:

1. Transit Station Area Development.
2. Major Roadway Access Management.
3. Complete Streets & Context-Sensitive Design.

Transit Station Area Development. The MPOs Metropolitan Transportation Plans include billions of dollars of capital investments in rail and bus rapid transit infrastructure to connect our region's five largest activity centers and link these centers to neighborhoods across the region (see major transit infrastructure investment descriptions in section 7.3). Ensuring that well-designed, compact, mixed use development occurs within the first half mile around transit stations is a key element in determining how cost-effective major transit investments will be. Working with a range of local and regional partners, the Triangle J Council of Governments and GoTriangle have been leading efforts to develop and share key land use and affordable housing practices that can be used by local governments and other organizations to support fixed guideway investments such as rail and bus rapid transit. Continuing to build on this collaborative approach is an important and cost-effective way to match local land use decisions with regional transportation investments.

Major Roadway Access Management. Roads serve two main purposes. One is mobility and the other is access. Mobility is the efficient movement of people and goods. Access is getting those people and goods to specific properties. A roadway designed to maximize mobility typically does so in part by managing access to adjacent properties. A good example is an Interstate Highway. While a motorist could expect to travel quite efficiently over a long distance using an Interstate Highway, the number of access points is restricted to only freeway interchanges every few miles. This type of roadway serves primarily a mobility function. At the other end of the spectrum, a local residential street would provide easy and plentiful access to all adjacent properties, but long distance travel on such a roadway would be time consuming and inconvenient. This type of roadway serves primarily an access function. Many costly road investments involve widening roads to provide additional travel capacity. Where these investments are made, the MPOs will work with the NCDOT and local communities to ensure that the new capacity is not inappropriately degraded by a pattern of "strip development" requiring numerous driveways and median cuts.

Complete Streets & Context-Sensitive Design. Roadways are the largest component of our communities' public realm: the spaces all of us share with our neighbors and which provide access to the front doors of homes and businesses. Especially where roadways traverse town centers, walkable neighborhoods and important activity centers such as college campuses, the MPOs will work with the NCDOT and local communities to ensure that roads are appropriately designed to accommodate the full range of travel choices and that adjoining development is sited and designed to promote alternatives to auto travel. As the benefits of walking and cycling are better understood, creating safe and healthy streets is becoming a higher priority for MPO support.

So in the three instances summarized above: transit station area development, major roadway access management and complete streets whose designs are sensitive to the neighborhoods of which they are a part, the DCHC MPO and CAMPO are committed to work with their member communities and regional organizations such as the Triangle J Council of Governments and GoTriangle to coordinate land use decisions and transportation investments.

7.2 Roadways

This section contains a list of major road investments in the 2045 Capital Area MPO and Durham-Chapel Hill-Carrboro MPO Metropolitan Transportation Plans. A full listing of all roadway projects, by time period is in Appendix 1.

Projects are separated into four categories based on anticipated date of completion. 2025 projects are projects already underway with full funding and an expected completion date by 2025, derived from the adopted Transportation Improvement Program (TIP). The 2035 and 2045 projects are composed of projects selected through the alternatives analysis process described in Section 6.4 and that can be funded with existing revenue streams or reasonably foreseeable new revenue streams.

Due to anticipated funding constraints, a fourth category includes projects that had merit but could not be completed by 2045 with anticipated revenue. These projects that are not part of our fiscally constrained plans are compiled separately in the Comprehensive Transportation Plan (CTP) for the DCHC MPO. Each project in the fiscally-constrained plan has a project identifier that is shown on the 2045 MTP Road Project Map. The project listing in Appendix 1 includes information on each project's limits, length, present and future lanes, funded completion year, cost estimation and whether it meets federal definitions for a regionally significant or exempt project.

The resiliency and reliability of the roadway network is expected to improve with the implementation of this Plan. The planned investment in highway maintenance is approaching 50% of the non-transit budget for both MPOs, up from about 30% in the previous plan.

Figure 7.2.1 below is a listing of the major highway projects by time period in each MPO. A larger version of the roadway map is available in Appendix 10 and on the MPO web sites.

Figure 7.2.1. Major Highway Projects by MPO and Time Period

Durham Chapel Hill-Carrboro MPO		
2018-25	**2026-35**	**2036-45**
East End Connector will link US 70 to NC 147 (Durham Freeway) to form I-885	I-40 managed lanes (Wade Avenue in Wake County to NC 147)	I-40 managed lanes (NC 147 to US 15-501)
NC 147 (Durham Freeway) widened (East End Connector to I-40)	I-40 widening (US 15-501 to I-85)	I-85 widened (I-40 to Durham County)
US 70 lane addition and freeway conversion (East End Connector to Miami Blvd)	US 70 lane addition and freeway conversion (Miami Blvd to Wake County)	I-85 widened (US 70 to Red Mill Road)
	US 15-501 (Fordham Blvd) capacity improvements (Columbia St to I-40)	US 15-501 freeway conversion (I-40 to US 15-501 bypass)
Capital Area MPO		
2018-25	**2026-35**	**2036-45**
I-40 widened from Wade Ave. to Lake Wheeler Road	I-40 widened from I-440 to NC 42 in Johnston County	I-87 widened from US 64 Bus to US 264
I-440 widened from Wade Avenue to Crossroads	I-87 widened from I-440 to US 264	NC 210 widened from Angier to Lassiter Pond Rd.
I-40 widened from I-440 to NC 42 in Johnston County	US 1 widened south from US 64 to NC 540	NC 50 widened from NC 98 to Creedmoor
US 64 W corridor improvements from US 1 to Laura Duncan Rd.	Managed lanes added to I-540 (Northern Wake Expressway) from I-40 to I-87	US 401 widened from Fuquay-Varina to MPO boundary in Harnett County
NC 540 toll road extended from Holly Springs to I-40 south of Garner	NC 540 completed as a toll road from Holly Springs to I-87/US 64 bypass	NC 96 widened from US 1 to NC 98
NC 50 widened and access management from I-540 to NC 98	Managed lanes added to I-40 from Durham County to MPO boundary in Johnston County	NC 56 widened from I-85 to MPO boundary in Franklin County

7.3 Fixed Guideway and Premium Transit Services

A number of extensive transit planning efforts that have taken place in the last decade have resulted in transit plans in Durham, Orange, and Wake Counties. These county plans provide new dedicated revenue sources to finance significant transit improvements, including projects to produce enhanced regular bus service, implement high-quality fixed-guideway transit projects, build improved transit infrastructure, and develop new services to connect job centers and population centers throughout the region.

Among the projects identified in the county transit plans and included in this 2045 MTP are a variety of premium transit investments that will provide dedicated transit corridors. These major projects will reduce transit time, improve reliability, and provide enhanced customer experiences. Three types of investments are included in this 2045 MTP:

- Light rail transit (LRT) provides frequent, all-day passenger rail service to serve allow compact and walkable development patterns. Light rail uses electric vehicles that run on a dedicated fixed-guideway to provide safe, quiet, and reliable transportation along congested transportation corridors, and stopping at stations that are easily accessible to existing neighborhoods and new transit-oriented development by walking, bicycling, bus, and automobile.
- Bus rapid transit (BRT) encompasses a variety of enhancements to regular bus service, such as enhanced stations with off-board ticketing, dedicated lanes that allow buses to bypass congested automobile traffic and improve system reliability, priority treatment at traffic signals, and other improvements.
- Commuter rail service operates in existing mainline rail corridors, serving stations that generally are spaced farther apart than in light rail networks. Commuter rail projects generally provide service during peak commuting hours, with occasional mid-day, evening, and weekend service.

The specific projects included in this 2045 MTP include:

- The Durham-Orange Light Rail Transit (D-O LRT) Project, a light-rail system connecting Chapel Hill and Durham. The project is currently within the Engineering phase of the Federal Transit Administration (FTA's) Capital Investment Grants/New Starts program and is under active development. The project is anticipated to begin construction in 2020 and be completed by 2028. Further information about D-O LRT is available at ourtransitfuture.com.
- A westward extension of the D-O LRT Project from its initial terminus at UNC Hospitals to serve the town centers of Chapel Hill and Carrboro. This project is scheduled for 2035-45.
- Chapel Hill Transit's North-South Corridor BRT, an 8-mile, 16-station project along the primary north-south corridor in Chapel Hill, Martin Luther King Jr. Blvd. and Columbia Street. It is currently in FTA's Small Starts Project Development program. Additional environmental analysis and project design is underway, and revenue service anticipated to begin before the end of the 2025 time period of this plan. Further information about this BRT project is available at nscstudy.org.
- A rapid rail system with an initial focus linking, Garner, Raleigh, and Cary in Wake County with the Research Triangle Park downtown Durham and West Durham. This project is currently being evaluated as part of a Major Investment Study funded by Wake County and Durham County. This initial phase is scheduled for the 2026-35 time period of this plan.
- A westward extension of the rapid rail system from west Durham to Hillsborough, where a new Amtrak intercity rail station is currently being developed by NCDOT, and an eastward extension from Garner to Clayton. These extensions are scheduled for the 2036-45 time period of this plan.
- A rapid rail extension running between Apex and Wake Forest/Youngsville via Cary and Raleigh. This phase is scheduled for the 2036-2045 time period of this plan.
- A BRT system connecting Raleigh, Cary, Morrisville, Research Triangle Park, and Garner. These projects and services are currently being evaluated as part of the Major Investment Study funded by Wake and Durham County as well as the Bus Implementation Plan funded by Wake County. The initial phase includes portions of both dedicated fixed guideway as well as mixed traffic BRT service and is scheduled early in the 2026-2035 time period of this plan.
- An extension of dedicated fixed guideway for the initial BRT corridors in Wake County as well as the addition of BRT service to Midtown in Raleigh is scheduled for the latter part of the 2026-2035 time period of this plan.
- An extension of dedicated fixed guideway and BRT service to New Hope Rd. in the New Bern BRT corridor in Raleigh is scheduled for the 2036-2045 period of this plan.

- A north-south BRT corridor in Cary along the Harrison-Kildaire Farm-Tryon Rd. corridor that will connect the SAS/Weston area to the Regency business park via downtown Cary is scheduled for the 2036-2045 time period of this plan.
- An eastward extension of the rapid rail system from Clayton to the Smithfield/Selma area, where Amtrak intercity rail service is currently operating. This extension is not included in the fiscally constrained portion of this plan and is depended on various other rail transit partners in Johnston County that are outside of the MPO boundary.

7.4 Frequency- and Coverage-Based Bus Services

The 2008 Special Transit Advisory Committee (STAC) produced an initial report identifying the need for additional transit services and setting forth a vision for providing higher-quality transit services along multiple transportation corridors within the MPOs. This effort sparked additional planning efforts throughout the region involving multiple counties, municipalities, residents, and other stakeholders. These different efforts coalesced into three transit plans that direct dedicated revenue to a variety of transit projects throughout the region:

- Durham County: In 2011, Durham County commissioners and voters approved the Bus and Rail Investment Plan with a new ½-cent sales tax and other revenues to fund transit expansion, including improved bus service, improved infrastructure; and premium transit services including D-O LRT and commuter rail. The plan was updated and renamed the Durham County Transit Plan in April 2017.
- Orange County: In 2012, Orange County commissioners and voters approved the County's Bus and Rail Investment Plan and identical funding sources as Durham County. The new dedicated revenues are being used to provide improved bus service and infrastructure, and pay the local share of the D-O LRT and North-South Corridor BRT premium transit services. The plan was updated and renamed the Orange County Transit Plan in April 2017.
- Wake County: The Wake Transit Plan and dedicated revenue sources were approved by county commissioners and voters in 2016. The plan focuses on four "Big Moves" to 1) connect the region; 2) connect all Wake County communities; 3) create a frequent and reliable urban transit network; and 4) provide enhanced access to transit. The plan proposes to develop a greatly expanded frequent bus network, bus service that connects the 12 Wake County municipalities, passenger infrastructure improvements; and the BRT and commuter rail services.

Increased regular bus service has been implemented by transit agencies throughout the three counties as well as by GoTriangle, the regional transit provider. In addition, the counties and transit agencies are investing in infrastructure such as improved customer bus stops and shelters, park-and-ride lots, and new vehicles. Local public transit systems coordinate and share facilities with private intercity bus operations; for example, the Durham Central Transit Station serves both Greyhound and MegaBus along with local/regional public routes.

The transit systems and MPO are putting greater emphasis on the maintenance of transit assets. Both MPOs approved transit asset performance measures and targets addressing State of Good Repair in June 2017.

Further information about the projects are included in the Durham County Transit Plan, Orange County Transit Plan, and Wake Transit Plan. Please visit ourtransitfuture.com, waketransit.com, and gotriangle.org for copies of the plans and updated information.

More information on bus transit projects including implementation years and type of service is in Appendix 3. The bus transit investment includes extending current service areas, but also emphasizes service improvements to the current service areas, as outlined in the county transit plans. Area transit agencies and the counties continually revise their current and proposed future route networks to optimize transit performance.

The proposed improvements in bus service include:

- Increased frequency: In the region, most buses operate on 30-minute headways most of the day. Each transit plan provides for more frequent service. Using county transit plan revenues, Durham County has implemented a "frequent bus network" with 12 miles of services that operate all-day at 15-minute frequencies, while the Wake Transit Plan proposes to grow the county's frequent bus network from 17 miles in 2016 to 83 miles by 2027.
- Expanded span of service: By operating existing services later into the evening and on weekends, the bus system will provide enhanced access to jobs and other activities for more residents.
- Redesigned networks: Regular bus service will be reimagined to better connect with fixed-guideway services such as D-O LRT, N-S Corridor BRT, Wake County's BRT lines, and commuter rail, increasing access to these high-quality transit spines.
- New service: New bus service provided to additional communities, including express services that run during peak commute times and local services such as circulators.
- Improved infrastructure: The county plans provide for additional customer-facing infrastructure such as bus shelters, benches, park-and-ride lots, and access improvements such as sidewalks and trails.
- Last-mile connections: The plans provide for services to provide the "last mile" connection between bus routes and patrons' final destinations, using bus routes and innovative services such as on-demand bus shuttle routes.
- Electric buses: The area's transit agencies are considering purchasing buses that couple electric propulsion with battery storage. If implemented, electric buses will have local air quality benefits, and may also provide improved passenger comfort and reduced operating costs.

7.5 Bicycle and Pedestrian Facilities

Bicycle and pedestrian transportation are becoming integral forms of travel in the Triangle Region. The land use characteristics of local universities, business districts, and major activity centers encourage short trips that can be easily served by biking and walking. Urban centers retain attractive, grid street patterns with retail and residential developments that lend well to biking and walking, and the scenery of the region's rural landscape provides opportunities for bicycle and pedestrian tourism and recreational cycling. Additionally, the area's geography and mild year-round climate make these modes viable travel options.

Since the adoption of the region's previous long-range plan in 2013, several important initiatives have been undertaken, including the following:

- In 2014 the N.C. Department of Transportation held a Complete Streets Summit to highlight how NCDOT's Complete Streets Guidelines can be used to design and build streets that enable safe access for pedestrians, bicyclists, and public transportation users of all ages and abilities.
- Communities have hosted various bicycle and pedestrian events, including the annual Triangle Bicycle and Pedestrian Workshop sponsored jointly by the MPOs, and many activities during Bike Month and Bike to Work Week in May.
- The number of motor vehicle crashes involving pedestrians and bicycles has motivated federal, state, and local officials to conduct enforcement exercises and education campaigns focused on bicycle and pedestrian safety.
- Communities in both MPOs began participating in an NCDOT initiative to develop a systematic approach to counting pedestrian and cyclists by installing equipment that uses electromagnetic bicycle detectors and passive infrared technology to count bicycle and pedestrian traffic at key locations.
- The MPOs assisted N.C. State researchers study the economic impacts of bicycling and walking, with a particular focus on the usage and change in economic indicators on the American Tobacco Trail in Durham before and after the construction of a bridge that closed a gap in the 23-mile shared use path.

In response to the increased popularity of bike and pedestrian travel, CAMPO and DCHC MPO are encouraging the creation of a pedestrian and bicycle system that provides an alternative means of transportation, allows greater access to public transit, and supports commuting and recreational opportunities. Regional and statewide facilities such as the East Coast Greenway, the Cross-Triangle Greenway, and the American Tobacco Trail are heavily used as soon as segments are opened. Member governments coordinate planning efforts and strive toward the development of a safe, accessible, and convenient network of regional bicycle and pedestrian routes. Many local governments in the region have prepared their own citywide and county bicycle and pedestrian plans and/or facility inventories. Granville County, for instance, has established a Greenway Technical Committee to develop a network of trails for local and regional use.

Pedestrian Facilities

Pedestrian facilities in the Triangle region vary in type, condition and level of service. Urban areas within the MPO boundary are often outfitted with suitable sidewalk facilities, however many thoroughfares lack any pedestrian accommodations or relegate pedestrians to one side of the roadway. Historically, suburban development has been inattentive to pedestrian needs, leading to incomplete pedestrian networks within highly populated commercial and residential areas. Also, many areas once classified as rural are seeing increases in development, and citizens are demanding pedestrian access from their neighborhoods to nearby destinations. Local governments recognize these pedestrian needs, and are working toward filling the missing links in local sidewalk networks.

Many thoroughfares lack sidewalks

On a regional level, the MPOs encourage pedestrian projects. Most town and city governments have instituted sidewalk requirements for new development, and sidewalk upgrades are generally included in roadway construction projects. Most roadway projects in the 'Roadway Element' of the MTP are expected to provide appropriate accommodations for pedestrians, concurrent with roadway improvements. Missing links and gaps in the pedestrian networks will be constructed retroactively. Priority is generally given to areas with heavy pedestrian traffic generators, such as schools, parks and business districts.

The MPOs rely on the "NCDOT Complete Streets Planning and Design Guidelines" and other guidelines to identify appropriate facility type, and depend on local plans for project identification. The MPOs rely on the "NCDOT Bridge Policy" and "NCDOT Pedestrian Policy" to ensure that new bridges in the urban area include sidewalks or have sufficient bridge deck width to accommodate future sidewalks. Projects are prioritized on a regional level for funding allocation. The following table presents recent local plans and inventories used for facility recommendations.

Figure 7.5.1 – Local Plans and Inventories Used for Pedestrian Facility Recommendations

- Carrboro Sidewalk Policy (1989)
- Chapel Hill Mobility & Connectivity Plan (2017)
- Durham Bike+Walk Implementation Plan (2017)
- Durham Trails and Greenways Master Plan (2011)
- Hillsborough Vision 2020 Plan (1991, revised 1998)
- Angier Pedestrian Plan (2012)
- Apex Bicycle & Pedestrian Plan (2011)
- Cary Pedestrian Plan (Imagine Cary) (2017)
- Creedmoor Pedestrian Plan (2011)
- Fuquay Varina Pedestrian Plan (2012)
- Garner CTP (2018)
- Holly Springs CTP (2013)
- Knightdale Pedestrian Plan (2011)
- Raleigh Pedestrian Plan (2013)
- Youngsville Bicycle/Pedestrian Plan (2014)
- NCSU Bicycle/Pedestrian Plan (2011)

Bicycle Facilities

The 2045 MTP recommends extensive integration of bicycle needs into the design and construction specification of new highways and other future or ongoing transportation projects. The bicycle projects include off-road shared-use bicycle paths, on-road bicycle lanes and wide shared roadways in urban areas, as well as paved 4-foot shoulders on rural roads. Highway and transit project designs assume the provision of bicycle racks and other bicycle and pedestrian amenities at key locations such as park-and-ride lots, transit hubs, and major activity centers.

Bicycle parking at a bus stop near the American Tobacco Trail.

The 2045 MTP identifies statewide and regional bicycle routes in the Triangle region. Statewide routes include NCDOT-designated Bicycling Highways as well as the East Coast Greenway. Regional bicycle routes provide links between major destinations and between urban centers; facilitate primarily utilitarian bicycle trips, though the routes can also serve recreational cycling; and serve as a backbone to a finer grained system of local bicycle routes in each jurisdiction.

The "NCDOT Complete Streets Planning and Design Guidelines" and AASHTO "Guide for Development of New Bicycle Facilities" act as construction standards for projects, and local agencies play a lead role in the implementation of new projects. The MPOs rely on the "NCDOT Bridge Policy" to ensure that new bridges have sufficient bridge deck width to accommodate planned bicycle facilities. Local plans supplement the MTP regional bicycle routes by identifying additional projects and development requirements to complete the regional bicycle transportation network. Figure 7.4.2 lists these local plans.

Figure 7.5.2 – Local Plans Used for Bicycle Facility Recommendations

- Carrboro Comprehensive Bicycle Transportation Plan (2009)
- Chapel Hill Mobility & Connectivity Plan (2017)
- Durham Bike+Walk Implementation Plan (2017)
- Apex Bicycle & Pedestrian Plan (2011)
- Cary Imagine Cary Plan (2017)
- Capital Area MPO Bicycle & Pedestrian Plan (2003)
- Fuquay-Varina Bicycle Plan (2015)
- Garner Forward Transportation Plan (2018)
- Holly Springs Comprehensive Transportation Plan (2011)
- NC State University Bicycle & Pedestrian Plan (2011)
- Durham Trails and Greenways Master Plan (2011)
- Orange County Bicycle Transportation Plan (1999)
- Morrisville Land Use and Transportation Plan (2008)
- Raleigh Bicycle Transportation Plan (2016)
- Rolesville Bicycle Plan (2011)
- Youngsville Bicycle/Pedestrian Plan (2014)
- Zebulon Multimodal Transportation Plan (2001)

Education, Enforcement & Encouragement

In addition to facility improvement projects included in the MTP, the DCHC and Capital Area MPOs devised a series of local education, enforcement and encouragement programs. Outreach programs are essential

elements of any bicycle and pedestrian friendly community, and complement the engineered components of a bicycle and/or pedestrian route network. The following recommendations are intended to increase bicycle and pedestrian safety and provide the incentive to get more people biking and walking in the region.

Education

- Institutionalize bicycle and pedestrian safety education within public schools.
- Provide bicycle instruction to adult cyclists.
- Provide educational messages to better inform drivers and pedestrians about pedestrian and bicycle safety laws and best practices.
- Educate motorists on cyclists' rights to use the road.
- Establish a local fund for bicycle and motorist education.

Enforcement

- Update bicycle traffic laws.
- Provide an active enforcement program.
- Appoint a "Bicycle Liaison Officer".
- Develop "Bicycle Patrol Units" within local police departments.

Encouragement

- Offer incentives to employers to encourage employee bicycle commuting.
- Conduct a well-publicized annual "Bike-to-Work" week with multiple events.
- Improve access to transit for pedestrians and bicyclists.
- Develop a publicity campaign to raise awareness of cycling issues.
- Conduct annual regional bicycle events.
- Publicize the region as "bicycle-friendly."
- Encourage community-based support for cycling.
- Develop cooperative relationships.
- Promote Safe Routes to Schools and walk/bike to school events.
- Participate in the Triangle Transportation Demand Management activities and programs.

Bicycle and pedestrian resource materials

The MPOs are also developing supplementary resources, such as bicycle maps, safety-education materials, and community action plans that provide a development strategy for the implementation of the five "E's" – engineering, education, encouragement, enforcement, and evaluation. Many member jurisdictions are proceeding toward great accomplishments in the outreach sector, including the national recognition of Carrboro, Cary, Chapel Hill, Durham, and Raleigh as "Bicycle Friendly Communities" by the League of American Bicyclists. The MPOs continually seek funding for Safe Routes to School (SRTS) projects, and several school activities have been completed using this funding source. With such progress already being made, it is certain that the DCHC and Capital Area MPOs will continue to advance toward a sophisticated, well-integrated bicycle and pedestrian transportation system over the next three decades.

<u>Summary</u>

The 2045 MTP does not specifically list bicycle and pedestrian projects. Local municipalities and counties have identified and prioritized these projects, and have coordinated their interaction at the jurisdiction boundary areas. As a result, the 2045 MTP defers to those local government plans.

The DCHC MPO bicycle and pedestrian policy basically expects any roadway or other transportation project, whether it is a new or improved facility, to include appropriate pedestrian and bicycle accommodations. That policy provides extensive integration of bicycle and pedestrian needs into the design and construction of new and improved highway and other transportation projects. In addition, the "NCDOT Complete Streets Planning and Design Guidelines" and other related guidelines provide planning and design guidance for use when building new projects or making changes to existing infrastructure. For bicycle facilities, the Durham-Chapel Hill-Carrboro MPO adopted a Comprehensive Transportation Plan (CTP) in May 2017 that lists all the local bicycle projects from the jurisdiction and county plans in the MPO area. The MPO has also identified statewide and regional bicycle routes in the MPO region, as listed in Appendix 4.

The Capital Area MPO map communicates an extensive regional layout of off-road bicycle and pedestrian facilities in conjunction with on-road facilities that will receive bicycle-pedestrian accommodations only. This on-road/off-road network is congruent in scope, and communicates opportunities for multiple forms of access throughout the region. Note that many roadway projects will incorporate bicycle and pedestrian accommodations in conjunction with capacity improvements; which is consistent with the principle of "universal access" as addressed in the Capital Area MPO Bicycle and Pedestrian Plan adopted in 2003. Roads that will receive bicycle and pedestrian accommodations only are those roads that did not meet strict criteria for capacity improvements; but in practicing good transportation system management would qualify as candidates for bicycle and pedestrian accommodations.

Figure 7.5.3 - Bicycle & Pedestrian Investment

2018-2045 Bicycle and Pedestrian Investment ($2016)		
Total	CAMPO	DCHC MPO
$1,207,000,000	$915,000,000	$292,000,000

7.6 Freight Movement

Successful economic development depends on the fast and reliable movement of people, goods and information. For the 2045 Metropolitan Transportation Plan, the two MPOs have been engaged in an extensive and systematic examination of freight trends and opportunities through a new Triangle Regional Freight Plan to ensure that goods movement is a key component of long-term transportation investment decisions. Although the MPOs will not formally adopt recommendations until later in 2018, some key freight movement forecasts and principles are expected to guide MPO transportation investment decisions.

The growing regional attention to freight movement has been matched at the state and federal levels. The most recent federal transportation legislation, the FAST Act, and North Carolina's Strategic Transportation Investments (STI) law place increased emphasis on freight planning and investment. Looking for opportunities to leverage state and federal interest is a driving force in the MPO's approach to freight movement.

An examination of trends and forecasts for the regional freight plan found that:

1. The highway system is and will remain the principal freight mode in the region: 80% of both freight tonnage and freight value in the region moves by truck. By 2045, the amount of freight moved by truck is expected to grow by a third. Because of its advantage in moving heavy commodities, rail carries 16% of the region's freight tonnage, but only 2% of its freight value, and is not forecast to grow significantly.

2. "Truck tonnages are expected to increase considerably out to 2045, especially for shipments to and from the Triangle Region."
3. "Projects are needed to ensure that the roadway network keeps up with the rapid increase expected of inbound and outbound shipments....improving the routes that are already congested that provide regional connection to Interstates and the rest of the State."
4. "Total freight rail volumes are forecasted to have minimal growth in the Triangle Region over the coming decades...chiefly due to the decline in coal, which offsets growth in other areas...total tonnage is expected to remain roughly constant out to 2045."

Key freight movement principles that the MPOs will use to inform investment decisions include:

1. As with the movement of passengers, paying close attention to the location of major freight facilities and destinations relative to the transportation network is important; linking industrial land use decisions to the careful design of road and rail access can yield cost-effective solutions. Just as Transit-Oriented Development (TOD) has become a principal tool in regional land use planning to support transit corridor investments, Freight-Oriented Development can help inform industrial land use planning and supply chain logistics along strategic freight corridors and in freight industry clusters.
2. Logistics and supply chain performance expectations change rapidly. In particular, supply chains designed for home deliveries continue to grow in importance with the explosion in e-commerce.
3. On the road system, freight bottlenecks with significant truck volumes should be a key priority, with a tiered approach to address trade routes that connect the Triangle to other regions, distribution and connectivity routes that link freight industry clusters with activity centers, and critical access routes serving industrial sites and redevelopment areas.
4. On the rail system, network reliability and speed will be important considerations for goods movement as bulk commodities like coal become less important, with the added benefit that reliability and speed are also important to passenger rail that shares tracks with freight trains.

7.7 Transportation Demand Management (TDM)

Each year, hundreds of millions of dollars are spent in the region on the supply side of mobility: building and maintaining roads, buying and operating buses, building sidewalks and bicycle facilities. Some of the most cost-effective mobility investments we can make are on the demand side: encouraging commuters to use our transportation facilities as efficiently as possible by carpooling, vanpooling, taking transit, telecommuting, walking or bicycling.

TDM Coordinators tabling at Red Hat

These marketing and outreach efforts targeted to commuters and the employers they work for are called Transportation Demand Management, or TDM. The Triangle TDM program is active in Chapel Hill, Carrboro, Raleigh, Research Triangle Park, Durham County, Orange County, Wake County, Duke University, NC State University, UNC-Chapel Hill, and Wake Tech Community College. Since 2008, service providers in the region have undertaken a range of TDM projects, such as GoTriangle's New Year/New Commute and Bike Month regional campaigns, and Triangle J Council of Government's *Best Workplaces for Commuters* program. These TDM efforts can be very effective. In 2017, 96,000 workers were employed at a *Best Workplace for Commuters,* where their employer offers commute benefits such as subsidized transit passes, vanpooling, bicycle facilities or telework. The following travel, air

quality, and energy saving impacts were calculated due to the collective efforts of Triangle TDM service providers in FY16-17 :

- 5 million vehicle trips avoided
- 2.2 million gallons of gas saved
- 54 million commute miles reduced
- 36,027 alternative transportation users supported
- 43.8 million pounds of Carbon dioxide (CO2) release prevented

TDM Coordinators tabling at Rex Hospital

The region's TDM program is based on the Triangle Region Transportation Demand Management Plan for the Triangle. Implementing the plan is designed to achieve a goal of reducing the *growth* in the amount of *commuter* travel by 25%. The plan provides both a more systematic framework for TDM coordination and significantly more state and federal funding for TDM. TDM Plan details are available at http://www.tjcog.org/transportation-reports-downloads.aspx

The TDM Plan recognizes that the most effective TDM strategies are targeted to employment "hot spots:" places where employment is concentrated, including sites where transit service is available and/or parking is costly or inconvenient, such as in downtowns and at university campuses.

Continuing to implement and extend this TDM Plan is included in the Metropolitan Transportation Plan. Implementation includes:

- aggregating funding from the sponsors: state funds from NCDOT and federal funds allocated by the Capital Area MPO and Durham-Chapel Hill-Carrboro MPO,
- issuing a competitive "call for projects" from providers of TDM services, and
- working with an Oversight Committee of state and MPO staff that works with applicants to refine their proposals and makes recommendations for funding.

Based on this plan and the current level of the region's comprehensive, coordinated TDM program, the 2045 Metropolitan Transportation Plans include continued funding for TDM services and will follow the existing model where service providers supply a significant cost share to match federal and state funds.

The key Transportation Demand Management strategies in the 2045 Metropolitan Transportation Plan are:

1. Continue to invest in a collaborative regional program between the two MPOs and NCDOT through a single coordinating agency providing administrative, fiscal and measurement services.
2. Periodically review and update the regional TDM plan to serve as the guidance document for regional TDM collaboration roles and responsibilities.
3. Use the forthcoming NC DOT PTD strategic plan to align the regional program with statewide resources and to leverage opportunities to collaborate with other regional TDM efforts.
4. Continue and strengthen the regional collaboration's "three-legged stool" of services:
    a. "foundational" services provided throughout the region by a designated regional service provider,

b. local services in selected hot spots provided through a competitive process involving local service provider funding matches, and
c. support and recognition programs for measurable "best practice" employers

5. Periodically review and modify or expand "hot spot" locations where TDM efforts can be most effective, based on available funding.
6. Continue to examine the use of new technologies and innovative demand management techniques such as parking cash-out programs.

The region's transportation demand management program can be a crucial component of the overall transportation system, prompting employers to encourage the use of alternatives to driving alone and assisting commuters in understanding and using these alternatives.

7.8 Transportation Technology & Intelligent Transportation Systems (ITS)

Technology has always been an important part of the transportation system, from safety features on private vehicles to traffic information and traffic control signals and devices in public investments. This section of the plan addresses both vehicle technologies and public facility and service investments.

Technological advancement is anticipated to significantly affect mobility over the span of this plan. Much of this advancement is expected to be vehicle-oriented, with the advent of autonomous vehicles and connected vehicles. Levels of vehicle automation lie along a spectrum:

0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
A human driver is in control of all driving functions.	An advanced driver assistance system (ADAS) can assist the human driver in either steering or braking/accelerating, but never at the same time.	ADAS can control both steering and braking/accelerating simultaneously, but requires the human driver to continue to pay full attention at all times and assume control outside of those two functions.	All driving functions are performed by an automated driving system (ADS) in some circumstances, but the human driver must be able to respond when requested by the ADS. The driver assumes control in environments unmanageable by the ADS.	All driving functions are performed by an ADS in some circumstances, during which the driver does not need to pay attention. The driver assumes control in environments unmanageable by the ADS.	All driving functions are performed by an ADS in all circumstances. Human occupants are now passengers as opposed to drivers.

Although autonomous vehicle technology is expected to make in-roads in the near-term and mid-term, its market penetration may not result in substantial changes in public infrastructure investment decisions until the longer term period of this plan. Estimates of market penetration vary widely, but it is more likely that Level 4 and Level 5 vehicles will become a large enough share of the market to affect infrastructure design in the long-term phase of this plan than in the mid-term phase. Nevertheless, it would be appropriate to explicitly consider the possible impacts of faster or slower market penetration in decisions about fixed, costly and long-lived investments, such as parking garages or freeway widenings, especially if the investments would be difficult or costly to repurpose for a society with extensive automated and connected vehicles.

Significant market penetration may occur soonest for fleet vehicles such as trucks, buses and other vehicles where vehicle operators are a significant part of the cost of a service and where operator rest time (and thus vehicle down time) is important for safe operation. The MPOs and their regional partners will continue to track and report on information and sources on autonomous and connected vehicles. Appendix 5 lists resources on autonomous and connected vehicles.

In this plan, public investments in technology are grouped under the term "Intelligent Transportation Systems (ITS)," a set of diverse technologies designed to make existing transportation infrastructure, facilities and services more efficient and safer. The Capital Area MPO (CAMPO), Durham-Chapel Hill-Carrboro MPO (DCHC MPO) and NCDOT jointly developed a prioritized list of improvements and a coordinated framework for ITS solutions for the region. This framework is scheduled for updating beginning in 2018.

The most recent Triangle Regional ITS Strategic Deployment Plan (SDP) update was completed in 2010. The update followed a needs based approach to project development and created a comprehensive prioritization of regional project needs. The Triangle ITS SDP included 175 projects totaling $315 million across eight categories:

Triangle ITS Project Categories	
System Preservation	**Highway**
Emergency Management	**Turnpike**
Corridor Management	**Transit**
Regional Non-Infrastructure	**Statewide Non-Infrastructure**

The Triangle Strategic Deployment Plan contains a list of feasible ITS projects. The details of the solutions and technologies will continue to change as conditions change and transportation technologies advance. The list of ITS projects in the 2045 MTP and Triangle Regional ITS Plan is not intended to be exhaustive. As a result, it is possible that an ITS solution might be implemented that is not in these plans.

Following the completion of the SDP document in 2010, NCDOT began work on ten Highway, System Preservation, Transit, and North Carolina Turnpike related ITS projects totaling $13.5 million.

The Strategic Deployment Plan is designed to “mainstream” ITS projects into the overall transportation planning process for both CAMPO and the DCHC MPO. This is being accomplished in a variety of ways. CAMPO’s Locally Administered Projects Program (LAPP) has funded ITS projects annually using STP-DA funding, including investments in several strategic corridors such as US-64 and I-40. ITS projects are incorporated biennially through Transportation Improvement Program updates.

7.9 Transportation System Management (TSM)

Transportation System Management (TSM) solutions increase efficiency and safety by allowing the current transportation network to operate with fewer travel delays and increased capacity. These projects are often relatively inexpensive compared to building and widening roadways and making new public transit capital investments. They often provide cost effective solutions that can be implemented relatively quickly or in phases, and with comparatively few environmental impacts.
The following list provides examples of the types of TSM projects that are expected to be implemented through the 2045 MTP period. This list is not exhaustive because solutions will be designed for the unique challenges of a particular intersection or corridor, and the types of TSM solutions will continue to evolve.

- Widening of approach widths for key intersections;
- Installation and/or adjustment of traffic signals, including dynamic signal timing coordination and signal preemption;
- Provision and lengthening of turn lanes;
- Limitation or prohibition of driveways, turning movements, trucks, and on-street parking;
- Construction of median U-turn, Quadrant, continuous flow and other unique intersection and interchange designs;

- Fixing horizontal/vertical curves, insufficient ramp lengths, weaving sections and other geometric deficiencies;
- Implementing Bus on Shoulder System (BOSS) for transit buses and express shoulder lanes for all vehicles;
- Installation of traffic calming devices for residential neighborhoods; and,
- Traffic circles and roundabouts at appropriate intersections.

Individual TSM projects are not listed in the 2045 MTP because of their project-specific design characteristics and short planning-to-construction project cycle. Some projects might be included in project lists if they have been incorporated into a TIP or local CIP. The 2045 MTP financial plan specifically dedicates funding for TSM projects.

7.10 Rail Investments

The region is traversed by several key rail corridors, most notably the state-owned North Carolina Railroad Company (NCRR) right-of-way that stretches from Morehead City to Charlotte. Other major lines are owned by the region's two Class I railroads: Norfolk-Southern and CSX. The NCRR corridor carries both freight and intercity passenger rail traffic; existing passenger rail stations within the MPO boundaries include Raleigh, Cary and Durham. The CSX "S" line heading north from central Raleigh and south from central Cary intersects the NCRR corridor along a section carrying freight and passenger traffic. The CSX "S" line from Richmond to Raleigh and the NCRR from Raleigh to Charlotte is also part of the Federally-designated Southeast High Speed Rail (SEHSR) Corridor.

North Carolina Railroad Company/Nick D'Amato

This *Rail Investments* section of the plan focuses on freight rail and intercity passenger rail that links the Triangle to other regions. Commuter rail and light rail services within the region located within or adjacent to existing rail corridors are addressed in *Section 7.3 Transit Services*. General freight issues--including freight carried by rail--are addressed in *Section 7.5 Freight Movement*. The recently completed draft freight plan notes that the volume of rail freight carried in and through the Triangle is expected to decrease slightly through the 2045 horizon year of this MTP, due in part to declines in coal shipments as the region's energy mix changes.

Rail planning and investments are frequently a cooperative effort between owners and operators of rail assets and partner agencies. For example, a project to straighten curves and replace an at-grade crossing with a bridge may involve funding and other contributions from the North Carolina Railroad, Norfolk-Southern and NCDOT's Rail Division. Funding from NCDOT is from state and federal sources, including Federal Railroad Administration competitive grants. Rail-related investments that involve roadway improvements and are included in the Transportation Improvement Program are included in the fiscal constraint analysis and transportation modeling that are part of this 2045 Plan. Investments that do not affect track capacity or cross streets are not specified in 2045 MTP project lists. Examples include safety improvements at highway-rail crossings or short sidings that serve adjacent properties.

Several projects and studies have been recently completed, are underway, or are planned to improve the performance of rail services within the region. Many are included within NCDOT's Piedmont Improvement

Program that received $520 million in Recovery Act funding targeted specifically for passenger rail improvements. Recent and on-going Triangle rail projects and studies include:

1. Cary Depot ($2.3 million project completed in 2011)*
2. Raleigh Union Station
3. Hillsborough Passenger Rail Station
4. Raleigh West Street Grade Separation
5. NCDOT Capital Yard Railroad Maintenance in Raleigh ($6.1 million project completed in 2012)*
6. Hopson Road Grade Separation and Nelson to Clegg passing siding (completed in 2015)*
7. Morrisville Parkway Grade Separation (completed in 2016)*
8. "NC 54 and More" Corridor Feasibility Study (road project in Morrisville along the NCRR right-of-way, including proposed grade separations of connecting roads and the railroad)
9. Raleigh-Cary Traffic Separation Study (phased approach)
10. Durham Traffic Separation Study
11. Hillsborough Traffic Separation Study
12. Raleigh East 2nd Main Track (study completed in 2013)
13. Morrisville to Cary 2nd Main Track (study completed in 2011)
14. Blue Ridge Road Grade Separation
15. Boylan Junction Improvements
16. Churton Street bridge widening over NCRR
17. NCRR Bridge over NC 54 Replacement ($5.5 million project completed in 2006)

(* asterisk denotes part of Piedmont Improvement Program)
(** a Traffic Separation Study examines at-grade rail-highway crossings to determine short-, mid- and long-range opportunities for closure or bridges)

Current North Carolina intercity passenger rail service consists of three trains in each direction each day operated by Amtrak and serving the Durham, Cary and Raleigh stations. Two of the trains travel between Charlotte and Raleigh, while the third continues north from Raleigh to Washington, DC and New York City via a route heading east to Selma in Johnston County, then north along the CSX "A" line that roughly parallels I-95. Ridership has increased steadily on the service; during the federal fiscal year that ended in September 2017, ridership on the three trains was 427,000. During October 2017, 23,600 passengers boarded or alighted from the three trains at the three Triangle stations: Raleigh, Durham and Cary. Two additional Raleigh-Charlotte Piedmont daily trains are planned to be added upon completion of the Piedmont Improvement Program projects.

Planning for Southeast High Speed Rail envisions high performing rail operating within the region along the NCRR corridor east to Raleigh at speeds up to 90 mph, then north along the CSX "S" line at speeds up to 110 mph. The NCDOT Rail Division is leading efforts to provide a "sealed corridor" for higher speeds and additional trains, closing or bridging existing at-grade crossings where feasible to improve both safety and operations. The NCRR has led commuter rail capacity and ridership studies to better understand the interplay of freight and passenger rail operations within the region and the range of track investments that might be needed to accommodate increased shared use.

Due to the complexity of rail investments and the myriad of interested organizations, the MPOs helped initiate a Triangle Main Lines Forum in 2011 which has periodically brought together public and private sector owners and operators of critical rail assets along with the communities and anchor institutions adjacent to the rail lines. The forum is designed to help stakeholders: i) better understand projects affecting the region's main rail corridors, ii) identify interests of primary importance to the stakeholders, and iii) generate collaborative efforts to advance shared interests.

Ensuring that any investments affecting our rail corridors are done with detailed attention to longer term impacts on forecast freight movement, inter-city passenger rail, regional rail connections contained in this MTP, and opportunities for High Speed Rail is a key strategy for the two MPOs in this plan. Ensuring that near term decisions do not constrain choices or drive up costs for mid-term and long-term services is an important consideration for the MPOs. As both in-region rail connections are implemented, and intercity rail services connecting the Triangle to other regions is expanded, taking steps to make sure that service is fast and reliable will be important to attract and retain ridership. For the most recent month reported (October 2017), only roughly half of Carolinian and Piedmont intercity passenger trains arrived on time, defined as within 20 minutes of scheduled time for the Carolinian and 10 minutes of schedule time for the Piedmont.

7.11 Air Transportation

Raleigh-Durham International Airport (RDU) serves both MPOs with passenger and air cargo services. The airport is located on 5,000 acres near the boundary between the two MPOs in Wake County, and is governed as an authority with board members appointed by the largest jurisdictions in the two MPOs: Wake County, Durham County, Raleigh and Durham City.

During 2016, RDU served 11 million passengers, about 90,000 tons of cargo and 190,000 aircraft operations.

Recent major projects have been designed to improve aviation services:

- Terminal 2 was completed in 2011; this $573 million, 920,000 square foot project includes 37 boarding gates
- Terminal 1 reconstruction was completed in 2014; this $68 million project rebuilt the oldest terminal at RDU.

RDU completed a new master plan – Vision2040 – in 2017. For more information on Vision2040 – and the investments it considers – visit https://vision2040.rdu.com/

Vision 2040's baseline forecast, used for this plan, envisions growth in enplaned passengers (those boarding at RDU) from 5.5 million in 2016 to about 8.5 million. No additional terminal gates are planned in the first ten years. General aviation operations are expected to grow modestly and remain below pre-recession levels.

7.12 Recommended Special Plans, Projects & Studies

Section 5.4 already identified corridor studies, small area plans, feasibility studies, functional plans or similar efforts that have been completed to provide input into the development of the Metropolitan Transportation Plan. This section outlines possible plans or studies using the same format as the completed plans and studies described in Section 5.4. Although this section is not designed to list every plan or study that may be undertaken, it indicates some of the major efforts that the two MPOs and their partners anticipate to pursue through their annual Urban Planning Work Programs (UPWPs), the planning budget documents that guide MPO activities each fiscal year. Also included are major efforts designed to improve the input data, accuracy and functionality of the region's principal analysis tool, the Triangle Region Travel Demand Model (TRM).

	Recommended Plan or Study	*Type*
1	*US 15-501 Corridor Study*. This MPO and NCDOT study will develop a corridor vision based on public and stakeholder input, identify capacity and safety deficiencies, propose policies and projects, and create an implementation plan. This is for the corridor between Fordham Blvd. and University Dr. 2019 completion expected.	Corridor Plan
2	*NC 54 West Corridor Study.* This MPO and NCDOT study will evaluate future land uses and traffic impacts, conduct public and stakeholder outreach, and develop projects and strategies for transportation improvements. 2018 completion expected.	Corridor Plan
3	*Downtown Durham Transportation Study.* This MPO and City of Durham study will create a transportation vision that will propose a strategy and projects that balance the current and future operational needs of all users. 2019 completion expected.	Small Area Plan
1	*Southwest Area Study Update.* The MPO will begin the update of the Southwest Area Study during FY 2018, with recommendations from that update carried forward to inform the 2050 MTP. The study will examine growth forecasts and develop a long-range and interim list of multi-modal transportation improvement priorities.	Small Area Plan
2	*Northeast Area Study.* The MPO anticipates beginning the update of the Northeast Area Study during FY 2019, with recommendations from that update carried forward to inform the 2050 MTP. This study may include the municipalities Wake Forest, Rolesville, Knightdale, Wendell, Zebulon, Youngsville, Franklinton and Bunn, as well as the surrounding areas of Franklin and Wake Counties. The study would examine growth forecasts and develop a long-range and interim list of multi-modal transportation improvement priorities.	Small Area Plan
3	*Southeast Area Study.* The MPO anticipates beginning the update of the Southeast Area Study during FY 2021 to inform future MTP updates. This study will cover the municipalities of Knightdale, Wendell, Zebulon, Archer Lodge, Clayton, and Garner. Surrounding areas in Johnston and Wake Counties will also be included. The study will examine growth forecasts in the area, and develop a long-range and interim list of multi-modal transportation improvement priorities for the subarea described.	Small Area Plan
4	*Transit Systems Plan.* This study will assist in the development of the transit section of the Comprehensive Transportation Plan and MTP. It will identify, evaluate and prioritize future transit needs. It will use a needs-based planning process and engage transit stakeholders, including local governments and the public, throughout the study process. The effort will include a detailed level of analysis of current and future transit system plans and needs, and provide recommendations for a decision-making framework to guide future policy decisions. The plan will identify priorities for transit and ancillary road, pedestrian, and bicycle improvements. The planning effort will also examine demand-response service and make recommendations for improvements to meet future demand. Results should be a prioritized set of infrastructure improvements necessary to implement a fully-realized transit vision for the CAMPO area.	Transit Plan
5	*Major Corridors Study.* The MPO and NCDOT will create a transportation vision that will propose a strategy, projects, and programs that balance the current and future mobility needs, particularly in commuting corridors, for all users.	Corridor Study
6	*NC 751 Corridor Extension* – The 2018 Southwest Area Study update identified the need for additional NC Highway network connectivity between US Highway 64 and US 401 through a combination of existing roads (New Hill Olive Chapel/Holloman Rd) and new location roadways. *MTP Project A173, A190*	Future Route Designations

	Recommended Plan or Study	*Type*
7	*NC 55 / NC 55 Business Corridors* – The 2011 Southwest Area Study and the 2018 update identified the benefits of re-routing a portion of the NC 55 corridor in Fuquay-Varina around the existing congested corridor and historic Varina business district. This would be accomplished using the northeast portion of Judd Parkway and a new location grade separation over US 401, connecting to existing NC 55 south of the existing NC 42/NC 55 intersection. The existing corridor would be designated as NC 55 business. *MTP Project A679ab*	Future Route Designations
8	*NC 42 / NC 42 Business Corridors* – The NC 42 corridor in Johnston County is co-located with US 70 business and Lombard Street corridors through the Town of Clayton. Analysis conducted during the 2016 Southeast Area Study identified the network benefits to re-locating a portion of NC 42 around the existing congested corridor using the Ranch Road and US 70/Clayton Bypass corridors. The existing corridor would be designated as NC 42 business. *MTP Project Jhns13abc*	Future Route Designations
1	*Triangle Regional Freight Plan.* The two MPOs and NCDOT conducted a freight flows, forecasts, capacities, performance, conditions and trends in the Triangle to develop a set of policy, program and project recommendations. 2018 completion expected.	Transportation Plan
2	*NC 98 Corridor Study.* The two MPOs and NCDOT are conducting a study to identify capacity deficiencies and safety issues, and to develop multimodal solutions to those deficiencies. 2018 completion expected. http://www.nc98corridor.com/	Corridor Plan
3	*Triangle Strategic Toll Study.* The two MPOs and NCDOT are conducting a study to develop a holistic implementation plan for tolling and managed lanes in the Triangle. It includes an evaluation of technologies, operational structures, performance measures, and financing/partnering mechanisms. 2019 completion expected.	Transportation Plan
4	*Intelligent Transportation Systems Plan Update*. The two MPOs and NCDOT are collaborating on an update of the Plan that will make recommendations on overall system architecture, data and other compatibility standards, infrastructure and operation needs.	Transportation Plan
5	*CommunityViz 3.0.* The 2040 MTP and 2045 MTP processes provided the Triangle with future regional planning scenarios based on a land use model called Community Visualization. The model provides population and employment growth locations (socioeconomic data – SE Data) in a format that can be easily imported into the Triangle Regional Model (TRM). The CommunityViz3.0 effort will include an update of socio-economic data for use in the next MTP as well as more seamless links to TRM methods and technical changes to improve accuracy and precision of the forecasts.	Transportation Model Improvement
6	*Triangle Regional Model Services Bureau Activities.* The Triangle Regional Model Services Bureau will prepare for major model updates as well as shorter term model improvements. Examples of proposed activities include: (1) improve links to CommunityViz, (2) improve parking constraint model, (3) improve flexibility in treating the ridership benefits of premium transit services, and (4) examining ways to better address the travel of visitors and tourists and account for special events.	Transportation Model Improvement
7	*MPO & Transit Agency Information Sharing.* The MPOs and transit providers will develop mechanisms to share information to support transit performance measures, targets and project tracking.	Performance Measurement
8	*Joint MPO Environmental Justice Analysis.* The MPOs will undertake a detailed environmental justice analysis with guidance from FHWA prior to the next federal certification reviews, based on best practices from other regions.	Project Analysis and Prioritization