

2050 MTP –Preferred Option

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Send comments or request to speak at November 10, 2021, public hearing:

Andy Henry

Planner, Durham-Chapel Hill Carrboro MPO

andrew.henry@durhamnc.gov

(919) 560-4366, ext. 36419

Public input period is October 27, 2021 through December 7, 2021.

Creating the Preferred Option

In September 2021, the MPO Board directed MPO staff to develop an option for the 2050 Metropolitan Transportation Plan that better reflects the [bold goals and objectives](#) that the MPO Board adopted for the plan. The MPO Board indicated that the most ambitious of the three alternatives developed for the [Alternatives Analysis](#), the All Together alternative, was insufficient to achieve the MPO's goals related to climate change, equity, connectivity, and safety. MPO staff developed the Vision scenario in response to this directive from the MPO Board.

The Vision Scenario reduces the number of new and widened roadways in the region while increasing investments in transit and bicycle and pedestrian projects to better support the MPO's adopted goals.

Alternatives Analysis: Three Original Scenarios

Alternatives are a combination of a transportation network and land use assumptions that are used to create a scenario for public discussion. Previously, the preferred option was to be developed based on elements of the following three alternatives:

Plans and Trends

Also known as business-as-usual, this alternative distributes 2050 population and employment based on current land use plans and policies, and creates an improved transportation system based on the current long-range transportation plan.

Shared Leadership

This alternative could be called the we-can-do-better scenario. It increases the intensity and mix of land use at major employment hubs and travel corridors, and assumes additional transportation funding for transit facilities, services, and a few roadway improvements.

All Together

This balanced-and-equitable alternative increases the intensity and mix of land uses at major employment hubs and travel corridors, and works to link minority, low-income, and zero-car households to jobs. This alternative focuses on biking and walking facilities, and provides transit services in major commuting corridors, often instead of increased roadway capacity.

The consistent increase of new and widened major roadways in all three alternatives is likely the component that mostly drove the failure of the alternatives to meet the MPO's goals and objectives. The increased roadway capacity, for example, encouraged large increases in vehicle miles traveled that greatly increased greenhouse gas emissions.

The Vision Scenario

Developed as a fourth scenario at the directive of the MPO Board, the Vision Scenario consists of the following types of transportation projects from all modes:

Highway:

- Funded highway projects in the first four years of the State Transportation Improvement Program
- Highway modernization projects, which improve the operation, safety and multimodal features of highway facilities but do not significantly increase the capacity of roadways
- Grid projects that provide a grid to support bicycle and pedestrian and transit trips and reduce vehicle miles traveled by providing more direct routes. Grid projects are mostly developer built and may also improve safety.
- Projects of local or regional interest that do not meet the above criteria

Transit: Transit projects from the Vision Scenario are similar to those in the All Together Scenario. Transit Investment include enhanced bus service, bus rapid transit throughout the region, and a Triangle Commuter Rail.

Bicycle and Pedestrian: Specific bicycle and pedestrian projects are not usually identified in the MTP. The level of bicycle and pedestrian facility investment is based on a compilation of the MPO's local government plans, including:

- 175 miles of sidewalk per decade
- 70 miles of shared use paths per decade
- 80 miles of protected bike lanes per decade
- 20 miles of bicycle boulevards per decade

The land use of the Preferred Option increases the intensity and mix of land uses at major employment hubs and travel corridors, and links minority, low-income, and zero-car households to jobs. These land use characteristics help reduce the growth of vehicle miles traveled and greenhouse gases, and supports the MPO's goals concerning equity and connectivity.

The Preferred Option

The MPO Board has authorized the release of the Vision Scenario as the preferred option to the public. Staff will rely on public comments and a fiscal analysis of the preferred option to develop the first draft of the 2050 MTP.

Goals and Objectives

Background

The MPO Goals and Objectives are notable for several reasons:

- Development process -- The Goals and Objectives were developed using an extensive public input process that included: a review of recent public engagement content and summaries of similar planning processes in the Triangle area; a public hearing; and, an online survey that received over 2,000 responses. The 2050 MTP Goals web page at this [LINK](#) has detailed information on the development process and results.
- Alignment -- The Goals and Objectives are aligned with a set of performance measures. For example, a performance measure to calculate greenhouse gas is under the “reduce transportation section emission” objective, which is one of the objectives under “Protect the human and natural environment, and minimize climate change.” This alignment will make it easier to evaluate how the 2050 MTP meets the Goals and Objectives.
- Regional coordination – The DCHC MPO and Capital Area MPO (Raleigh area) have virtually the same set of Goals, Objectives and performance measures.
- Vision – The Goals push for change in issues related to climate change, racial equity and participation, safety, and health.

2050 MTP Goals and Objectives

The aligned Goals, Objectives and Performance Measures are displayed on the following pages.

DCHC MPO -- Goals, Objectives, Performance Measures

DCHC Goals	DCHC Objectives	Performance Measures
I. Protect the Human and Natural Environment and Minimize Climate Change	a) Reduce transportation sector emissions	a) and b) Total and per capita transportation GHG (CO2) featured. Also calculate ozone (NOx), CO (carbon monoxide), and particulate matter emissions, and energy consumption (in vehicles)
	b) Achieve net zero carbon emissions	
	c) Reduce negative impacts on natural and cultural environment	c) Proportion of planned investment in existing highways (i.e., dollars for existing highways, as opposed to new highways)
		c) Vehicle Miles Traveled (VMT) per capita (add per employee and total)
II. Ensure Equity and Participation	a) Ensure that transportation investments do not create disproportionate negative impacts for communities of concern	The <i>Environmental Justice (EJ)</i> report for the 2045 MTP assesses equitable distribution of transportation investments, thus, a separate performance measure is not needed. The <i>EJ</i> report will be updated for the 2050 MTP.
	b) Ensure equitable public participation among communities of concern	At least 80% of Public Involvement Plan (PIP) requirements are met [insert link to PIP]
III. Connect People and Places	a) Increase mobility options for all communities -- particularly communities of concern	a) Percentage of work and non-work trips by transit less than 40 minutes (change to average minutes) (by MPO, and by low-income, minority and zero-car households) This performance measure is new - it was not in the 2045 MTP.
		a) Percentage of jobs within 1/4 mile of frequent bus transit service (15min) or 1/2 mile of fixed guideway stations (BRT/CRT)
	b) Achieve zero disparity of access to jobs, education, and other important destinations by race, income, or other marginalized groups	b) Percentage of work and non-work trips by auto less than 20 minutes (change to average minutes) (by MPO, and by low-income, minority and zero-car households) This performance measure is new - it was not in the 2045 MTP.
IV. Ensure That All People Have Access to Multimodal and Affordable Transportation Choices	a) Enhance transit services, amenities and facilities	a) Per capita transit service hours <u>Note:</u> Staff is assessing the feasibility of adding "per capita expenditure for amenities and facilities."
	b) Improve bicycle and pedestrian facilities	b) MPO total programming per capita on bicycle and pedestrian facilities <u>Note:</u> This measure is unlikely to be available for 2050 MTP. Staff is investigating feasible methods.
		b) Proportion of jurisdictions that have an ordinance requiring developers to build or pay in lieu for sidewalks
	c) Increase utilization of affordable non-auto travel modes	c) Total transit boardings per capita

DCHC MPO -- Goals, Objectives, Performance Measures

DCHC Goals	DCHC Objectives	Performance Measures
		<p>c) Percentage of transit and bicycle/pedestrian mode shares in Travel Choice Neighborhoods (TCN) (staff checking relevance and feasibility by MPO, and by low-income, minority and zero-car households)</p> <p>This performance measure is new - it was not in the 2045 MTP.</p>
V. Promote Safety, Health and Well-Being	a) Achieve zero deaths and serious injuries on our transportation system	<p>a) FHWA TPMs (highway)</p> <ul style="list-style-type: none"> - Number of non-motorized fatalities and serious injuries (by low-income, minority and zero car households) - Number of motorized fatalities - Rate of motorized fatalities (per 100m VMT) - Number of motorized serious injuries - Rate of motorized serious injuries (per 100m VMT)
		<p>a) FHWA TPMs (transit)</p> <ul style="list-style-type: none"> - Fixed-route (FR) and demand response (DR) total fatalities and fatalities per 100k vehicle revenue miles (VRM) - FR and DR total injuries and injuries per 100k VRM - FR and DR total safety events and safety events per 100k VRM - FR and DR system reliability (distance between major mechanical failures) <p>This performance measure is new - it was not in the 2045 MTP.</p>
	b) Provide all residents with active transportation choices	See performance measure for Goal IV, Objective C.
VI. Improve Infrastructure Condition and Resilience	a) Increase proportion of highways and highway assets in 'Good' condition	<p>a) FHWA TPMs</p> <ul style="list-style-type: none"> - Percent of interstate pavement in good and poor condition - Percent of National Highway System (NHS) pavement in good and poor condition - Percent of NHS bridges in good and poor condition
	b) Maintain transit vehicles, facilities, and amenities in the best operating condition	<p>b) FTA TPMs:</p> <ul style="list-style-type: none"> - Percentage of non-revenue vehicles that have met or exceeded their useful life benchmark (ULB) - Percentage of revenue vehicles within a particular asset class that have met or exceeded their ULB - Percentage of facilities with a condition rating below 3 on the Federal Transit Agency's Transit Economic Requirements Model (TERM)
	c) Improve the condition of bicycle and pedestrian facilities and amenities	See performance measure for Goal IV, Objective B (per capita programming on bicycle and pedestrian facilities)
	d) Promote resilience planning and practices	<u>Note:</u> This measure is unlikely to be available for 2050 MTP. Staff is investigating feasible methods.
	e) Support autonomous, connected, and electric vehicles	<u>Note:</u> This measure is unlikely to be available for 2050 MTP. Staff is investigating feasible methods.
VII. Manage Congestion & System Reliability	a) Allow people and goods to move with greater reliability	<p>a) FHWA TPMs: (there are 2- and 4-year targets for Interstate)</p> <ul style="list-style-type: none"> - Interstate LOTTR (level of travel time reliability) - Non-interstate NHS LOTTR

DCHC MPO -- Goals, Objectives, Performance Measures

DCHC Goals	DCHC Objectives	Performance Measures
		<p>a) Daily minutes of delay per capita (staff is checking reliability by MPO, and by low-income, minority and zero-car households)</p> <p>This performance measure is new - it was not in the 2045 MTP.</p>
	b) Increase efficiency of existing transportation system through strategies such as Transportation Demand Management (TDM) and Intelligent Transportation Systems (ITS)	b) Percentage of peak-hour travelers driving alone (use peak period, which is more readily available)
		b) Total individuals provided TDM support via programs and activities
		<p>b) ITS investments</p> <p><u>Note:</u> This measure is unlikely to be available for 2050 MTP. Staff is investigating feasible methods.</p>
VIII. Stimulate Inclusive Economic Vitality	a) Ensure equitable distribution of transportation investments especially to communities of concern	The <i>Environmental Justice (EJ)</i> report for the 2045 MTP assesses equitable distribution of transportation investments, thus, a separate performance measure is not needed. The <i>EJ</i> report will be updated for the 2050 MTP.
	b) Improve freight movement	b) FHWA TPM: (there is a 2- and 4-year target) - Interstate truck TTR
	c) Coordinate land use and transportation	See performance measure for Goal I, Objective C (vehicle miles of travel per capita); Goal III, Objectives A, B and C (percentage of jobs near transit, and percentage of trips under specified travel time)
	d) Invest in cost-effective solutions to improve travel reliability and safety	<u>Note:</u> This measure is unlikely to be available for 2050 MTP. Staff is investigating feasible methods.
	e) Improve project delivery for all modes	<u>Note:</u> This measure is unlikely to be available for 2050 MTP. Staff is investigating feasible methods.

Land Use (Socioeconomic Data)

Background

The MPO forecasts socioeconomic data (SE Data), such as dwelling units, population and employment, to the year 2050 and uses that data as a key input into the travel demand model called the Triangle Regional Model, or TRM). The process starts with the 2050 guide totals, which are county- level population and employment projections for the year 2050, and proceeds to the Community Visualization (CommViz) model that distributes the dwelling units and employment to particular parcels based on land availability and suitability.

The following MPO Web maps and document links provide more detailed information:

- [Map](#) of population and employment distribution for the Opportunity Places development foundation used in the Preferred Option.
- [Document](#) that explains the methodology for creating the Opportunity Places foundation.

Guide Totals

The MPO establishes the 2050 county-level population and employment to calculate the growth that the CommViz model process will distribute. The population is based on estimates and projections from the N.C. Office of State Budget and Management, and the employment projection is based on a private service from Woods-and-Poole Economics. The current employment estimate is based on employer data from InfoUSA that is verified and updated by local planners. The following table provides the county-level guide totals:

Population				
County	2016	2050	2016-2050	% change
Chatham*	46,051	103,345	57,294	124%
Durham	300,939	458,906	157,967	52%
Orange	143,678	193,477	49,799	35%
<i>Total</i>	<i>490,668</i>	<i>755,729</i>	<i>265,061</i>	<i>54%</i>
Employment				
County	2016	2050	2016-2050	% change
Chatham*	11,358	24,426	13,068	115%
Durham	217,114	401,168	184,054	85%
Orange	71,516	116,769	45,253	63%
<i>Total</i>	<i>299,988</i>	<i>542,363</i>	<i>242,375</i>	<i>81%</i>
* Only includes portion of Chatham County in modeling area.				

Opportunity Places Development Foundation

The Preferred Option uses the Opportunity Places development foundation for land use. This foundation assumes that many of the current land use plans and policies will continue in the future, however it makes four important land use change, including:

- ❑ 20% more net growth asserted on Anchor Institution campuses – adding 5,000 jobs combined over and above existing plans
- ❑ Multi-family affordable housing asserted at publicly controlled sites that meet physical criteria: 10,000 units over 30 years
- ❑ Increased capacity for growth at 22 activity hubs
- ❑ Increased capacity for transit-oriented mixed-use development along frequent transit lines

Note that examples of Anchor Institutions include the major universities and medical campuses.

Highways

Tables and Maps

The highway and intersection/interchange projects to be included in the Preferred Option are shown in the maps and tables in this document. The DCHC MPO believes it is important to show not only which highway projects are included in the Preferred Option but also those that are not included. In the highway table, the **red font** *Pref Opt* column indicates whether or not a project is included, i.e., “Y” = yes. The four columns in **blue font** and the comment column provide information on why a project is in the Preferred Option. Those columns include:

- Modernizations do not add vehicle travel lanes. In Urban areas, they generally add bicycle, pedestrian and transit facilities, add turn lanes at intersections, sometimes widen a narrow road, and sometimes improve curves and sight lines. In Rural areas, they widen a narrow road and shoulder, add turn lanes at intersections, and sometimes improve curve and sight lines.

The current transportation legislation (STI – Strategic Transportation Initiative) and process that controls the prioritization of projects for funding does not favor modernization projects. Prioritization favors projects that add capacity to heavily congested roadways. As such, the funding of these modernization projects assumes changes to the STI prioritization process that values modernization benefits, and assumes that the funding based on the NCFirst Commission recommendations will be available for modernization projects.

- Bus advantage improvements add travel lanes to roadways but also provide a travel time advantage to transit vehicles when compared to general traffic. Transit buses would be able to use the uncongested toll lanes of a managed lane roadway to reduce travel delays. More specifically, there is a possibility that two additional lanes in each direction would be added to NC 147 between the East End Connector and I-40: one general purpose lane and one bus lane.

The Preferred Option does not include any bus advantage, i.e., managed lanes.

- Grid, or connector roads, improve bicycle, pedestrian and transit trips by reducing the trip length, and can also reduce vehicle VMT (vehicle miles traveled). These roadways are mostly built by developers.
- Boulevard improvements typically include: one to three travel lanes in each direction; a raised, landscaped median; sidewalks; bike lanes; and bus pull outs, if preferred. A multi-use path can be substituted for the sidewalks and bike lanes. The intersection with other roadways is at grade, i.e., no bridge or ramps, and provides facilities for safe bicyclist and pedestrian crossing. The posted speed limits are 35-45mph.

The table is sorted by county and project name. It does not provide all of the available roadway project information to keep the table in a readable font size. Additional information is available by viewing the roadway map at the top of the 2050 MTP – Preferred Option web page (<https://www.dhcmpo.org/what-we-do/programs-plans/transportation-plans/2050-metropolitan-transportation-plan>) In the online map, the user can click on the roadway line or interchange point to view a pop-up of more detailed data such as:

- AQYEAR – The Air Quality Year designates the year, if before 2030, or decade in which the project will be operational. This designation helps demonstrate that the MTP is accountable to the federal fiscal constraint requirement and air quality determinations.
- STI -- The North Carolina Strategic Transportation Investments (STI) funding tiers, i.e., St = statewide, Reg = regional or Div = division, are identified to abide by the current state funding process.
- TIP – This field designates the ID, if it exists, for the Transportation Improvement Program (TIP). The TIP identifies transportation projects that are likely to receive funding in the next ten years.

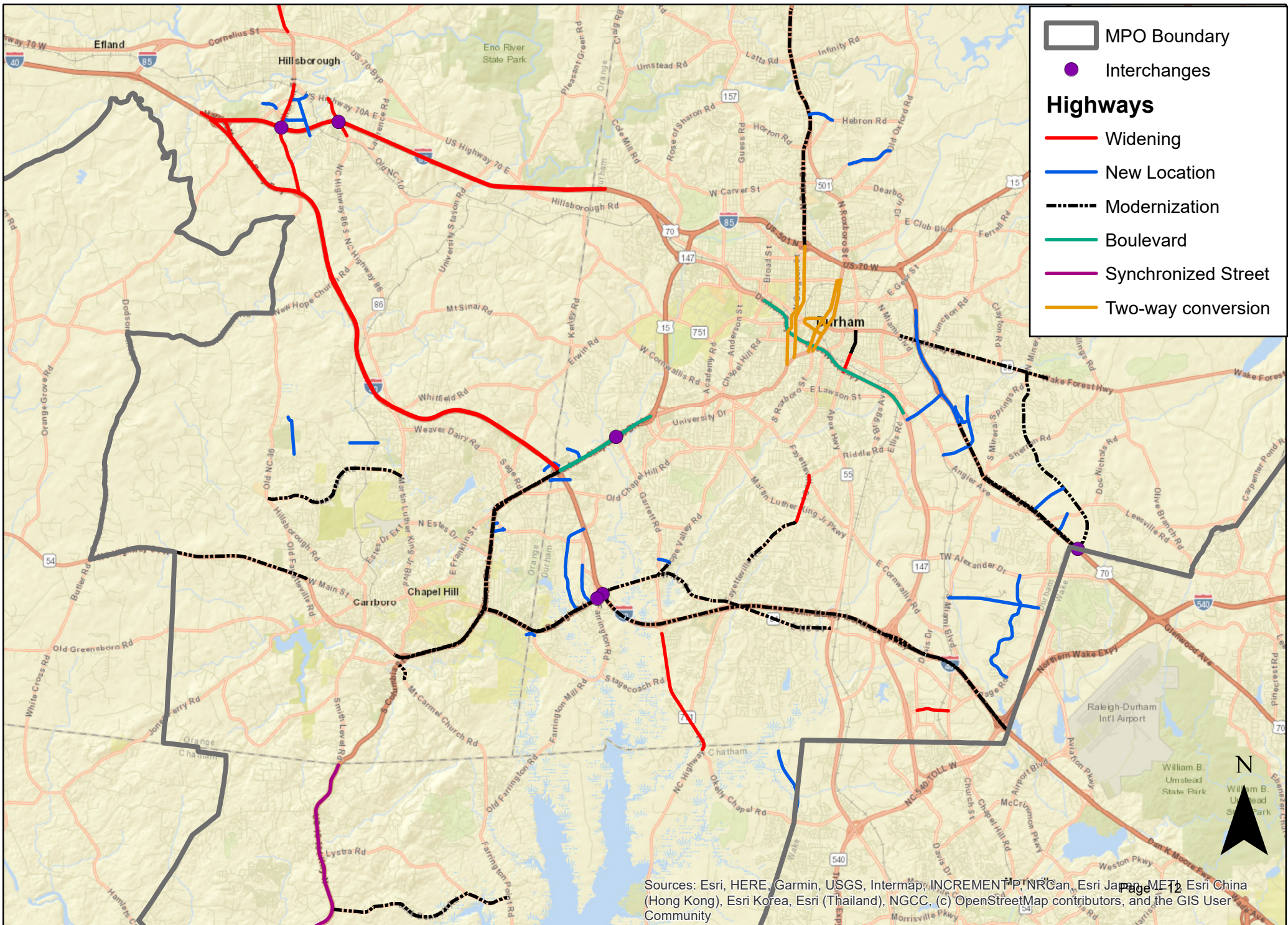
For the most part, new and upgraded interchanges/intersections are assumed to be part of the highway projects – not separate interchange projects. None of the interchanges were designated as a modernization, bus-advantage or grid project, and thus those data fields are not shown.

Highway Map

The highway maps on the next page shows the highway improvements that were considered for the Preferred Option. An interactive online map is also available at the top of the Preferred Option web page (<https://www.dhcmpo.org/what-we-do/programs-plans/transportation-plans/2050-metropolitan-transportation-plan>)

2050 Metropolitan Transportation Plan (MTP)

Preferred Option



Pref. Opt = "Y" (projects included in the Preferred Optoin)
 Pref. Opt = "N" (projects not included in the Preferred Optoin)

2050 MTP -- Preferred Option
 Highways

Project	From	To	Existing Lanes	Proposed Lanes	Improvement	Pref. Opt.	Modernization	Bus Advantage	Grid	Comments	Estimated Cost
Chatham County											
Jack Bennet Rd/Lystra Rd	US 15-501 South	Farrington Mill/Point Rd	2	2	Modernization	Y	Y	N	N		\$ 28,793,800
NC 751	Martha's Chapel Rd	O'Kelly Ch. Rd	2	4	Widening	N	N	N	N		\$ 69,400,000
US 15-501	Smith Level Rd	US 64	4	4	Synchronized Street	Y	Y	N	N		\$ 117,700,000
Yates Store Rd Extension	Yates Store Rd	Wake Rd	0	2	New Location	Y	N	N	Y		\$ 16,126,600
Durham County											
Angier Av Ext	US 70	Northern Durham Pkwy	0	2	New Location	Y	N	N	Y	To be built by developer; in dev't review in 2021	\$ 7,050,100
Angier/Glover Connector	Ellis Rd	Glover Rd	0	2	New Location	N	N	N	Y	Durham deleted from Vision	\$ 12,075,000
Carver St Ext	Armfield St	Old Oxford Rd	0	2	New Location	Y	N	N	N	Funded before 2020 - completed	\$ - -
Crown Pkwy/Roche Dr	Page Rd	T.W. Alexander Dr	0	2	New Location	Y	N	N	Y		\$ 15,457,400
Danziger Dr Extension	Mt Moriah Rd	E Lakewood Dr	0	2	New Location	Y	N	N	Y		\$ 7,177,800
Duke St	I-85	W Lakewood Av north of NC 98 in Durham	2	2	Two-way conversion	Y	Y	N	Y	Cost is from MOVEDurham Study	\$ 4,435,000
East End Connector (EEC)	NC 147	Durham	0	4	New Location	Y	N	N	N	Funded before 2020	\$ -
Falconbridge Rd Connector	Falconbridge Rd	Farrington Rd	0	2	New Location	N	N	N	N		\$ 1,717,800
Falconbridge Rd Extension	Farrington Rd	NC 54	0	4	New Location	Y	N	N	Y		\$ 23,359,000
Fayetteville Rd	Woodcroft Pkwy	Barbee Rd	2	4	Widening	N	N	N	N		\$ 21,381,000
Fayetteville Rd	Barbee Rd	Cornwallis Rd	2	4	Widening	Y	N	N	N	Under construction; will be operational in Nov/2021	\$ -
Fayetteville Rd	Woodcroft Pkwy	Barbee Rd	2	2	Modernization	Y	Y	N	N	Durham added to Vision as modernization	\$ 10,495,190
Garrett Rd	NC 751	Old Durham Rd	2	4	Widening	N	N	N	N		\$ 22,489,600
Garrett Rd	Old Durham Rd	US 15-501	2	4	Widening	N	N	N	N		\$ 10,865,400
Glover Rd	Angier	US 70	0	2	New Location	Y	N	N	Y		\$ 5,199,600
Hebron Rd Extension	Hebron Rd	Roxboro Rd (501 N)	0	2	New Location	Y	N	N	Y		\$ 5,056,800
Holloway St (NC 98)	Miami Blvd	Nichols Farm Dr	4	4	Modernization	Y	Y	N	N		\$ 85,800,000
Hope Valley Rd (NC 751)	S Roxboro St	Woodcroft Parkway	2	4	Widening	N	N	N	N		\$ 12,400,000
Hope Valley Rd (NC 751)	NC 54	Woodcroft Pkwy	4	4	Modernization	Y	N	N	N		\$ 2,998,626
Hopson Rd	Davis Dr	S Miami Blvd (NC 54)	2	4	Widening	Y	N	N	Y	Built by developer in 2021	\$ 7,280,000
Hopson Rd	Louis Stephens Dr	Davis Dr	2	4	Widening	N	N	N	N		\$ 12,873,000
I-40 (westbound auxiliary lane)	NC 147	NC 55	6	7	Widening	N	N	N	N		\$ 10,660,000
I-40 Managed Lane	NC 54	US 15-501	6	8	Widening	N	N	Y	N	Durham deleted from Vision	\$ 85,621,000
I-40 Managed Lanes	Wake County Line	NC 147	8	10	Widening	N	N	Y	N	Durham deleted from Vision	\$ 446,464,000
I-40 Managed Lanes	NC 147	NC 54	6	10	Widening	N	N	Y	N	Durham deleted from Vision	\$ 250,290,000
I-40 Managed Roadway	Wake County Line	NC 54	8	8	Modernization	Y	Y	N	N	MPO staff added to Vision	\$ 34,000,000
I-40/ NC 54 ramp	Farrington Rd.	I-40	0	1	New Location	N	N	N	N		\$ 2,240,000
I-85	US 70	Red Mill Rd	4	6	Widening	N	N	N	N		\$ 64,171,000
Leesville Rd Ext	US 70/Page Rd Ext	Leesville Rd	0	2	New Location	Y	N	N	Y	Built as part of US 70 (U-5720)?	\$ 3,701,600
Lynn Rd Extension	US 70	Existing Lynn Rd	0	2	New Location	Y	N	N	Y		\$ 9,606,800
Lynn Rd/Pleasant Dr Connector	Lynn Rd	Pleasant Dr	0	2	New Location	Y	N	N	Y	Part of East End Connector	\$ 5,111,400
Mangum St	W Lakewood Av	N Roxboro St	2	2	Two-way conversion	Y	Y	N	Y	Cost is from MOVEDurham Study	\$ 2,870,000
N Duke St (501 N)	I-85	N Roxboro split	5	4	Modernization	Y	Y	N	N		\$ 18,590,600

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2050 MTP -- Preferred Option
 Highways

Project	From	To	Existing Lanes	Proposed Lanes	Improvement	Pref. Opt.	Modernization	Bus Advantage	Grid	Comments	Estimated Cost
N Gregson ST/Vickers Av	W Club Blvd	University Dr	2	2	Two-way conversion	Y	Y	N	Y	Cost is from MOVEDurham Study	\$ 4,435,000
NC 147 (boulevard conversion)	Swift Av	East End Connector	4	4	Boulevard	Y	Y	N	N		\$ 69,896,559
NC 147 (operational improvements)	Swift Av	East End Connector	4	4	Operational	N	Y	N	N		\$ 81,323,200
NC 147 (possible managed lanes)	Future I-885	I-40	4	8	Widening	N	N	Y	N	Durham deleted from Vision	\$ 250,947,200
NC 54	I-40 Interchange	NC 751	2	4	Widening	N	N	N	N		\$ 55,100,000
NC 54	NC 751	Highgate Dr	2	4	Widening	N	N	N	N		\$ 45,800,000
NC 54	Fayetteville	Barbee	2	4	Widening	N	N	N	N		\$ 47,040,000
NC 54	Barbee	NC 55	2	4	Widening	N	N	N	N		\$ 42,800,000
NC 54	Highgate Dr	Fayetteville Rd	4	4	Modernization	Y	Y	N	N		\$ 2,998,626
NC 54	NC 751	Highgate Dr	2	2	Modernization	Y	Y	N	N		\$ 11,244,846
NC 54	I-40 Interchange	NC 751	2	2	Modernization	Y	Y	N	N	Durham changed to Modernization	\$ 8,995,877
NC 54	Fayetteville	Barbee	2	2	Modernization	Y	Y	N	N	Durham changed to Modernization	\$ 7,496,564
NC 54	Barbee	NC 55	2	2	Modernization	Y	Y	N	N	Durham changed to Modernization	\$ 9,745,533
NC 54 (widening; superstreet)	I-40	Barbee Chapel Rd	4	6	Widening	N	N	N	N	Orange County added to Vision	\$ 28,576,000
NC 54 (widening; superstreet)	I-40	Barbee Chapel Rd	4	4	Modernization	Y	Y	N	N	Durham changed to Modernization	\$ 11,994,502
NC 55 (Alston Ave)	NC 147	Main St	2	4	Widening	Y	N	N	N	Funded before 2020; operational in 2021	\$ -
NC 55 (Alston Ave)	Main St	NC 98	2	2	Modernization	Y	Y	N	N	Funded before 2020; operational in 2021	\$ -
NC 55 (Alston Ave)	Main St	NC 98	2	4	Modernization	Y	Y	N	N	Possible restriping from 2 to 4 lanes	\$ 1,400
NC 751	NC 54	Southpoint Auto Park Blvd	2	4	Widening	N	N	N	N	Some sections complete, but mostly still two-lane	\$ 21,800,000
NC 751	Renaissance Pkwy	O'Kelly Chapel Rd	2	4	Widening	Y	N	N	N	Developer will build based on water/sewer agreement	\$ 30,375,800
Northern Durham Pkwy	US 70 E	Sherron Rd	0	2	Modernization	Y	Y	N	N	Built by development; modernization will be needed	\$ 32,900,000
Northern Durham Pkwy	I 85 North	Old Oxford Hwy	0	4	New Location	N	N	N	N		\$ 32,607,400
Northern Durham Pkwy	Sherron Rd	NC 98	0	2	Modernization	Y	Y	N	N	Built by development; modernization will be needed	\$ 19,040,000
Patriot Dr Extension	S Miami Blvd	Page Rd	0	2	New Location	Y	N	N	Y		\$ 18,320,400
Roxboro Rd (501 N)	Duke St	Goodwin Rd	4	4	Modernization	Y	Y	N	N		\$ 20,403,600
Roxboro St	Cornwallis Rd	MLK Pkwy	0	4	New Location	N	N	N	Y	Durham deleted from Vision; environmental concerns	\$ 16,888,200
Roxboro St	W Lakewood Av	W Markham Av	2	2	Two-way conversion	Y	Y	N	Y	Cost is from MOVEDurham Study	\$ 2,870,000
Sherron Rd	S Mineral Springs Rd	Stallings Rd	2	4	Widening	N	N	N	N		\$ 35,004,200
Southwest Durham Dr	Sawyer Dr	Old Chapel Hill Rd	2	4	Widening	N	N	N	N		\$ 7,604,800
Southwest Durham Dr	US 15-501 Business	Mt Moriah Rd	0	4	New Location	Y	N	N	Y		\$ 5,133,800
Southwest Durham Dr	NC 54	I-40	0	2	New Location	Y	N	N	Y		\$ 17,362,800

Pref. Opt = "Y" (projects included in the Preferred Optoin)
 Pref. Opt = "N" (projects not included in the Preferred Optoin)

2050 MTP -- Preferred Option
 Highways

Project	From	To	Existing Lanes	Proposed Lanes	Improvement	Pref. Opt.	Modernization	Bus Advantage	Grid	Comments	Estimated Cost
US 15-501 (boulevard conversion)	US 15-501 Bypass	I-40	6	6	Boulevard	Y	Y	N	N		\$ 46,597,706
US 15-501 (expressway conversion)	US 15-501 Bypass	I-40	6	6	Expressway	N	N	N	N		\$ 195,183,000
US 15-501 Bypass	MLK Parkway	I-85	4	6	Widening	N	N	N	N		\$ 113,027,600
US 70 (freeway conversion)	S Miami Blvd	MPO Boundary	4	6	Freeway	N	N	N	N		\$ 95,340,000
US 70 (freeway conversion)	Lynn Rd	S Miami Blvd	4	6	Freeway	N	N	N	N		\$ 87,780,000
US 70 (freeway conversion)	S Miami Blvd	MPO Boundary	4	4	Modernization	Y	Y	N	N	Durham changed to Modernization	\$ 58,247,133
US 70 (freeway conversion)	Lynn Rd	S Miami Blvd	4	4	Modernization	Y	Y	N	N	Durham changed to Modernization	\$ 37,278,165
W Morgan/W Ramseur/	N Roxboro St	W Main St	4	4	Two-way conversation	Y	Y	N	Y	Cost is ballpark figure	\$ 16,500,000
Wake Forest Hwy (NC 98)	Nichols Farm Dr	Wake County Line	2	4	Widening	N	N	N	N		\$ 67,863,600
Woodcroft Pkwy Ext	Garrett Rd	Hope Valley Rd	0	2	New Location	Y	N	N	Y		\$ 3,793,000
Orange County											
Eno Mountain Rd realignment	Mayo St	Eno Mountain Rd	2	2	New Location	Y	N	N	Y		\$ 5,800,000
Eubanks Rd	Millhouse Rd	Rex Rd/Kousa trail	2	4	Widening	N	N	N	N		\$ 1,086,400
Fordham Blvd (US 15-501)	I-40	Ephesus Ch Rd	4	4	Modernization	Y	Y	N	N		\$ 46,586,400
Fordham Blvd (US 15-501)	NC 54	Ephesus Ch Rd	4	4	Modernization	Y	Y	N	N		\$ 49,481,600
Fordham Blvd (US 15-501)	NC 54	NC 86 (S Columbia St)	4	4	Modernization	Y	Y	N	N		\$ 39,600,000
Freeland Memorial Extension	S Churton St	New Collector Rd	0	2	New Location	Y	N	N	Y		\$ 4,484,200
Homestead Rd	Old NC 86	Rogers Rd	2	2	Modernization	Y	Y	N	N		\$ 14,327,600
Homestead Rd	Rogers Rd	NC 86	2	2	Modernization	Y	Y	N	N		\$ 9,597,000
I-40	NC 86	I-85	4	6	Widening	Y	N	N	N	First four years of STIP	\$ 107,290,000
I-40	Durham County line	NC 86	4	6	Widening	Y	N	N	N	First four years of STIP	\$ 68,851,000
I-85	Orange Grove Rd	Sparger Rd	4	6	Widening	Y	N	N	N	Orange County added to Vision	\$ 186,760,000
Lake Hogan Farms Rd	Eubanks Rd	Legends Way	0	2	New Location	Y	N	N	Y		\$ 6,169,800
Legion Rd Ext	Legion Rd	Fordham Blvd	0	2	New Location	Y	N	N	Y		\$ 2,100,000
Marriott Way	Friday Center Dr	Barbee Chapel Rd	0	2	New Location	Y	N	N	Y		\$ 954,800
Mt Carmel Ch Rd	US 15-501	Bennett Rd	2	2	Modernization	Y	Y	N	N		\$ 2,795,800
NC 54	Fordham Blvd (US 15-501)	Barbee Chapel Rd	6	6	Modernization	Y	Y	N	N		\$ 59,234,000
NC 54	Old Fayetteville Rd	Orange Grove Road	2	2	Modernization	Y	Y	N	N		\$ 50,040,000
NC 86	Old NC 10	US 70 Business	2	4	Widening	Y	N	N	N	Orange County added to Vision	\$ 10,162,600
NC 86 (and US 70 intersection)	US 70 Bypass	North of NC 57	2	4	Widening	Y	N	N	N	Orange County added to Vision	\$ 21,300,000
New Collector Rd	Orange Grove Rd Ext	Becketts Ridge Rd New Hope Commons	0	2	New Location	Y	N	N	Y		\$ 10,124,800
New Hope Commons Dr Extension	Eastowne Dr	Dr	0	2	New Location	Y	N	N	Y		\$ 6,423,200
Orange Grove Connector	Orange Grove Rd	NC 86	0	2	New Location	Y	N	N	Y		\$ 7,418,600
Purefoy Rd Ext	Sandberg Ln	Weaver Dairy Rd	0	2	New Location	Y	N	N	Y		\$ 5,287,800
S Churton St	Eno River in Hillsborough	I-40	2	4	Widening	Y	N	N	N	Orange County added to Vision	\$ 79,178,000
S Elliot Rd Ext	Fordham Blvd	Ephesus Church Rd	0	2	New Location	Y	N	N	Y		\$ 5,922,000

Public Transportation

Transit Service and Infrastructure

The 2050 MTP uses the services as approved in the currently adopted county transit plans as a starting point. These plans include major projects but do not specify programmed bus facilities and service beyond several years. However, both the Durham County Transit Plan and Orange County Transit Plan are being updated as the 2050 MTP process identifies the draft plan, i.e., Preferred Option. As a result, staff who are involved in the transit plan updating process have helped identify the major transit investments for the 2050 MTP.

The table below shows those investments and the decade in which the services and assets will begin to operate or be available. Note that the transit plans have a 2040 horizon year and the MTP has a 2050 horizon year. Thus, some of the transit projects in the 2050 MTP will not be in the upcoming, updated county transit plans.

Transit Element	Year/Extent
Commuter Rail Transit (CRT) –Triangle Commuter Rail	2040 – W. Durham to Clayton 2050 – Hillsborough to Selma
Bus Rapid Transit (BRT) - Chapel Hill North-South	2030 – Eubanks to Southern Village
Bus Rapid Transit (BRT) - Downtown Durham	2040 – Duke to NCCU
Bus Rapid Transit (BRT) - Durham/Chapel Hill	2040 – UNC to Duke (via US 15-501)
Bus Rapid Transit (BRT) - Durham/RTP	2040 – NCCU to RTP
Bus Rapid Transit (BRT) - Chapel Hill/RTP	2050 – (via NC 54)
Bus Service – frequency, coverage and connection improvements, especially major corridors	2030 – all transit systems
Bus - amenity and access improvements	2030 – all transit systems
Express Bus - Durham/Butner (via I-85)	2040 – White Cross/UNC 2040 – Chapel Hill/Hillsborough 2040 – Chapel Hill/Pittsboro 2050 – Durham/Butner
BOSS – bus on shoulder improvements to highways	2030 – (see more details in section below)

There are a few additional points about the transit investment in the above table:

- Increased costs -- The county transit plans and the 2050 MTP also support the increased cost of existing service – e.g., the increased cost of providing service that the transit systems provided before the transit plans were implemented, i.e., before fiscal year 2014.
- Bus Service – Improvements to service include increased bus frequency, greater route coverage, express service, crosstown routes (i.e., more direct routing), increased evening and weekend hours, use of microtransit in appropriate areas, paratransit service expansion,
- Amenity and Access -- Improvements to transit access and the customer experience include new park-and-ride lots, stop benches and shelters, crosswalks and pedestrian signals, mobile ticket systems, automated vehicle location (to display bus location), and transit transfer centers on major transit corridors.
- Commuter Rail Transit Frequency – The CRT will have 16 and 12 trains during peak and off-peak services hours, respectively, between West Durham and Raleigh. This frequency equates to a train every 15 and 30 minutes during peak and off-peak. There will be 8 (every 30 minutes) and 2 (every 3 hours) trains between West Durham and Hillsborough.

Bus on Shoulder System (BOSS)

A bus on shoulder system (BOSS) allows transit buses to use the shoulder when the traffic has slowed to a certain speed along a congested roadway. This system allows buses to continue moving in congested roadways and thus provides some advantage to transit vehicles and passengers. The Triangle area has already implemented BOSS along I-40 in Durham and Wake counties, and an evaluation of the system has concluded that there have been substantial benefits for transit travel. A recent study, Bus on Shoulder System (BOSS) Expansion Study concluded that several additional corridors can provide substantial travel benefits from BOSS and therefore the DCHC MPO recommends that the roadway segments listed in the table below be included in the 2050 MTP for BOSS implementation. The table indicates the roadway segment and whether BOSS could be part of an anticipated roadway improvement or will need to be implemented as a stand-alone project. The BOSS costs are included in the Preferred Option financial plan.

BOSS Project	Roadway Project
I-40 – I-85/US 15-501	part of widening
I-40 – US 15-501/NC 54	no roadway improvements
I-40 – NC 54/Wake Co.	no roadway improvements
NC 147 – I-85/W Chapel Hill St	no roadway improvements
NC 147 – W Chapel Hill St/I-885	interim to modernization
NC 147 – I-885/I-40	no roadway improvements
I-85 – NC 147/I-40 (Orange County)	interim to widening
I-85 – US 70/NC 147	no roadway improvements

BOSS Project	Roadway Project
NC 54 – Old Fayetteville Rd/NC 86	no roadway improvements
US 15-501 – NC 86/NC 54	part of modernization
US 15-501 – NC 54/E Franklin St	part of modernization
US 15-501 – E Franklin St/I-40	part of modernization
US 15-501 – I-40/US 15-501 Bypass	no roadway improvements
US 15-501 –US 15-501/I-85	no roadway improvements
NC 54 – US 15-501/Barbee Chapel	part of modernization
NC 54 – Barbee Chapel/I-40	interim to widening
NC 54 – Davis Dr/Miami Blvd	no roadway improvements
NC 54 – Slater Rd/Wake Co	no roadway improvements
US 70 I-885/Wake County	interim to widening

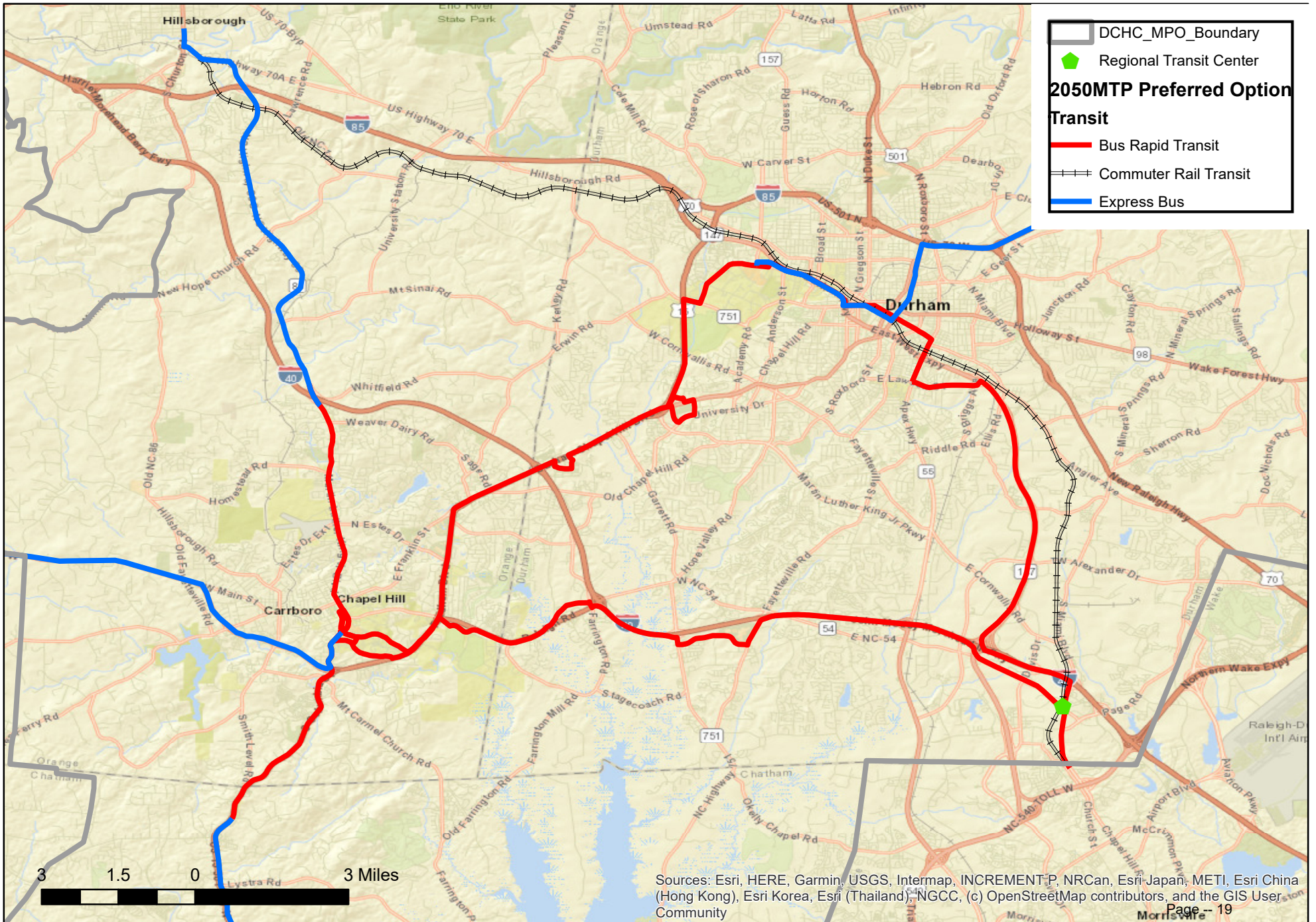
Transit Maps

The following page is a map of the commuter rail transit (CRT), bus rapid transit (BRT) and express bus services proposed for the 2050 MTP. Fixed-route bus services are identified in the MTP for the year 2050 for purposes of transportation modeling but the MTP does not list those individual bus transit projects. That service can change routing, bus frequency and service hours relatively frequently for the purposes of a 30-year long-range plan.

It should be noted that the CRT, BRT and express bus routes are to show the intent to serve major transit markets. They are for illustrative purposes only and are not intended to show detailed routing for transit services that are years, if not decades, from implementation. Routing details will be set in later, more focused studies.

An interactive, online transit map is also available at the top of this Preferred Option [Web page](#).

2050 MTP Transit Projects Preferred Option



Bicycle and Pedestrian

Summary

The 2050 MTP does not specifically list all of the bicycle and pedestrian projects. The local jurisdictions and counties have identified, and in many cases prioritized these projects and have coordinated their interaction in the jurisdiction boundary areas through the DCHC MPO. As a result, the 2050 MTP defers to those local government processes and documents.

Local Plans

Bicycle

The DCHC MPO adopted a Comprehensive Transportation Plan (CTP) in May 2017 in cooperation with the North Carolina Department of Transportation (NCDOT). The CTP lists all the local bicycle projects from the jurisdiction and county plans in the MPO area as of the 2017 adoption date. The Bike-Ped-Multiuse map at the top of the following web page and the tables in the CTP document provide information on those projects.

- [CTP Web site](#)

The local plans provide details on the planned facilities at the following links:

- [Carrboro Comprehensive Bicycle Transportation Plan](#) (2020)
- [Chapel Hill Mobility and Connectivity Plan](#) (2020)
- [Chatham County Bicycle Plan](#) (2011)
- [Durham City and County Comprehensive Bicycle Plan](#) (2006)
- [Durham Bike+Walk Implementation Plan](#) (2017)
- [Hillsborough Community Connectivity Plan](#) (2009, revised 2014 & 2017)

Pedestrian

Local pedestrian plans include:

- [Chapel Hill Mobility and Connectivity Plan](#) (2020)
- [Durham Walks! Pedestrian Plan](#) (2006)
- [Durham Bike+Walk Implementation Plan](#) (2017)
- [Hillsborough Community Connectivity Plan](#) (2009, revised 2014 & 2017)

MPO Policy

The 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, guidelines from the N.C. Department of Transportation, the American Association of State Highway and Transportation Officials (AASHTO), the National Association of City Transportation Officials (NACTO), and other related guidelines provide planning and design guidance for use when building new projects or making changes to existing infrastructure.

Financial Plan

Although the 2050 MTP does not list the individual bicycle, pedestrian and multiuse path projects, the 2050 MTP requires an estimate of the level of investment for purposes of the financial plan. The DCHC MPO reviewed local plans and made the following estimates of infrastructure in those plans:

- 175 miles of sidewalk per decade;
- 70 miles of shared use paths per decade;
- 80 miles of protected bike lanes per decade; and,
- 20 miles of bicycle boulevards per decade

A total of approximately 20 miles of the shared use path and 30 miles of the sidewalk/bike lane will be constructed as part of roadway modernization projects. Thus, a total \$2.679 billion is required to complete the projects in the local plans. See the table below.

	Length (mi)	Unit Cost (ft)	Total Cost (\$millions)
Sidewalk	495	\$ 250	\$ 653
Shared Use Path/Sidepath	190	\$ 500	\$ 502
Protected bike lane (both sides)	240	\$ 1,200	\$ 1,521
Bicycle Boulevard	60	\$ 10	\$ 3
Total			\$ 2,679

Not all of these projects can be constructed during the 30-year horizon of the 2050 MTP because there is not enough funding available. The current Strategic Transportation Initiative (STI) that directs transportation funding in North Carolina only designates a minimum of 4% of the total funding for non-highway projects. Federal funding levels are relatively low, as well. However, the 2050 MTP financial plan assumes that the majority of the NC First Commission recommended income, which is \$1.1 billion in each of the two later decades, i.e., 2040 and 2050, will be available for bicycle and pedestrian projects. As a result, there will be \$2.332 billion available to fund the \$2.679 billion of projects in the local plans. That funding covers 87% of the projects in the local plans.

Financial Plan

Background and Assumptions

This document provides:

- Narratives details of the financial plan tables;
- Graphs of the level of investment in different modes (page 4 and 5); and,
- Financial plan tables (starting page 6).

The MPO created and reviewed three financial projections in the Alternatives Analysis: Plans and Trends; Shared Leadership; and, All Together. The Preferred Option uses the All Together financial projection because it provides the most funding for transit, bicycle and pedestrian projects. The key revenue sources and assumptions include:

1. “Traditional” revenues (2021-50)
 - State & federal funds based on:
 - The current State Transportation Improvement Program (STIP), which identifies state and federal funding sources for projects over the next ten years
 - NC Moves report and NCDOT revenue model, which estimates available transportation funding over the next few decades
 - The financial plan follows the Strategic Transportation Initiative (STI) process for funding projects
 - Continuation of county-level transit sales taxes
 - Past pattern for other sources (e.g., local bonds and revenue, developer-built projects)
2. NC First Commission recommendation for additional state revenues (2031-50)
 - The MPO will receive a “fair share” of recommended amount, e.g., allocated by population
 - The allocation will not go through STI, and therefore provides the MPO greater latitude to determine the investment target
3. Additional local/regional revenues (2031-50)
 - Based on “sales tax equivalent”

Financial Table

This section provides additional details on the line items in the financial table. The columns break out the costs and revenues by decade, i.e., 2030 (2021-2030), 2040 (2031-2041), and 2050 (2041-2050), as required by federal guidelines. The values are in 2020 constant dollars, i.e., no inflation factors are applied. The itemized costs of highway, transit and bicycle/pedestrian projects in the MTP are also in 2020 constant dollars.

Roadways and Alternative Transportation – Costs

Statewide, Regional and Division – These values are the sum of the roadway projects in the Preferred Option, and are broken out by the STI funding category, i.e., statewide, etc.

Roadway Maintenance and Operations – These cost values equal the revenue that will be available for maintenance and operations, which can only be invested in maintenance and operations.

Bicycle and Pedestrian -- The cost to implement the bicycle and pedestrian projects in the long-range local plans of counties and jurisdictions in the DCHC MPO is \$2.679 billion. The financial plan values are the amount that will be available for bicycle and pedestrian projects, which will rely on NC First Commission, developer-built, local revenue, STBG-DA and CMAQ funding. The expected investment in these projects is expected to increase over the years of the first decade. The NC First Commission funding will not be available until the second and third decades.

Transportation Demand Management, Intelligent Transportation Systems, and Transportation System Management – The total estimate of \$100 million per decade is based on current patterns of investment in these types of transportation projects. A review of the current STIP and the NCDOT revenue model indicates that the total State and federal capital funding available in the 2030, 2040 and 2050 time periods will be \$3.4, \$2.1 and \$2.4 billion. Thus, the TDM, ITS and TSM costs are %3 to 5% of the total State and federal capital.

Bus on Shoulder System – The BOSS needs are based on the Bus on Shoulder Expansion Study (2021) and most of the needs are assumed to be constructed when roadways are widened or modernized. However, some roadways do not have future improvements designated and in these cases the cost is calculated at \$100,000 per mile.

Roadways and Alternative Transportation – Revenues

Statewide, Regional and Division – These revenues are the sum of the roadway projects in the Preferred Option, and are broken out by the STI funding category, i.e., statewide, etc. It also includes portions of revenue for the following:

- Statewide: ITS (70%) and TSM (40%)
- Regional: ITS (30%) and TSM (30%)
- Division: TCM (100%) and TSM (30%)

Roadway Maintenance and Operations – These revenue values can only be invested in maintenance, operations, and some other related costs.

Regional (State and Federal) – non roadways – STI allocation designates a minimum of 4% of the total available Regional funding for non-highway uses. This is 4% of the \$828 million, \$523 million and \$603 million that are estimated to be available for 2030, 2040 and 2050.

Division (State and Federal) – non roadways – STI allocation designates a minimum of 4% of the total available Regional funding for non-highway uses. This is 4% of the \$828 million, \$320 million and \$362 million that are estimated to be available for 2030, 2040 and 2050.

Local/private - Roadways – This number is the value of the roadways that will be built by local governments and private developers. Most of these roadways will be connector roads.

Local/private – Bicycle and Pedestrian – This number is based on an estimate of past values. It is value of the bicycle and pedestrian projects that will be built by local governments (e.g., financed by bonds) and private developers (e.g., related to development projects).

STBG-DA and CMAQ – This value is based on the record of revenues from the Surface Transportation Block Grant – Direct Apportionment and Congestion Management Air Quality federal funding grants that are provided to the DCHC MPO annually. MPO policy directs this funding to non-highway investments.

NC First Commission – This value assumes that the recommended new transportation funding that the NC First Commission identified will become available in 2031 and will be roughly allocated by population.

Roadways and Alternative Transportation – Balance

The DCHC MPO has kept a positive balance of \$200 million each decade to cover any additional projects that are identified during the Preferred Option public engagement process. Also, the MPO will try to keep a positive balance in the final 2050 MTP because amendments are expected that will likely add to the overall cost. A positive balance can eliminate the necessity to update the financial plan, which requires a high level of staff resources.

Public Transportation – Pre Transit Plan – Costs and Revenues

This table shows the costs and revenues for the transit operations and capital for services provided before implementation of the county transit plans, i.e., before fiscal year 2014. These operations and capital items are separated from the transit plan ones because most of the revenue from the half-cent transit tax and increases in vehicle

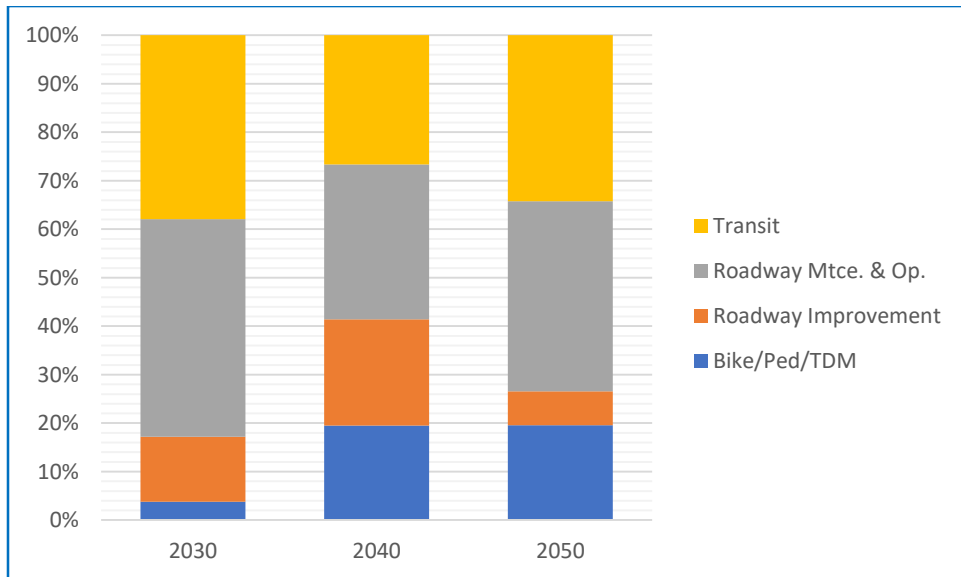
registration and car rental taxes cannot supplant funding that was already being expended on transit services in fiscal year 2013.

Public Transportation – New / Transit Plan – Costs and Revenues

This table shows the costs and revenues for the transit operations and capital for services initiated through the county transit plans, i.e., fiscal year 2014, and onward.

Investment Summaries

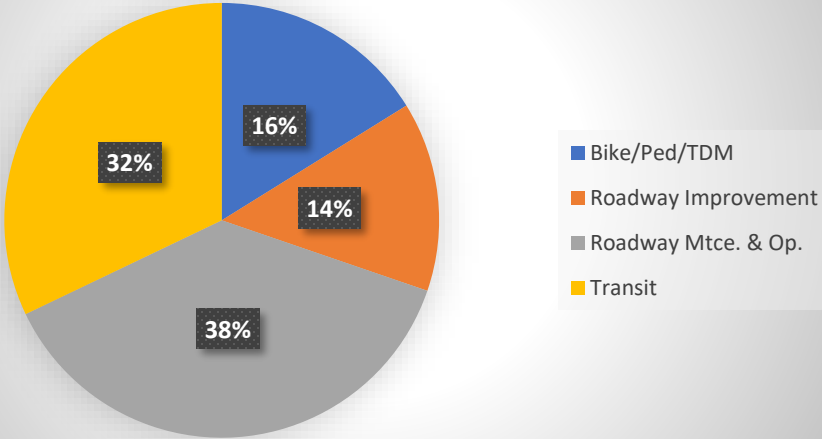
The bar chart below shows the percent of the total investment by mode for each of the three decades. Transit and roadway maintenance and operations combine for about 60% to 80% of the total investment in the three periods. Bicycle and pedestrian investments grow swiftly in the second decade.



The pie graph and table below show the total and percent of MTP investment by mode. Roadway maintenance and operations, and transit have the highest investments, while Bike/Ped and roadway improvement are at similar levels.

Total MTP Investment	(\$ in billions)
Bike/Ped/TDM	2.4
Roadway Improvement	2.1
Roadway Mtce. & Op.	5.6
Transit	4.8

MTP Total Investments by Mode



DCHC MPO - 2050 MTP Financial Plan

Preferred Option (in millions \$)				
Roadways & Alternative Transportation	2030	2040	2050	Total
Costs (millions \$)				
Statewide (State/Federal Capital)	\$ 247	\$ 817	\$ -	\$ 1,065
Regional (State/Federal Capital)	\$ 30	\$ 162	\$ 174	\$ 366
Division (State/Federal Capital)	\$ 67	\$ 188	\$ 163	\$ 418
Roadway Maintenance and Operations	\$ 1,425	\$ 1,823	\$ 2,326	\$ 5,573
Bicycle and Pedestrian	\$ 100	1,092	1,141	\$ 2,332
Transportation Demand Management	\$ 20	\$ 20	\$ 20	\$ 60
Intelligent Transportation Systems	\$ 35	\$ 35	\$ 35	\$ 105
Transportation System Management	\$ 45	\$ 45	\$ 45	\$ 135
Bus On Shoulder (BOSS)	\$ 1.3	\$ 3.4	\$ 1.4	\$ 6.1
Roadways & Alternative Transportation Cost Total	\$ 1,972	\$ 4,185	\$ 3,904	\$ 10,060
				\$ 10,054
	\$ 445	\$ 1,267	\$ 437	\$ 2,149
Revenue (millions \$)	\$ 445	\$ 1,267	\$ 437	\$ 2,149
Statewide (State/Federal Capital) - roadways	\$ 290	\$ 860	\$ 43	\$ 1,192
Regional (State/Federal Capital) - roadways	\$ 54	\$ 186	\$ 198	\$ 438
Division (State/Federal Capital) - roadways	\$ 101	\$ 221	\$ 196	\$ 519
Roadway Maintenance and Operations	\$ 1,425	\$ 1,823	\$ 2,326	\$ 5,573
Regional (State/Federal Capital) - non roadways	\$ 33	\$ 21	\$ 24	\$ 78
Division (State/Federal Capital) - non roadways	\$ 33	\$ 13	\$ 14	\$ 60
Local/private - Roadways	\$ 71	\$ 56	\$ 99	\$ 225
Local/private - Bicycle & Pedestrian	\$ 25	\$ 25	\$ 25	\$ 75
STBG-DA and CMAQ	\$ 80	\$ 80	\$ 80	\$ 240
NC First Commission	\$ -	\$ 1,100	\$ 1,100	
Roadways & Alternative Transportation Revenue Total	\$ 2,113	\$ 4,384	\$ 4,104	\$ 10,601
Roadways and Alt. Transportation Balance	\$ 141	\$ 200	\$ 200	\$ 541

DCHC MPO - 2050 MTP Financial Plan

Preferred Option (in millions \$)				
Public Transportation - Pre Transit Plan	2030	2040	2050	Total
Costs (millions)				
Operations and Capital	\$ 562	\$ 562	\$ 562	\$ 1,686
Revenues (millions)				
Existing Revenues (non-transit plan)	\$ 562	\$ 562	\$ 562	\$ 1,686
Pre Transit Plan Balance	\$ -	\$ -	\$ -	\$ -
Public Transportation - New / Transit Plan				
Costs (millions)				
Operations	\$ 233	\$ 463	\$ 512	\$ 1,208
Capital	\$ 408	\$ 488	\$ 958	\$ 1,854
Total	\$ 641	\$ 951	\$ 1,470	\$ 3,062
Revenue (millions)				
Current and Proposed Tax	\$ 550	\$ 1,046	\$ 1,260	\$ 2,856
Federal (CIG)	\$ 128	\$ 195	\$ 442	\$ 765
Total	\$ 678	\$ 1,241	\$ 1,702	\$ 3,621
New / Transit Plan Balance	\$ 37	\$ 290	\$ 232	\$ 559

Grand Total Costs	3,175	5,698	5,936	14,808
Grand Total Revenue	3,353	6,187	6,368	15,908
Grand Total Balance	178	490	432	1,100

MOE (Measures of Effectiveness)

Background

Measures of effectiveness (MOE) from the Triangle Regional Model (TRM) provide general, system-wide indicators for travel volume, mobility, travel time, congestion, and mode choice. The measures are not specific to a particular roadway or travel corridor but instead cover the entire transportation system, and therefore are useful for comparing the effectiveness of the Preferred Option with the 2016 Base Year and the 2050 Existing Plus Committed (E+C) no build scenarios. Most of the data used for calculating these Performance Measures comes from the TRM, which is a travel demand model that is capable of forecasting future transportation metrics based on a set of assumptions concerning the highway and transit network, and land use (i.e., location of population and employment).

This document presents and compares the MOEs for three transportation scenarios:

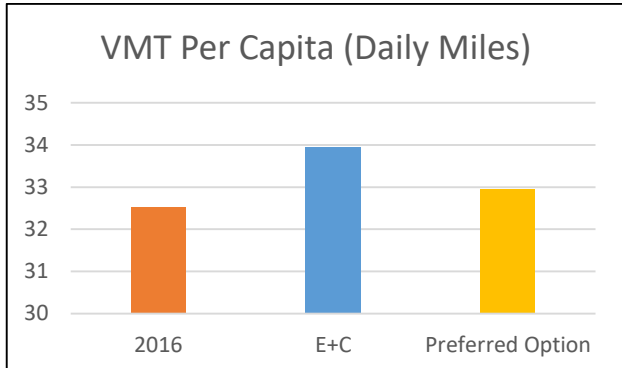
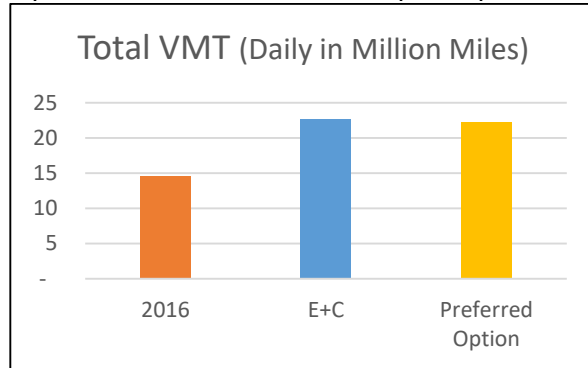
- 2016 Base Year – This is a model of the existing transportation network.
- 2050 E+C – This is the population and employment for the year 2050 on the existing transportation network, plus any projects that are currently committed for completion, e.g., the East End Connector. This could be called the “no-build” scenario.
- 2050 – This is the population and employment for the year 2050, using the Opportunity Places land use scenario, and a transportation network that includes the highway and transit improvements in the Preferred Option.

Measures

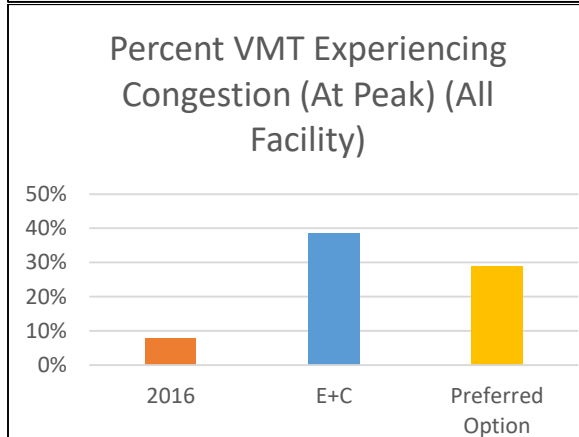
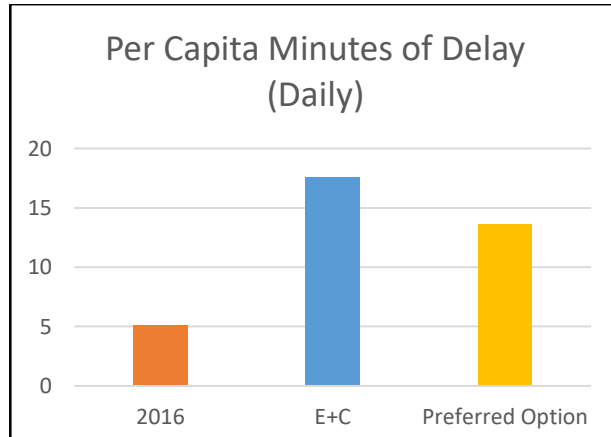
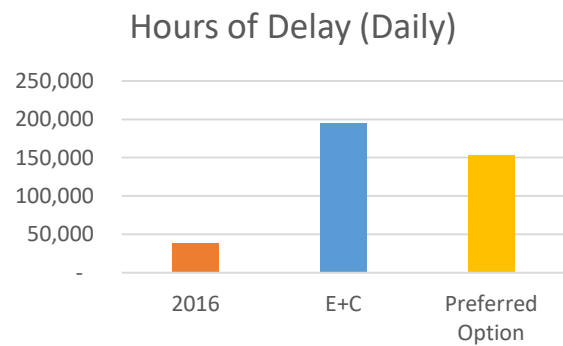
The next section summarizes the key trends of the TRM measures. A table of all the measures follows that section. The DCHC MPO will post additional performance measures, such as the mode choice for Travel Choice Neighborhoods (TCN, i.e., areas with high capacity transit), on the Preferred Option web page.

Summary

Volume – The population and employment in 2050 drive large travel increases in the E+C (i.e., No Build scenario) and Preferred Option. The transportation improvements in the Preferred Option do little to reduce the per capita mileage.

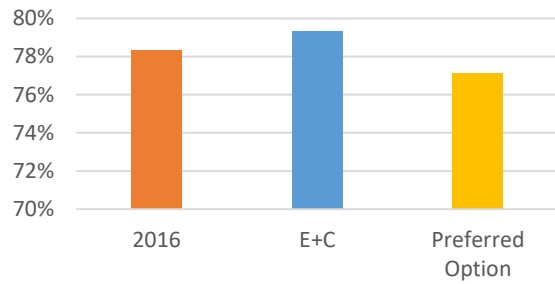


Congestion and Delay – The E+C scenario produces high levels of delay and congestion. The Preferred Option does well to reduce the overall congestion and per capita delay, but those values do not return to the current levels.

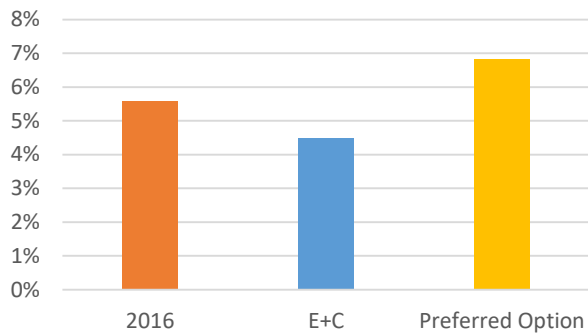


Mode Share – The single-occupied vehicle (SOV) and biking and walking (non-motorized) trip shares vary little among the different scenarios. There is a positive improvement in the transit mode share in the Preferred Option because of the investment in transit.

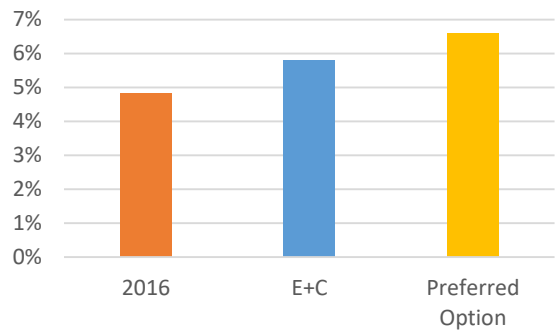
Percent SOV Trip Share (Work Trips)



Transit Mode Share (Work Trips)

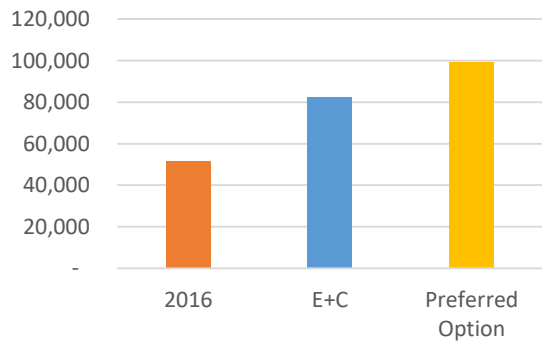


Non-Motorized Trip Share (Work Trips)



Transit Trips – The higher population and employment in the E+C scenario produces a modest increase in transit use. The transit investments in the Preferred Option help the number of transit investments to double.

Transit Trips (Daily)



2050 MTP -- Preferred Option
Measures of Effectiveness for the DCHC MPO

DCHC MPO	Year =	2016	2050	2050
	Alternative (Scenario) =	Baseline	E+C	Preferred Option
1 Performance Measures				
1.1 Total VMT (daily)				
1.1.1	All Facility+C Connectors	14,516,717	22,620,357	22,279,438
1.1.1a	All Facility+C Connectors (per capita)	33	34	33
1.1.2	All Facility (no C Connectors)	13,612,286	21,264,845	20,976,915
1.1.2a	All Facility (no C Connectors) (per capita)	31	32	31
1.2 Total VHT (daily)				
1.2.1	All Facility+C Connectors	365,641	725,075	670,399
1.2.1a	All Facility+C Connectors (per capita)	0.82	1.09	0.99
1.2.2	All Facility (no C Connectors)	335,601	677,058	623,814
1.2.2a	All Facility (no C Connectors) (per capita)	0.75	1.02	0.92
1.3 Average Speed by Facility (miles/hour)				
1.3.1	- Freeway	59	48	51
1.3.2	- Arterial	35	30	31
1.3.3	- All Facility	46	39	40
1.4 Peak Average Speed by Facility (miles/hour)				
1.4.1	- Freeway	57	45	48
1.4.2	- Arterial	34	28	29
1.4.3	- All Facility	45	36	38
1.5 Daily Average Travel Length - All Person Trips				
1.5.1	- Travel Time	13	16	16
1.5.2	- Travel Distance	6	6	6
1.6 Daily Average Travel Length - Work Trips				
1.6.1	- Travel Time	20	25	22
1.6.2	- Travel Distance - Work Trips	10	10	10
1.7 Peak Average Travel Length - All Person Trips				
1.7.1	- Peak Travel Time	14	18	17
1.7.2	- Peak Travel Distance	6	6	7
1.8 Daily Average Travel Length - All CV Trips				
1.8.1	- Travel Time	10	11	11
1.8.2	- Travel Distance	7	7	7
1.9 Daily Average Travel Length - Truck Trips				
1.9.1	- Travel Time	11	13	12
1.9.2	- Travel Distance	8	8	8
1.10.	Hours of Delay (daily)	37,909	195,359	153,637
1.10a	Minutes of Delay (daily) (per capita)	5	18	14
1.10.1	Truck Hours of Delay (daily)	1,939	10,911	8,309
1.11 Percent of VMT experiencing congestion - All Day				
1.11.1	- Freeway	6%	52%	34%
1.11.2	- Arterial	5%	18%	14%
1.11.3	- All Facility	5%	33%	23%
1.12 Percent of VMT experiencing congestion - Peak				

2050 MTP -- Preferred Option
Measures of Effectiveness for the DCHC MPO

DCHC MPO	Year =	2016	2050	2050 Preferred Option
	Alternative (Scenario) =	Baseline	E+C	Option
1.12.1	- Freeway	10%	61%	43%
1.12.2	- Arterial	7%	26%	21%
1.12.3	- All Facility	8%	39%	29%
1.12.4	- Designated truck routes	6%	26%	24%
1.12.5	- Facilities w/bus routes	8%	49%	27%
2 Mode Share Measures				
2.1 All Trips - Daily				
2.1.1	- Drive alone (single occupant vehicle -SOV)	939,928	1,474,117	1,444,960
2.1.2	- Carpool (Share ride)	765,458	1,209,578	1,196,098
2.1.3	- Bus	51,620	82,246	99,169
2.1.4	- Rail	-	-	1,489
2.1.5	- Non-Motorized (Bike and Walk)	311,628	554,258	603,202
2.2 Work Trips - Daily				
2.2.1	- Drive alone (single occupant vehicle -SOV)	202,133	329,284	323,701
2.2.2	- Carpool (Share ride)	29,143	43,077	39,227
2.2.3	- Bus	14,413	18,669	28,579
2.2.4	- Rail	-	-	547
2.2.5	- Non-Motorized (Bike and Walk)	12,433	24,046	27,636
2.3 All Trips - Peak Hours				
2.3.1	- Drive alone (single occupant vehicle -SOV)	500,574	787,905	776,017
2.3.2	- Carpool (Share ride)	439,581	705,322	696,811
2.3.3	- Bus	27,172	43,724	54,183
2.3.4	- Rail	-	-	1,131
2.3.5	- Non-Motorized (Bike and Walk)	140,260	251,413	275,912
3 Demographics and Trip Measures				
3.1	Population	446,275	666,483	675,991
3.2	Employment	289,221	518,726	519,644
3.3	Total Daily Person Trips	2,068,634	3,320,199	3,344,918
3.3.1	Work Person Trips	258,122	415,076	419,690
3.4	Total Daily CV Trips	133,002	202,059	203,886
3.4.1	Daily Truck Trips	54,882	82,260	82,821
4 Other Measures				
4.1	Lane Miles	2,597	2,675	2,851
5 Transit Measures				
5.1	Transit Ridership by Prod. Ends			
5.1.1	- GoTriangle (Including Rail)	17,035	30,363	70,858
5.1.2	- GoRaleigh	23,853	62,385	114,711
5.1.3	- CHT	29,797	59,794	56,414
5.1.4	- GoDurham	23,286	26,842	33,484
5.1.5	- NCSU	11,873	18,999	16,245
5.1.6	- DUKE	8,018	12,727	9,905
5.1.7	- OCPT	576	109	459

2050 MTP -- Preferred Option
Measures of Effectiveness for the DCHC MPO

DCHC MPO	Year =	2016	2050	2050
		Baseline	E+C	Preferred Option
Alternative (Scenario) =				
5.1.8	- GoCary	2,597	3,688	4,071
5.1.9	Total	117,036	214,908	306,149
5.4 Transit Supply - Service Miles				
5.4.1	- GoTriangle (Including Rail)	13,392	13,128	37,084
5.4.2	- GoRaleigh	10,970	17,686	51,018
5.4.3	- CHT	10,418	9,876	16,584
5.4.4	- GoDurham	9,852	9,389	25,302
5.4.5	- NCSU	4,563	4,563	3,566
5.4.6	- DUKE	2,652	2,776	3,017
5.4.7	- OCPT	974	662	423
5.4.8	- GoCary	1,623	1,931	3,730
5.4.9	Total	54,448	60,015	140,728
All Trips - Mode Share				
	- Drive alone (single occupant vehicle -SOV)	45%	44%	43%
	- Carpool (Share ride)	37%	36%	36%
	- Bus	2%	2%	3%
	- Rail	0%	0%	0%
	- Non-Motorized (Bike and Walk)	15%	17%	18%
	Total	100%	100%	100%
Work Trips - Mode Share				
	- Drive alone (single occupant vehicle -SOV)	78%	79%	77%
	- Carpool (Share ride)	11%	10%	9%
	- Bus	6%	4%	7%
	- Rail	0%	0%	0%
	- Non-Motorized (Bike and Walk)	5%	6%	7%
	Total	100%	100%	100%

Note: Values are rounded. Thus, some math operations will appear incorrect, e.g., 90 - 89 = 0