

2045 MTP – Draft Preferred Option

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Executive Summary

Goals and Objectives

DCHC MPO and Capital Area MPO (CAMPO) have coordinated to create the same Goals, Objectives and Performance Measures. DCHC MPO used an extensive public input process to create Goals and Objectives that are aligned with a set of performance measures and targets. This alignment makes it easier to evaluate how the 2045 MTP investments meet the Goals and Objectives. In the Preferred Option, the MPO has endeavored to the greatest extent possible to make sure that the 2045 MTP transportation projects and budget reflect these Goals and Objectives despite the constraints imposed by the current North Carolina transportation policy, i.e., Strategic Transportation Investments (STI).

The Goals include:

- I. Protect environment and minimize climate change
- II. Connect people
- III. Promote multimodal and affordable travel choices
- IV. Manage congestion & system reliability
- V. Improve infrastructure condition
- VI. Ensure equity and participation
- VII. Promote safety and health
- VIII. Stimulate economic vitality

Land Use

The MPO forecasts socioeconomic data (SE Data), such as dwelling units, population and employment, to the year 2045. The county-level forecasts, shown in the table on the next page, are distributed within the counties using a regional land use modeling process. That modeling process adopted the AIM-High land use scenario which is based on local land use plans and policies, and includes increases in land use density and mix around the future light rail stations that are within the realm of those markets.

Highways

The highway and interchange projects in the Preferred Option were selected based on their ability to promote the MPO's draft Goals and Objectives and the expected availability of funding. A project table and interactive online map depict the highway projects (see Preferred tab on the 2045 MTP Web page: www.bit.ly/DCHC-MTP).

Population				
County	2013	2045	2013-45	% change
Chatham*	41,543	72,110	30,567	74%
Durham	286,210	475,091	188,881	66%
Orange	139,289	194,867	55,578	40%
<i>Total</i>	<i>467,042</i>	<i>742,068</i>	<i>275,026</i>	<i>59%</i>
Employment				
County	2013	2045	2013-45	% change
Chatham*	9,339	17,718	8,379	90%
Durham	192,877	342,910	150,033	78%
Orange	64,212	107,791	43,579	68%
<i>Total</i>	<i>266,428</i>	<i>468,419</i>	<i>201,991</i>	<i>76%</i>

* Only includes portion of Chatham County in the modeling area.

Public Transportation

The Preferred Option adopts the transit services as approved in 2017 in the Durham County Transit Plan and Orange County Transit Plan. The principal transit services include:

- D-O LRT: light rail transit service between UNC Hospitals in Chapel Hill and North Carolina Central University (NCCU) in Durham
- CRT: commuter rail transit service between west Durham and Wake County
- BRT: bus rapid transit from Eubanks Road to Southern Village in Chapel Hill
- Bus: increases in bus service hours
- Capital Projects: a rail station in Hillsborough, additional transit stations and stops, improved amenities and facilities.

In addition, an extension of the D-O LRT to Carrboro and the CRT to Hillsborough are proposed.

Bicycle, Pedestrian and Multiuse Paths

The 2045 MTP does not specifically list 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. The 2045 MTP defers to the details and priorities of these local governments plans. The financial plan provides \$225 million to implement these projects; that is \$75 million for each decade in the 2045 MTP.

Financial Plan

The MPO created and reviewed three financial projections in the Alternatives Analysis, including Constrained, Moderate, and, Optimistic (formerly known as Aspirational). The Preferred Option uses the Optimistic financial projection. The financial plan abides by the North Carolina STI (Strategic Transportation Investment) legislation and policy in the first two decades of the plan, i.e., 2025 and 2035. In the third decade, 2045, the financial plan assumes that statewide and national policy would relax restrictions on the use of funding for transit projects, and permit some traditional highway funding to extend the Commuter Rail Transit (CRT) and Light Rail Transit (LRT) lines.

Preferred Option Investments:

<u>Roadways</u>	<u>Total</u>
Roadways (statewide)	2,618
Roadways (regional)	354
Roadways (division)	429
Maintenance (all)	3,525
Total Roadways	6,926
<u>Alternative Transportation</u>	
Bicycle & Pedestrian (division)	270
Transportation Demand Management (division)	38
Intelligent Transportation Systems (statewide)	60
Transportation System Management (all)	120
Total Alternated	488
<u>Transit</u>	
Total Transit	4,760
Total Costs	12,173
(in \$ millions)	

Performance Measures

Performance Measures from the Triangle Regional Model (TRM) provide general, system-wide measures that are not specific to a particular roadway or travel corridor. The Measures are useful for comparing the effectiveness of the Preferred Option with the 2015 Base Year and the 2045 Existing Plus Committed (E+C) no build scenarios. The key Measures and summary are in the following table:

Summary	Performance Measure	2015	2045 E+C	Preferred Option
The population and employment increases through the year 2045 will push a large increase (~50%) in travel demand.	Vehicle Miles Traveled (daily) (millions)	14	21	21
Delay and congestion increases are huge in the no build (E+C) scenario but the Preferred Option does well to mitigate the impacts. However, these measures will not return to those of the present.	Minutes of Delay (daily) (per capita)	4	15	7
	Percent of Congested VMT (peak)	2%	18%	6%
Mode shares vary little among the scenarios.	Drive alone mode share (work trips)	80%	79%	78%
The investment in fixed-guideway and bus transit stimulate a large increase in transit ridership and help increase the transit mode share, which is fairly inflexible.	Transit mode share (work trips)	5%	4%	7%
	Transit ridership	116,484	159,200	288,431

Goals and Objectives

Background

The MPO Goals and Objectives are notable for three reasons:

- Development process -- The Goals and Objectives were developed using an extensive public input process that included a public workshop, an MPO Board workshop, a public hearing and an online survey that received more than 800 responses. The following 2045 MTP Web page has detailed information on the development process:
<http://bit.ly/DCHC-MTP-Goals>
- Alignment -- The Goals and Objectives will be aligned with a set of performance measures and targets. For example, a performance measure such as “mobile energy consumption per capita” might be aligned with Objective 1A Reduce mobile source emissions. This alignment will make it easier to evaluate how the 2045 MTP meets the Goals and Objectives.
- Regional coordination – The DCHC MPO and Capital Area MPO (Raleigh area) have had a joint 2045 MTP development process and final plan for almost a decade. However, the Goals and Objectives have been separate. In this long-range update, the two MPOs will have the same Goals and Objectives.

2045 MTP Support of the Goals

The DCHC MPO strongly supports transit, non-motorized transportation modes such as bicycling and walking, and the transportation needs of low-income families, and endeavors to minimize transportation impacts on the environment. This support is clear in the language of the Goals and Objectives.

At the same time, federal rules that guide the development of these long-range plans require that the MTP use reasonable assumptions in the financial plan. This requirement effectively means that the financial plan needs to abide by the current North Carolina Strategic Transportation Investment (STI) law. The STI and the project prioritization methodology that implements the STI do not permit the MPO to completely carry out its Goals and Objectives. The STI, for example: limits state funding for fixed-guideway capital expenses to ten percent of the total project capital; limits non-highway funding to eight percent of total STI funding; and, favors highway projects over transit and other non-highway modes in the prioritization methodology.

In the Preferred Option, the MPO has endeavored to the greatest extent possible to make sure that the 2045 MTP transportation projects and budget reflect these Goals and Objectives despite the constraints imposed by the current STI.

2045 MTP Goals and Objectives

Goals	Objectives
I. Protect Environment and Minimize Climate Change	A. Reduce mobile source emissions, GHG, and energy consumption B. Reduce the negative impacts on the natural and cultural environment
II. Connect People	A. Connect people to jobs, education and other important destinations using all modes B. Ensure transportation needs are met for all populations (especially the aging and youth, economically disadvantaged, mobility impaired, and minorities)
III. Promote Multimodal and Affordable Travel Choices	A. Enhance transit services, amenities and facilities B. Improve bicycle and pedestrian facilities C. Increase utilization of affordable non-auto travel modes
IV. Manage Congestion & System Reliability	A. Allow people and goods to move with minimal congestion and time delay, and greater predictability. B. Promote Travel Demand Management (TDM, such as carpool, vanpool and park-and-ride) C. Enhance Intelligent Transportation Systems (ITS, such as ramp metering, dynamic signal phasing and vehicle detection systems)
V. Improve Infra-structure Condition	A. Increase proportion of highways and highway assets in 'Good' condition B. Maintain transit vehicles, facilities and amenities in the best operating condition. C. Improve the condition of bicycle and pedestrian facilities and amenities D. Improve response time to infrastructure repairs

Goals	Objectives
VI. Ensure Equity and Partici-pation	A. Ensure that transportation investments do not create a disproportionate burden for any community B. Enhance public participation among all communities
VII. Promote Safety and Health	A. Increase safety of travelers and residents B. Promote public health through transportation choices
VIII. Stimulate Economic Vitality	A. Improve freight movement B. Link land use and transportation C. Target funding to the most cost-effective solutions D. Improve project delivery for all modes

Land Use (Socioeconomic Data)

Background

The MPO forecasts socioeconomic data (SE Data), such as dwelling units, population and employment, to the year 2045 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 2045 guide totals, which are county- level population and employment projections for the year 2045, 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 page provides detailed information on the methodologies used for the guide totals and CommViz modeling process, as well as maps showing the projected population and employment distribution: <http://bit.ly/DCHC-MTP-LandUse>

Guide Totals

The MPO establishes the 2045 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 employment current employment estimate is based on employer data from InfoUSA that is verified and updated by local planners. The following table provides the guide totals:

Population				
County	2013	2045	2013-45	% change
Chatham*	41,543	72,110	30,567	74%
Durham	286,210	475,091	188,881	66%
Orange	139,289	194,867	55,578	40%
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<i>Total</i>	<i>266,428</i>	<i>468,419</i>	<i>201,991</i>	<i>76%</i>

* Only includes portion of Chatham County in the modeling area.

Scenarios

The 2045 MTP uses the Connect 2045 Triangle area land use modeling process, which is based on a model called Community Visualization (or CommViz). The Connect 2045 team created two land use scenarios with the direct assistance of local land use planners throughout the Triangle area. In these scenarios, the CommViz model distributes the county-level guide totals of population and employment growth to a particular place.

- Community Plan – This scenario is based on the local comprehensive plans and land use policies, and can be understood as the most likely scenario.
- AIM-High – This scenario uses the Community Plan scenarios as a base but increases the land use density and mix around the future light rail. It is based on draft data from an ongoing regional study on rail station development potential, and though it pushes the limits it is still market possible.

Preferred Option Uses AIM-High

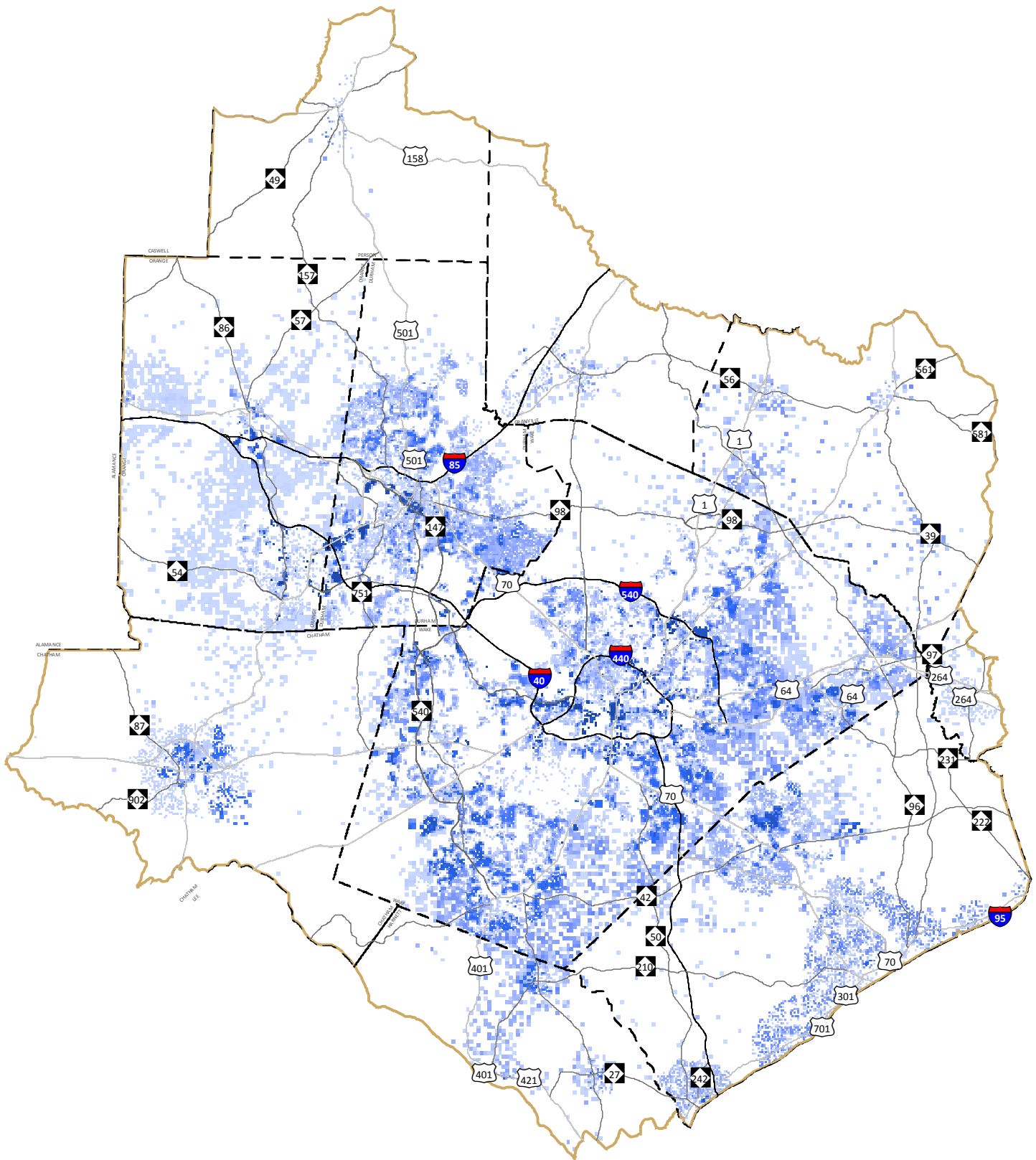
The MPO staff proposes using the AIM-High scenario for the Preferred Option. AIM-High is within the market possibilities of rail station development and it proved to have desired, positive impacts on the performance measures such as reduced overall congestion and delay.

Maps

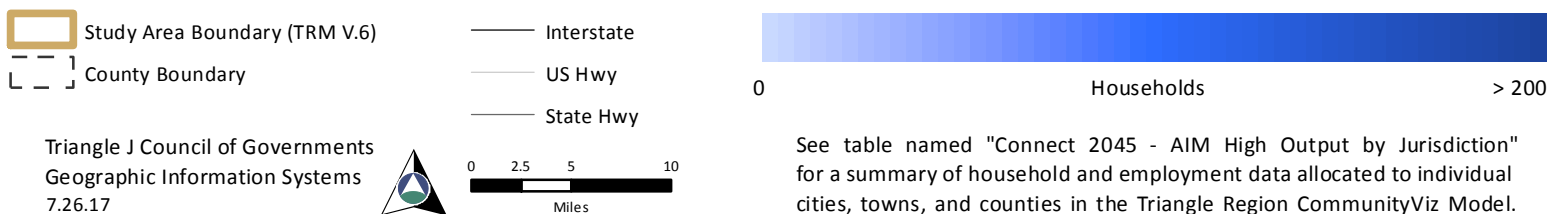
The maps on the following pages show the distribution of the growth of households and employment from 2013 through 2045 in the Triangle Region and the three counties in the MPO. The set of household maps are presented first, followed by the employment maps.

Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario

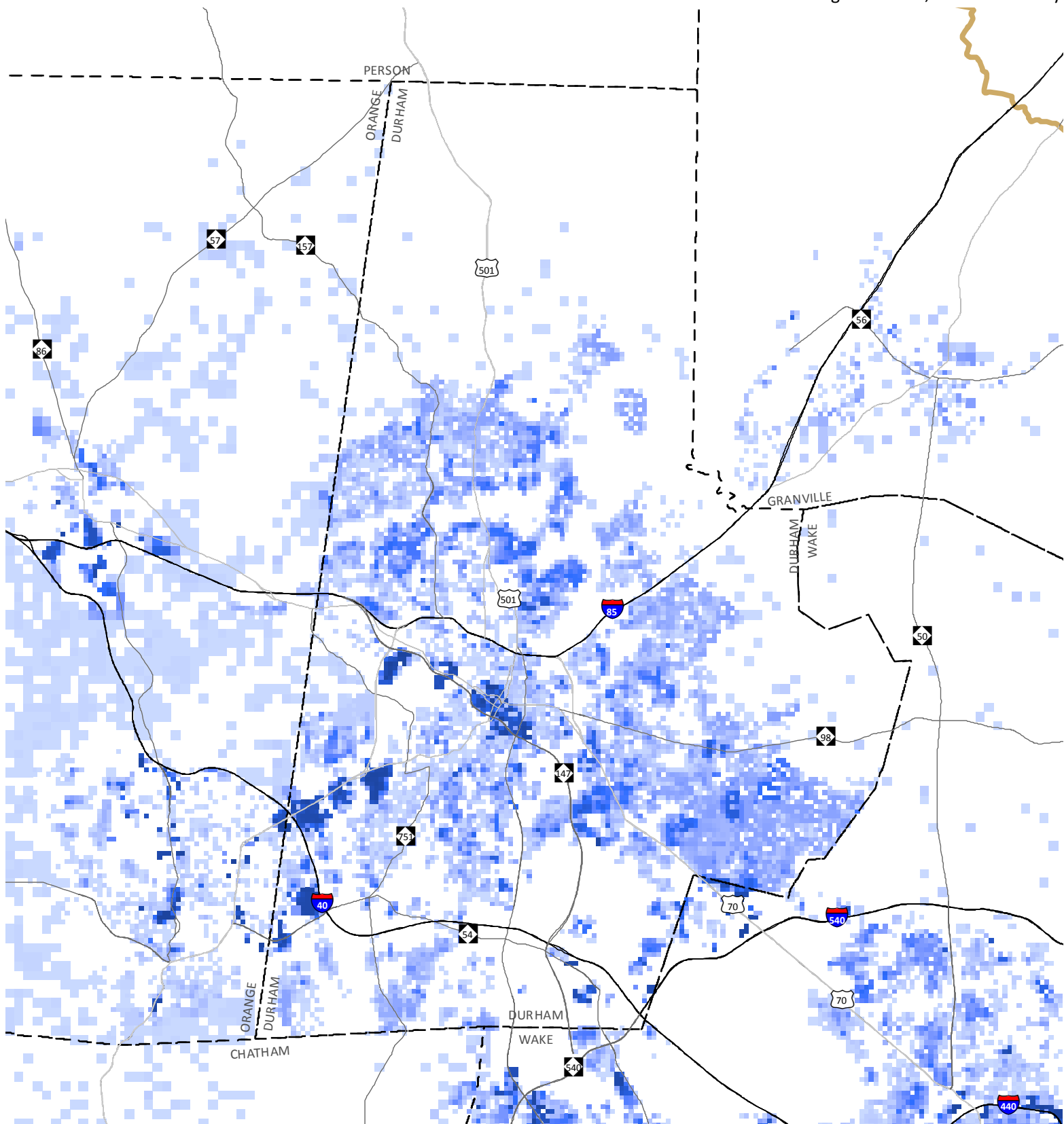


Regional Composite Map - New Household Distribution - 32-Year Forecast (2013-2045)



Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, Durham County



Regional Composite Map - New Household Distribution - 32-Year Forecast (2013-2045)



Study Area Boundary (TRM V.6)

County Boundary

Interstate

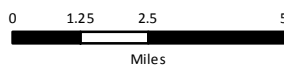
US Hwy

State Hwy

0

Households

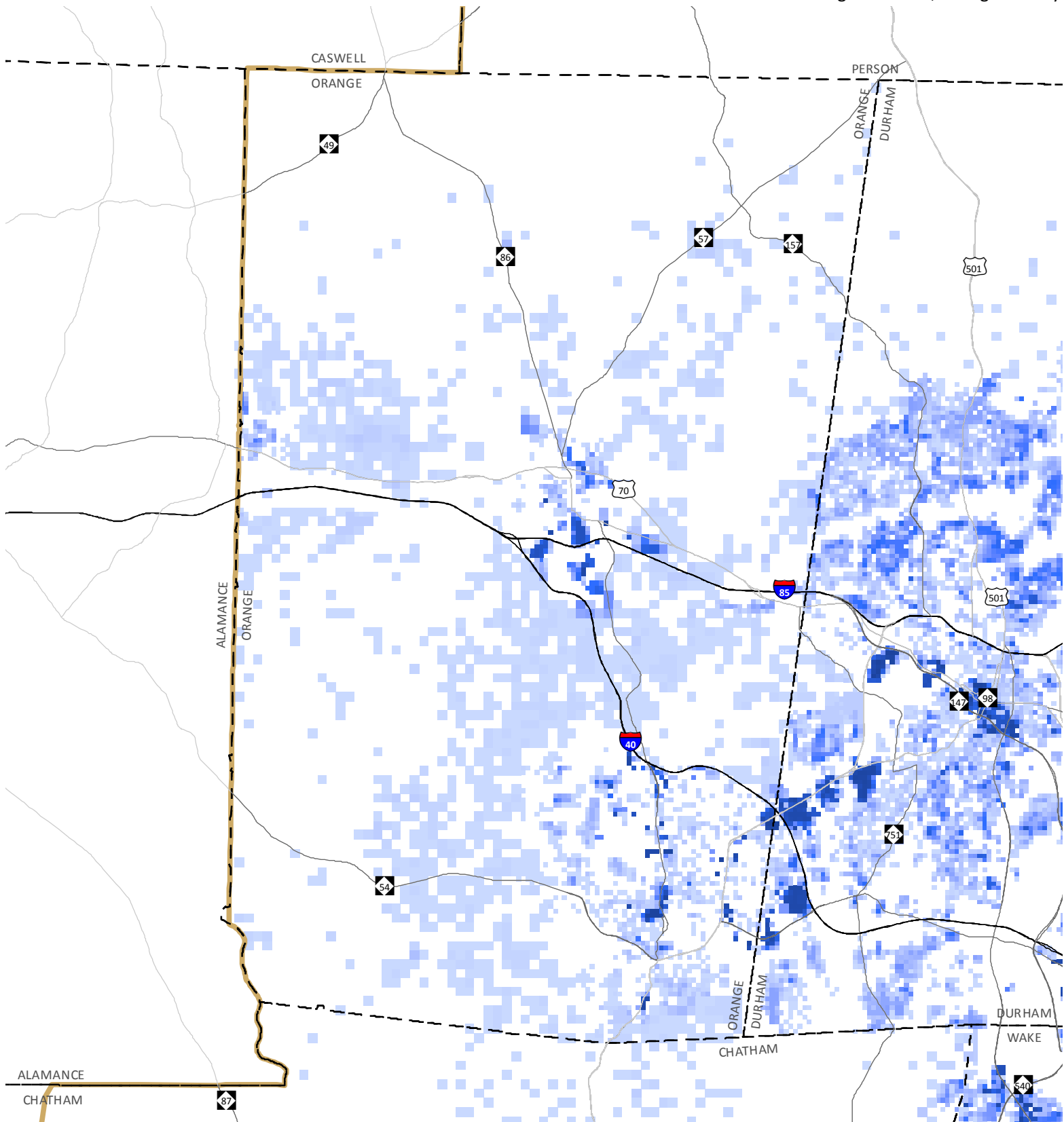
> 200





See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.


Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, Orange County



Regional Composite Map - New Household Distribution - 32-Year Forecast (2013-2045)

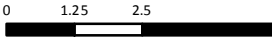
 Study Area Boundary (TRM V.6)
 County Boundary

 Interstate
 US Hwy
 State Hwy


 0 Households > 200

Triangle J Council of Governments
 Geographic Information Systems
 7.26.17

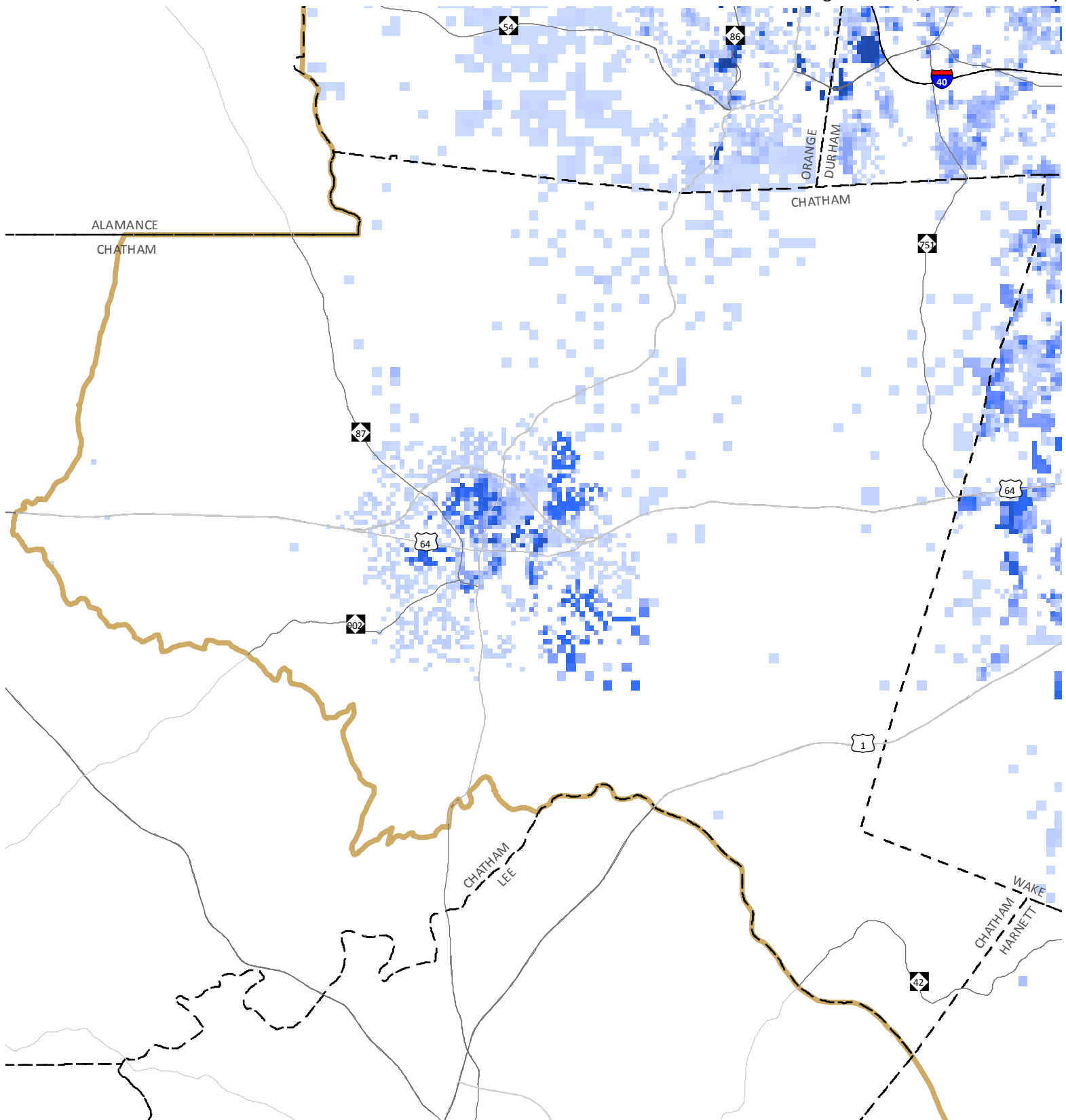



 0 1.25 2.5 5
 Miles

See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.

Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, Chatham County

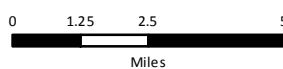


Regional Composite Map - New Household Distribution - 32-Year Forecast (2013-2045)

Study Area Boundary (TRM V.6)
County Boundary

Interstate
US Hwy
State Hwy

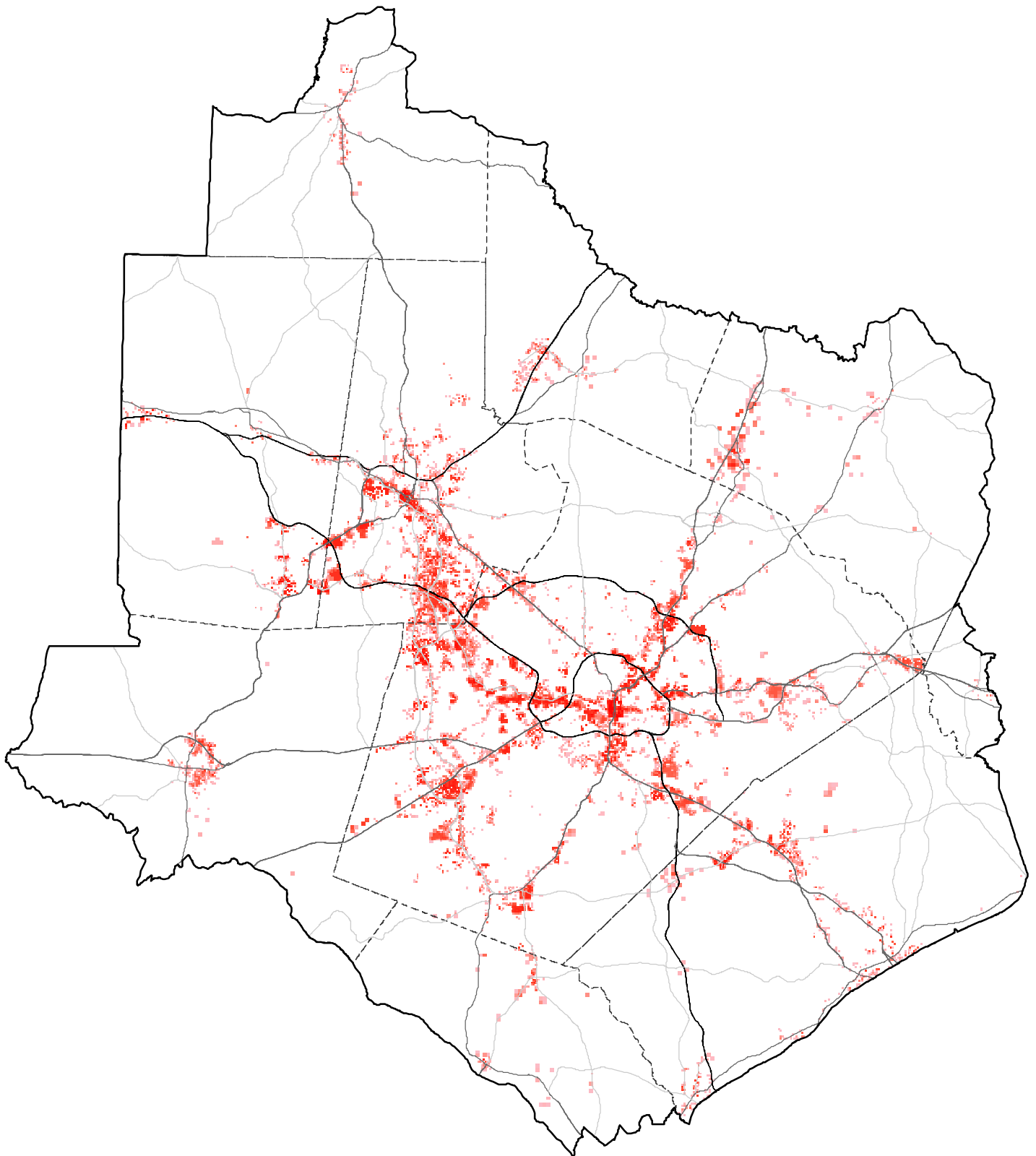
Households
0 2.5 5
> 200







See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.

Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, 5.1.17



Regional Composite Map - New Employment Distribution - 32-Year Forecast (2013-2045)

 County Boundaries
  Interstates/ Freeways
 US Highways
 NC Highways

0 Employees > 1000



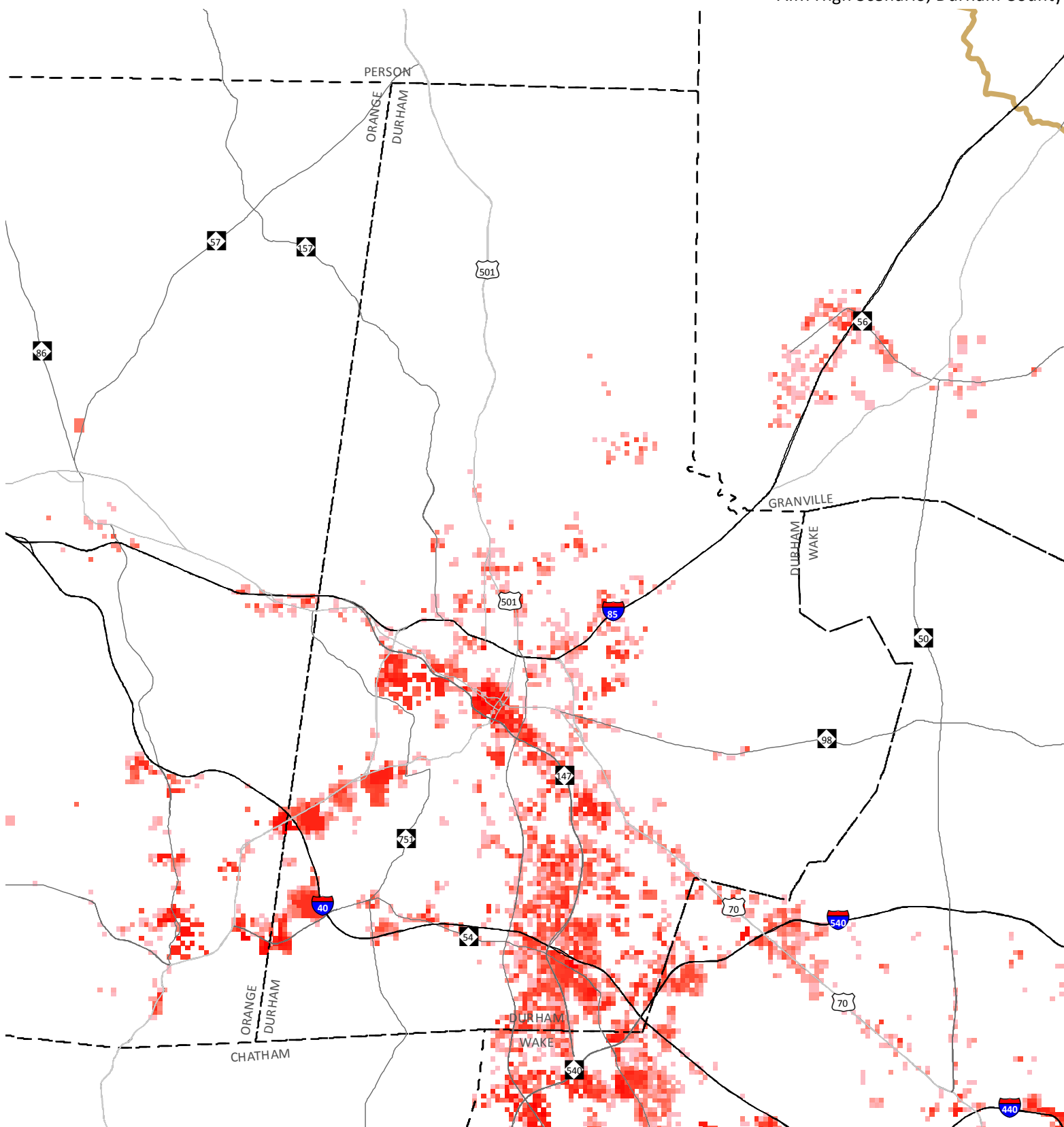
Triangle J Council of Governments
Geographic Information Systems

0 2.5 5 10
Miles

See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.

Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, Durham County



Regional Composite Map - New Employment Distribution - 32-Year Forecast (2013-2045)

Study Area Boundary (TRM V.6)

County Boundary

Interstate

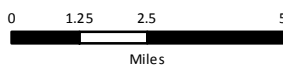
US Hwy

State Hwy

0

Employees

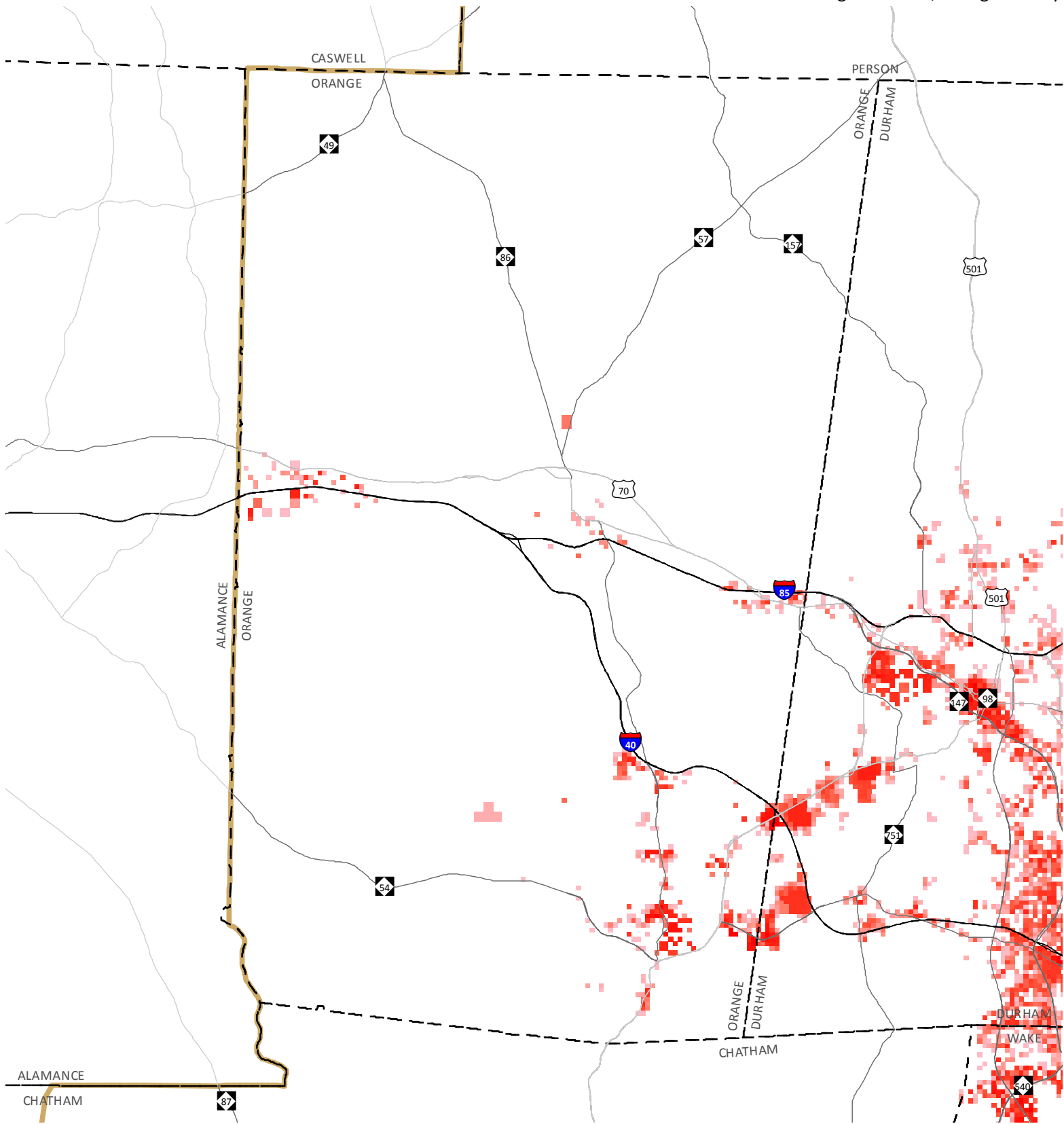
> 1,000



See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.

Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, Orange County



Regional Composite Map - New Employment Distribution - 32-Year Forecast (2013-2045)

Study Area Boundary (TRM V.6)
County Boundary

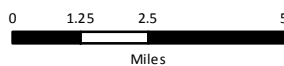
Interstate
US Hwy
State Hwy

0

Employees

> 1,000

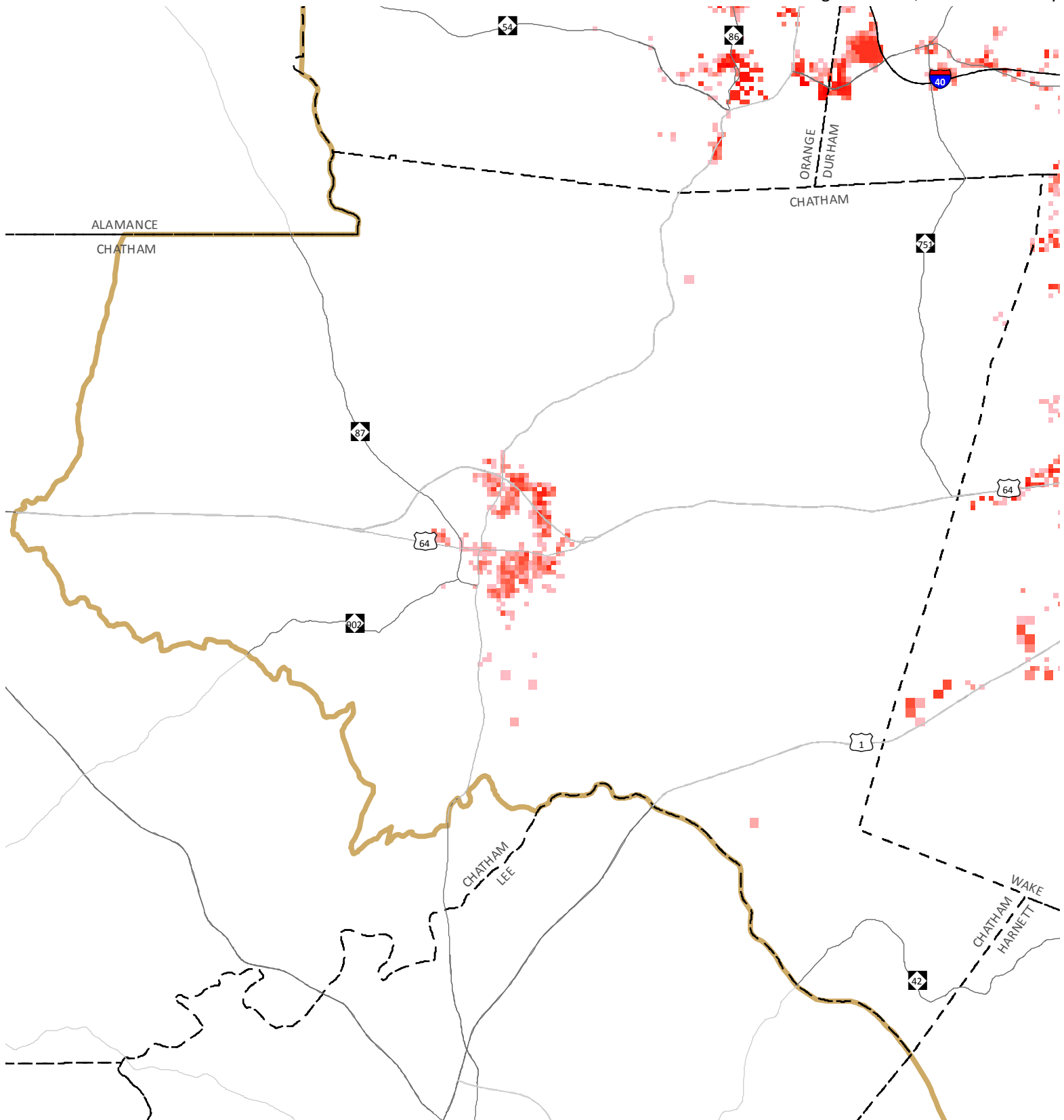
Triangle J Council of Governments
Geographic Information Systems
7.26.17





See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.

Connect 2045 - Triangle Region Scenario Planning

AIM High Scenario, Chatham County

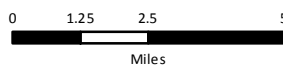


Regional Composite Map - New Employment Distribution - 32-Year Forecast (2013-2045)

 Study Area Boundary (TRM V.6)
 County Boundary

 Interstate
 US Hwy
 State Hwy


 0 Employees > 1,000



See table named "Connect 2045 - AIM High Output by Jurisdiction" for a summary of household and employment data allocated to individual cities, towns, and counties in the Triangle Region CommunityViz Model.

Highways

Background

The highway and interchange projects to be included in the Preferred Option are shown in the maps and tables below. Projects were selected based on their ability to promote the MPO's draft Goals and Objectives and the expected availability of funding.

The MTP designates and funds the highway projects by the decade in which the project will be completed for operation, i.e., current to 2025, 2026 to 2035 and 2036 to 2045. This designation helps demonstrate that the MTP is accountable to the federal fiscal constraint requirement. 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.

For the most part, new and upgraded interchanges are assumed to be part of the highway projects that are listed and therefore are not commonly listed separately. However, the fiscal year 2018-2027 Transportation Improvement Program (TIP) has listed eight new or upgraded interchanges as separate projects from the highway project. The 2045 MTP highway map and table show these as separate projects, as well.

Highway Map

The highway map on the next page shows the proposed highway improvements for the 2045 MTP. An interactive online map is also available at the Preferred tab on the 2045 MTP Web page: www.bit.ly/DCHC-MTP

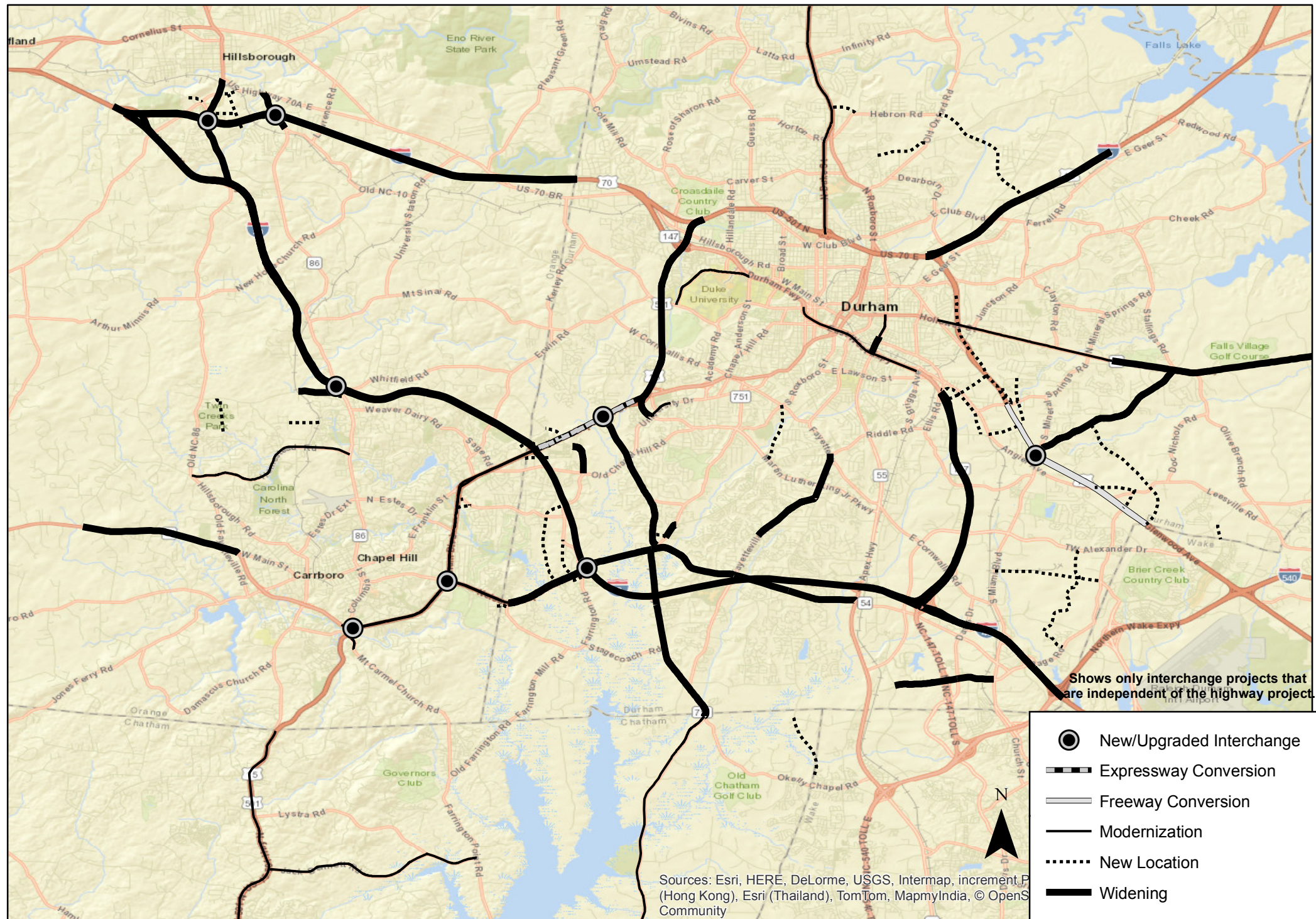
The DCHC MPO adopted a multimodal Comprehensive Transportation Plan (CTP) in May 2017, which contains a larger set of proposed projects because the CTP is not fiscally-constrained. See the interactive online map called Highways and Intersections at the following link to view the CTP highways that were considered for possible inclusion in the 2045 MTP: www.bit.ly/DCHCMPO-Adopted-CTP

Highway Table

The highway table breaks the projects into the three funding decades, i.e., 2025, 2035 and 2045, and then lists them alphabetically.

2045 Metropolitan Transportation Plan (MTP)

Preferred Option -- Highways



2045 Metropolitan Transportation Plan (MTP)

Preferred Option -- Highway Project List

Highway Project	From	To	Existing Lanes	Proposed Lanes	Improvement Type	Length (miles)	Estimated Cost	STI	Funding Source
2025 MTP									
Brier Creek Pkwy Extension	T.W. Alexander Dr	Andrew's Chapel Rd	-	4	New Location	0.4	3,990,000	Div	Private
Carver St Ext*	Armfield St	Old Oxford Rd	-	4	New Location	1.0	8,185,000	Div	State/Fed
East End Connector (EEC)*	NC 147	US 70	-	4	New Location	3.6	140,700,000	St	State/Fed
Eubanks Rd	MLK Blvd (NC 86)	Millhouse Rd	2	4	Widening	0.8	7,487,000	Div	State/Fed
Fayetteville Rd	Barbee Rd	Cornwallis Rd	2	4	Widening	1.0	3,374,000	Div	State/Fed
Fayetteville Rd	Woodcroft Pkwy	Barbee Rd	2	4	Widening	1.3	4,661,000	Div	State/Fed
Fordham Blvd (US 15-501)	I-40	Franklin St	4	4	Modernization	1.6	2,052,000	St	State/Fed
Freeland Memorial Extension	S Churton St	New Collector Rd	-	2	New Location	0.5	3,203,000	Div	Private
I-40/NC 86	Interchange		-	-	Upgrade	N/A	16,500,000	St	State/Fed
I-40 (westbound auxiliary lane)	NC 147	NC 55	6	7	Widening	1.2	3,850,000	St	State/Fed
Legion Rd Ext	Legion Rd	Fordham Blvd	-	2	New Location	0.1	1,500,000	Div	Private
Lynn Rd/Pleasant Dr Connector	Lynn Rd	Pleasant Dr	-	2	New Location	0.6	3,651,000	Div	Private
NC 147 (Operational Improvements)	Briggs Ave	W Chapel Hill St	4	4	To Be Determined	1.7	58,400,000	St	State/Fed
NC 147 (possible Managed Lanes)	East End Conn	I-40	4	8	Widening	4.9	179,248,000	St	State/Fed
NC 54	Old Fayetteville Rd	MPO Boundary	2	3	Widening	2.9	14,457,000	Reg	State/Fed
NC 55 (Alston Ave)*	NC 147	Main St	2	4	Widening	0.4	13,934,000	Reg	State/Fed
NC 55 (Alston Ave)*	Main St	NC 98	2	2	Modernization	0.5	17,252,000	Reg	State/Fed
New Collector Rd	Orange Grove Rd Ext	Becketts Ridge Rd	-	2	New Location	0.8	7,232,000	Div	State/Fed/ Private
Orange Grove Connector	Orange Grove Rd	US 70	-	2	New Location	0.4	5,299,000	Div	State/Fed
Purefoy Rd Ext	Sandberg Ln	Weaver Dairy Rd	-	2	New Location	0.6	3,777,000	Div	Private
S Elliot Rd Ext	Fordham Blvd	Ephesus Church Rd	-	2	New Location	0.3	4,230,000	Div	State/Fed/ Private
US 70 (freeway conversion)	Pleasant Dr	S Miami Blvd	4	6	Freeway	1.6	111,020,000	St	State/Fed
Woodcroft Pkwy Ext	Garrett Rd	Hope Valley Rd	-	2	New Location	0.2	2,219,000	Div	State/Fed
US 15-501/Garrett Rd	Interchange		-	-	New Interchange	N/A	71,200,000	St	State/Fed
US 70/Miami Blvd	Interchange		-	-	New Interchange	N/A	46,621,000	St	State/Fed

STI roadway tier: St = statewide; Reg = regional; Div = division

2045 Metropolitan Transportation Plan (MTP)

Preferred Option -- Highway Project List

Highway Project	From	To	Existing Lanes	Proposed Lanes	Improvement Type	Length (miles)	Estimated Cost	STI	Funding Source
2035 MTP									
Danziger Dr Extension	Mt Moriah Rd	E Lakewood Dr	-	2	New Location	0.4	5,127,000	Div	State/Fed
Erwin Rd	Cameron Blvd	W Main St	4	4	Modernization	1.8	12,025,000	Div	Private
Falconbridge Rd Connector	Falconbridge Rd	Farrington Rd	-	2	New Location	0.2	1,227,000	Div	State/Fed
Falconbridge Rd Extension	Farrington Rd	NC 54	-	4	New Location	0.9	16,685,000	Div	State/Fed/ Private
Farrington to I-40 eastbound slip ramp	Farrington Rd	I-40	-	1	New Location	0.1	1,600,000	Div	State/Fed
Fordham Blvd (US 15-501)	NC 54	Franklin Street	4	4	Modernization	2.1	45,498,000	St	State/Fed
Fordham Blvd (US 15-501)	NC 54	US 15-501	4	4	Modernization	2.2	49,832,000	St	State/Fed
Fordham Blvd/Raleigh Rd	Interchange		-	-	Upgrade	N/A	14,800,000	St	State/Fed
Fordham Blvd/S Columbia St	Interchange		-	-	Upgrade	N/A	35,000,000	St	State/Fed
Garrett Rd	NC 751	Old Durham Rd	2	4	Widening	2.1	16,064,000	Div	State/Fed
Homestead Rd	Old NC 86	Rogers Rd	2	2	Modernization	2.1	10,234,000	Div	State/Fed
Homestead Rd	Rogers Rd	NC 86	2	2	Modernization	1.3	6,855,000	Div	State/Fed
Hope Valley Rd (NC 751)	S Roxboro St	Woodcroft Parkway	2	4	Widening	0.3	2,716,000	Reg	State/Fed
Hopson Rd	Davis Dr	S Miami Blvd (NC 54)	2	4	Widening	0.7	5,200,000	Div	State/Fed
I-40	NC 86	I-85	4	6	Widening	7.8	58,784,000	St	State/Fed
I-40	US 15-501	NC 86	4	6	Widening	3.9	29,316,000	St	State/Fed
I-40 Managed Lanes	Wake County Line	NC 147	8	10	Widening	7.0	446,464,000	St	State/Fed
I-40/NC 54	Interchange		-	-	Upgrade	N/A	94,100,000	St	State/Fed
I-40/ NC 54 ramp	Farrington Rd.	I-40	-	1	New Location	0.2	1,600,000	St	State/Fed
I-85/NC 86	Interchange		-	-	Upgrade	N/A	16,488,000	St	State/Fed
I-85/S Churton St	Interchange		-	-	Upgrade	N/A	20,700,000	St	State/Fed
Jack Bennet Rd/Lystra Rd	US 15-501 South	Farrington Mill/Point Rd	2	2	Modernization	4.1	20,567,000	Div	State/Fed
Lake Hogan Farms Rd	Eubanks Rd	Legends Way	-	2	New Location	0.7	4,407,000	Div	State/Fed/ Private
Marriott Way	Friday Center Dr	Barbree Chapel Rd	-	2	New Location	0.2	682,000	Div	State/Fed
NC 54	Fordham Blvd (US 15-501)	Barbee Chapel Rd	6	6	Modernization	1.2	32,106,000	Reg	State/Fed
NC 54	I-40 Interchange	NC 751	2	4	Widening	1.2	32,000,000	Reg	State/Fed
NC 54	NC 751	Rollingwood Dr	2	4	Widening	1.5	21,600,000	Reg	State/Fed

STI roadway tier: St = statewide; Reg = regional; Div = division

2045 Metropolitan Transportation Plan (MTP)

Preferred Option -- Highway Project List

Highway Project	From	To	Existing Lanes	Proposed Lanes	Improvement Type	Length (miles)	Estimated Cost	STI	Funding Source
NC 54	Fayetteville	Barbee	2	4	Widening	1.0	46,800,000	Reg	State/Fed
NC 54	Barbee	NC 55	2	4	Widening	1.3	46,400,000	Reg	State/Fed
NC 54 (widening; superstreet)	I-40	Barbee Chapel Rd	4	6	Widening	1.6	9,100,000	Reg	State/Fed
NC 55 (Alston Ave)	Main St	NC 98	2	4	Modernization	0.5	1,000	Reg	State/Fed
New Hope Commons Dr Extension	Eastowne Dr	New Hope Commons Dr	-	2	New Location	0.4	4,588,000	Div	State/Fed
Roxboro St	Cornwallis Rd	MLK Pkwy	-	4	New Location	1.2	12,063,000	Div	State/Fed
S Churton St	US 70 Business	I-40	2	4	Widening	2.4	31,825,000	Div	State/Fed
Southwest Durham Dr	NC 54	I-40	-	2	New Location	2.0	12,402,000	Div	State/Fed
University Dr	MLK Parkway	Shannon Rd	5	4	Modernization	0.5	768,000	Div	Private
US 70 (freeway conversion)	S Miami Blvd	Northern Durham Parkway	4	6	Freeway	2.5	173,469,000	St	State/Fed
2045 MTP									
Angier Av Ext	US 70	Leesville Rd	-	2	New Location	0.8	4,784,000	Div	State/Fed
Angier/Glover Connector	Ellis Rd	Glover Rd	-	2	New Location	1.4	8,625,000	Div	State/Fed
Crown Pkwy/Roche Dr	Page Rd	T.W. Alexander Dr	-	2	New Location	2.7	11,041,000	Div	State/Fed
Eno Mountain Rd realignment	Mayo St	Eno Mountain Rd	-	2	New Location	0.3	2,015,000	Div	State/Fed
Garrett Rd	Old Durham Rd	US 15-501	2	4	Widening	1.0	7,761,000	Div	State/Fed
Glover Rd	Angier	US 70	-	2	New Location	0.6	3,714,000	Div	State/Fed
									State/Fed/ Private
Hebron Rd Extension	Hebron Rd	Roxboro Rd (501 N)	-	2	New Location	0.5	3,612,000	Div	
Holloway St (NC 98)	Miami Blvd	Nichols Farm Dr	4	4	Modernization	3.3	17,705,000	Reg	State/Fed
Hopson Rd	Louis Stephens Dr	Davis Dr	2	4	Widening	1.1	9,195,000	Div	State/Fed
I-40 Managed Lane	NC 54	US 15-501	6	8	Widening	2.9	85,621,000	St	State/Fed
I-40 Managed Lanes	NC 147	NC 54	6	10	Widening	6.4	250,290,000	St	State/Fed
I-85	US 70	I-40	4	6	Widening	7.1	197,378,000	St	State/Fed
I-85	US 70	Red Mill Rd	4	6	Widening	8.2	215,940,000	St	State/Fed
I-85	Sparger Rd	US 70	4	6	Widening	3.0	39,118,000	St	State/Fed
Leesville Rd Ext	US 70/Page Rd Ext	Leesville Rd	-	2	New Location	0.4	2,644,000	Div	State/Fed
Lynn Rd Extension	US 70	Existing Lynn Rd	-	2	New Location	1.1	6,862,000	Div	State/Fed
Mt Carmel Ch Rd	US 15-501	Bennett Rd	2	2	Modernization	0.4	1,997,000	Div	State/Fed
N Duke St (501 N)	I-85	N Roxboro split	5	4	Modernization	2.5	13,279,000	Reg	State/Fed

STI roadway tier: St = statewide; Reg = regional; Div = division

2045 Metropolitan Transportation Plan (MTP)

Preferred Option -- Highway Project List

Highway Project	From	To	Existing Lanes	Proposed Lanes	Improvement Type	Length (miles)	Estimated Cost	STI	Funding Source
NC 751	Renaissance Pkwy	O'Kelly Chapel Rd	2	4	Widening	2.7	21,697,000	Reg	State/Fed/Private
NC 751	Martha's Chapel Rd	O'Kelly Ch. Rd	2	3	Modernization	5.4	9,648,000	Reg	State/Fed
NC 751	NC 54	Renaissance Pkwy	2	4	Widening	1.2	5,290,000	Reg	State/Fed
NC 86	Old NC 10	US 70 Business	2	4	Widening	0.9	7,259,000	Reg	State/Fed/Private
Northern Durham Pkwy	US 70 E	Sherron Rd	-	4	New Location	2.7	23,500,000	Div	State/Fed
Northern Durham Pkwy	I 85 North	Old Oxford Hwy	-	4	New Location	2.7	23,291,000	Div	State/Fed
Patriot Dr Extension	S Miami Blvd	Page Rd	-	2	New Location	1.9	13,086,000	Div	State/Fed
Roxboro Rd (501 N)	Duke St	Goodwin Rd	4	4	Modernization	2.7	14,574,000	Reg	State/Fed
Sherron Rd	S Mineral Springs Rd	Stallings Rd	2	4	Widening	3.1	25,003,000	Div	State/Fed
Southwest Durham Dr	US 15-501 Business	Mt Moriah Rd	-	4	New Location	0.4	3,667,000	Div	State/Fed/Private
SW Durham Dr	Sawyer Dr	Old Chapel Hill Rd	2	4	Widening	0.7	5,432,000	Div	State/Fed
US 15-501	Smith Level Rd	MPO Boundary	4	4	Modernization	4.9	25,673,000	St	State/Fed
US 15-501 (expressway conversion)	US 15-501 Bypass	I-40	6	6	Expressway	2.2	195,300,000	St	State/Fed
US 15-501 Bypass	MLK Parkway	I-85	4	6	Widening	4.8	80,734,000	St	State/Fed
Wake Forest Hwy (NC 98)	Nichols Farm Dr	Wake County Line	2	4	Widening	6.0	48,474,000	Reg	State/Fed
Yates Store Rd Extension	Yates Store Rd	Wake Rd	-	2	New Location	1.4	11,519,000	Div	State/Fed/Private
(1) East End Connector costs are \$35,175,000, and Alston Ave and Carver St costs are \$0 in the financial plan because the funding is before 2018.									

Public Transportation

Summary

As a basis, the 2045 MTP adopts the transit services as approved in the county plans:

- Durham County Transit Plan, originally approved in 2011 and updated April 28, 2017. The detailed plan is available at <http://ourtransitfuture.com/plans/durham/>
- Orange County Transit Plan, originally approved in 2012 and updated April 28, 2017. The detailed plan is available at <http://ourtransitfuture.com/plans/orange/>

The plans include major projects such as Durham-Orange Light Rail Transit (D-O LRT) and Wake-Durham Commuter Rail (CRT), but do not include specific programmed bus facility or service projects beyond 2023. The bus services operating in the DCHC MPO in 2045 reflect the MPO's best predictions of transit services operating at that time.

The 2045 MTP makes two notable transit investments that exceed the county transit plans:

- The Wake-Durham Commuter Rail Transit (CRT) is extended from West Durham to Hillsborough in the 2045 timeframe; and,
- The Durham-Orange Light Rail Transit (LRT) is extended from Chapel Hill to downtown Carrboro.

Durham County Services

The program of projects and services in the Durham County Transit Plan include the following:

■ Bus Services

Already Implemented Additional Bus Service (including new routes, increases in frequency, etc.)

- GoTriangle, 7,640 annual service hours
- GoDurham, 24,350 annual service hours

Planned Additional Bus Service

- GoTriangle, 6,260 annual service hours
- Durham County Access, 7,896 annual demand responsive trips

The Durham County Transit Plan also supports the increased cost of existing GoDurham service – e.g., the increased cost of providing service that GoDurham provided before the transit plan was implemented. About 9,000 existing annual service hours are assisted with Durham County Transit Plan funds.

An anticipated 15,000 – 27,500 additional bus service hours may be available following implementation of D-O LRT. These “rail dividend hours” reflect bus service currently

operating in the D-O LRT corridor that could be redirected to meet other Durham County transit priorities.

■ **Bus Capital Projects**

The purchase of new vehicles (and subsequent replacement) to support the service funded by the Durham County Transit Plan.

Bus facility improvements to facilitate transit access and improve the customer experience, including new park-and-ride lots, stop improvements and other capital investments along transit emphasis corridors, new transit centers, and stop improvements.

- **Durham-Orange Light Rail Transit (D-O LRT)** – 2028 estimated completion date
Light rail transit service between UNC Hospitals in Chapel Hill and North Carolina Central University (NCCU) in Durham, providing 50,000 hours of transit service. Project includes bicycle, pedestrian and bus infrastructure improvements along the alignment.

- **Wake-Durham Commuter Rail (CRT)** – 2035 estimated completion date
Commuter rail service linking Durham, RTP, Cary, Raleigh and Garner. The service will be funded in coordination with Wake County.

- **Wake-Durham Commuter Rail Extension (CRT)** – 2045 estimated completion date
Commuter rail service will be extended from West Durham to Hillsborough, with a station at NC 10/US 70 area and S Churton St/US 70 Business. This extension is not in the Durham County Transit Plan. It will be financed in the last decade of the 2045 MTP by assuming that legislative restrictions that currently restrict funding that can be used for transit will be repealed.

Orange County Services

The program of projects and services in the Orange County Transit Plan include the following:

■ **Bus Services**

Already Implemented Additional Bus Service (including new routes, increases in frequency, etc.)

- Orange Public Transit, 4,500 annual service hours
- GoTriangle, 6,708 annual service hours
- Chapel Hill Transit, 6,427 annual service hours

Planned Additional Bus Service

- Orange Public Transit, 2,387 annual service hours
- GoTriangle, 1,492 annual service hours
- Chapel Hill Transit, 6,392 annual service hours

The Orange County Transit Plan also supports the increased cost of existing Orange Public Transit and Chapel Hill Transit services – e.g., the increased cost of providing Orange Public Transit and Chapel Hill Transit service that was provided before the transit plan was implemented. About 9,000 existing annual service hours are assisted with Orange County Transit Plan funds.

An anticipated 30,000 – 45,000 additional bus service hours may be available following implementation of D-O LRT. These “rail dividend hours” reflect bus service currently operating in the D-O LRT corridor that could be redirected to meet other Orange County transit priorities.

■ **Bus Capital Projects**

The purchase of new vehicles (and subsequent replacement) to support the service funded by the Orange County Transit Plan.

Bus facility improvements to facilitate transit access and improve the customer experience, including new park-and-ride lots, improved transit amenities, and access improvements (e.g. new sidewalks) to bus stops.

■ **Hillsborough Train Station – 2020 completion date**

The station will be served by two Amtrak passenger routes.

■ **North-South Bus Rapid Transit (N-S BRT) – 2023 estimated completion date**

Bus rapid transit service using a mix of dedicated and mixed-traffic lanes between the Eubanks Road and Southern Village park-and-ride facilities, with direct service to UNC Hospitals.

■ **Durham-Orange Light Rail Transit (D-O LRT) – 2028 estimated completion date**

Light rail transit service between UNC Hospitals in Chapel Hill and North Carolina Central University (NCCU) in Durham, providing 50,000 hours of transit service. Project includes bicycle, pedestrian and bus infrastructure improvements along the alignment.

■ **Durham-Orange Light Rail Transit Extension (D-O LRT) – 2045 est. completion date**

Light rail transit will be extended from the UNC Hospitals station to a station near Main Street in Carrboro. The route, along S Columbia St and W Cameron Ave, is a conceptual placeholder until further study can be completed. This extension is not in the Orange County Transit Plan. It will be financed in the last decade of the 2045 MTP by assuming that legislative restrictions that currently restrict funding that can be used for transit will be repealed.

■ **Wake-Durham Commuter Rail Extension (CRT) – 2045 estimated completion date**

Commuter rail service will be extended from West Durham to Hillsborough, with a station at NC 10/US 70 area and S Churton St/US 70 Business. This extension is not in

the Orange County Transit Plan. It will be financed in the last decade of the 2045 MTP by assuming that legislative restrictions that currently restrict funding that can be used for transit will be repealed.

Chatham County Services

The express bus services from Pittsboro to UNC and the UNC Hospitals will be improved in frequency and service hours. Bus stops and stations will be increased and improved.

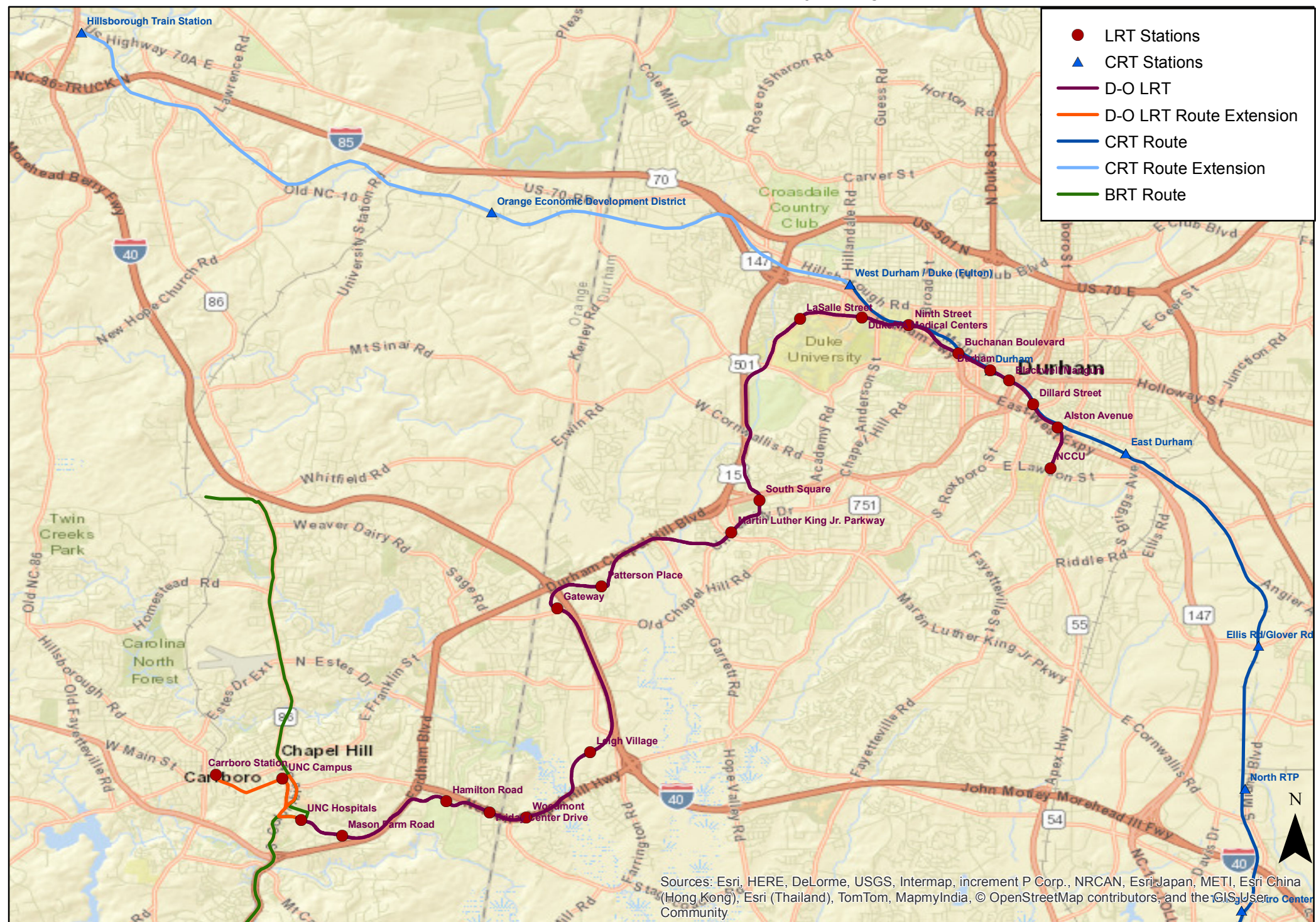
Fixed Guideway Maps

The following three pages are MPO-level, Durham close-up and Chapel Hill/Carrboro close-up maps of the fixed-guideway services in the Preferred Option. Fixed guideway includes light rail transit, commuter rail transit and bus rapid transit.

An interactive, online map is also available at the Fixed-Guideway map tile at the top of the following MTP Web page: www.bit.ly/DCHC-MTP-Preferred

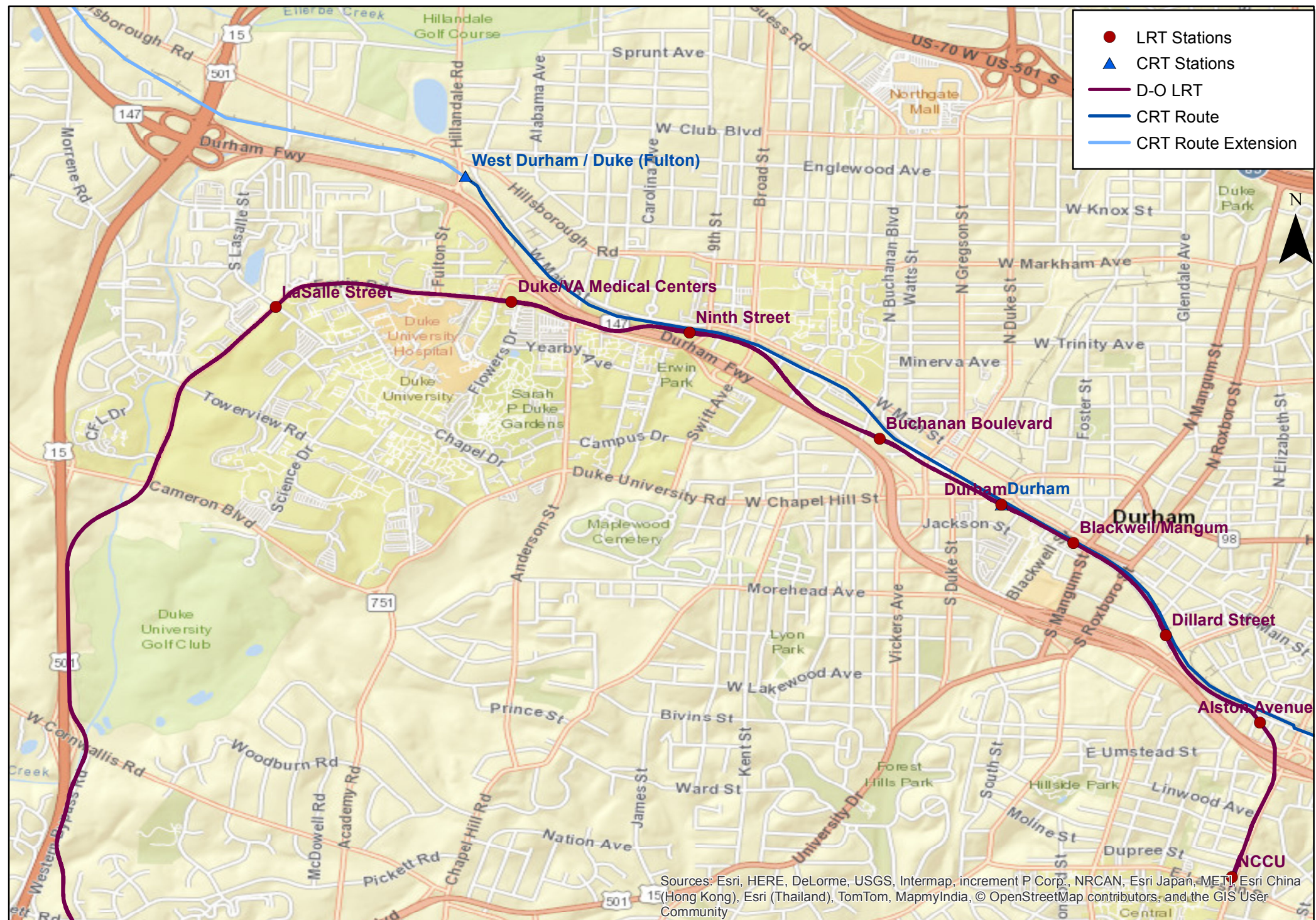
2045 Metropolitan Transportation Plan (MTP)

Preferred Option -- Fixed Guideway Projects

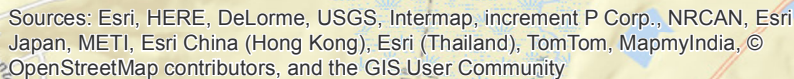


Preferred Option -- Fixed Guideway Projects -- Durham Close up

MPO Board 11/8/2017 Item 44



Preferred Option -- Fixed Guideway Projects -- Chapel Hill/Carrboro Close-up



Bicycle, Pedestrian and Multiuse Paths

Summary

The 2045 MTP does not specifically list 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 2045 MTP defers to those local governments. The financial plan provides \$225 million to implement these projects; that is \$75 million for each decade in the 2045 MTP.

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.

- CTP Web site: <http://bit.ly/DCHCMPO-Adopted-CTP>

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

- Carrboro Comprehensive Bicycle Transportation Plan (2009) -- <http://bit.ly/1PeRnsl>
- Chapel Hill Bike Plan (2014) -- <http://bit.ly/1uGbDZ5>
- Chatham County Bicycle Plan (2011) -- <http://bit.ly/1TSdlUv>
- Durham City and County Comprehensive Bicycle Plan (2006) -- <http://bit.ly/1UCSIDz>
- Hillsborough Community Connectivity Plan (2009) -- <http://bit.ly/1Uan3VO>

Pedestrian

Local pedestrian plans include:

- Chapel Hill Bicycle and Pedestrian Action Plan (2004) -- <http://bit.ly/28gbvqi>
- Durham Walks! Pedestrian Plan (2006) -- <http://bit.ly/1Y66mfG>
- Durham Bike+Walk Implementation Plan (2017) -- <http://bit.ly/2p2yHJS>
- Hillsborough Community Connectivity Plan (2009) -- <http://bit.ly/1Uan3VO>

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, 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.

Financial Plan

Background and Assumptions

The MPO created and reviewed three financial projections in the Alternatives Analysis: Constrained; Moderate; and, Optimistic (formerly known as Aspirational). The Preferred Option uses the Optimistic financial projection, and breaks out the Costs and Revenues by the funding decades, i.e., 2025, 2035 and 2045.

It is important to note that the financial plan abides by the North Carolina STI (Strategic Transportation Investment) legislation and policy in the first two decades, i.e., 2025 and 2035. In the third decade, 2045, the financial plan assumes that statewide and national policy would recognize the need for urban areas to invest more in transit, bicycle and pedestrian projects to create a more sustainable transportation system. As a result, a larger portion of funding would be available for these non-highway projects, and state and federal programs would contribute at a larger portion of the total costs for transit projects.

The text below provides notes for the financial table that follows the text. There are two graphs after the financial table that present major financial themes.

Cost Table

Roadways and Alternative Transportation

The roadway costs are broken out by the three North Carolina STI (Strategic Transportation Investment) funding tiers to abide by the current state policy. The highway costs mostly use TIP estimates, recent feasibility studies, or the 2016 NCDOT highway cost workbook to calculate the individual project cost.

Maintenance costs are based on the STI and NCDOT statewide plan.

The estimated alternative transportation costs are shown for Bicycle and Pedestrian, Transportation Demand Management (TDM), Intelligent Transportation Systems (ITS), and Transportation System Management (TSM). These programs do not have individual projects listed in the 2045 MTP and thus the program cost is a single estimate rather than the sum of the listed projects. The assumed STI tier is also shown in parenthesis in the program title.

Transit

The transit costs and revenues are based on the Durham County Transit Plan and the Orange County Transit Plan that were recently updated in 2017. The costs are broken out by existing and new/expanded services because of the policy of those plans and the funding restrictions of the revenue sources.

Additional Transit

Two fixed guideway extensions in the Preferred Option are included in the Comprehensive Transportation Plan (CTP) that the MPO adopted in May 2017. However, these extensions are not in the current Durham County Transit Plan (2017) and Orange County Transit Plan (2017). The costs include:

- D-O LRT extension is \$120 million based on the Federal Transit Authority (FTA) Standard Cost Category (SCC) workbook.
- CRT extension is \$160 million based on cost estimates for the section of the CRT that is included in the Durham County Transit Plan.

Revenue Table

STI/Local/Private

The STI revenues are based on the Optimistic financial scenario and abide by the STI requirements and methodology throughout the entire 2045 MTP.

Maintenance revenues match the costs. Local funding are estimates based on the current 2040 MTP and a modest growth rate. CMAQ funding is based on the STI. Private funding is mostly summed from the 2045 MTP highway projects that are expected to be constructed by private concerns.

Transit

The transit costs and revenues are based on the Durham County Transit Plan and Orange County Transit Plan that were recently updated in 2017. However, the rail extensions will need funding that is not currently included in the county plans. The following revenue sources are recommended:

D-O LRT Extension (\$120 million total cost)

- A federal Small Starts grant would provide \$78 million (65% of total). Small Starts has a total project and a federal grant limitation of \$300 million and \$100 million, respectively.
- The state would provide \$30 million (25% of total).
- The local jurisdiction would provide \$12 million (10%). This amount is within the funding capacity of the jurisdictions as demonstrated by taking into consideration the some potential revenue options. One option might be a 13-year, \$0.01 property tax addition in Chapel Hill and Carrboro that would yield the needed revenue. Other options include the use of excess revenues that would be realized from conservative revenue forecasts in the county plans, or even a minor increase to the transit sales tax rate.

CRT Extension (\$160 million total cost)

- A federal Small Starts grant would provide \$100 million (62% of total). Small Starts has a grant limitation of \$100 million.
- The state would provide \$40 million (25% of total).
- The local area would provide \$20 million (13%). This amount is certainly within the funding capacity of the local governments. Consider that a \$0.01 property tax addition in Durham County and Orange County would yield the needed local revenue in 2 years and 9 years, respectively. Other options include the excess revenues that would be realized from the conservative revenue forecasts in the county plans, or even a minor increase to the transit sales tax rate.

It bears noting that these examples of local funding sources are to demonstrate that the jurisdictions and counties have the capacity to provide the local match at the scale indicated. The eventual revenue source would not be identified until those projects are well into the detailed planning and public input phases.

Balance Table

This table is a tool to help guide changes in the project lists and financial plan during the public input period of the Preferred Option. It shows the balance (i.e., revenue minus cost) by STI tier and decade. The values in parenthesis are negative, meaning that the costs are greater than the revenues. This table shows two issues might need resolution before adoption of the 2045 MTP. There is a \$139 million statewide budget deficit and a \$195 million regional budget surplus in the last decade, i.e., 2045.

2045 Metropolitan Transportation Plan

Preferred Option -- Financial Plan

COSTS	Uses Optimistic Financial Projection			
	(in millions \$)			
Roadways & Alternative Transportation	2025	2035	2045	Total
Roadways (statewide)	480	1,048	1,090	2,618
Roadways (regional)	24	192	138	354
Roadways (division)	53	167	209	429
Maintenance (all)	874	1,242	1,409	3,525
Bicycle & Pedestrian (division)	90	90	90	270
Transportation Demand Management (division)	13	13	13	38
Intelligent Transportation Systems (statewide)	20	20	20	60
Transportation System Management (all)	40	40	40	120
Total Roadway and Alternate	1,592	2,812	3,009	7,414
Transit				
Continued Transit Funding to Support <u>Existing</u> Services	386	482	482	1,350
Funding for <u>New/Expanded</u> Transit Services	1,261	1,207	471	2,939
Additional Transit				
Transit funding match, etc. (regional)	95	96	-	191
Extend CRT from West Durham to Hillsborough (regional)	-	-	160	160
Extend LRT from Chapel Hill to Carrboro (regional)			120	120
Total Transit	1,742	1,785	1,233	4,760
Total Costs	3,334	4,597	4,242	12,173
REVENUES				
STI/Local/Private	2025	2035	2045	Total
STI (statewide)	542	898	981	2,421
STI (regional)	132	373	423	928
STI (division)	122	228	256	606
Maintenance (all)	874	1,242	1,409	3,525
Toll Revenue (statewide)	0.1	196	-	196
Local Funding (bicycle/pedestrian) (division)	35	20	20	75
Local Funding (roadway) (division)	25	25	25	75
Private Funds (division)	27	30	24	81
CMAQ Funding (division)	17	18	15	49
Total STI/Local/Private	1,773	3,029	3,153	7,956

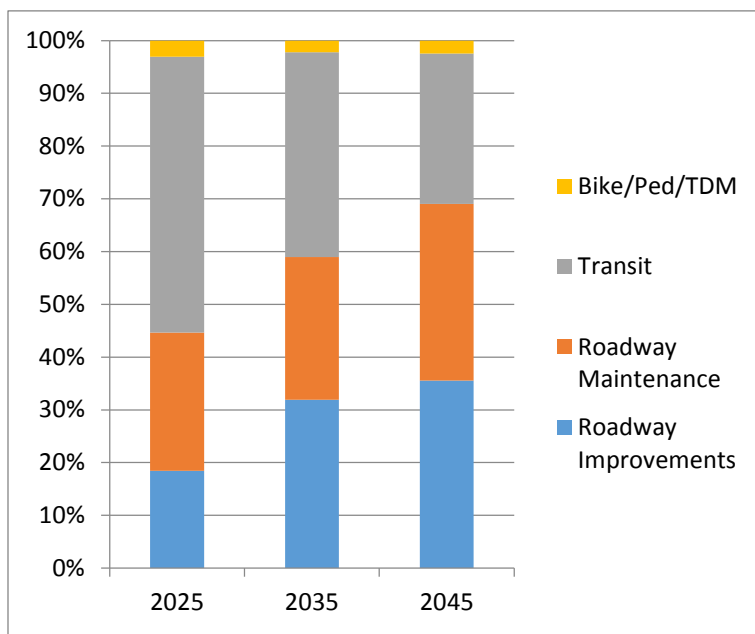
2045 Metropolitan Transportation Plan

Preferred Option -- Financial Plan

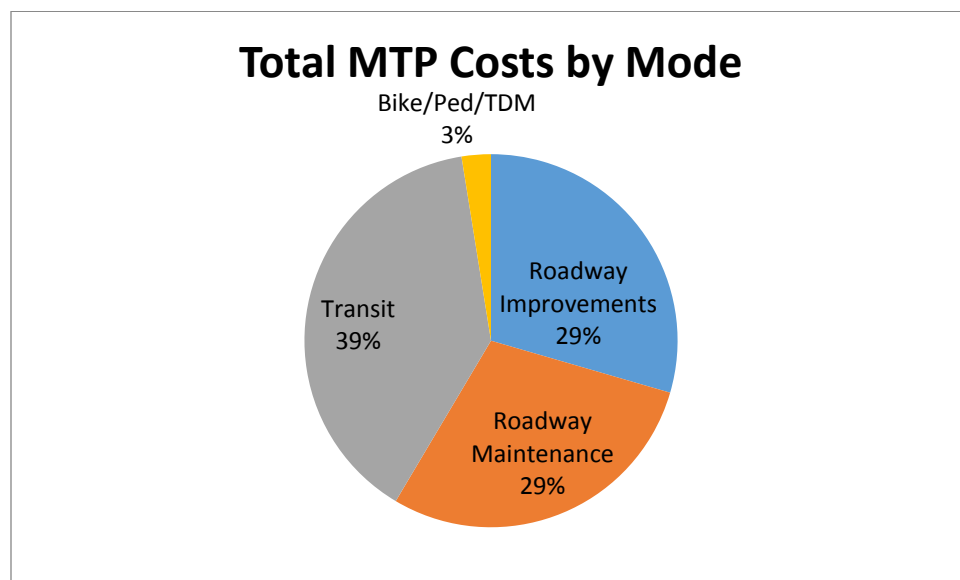
<u>Transit</u>				
Continued Transit Funding to Support Existing Services	386	482	482	1,350
Funding for New/Expanded Transit Services	1,261	1,207	471	2,939
Small Starts (LRT and CRT extensions)	-	-	178	178
Local Funds (LRT and CRT extensions)	-	-	32	32
Total Transit	1,647	1,689	1,163	4,499
Total Revenues	3,420	4,719	4,316	12,454
	(parenthesis are negative values)			
BALANCE	<u>2025</u>	<u>2035</u>	<u>2045</u>	<u>Total</u>
Statewide	32	15	(139)	(92)
Regional	(7)	65	195	253
Division	61	41	18	120
Total Balance	86	121	74	281

Graphics

The bar chart below shows the percent of the total investment by mode for each of the three decades. Transit investments are relatively larger in the first two decades because of the large capital investments in light rail and commuter rail.



The pie graph below shows the percent of total investment, i.e., 2025, 2035 and 2045, by mode. Roadway improvements and roadway maintenance are the same. The transit, bicycle, pedestrian and TDM investment is less than one-half of the total, 42%. It is difficult to get these investments higher and continue to mostly abide to the STI funding restrictions.



TRM Performance Measures

Background

Performance Measures 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 2015 Base Year and the 2045 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.

This document presents and compares the Performance Measures for three transportation scenarios:

- 2015 Base Year – This is a model of the existing transportation network.
- 2045 E+C – This is the population and employment for the year 2045 on the existing transportation network, plus any projects that are currently committed for completion, e.g., the East End Connector. This is similar to a “no-build” scenario.
- 2045 – This is the population and employment for the year 2045, using the AIM-High land use scenario, and a transportation network that includes the highway and transit improvements in the Preferred Option.

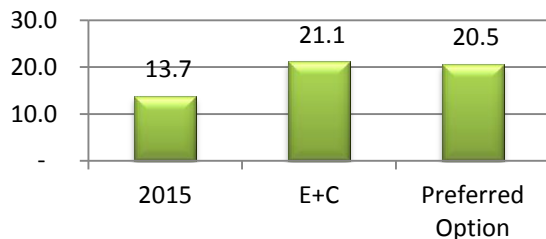
Performance Measures

The next section summarizes the key trends of the TRM Performance Measures. A table of all the Measures follows that section. The table displays the actual values of the three Performance Measure scenarios and the percent of variation among those scenarios.

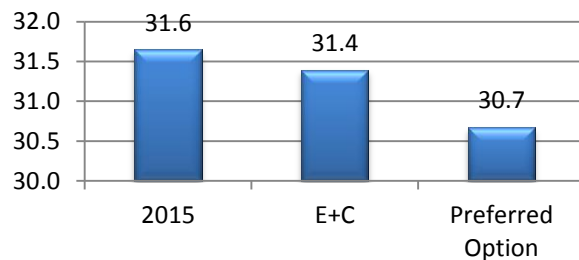
Summary

Volume – The population and employment in 2045 drive large travel increases in the E+C and Preferred Option. The transportation improvements in the Preferred Option do little to reduce the per capita mileage.

**Total VMT
(daily miles in
millions)**

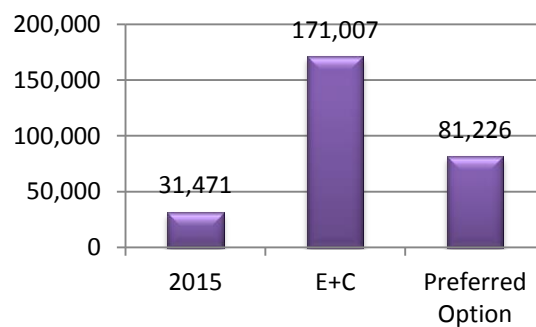


**Total VMT per Capita
(daily miles)**

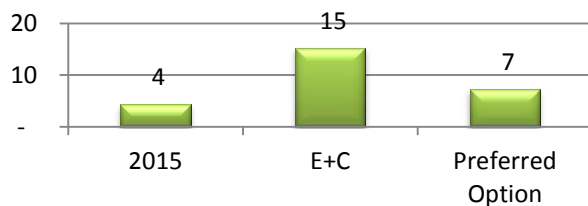


Congestion and Delay – The E+C scenario produces high levels of delay and congestion. The Preferred Option does well to reduce the overall congestion and per capita delay, but those values do not return to the current levels.

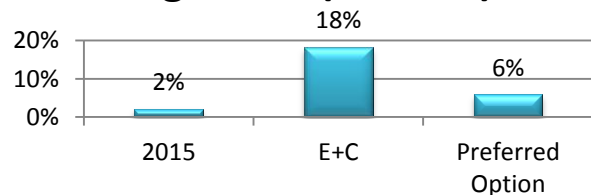
Hours of Delay (Daily)



**Per Capita Minutes of
Delay
(Daily)**

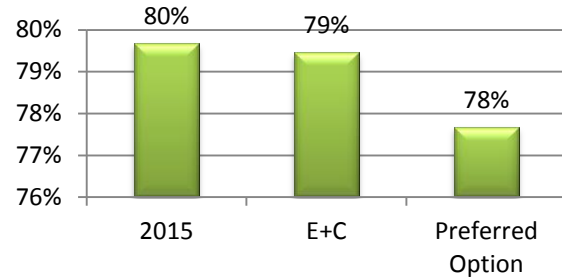


**Percent VMT
Experiencing
Congestion (at Peak)**

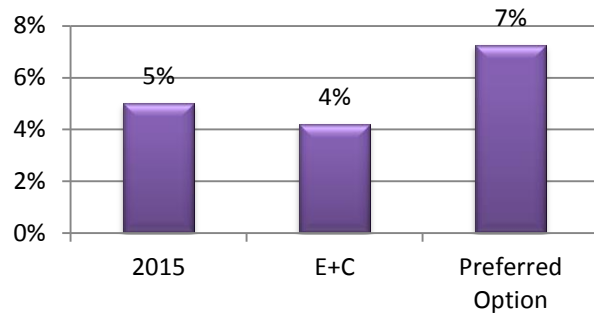


Mode Share – The single-occupied vehicle (SOV) and biking and walking (non-motorized) trip shares vary little among the different scenarios. There is a positive improvement in the transit mode share in the Preferred Option because of the investment in fixed-guideway and bus transit.

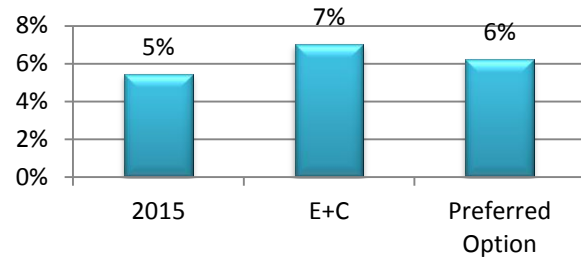
Percent SOV Trip Share (work trips)



Transit Mode Share (work trips)

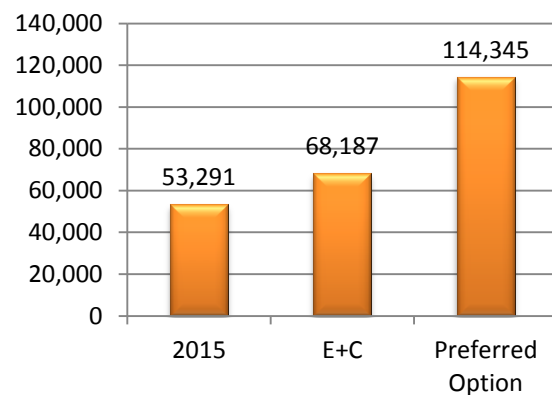


Non-Motorized Trip Share (work trips)



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)



2045 MTP -- Preferred Option

TRM Performance Measures for the DCHC MPO

MPO	Name =	Baseline	E+C	Pref. Opt.	Comparisons		
		2015	2045	2045 AIM High	Baseline	E+C to	Baseline to
		2015	E+C	Preferred Option	to E+C	Pref. Opt.	Pref. Opt.
	SE Data ==>						
	Transportation Network ==>						
1	Performance Measures						
1.1.1	Total Vehicle Miles Traveled (VMT-daily)	13,736,334	21,108,837	20,545,690	54%	-3%	50%
1.1.1a	Total Vehicle Miles Traveled (VMT-per capita)	32	31	31	-1%	-2%	-3%
1.2.1	Total Vehicle Hours Traveled (VHT-daily)	342,054	665,310	548,553	95%	-18%	60%
1.2.1a	Total Vehicle Minutes Traveled (VHT-per capita)	47	59	49	26%	-17%	4%
<u>1.3</u>	<u>Average Speed by Facility (miles/hour)</u>						
1.3.1	- Freeway	57	48	53	-16%	11%	-6%
1.3.2	- Arterial	35	30	33	-14%	9%	-6%
1.3.3	- All Facility	47	40	45	-15%	12%	-4%
<u>1.4</u>	<u>Peak Average Speed by Facility (miles/hour)</u>						
1.4.1	- Freeway	56	45	52	-19%	14%	-7%
1.4.2	- Arterial	34	28	32	-17%	12%	-6%
1.4.3	- All Facility	46	37	43	-18%	15%	-6%
<u>1.5</u>	<u>Daily Average Travel Length - All Person Trips</u>						
1.5.1	- Travel Time (minutes)	13	16	14	22%	-13%	7%
1.5.2	- Travel Distance (miles)	6.1	6.1	6.1	0%	0%	0%
<u>1.6</u>	<u>Daily Average Travel Length - Work Trips</u>						
1.6.1	- Travel Time	20	24	21	20%	-14%	4%
1.6.2	- Travel Distance - Work Trips	10.8	10.1	10.6	-6%	5%	-2%
<u>1.7</u>	<u>Peak Average Travel Length - All Person Trips</u>						
1.7.1	- Peak Travel Time	15	18	16	22%	-14%	5%
1.7.2	- Peak Travel Distance	7.0	6.7	6.9	-4%	2%	-2%
<u>1.8</u>	<u>Daily Avg. Travel Length - Commercial Vehicle Trips</u>						
1.8.1	- Travel Time	10	11	10	11%	-5%	5%
1.8.2	- Travel Distance	6.7	6.5	6.8	-2%	4%	2%
<u>1.9</u>	<u>Daily Average Travel Length - Truck Trips</u>						
1.9.1	- Travel Time	11	13	12	11%	-5%	5%
1.9.2	- Travel Distance	7.8	7.7	8.1	-2%	5%	3%

2045 MTP -- Preferred Option

TRM Performance Measures for the DCHC MPO

MPO	Name =	Baseline	E+C	Pref. Opt.	Comparisons		
					Baseline	E+C to	Baseline to
	SE Data ==>	2015	2045	2045 AIM High			
	Transportation Network ==>	2015	E+C	Preferred Option	to E+C	Pref. Opt.	Pref. Opt.
<u>1.10</u>	Hours of Delay (daily)	31,471	171,007	81,226	443%	-53%	158%
1.10a	Minutes of Delay (daily) (per capita)	4	15	7	251%	-52%	67%
1.10.1	Truck Hours of Delay (daily)	1,588	10,643	5,344	570%	-50%	237%
<u>1.11</u>	Percent of Congested VMT (volume > capacity) - All Day						
1.11.1	- Freeway	1%	12%	4%	933%	-70%	208%
1.11.2	- Arterial	3%	15%	5%	500%	-65%	108%
1.11.3	- All Facility	1%	12%	4%	764%	-69%	164%
<u>1.12</u>	Percent of Congested VMT (volume > capacity) - Peak						
1.12.1	- Freeway	2%	20%	6%	1047%	-69%	253%
1.12.2	- Arterial	4%	22%	8%	441%	-65%	90%
1.12.3	- All Facility	2%	18%	6%	767%	-68%	176%
1.12.4	- Designated truck routes	3%	17%	8%	425%	-51%	156%
1.12.5	- Facilities w/bus routes	2%	18%	5%	738%	-70%	152%
2	Mode Share Measures						
<u>2.1</u>	All Trips - Daily						
2.1.1	- Drive alone (single occupant vehicle -SOV)	906,699	1,389,181	1,326,015	53%	-5%	46%
2.1.2	- Carpool (Share ride)	720,549	1,096,707	1,096,202	52%	0%	52%
2.1.3	- Bus	53,291	68,187	81,640	28%	20%	53%
2.1.4	- Rail	-	-	32,705			
2.1.5	- Non-Motorized (Bike and Walk)	302,239	503,083	533,560	66%	6%	77%
<u>2.2</u>	Work Trips - Daily						
2.2.1	- Drive alone (single occupant vehicle -SOV)	198,430	305,947	301,831	54%	-1%	52%
2.2.2	- Carpool (Share ride)	24,542	35,811	34,321	46%	-4%	40%
2.2.3	- Bus	12,511	16,207	20,577	30%	27%	64%
2.2.4	- Rail	-	-	7,630	N/A	N/A	N/A
2.2.5	- Non-Motorized (Bike and Walk)	13,587	27,085	24,209	99%	-11%	78%
<u>2.2a</u>	Work Trips - Mode Share						
2.2.1a	- Drive alone (single occupant vehicle -SOV)	80%	79%	78%	0%	-2%	-2%

2045 MTP -- Preferred Option

TRM Performance Measures for the DCHC MPO

MPO	Name =	Baseline	E+C	Pref. Opt.	Comparisons		
					Baseline	E+C to	Baseline to
	SE Data ==>	2015	2045	2045 AIM High			
	Transportation Network ==>	2015	E+C	Preferred Option	to E+C	Pref. Opt.	Pref. Opt.
2.2.2a	- Carpool (Share ride)	10%	9%	9%	-6%	-5%	-10%
2.2.3a	- Bus	5%	4%	5%	-16%	26%	5%
2.2.4a	- Rail	N/A	N/A	2%	N/A	N/A	N/A
2.2.5a	- Non-Motorized (Bike and Walk)	5%	7%	6%	29%	-11%	14%
3	Transit Measures						
3.1	Transit Ridership (regionwide)						
3.1.1	- GoTriangle (rail included in rail scenarios)	12,064	20,374	59,018	69%	190%	389%
3.1.2	- GoRaleigh	24,308	36,407	87,509	50%	140%	260%
3.1.3	- CHT	33,206	41,831	55,494	26%	33%	67%
3.1.4	- GoDurham	21,963	27,466	45,172	25%	64%	106%
3.1.5	- NCSU	13,614	20,438	24,161	50%	18%	77%
3.1.6	- DUKE	8,263	9,579	12,071	16%	26%	46%
3.1.7	- OPT	306	N/A	N/A	N/A	N/A	N/A
3.1.8	- GoCary	2,765	3,110	5,006	12%	61%	81%
3.1.9	Total	116,484	159,200	288,431	37%	81%	148%
3.2	Total Rail Ridership	N/A	N/A	43,589	N/A	N/A	N/A
4	Demographic Measures						
4.1	Population	434,036	672,377	669,866	55%	0%	54%
4.2	Employment	269,779	449,898	449,071	67%	0%	66%
4.3	Total Daily Person Trips	1,982,778	3,057,158	3,070,122	54%	0%	55%
4.3.1	Work Person Trips	249,070	385,050	388,568	55%	1%	56%
4.4	Total Daily CV (commercial vehicle) Trips	126,680	202,550	202,014	60%	0%	59%
4.4.1	Daily Truck Trips	52,282	84,686	84,293	62%	0%	61%
4.5.1	Total Highway Lane Miles	2,555	2,605	2,902	2%	11%	14%
4.5.2	Transit Service Miles	61551	61,581	84,368	0%	37%	37%

N/A = measures is not applicable, e.g., there is no rail transit in the 2013 scenario.

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