Connect2050 – The Triangle Region's Metropolitan Transportation Plan
A Technical Guide to Framing, Creating, Describing and Analyzing Scenarios

This technical guide:

1. ***Establishes a Framework for Connect2050 Scenarios***
   a. See page 2 for the framework built on development and mobility foundations

2. ***Defines the Elements of the Development Foundation: Hubs & Neighborhoods***
   a. See pages 3 and 4 for a description of different types of hubs
   b. See page 5 for a description of REINVEST Neighborhoods and their relationship to broader equity considerations
   c. See page 6 for a description of Travel Choice Neighborhoods
   d. See page 7 for the specific development foundation elements of each scenario

3. ***Establishes the Fiscal Constraint Parameters for the Mobility Investment Foundation***
   a. See page X for the fiscal constraint assumptions for foundation alternatives
      i. DIY (Do It Yourself – current STI and federal programs)
      ii. NC1st (implementation of specified NC1st Commission recommendations)
      iii. Partners & Leverage (aspirational local, anchor institution, state and federal investment)
   b. Each alternative includes 3 distinct time periods:
      i. 2030 (one STIP-based road & transit network) – including fiscal constraint assumptions
      ii. 2040 (networks for each scenario) – including fiscal constraint assumptions
      iii. 2050 (networks for each scenario) – including fiscal constraint assumptions

4. ***Reserved***
   a. Reserved

NOTE: this initial discussion draft is designed to:

1. Clarify what scenarios are and what they are composed of

2. Guide the two MPO staffs to reach consensus on the nature and number of scenarios that will be developed -- Page 2 with the scenario framework is the most important immediate consideration.

3. Capture the issues that MPO staff will need to address in order to bring back scenarios for consideration.

4. Identify tasks and responsibilities to develop complete scenarios

5. Get general input on labels and terminology to use as scenarios are created and their elements described

Scenarios for Connect2050

"Prediction is very difficult, especially if it's about the future."
--Nils Bohr, Nobel laureate in Physics

"Are these the shadows of the things that Will be, or are they shadows of things that May be, only?''
--Ebenezer Scrooge, during the visitation of the Ghost of Christmas Yet to Come

A scenario describes a way that the future *might* be, but it is not a forecast, which predicts the way the future *will* be, nor a plan, which defines what the future *should* be. Since it is very difficult to know what the future will actually be like -- even for Nobel laureates -- **all** scenario characteristics are asserted, but are done so based on evidence and judgement. Making these assertions both explicit and transparent, and why they were selected from a range of possibilities, is a key to good scenario creation and analysis.

Scenarios are most helpful in understanding how realistic changes to current trends or adopted plans might influence mobility and access. What can vary in a scenario? Just about anything, from amounts and types of growth to household income to the price of a gallon of gas. But since the purpose of *Connect2050* is to make informed decisions about mobility investments – what roads to build, what transit services to provide, etc. – we early on settle on a most likely set of growth-related guide totals: population and housing by type, along with the numbers and types of jobs in the region – so that we can focus on land use and transportation decisions and how they align with values.

Scenarios have two foundations: a development foundation – which describes a regional pattern of land use, and a mobility investment foundation – which defines the road and transit and bicycle networks and transportation services that relate to the development pattern. The two foundations can be combined in different ways to form a matrix of scenarios, as shown below.

Connect 2050 Scenario Framework
(example for discussion)

		Mobility Investment Foundation				
		Existing & Committed	DIY	NC1st	Partners & Leverage	Comprehensive Transport Plan
Development Foundation	Existing or Underway	basis for all scenarios				
	Community Plans	Deficiency & Needs Scenario	Plans & Trends Scenario			
	Key Hubs & REINVEST Neighborhoods			Scenario B		
	Opportunity Corridors (Key & Halo Hubs; REINVEST Neighborhoods)			Scenario C	Scenario D	
	Build-Out					If unlimited $ & capacity growth

Note: **Green cells** would be initially analyzed scenarios; deficiency and needs is for informational base, and pivots on 2016 TRM data

Connect2050 Scenarios: The Development Foundation

Key and Halo Hubs, REINVEST Neighborhoods & Travel Choice Neighborhoods

Connect2050 scenarios have two foundations: a development foundation and a mobility foundation. This section outlines how the extensive and complex analysis of activity centers and communities of concern – the bedrock of the development foundation – are transformed into a more straightforward set of places that call attention to:

- job hubs that are especially important as trip destinations
- neighborhoods that are especially important as the origins of trips

This report calls the former *Key Hubs* and the latter *REINVEST Neighborhoods.*

The purpose of this step is to maintain the extensive data related to federally protected classes – so these data can be used for equitable engagement and the identification of disparate negative impacts – while making it easier for decision-makers to focus on how transportation investments serve high-priority places.

Environmental Justice has a prominent place in the Metropolitan Transportation Plan, based on status in federal anti-discrimination laws and policies:

• Race	• Age	• National Origin	• Disability
• Familial Status	• Sex	• Religious Belief	• Veteran Status

> ### *Three Ways Environmental Justice (EJ) Data Are Used*
>
> EJ data are used for 3 main purposes in *Connect2050:*
>
> - To ensure equitable engagement
> - To analyze disparate impacts
> - To highlight key neighborhoods for mobility investments - especially those serving workers - in different scenarios
>
> All EJ data is used for the first two purposes. The key neighborhoods identification focuses special attention on race & ethnicity, income and households without cars, factors shown to have the most impact on travel.

These protected classes are then supplemented with characteristics closely aligned with mobility choices, most notably income and vehicle ownership. As the current 2045 MTP notes, "the intent of environmental justice is to avoid, minimize, or mitigate disproportionately high and adverse effects on minority and low-income populations; and ensure the full and fair participation by all potentially affected communities in the transportation decision-making process."

Connect2050 will go beyond the requirements of full and fair participation and avoidance of disparate adverse effects to proactively invest to the benefit of BIPOC residents, lower-income neighborhoods and households without cars.

This distinction is important: the full gamut of protected class data will continue to be used to drive equitable engagement and the analysis of disparate impact – regardless of where people in protected classes live. The REINVEST Neighborhood demarcation is layered on top to highlight investments in places rich in racial and ethnic diversity and with a significant proportion of lower-income households and households without cars.

Key Hubs

The basis for defining and analyzing hubs of activity is built around two types of places that are represented by nautical terms: anchors and mainstays. The table below provides context and examples.

Hubs	Description	Examples
Anchors	Places with the highest concentrations of jobs and services, plus places with moderate intensity and an anchor institution that can influence mobility-based policy decisions	• Metropolitan CBDs • Major Universities • Medical Centers • Research Triangle Park
Mainstays	Places with regionally significant concentrations of jobs, either outright or in comparison to their surroundings	• Many mid-sized town and city centers • Some suburban centers, often along major transportation corridors

Building on the nautical theme, investments that serve anchors and mainstays ride the tide; those that don't fight the tide.

Anchors

Anchors meet two criteria:

1. They are high, very high or extremely high density job hubs using the most up-to-date national data sources and methods employed in recent research, and
2. They are served by an anchor institution that can influence mobility (university, medical center, special district).

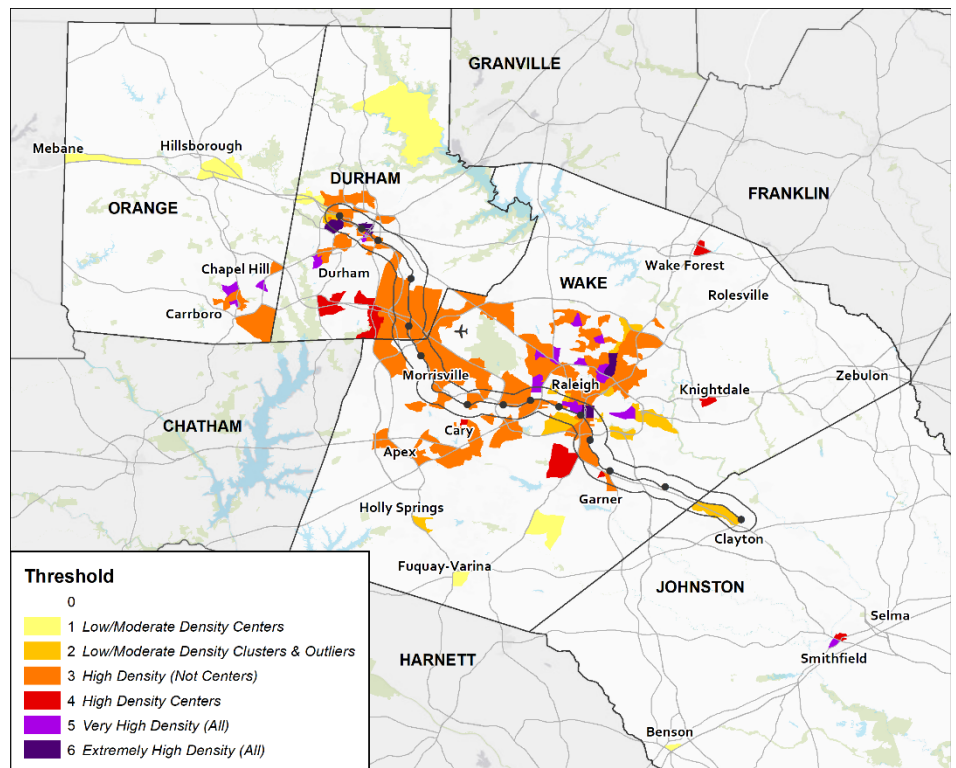The criteria result in **11 regional anchors**:

- Raleigh CBD
- Durham CBD
- NC State University
- Duke University
- North Carolina Central University
- Research Triangle Park
- Duke University Medical Center/VA Medical Center
- UNC-Chapel Hill
- UNC Health System
- Wake Med
- Rex Healthcare (? – need to verify job intensity for inclusion)

Mainstays

Mainstays are the areas shown in the map at right that do not meet the criteria for being an Anchor.

[this is a draft map focusing on only part of the region; it has anomalies which are being adjusted – for example, UNC-Chapel Hill jobs are located at the payroll processing address, not where the jobs are located. Similarly, many state government jobs, including ones located outside the region, appear to be at North Raleigh and Garner payroll processing sites]

Together, the anchors and mainstays that meet the evidence-based thresholds to be defined as Key Hubs comprise X% of the region's area, but hold Y% of the region's jobs.

Threshold

0
1 Low/Moderate Density Centers
2 Low/Moderate Density Clusters & Outliers
3 High Density (Not Centers)
4 High Density Centers
5 Very High Density (All)
6 Extremely High Density (All)

Halo Hubs

[to be fleshed out – Halo hubs are places that:

1. Currently meet some lower threshold of activity than key hubs, but could achieve a center or cluster intensity if built out under CommunityViz place type densities and intensities – extending hubs into "halo" communities,
2. Are along designated regional mobility corridors connecting "halo" communities to the region's core hubs

REINVEST Neighborhoods

REINVEST neighborhoods are identified based on four characteristics, each represented by two letters in RE-IN-VE-ST:

RE	**R**ace/**E**thnicity – a neighborhood is home to people who are Black, Indigenous or People of Color (BIPOC)
IN	**In**come – households in a neighborhood have annual incomes below designated thresholds
VE	**Ve**hicles – households in a neighborhood report having no vehicles available
ST	**St**atus – neighborhoods with a specific designation of particular interest for transportation investment. In this analysis, status characteristics are used, although either fewer or more criteria could be used: i) # of legally-binding, affordability-restricted (LBAR) housing units, and ii) designation as an Opportunity Zone

The maps in this section show neighborhoods -- represented by block groups -- that meet one, two, three or all four of selected REINVEST thresholds. Different environmental justice and equity studies in the Triangle have defined thresholds in different ways, and the technique that is selected will affect the amount and distribution of REINVEST neighborhoods.

There is no single right way to define key neighborhoods, and the data allow a range of definitions and emphasis areas. Because the 2050 MTP is a regional-scale investment plan that transcends both MPOs, the method used here follows the technique used to identify Environmental Justice populations in the 2045 Metropolitan Transportation Plan, which used the 75th percentile of block groups in each measure as a threshold (i.e., one quarter of all block groups are identified for each measure, then block groups that meet 0, 1, 2, 3 or all 4 thresholds are identified). Note that thresholds can be set for the region as a whole (which is done for this analysis) or for each component MPO or County.

The first three maps below are threshold maps for race & ethnicity, income and vehicle availability. Each shows the top quartile of block groups in the region for the threshold. A fourth map is a special status map: it shows all block groups that have 100 or more legally binding, affordability-restricted housing units, or are a designated federal Opportunity Zone. The final map combines these maps to show block groups that meet one, two, three or all four of the status thresholds.
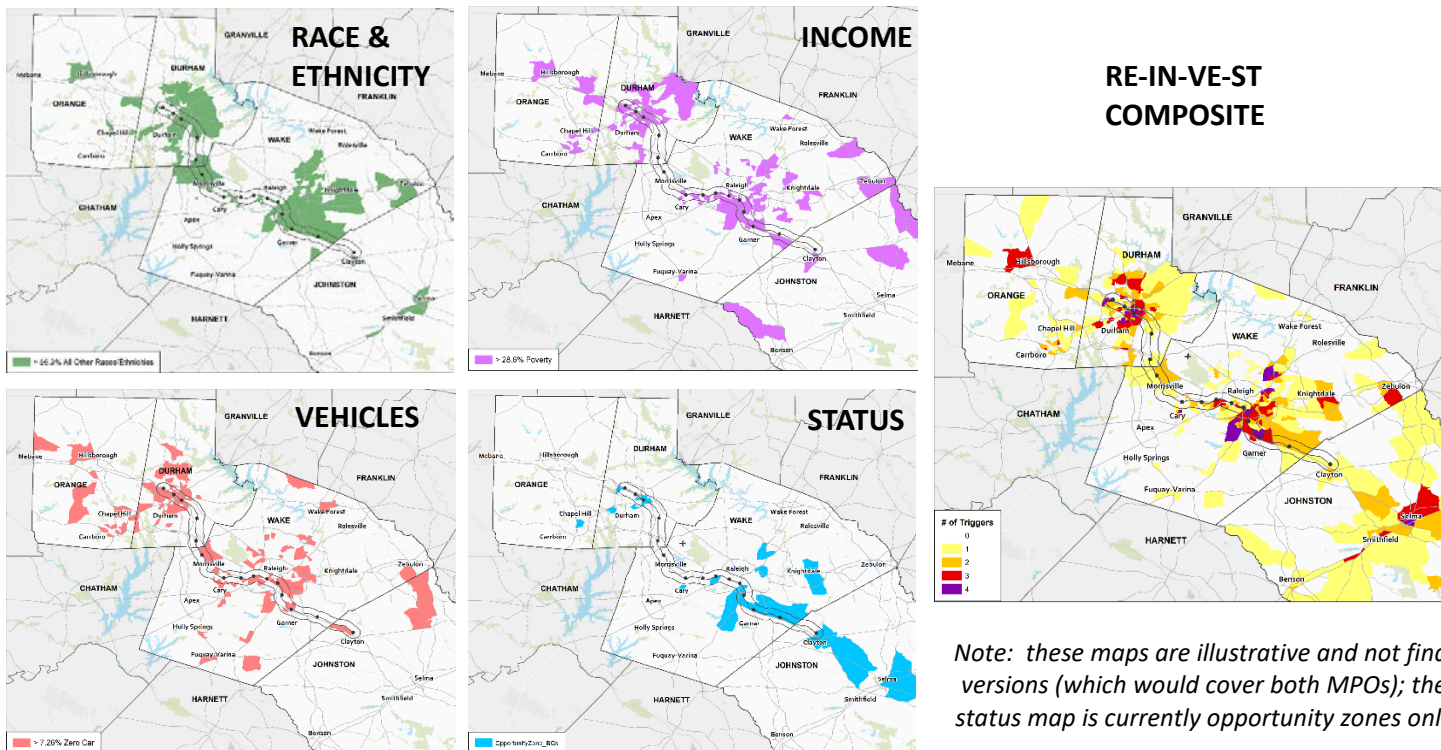
Note: these maps are illustrative and not final versions (which would cover both MPOs); the status map is currently opportunity zones only

The 2045 MTP introduced the concept of "travel choice neighborhoods," which were defined based on proximity to frequent transit – a "supply side" measure. This approach could be used to see how many REINVEST neighborhoods are also travel choice neighborhoods under different scenarios.

Travel Choice Neighborhoods
-- comparing transit investments that serve neighborhoods --

While REINVEST Neighborhoods are identified based on the *characteristics of the people who live there,* Travel Choice Neighborhoods are defined based on the *transit service that is provided.* For those who rely on transit to serve their daily needs, frequency is freedom – unless people are served by frequent transit trips, they have to arrange their lives to meet transit schedules, not have transit schedules support their lives. The amount of transit service -- that is, the degree to which residents would have meaningful choices on when and where to work, shop, learn and access services -- is categorized by the service frequency:

	Lifeline service provides 1 bus or train every hour or less frequently – 60+ minutes between transit trips
	Vital service provides 2 or 3 buses or trains every hour – 20 to 30 minutes between transit trips
	Freedom service provides 4 or more buses or trains every hour – 15 minutes or less between transit trips

In practice, transit service often varies by the time of the day and day of the week (termed "service span"). For the purpose of defining travel choice neighborhoods, a combination of frequency, span and infrastructure investment could be used.

Travel Choice Neighborhoods were first developed for the 2045 Metropolitan Transportation Plan to provide a more meaningful look at the impacts of different transit investment choices within broader development and mobility scenarios. One of the critical parts of the *Connect2050* analysis will look at how many of the REINVEST Neighborhoods also achieve the status of a travel choice neighborhood.

As scenarios are created for Connect2050, performance metrics can be included for each of these types of important places: key job hubs, REINVEST Neighborhoods and Travel Choice Neighborhoods.

Scenarios will examine the development foundations and transportation facilities and services through the lens of how they fulfill *Connect2050's* vision, goals, objectives and performance measures.

Connect2050 Goals:

• Ensure Equity & Participation	• Protect the Human & Natural Environments and Minimize Climate Change
• Promote Safety, Health and Well-being	• Ensure that all People have Access to Multimodal and Affordable Travel Choices
• Connect People and Places	• Improve Infrastructure Condition and Resilience
• Stimulate Inclusive Economic Vitality	• Manage Congestion and System Reliability

The next section of this document describes the components of each scenario considered for analysis, and how they were developed based on the vision, goals and objectives of Connect2050, and the public engagement that took place.