APPENDIX B

Scenario Planning

The scenario planning effort documented in Chapter 4 of the MTP and in this appendix was conducted to support development of the 2055 MTP by evaluating how different future growth and development patterns could influence transportation outcomes across the CRTPO planning area. Rather than predicting future conditions, scenario planning was used to explore potential land use and transportation tradeoffs and provide context for long-range decision-making.

Three scenarios—Distributed Growth, Current Plans, and Compact Centers—were analyzed to understand their impacts on transportation performance, infrastructure needs, mobility options, land consumption, and housing patterns. Results showed that more compact growth patterns generally improved transit accessibility, walkability, housing diversity, and infrastructure efficiency, while more dispersed growth increased roadway needs and land consumption. These findings informed the 2055 MTP by illustrating how growth patterns affect transportation outcomes and by supporting alignment between regional goals, policies, and investment decisions. Outcomes from these scenarios were provided to member jurisdictions for consideration in their identification of potential MTP projects.

Overview of Scenarios

Scenario planning allows CRTPO and its partners to think critically about how major trends and drivers impact the planning area's future by asking a series of "what if" questions. The scenarios are not predictions but instead represent a range of hypothetical outcomes to inform land use and transportation planning decision-making. Land use scenario planning is one of the most impactful ways that CRTPO can evaluate long-term land use decisions.

The MTP Update builds on the scenario planning effort completed for the 2050 MTP. It includes many of the same regional trends and drivers and includes a more robust set of performance measures. Drivers also were updated to reflect current regional priorities, removing scenarios based on connected and autonomous vehicles (CAVs) and adding a scenario that incorporates proposed new roads.

Growth and Development Patterns

The scenario planning process considers the impact of future growth and development patterns in the region. The scenarios are built on various "intended growth areas" that may be influenced by local government plans and policies, market or demographic trends, and developer/builder interests for various product types. The growth scenarios were modeled using the Metrolina CommunityViz Model 3.0 (MCM V3.0), developed in 2024 and used to derive the formal socioeconomic data set for the 2055 MTP Update.

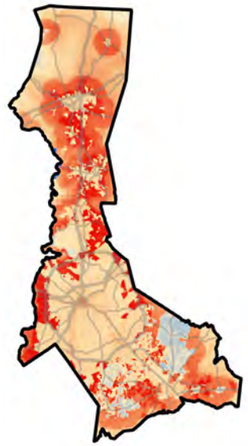
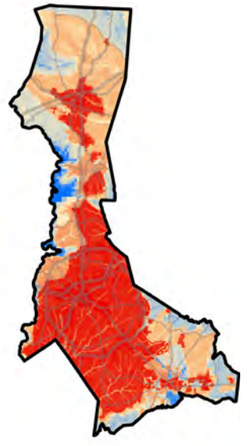
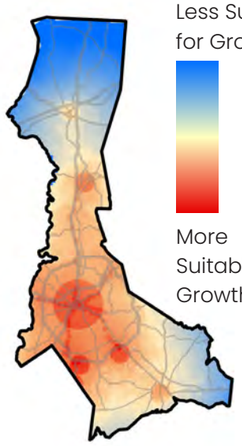
Current Plans is the official scenario of the MCM V3.0. It reflects current plans adopted by member jurisdictions and serves as a middle ground. In contrast, the Distributed Growth scenario assumes policies, actions, or investments that would promote outward expansion of the region's development footprint (sprawl). At the other end of the spectrum, the Compact Centers scenario assumes policies, actions, or investments that promote compact development in a limited number of locations for each county.

Telecommuting for Work

While many of the work from home (WFH) policies that increased during the COVID-19 pandemic have dissipated, many employers still have WFH policies in place. This could include fully remote employees or a hybrid schedule in which employees come to the office a few days each week. A baseline condition for all three scenarios assumes the WFH trend tapers off and no additional telecommuting will occur over the long term. As an alternative, both the Distributed Growth and Compact Centers scenarios assume an additional scenario in which telecommuting increases by 20%. The WFH condition is tested through modifications in trip making in the Metrolina Regional Model travel demand model (TDM).

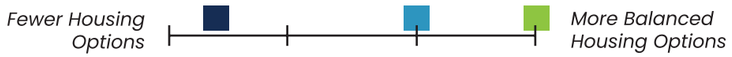
Proposed New Roads

The CRTPO's Comprehensive Transportation Plan recommends several new location roads and bypasses, including the Waxhaw Parkway, Mooresville East-West Connector, and Fred D. Alexander Road Extension. These facilities were added to the highway network in the travel demand model and tested with the Dispersed Growth scenario. This transportation-land use combination makes the most sense, as the accessibility provided by new connections will attract new growth in these locations.

	Distributed Growth	Current Plan	Compact Centers
Growth and Development Patterns			
Telecommuting for work	No additional shift in telecommuting	No additional shift in telecommuting	No additional shift in telecommuting
	20% shift in telecommuting		20% shift in telecommuting
Proposed New Roads	Proposed new roads		

2055 MTP Scenario Planning Scorecard

Housing Options



The Current Plans and Compact Centers scenarios provide a greater balance of housing options. Current Plans provide 18,400 more multifamily units and 11,900 attached housing unit than the Distributed Growth scenario, still providing 98,900 new single-family neighborhood homes and 29,200 new large lot homes. Moving towards the Compact Centers scenario could add 18,400 multifamily units and 7,400 attached single-family units over Current Plans, still providing 76,600 new single-family neighborhood homes and 22,800 new large lot homes.

Transit Accessibility

Almost half of all new homes and jobs are in close proximity to a transit station (43% of homes; 48% of jobs) or high capacity transit corridor (43% of homes; 55% of jobs) under the Compact Centers scenario. The Current Plans scenario has fewer new homes in proximity to transit stations than the Distributed Growth scenario (27% in Current Plans versus 37% in Distributed Growth, due to more non-residential development around some stations), but better job proximity (54% in Current Plans versus 30% in Distributed Growth).

Walking and Cycling

The Current Plans and Distributed Growth scenarios have less than half of new homes in walkable areas (47% for Current Plans, 45% for Distributed Growth), while the Compact Centers scenario is closer to two-thirds of new homes in walkable areas (63%). Moving towards the Compact Centers scenario could generate 13% more walking and bicycle trips beyond Current Plans and 21% more walking and bicycle trips than the Distributed Growth scenario, many of which would likely replace car trips.

Conservation

Current Plans conserve an additional 4% of vacant land consumed for development compared to the Distributed Growth scenario through more compact growth patterns. Moving towards the Compact Centers scenario could save an additional 4% over Current Plans.

Recreation

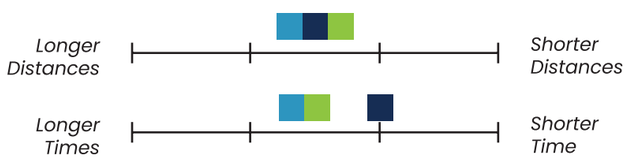
All three scenarios see high access to recreation. While differences between the scenarios are marginal, the Current Plans scenario has the highest percentage of new homes within a half mile of a park, greenway, or community center (79%), followed by the Compact Centers scenario (77%) and Distributed Growth scenario (74%).

Infrastructure Costs

More distributed growth patterns also come with higher costs of maintaining new local roads. Moving towards the Compact Centers scenario from Current Plans could reduce the total amount of new roadway miles needed by 20.5% (from 1,070 miles to 850 miles).

Mecklenburg and Union County already have substantial utility coverage of most areas. While maintaining the existing utilities is already a sunk cost, the Current Plans scenario has the lowest percentage of new homes outside existing sewer service areas (2%), followed by the Compact Centers scenario (5%).

Motor Vehicle Travel



The impact of each scenario on motor vehicle travel is best understood as part of a broader discussion of trade-offs. When assuming no change in telecommuting, the Compact Centers scenario brings a greater increase in vehicle hours traveled (VHT) than the Designated Growth scenario (81% versus 74%), but also a slightly smaller increase in travel distances to destinations (42% to 43%) and a growth pattern more conducive to alternative modes of transportation. The Current Plans scenario has the largest increase in vehicle hours traveled (83%) and the same increase in vehicle miles traveled (VMT) as the Designated Growth scenario (42%). Notably, the Designated Growth scenario assumes significant investment in new road connections, which is likely what led to the decrease in VHT.

Distributed Growth Scenario Current Plans Scenario Compact Centers Scenario

COMPARING SCENARIOS

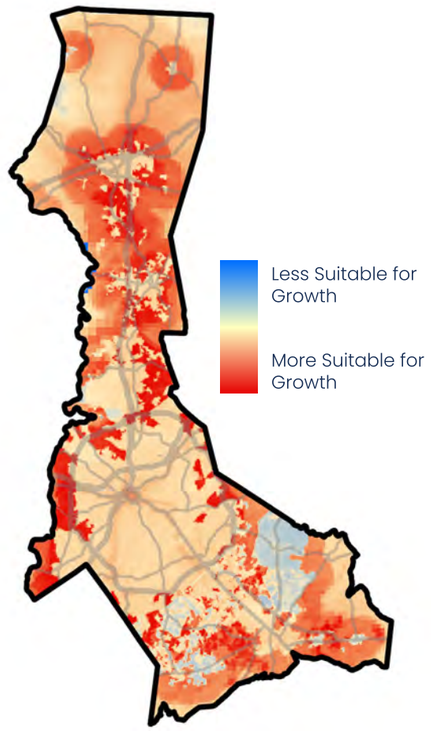
Each of the three growth patterns captured in the scenarios represents a theoretical potential future for the CRTPO planning area over the next 30 years.

> **Distributed Growth** represents a future where the region continues to grow outward.
>
> **Current Plans** represents a future where the region stays the course with the trajectory captured in adopted land use plans.
>
> **Compact Centers** represents a future where increased effort is focused on concentrating growth in a set of centers.

The policies, practices, and planning decisions made in the planning area today will impact how the region evolves, impacting everything from infrastructure costs to traffic congestion.

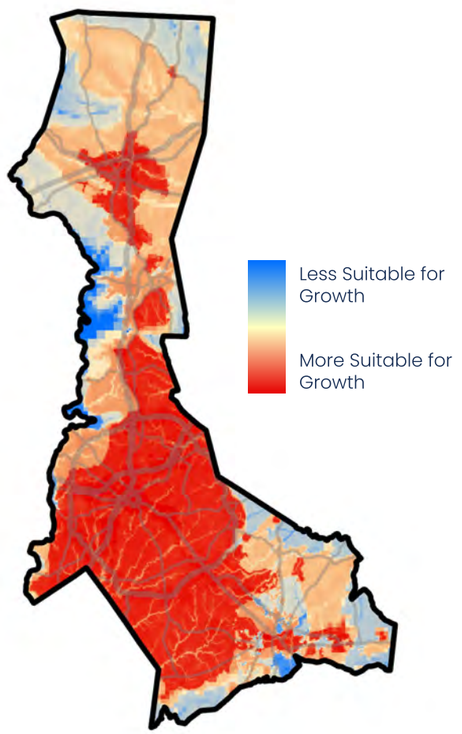
This section provides additional detail on the areas each scenario treats as most suitable for growth and includes a discussion of the tradeoffs that come with each pattern. The following spread includes additional maps comparing and contrasting each scenario on metrics, including land consumed, density of new homes and jobs, and the location of walkable community types.

As jurisdictions make decisions about what projects to prioritize and what policies to enact, these scenarios can help align their decisions with the outcomes they desire.



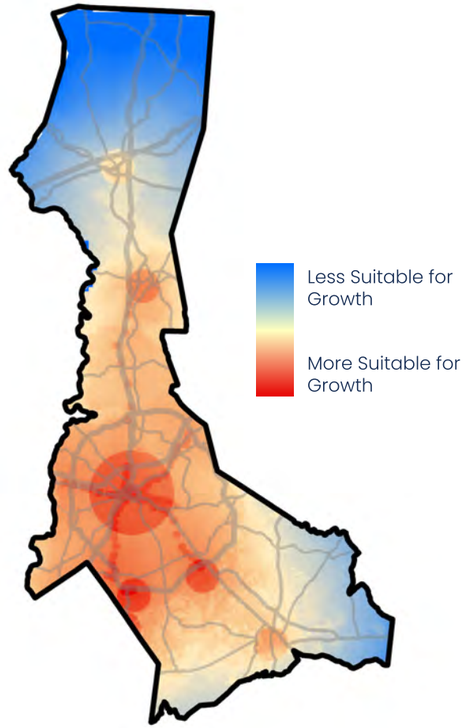
Distributed Growth

The Distributed Growth scenario assumes growth occurs primarily in outlying, less developed areas with less compact growth patterns. Rapidly growing regions often gravitate towards this growth pattern. Housing options trend more toward single-family neighborhoods and large rural lots. The predominant form of commercial growth is in the form of suburban retail centers and office parks.



Current Plans

The Current Plans scenario represents staying the course by adhering to adopted plans. Many jurisdictions have taken policy and land use actions that favor more compact growth patterns. They are continuing to work towards the goals outlined in those plans such as making sustainable use of infrastructure, conserving land, improving access to opportunity, and increasing multimodal transportation options.



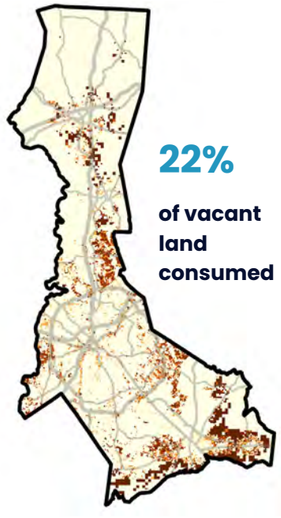
Compact Centers

The Compact Centers scenario represents the potential to accelerate progress towards regional goals by focusing growth and development in a limited set of locations throughout the region most suitable for significant compact growth. This scenario assumes a more aggressive approach that emphasizes redeveloping existing places and creating new centers that favor compact growth patterns and many housing and mobility options.

LAND CONSUMED

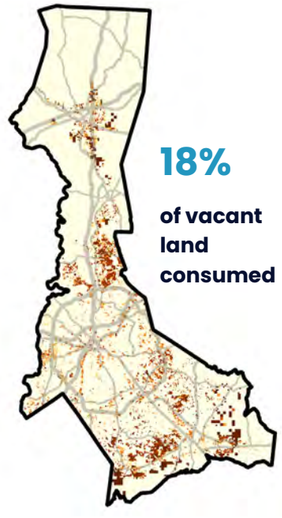
Less Consumed — More Consumed

Distributed Growth



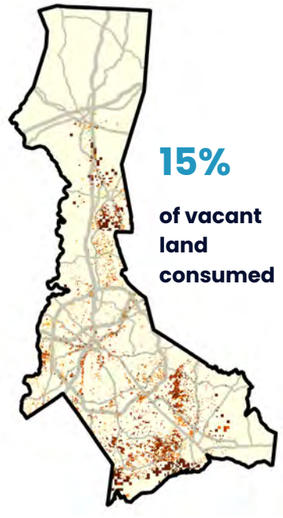
22% of vacant land consumed

Current Plans



18% of vacant land consumed

Compact Centers

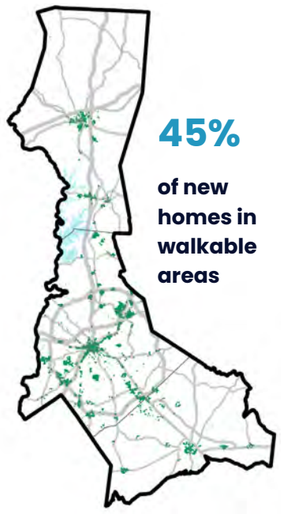


15% of vacant land consumed

WALKABLE LAND USES

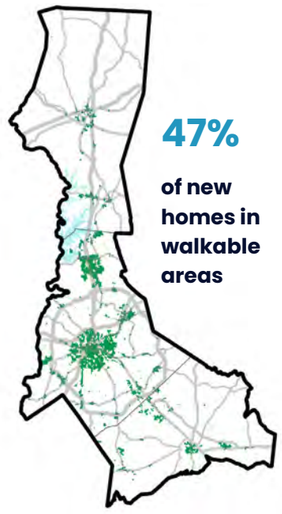
Walkable Community Types

Distributed Growth



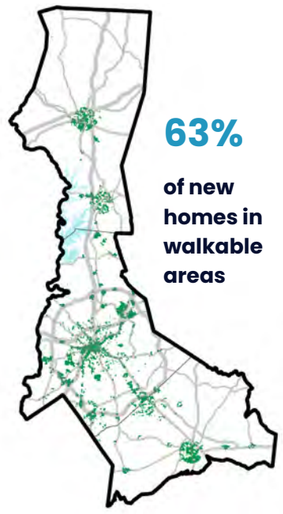
45% of new homes in walkable areas

Current Plans



47% of new homes in walkable areas

Compact Centers

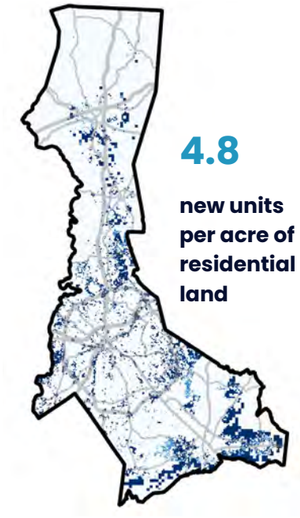


63% of new homes in walkable areas

DENSITY OF NEW HOMES

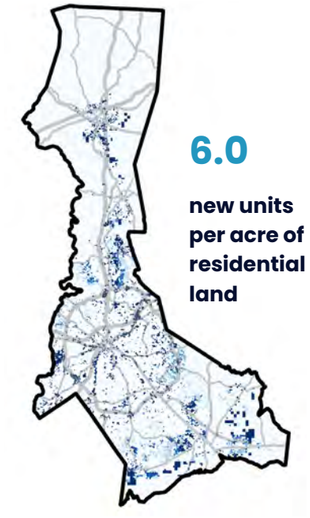
Lower Density — Higher Density

Distributed Growth



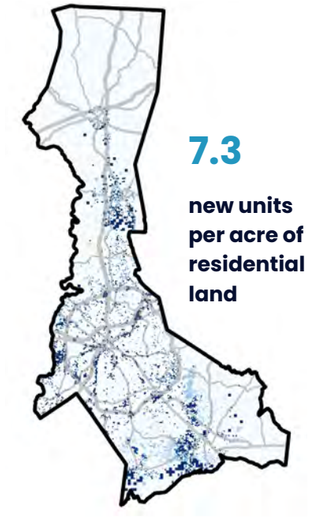
4.8 new units per acre of residential land

Current Plans



6.0 new units per acre of residential land

Compact Centers



7.3 new units per acre of residential land

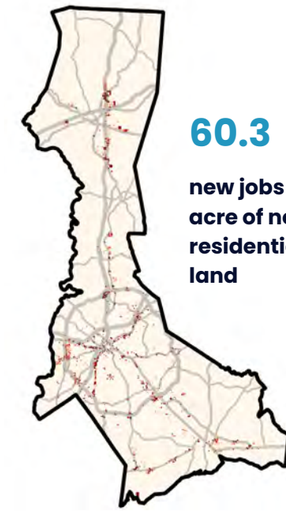
DENSITY OF NEW JOBS

Lower Density — Higher Density

Distributed Growth

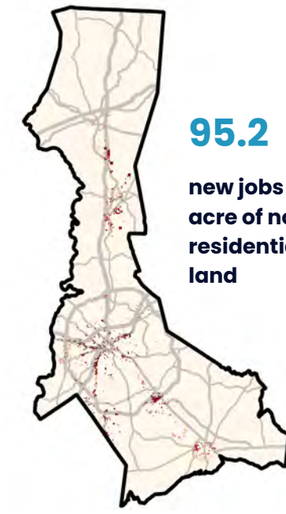
51.1 new jobs per acre of non-residential land

Current Plans



60.3 new jobs per acre of non-residential land

Compact Centers



95.2 new jobs per acre of non-residential land

PERFORMANCE MEASURES SCORECARD

Performance measures (PMs) quantify how each scenario addresses the region's priorities and the six goals for the MTP. They were developed in partnership with the CRTPO Technical Coordinating Committee. The PMs will not be used to score MTP projects; instead, they will provide information about each scenario that will inform the identification of projects.

Table B-1: Performance Measures Scorecard

	Distributed Growth	Current Plans	Compact Centers
Home Proximity to Transit Stations	37%	27%	43%
Job Proximity to Transit Stations	30%	54%	48%
Home Proximity to Transit Corridors	32%	34%	43%
Job Proximity to Transit Corridors	37%	51%	55%
Land Consumed	22%	18%	15%
Average New Home Density (units per acre of residential land)	4.8	6.0	6.9
Average New Job Density (jobs per acre of non-residential land)	51.1	60.3	152.9
New Jobs in Freight Corridors and Clusters	90%	93%	94%
New Multifamily Units	154,600	173,000	191,400
New Single-Family Attached Units	88,300	100,200	107,500
New Single-Family Neighborhood Units	111,600	98,900	75,300
New Rural and Large Lot Residential Units	44,900	29,200	24,100
New Homes Outside of Existing Utility Service Area	11%	2%	5%
New Jobs Outside of Existing Utility Service Area	6%	1%	2%
New Homes in Walkable Areas	45%	47%	63%
Walk and Bicycle Trip Potential	535,000	571,000	664,000
Homes Within 1/2 mile of a School	28%	26%	34%
Homes Within 1 Mile of a School	63%	66%	75%
Homes Within 2 Miles of a School	90%	96%	97%
Homes Within 1/2 Mile of a Park, Greenway, or Recreation Center	74%	79%	77%
New Lane Miles of Streets	1,310	1,070	860
Vehicle Miles Traveled: No Shift in Telecommuting	43%	43%	42%
Vehicle Miles Traveled: +20% Shift in Telecommuting	42%	42%	40%
Vehicle Hours Traveled: No Shift in Telecommuting	74%	83%	81%
Vehicle Hours Traveled: +20% Shift in Telecommuting	68%	76%	75%
Home Proximity to Regional Activity Centers (15 minute driveshed)	45%	47%	44%
Job Proximity to Regional Activity Centers (15 minute driveshed)	56%	59%	54%

Table B-2: Performance Measures Scorecard by County

		Distributed Growth	Current Plans	Compact Centers
Home Proximity to Transit Stations	Iredell	0%	0%	1%
	Mecklenburg	45%	34%	53%
	Union*	0%	0%	0%
Job Proximity to Transit Stations	Iredell	1%	1%	1%
	Mecklenburg	36%	66%	58%
	Union*	2%	3%	11%
Home Proximity to Transit Corridors	Iredell	13%	23%	16%
	Mecklenburg	37%	38%	50%
	Union*	9%	14%	11%
Job Proximity to Transit Corridors	Iredell	25%	32%	43%
	Mecklenburg	36%	55%	61%
	Union*	42%	38%	22%
Land Consumed	Iredell	6%	4%	4%
	Mecklenburg	66%	56%	35%
	Union*	19%	15%	13%
Average New Home Density (units per acre of residential land)	Iredell	2.8	4.4	3.1
	Mecklenburg	9.9	11.4	18.7
	Union*	1.1	1.5	1.4
Average New Job Density (jobs per acre of non-residential land)	Iredell	14.6	17.0	176.6
	Mecklenburg	86.2	114.6	173.0
	Union*	22.8	24.1	82.5
New Jobs in Freight Corridors and Clusters	Iredell	88%	89%	98%
	Mecklenburg	94%	96%	99%
	Union*	69%	74%	60%
New Multifamily Units	Iredell	6,600	8,300	9,900
	Mecklenburg	146,000	162,200	178,400
	Union*	2,000	2,500	3,000
New Single-Family Attached Units	Iredell	1,700	2,100	2,400
	Mecklenburg	84,700	94,100	103,500
	Union*	1,900	4,100	1,600
New Single Family Neighborhood Units	Iredell	19,200	18,100	15,000
	Mecklenburg	77,400	55,900	37,700
	Union*	15,000	24,900	22,500
New Rural and Large Lot Residential Units	Iredell	1,500	500	1,500
	Mecklenburg	16,400	12,200	4,800
	Union*	28,300	17,100	18,100
New Homes Outside of Existing Utility Service Area	Iredell	9%	1%	13%
	Mecklenburg	7%	0%	1%
	Union*	47%	16%	27%

**Where indicated, Union County results include the entire county, not just the area within the MPO boundary*

Table B-2: Performance Measures Scorecard by County (Continued)

		Distributed Growth	Current Plans	Compact Centers
New Jobs Outside of Existing Utility Service Area	Iredell	10%	4%	1%
	Mecklenburg	2%	0%	0%
	Union*	31%	5%	13%
New Homes in Walkable Areas	Iredell	8%	22%	32%
	Mecklenburg	54%	54%	73%
	Union*	5%	10%	13%
Walk and Bicycle Trip Potential	Iredell	27,000	26,000	45,000
	Mecklenburg	474,000	511,000	552,000
	Union*	39,000	34,000	68,000
Homes Within 1/2 Mile of a School	Iredell	9%	18%	18%
	Mecklenburg	33%	29%	39%
	Union*	9%	10%	12%
Homes Within 1 Mile of a School	Iredell	33%	55%	57%
	Mecklenburg	70%	71%	81%
	Union*	32%	40%	39%
Homes Within 2 Miles of a School	Iredell	85%	95%	98%
	Mecklenburg	94%	97%	99%
	Union*	68%	83%	78%
Homes Within 1/2 Mile of a Park, Greenway, or Recreation Center	Iredell	52%	73%	77%
	Mecklenburg	78%	80%	79%
	Union*	40%	61%	53%
New Lane Miles of Streets	Iredell	180	130	130
	Mecklenburg	540	460	290
	Union*	610	490	450
Vehicle Miles Traveled: No Shift In Telecommuting	Iredell	39%	38%	38%
	Mecklenburg	44%	44%	42%
	Union	44%	50%	45%
Vehicle Miles Traveled: +20% Shift In Telecommuting	Iredell	37%	36%	36%
	Mecklenburg	42%	42%	41%
	Union	42%	47%	43%
Vehicle Hours Traveled: No Shift In Telecommuting	Iredell	57%	57%	58%
	Mecklenburg	78%	89%	86%
	Union	55%	67%	71%
Vehicle Hours Traveled: +20% Shift In Telecommuting	Iredell	53%	53%	54%
	Mecklenburg	73%	82%	80%
	Union	50%	61%	65%
Home Proximity to Regional Activity Centers (15 minute driveshed)	Iredell	79%	83%	76%
	Mecklenburg	41%	46%	44%
	Union*	53%	37%	31%
Job Proximity to Regional Activity Centers (15 minute driveshed)	Iredell	60%	75%	84%
	Mecklenburg	54%	58%	54%
	Union*	71%	50%	31%

**Where indicated, Union County results include the entire county, not just the area within the MPO boundary*

Summary

Scenario planning is an effective tool for the CRTPO and its partners to think critically about how major trends and drivers will impact the planning area's future.

Three hypothetical scenarios present alternative ways of thinking about our future, including a "base" scenario, Current Plans, that reflects adopted local government plans and two alternatives: a Distributed Growth scenario that reflects outward, less compact growth and a Compact Centers scenario that accelerates progress towards regional goals of more compact growth in desired locations. These alternative scenarios also consider a future that continues recent trends toward work from home, while the Distributed Growth scenario includes significant investment in proposed new roads such as bypasses.

KEY TAKEAWAYS

Generally speaking, the Compact Centers scenario better positions the planning area to shift to a more balanced transportation system by making high capacity transit more accessible and encouraging growth in a way that makes walking and cycling more likely. It also results in more housing choices and conserves more land.

The Distributed Growth scenario generally facilitates better motor vehicle accessibility, but also requires greater investment in road infrastructure.

Telecommuting has a measurable impact on motor vehicle travel, specifically a reduction in travel time and delay.

HOW SCENARIO PLANNING INFLUENCES THE MTP

The scenario planning process and findings can influence the 2055 MTP Update by providing a better understanding of progress toward regional goals and what additional steps can help achieve those goals. For example, if pursuing a more balanced future transportation system that expands choice is a priority, changes in land use and development patterns will accelerate progress toward those goals.

More granularly, it also will provide insight into which mobility projects and investments are most consistent with desired growth patterns.