Transportation Technical Appendix

Model Documentation

Overview

Future conditions were modeled using the Triangle Regional Model version five (TRM), a joint project of the Durham Chapel Hill Carrboro Metropolitan Planning Organization, the Capital Area Metropolitan Planning Organization (CAMPO), the North Carolina Department of Transportation, and Go Triangle. The TRM is a the travel demand forecasting tool for the Triangle, covering all of Orange, Wake, and Durham counties, and parts of Chatham, Person, Granville, Franklin, Nash, Johnston, and Harnett counties. In total, the TRM covers over 3,000 square miles. The model is broken down into approximately 2,600 Traffic Analysis Zones (TAZs) which are small geographic areas that include assumptions about the land uses, levels of population and employment, and socio-economic makeup of each TAZ. The TRM is an aggregate trip based four step model where the four model steps are trip generation, trip distribution, mode choice, and trip assignment.

Trip generation is the number of trips made and for what purpose. The TRM uses a trip generation and attraction model, which creates the two ends of a trips, where it is generated and where it is attracted, although at this stage of the process, they are unlinked. Trips are generated by households which are classified into workers, non-working adults, and children. Socio-economic data on income levels, Census data, and detailed household travel behavior surveys inform the model's trip making and trip generation assumptions. The end result is the number of trips taken by person and household, which is validated by survey data of the region. The trip attraction model estimates the trip ends, by estimating the number of trips that land uses like various commercial, industrial, and retail land uses attract to them. The trip generation stage does not include any geographic information, but is a list of tables for trips generated and attracted by different land use typologies.

Trip distribution is the second step in the model which is the estimation of where trips go. The TRM uses destination choice models to predict the probability that trips from a home zone will be attracted to another zone based on the attributes of the attraction zone. Trip distribution is broken down by trip purpose, socio-economic strata, and time of day. The underlying assumptions on trip distribution are based on household survey data on travel behavior. This step of the modeling process connects two ends of a trip, a trip generation with a trip attraction.

The mode choice step of the process determines which mode of travel a trip will take in the model. The determination of mode is based on travel behavior data and estimated sensitivities to price and travel time based on income levels and trip purposes. The model estimates trips made on non-motorized trips, but separates them out from later steps in the model.

The final step in the modeling process is trip assignment which determines the route a trip takes and the facilities which are used traveling from each trip beginning to trip end. The TRM uses the User Equilibrium method to assign vehicle trips onto the highway network by time period. This method makes several behavioral assumptions, most importantly that every traveler has perfect information regarding network alternatives, all travelers seek to minimize travel time and costs, and all travelers have the same valuations of network attributes. The trip assignment process includes multiple iterative assignments until a pre-defined level of convergence is arrived at which represents the equilibrium state of travel.

This four-step process determines trip patterns for both the base year and future year trip patterns within the Triangle Region. Travel behaviors and trip generation characteristics are assumed to be the same for

each household in the model in the future year (2040) as in the base year (2010). The TRM also includes a transportation network which focuses on major streets and transit services. The highway network consists of over 14,000 roadway links and includes attributes on lanes, signal density, median type, facility type, speed, and land use characteristics. These attributes determine traffic flow characteristics during model simulation. The full model documentation can be viewed on CAMPO's website at: https://sites.google.com/a/ncsu.edu/dchc-mpo/home/trm-v5-data.

Modeled Scenarios

Three model scenarios were examined, two that were developed by CAMPO as part of the 2040 Metropolitan Transportation Plan (MTP) and a third scenario created for the Imagine Cary study. The 2040 MTP is a federally required long-range planning document prepared by CAMPO, which develops future population, employment, and socio-economic conditions and a set of highway, bike, pedestrian, and transit projects. The MTP is a fiscally-constrained plan, meaning the set of transportation projects included in the plan are programmed to fit within a budget of revenues which are reasonably expected to be available over the timeframe of the plan. The MTP is developed by CAMPO and the Durham Chapel Hill Carrboro MPO, with extensive input from the local municipalities that comprise the two MPOs' jurisdictions.

The first scenario used from the CAMPO 2040 MTP is the 2040 Existing + Committed (2040 E+C) scenario. This scenario uses the estimated future population, employment, and socio-economic data in the 2040, but only a limited set of transportation projects that are existing or have specific funding allocated in local budgets as of 2013. This scenario acts as a "do nothing" scenario for the examination of future conditions, as it models what would happen with continued population and employment growth in the region as expected, but only those transportation improvement projects that are under construction or nearly under construction. The full list of projects and model outputs are included in a later section of this appendix.

The second scenario is the CAMPO 2040 MTP plan. This scenario includes the same population, employment, and socio-economic data as the E+C scenario, but includes the full set of transportation projects envisioned in the plan. With the MTP being adopted in September 2015, the 2040 MTP plan represents the current regional plan for transportation improvements. This scenario provides a good comparison to the Imagine Cary scenario.

For the Imagine Cary process, two sets of edits were made to the 2040 MTP model scenario future conditions based on the information developed on land use and transportation through this process. The underlying levels of population, households, and employment were edited at the TAZ level to better replicate the land use developed as the Future Growth Framework land use component. Also, several street links were edited in the transportation network in the model to match the recommendations included in this document.

Future Growth Framework Land Use Integration

Information on the Future Growth Framework map and the land use categories contained in the map is available in Chapter 6: Shape. To translate the information in this map into model data, individual TAZ files were altered. For the majority of Cary, the land uses envisioned in the Future Growth Framework map did not differ significantly from the 2040 MTP data estimated for these areas, especially when the data is aggregated to the TAZ level. Therefore, the decision was made to only alter the underlying data for the Destination Centers, which are proposed to different from the same areas as envisioned in the 2040 MTP.

To alter the TAZs for the Destination Centers, parcel level changes were made by defining new place codes which were unique to each Destination Center. A modeling firm, Clearbox Forecast Group, then used CAMPO's CommunityVIZ-based growth model to allocate households and employment to the region's

TAZs. This process overall increased the level of population and employment envisioned in Cary above the levels contained in the 2040 MTP. The control total population and employment was not maintained for the TRM, meaning that these changes meant the model region as a whole had increased population and employment. The table below shows how the new levels of dwelling units and employment differ from the 2040 MTP data for the changed TAZs.

	2040 TRM	Future Growth Framework	Difference
Dwelling Units	8,228	18,112	9,884
Industrial Employment	739	3,059	2,320
Retail Employment	1,654	2,448	794
Highway Retail Employment	1,509	3,296	1,787
Office Employment	1,732	3,730	1,998
Service Employment	8,806	15,577	6,771
Total Employment	**14,440**	**28,110**	**13,670**

Compared to the full TAZ data for Cary, the changes to the land use layer represent an increase of about 11.5 percent in households and an increase of about 8.8 percent in employment above the 2040 MTP levels. Figure 1 shows spatially where the altered TAZs are in Cary (in green). They are primarily along the NC 55 corridor and in the eastern part of Cary, stretching from the downtown area to the Crossroads area.

Figure 1: TAZs with changed data for Future Growth Framework Modeling Scenario

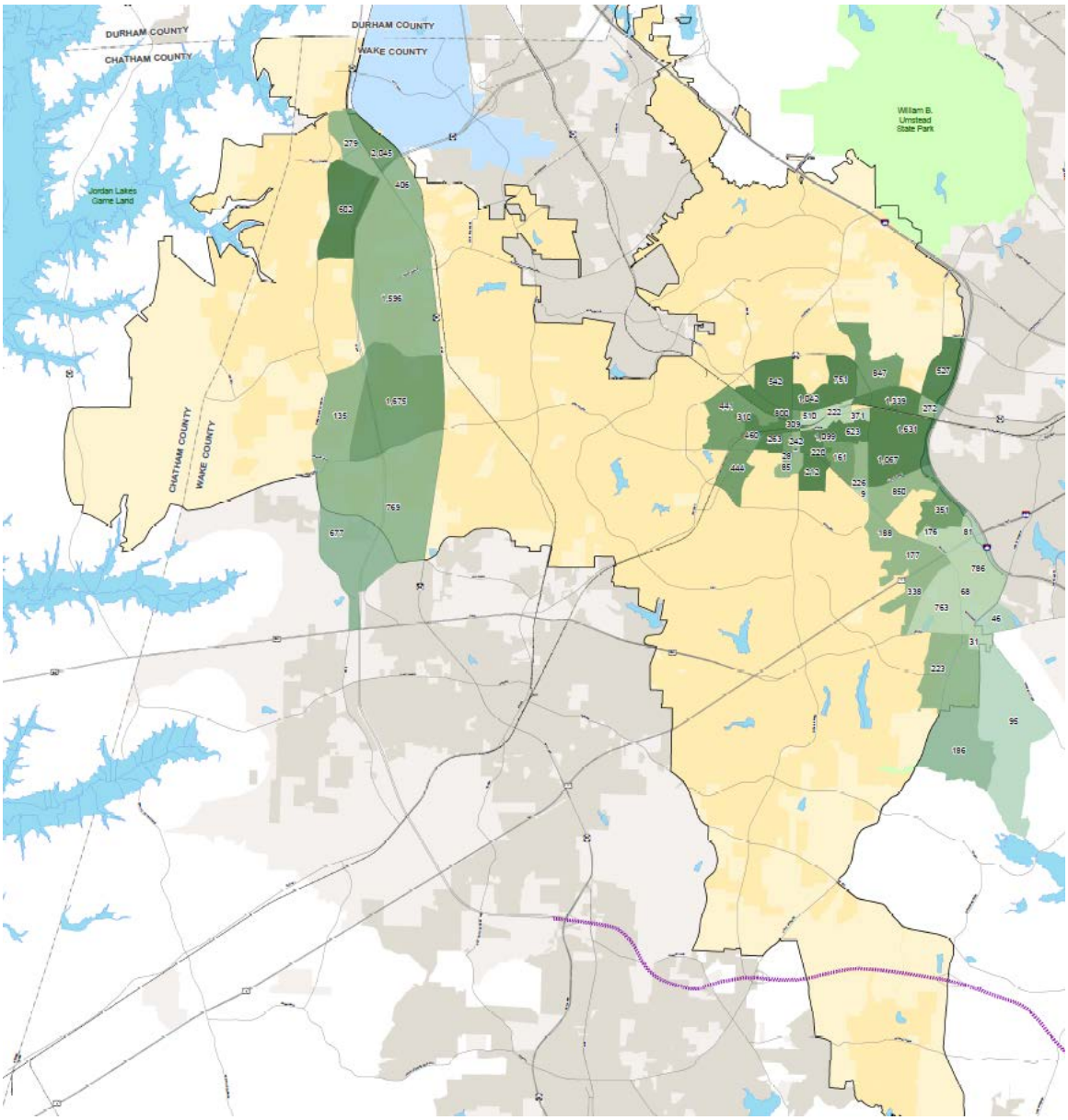


Figure 2 to Figure 6 show change in dwelling units, by TAZ, for each destination center. Figure 7 to Figure 11 show change in employment, by TAZ, for each destination center.

Figure 2: Change in Dwelling Units, Alston Destination Center

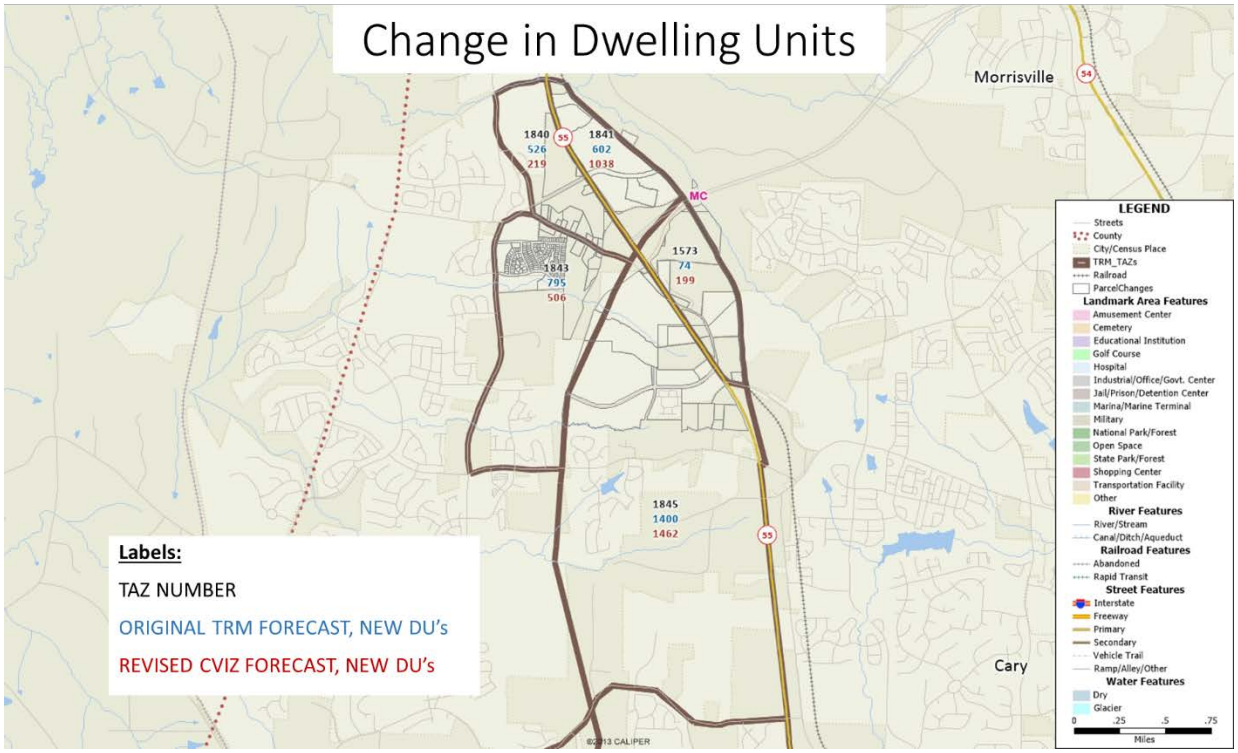


Figure 3: Change in Dwelling Units, Green Level & 540 Destination Center

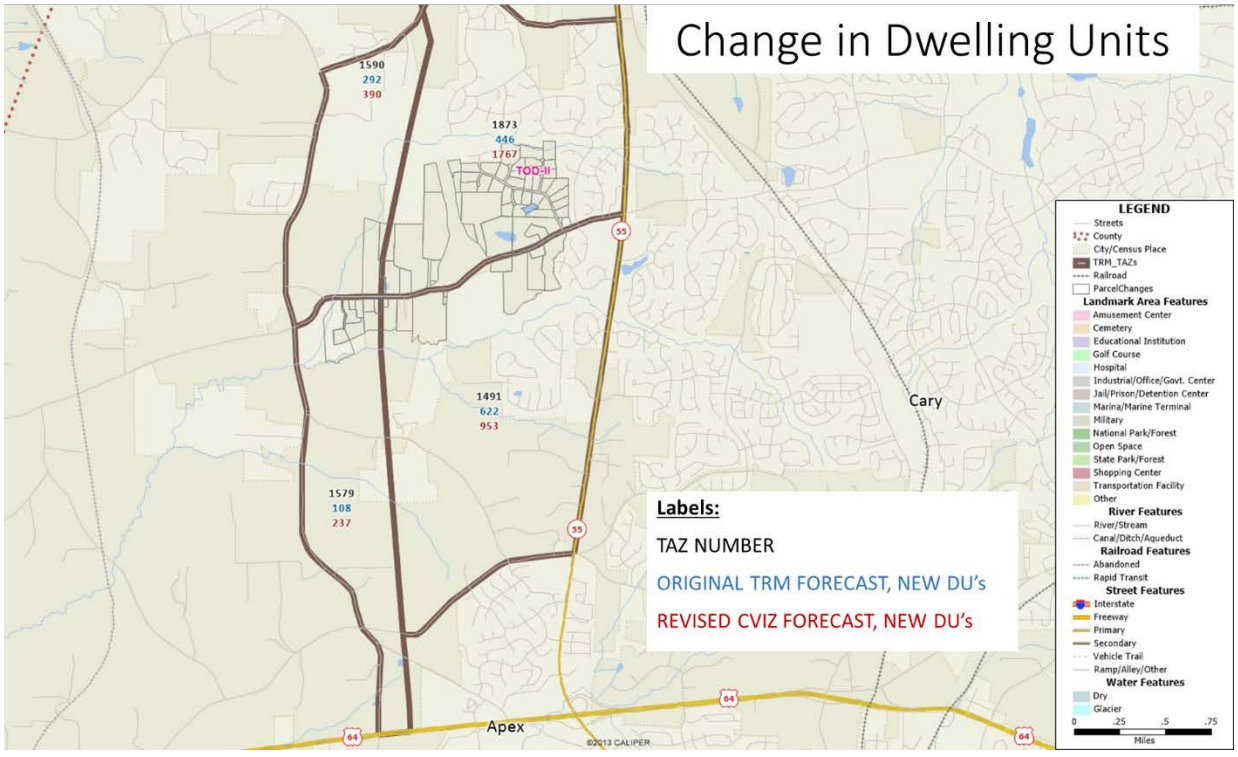


Figure 4: Change in Dwelling Units, Downtown Cary

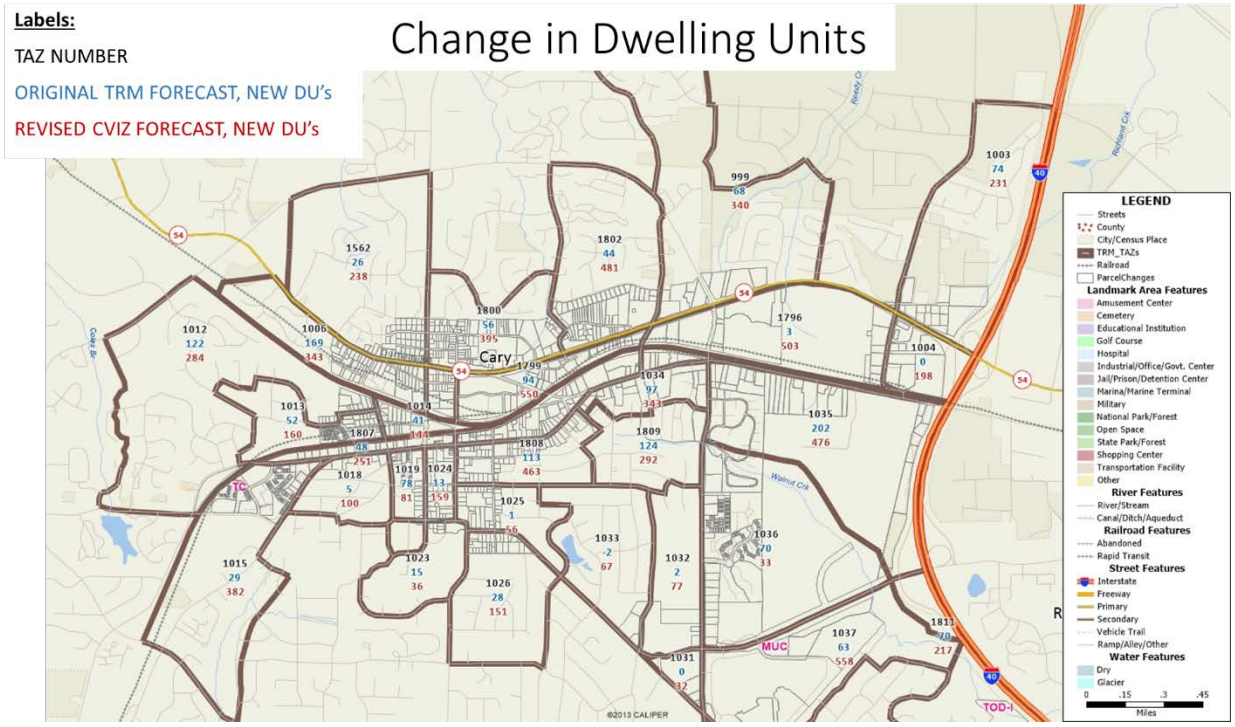


Figure 5: Change in Dwelling Units, Cary Towne Destination Center

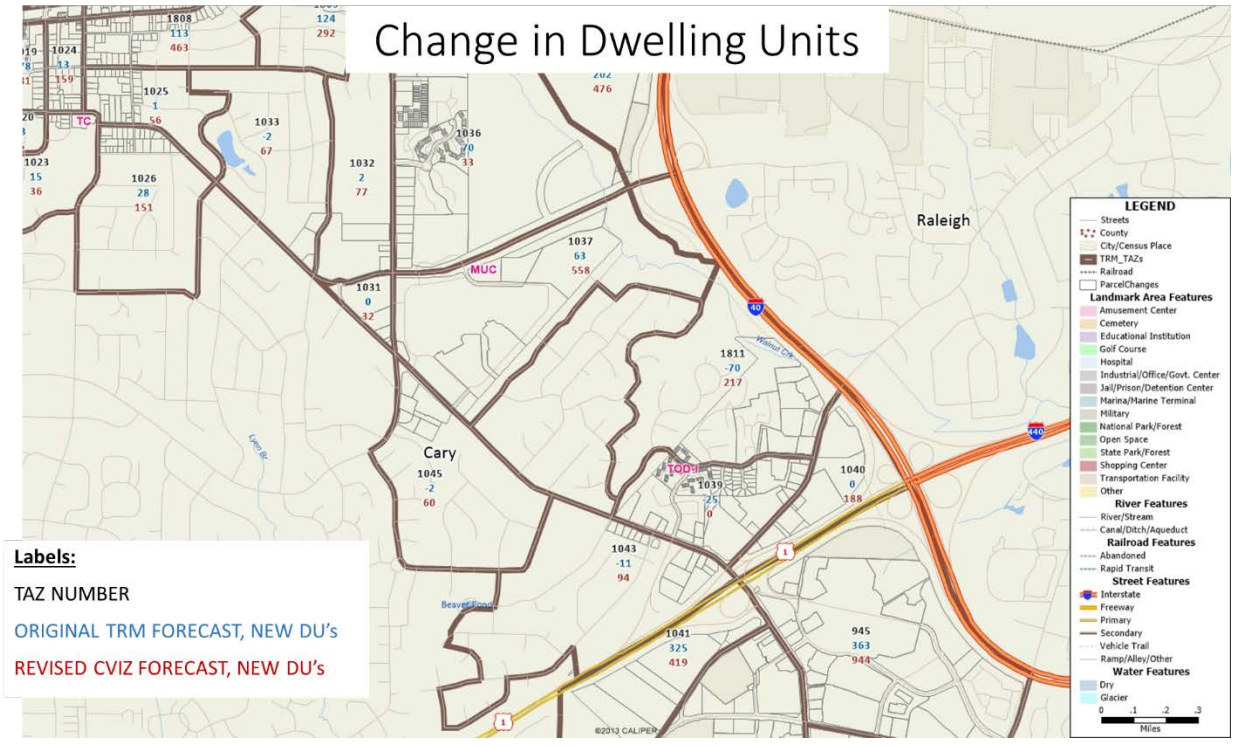


Figure 6: Change in Dwelling Units, Crossroads Destination Center

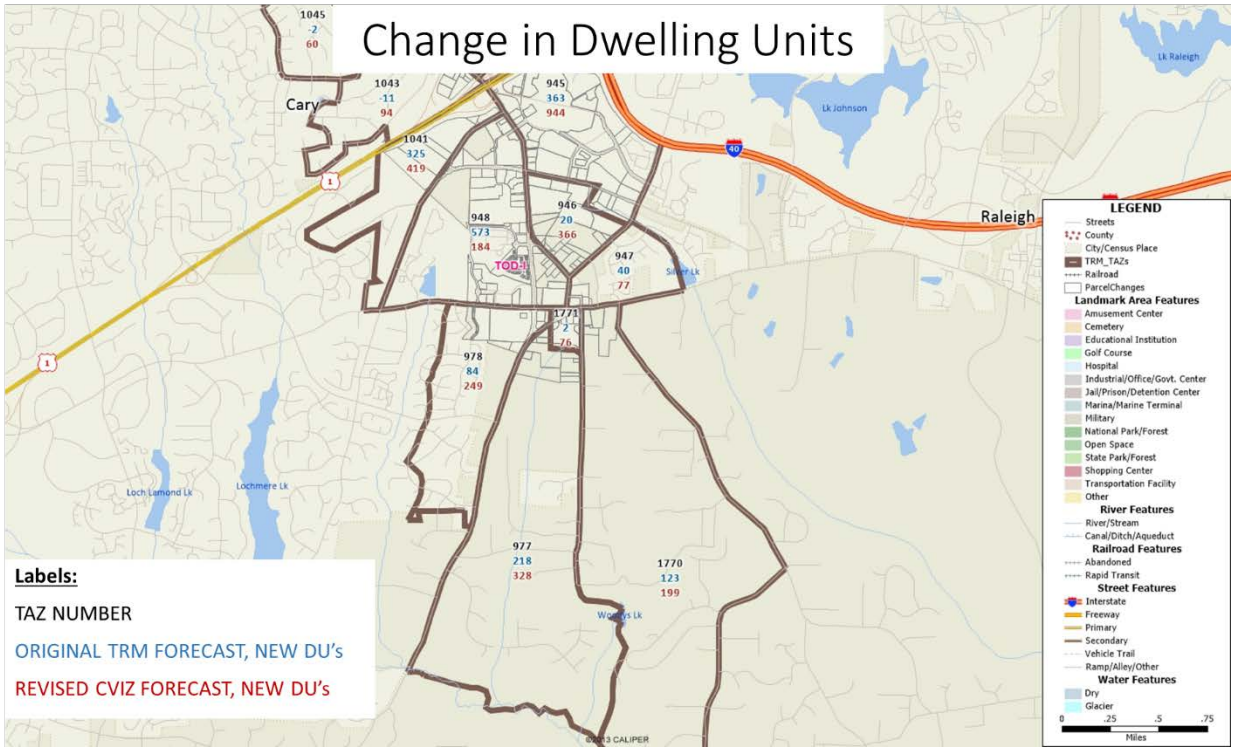


Figure 7: Change in Total Employment, Alston Destination Center

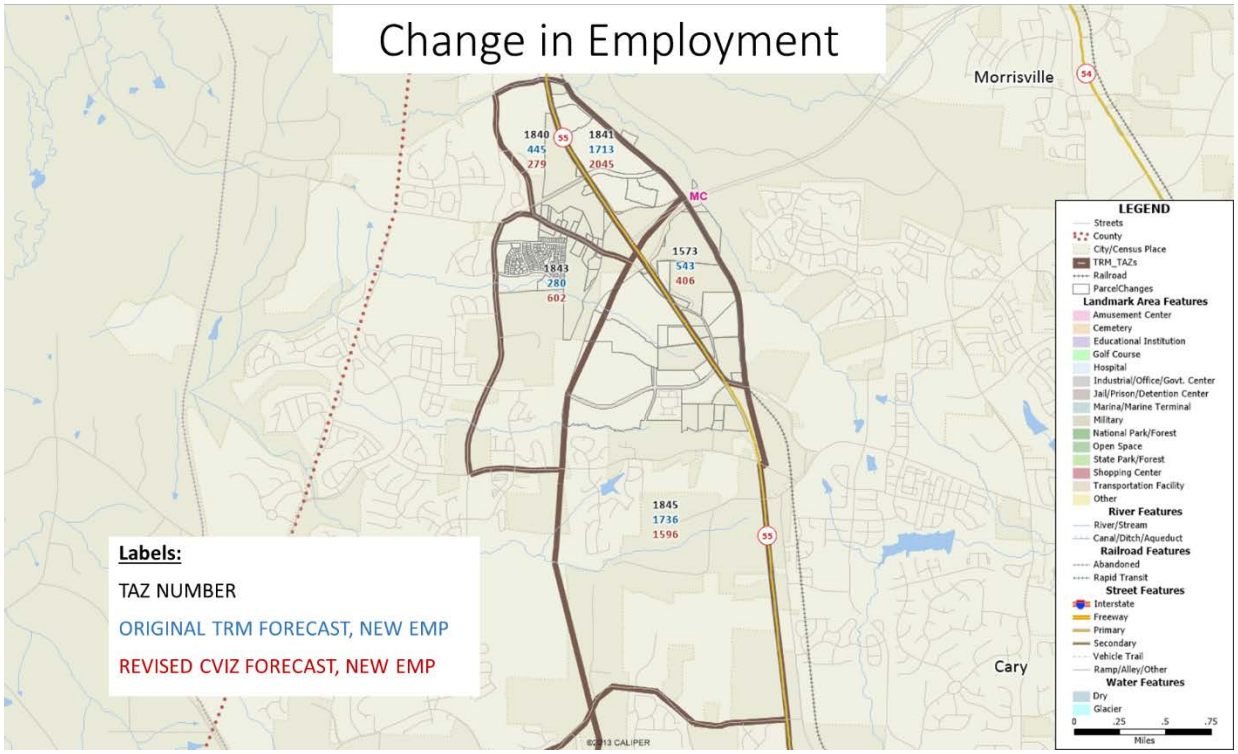


Figure 8: Change in Total Employment, Green Level & 540 Destination Center

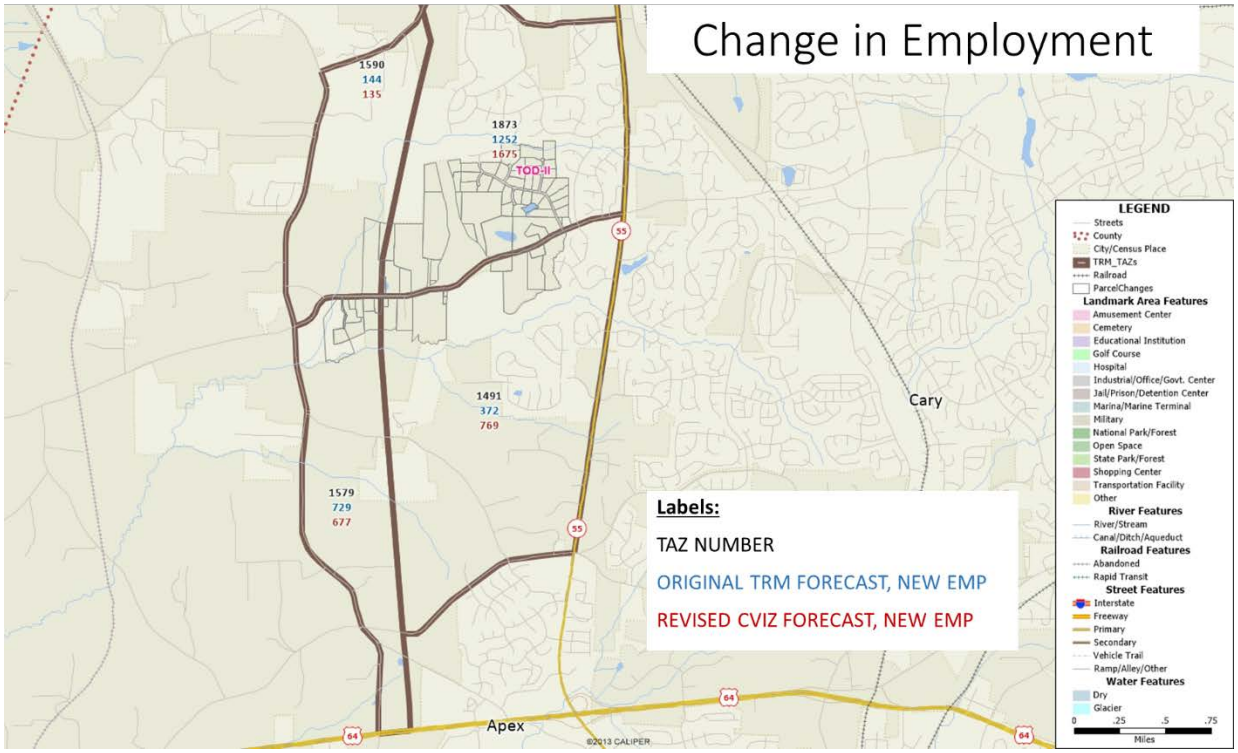


Figure 9: Change in Total Employment, Downtown Cary

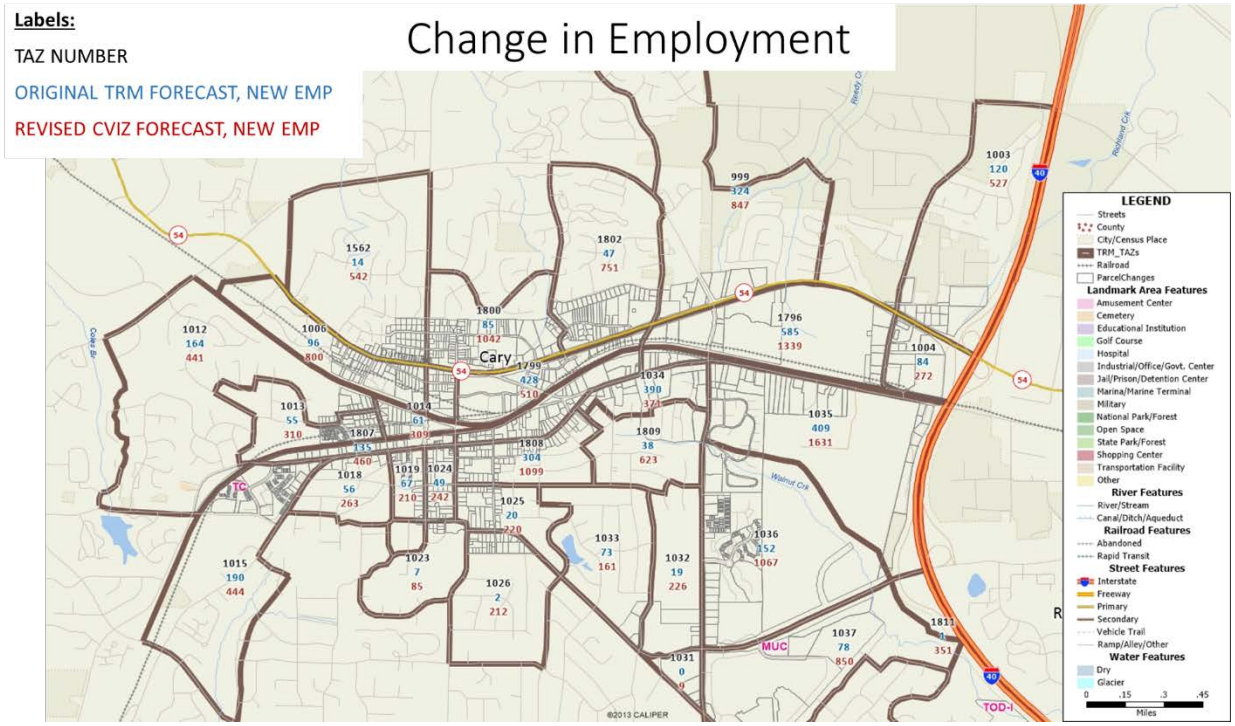


Figure 10: Change in Total Employment, Cary Towne Destination Center

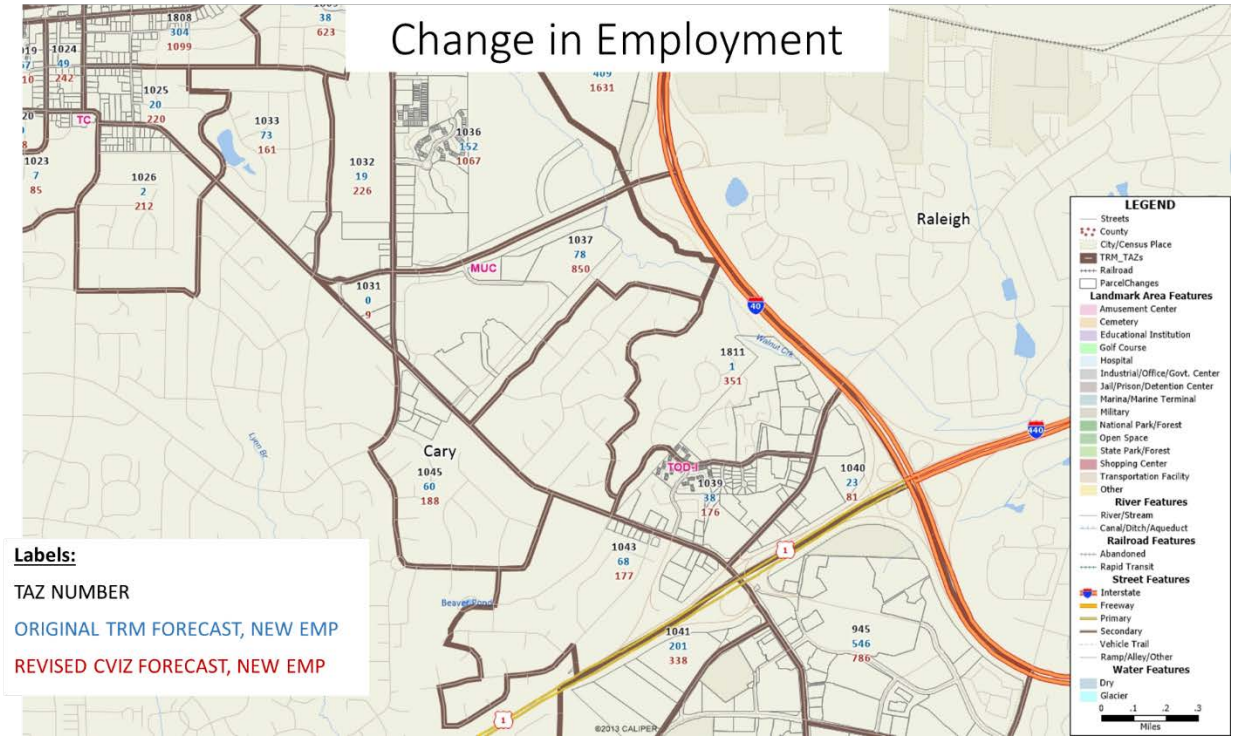


Figure 11: Change in Total Employment, Crossroads Destination Center

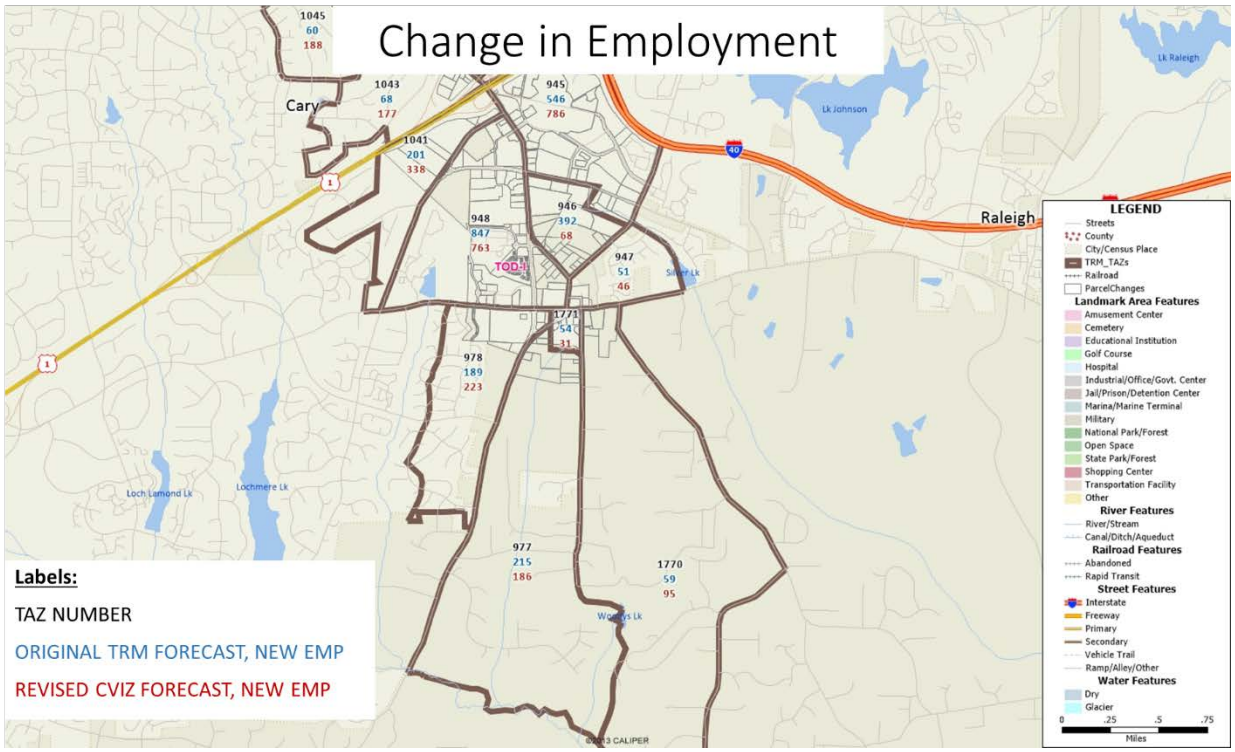
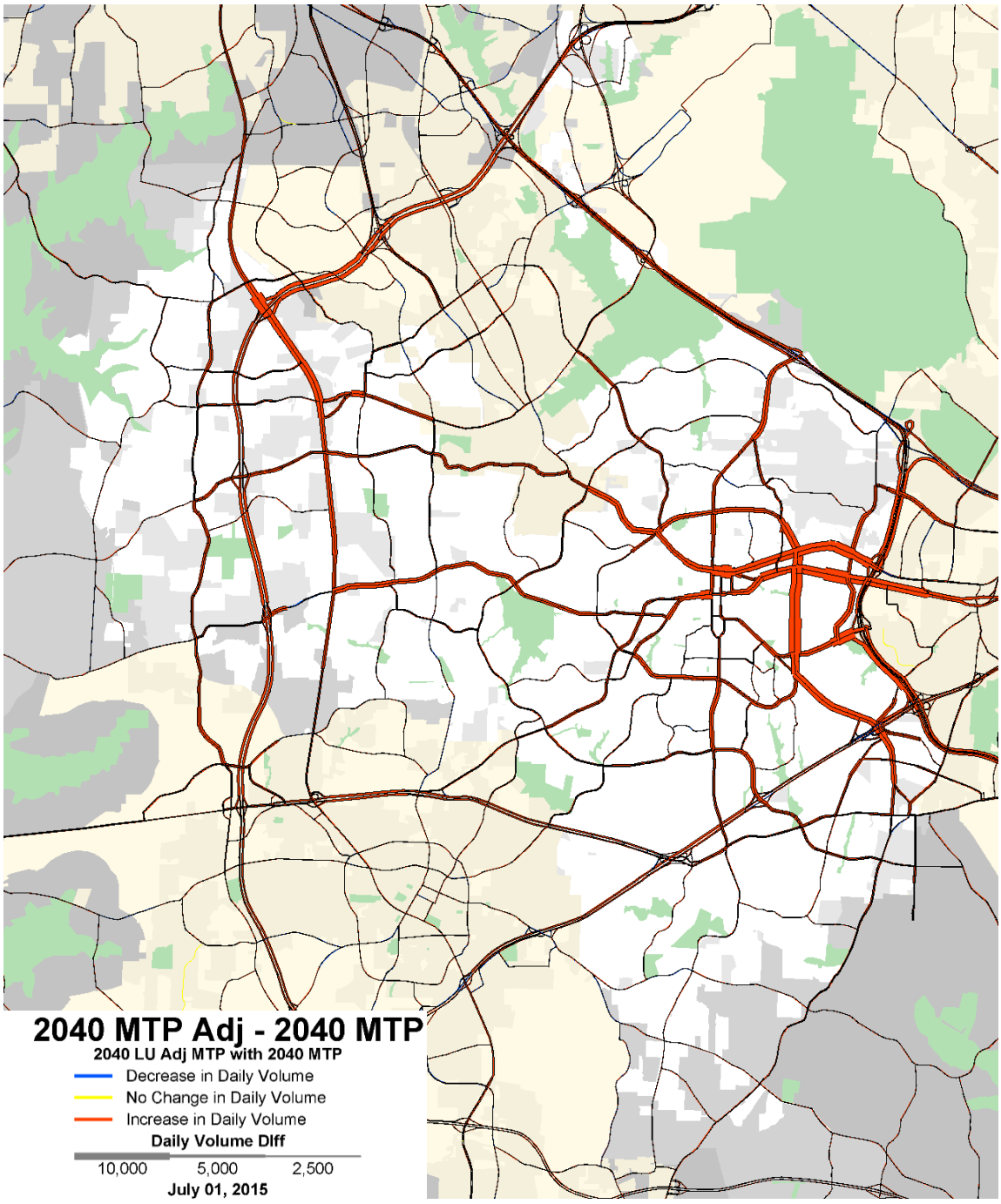


Figure 12 shows the change in daily volume between the CAMPO 2040 MTP model and the Imagine Cary land use data. This model run uses adjusted TAZs in Cary and MTP 2040 TAZs elsewhere in the Triangle. The transportation network is the 2040 MTP network. Red indicates and increase in daily volume and the thickness of the line is proportional to the increase in volume. There is a clear increase in volume on streets near destination centers.

Figure 12: Change in Daily Volume with Future Growth Framework Land Use



Future Conditions Model Scenarios

2040 Existing + Committed Scenario

This scenario acts as a 'do nothing' scenario for comparison purposes. It is based on the 2040 MTP land use and socio-economic data, but only includes transportation projects that are existing or have specific funding allocated in local budgets. Table 1 and Table 2 show existing and committed projects in or adjacent to Cary for the E+C scenario; Project ID refers to the CAMPO project identification number. Figure 13 shows the daily volume for the E+C Scenario. Figure 14 shows volume to capacity for the afternoon peak hour.

Table 1: Existing Projects (2013)

Project ID	Street Name	From	To	Existing Lanes	Proposed Lanes	Distance (miles)
F16	I-40	US 1-64	Wade Avenue	4	6	3.89
F12	NC 147 Toll Extension (CAMPO Portion)	Durham County Line	NC 540	0	6	0.89
F4b	NC 540 Tri-Ex (Phase II)(Toll)	NC 55 (Morrisville/ Cary)	US 1	0	6	10.10
F4c	NC 540 Tri-Ex (Phase III)(Toll)	US 1	NC 55 Bypass	0	6	2.30
A164b	Green Level Church Rd	Carpenter Fire Station Rd	Morrisville Pkwy	2	4	1.21
A550	Green Level Ch Realign	Green Level Church	Jenks Rd	2	2	0.24

Table 2: Committed Projects (2013)

Project ID	Street Name	From	To	Existing Lanes	Proposed Lanes	Distance (miles)
A640	Aviation Pkwy Interchange	National Guard Dr.	1-40	4	4	0.42
F43	I-40	US 1/64	Lake Wheeler Rd	6	8	4.43
A440b	Carpenter Fire Station Ext	NC 55	Morrisville Carpenter Rd	0	4	0.30
A171	Green Level West Rd	NC 55	I-540	2	4	0.90
A104a	Morrisville Parkway	Green Level Ch Rd	NC 55	0	2	1.83
A521	O'Kelly Chapel Rd	Louis Stephens Dr	NC 55	0	4	0.62
A111	Reedy Creek Turn Lane	N.E. Maynard Rd	Harrison Ave	2	3	1.17
A561	Walnut St. Widening	US 1	Macedonia Rd	4	6	0.83
F10	I-440 Widening	US 1/64	Wade Avenue	4	6	3.50
A380	US 64 (superstreet)	US 1	Laura Duncan Rd	4	4	2.49
A104b	Morrisville Parkway	Green Level Ch Rd	NC 55	2	4	1.83
A642	N Harrison Ave HSR Grade Sep	Chapel Hill Rd	W Chatham St	4	4	-

Figure 13: 2040 E+C Scenario Daily Volume

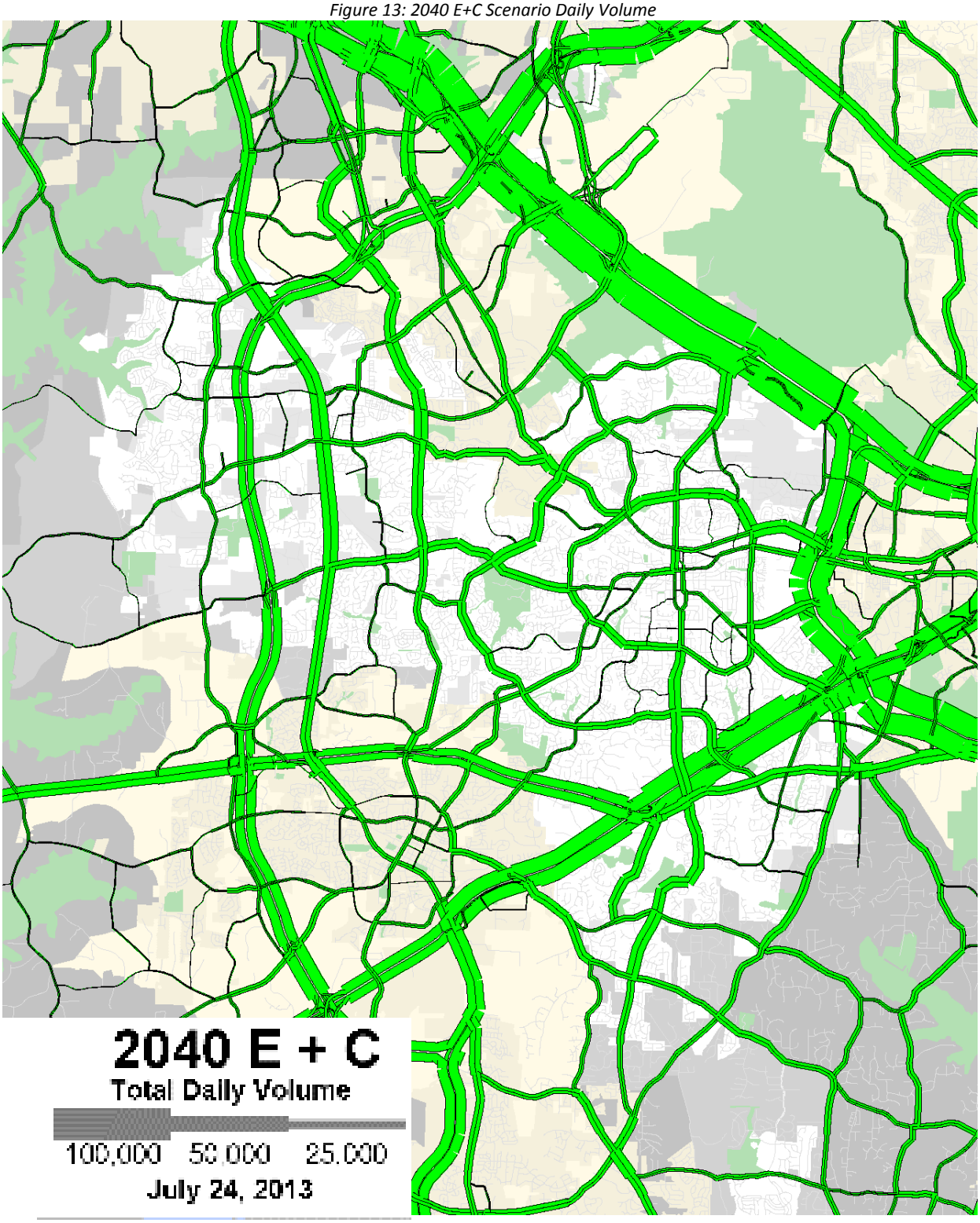
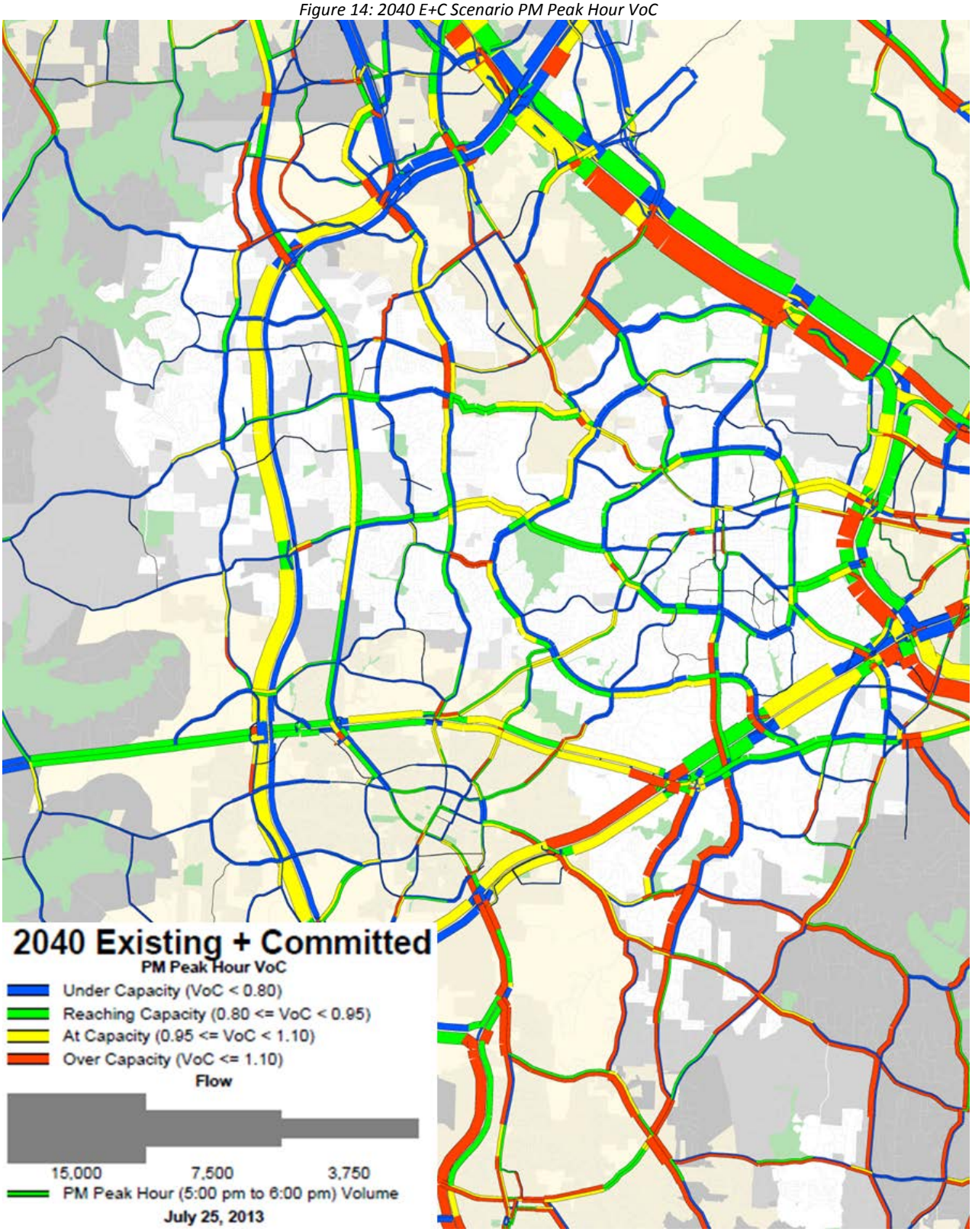


Figure 14: 2040 E+C Scenario PM Peak Hour VoC



2040 MTP Scenario

This scenario is the existing 2040 vision for the Triangle region, containing the expected population, employment, and socio-economic conditions in 2040 and the regional set of fiscally-constrained projects. Table 3 lists the projects in or adjacent to Cary that are included in the 2040 MTP plan.

Table 3: MTP Scenario Project List

Project ID	Street Name	From	To	Existing Lanes	Proposed Lanes	Distance (miles)
A440a	Carpenter Fire Station Rd	NC 55	Yates Store Rd	2	4	0.47
A220b	Morrisville Carpenter Rd	Davis Dr	Louis Stephens Dr	2	4	0.70
A30	Morrisville Parkway (part NL)	Davis Dr	NC 55	2	4	0.60
A222a	NC 54	Cary Parkway	Weston Parkway	2	4	0.90
A240c	South Harrison Avenue	Dry Rd	Kildaire Farm Rd	0	2	0.23
F40	I-40 Managed Lanes (Toll)	Durham County Line	Wade Avenue	0	2	9.20
F41	I-40 Managed Lanes (Toll)	Wade Avenue	Johnston County	0	2	21.29
F42b	I-540 Managed Lanes (Toll)	I-40	US-64 Bypass	0	2	25.82
F5	NC 540 Tri-Ex (Phase IV)	NC 55 Bypass	US 401 (South)	0	6	7.80
A222b	NC 54	Weston Parkway	McCrimmon Pkwy Grade S	2	4	2.40
A221	NC 54	N.W. Maynard Rd	Wilson St	2	6	0.93
A653	NC 55 Operational Improvements	Morrisville Parkway	McCrimmon Pkwy	4	4	0.75
A165b	Airport Blvd Ext	Davis Dr	Louis Stephens Rd	0	2	0.36
A165a	Airport Blvd Ext	NC 54	Garden Square Ln	0	4	0.84
A39	Alston Avenue	Kit Creek Rd	NC 55	2	4	2.12
A545	Arthur Pierce Rd	Kildaire Farm	Holly Springs Rd	2	3	1.03
A64d	Aviation Parkway	I-40	Gateway Centre Blvd	4	6	0.92
A34	Cary Parkway	Evans Rd	Harrison Avenue	2	4	1.74
A530	Evans Rd	Aviation Parkway	Weston Parkway	4	6	0.50
A164c	Green Level Church Rd	Alston Avenue	O'Kelly Chapel Rd	2	4	0.60
A168b	Green Level Church Rd	Green Level West	Morrisville Parkway	2	4	1.86
A69	Holly Springs Rd	Cary Parkway	Penny Rd	2	4	2.22
A70	Holly Springs Rd	Penny Rd	Ten Ten Rd	2	4	1.22
A72	Holly Springs Rd	Tryon Rd	SE Cary Parkway	2	4	0.61
A71	Holly Springs Rd	Ten Ten Rd	Kildaire Farm Rd Connector	2	4	0.84
A73a	Jones Franklin Rd	Tryon Rd	Dillard Dr	2	4	0.67
A41	Kildaire Farm Rd	Ten Ten Rd	Kildaire Farm Connector	2	4	2.03
A219a	McCrimmon Parkway Ext	NC 54	Louis Stephens Rd	2	4	0.82
A220a	Morrisville Carpenter Rd	Page St	Davis Dr	2	4	0.60
A220c	Morrisville Carpenter Rd	Louis Stephens Dr	Good Hope Ch Rd	2	4	0.28
A230	S.E. Maynard Rd	Cary Towne Blvd	Walnut St	4	6	0.26
A114	Ten Ten Rd	Holly Springs Rd	US 1	2	4	3.40

Project ID	Street Name	From	To	Existing Lanes	Proposed Lanes	Distance (miles)
A563	Trinity Rd	NC 54	Chatham St	2	4	0.32
A82	Trinity Rd Ext	Chatham St	Cary Towne Blvd	0	4	0.51
A32	Walker St	Chatham St	Chapel Hill Rd	0	2	0.25
A77	West Lake Rd	Ten Ten Rd	Optimist Farm Rd	2	4	1.28
A75c	Wimberley Rd	Morrisville Parkway	Green Level West Rd	0	4	1.46
A75b	Yates Store Rd	Yates Store Rd	Morrisville Parkway	0	4	1.09
F110	US 1	US 64	NC 540	4	6	5.30
F15a	US 64 West Conversion to Expressway	US 1/64	I-540	4	6	5.70
A229	NC 54	Chapel Hill Rd	Harrison Avenue	4	6	0.80
A233b	NC 54	Reedy Creek Rd	Harrison Avenue	4	6	0.99
A233a	NC 54	Reedy Creek Rd	Chapel Hill Rd	4	6	0.40
A94	NC 55	NC 540	Kit Creek Rd	4	6	1.58
A652	NC 55	Morrisville Carpenter Rd	NC 540	4	6	1.55
A64b	Aviation Parkway	Evans Rd	NC 54	2	4	0.90
A64a	Aviation Parkway	Gateway Centre Blvd	Dominion Dr	2	4	0.58
A236	Chapel Hill Rd	NE Maynard Rd	NW Maynard Rd	2	4	2.06
A36c	Chatham St	N.E. Maynard Rd	I-40 bridge	2	4	0.93
A28b	Davis Dr	Farm Pond Rd	US 64	2	4	1.10
A557	Green Lvl W Rd Widening	NC 540	Green Level Ch Rd	2	4	0.95
A560b	Jones Franklin Widening	I-440	Dillard Dr	2	4	1.22
A223a	Kit Creek Rd	Wake Rd	Green Level Ch Rd	0	4	0.42
A410	Lake Pine Dr/Old Raleigh Rd	Cary Parkway	Apex Peakway	2	4	1.70
A27c	Louis Stephens Dr Ext (part NL)	O'Kelly Chapel Rd	McCrimmon Pkwy	2	4	1.57
A237b	Old Apex Rd	Cary Parkway	Laura Duncan Rd	2	4	0.39
A547	Stephenson Rd	Ten Ten Rd	Sunset Lake Rd	2	4	2.03
A113	Ten Ten Rd	Holly Springs Rd	Bells Lake Rd	2	4	1.95
A400a	Ten-Ten Rd	Bells Lake Rd	Old Stage Rd	2	4	5.10
A231	Trinity Rd	Edwards Mill Rd Ext	Trenton Rd	2	4	1.10
A77a	West Lake Rd	Larboard Rd	Bells Lake Rd	0	2	0.53

Figure 15: 2040 MTP Scenario, Daily Volume

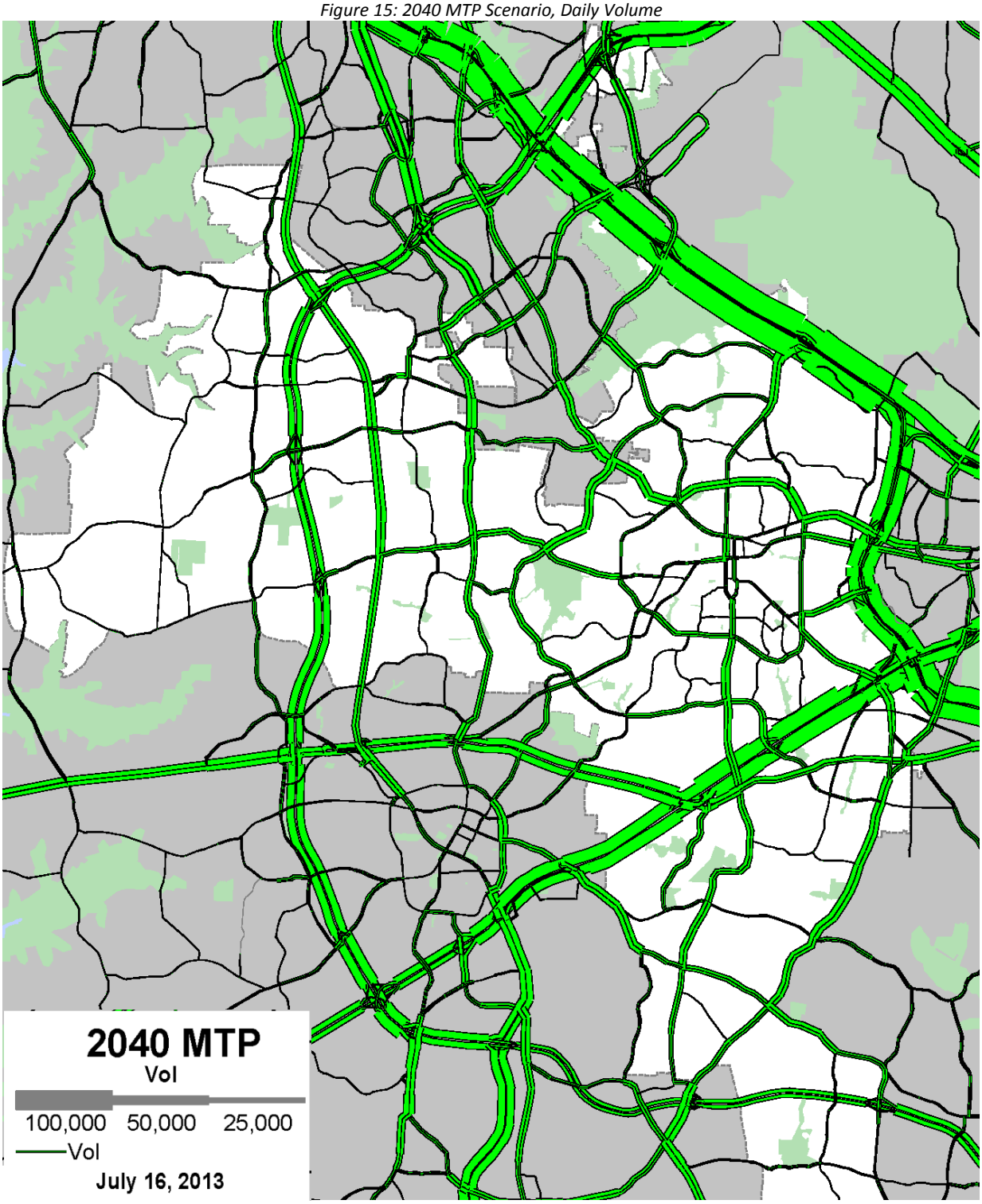
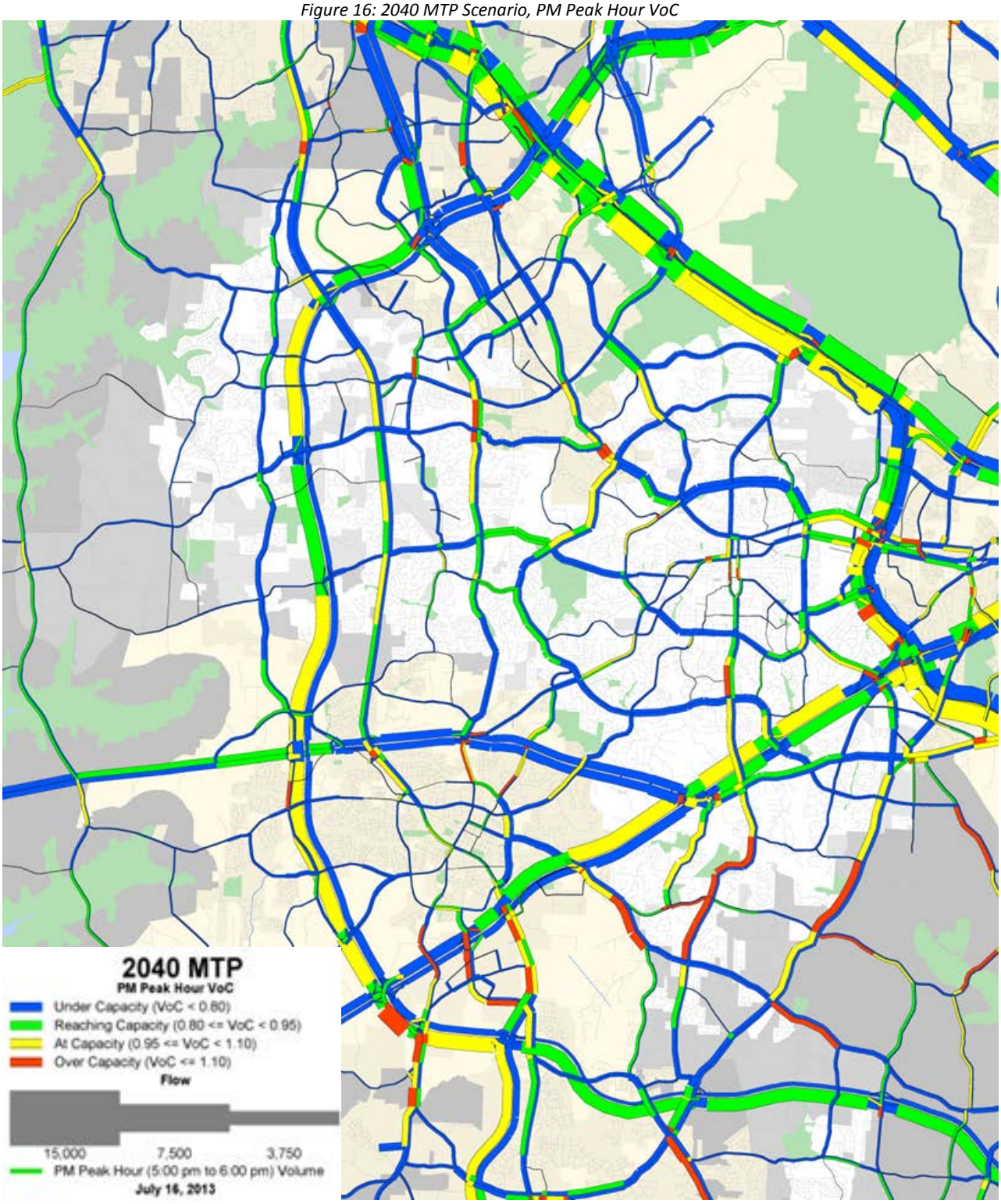


Figure 16: 2040 MTP Scenario, PM Peak Hour VoC



2040 Imagine Cary Scenario

This scenario models the land use and transportation plans envisioned as part of this planning process. This includes the Future Growth Framework land use plan, which was converted into socio-economic model inputs as described earlier in this technical appendix. This model scenario also includes a set of street improvements in addition to those included as part of the 2040 E+C and 2040 MTP scenarios. The projects included in Table 4 do not represent all the projects envisioned in the Imagine Cary process and included on the Streets Map in Chapter 7. The list in Table 4 represent edits made to the 2040 MTP in order to model the Imagine Cary scenario. Because the TRM does not contain all streets in the Triangle, many projects were not coded into the model because the projects affected smaller collectors not included in the model. The model was edited to include all thoroughfares from the Streets Map, but no new collectors were added.

Table 4: Imagine Cary Scenario Projects

Street Name	From	To	Existing Lanes	Proposed Lanes
Yates Store Rd	O'Kelly Chapel Rd	Wake Rd	0	4
O'Kelly Chapel Rd	Cary Boundary	Stonecroft Ln	2	4
O'Kelly Chapel Rd	Stonecroft Ln	Cary Boundary	4	6
Yates Store Rd	New Hope Church Rd	Carpenter Fire Station Rd	2	4
Wimberley Road Extension	Morrisville Parkway	Green Level Rd	2	4
Green Level West Rd	Luther Rd	Green Level Church Rd	2	4
Roberts Rd	Green Level Church Rd	Jenks Rd	0	3
NC 55	McCrimmon Pkwy	Carpenter Fire Station Rd	4	6
McCrimmon Pkwy Ext	NC 55	Louis Stephens Dr	0	4
Louis Stephens Dr	Cary Boundary	Morrisville Pkwy	2	4
Louis Stephens Dr	Morrisville Pkwy	High House Rd	4	3
Davis Dr	McCrimmon Pkwy	Cary Boundary	4	6
Chapel Hill Rd	Aviation Pkwy	NW Cary Pkwy	4	6
Norwell Blvd	Weston Pkwy	NW Cary Pkwy	0	4
Old Reedy Creek Rd	I-40	Weston Pkwy	0	3
New Interchange	I-40 Managed Lanes	Old Reedy Creek Rd	0	1
N Harrison Ave	Weston Pkwy	Reedy Creek Rd	4	6
NE Cary Pkwy Ext	N Harrison Ave	Trenton Rd	0	2
NW Maynard Rd	Chapel Hill Rd	High House Rd	2	4
Chapel Hill Rd	NE Maynard Rd	Cary Boundary	4	6
Reedy Creek Rd	Chapel Hill Rd	E Chatham St	2	0
Chatham St	Dixon Ave	E Durham Rd	4	2
High House Rd	Old Apex Rd	Chatham St	4	2
Walnut St	Walker St	Warren Ave	4	3
Cary Towne Blvd	SE Maynard Rd	Cary Boundary	4	6
SE Maynard Rd	Cary Towne Blvd	Walnut St	6	4

Street Name	From	To	Existing Lanes	Proposed Lanes
Walnut St	SE Maynard St	US 1 / 64	4	6
Tryon Rd	Regency Pkwy	New Waverly Place	4	6
Tryon Rd	Walnut St	Cary Boundary	4	6
Lake Pine Dr	SW Cary Pkwy	Cary Boundary	4	3
Arthur Pierce Rd	Kildaire Farm Rd	Holly Springs Rd	4	3
Bells Lake Rd	Ten Ten Rd	West Lake Rd	2	4
Optimist Farm Rd	Sunset Lake Rd	Bells Lake Rd	2	4
Evans Rd	NW Cary Parkway	Winfair Dr	6	4
NE Cary Pkwy	Trenton Rd	Cary Boundary	2	4
Green Level Church	McCrimmon Parkway	O'Kelly Chapel Rd	6	4
Holly Springs Rd	SE Cary Boundary	Tryon Rd	4	6

The 2040 total daily volume is shown in Figure 17. The 2040 PM peak hour VoC is shown in Figure 18.

Figure 17: 2040 Imagine Cary Scenario, Total Daily Volume

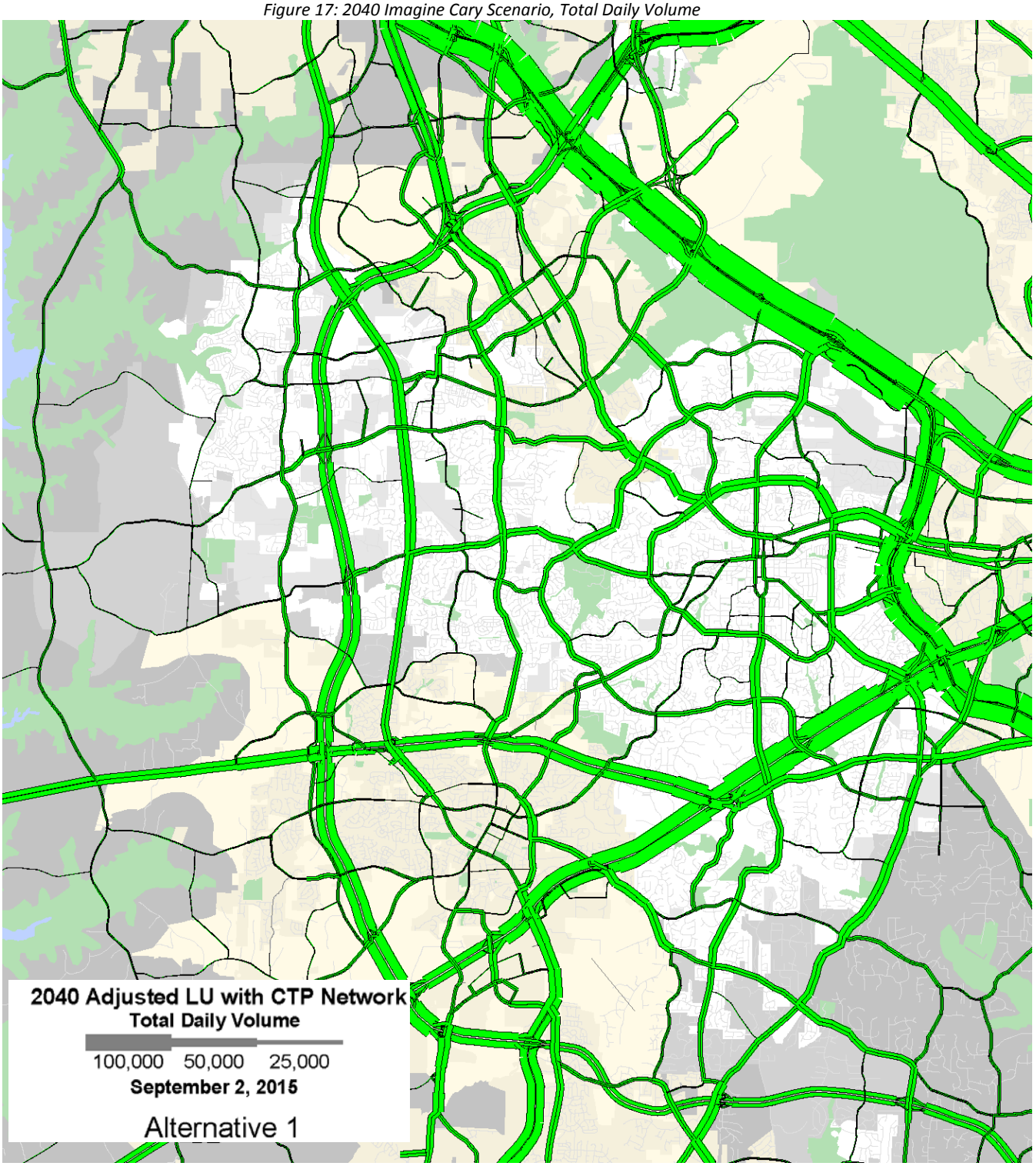
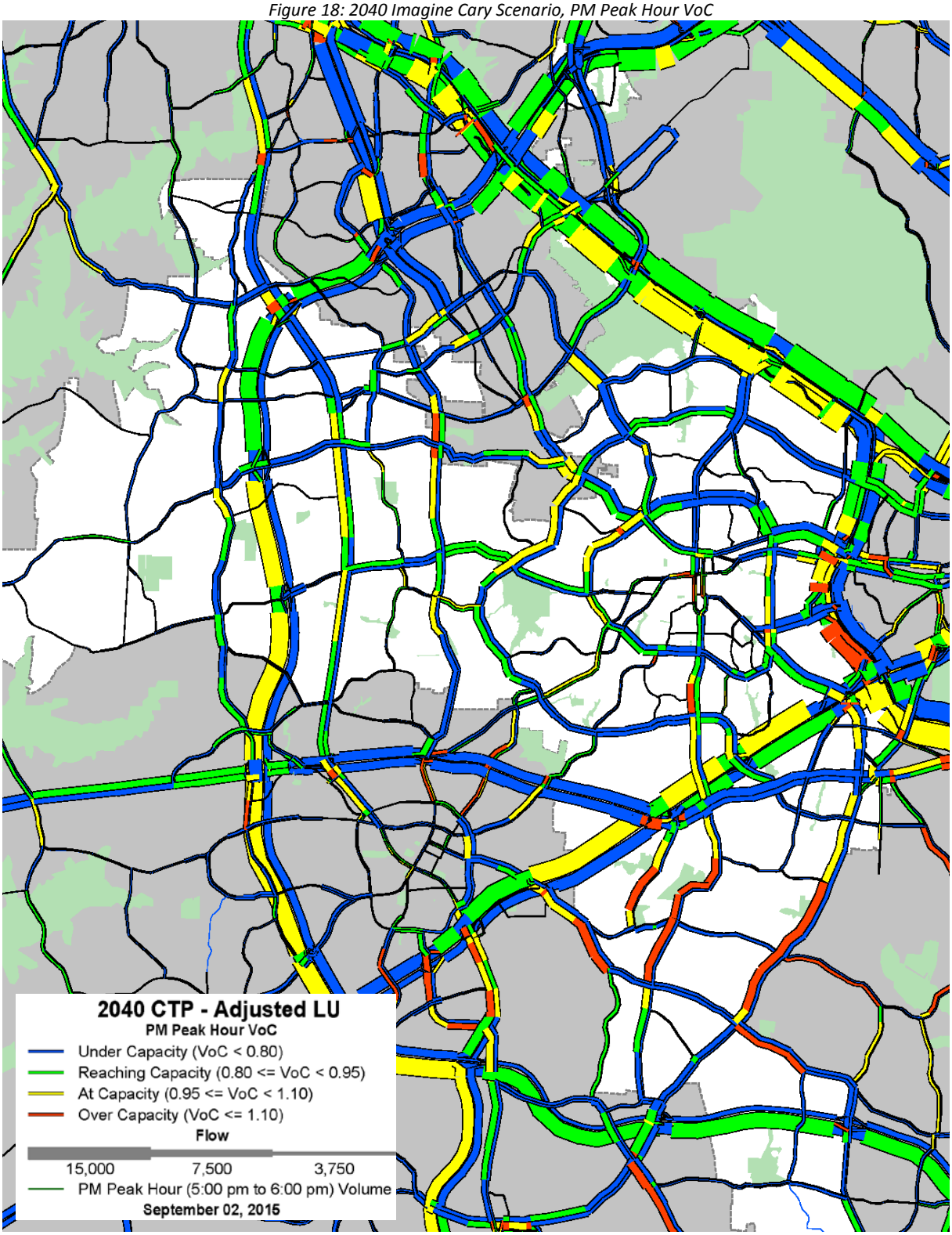


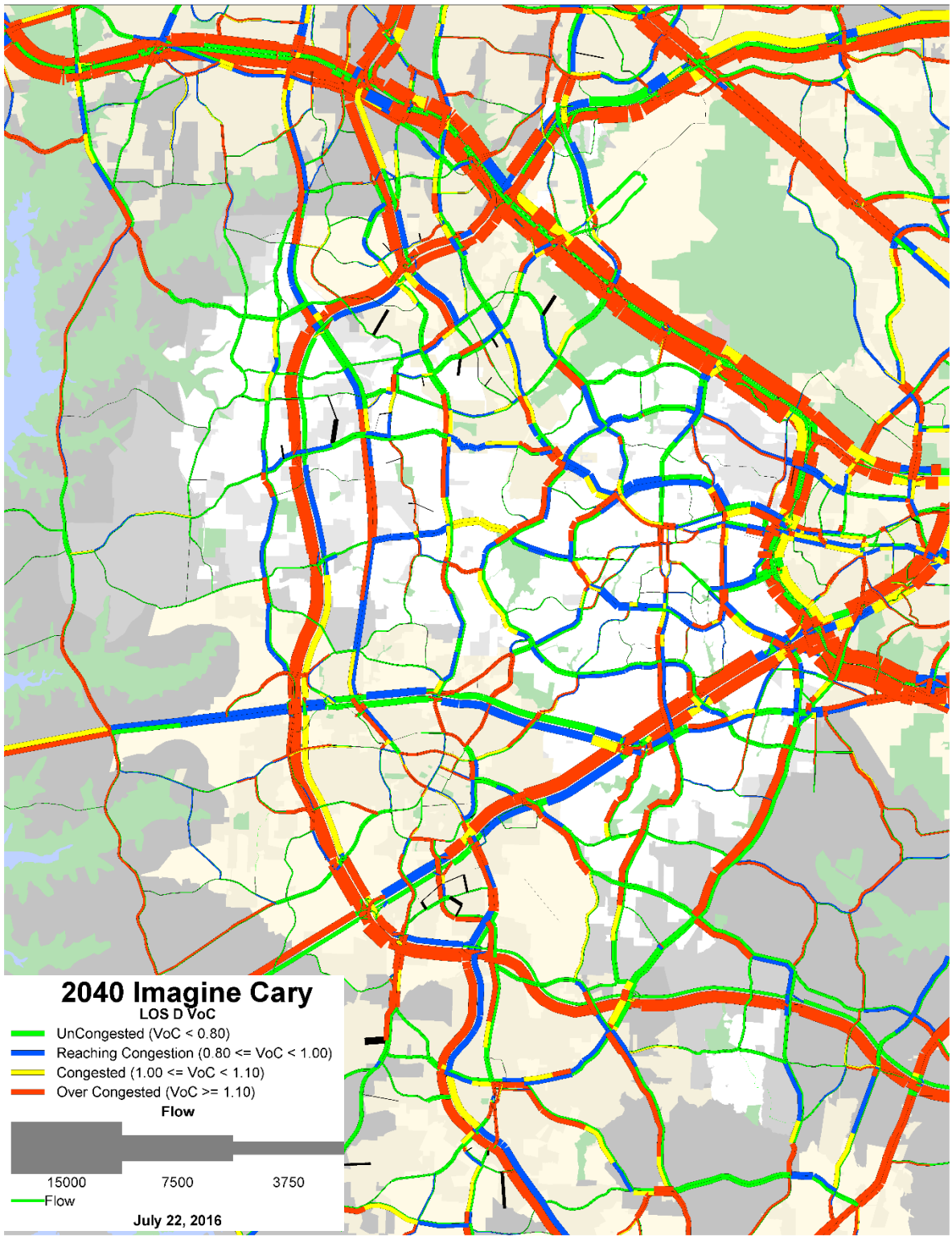
Figure 18: 2040 Imagine Cary Scenario, PM Peak Hour VoC



Level of Service D Analysis

The Imagine Cary Scenario was also modeled with a Level of Service factor applied to approximate a Level of Service (LOS) level D. The TRM is calibrated on ultimate capacity, which is generally analogous to LOS E. Factors were provided by the Durham-Chapel Hill-Carrboro MPO (DCHC MPO) to convert the LOS E capacities to LOS D capacities to perform the LOS D model analysis. The image below shows PM Peak Hour LOS D 2040 Volume to Capacity Ratio (VoC).

Figure 19: Imagine Cary Scenario LOS D 2040 PM Peak Hour VoC



2040 Imagine Cary Scenario Thoroughfare Projects

The following list is the set of construction projects for thoroughfares in Cary. These are the projects that make up the Streets Map that is the long-term vision for Cary's street network.

Table 5: Imagine Cary Scenario Thoroughfare Projects

Street Name	From	To	Existing Lanes	Proposed Lanes
Chapel Hill Rd	NE Maynard Rd	Cary Boundary	4	6
N Harrison Ave	I-40	Reedy Creek	4	6
Maynard Rd	Chapel Hill Rd	Chapel Hill Rd	4	6
Chapel Hill Rd	Cary Boundary	NW Maynard Rd	4	6
NC 55	Cary Boundary	Morrisville Carpenter Rd	4	6
Walnut St	SE Maynard Rd	US 1 / 64	4	6
Tryon Rd	US 64	New Waverly Pl	4	6
Tryon Rd	Walnut St	Cary Boundary	4	6
Davis Dr	McCrimmon Pkwy	Cary Boundary	4	6
O'Kelly Chapel Rd	Stonecroft Ln	Cary Boundary	4	6
Evans Rd	N Cary Boundary	NW Cary Parkway	4	6
Penny Rd	Ten Ten Rd	Holly Springs Rd	2	4
Holly Springs Rd	Cary Boundary	Tryon Rd	2	6
Green Level Church Rd	SW Cary Boundary	Millercrest Ln	2	4
Green Level Church Rd	McCrimmon Pkwy	Evans Farm Rd	2	4
Chatham St	NE Maynard Rd	Cary Boundary	2	5
Kildaire Farm Rd	Ten Ten Rd	Holly Springs Rd	2	4
Carpenter Fire Station Rd	Cameron Pond Dr	NC 55	2	4
Green Level Church Rd	Green Hope School Rd	Roberts Rd	2	4
Jones Franklin Rd	Dillard Dr	Tryon Rd	2	5
Ten Ten Rd	Cary Boundary	Bells Lake Rd	2	4
Cary Pkwy	Evans Rd	N Harrison Ave	2	4
Louis Stephens Dr	Morrisville Carpenter Rd	Cary Boundary	2	4
Optimist Farm Rd	Pierce Olive Rd	Bells Lake Rd	2	4
Bells Lake Rd	Ten Ten Rd	Cary Boundary	2	4
Pleasant Grove Church Rd	Airport Blvd	Cary Boundary	2	4
Chapel Hill Road	NW Maynard	NE Maynard	2	4
O'Kelly Chapel Rd	Cary Boundary	Stonecroft Ln	2	4
Walker St	Cedar St	Wilkinson Ave	0	2
Morrisville Carpenter Rd	NC 55	Louis Stephens Dr	0	4
Louis Stephens Dr	Morrisville Carpenter Rd	High House Rd	2	3
Trinity Rd Ext	Chatham St	Cary Towne Blvd	0	4
Yates Store Rd	Carpenter Fire Station Rd	Green Level West Rd	0	4

Street Name	From	To	Existing Lanes	Proposed Lanes
Morrisville Pkwy Ext	Green Level Church Rd	NC 55	0	4
Cary Pkwy Ext	N Harrison Ave	Trinity	0	2
Harrison Ext	Dry Ave	Kildaire Farm Rd	0	2
West Lake Rd	Larboard Rd	Bells Lake Rd	0	2
McCrimmon Pkwy	NC 55	Louis Stephens Dr	0	4
Aviation Pkwy	Dominion Dr	National Guard Dr	2	4
Norwell Blvd	Weston Pkwy	NW Cary Pkwy	2	4

2040 Imagine Cary Scenario Map Updates

The following is a list of changes made to the 2008 CTP Roadway Widths map in order to make the Streets Map shown in Chapter 7. These changes represent revisions to recommendations, updates of alignment, updates to reflect existing sections, and the addition of new map elements.

Table 6: Imagine Cary Scenario Streets Map Changes

ID	Street Name	From	To	Action
CARY-001	Aerial Center Parkway	Airport Blvd	Gateway Center Drive, new location	Show as collector
CARY-002	Bamburg Road	Pierce Olive Road	Orchard Knoll Drive	Remove from map
CARY-003	Banningford Road Extension	Banningford Road	Rosiere Drive	Realign collector system in the area to extend Banningford Road on new location across Arthur Pierce
CARY-004	Batchelor Rd	End of existing facility	White Oak Church Rd	New Collector recommendation
CARY-005	Carpenter Upchurch Road Extension (new Location)	Carpenter Upchurch Road	Morrisville Carpenter Road	Remove this recommendation
CARY-006	Carramore Avenue	Louis Stephens Drive	Davis Drive	Change section to solid line
CARY-007	Cary Parkway Extension	Trenton Road	I-40	Change to 4-lane median divided
CARY-008	Chatham Street	Maynard Road	Durham Road	Show as 3-lane thoroughfare
CARY-009	Cozy Oak Lane	Green Hope School Road	Morrisville Parkway	Show as a collector
CARY-010	Crossroads Boulevard	US 1	Caitboo Avenue	Remove collector avenue
CARY-011	Crossroads Manor Court	Walnut Street	Macedonia Lake Drive	Change section to solid line

ID	Street Name	From	To	Action
CARY-012	Dell Webb Avenue	O'Kelly Chapel Road	Yates Store Road	Add to the system as a collector
CARY-013	Earnest Jones Road	Mount Pisgah Church Road	Wake County line	Show as two-lane thoroughfare
CARY-014	East Ferrell Road	Wake County line	Morrisville Parkway	Show as two-lane thoroughfare
CARY-015	Evans Rd	NW Cary Parkway	Winfair Dr	Revise recommendation to five lanes
CARY-016	Green Hope School Road	Green Level Church Road	end of existing facility	Change section to solid line
CARY-017	Green Level Church Road	Green Level West Road	Green Level Church Road	Show as 4-lane median divided thoroughfare
CARY-018	Green Level Church Road	McCrimmon Parkway	O'Kelly Chapel Road	Revise recommendation to a 4-lane divided section
CARY-019	Green Level West Road	Batchelor Road	Lewter Shop Road	Show as two-lane thoroughfare
CARY-020	Highcroft Drive	Green Hope School Road	McCrimmon Parkway	Realign collector; change to solid line where road is built
CARY-021	Highcroft Drive	McCrimmon Parkway	Horton's Creek Road	Realign and switch through road to Highcroft Drive
CARY-022	Highcroft Drive	Green Level West Road	Briardale Road	Show as collector avenue
CARY-023	Highcroft Lane	Carpenter Fire Station Rd	Parkman Grant Dr	Change section to solid line
CARY-024	Highgate Oak Drive	Wackena Road	Sedgefield Park Lane	Add to system as collector
CARY-025	Holly Springs Rd	SW Cary Boundary	Tryon Road	Revise recommendation to six-lanes
CARY-026	Horton's Creek Road	Yates Store Road	Plum Branch Drive	Change section to solid line and a collector avenue
CARY-027	Hunter Street	Chatham Street	Cedar Street	Take off map
CARY-028	Johnson Pond Road Extension	Johnson Pond Road	Sawyers Mill Drive	Remove the two extensions from Johnson Pond and Sawyers Miller and replace with one extension on new location directly connecting the two roads

ID	Street Name	From	To	Action
CARY-029	Kildaire Farm Road	Cornwall Road	Tryon Road	Show as 5-lane thoroughfare
CARY-030	Kildaire Farm Road	Cornwall Road	Walnut Street	Revise to a 3-lane thoroughfare recommendation
CARY-031	Lake Grove Road	Cary Town Limits	McCrimmon Parkway	Add to the system as a collector
CARY-032	Lake Pine Drive	Cary Parkway	US64	Revise recommendation to 3-lane section
CARY-033	Lake Pine Interchange	US64	US64	Show proposed interchange
CARY-034	Lewter Shop Road	NC751	Wake County line	Show as two-lane thoroughfare
CARY-035	Louis Stephens Road	Bender Bridge Road	Airport Boulevard Extension	Smooth out L-curve
CARY-036	Macedonia Lake Drive	Tryon Manor Drive	Crossroads Manor Court	Change section to solid line
CARY-037	Macedonia Road (proposed new location)	Walnut Street	Jones Franklin Road	Realign road to existing Macedonia Lake Road. Remove N-S connector to Columbus
CARY-038	Magness Drive	High House Rd	Davis Drive	Show as collector avenue
CARY-039	Maynard Road	High House Rd	Chapel Hill Road	Revise recommendation to 5-lane section
CARY-040	Meeting Street	Walnut Street	Caitboo Avenue	Change section to solid line
CARY-041	Mills Park Drive	Green Level Church Road	Mills Park School	Change section to solid line
CARY-042	Morrisville Parkway	Cozy Oak Avenue	Davis Drive	Change section to solid line
CARY-043	Morrisville Parkway	Yates Store Road	Wake County line	Show as 4-lane median divided thoroughfare
CARY-044	NC55	Turner Creek Road	Glendon Way	Change to five lane thoroughfare
CARY-045	NC751	Cary Urban Services Boundary	Cary Urban Services Boundary	Show as four-lane thoroughfare
CARY-046	Nelson Rd	Kitty Hawk Drive	Cary boundary	Show as collector avenue
CARY-047	New Collector	Turner Creek Road	Roberts Road	New collector alignment
CARY-048	New Hope Church Road	Mount Pisgah Church Road	Yates Store Road	Show as two-lane thoroughfare
CARY-049	New Location Collector	NW Cary Parkway (new location)	SAS Campus Limit	Show collector street on new location

ID	Street Name	From	To	Action
CARY-050	New Location Collector Avenue	Good Hope Church Road	McCrimmon Parkway	Revise recommendation to a collector avenue
CARY-051	New Location Collector	Carpenter Upchurch Road Extension (new Location)	Morrisville Carpenter Road	Remove this recommendation
CARY-052	New Location Collector	Good Hope Church Road	McCrimmon Parkway Extension (new location)	Revise recommendation to a collector avenue
CARY-053	New Location Collector	Chaumont Drive	Ten-Ten Road	Revise recommendation to a collector
CARY-054	Old Apex Road	West Chatham Street	West Chatham Street	Revise recommendation to 3-lane section
CARY-055	Old Raleigh Road	Gregson Drive	US64	Add to the map as a collector avenue
CARY-056	Old Reedy Creek Road	Old Reedy Creek Road	Weston Parkway	Show collector section on Winstead Drive near the intersection with Weston Parkway until it ties back in with existing Reedy Creek
CARY-057	Old Reedy Creek Road	Winstead Road	I-40	Show as a 3-lane thoroughfare
CARY-058	Old Reedy Creek Road Interchange	I-40	I-40	Proposed Interchange at I-40
CARY-059	Olive Tree Lane	Pierce Olive Road	New location	Change section to solid line
CARY-060	Orchard Knoll Drive	Ten Ten Road	Lawdraker Road	Remove from map
CARY-061	Oxford Green Drive	Bells Lake Road	West Lake Road	Remove as collector
CARY-062	Parkscene Lane	NC55	NC55	Change to collector
CARY-063	Piney Plains Road	Stephens Road	Tryon Road	Show as 5-lane thoroughfare
CARY-064	Pittard Sears Road	O'Kelly Chapel Road	Nickel Creek Circle	Add to the system as a collector
CARY-065	Reedy Creek Road	Chapel Hill Road	NE Maynard Road	Revise recommendation to a collector
CARY-066	Reedy Creek Road	Chapel Hill Road	Chatham Street	Remove recommendation from the map
CARY-067	SAS Campus Drive	Harrison Avenue	Trenton Road	Take off map
CARY-068	Sedgefield Park Lane	Highgate Oak Drive	Morrisville Parkway	Add to system as collector

ID	Street Name	From	To	Action
CARY-069	Stonewater Glen	Yates Store Road	Alston Avenue	Change section to solid line and a collector avenue, it needs to connect to O'Kelly Chapel Road
CARY-070	Summer Brook Drive Extension	Summer Brook Drive	Optimist Farm Road	Realign collector connection
CARY-071	Trinity Road	Trenton Road	I-40	Remove from map
CARY-072	Trinity Road	Chapel Hill Road	Trenton Road	Show as 3-lane thoroughfare
CARY-073	Trinity Road (new location)	Cary Town Boulevard	Chatham Street	Realign segment to be on existing stub at Cary Town Boulevard
CARY-074	Tryon Road	Walnut Street	Town limits	Revise recommendation to six-lanes
CARY-075	Turner Creek Road	NC55	New collector location	Show as collector
CARY-076	Upchurch Meadow Road	Louis Stephens Drive	Circle on the Green	Show as collector
CARY-077	Wake Road	Yates Store Road	Green Level Church Road	Remove Rural Designation and show as Collector Avenue
CARY-078	Waldo Rood Boulevard	Davis Drive	Cary Parkway	Show as 3-lane thoroughfare
CARY-079	West Ferrell Road	Lewter Shop Road	Mount Pisgah Church Road	Show as two-lane thoroughfare
CARY-080	White Oak Church Road	Green Level West Road	Yates Store Road extension (new location)	Add street as a collector avenue to the map; create T-intersection at the intersection with Yates Store
CARY-081	White Oak Church Road	Morrisville Parkway	existing White Oak Church	Change section to solid line
CARY-082	Wilson Road realignment	NW Cary Parkway	Chapel Hill Road	Remove this recommendation
CARY-083	Winstead	Old Reedy Creek Road	Weston Parkway	Show as 3-lane thoroughfare
CARY-084	Wrenn Drive	Bargate Drive	Farmington Woods Drive	Show as collector
CARY-085	Yates Store Road	Yates Store Road	Lewter Shop Road	Update alignment
Add American Tobacco Trail to the CTP Map				
Remove Rural Road Designation from the CTP Map				

Model Scenario Analysis

Overall, the 2040 MTP and 2040 Imagine Cary scenarios represent a substantial improvement in traffic conditions over the modeled E+C Scenario, although this is not surprising considering that there are vastly more transportation improvements modeled in both the 2040 MTP and 2040 Imagine Cary scenarios.

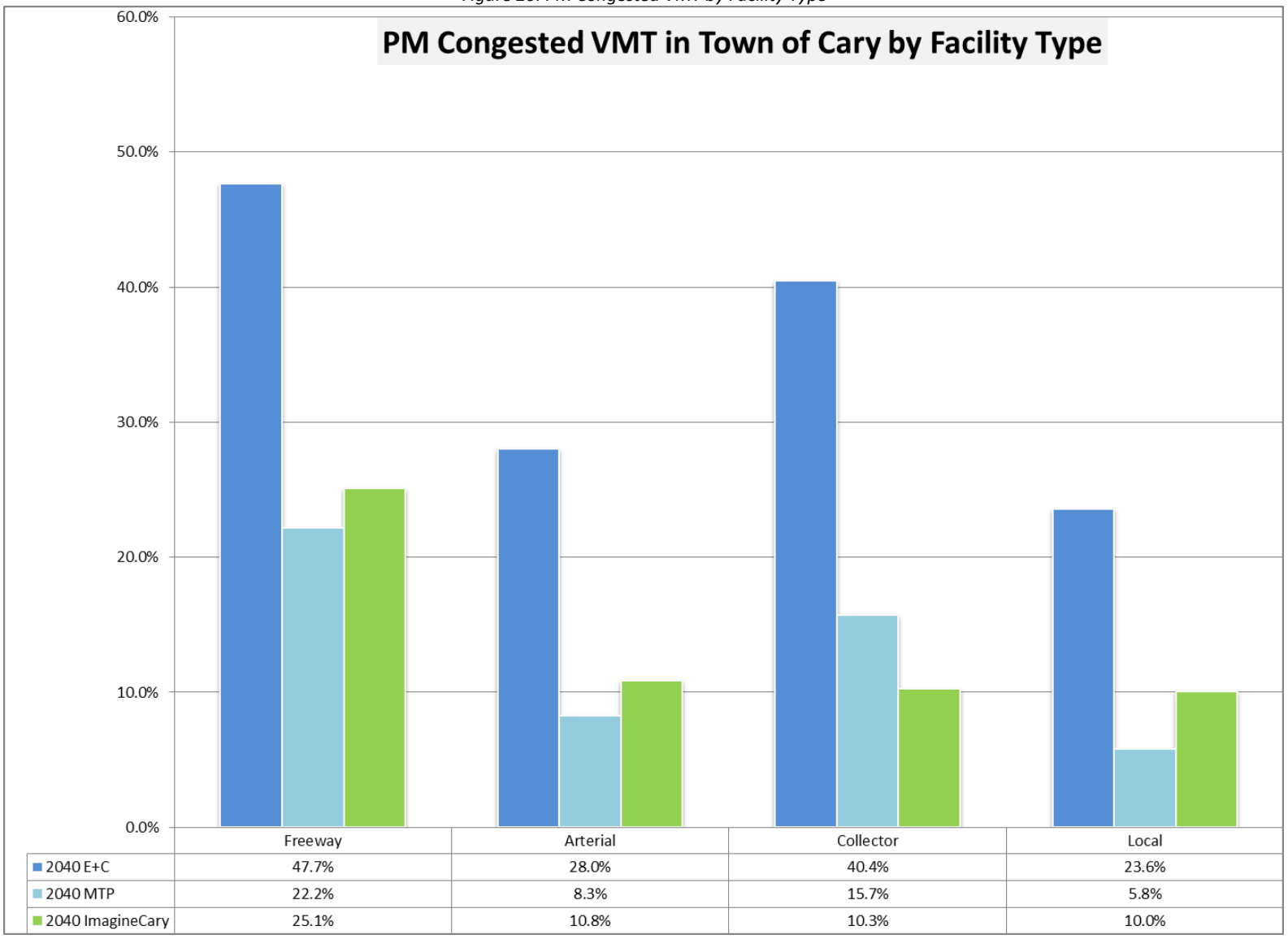
The Imagine Cary Scenario typically has slightly higher levels of the various congestion measurements, although this again is not surprising. The 2040 Imagine Cary Scenario has 11 percent more households and almost 9 percent more employees than the 2040 MTP Scenario. The following table compares total measures between the 2040 MTP Scenario and the 2040 Imagine Cary Scenario.

Table 7: Comparison of 2040 MTP Scenario and 2040 Imagine Cary Scenario

	2040 MTP	2040 Imagine Cary	Change
Total Vehicle Miles Traveled (VMT)	659,532	701,660	6.4%
Total Vehicle Hours Traveled (VHT)	18,311	19,843	8.4%
Congested VMT	93,434	112,608	20.5%
Congested VHT	4,306	5,286	22.8%
Hours of Delay	5,889	6,468	9.8%
Lanes Miles	803	858	6.8%
Centerline Miles	225	230	2.6%
Congested Lane Miles	55	69	24.3%
Congested Centerline Miles	20	26	26.6%

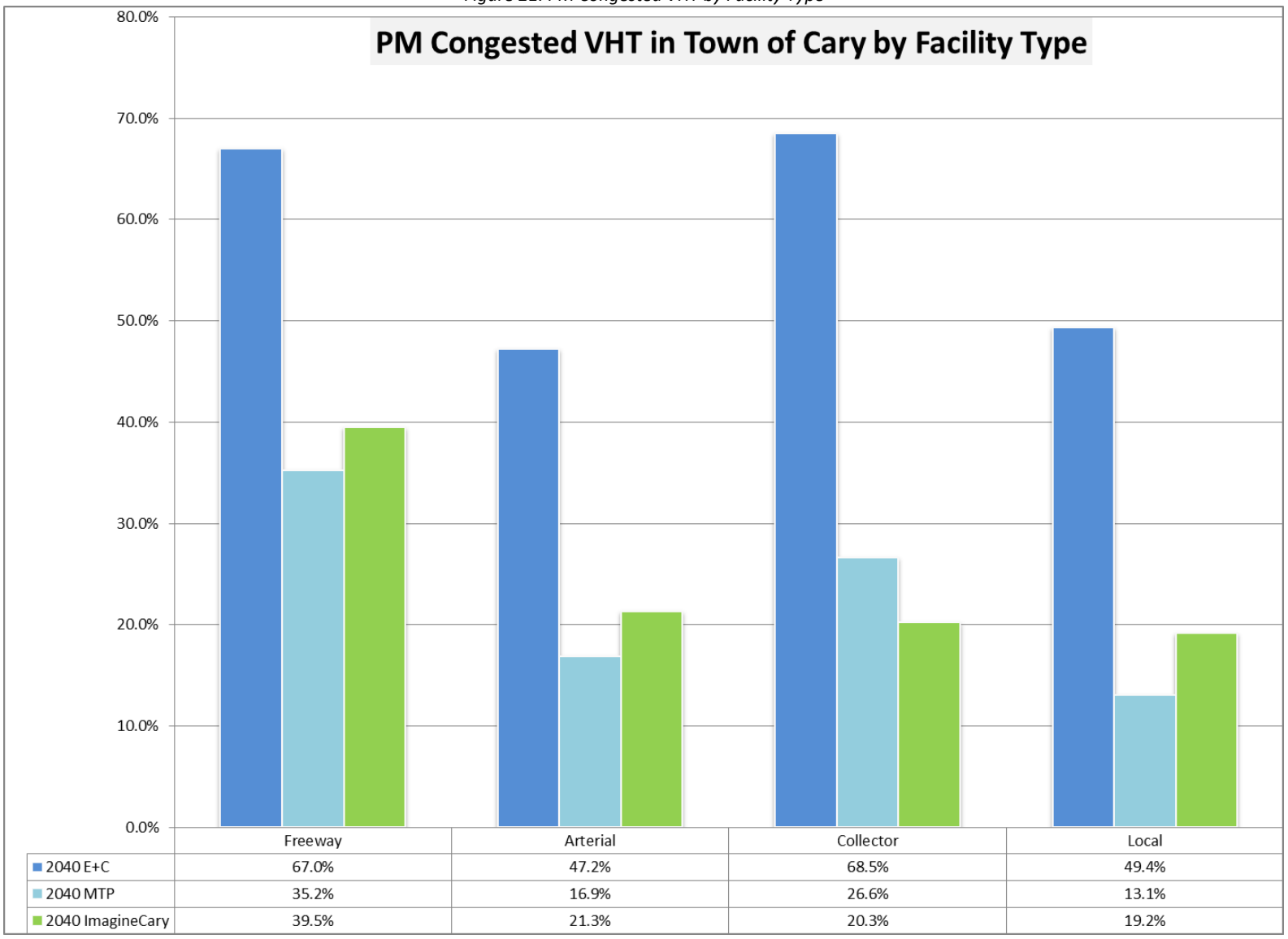
The following charts compare the three future year model scenarios: the 2040 Existing + Committed Scenario, the 2040 MTP Scenario, and the 2040 Imagine Cary Scenario on the various measures of congestion broken down by functional classification.

Figure 20: PM Congested VMT by Facility Type



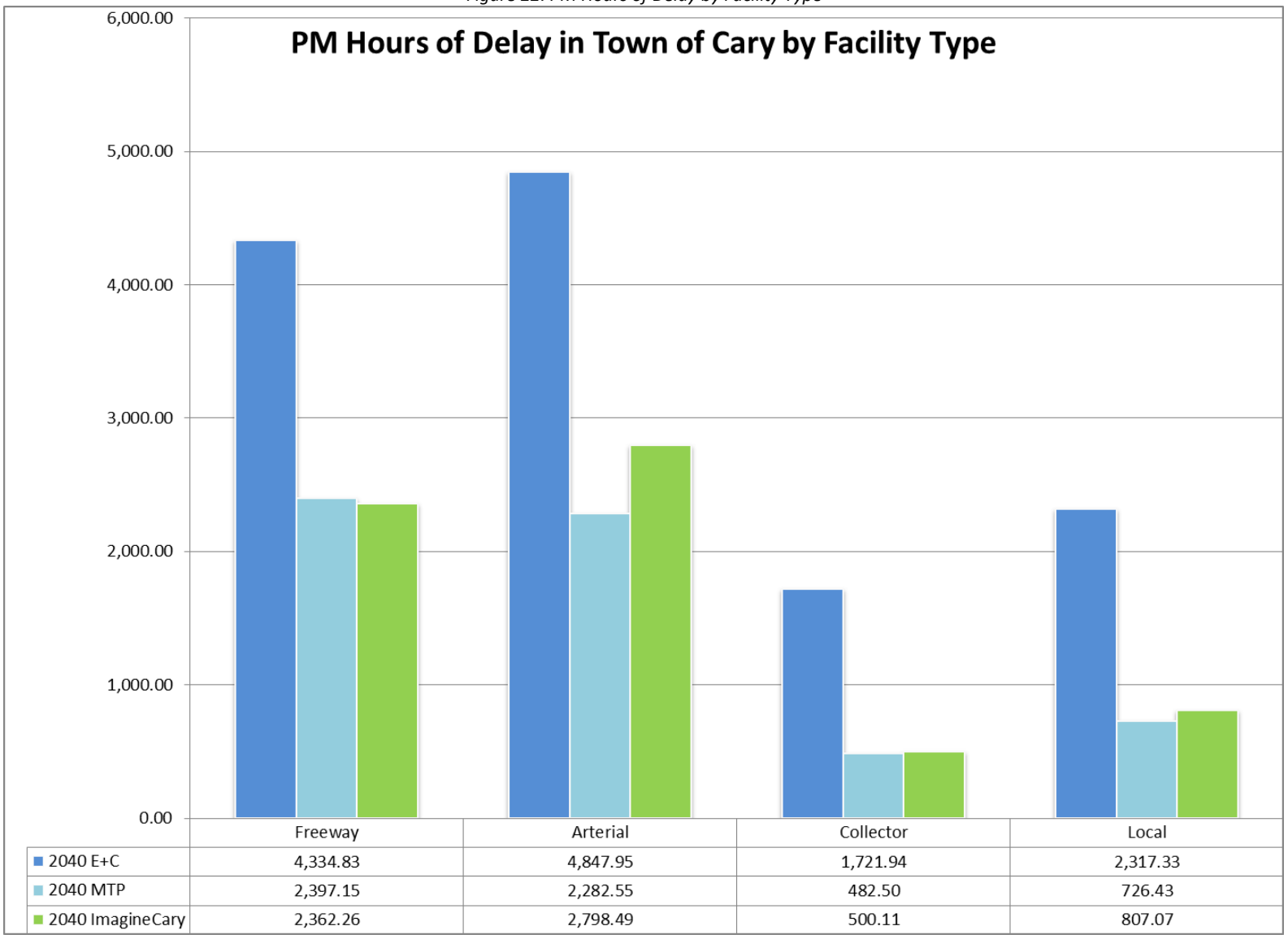
	Freeway	Arterial	Collector	Local
2040 E+C	47.7%	28.0%	40.4%	23.6%
2040 MTP	22.2%	8.3%	15.7%	5.8%
2040 ImagineCary	25.1%	10.8%	10.3%	10.0%

Figure 21: PM Congested VHT by Facility Type



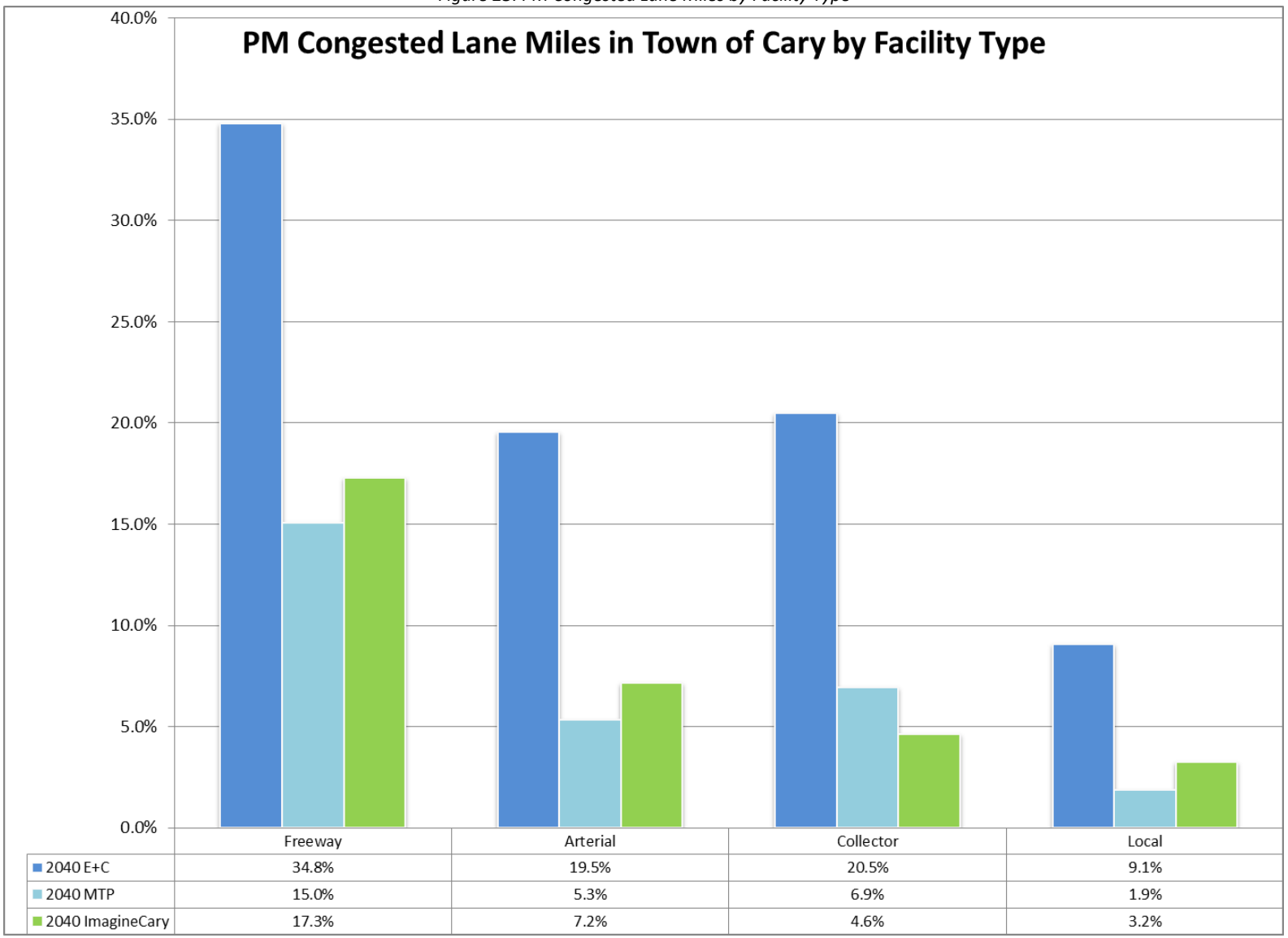
	Freeway	Arterial	Collector	Local
2040 E+C	67.0%	47.2%	68.5%	49.4%
2040 MTP	35.2%	16.9%	26.6%	13.1%
2040 ImagineCary	39.5%	21.3%	20.3%	19.2%

Figure 22: PM Hours of Delay by Facility Type



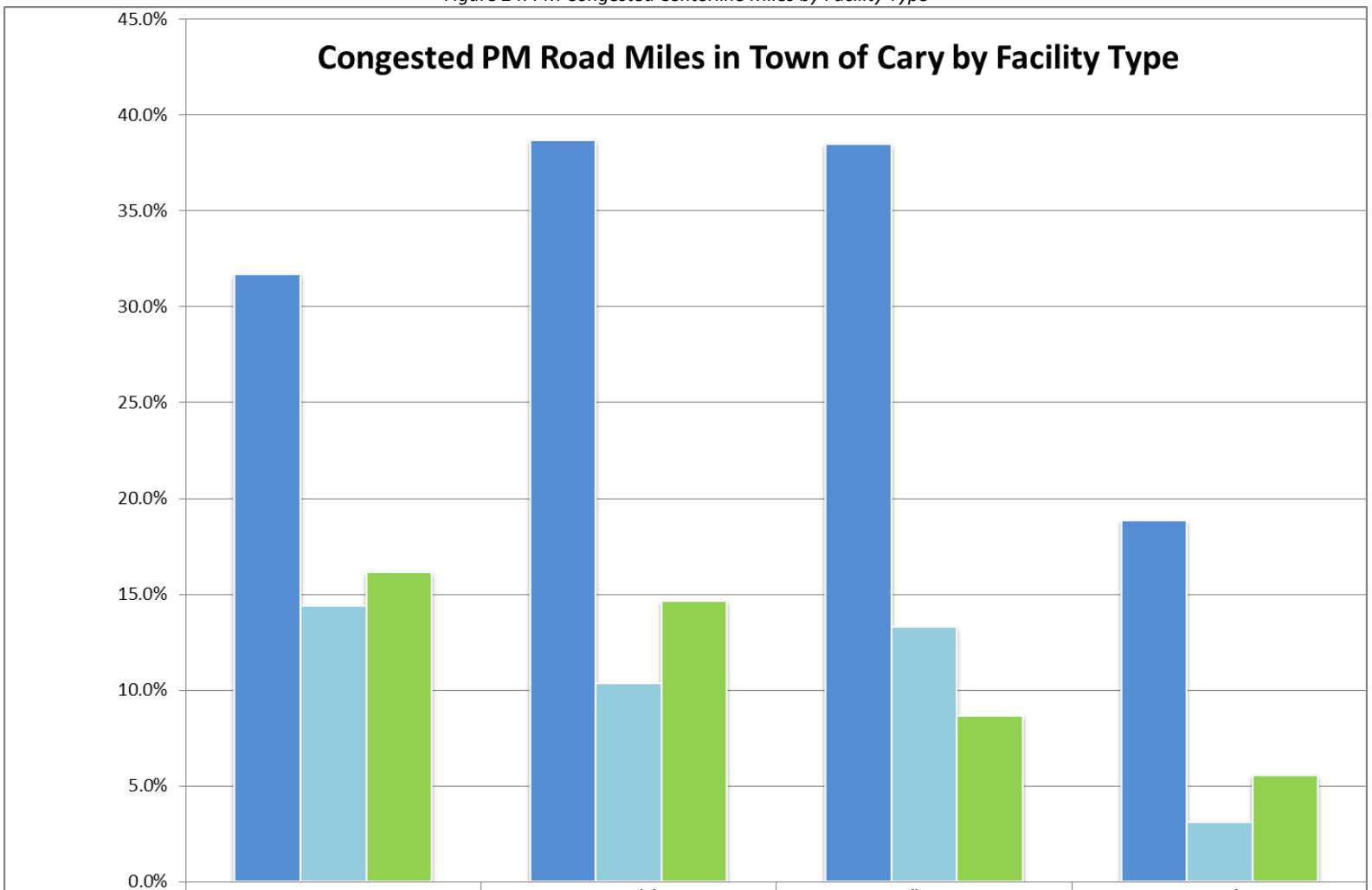
	Freeway	Arterial	Collector	Local
2040 E+C	4,334.83	4,847.95	1,721.94	2,317.33
2040 MTP	2,397.15	2,282.55	482.50	726.43
2040 ImagineCary	2,362.26	2,798.49	500.11	807.07

Figure 23: PM Congested Lane Miles by Facility Type



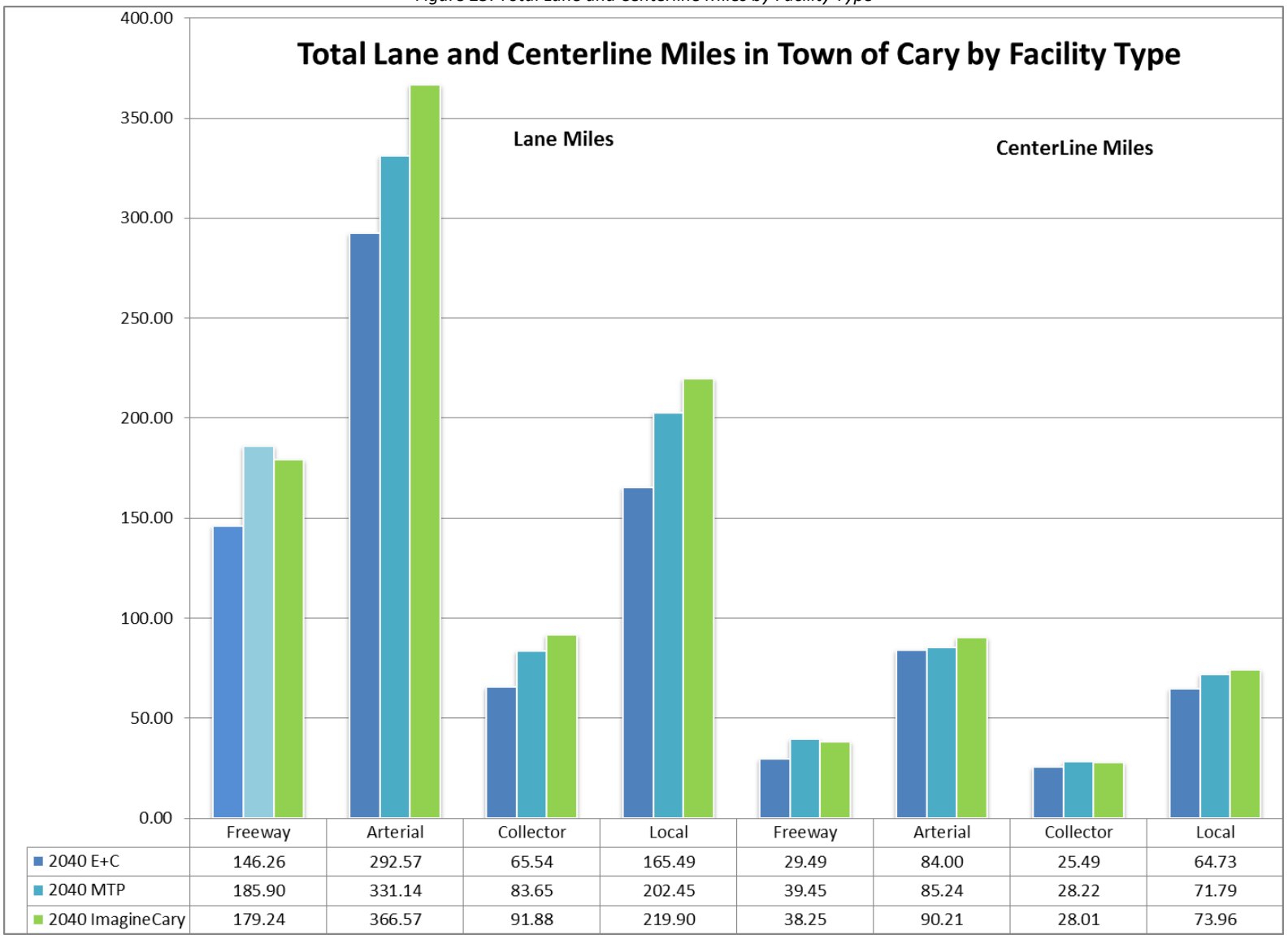
	Freeway	Arterial	Collector	Local
2040 E+C	34.8%	19.5%	20.5%	9.1%
2040 MTP	15.0%	5.3%	6.9%	1.9%
2040 ImagineCary	17.3%	7.2%	4.6%	3.2%

Figure 24: PM Congested Centerline Miles by Facility Type



	Freeway	Arterial	Collector	Local
2040 E+C	31.7%	38.7%	38.5%	18.8%
2040 E+C	14.4%	10.4%	13.3%	3.1%
2040 ImagineCary	16.2%	14.7%	8.7%	5.5%

Figure 25: Total Lane and Centerline Miles by Facility Type



	Freeway	Arterial	Collector	Local	Freeway	Arterial	Collector	Local
2040 E+C	146.26	292.57	65.54	165.49	29.49	84.00	25.49	64.73
2040 MTP	185.90	331.14	83.65	202.45	39.45	85.24	28.22	71.79
2040 ImagineCary	179.24	366.57	91.88	219.90	38.25	90.21	28.01	73.96

Pedestrian & Bicycle Project Prioritization

Implementation of the long-term recommended pedestrian and bicycle networks presented in Chapter 7 requires a strategic approach. This section presents a prioritization methodology to break down those networks into logical projects and score those projects, and provides the ranked list of projects that result.

Prioritization Methodology

Prioritization began by breaking down infrastructure recommendations into discrete segments at logical points, such as major intersections or connection points with other facilities. In addition, key locations for intersection improvements were identified along both the pedestrian and bicycle networks. These segments and intersections were then prioritized with scores based on the weighted criteria listed below. Segments and intersection improvements are scored independently since these projects can be implemented independently.

Table 8: Prioritization Criteria for Pedestrian and Bicycle Projects

PRIORITIZATION CRITERIA	WEIGHT
Reported pedestrian or bicycle crash location	4
Connection to an existing facility	4
Access to mixed-use commercial center, destination center, or downtown	4
Access to an existing or planned school	4
Access to an existing or planned park	4
Access to shopping center	3
Access to transit (bus stop)	3
Access to employment mixed-use campus	3
Access to core neighborhoods	2
Connects to regional trail	2
Low-income areas (US Census)	2
Low-vehicle access areas (US Census)	2

Priority Pedestrian Projects

The following figures and tables present prioritized sidewalk improvements and pedestrian intersection improvements. The specific elements of intersection improvements should be determined during implementation based on the roadway context and land use context of the intersection.

Figure 26: Priority Scoring of Sidewalk Improvements

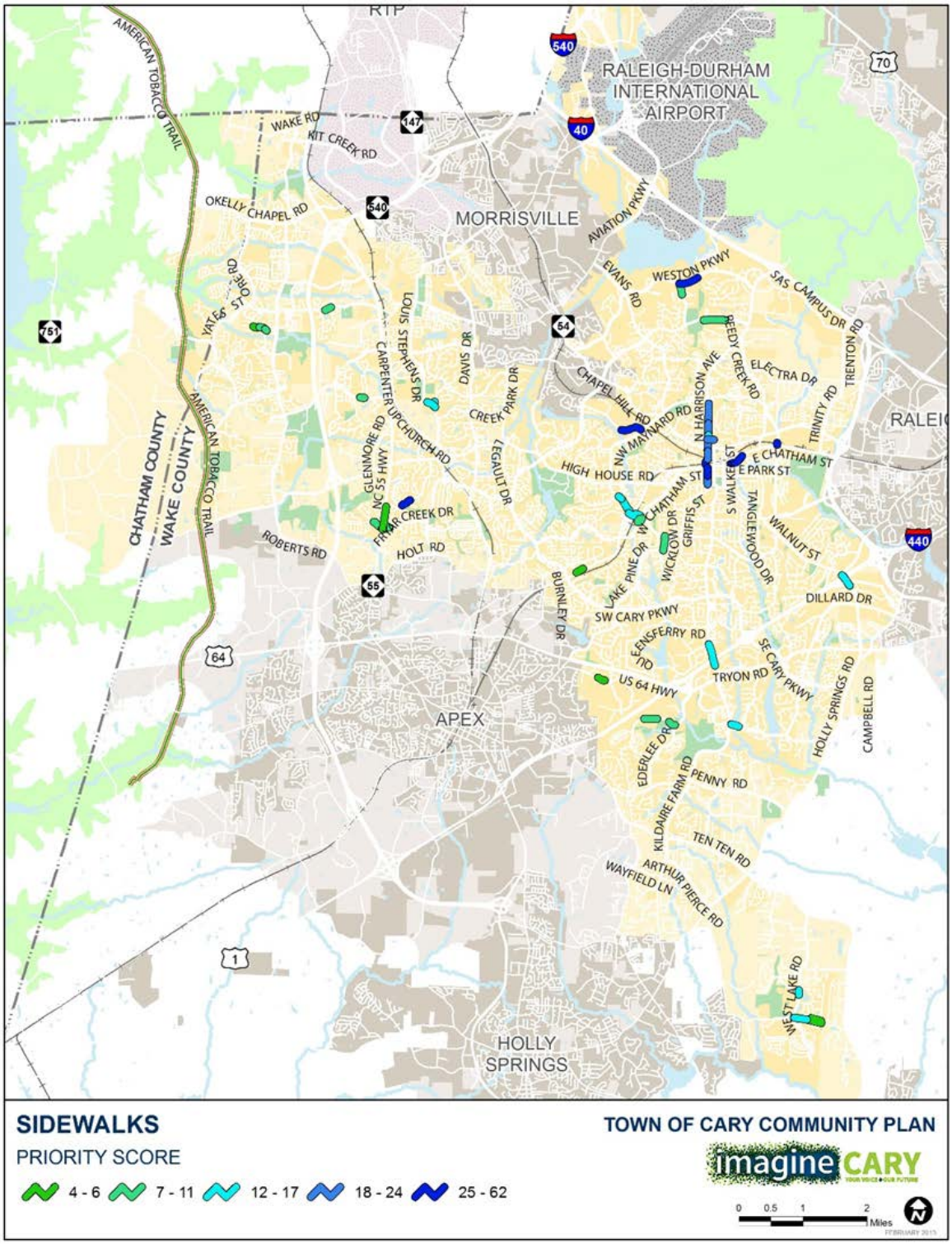


Table 9: Priority Scoring of Sidewalk Improvements

LOCATION	FROM	TO	PRIORITY SCORE
E CHATHAM ST	TEMPLETON ST	E DURHAM RD	62
N HARRISON AVE	W CHATHAM ST	HILLSBORO ST	62
N HARRISON AVE	E PARK ST	E CHATHAM ST	62
NE MAYNARD RD	E CHATHAM ST	CHAPEL HILL RD	58
JAMES JACKSON AVE	TOWERVIEW CT	NW MAYNARD RD	57
WESTON PKWY	NORWELL BLVD	WINSTEAD DR	49
PARKGATE DR	PARKBOW CT	BARNES SPRING CT	44
N HARRISON AVE	GRAY ST	CHAPEL HILL RD	24
W JOHNSON STREET	N HARRISON AVE	N ACADEMY ST	24
N HARRISON AVE	DRY AVE	E PARK ST	21
N HARRISON AVE	HILLSBORO ST	ADAMS ST	20
N HARRISON AVE	E BOUNDARY ST	KINGSWOOD DR	19
N HARRISON AVE	KINGSWOOD DR	ST CHARLES PL	18
WALNUT ST	BUCK JONES RD	PINEY PLAINS RD	17
N HARRISON AVE	E BOUNDARY ST	GRAY ST	16
NW MAYNARD RD	HIGH HOUSE RD	CASTALIA DR	15
LOUIS STEPHENS DR	HERITAGE PINES DR	UPCHURCH MEADOW RD	14
NW MAYNARD RD	CASTALIA DR	OLD APEX RD	14
NW MAYNARD RD	OLD APEX RD	W CHATHAM ST	14
OPTIMIST FARM RD	WEST LAKE RD	COVINGTON HILL WAY	14
UPCHURCH MEADOW RD	LOUIS STEPHENS DR	BENWELL CT	14
WEST LAKE RD	OPTIMIST FARM RD	MIDDLE CREEK PARK AVE	14
KILDAIRE FARM RD	GLASGOW RD	WAKE MEDICAL RD	13
LOCHMERE DR	KILDAIRE FARM RD	SUMMERWINDS DR	12
NORWELL BLVD	WESTON PKWY	BEXLEY BLUFF LN	11
PLANTATION DR	LAKE PINE DR	SW MAYNARD RD	11
W CHATHAM ST	COMMERCE CT	SW MAYNARD RD	11
CARPENTER FIRE STATION RD	CAMERON POND DR	BUXTON GRANT DR	10
NW CARY PKWY	HAMPTON LEE CT	WESTOVER HILLS DR	10
REGENCY PKWY	ANGELICA CIR	EDERLEE DR	10
GREEN HOPE SCHOOL RD	SEARS FARM RD	COZY OAK AVE	8
HOWARD GROVE PKWY	CREEKBURY CT	POPLIN CT	8
HOWARD GROVE PKWY	POPLIN CT	CARY GLEN RD	8
LEWEY DR	NC 55 HWY	JOSEPH POND LN	8
TURNER CREEK RD	ALLIANCE CIR	LEWEY DR	8

OPTIMIST FARM RD	HOMEPLACE DR	HENDERSON RD	6
OLD APEX RD	SW CARY PKWY	MARILYN CIR	5
HOWARD GROVE PKWY	SELWOOD PL	CREEKBURY CT	4
NC 55 HWY	LEWEY DR	PARKSCENE LN	4
OLD RALEIGH RD	AUTO PARK BLVD	MACKENAN DR	4

Figure 27: Priority Scoring of Pedestrian Intersection Improvements

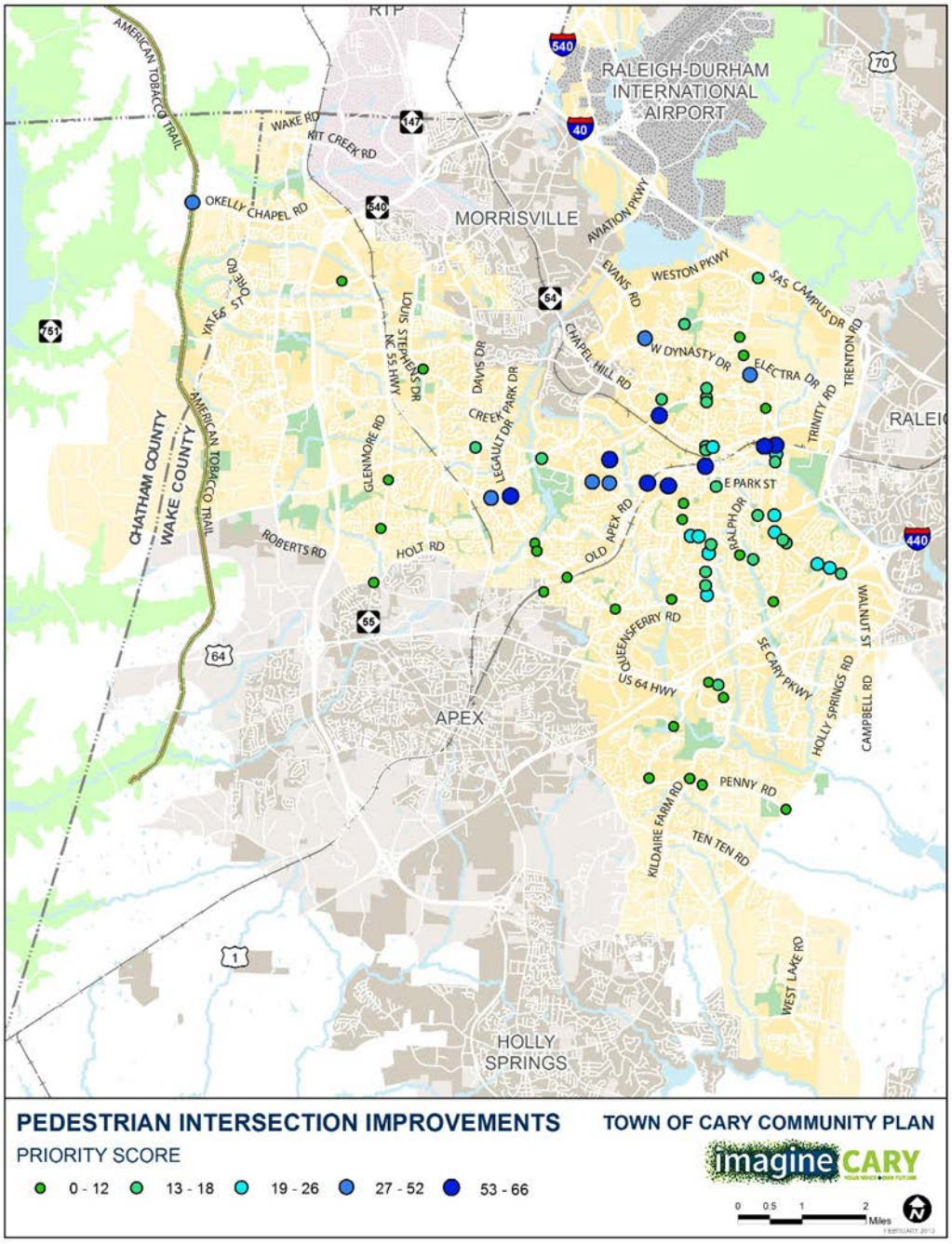


Table 10: Priority Scoring of Pedestrian Intersection Improvements

LOCATION	INTERSECTION TYPE	PRIORITY SCORE
W CHATHAM ST AND N HARRISON AVE	Signalized	66
NW MAYNARD RD AND CHAPEL HILL RD	Signalized	61
NW MAYNARD RD BTN MAYNARD CROSSING CT AND COLE VALLEY DR	Unsignalized	61
W CHATHAM ST AND HIGH HOUSE RD	Unsignalized	60
E CHATHAM ST BTN REEDY CREEK RD AND NE MAYNARD RD	Midblock	58
NE MAYNARD RD AND E CHATHAM ST	Signalized	58
SW CARY PKWY AND WALDO ROOD BLVD	Signalized	57
HIGH HOUSE RD AND OLD APEX RD	Signalized	56
NW MAYNARD RD AND HIGH HOUSE RD	Signalized	52
NW CARY PKWY AND EVANS RD	Signalized	51
E DYNASTY DR AND REEDY CREEK RD	Unsignalized	50
HIGH HOUSE RD AND DARBYTOWN PL	Unsignalized	49
AMERICAN TOBACCO TRAIL AND O'KELLY CHAPEL RD	Grade Separated	48
WALDO ROOD BLVD AND MACARTHUR DR	Unsignalized	44
KILMAYNE DR AND SW MAYNARD RD	Signalized	26
N ACADEMY ST AND CHAPEL HILL RD	Signalized	23
POND ST AND SW MAYNARD RD	Signalized	23
WALNUT ST AND NOTTINGHAM DR	Signalized	23
WALNUT ST AND SE MAYNARD RD	Signalized	23
CARY TOWNE BLVD AND SE MAYNARD RD	Signalized	22
COMMONWEALTH CT AND KILDAIRE FARM RD	Signalized	20
SE MAYNARD RD AND REED ST	Unsignalized	20
SW CARY PKWY AND KILDAIRE FARM RD	Signalized	20
DONALDSON DR AND WALNUT ST	Signalized	19
NW CARY PKWY AND HIGH HOUSE RD	Signalized	18
WALNUT ST AND KILDAIRE FARM RD	Signalized	18
ADAMS ST AND N HARRISION AVE	Unsignalized	17
BASS PRO LN AND N HARRISION AVE	Signalized	17
CHAPEL HILL RD AND N HARRISON AVE	Signalized	17
GRANDE HEIGHTS DR AND N HARRISION AVE	Unsignalized	17
KILDAIRE FARM RD AND SHANNON OAKS CIR	Signalized	17
SE MAYNARD RD AND TATE ST	Unsignalized	17
EVANS RD AND LAKE DR	Unsignalized	16
HIGH HOUSE RD AND DAVIS DR	Signalized	16
KILDAIRE FARM AND COLONADES WAY	Midblock	16

KILDAIRE FARM RD AND TWIN OAKS PL	Unsignalized	16
NW MAYNARD RD AND N HARRISON AVE	Signalized	16
ST CHARLES PL AND N HARRISION AVE	Unsignalized	16
SE MAYNARD RD AND GREENWOOD CIR	Unsignalized	15
WALNUT ST AND TANGLEWOOD DR	Unsignalized	15
CARY TOWNE CENTER AND WALNUT ST	Signalized	13
KILMAYNE DR AND KILDAIRE FARM RD	Signalized	13
NW CARY PKWY AND NORWELL BLVD	Unsignalized	13
WALNUT ST AND BUCK JONES RD	Signalized	13
WALNUT ST AND HUBBARD LN	Unsignalized	13
GRIFFIS ST AND ANN ST	Unsignalized	12
LAURA DUNCAN RD BTN LAUREL PARK PL AND OLD APEX RD	Midblock	12
MCCRIMMON PKWY AND HIGHCROFT DR	Unsignalized	12
NC 55 HWY AND TURNER CREEK RD	Signalized	12
NE MAYNARD RD AND REEDY CREEK RD	Unsignalized	12
PENNY RD AND CRICKENTREE DR	Midblock	12
W CORNWALL RD AND GRIFFIS ST	Unsignalized	12
NC 55 HWY AND PARKSCENE LN	Signalized	11
SE MAYNARD RD AND HAMPTON VALLEY RD	Unsignalized	11
EDERLEE DR AND WHITCOMB LN	Unsignalized	10
KILDAIRE FARM RD AND CRESCENT COMMONS DR	Midblock	10
LOUIS STEPHENS DR AND HERITAGE PINES DR	Unsignalized	10
REGENCY PKWY AND EDERLEE DR	Signalized	10
SEABROOK AVE AND ARIDITH CT	Unsignalized	10
SW CARY PKWY AND W CHATHAM ST	Signalized	10
SW CARY PKWY AND WESTHIGH ST	Signalized	10
TRYON RD AND ASHVILLE AVE	Unsignalized	10
N HARRISON AVE AND REEDY CREEK RD	Signalized	9
PENNY RD AND KILDAIRE FARM RD	Signalized	9
REEDY CREEK RD AND WYATTS POND LN	Unsignalized	8
SW CARY PKWY AND OLD APEX RD	Signalized	7
PENNY RD AND HOLLY SPRINGS RD	Signalized	6
SW CARY PKWY AND LAKE PINE DR	Signalized	6
SW CARY PKWY AND TWO CREEKS RD	Signalized	6
NC 55 HWY AND JENKS RD	Signalized	0

Priority Bike Projects

The following figures and tables present prioritized bikeway improvements and bicycle intersection improvements. All on-road bikeways are included in these tables, along with those greenway or street-side trail recommendations that were identified specifically to fill key connections within the on-road system or gaps between the on-road system and greenway system. The full recommended greenway network is not prioritized here, since it is housed in Cary's Parks, Recreation, and Cultural Resources Master Plan.

The specific elements of intersection improvements should be determined during implementation based on the roadway context, land use context, and location of the intersection along the neighborhood and commuter bikeway systems.

Figure 28: Priority Scoring of Neighborhood Bikeway Improvements

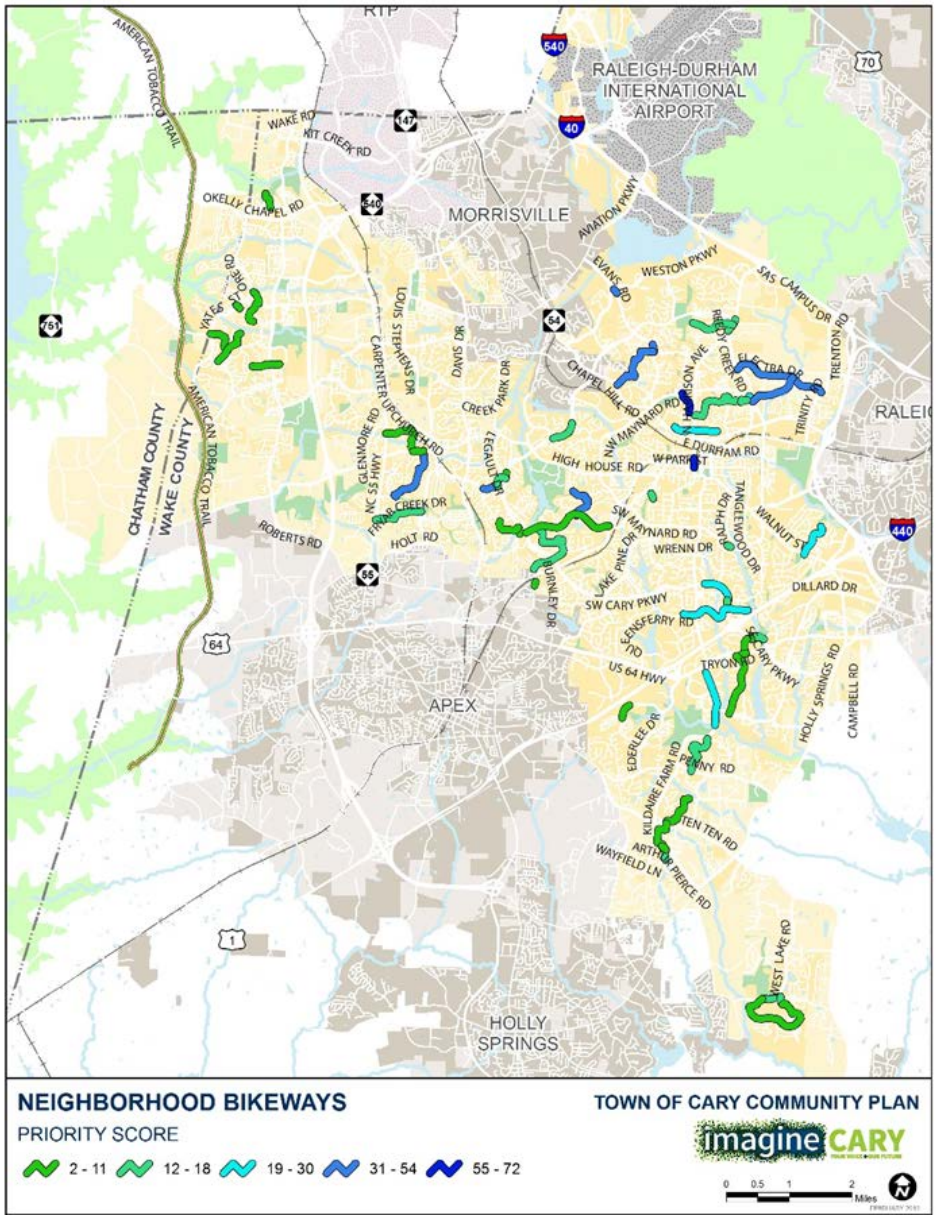


Table 11: Priority Scoring of Neighborhood Bikeway Improvements

SUBTYPE	ROADWAY	FROM	TO	METHOD	STATUS	PRIORITY SCORE
SIGNED NEIGHBORHOOD ROUTE	NORTHWOOD DR	NW MAYNARD RD	NORTHWOODS GREENWAY CONNECTOR	SIGNING	PROPOSED	68
SIGNED NEIGHBORHOOD ROUTE	S HARRISON AVE	W CHATHAM ST	W PARK ST	SIGNING	PROPOSED	59
SIGNED NEIGHBORHOOD ROUTE	ELECTRA RD/ BRANDYWINE RD	REEDY CREEK RD	TRINITY RD	SIGNING	PROPOSED	54
GREENWAY	EVANS RD	THORPE DR	W DYNASTY DR	NEW CONSTRUCTION	PROPOSED	54
SIGNED NEIGHBORHOOD ROUTE	FAIRBANKS RD/ NEW RAIL DR	CHAPEL HILL RD	ROCHELLE RD	SIGNING	PROPOSED	54
SIGNED NEIGHBORHOOD ROUTE	MEDFIELD RD	NE MAYNARD RD	ELECTRA RD	SIGNING	PROPOSED	54
STREET SIDE TRAIL	WALDO ROOD BLVD	MACARTHUR DR	TOWNE VILLAGE DR	NEW CONSTRUCTION	PROPOSED	51
SIGNED NEIGHBORHOOD ROUTE	CASTALIA DR/ TRACKERS RD	BLACK CREEK GREENWAY	W CHATHAM ST	SIGNING	PROPOSED	50
STREET SIDE TRAIL	EVANS RD	WESTON PKWY	PROPOSED GREENWAY	NEW CONSTRUCTION	PROPOSED	49
SIGNED NEIGHBORHOOD ROUTE	PARKGATE DR/ WIDDINGTON LN	PARKSCENE LN	HIGH HOUSE RD	SIGNING	PROPOSED	44
SIGNED NEIGHBORHOOD ROUTE	W JOHNSON ST	NORTHWOODS GREENWAY	KINGSWOOD ELEMENTARY SCHOOL	SIGNING	PROPOSED	26
STREET SIDE TRAIL	KILDAIRE FARM RD	SWIFT CREEK GREENWAY	ADVENT CT	NEW CONSTRUCTION	PROPOSED	24
SIGNED NEIGHBORHOOD ROUTE	QUEENSFERRY RD/ COORSDALE DR	KILARNEY DR	HEIDINGER DR	SIGNING	PROPOSED	23
STREET SIDE TRAIL	NE MAYNARD RD	REEDY CREEK RD	MEDFIELD RD	NEW CONSTRUCTION	PROPOSED	20
SIGNED NEIGHBORHOOD ROUTE	NOTTINGHAM DR/ WHITEHALL WAY	WALNUT ST	WALNUT CREEK PARK	SIGNING	PROPOSED	19
STREET SIDE TRAIL	SE CARY PKWY	HIGH MEADOW DR	SEABROOK AVE	NEW CONSTRUCTION	PROPOSED	19
SIGNED NEIGHBORHOOD ROUTE	KINGSWOOD DR/ BELHAVEN RD/ KEY WEST MEWS	N HARRISON AVE	REEDY CREEK PLAZA CONNECTOR	SIGNING	PROPOSED	18
SIGNED NEIGHBORHOOD ROUTE	CHATSWORTH ST/ LAURA DUNCAN RD	W CHATHAM ST	SWIFT CREEK GREENWAY	SIGNING	PROPOSED	17
SIGNED NEIGHBORHOOD ROUTE	CRICKENTREE DR/ HIGHLANDS LAKE DR	PENNY RD	LOCH HIGHLANDS DR	SIGNING	PROPOSED	17

SIGNED NEIGHBORHOOD ROUTE	LIVINGSTONE DR	BLACK CREEK GREENWAY CONNECTOR	N HARRISON AVE	SIGNING	PROPOSED	16
STREET SIDE TRAIL	N HARRISON AVE	NW CARY PKWY	REEDY CREEK RD	NEW CONSTRUCTION	PROPOSED	16
STREET SIDE TRAIL	SE CARY PKWY	PARKWAY OFFICE CT	THURSTON DR	NEW CONSTRUCTION	PROPOSED	16
STREET SIDE TRAIL	SE MAYNARD RD	HAMPTON VALLEY RD	RALPH DR	NEW CONSTRUCTION	PROPOSED	15
STREET SIDE TRAIL	NW CARY PKWY	CRABTREE CROSSING PKWY	OLDE WEATHERSTONE WAY	NEW CONSTRUCTION	PROPOSED	14
STREET SIDE TRAIL	OPTIMIST FARM RD	GLADE HILL DR	WEST LAKE RD	NEW CONSTRUCTION	PROPOSED	14
STREET SIDE TRAIL	WEST LAKE RD	OPTIMIST FARM RD	PINEY BRANCH DR	NEW CONSTRUCTION	PROPOSED	14
SIGNED NEIGHBORHOOD ROUTE	TOWNE VILLAGE DR	WALDO ROOD BLVD	SW CARY PKWY	SIGNING	PROPOSED	13
SIGNED NEIGHBORHOOD ROUTE	BECKFORD RD	BANNINGFORD RD	ARTHUR PIERCE RD	SIGNING	PROPOSED	12
GREENWAY	HIGGINS GREENWAY CONNECTOR	HIGGINS GREENWAY	PAMLICO DR	NEW CONSTRUCTION	PROPOSED	12
SIGNED NEIGHBORHOOD ROUTE	LEWEY DR/ FRYAR CREEK DR	NC 55 HWY	JENKS CARPENTER RD	SIGNING	PROPOSED	12
STREET SIDE TRAIL	REEDY CREEK PLAZA CONNECTOR	KEY WEST MEWS/ APPLEDOWN DR	REEDY CREEK PLAZA	NEW CONSTRUCTION	PROPOSED	12
STREET SIDE TRAIL	SE CARY PKWY	SEABROOK AVE	COORSDALE DR	NEW CONSTRUCTION	PROPOSED	12
SIGNED NEIGHBORHOOD ROUTE	FROSTWOOD DR	TRYON DR	GREENWAY CONNECTOR	SIGNING	PROPOSED	10
SIGNED NEIGHBORHOOD ROUTE	GLADE HILL DR/ SERENE FOREST RD/ PINE BRANCH DR	OPTIMIST FARM RD	WEST LAKE RD	SIGNING	PROPOSED	10
STREET SIDE TRAIL	REGENCY PKWY	ANGELICA CIR	SWIFT CREEK GREENWAY CONNECTOR	NEW CONSTRUCTION	PROPOSED	10
SIGNED NEIGHBORHOOD ROUTE	ROLLING SPRINGS DR/ WAVERLY HILLS DR	YATES STORE RD	ALDEN BRIDGE DR	SIGNING	PROPOSED	10
SIGNED NEIGHBORHOOD ROUTE	SUMMERWINDS DR	LOCHMERE DR	TRYON RD	SIGNING	PROPOSED	10
ONE WAY CYCLE TRACKS	W CHATHAM ST	SW CARY PKWY	OLD APEX RD	RESTRIPING	PROPOSED	10
STREET SIDE TRAIL	GREENWAY CONNECTOR	FROSTWOOD DR	PARKWAY OFFICE CT	NEW CONSTRUCTION	PROPOSED	9
STREET SIDE TRAIL	SW CARY PKWY	TOWNE VILLAGE DR	CEDARPOST DR	NEW CONSTRUCTION	PROPOSED	9

STREET SIDE TRAIL	ARTHUR PIERCE RD	ONYX CREEK DR	BECKFORD RD	NEW CONSTRUCTION	PROPOSED	8
SIGNED NEIGHBORHOOD ROUTE	AUDREY STONE DR/ ANDREWS POND DR	ARTHUR PIERCE RD	TEN TEN RD	SIGNING	PROPOSED	8
SIGNED NEIGHBORHOOD ROUTE	HEATHRIDGE LN	MACARTHUR DR	BISHOPS GATE GREENWAY CONNECTOR	SIGNING	PROPOSED	8
STREET SIDE TRAIL	LAURA DUNCAN RD	LAUREL PARK PL	LAUREL PARK ELEMENTARY SCHOOL	NEW CONSTRUCTION	PROPOSED	8
SIGNED NEIGHBORHOOD ROUTE	MONTCLAIR RIDGE DR/ AUTUMNGATE DR/ FELSPAR WAY	TEN TEN RD	CAMP BRANCH GREENWAY CONNECTOR	SIGNING	PROPOSED	8
SIGNED NEIGHBORHOOD ROUTE	CONNEMARA DR/ SIR WALKER LN	NC 55 HWY	HIGH HOUSE RD	SIGNING	PROPOSED	7
STREET SIDE TRAIL	HIGH HOUSE RD	SIR WALKER LN	WIDDINGTON LN	NEW CONSTRUCTION	PROPOSED	7
SIGNED NEIGHBORHOOD ROUTE	BROOKHILL WAY/ HOWARD GROVE PKWY	AMBERLY LAKE GREENWAY CONNECTOR	PANTHER CREEK GREENWAY CONNECTOR	SIGNING	PROPOSED	6
GREENWAY	GREENWAY CONNECTOR	YATES STORE RD	MICA LEAF PL	NEW CONSTRUCTION	PROPOSED	6
SIGNED NEIGHBORHOOD ROUTE	SANDY WHISPERS PL/ STONECROFT LN	DESERT TREE CT	STONEWATER GLEN LN	SIGNING	PROPOSED	6
STREET SIDE TRAIL	TRYON DR	SUMMERWINDS DR	FROSTWOOD DR	NEW CONSTRUCTION	PROPOSED	6
SIGNED NEIGHBORHOOD ROUTE	ALDEN BRIDGE DR	WELDON RIDGE BLVD	CARY PARK LAKE GREENWAY CONNECTOR	SIGNING	PROPOSED	4
GREENWAY	BISHOPS GATE GREENWAY CONNECTOR	HEATHRIDGE LN	BISHOPS GATE GREENWAY	NEW CONSTRUCTION	PROPOSED	4
SIGNED NEIGHBORHOOD ROUTE	LANTERN RIDGE LN/ GOLDEN HARVEST LOOP	SOUTHBRIDGE GREENWAY	GREEN LEVEL GREENWAY CONNECTOR	SIGNING	PROPOSED	4

Figure 29: Priority Scoring of Commuter Bikeway Improvements

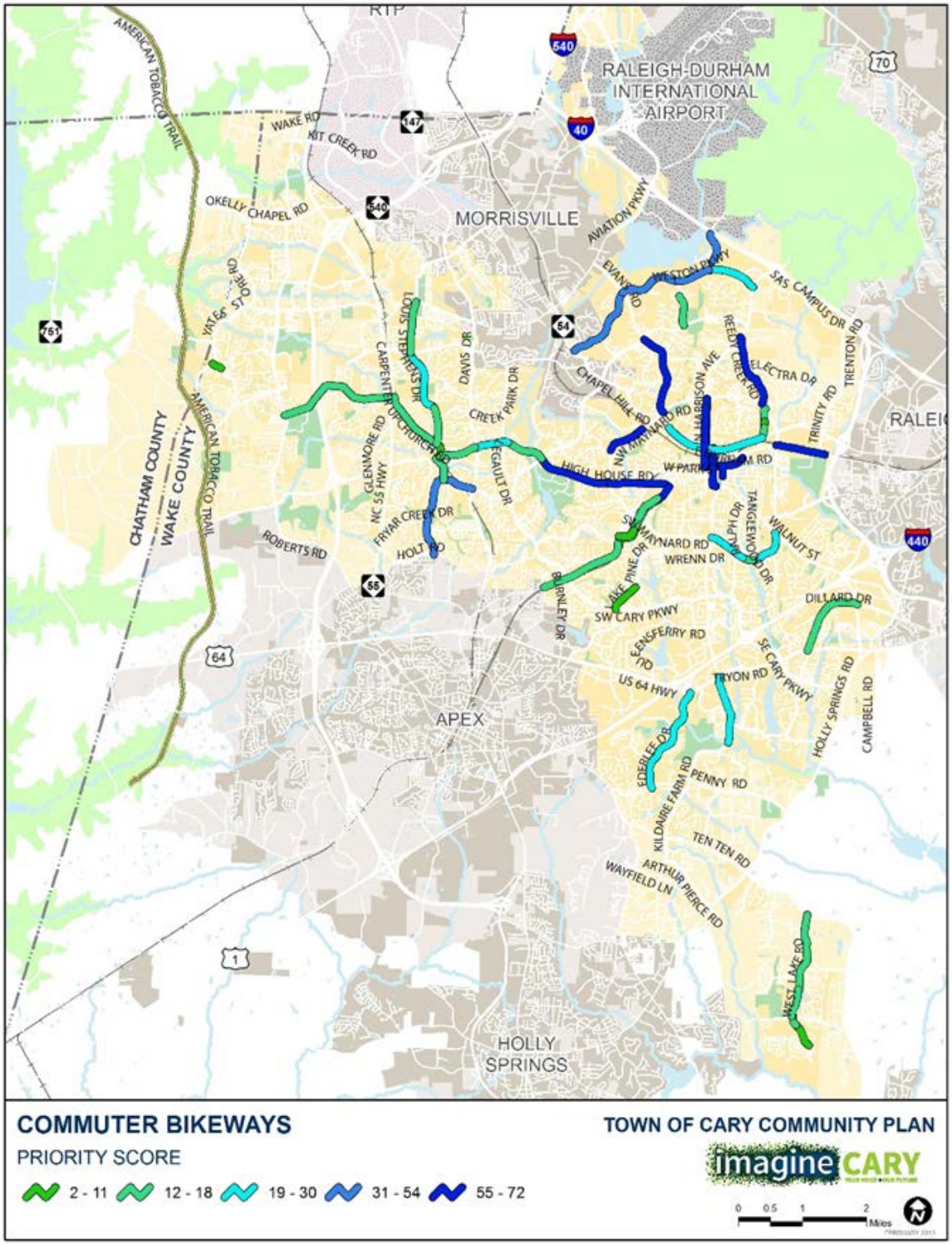


Table 12: Priority Scoring of Commuter Bikeway Improvements

SUBTYPE	ROADWAY	FROM	TO	METHOD	STATUS	PRIORITY SCORE
SHARED LANE MARKING	EVANS RD	NW CARY PKWY	NW MAYNARD RD	STRIPING	BOND	72
SHARED LANE MARKING	N ACADEMY ST	W CHATHAM ST	CHAPEL HILL RD	STRIPING	BOND	70
SHARED LANE MARKING	S ACADEMY ST/ K ILDAIRE FARM RD	W CHATHAM ST	WALNUT ST	STRIPING	PROPOSED	70
SHARED LANE MARKING	HIGH HOUSE RD	NW CARY PKWY	NW MAYNARD RD	STRIPING	BOND	68
SHARED LANE MARKING	N HARRISON AVE	W CHATHAM ST	ST CHARLES PL	STRIPING	BOND	68
COMMUTER BIKE LANE	N HARRISON AVE	W CHATHAM ST	NORTHWOODS SHOPPING CENTER	LANE REDUCTION	PROPOSED	68
SHARED LANE MARKING	E CHATHAM ST	NE MAYNARD RD	AEROGLIDE DR	CTP ROAD WIDENING	BOND	66
COMMUTER BIKE LANE	REEDY CREEK RD	N HARRISON AVE	NE MAYNARD RD	CTP ROAD WIDENING	PROPOSED	66
SHARED LANE MARKING	E CHATHAM ST	S HARRISON AVE	W CIRCLE DR	STRIPING	PROPOSED	62
SIGNED COMMUTER ROUTE	NW MAYNARD RD	OLD WEATHERSTONE WAY	CARROUSEL LN	SIGNING	PROPOSED	61
SHARED LANE MARKING	HIGH HOUSE RD	NW MAYNARD RD	OLD APEX RD	STRIPING	BOND	60
SHARED LANE MARKING	S WALKER ST	E CHATHAM ST	E PARK ST	STRIPING	PROPOSED	60
SHARED LANE MARKING	W CHATHAM ST	HIGGINS GREENWAY CONNECTOR	HIGH HOUSE RD	STRIPING	BOND	60
COMMUTER BIKE LANE	JENKS CARPENTER RD	HOLT RD	DAVIS DR	CTP ROAD WIDENING	PROPOSED	52
SHARED LANE MARKING	WESTON PKWY	CHAPEL HILL RD	EVANS RD	STRIPING	BOND	49
SHARED LANE MARKING	WESTON PKWY	EVANS RD	NORWELL BLVD	STRIPING	BOND	49
SHARED LANE MARKING	OLD REEDY CREEK RD	CARY LOFTS DR	INTERSTATE 40	STRIPING	BOND	47
SHARED LANE MARKING	WESTON PKWY	NORWELL BLVD	WINSTEAD DR	STRIPING	BOND	47
SHARED LANE MARKING	SE MAYNARD RD	GREENWOOD CIR	WALNUT ST	STRIPING	BOND	30
SHARED LANE MARKING	SE MAYNARD RD	KILDAIRE FARM RD	RALPH DR	STRIPING	BOND	26
SHARED LANE MARKING	KILDAIRE FARM RD	TRYON RD	SWIFT CREEK GREENWAY	STRIPING	BOND	24
SHARED LANE MARKING	WESTON PKWY	WINSTEAD DR	N HARRISON AVE	STRIPING	BOND	23
SHARED LANE MARKING	EDERLEE DR	PENNY RD	TRYON RD	STRIPING	BOND	22
SHARED LANE MARKING	HIGH HOUSE RD	DAVIS DR	LEGAULT DR	STRIPING	BOND	20
SHARED LANE MARKING	LOUIS STEPHENS DR	MORRISVILLE PKWY	UPCHURCH MEADOW RD	STRIPING	BOND	20

COMMUTER BIKE LANE	CHAPEL HILL RD	MIDDLETON AVE	REEDY CREEK RD	CTP ROAD WIDENING	PROPOSED	19
SHARED LANE MARKING	CARPENTER UPCHURCH RD	GREEN HOPE SCHOOL RD	CORNERSTONE DR	STRIPING	BOND	18
SHARED LANE MARKING	HIGH HOUSE RD	LEGAULT DR	SW CARY PKWY	STRIPING	BOND	18
SHARED LANE MARKING	LOUIS STEPHENS DR	MORRISVILLE PKWY	MORRISVILLE CARPENTER RD	STRIPING	BOND	18
SHARED LANE MARKING	OLD APEX RD	LAURA DUNCAN RD	W CHATHAM ST	STRIPING	BOND	17
SHARED LANE MARKING	PINEY PLAINS RD	TRYON RD	WALNUT ST	STRIPING	BOND	17
COMMUTER BIKE LANE	WEST LAKE RD	TEN TEN RD	WOLFS BANE DR	CTP ROAD WIDENING	PROPOSED	17
SHARED LANE MARKING	HIGH HOUSE RD	CARPENTER UPCHURCH RD	DAVIS DR	STRIPING	BOND	16
COMMUTER BIKE LANE	GREEN HOPE SCHOOL RD	GREEN LEVEL CHURCH RD	NC 55 HWY	CTP ROAD WIDENING	PROPOSED	15
SHARED LANE MARKING	SE MAYNARD RD	RALPH DR	ELLYNN DR	STRIPING	BOND	15
SHARED LANE MARKING	LOUIS STEPHENS DR	CARPENTER UPCHURCH RD	UPCHURCH MEADOW RD	STRIPING	BOND	14
SHARED LANE MARKING	W CHATHAM ST	COMMERCE CT	JASON CT	STRIPING	BOND	14
COMMUTER BIKE LANE	W CHATHAM ST	COMMERCE CT	NORMANDY ST	RESTRIPING	PROPOSED	14
SHARED LANE MARKING	WEST LAKE RD	OPTIMIST FARM RD	PINEY BRANCH DR	STRIPING	PROPOSED	14
SHARED LANE MARKING	WEST LAKE RD	OPTIMIST FARM RD	MIDDLE CREEK PARK AVE	STRIPING	PROPOSED	14
COMMUTER BIKE LANE	NORWELL BLVD	BEXLEY BLUFF LN	NW CARY PKWY	RESTRIPING	PROPOSED	13
COMMUTER BIKE LANE	REEDY CREEK RD	BRANNIFF DR	CHAPEL HILL RD	RESTRIPING	PROPOSED	13
COMMUTER BIKE LANE	JENKS CARPENTER RD	HIGH HOUSE RD	WALDO ROOD BLVD	CTP ROAD WIDENING	PROPOSED	12
COMMUTER BIKE LANE	REEDY CREEK RD	NE MAYNARD RD	WICKHAM PL	RESTRIPING	PROPOSED	12
SHARED LANE MARKING	SE MAYNARD RD	ELLYNN DR	GREENWOOD CIR	STRIPING	PROPOSED	11
SHARED LANE MARKING	CARPENTER UPCHURCH RD	HIGH HOUSE RD	CORNERSTONE DR	CTP ROAD WIDENING	BOND	10
COMMUTER BIKE LANE	WEST LAKE RD	PINEY BRANCH DR	FAIRVIEW RIDGE LN	STRIPING	PROPOSED	10
COMMUTER BIKE LANE	REEDY CREEK RD	WICKHAM PL	BRANNIFF DR	CTP ROAD WIDENING	PROPOSED	9
SHARED LANE MARKING	LAKE PINE DR	SW CARY PKWY	CORK HARBOR DR	STRIPING	BOND	6
SHARED LANE MARKING	W CHATHAM ST	OLD APEX RD	COMMERCE CT	STRIPING	BOND	6
SHARED LANE MARKING	WELDON RIDGE BLVD	YATES STORE RD	OLLIVANDER DR	STRIPING	PROPOSED	4
COMMUTER BIKE LANE	W CHATHAM ST	OLD APEX RD	COMMERCE CT	CTP ROAD WIDENING	PROPOSED	2

Table 13: Priority Scoring of Bicycle Intersection Improvements

LOCATION	CROSSING TYPE	PRIORITY SCORE
NW MAYNARD RD AND NORTHWOODS CIR	Unsignalized	68
NW MAYNARD RD BTN MAYNARD CROSSING CT AND COLE VALLEY DR	Midblock	61
W CHATHAM ST AND N HARRISON AVE	Signalized	59
REEDY CREEK RD AND E DYNASTY DR	Unsignalized	54
ROCHELLE RD AND EVANS RD	Signalized	54
OKELLY CHAPEL RD BTN ROSEMONT DR AND ROYAL SUNSET DR	Midblock	48
WALDO ROOD BLVD AND MACARTHUR DR	Unsignalized	44
SE MAYNARD RD AND VILLAGE GREENWAY	Signalized	23
KILDAIRE FARM RD AND WRENN DR	Signalized	21
EVANS RD AND LAKE DR	Midblock	20
KILDAIRE FARM RD AND BYRUM ST	Unsignalized	20
WALNUT ST AND LAWRENCE RD	Signalized	19
N HARRISON AVE AND NW CARY PKWY	Signalized	16
SE CARY PKWY BTN PARKWAY OFFICE CT AND THURSTON DR	Midblock	16
SW MAYNARD RD AND WICKLOW DR	Signalized	15
WALNUT ST AND TANGLEWOOD DR	Unsignalized	15
WEST LAKE RD AND OPTIMIST FARM RD	Signalized	14
WEST LAKE RD BTN OPTIMIST FARM RD AND MIDDLE CREEK PARK AVE	Midblock	14
KILDAIRE FARM RD AND QUEENSFERRY RD	Signalized	13
GREEN HOPE SCHOOL RD AND SEARS FARM RD	Unsignalized	12
LAURA DUNCAN RD BTN LAUREL PARK PL AND OLD APEX RD	Midblock	12
NE MAYNARD RD AND REEDY CREEK RD	Unsignalized	12
SE CARY PKWY AND KINGSCLERE DR	Unsignalized	12
SE CARY PKWY AND SEABROOK AVE	Signalized	12
WALNUT ST AND RALPH DR	Unsignalized	12
N HARRISON AVE AND KINGSWOOD DR	Unsignalized	11
SE MAYNARD RD BTN ASHE AVE AND COLLINGTON DR	Midblock	11
SE MAYNARD RD BTN ELLYNN DR AND GREENWOOD CIR	Midblock	11
SE MAYNARD RD BTN HAMPTON VALLEY RD AND RALPH DR	Midblock	11
DAVIS DR AND VELLEYSTONE DR	Signalized	10
KILDAIRE FARM RD BTN LANGSTON POND DRA ND POND VILLAGE LN	Midblock	10
LOUIS STEPHENS DR BTN MORRISVILLE PKWY AND DOMINION HILL DR	Midblock	10
NC 55 HWY AND PARKSCENE LN	Signalized	10

OLDE WEATHERSTONE WAY AND CASTALIA DR	Unsignalized	10
W CHATHAM ST AND RED FIELD ST	Unsignalized	10
WEST LAKE RD AND LANGSTON CIR	Unsignalized	10
WEST LAKE RD AND PINEY BRANCH DR	Unsignalized	10
LAURA DUNCAN RD AND SW CARY PKWY	Unsignalized	9
N HARRISON AVE AND REEDY CREEK RD	Signalized	9
N HARRISON AVE AND WYATTS POND LN	Unsignalized	9
OLD APEX RD BTN SW CARY PKWY AND MARILYN CIR	Midblock	9
NC 55 HWY AND TURNER CREEK RD	Signalized	8
OKELLY CHAPEL RD AND YATES STORE RD	Unsignalized	8
REEDY CREEK RD AND WYATTS POND LN	Unsignalized	8
SW MAYNARD RD AND PLANTATION DR	Unsignalized	8
TEN TEN RD AND ANDREWS POND DR	Unsignalized	8
YATES STORE RD BTN WEYCROFT AVE AND FINNBAR DR	Unsignalized	8
GREEN LEVEL WEST RD BTN JOSHUA TREE CT AND HIGHFIELD AVE	Midblock	7
WESTON PKWY BTN METLIFE WAY AND NORWELL BLVD	Midblock	7
CARPENTER FIRE STATION RD AND HOWARD GROVE PKWY	Unsignalized	6
DAVIS DR AND COUNCIL GAP CT	Unsignalized	6
DAVIS DR AND CREEK PARK DR	Unsignalized	6
DAVIS DR AND PRESTON VILLAGE WAY	Signalized	6
EDERLEE DR AND WHITCOMB LN	Unsignalized	6
NW CARY PKWY BTN CRABTREE CROSSING PKWY AND ROEBLING LN	Midblock	6
OPTIMIST FARM RD AND GLADE HILL DR	Unsignalized	6
STONECROFT LN AND OKELLY CHAPEL RD	Unsignalized	6
SW CARY PKWY AND TWO CREEKS RD	Signalized	6
TRYON RD AND YATES MILL POND RD	Signalized	6
TRYON RD BTN SUMMERWINDS DR AND FROSTWOOD DR	Midblock	6
YATES STORE RD AND DEL MAR OAKS DR	Unsignalized	6
YATES STORE RD AND MCCRIMMON PKWY	Unsignalized	6
ARTHUR PIERCE RD BTN ONYX CREEK DR AND BECKFORD RD	Midblock	4
GREEN LEVEL CHURCH RD AND ASHLEY ROSE DR	Unsignalized	4
GREEN LEVEL CHURCH RD AND DENNISON LN	Unsignalized	4
HIGH HOUSE RD AND LEGAULT DR	Signalized	4
HIGH HOUSE RD BTN CRANBORNE LN AND WIDDINGTON LN	Midblock	4
KILDAIRE FARM RD AND BANNINGFORD RD	Unsignalized	4
KILDAIRE FARM RD AND GRIST VALLEY LN	Unsignalized	4
OLD APEX RD AND LAURA DUNCAN RD	Signalized	4
PENNY RD AND BARTLEY PARK DR	Unsignalized	4

PENNY RD AND CRICKENTREE DR	Midblock	4

Pedestrian & Bicycle Program Recommendations

As a recognized Walk Friendly Community and Bicycle Friendly Community, Cary has an extensive set of programs in place that span the 5 E's framework introduced in Chapter 7. However, some gaps in education, encouragement, enforcement, and evaluation efforts remain. Below is a listing of new program recommendations for the Town to pursue to expand and complement its current programming.

Recommended Programs Summary Table

A summary of all of the recommendations is followed by a more detailed description of each.

STRATEGY	TARGET AUDIENCE	LEAD FACILITATOR	PARTNERSHIPS	TIME FRAME	DURATION
EDUCATION					
Bicycle & Pedestrian Advisory Committee	General public	Town Administration; Town Council	Cary Planning Department; Parks, Recreation, and Cultural Resources Department	Short-term	Ongoing
Expanded Safe Routes to School Program	School-aged children	School administration or district	Town of Cary and the National Center for Safe Routes to School	Short-term	Ongoing
Regular Bicycling Skills Classes	Teens and adults	Bicycle advocacy groups; local bike club	Local League Cycling Instructors; Local bike shops	Short-term	Monthly or seasonal (based on demand)
Driver Courtesy Training	School and commercial vehicle drivers	Wake County school district; Cary Police Department	CTRAN; employers of commercial vehicle drivers	Medium-term	Ongoing; as new drivers are hired
Public Bicycle Maintenance Classes	General public	Local bike shop; bike advocacy group	Town administration	Medium-term	Monthly or seasonal (based on demand)
ENCOURAGEMENT					
Open Streets Event	General public	Cary Parks, Recreation, and Cultural Resources Department; local advocacy groups	Local bike shops; Town staff; BPAC*; non-profits	Short-term	Biannual

Increased Marketing & Awareness of Existing Programs	General public	Town staff	Cary Planning Department; Cary Parks, Recreation and Cultural Resources Department; BPAC*; Town administration	Short-term	Ongoing
"Weekend Walkabout" Program	General public	Cary Parks, Recreation and Cultural Resources Department	Local walking groups; local sports shops	Medium-term	Monthly or seasonal (based on demand)
ENFORCEMENT					
Speed Feedback Signs	General public	Cary Police Department	Town agencies	Short-term	Ongoing
Progressive Ticketing Program	Drivers, bicyclists, & pedestrians	Cary Police Department	Town of Cary; County Clerk's office	Medium-term	Ongoing
EVALUATION					
Sidewalk and Bicycle Facility Maintenance Request Program	General public	Cary Public Works and Utilities Department	Town administration	Short-term	Ongoing
Bicycle & Pedestrian Needs Checklist	Town staff	Cary Public Works and Utilities Department	Cary Planning Department; BPAC; Wake County staff; NCDOT staff	Medium-term	Ongoing
Rides and Walks with Town Staff	General public	Cary Planning Department, Cary Public Works and Utilities Department	Cary Parks, Recreation and Cultural Resources Department; Town administration; BPAC	Medium-term	Semi-annual

Recommended Program Descriptions

Bicycle & Pedestrian Advisory Committee

Education, Encouragement, Evaluation

The Town is active with the regional CAMPO Bicycle and Pedestrian Stakeholders Group (BPSG) and has an active Town Greenway Committee. A town BPAC would supplement the Greenway Committee by helping to promote and prioritize on-road pedestrian and bicycle projects, build public support for improvements, and review development and redevelopment proposals for the inclusion of pedestrian and bicycle facilities. If created, the BPAC should help develop policy and planning documents in coordination with the Greenway Committee, review annual pedestrian and bicycle program work plans, and review major public and private projects.

Expanded Safe Routes to School Program
Education, Encouragement, Evaluation

Expand the Safe Routes to School program in Cary to include all elementary and middle schools. Ensure that pedestrian and bicycle safety education is a routine part of public education and that schools and the surrounding neighborhoods are safe and convenient for walking and biking. Consider "walking school buses" to encourage parent involvement. Conduct pedestrian and bicycle safety audits around all schools and propose recommendations to improve the safety and feasibility of walking and biking to school.

Regular Bicycling Skills Classes
Education

Offer bicycling skills classes, Traffic Skills 101 classes, maintenance classes, and commuter classes on a monthly basis or encourage a local bicycle advocacy group, club, or shop to do so. Current classes are offered on weekdays and are geared mainly toward transportation professionals; add to these a regular class in the evening or on weekends so that other citizens can attend as well. Cary could invite a League Cycling Instructor (LCI) to conduct the classes as it has in the past. Ideally the instruction would incorporate a classroom portion as well as on-road training.

Driver Courtesy Training
Education

Partner with the Wake County School District and companies to implement a driver courtesy training program. Some citizens have voiced concern about unsafe and aggressive driving behavior towards pedestrians and bicyclists by school bus drivers, taxi drivers, and commercial vehicle drivers. This training could be modeled after courtesy training that CTRAN requires for its bus drivers.

Public Bicycle Maintenance Classes
Education, Encouragement

Partner with a local advocacy group, bicycle shop, or League Cycling Instructor to offer regular public bicycle maintenance classes to residents at public parks, libraries, community centers, and in conjunction with city events. A short tutorial on how to change a flat tire or perform a tune-up can empower a person to ride their bike more often.

Open Streets Event
Encouragement

Begin car-free street events (known as Sunday Parkways, Ciclovias, Summer Streets, and Sunday Streets) that create a temporary public street space for walking, bicycling, dancing, and similar activities. The purpose of the event is to encourage physical activity by providing a fun, welcoming environment for all ages. Car-free street events have been very successful internationally and are rapidly becoming popular in the US. Durham and Carrboro have both recently held open streets events. Local businesses open doors and set up tables along sidewalks to support the event and generate foot traffic for their business.

Increased Marketing and Awareness of Existing Programs
Education, Encouragement

Cary has implemented a number of valuable pedestrian and bicycle programs that improve the quality, safety, and accessibility of walking and biking. However, some programs are still relatively unknown to many citizens because of a lack of publicity. Increasing marketing and advocacy efforts around existing programs could be a cost-effective and time-efficient way of increase the awareness of Cary's pedestrian and bicycle programs and ongoing efforts. Having a regularly updated website, tabling or handing out flyers at public events, and partnering with schools, law enforcement, libraries, and community centers to distribute information are some options for increasing the effectiveness of current programming.

"Weekend Walkabout" Program
Education, Encouragement

Initiate walking programs such as a "Weekend Walkabout" as regularly occurring events that promote walking while also bringing attention to pedestrian infrastructure. "Weekend Walkabouts" walking routes should highlight safe and inviting places to walk in the public realm and should be three miles or less in length. These events are ideal for families and seniors.

Speed Feedback Signs
Enforcement

Place signs as a traffic calming device temporarily at strategic roadway locations. The Town should use speed feedback signs as a traffic calming measure on streets with new pedestrian facilities and should include information about requesting a speed feedback sign on the Town's website.

Progressive Ticketing Program
Education, Enforcement

Start a ticket diversion program for motorists, bicyclists, and pedestrians who receive tickets for traffic violations. Road users given a citation are offered a one-time opportunity to waive fees for violations by attending a bike/ped education course. This should include a classroom and on-road component.

Sidewalk and Bicycle Facility Maintenance Request Program
Evaluation

Similar to the Sidewalk Request Program already in place to request new sidewalks, implement a sidewalk maintenance request program that provides citizens with a way to communicate maintenance issues to the Public Works and Utilities Department. This may include uneven sidewalk, vegetation overgrowth, potholes on roads or trails, restriping needs, or other facility conditions that create pedestrian or bicyclist safety concerns. Include an online request form and phone number for the program on the pedestrian and bicycle pages of the Town website.

Bicycle & Pedestrian Needs Checklist

Evaluation

Develop a Bicycle and Pedestrian Needs Checklist to ensure the full participation and timely review of Town and NCDOT staff in the development of new projects that have the potential to benefit bicyclists and pedestrians. One component of the checklist would be to increase bicycle- and pedestrian-related amenities at intermodal facilities and any existing or future Park & Ride facilities. There are many examples of Checklists available online in the form of Complete Streets checklists.

Rides and Walks with Town Staff

Evaluation

Organize semi-annual walks and bike rides with Town staff to assess pedestrian and bicycle facility conditions. This would provide the public with an opportunity to show Staff specific concerns with roadway and trail conditions, gaps in facilities, and other pedestrian and bicycle issues.

C-Tran Route Analysis Memorandum

The following two memoranda were prepared by Nelson/Nygaard as part of the Imagine Cary transit analysis looking at potential future bus routes in Cary and connecting to adjacent municipalities and the associated paratransit service.

MEMORANDUM

To: Ray Boylston and Adam Howell, Town of Cary

From: Nelson\Nygaard Project Team

Date: August 2, 2015

Subject: Imagine Cary: Evaluation of C-Tran Operating Proposals with Current Data and 2040 Projections

This technical memorandum presents evaluations of different proposals for C-Tran based on input from both Town of Cary staff and representatives of the Transportation Advisory Group (TAG) and Committee for the Future (CFTF) for Imagine Cary. Proposals are organized in the following categories:

- Proposed routes
- Proposed route changes
- Comparison of proposed routes and changes
- Service changes
- Bus Rapid Transit
- Park and Ride
- Paratransit

The analysis of proposed routes and proposed route changes is based on both current data and 2040 data projections.

EXISTING ROUTES

As context for the proposed changes and additions to C-Train service, Figure 1 provides an analysis of existing routes as a basis for comparison. Each proposal includes a rank to show how it compares to the existing routes in terms of population and jobs per revenue hour. Transit must serve sufficiently high volumes of travelers to be cost-effective; the density of population and jobs is an indication of the type and frequency of service that would be most appropriate. The reach of fixed route bus service is generally limited to within ¼-mile of the transit line.

Population data is provided by the 2010 US Census. Employment data for the area is drawn from the U.S. Census Bureau's 2011 Longitudinal Employer-Household Dynamics (LEHD)[1] product.

Due to growth in Cary that is not reflected in the available Census data, population and employment growth projections are incorporated based on building permits approved between 2011 and 2014. The residents per new development were estimated using an assumed rate of

[1] While the LEHD employment data is quite useful, the data comes with two notable drawbacks. First, job location data for companies with multiple locations occasionally suffers from "headquartering," where all employees are assigned to a central location. Second, some special classes of employees are excluded from the data entirely (military personnel and Federal civilian employees). The data should be interpreted with these drawbacks in mind.

occupancy per housing type based on Cary's average household size as identified in 2012 American Community Survey 5-year estimates. The number of residents per senior housing unit is an assumed standard rate.[2] Employees were estimated using average built square feet per employees by commercial activity as detailed in the 2003 Commercial Buildings Energy Consumption Survey published by the U.S. Department of Energy.[3]

As shown in Figure 2, C-Tran service operates weekdays and Saturdays between 6:00 a.m. and 10:00 p.m. Service on Routes 3 to 6 operates at 30-minute headways during peak hours: 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 10:00 p.m.[4] Service operates at 60-minute headways on the Maynard Loop Routes 1 and 2 during peak hours. Headways are 60 minutes on all routes between 9:00 a.m. and 3:00 p.m. In the following sections, the population and number of jobs per revenue hour within a ¼-mile radius along each proposed route are compared and ranked to the existing C-Tran routes. In addition, routes consistent with proposals in the Wake County Transit Plan and/or discussed at the Imagine Cary Planning Workshop on September 9, 2013.

For purposes of comparison, Maynard Loop Routes 1 and 2 are combined in the following tables (since the two routes follow the same path and serve the same populations). Population and employment numbers for these and other combined routes are proportionately averaged based on the number of trips per week for each route. Partial routes are highlighted in the tables for analysis, but not ranked against existing or proposed routes as they work in combination.

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[2] Residents per lot: 2.89; Residents per unit: 2.26; Residents per senior housing unit: 1.5.

[3] Per the 2003 Commercial Buildings Energy Consumption Survey, published by the U.S. Department of Energy, the average square feet per worker for the following principal building activities is assumed as follows: Education: 791 sq. ft., Food Sales: 877 sq. ft., Food Service: 528 sq. ft., Health Care: 501 sq. ft., Lodging: 2074 sq. ft., Non-Mall Retail: 1 sq. ft.,246 sq. ft., Office: 434 sq. ft., Public Assembly: 1 sq. ft.,645 sq. ft., Public Order and Safety: 809 sq. ft., Religious Worship: 2 sq. ft.,200 sq. ft., Service: 1 sq. ft.,105 sq. ft., Warehouse and Storage: 2 sq. ft.,306 sq. ft., Other: 956.

[4] Not shown in Figure 2, is the Route 5 - Kildaire Farm Road Express route that makes three inbound trips on weekdays, departing from Crescent Commons Drive between 4:10 p.m. and 5:10 p.m. to the Cary Depot, with one stop a Maynard Road. This express route will be eliminated when new routing or alignments are implemented.

Figure 1 Existing C-Tran Routes and Socio-Economic Characteristics

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Weekday Vehicles		Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Peak	Off-Peak		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
1. Maynard Loop	17,002	16,431	352	264	16.2	60	1	1	4,964	3.43	x/5	3.31	-
2. Maynard Loop	17,340	16,509	450	261	16.4	60	1	1	4,964	3.49	x/5	3.33	-
1/2. Maynard Loops (Combined for Comparison)	17,171	16,470	401	262	-	-	2	2	9,928	1.73	2/5	1.66	2/5
3. Harrison Ave	7,100	6,240	721	305	8.9	27	1	0.5*	4,033	1.76	1/5	1.55	3/5
4. High House Rd to Highway 55	9,224	3,601	20	329	13.4	57	2	1	8,067	1.14	5/5	0.45	5/5
5. Kildaire Farm Rd	5,429	10,897	16	144	8.4	28	1	0.5*	4,033	1.35	3/5	2.70	1/5
6. Buck Jones Rd	10,575	6,916	18	166	14.1	56	2	1	8,067	1.31	4/5	0.86	4/5

*Routes 3 and 5 interline. Based on the 60-minute off-peak frequency, 1 bus serves both routes.

Figure 2 Existing C-Tran Route Frequency[5]

Route	Weekday Frequency (min)		Saturday Frequency (min)	
	Peak	Off-Peak	Peak	Off-Peak
Span of Service	6 AM - 9 AM 3 PM - 8 PM	9 AM - 3 PM	6 AM - 9 AM 3 PM - 8 PM	9 AM - 3 PM
1. Maynard Loop	60	60	60	60
2. Maynard Loop				
3. Harrison Ave	30	60	30	60
4. High House Rd to Highway 55				
5. Kildaire Farm Rd				
6. Buck Jones Rd				

[5] Not shown in Figure 2, is the Route 5 - Kildaire Farm Road Express route that makes three inbound trips on weekdays, departing from Crescent Commons Drive between 4:10 p.m. and 5:10 p.m. to the Cary Depot, with one stop a Maynard Road. This express route will be eliminated when new routing or alignments are implemented.

PROPOSED ROUTES

A. Weston Parkway

The proposed Weston Parkway route would serve northwest Cary, operating from Harrison Square at North Harrison Avenue, through the office complex at Norvell Boulevard and passing by large employers on the north and south sides of Weston Parkway to Chapel Hill Road. The weekday route alignment would continue south to Park West Village, south along Northwest Cary Parkway to James Jackson Avenue, Maynard Road, and Chapel Hill Road before looping back at the Cary depot. The weekend route alignment would travel between Cary Depot and Park West Village, traveling along Chapel Hill Road, Maynard Road, and James Jackson Avenue before turning back on Weston Parkway and Sheldon Drive. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways once service commences on Sundays in the future. As most employers within ¼ mile radius of the Weston Parkway route are not open on weekends, less service is necessary.

The proposed Weston Parkway route is consistent with routes prioritized at the Imagine Cary Transit Planning Workshop on September 9, 2013.

Figure 3 Weston Parkway Route Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles			Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Weekday	Sat.	Sun.		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Data														
A1. Weston Parkway (Weekday Alignment)	7,106	11,370	209	3,293	18.08	60	3	0	0	12,252	0.58	-	0.93	-
A2. Weston Parkway (Weekend Alignment)	5,580	5,311	74	32	11.38	38	0	2	1	2,255	2.47	-	2.36	-
A1/A2. Weston Parkway (Combined)	6,795	10,134	182	2,628	-	-	3	2	1	14,507	0.47	6/6	0.70	5/6
2040 Projected Data														
A1/A2. Weston Parkway (Combined)	13,497	18,293	-	-	-	-	3	2	1	14,507	0.93	5/6	1.26	5/6
	Weekday		Saturday		Sunday									
Frequency	30		30		60									
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM									

Figure 4 Weston Parkway Route (Current Conditions)

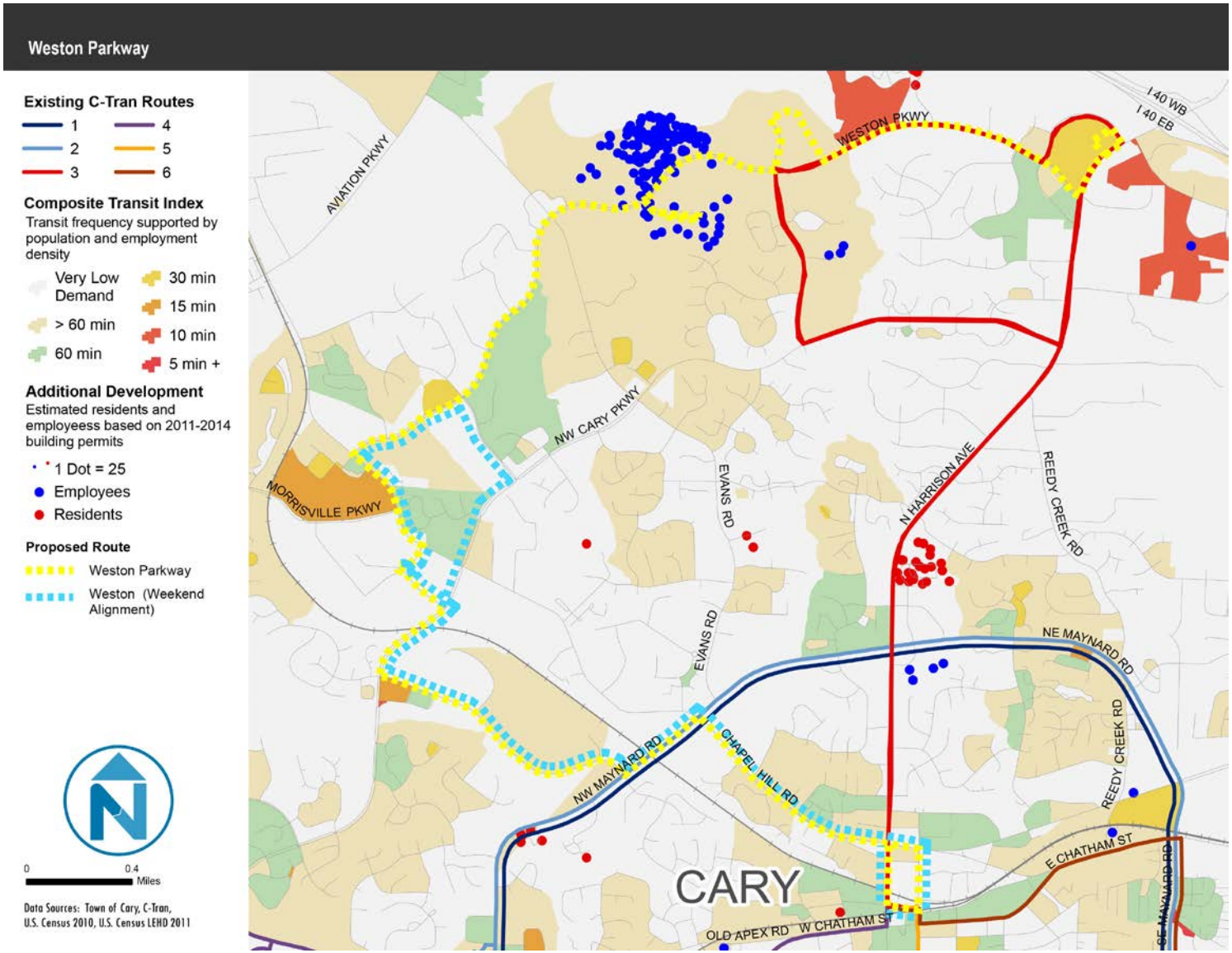
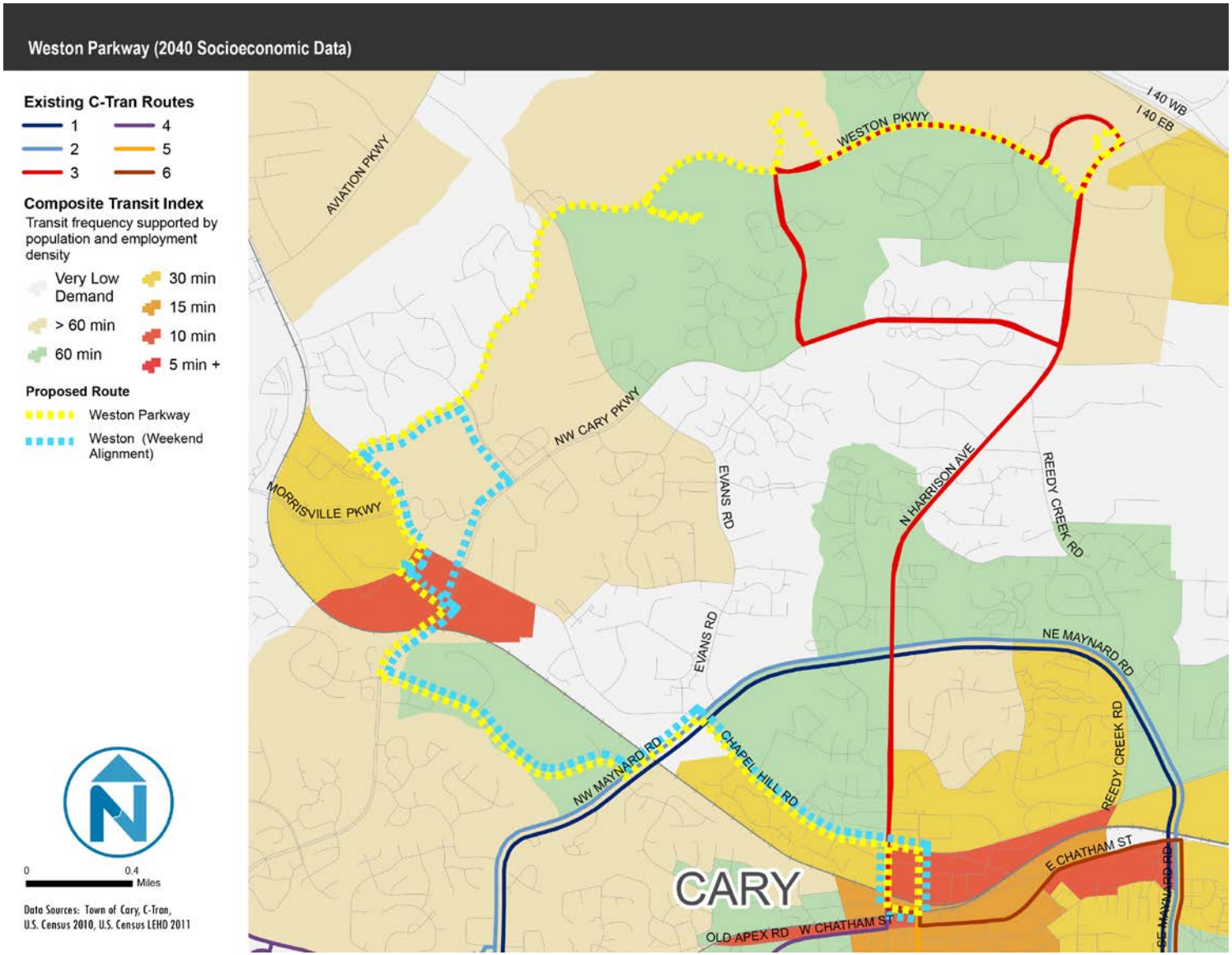


Figure 5 Weston Parkway Route (Future Conditions - 2040 Projected Demographics)



B. Cary Depot to Crossroads

The proposed route connects the Cary Depot to Crossroads Plaza, providing direct service to avoid the current circuitous travel on the existing C-Tran Route 6 or transfers to Routes 1 and 2. From the Depot, the service travels south along Walnut Street past Cary Village Square shopping center to jog around Cary Towne Mall at Cary Towne Boulevard, continues south on Walnut Street with a jog through Devonshire Place shopping plaza, before turning around at Tryon Road. The service turns north on Piney Plains Road, past the Centrum at Crossroads, to Crossroads Plaza and the Enclave at Crossroads. Turning west on Dillard Drive, the service reverses direction on Walnut Street to Cary Depot.

By replacing the Route 1 and 2 jog to Crossroads, the proposed route, shown in Figure 7, would cut travel time and help with schedule adherence for those routes. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways. In the future, the Town of Cary would work with Crossroads Plaza to create a transit hub on the west side of the property that would reduce the travel time and annual revenue hours for this proposed route.

The proposed Cary Depot to Crossroads route is consistent with routes prioritized at the Imagine Cary Transit Planning Workshop on September 9, 2013.

Figure 6 Cary Depot to Crossroads Route Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles			Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	M-F	Sat.	Sun.		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions														
B1. Depot to Crossroads	10,387	13,800	2,417	467	16.19	54	2	2	1	10,423	1.00	6/6	1.32	5/6
2040 Projected Demographic Conditions														
B1. Depot to Crossroads	17,039	15,709			16.19	54	2	2	1	10,423	1.63	6/6	1.51	5/6
	Weekday		Saturday		Sunday									
Frequency	30		30		60									
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM									

Figure 7 Cary Depot to Crossroads Route (Current Conditions)

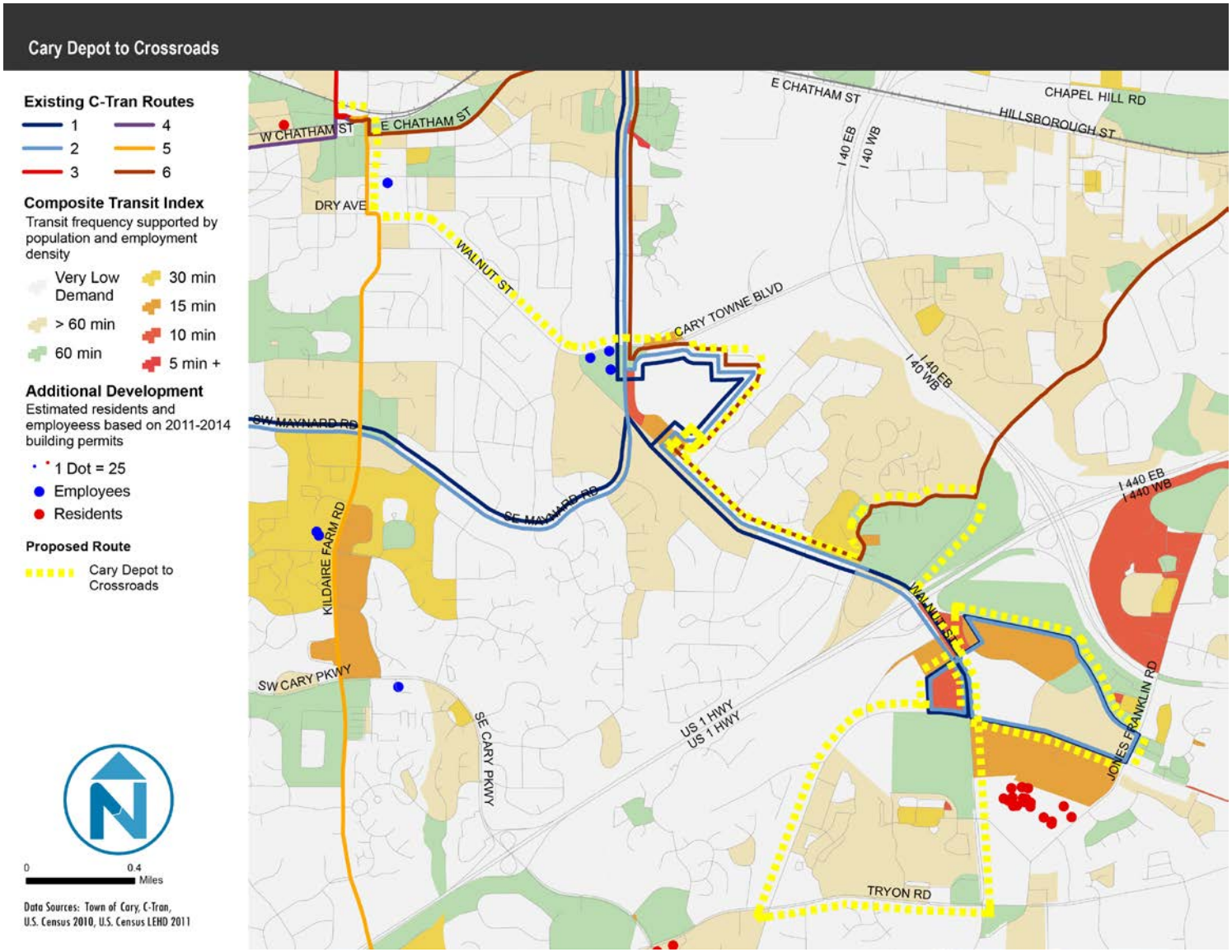
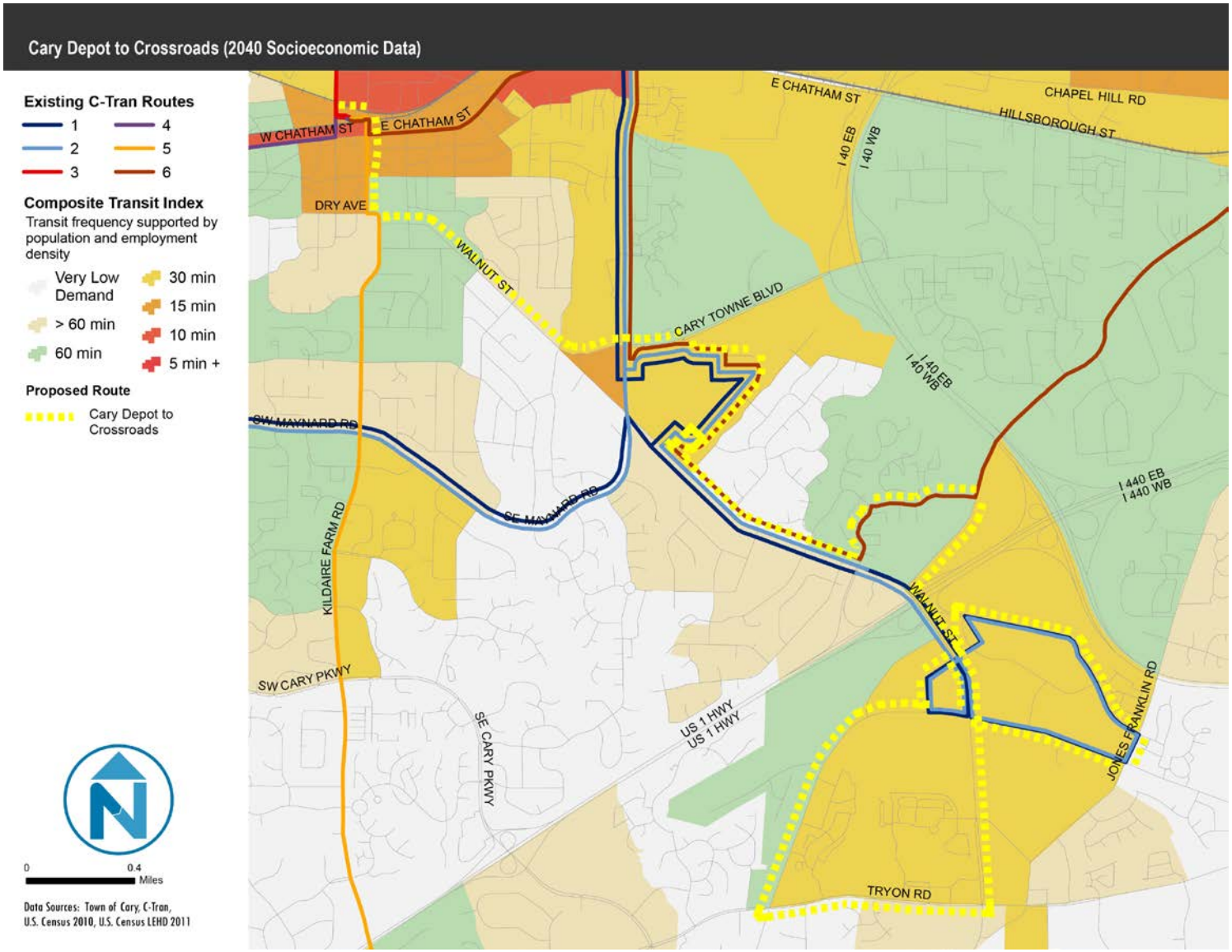


Figure 8 Cary Depot to Crossroads Route (Future Conditions - 2040 Projected Demographics)



D. Green Level Church Road Options

Four proposed routes to Green Level Church Road and Northwest Cary provide alternatives for providing transit service to this residential area. Northwest Cary is experiencing substantial growth, but is not currently served by fixed route Cary transit services. The proposed routes would provide residents and employees in this area with transit connections to increase their non-auto access to Cary and the Triangle Region.

The Cary Depot to Green Level Church Road route runs along Chapel Hill Road to Morrisville Carpenter Road, serving Park Place Shopping Center and Park West Village. As shown in Figure 10, the route continues west to NC-55 and loops around Green Level Church Road via O'Kelly Chapel Road to the north and McCrimmon Parkway to the south. The proposed Cary Depot to Green Level Church Road options are consistent with recommendations of the Wake County Transit Plan.

The Route 4 Extension, shown in Figure 10, travels along Green Level West Road to Northwest Cary. The existing Route 4 would be shortened to end west of Davis Drive at Cornerstone Drive and Carpenter Upchurch Road. The Route 4 Extension starts at Davis Drive and travels west along High House Road, north along Green Level Church Road to O'Kelly Chapel Road and south along NC-55 Highway to complete its return loop at High House Road. A potential midday variation of the route, to run during off-peak hours, would follow High House Road west to NC-55 Highway, before looping around O'Kelly Chapel Road to the north and Green Level Church Road and Carpenter Fire Station Road to the west. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways.

The Apex to O'Kelly Chapel Road route, shown in Figure 12, travels from Apex along Williams Street to NC-55 Highway north to O'Kelly Chapel Road. This route is complemented by the Alston/Amberly Spur Loop, which travels west from the terminus of the Apex to O'Kelly Chapel Road route to Yates Store Road, bordered by residential communities on both sides. The loop returns along McCrimmon Parkway to NC-55 Highway. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways.

The Apex to McCrimmon Parkway route, shown in Figure 12, travels north along Salem Street from Apex to Davis Drive and continues north to McCrimmon Parkway before turning around in the adjacent shopping plaza. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways.

Figure 9 Green Level Church Road Route Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles		Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Peak	Off-Peak		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions													
D1. Depot to Green Level Church Rd	12,097	3,531	2,417	467	19.39	65	3	3	15,882	0.76	6/6	0.22	6/6
D5. Route 4 Shortened to Davis Dr	7,679	3,506	20	312	11.53	38	2	2	10,423	0.74	6/6	0.34	6/6
D6. Route 4 Extension (Peak/Off Peak)	8,774	1,551	2,139	592	14.50	48	2	2	10,423	0.84	6/6	0.15	6/6
D7. Route 4 Extension (Midday)	7,569	1,555	1,887	621	12.88	43	0	2	4,218	1.79	x/6	0.37	6/6
D10. Route 4 Extension (Peak)	8,774	1,551	2,139	592	14.50	48	2	2	6,205	1.41	x/6	0.25	6/6
D7/D10. Route 4 Extension (Peak/Midday Route)	8,288	1,553	2,038	604	-	-	-	-	10,423	0.80	6/6	0.15	6/6
D8. Apex to O'Kelly Chapel Road	9,113	4,381	716	327	19.30	64	3	3	15,882	0.57	x/6	0.28	-
D9. Alston/Amberly Spur Loop	5,374	287	3,587	474	8.68	29	1	1	5,459	0.98	x/6	0.05	-
D8/D9. Apex to O'Kelly Chapel Road & Alston/Amberly Spur	7,243	2,334	2,152	401	-	-	4	4	21,341	0.34	6/6	0.11	6/6
D11. Apex to McCrimmon Parkway	9,332	3,120	218	303	15.74	52	2	2	10,423	0.90	6/6	0.30	6/6
2040 Projected Demographic Conditions													
D1. Depot to Green Level Church Rd	26,957	18,076	-	-	19.39	65	3	3	15,882	1.70	3/6	1.14	5/6
D5. Route 4 Shortened to Davis Dr	12,745	7,273	-	-	11.53	38	2	2	10,423	1.22	5/6	0.70	5/6
D6. Route 4 Extension (Peak/Off Peak)	22,133	9,223	-	-	14.50	48	2	2	10,423	2.12	3/6	0.88	6/6
D7/D10. Route 4 Extension (Peak/Midday Route)	20,394	8,977	-	-	-	-	-	-	10,423	1.96	3/6	0.86	6/6
D8/D9. Apex to O'Kelly Chapel Road & Alston/Amberly Spur	16,074	9,126	-	-	-	-	4	4	21,341	0.75	6/6	0.43	6/6
D11. Apex to McCrimmon Parkway	13,253	4,999	-	-	15.74	52	2	2	10,423	1.27	5/6	0.48	6/6
	Weekday		Saturday		Sunday								
Frequency	30		30		60								
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM								

Figure 10 Cary Depot to Green Level Church Road Routes (Current Conditions)

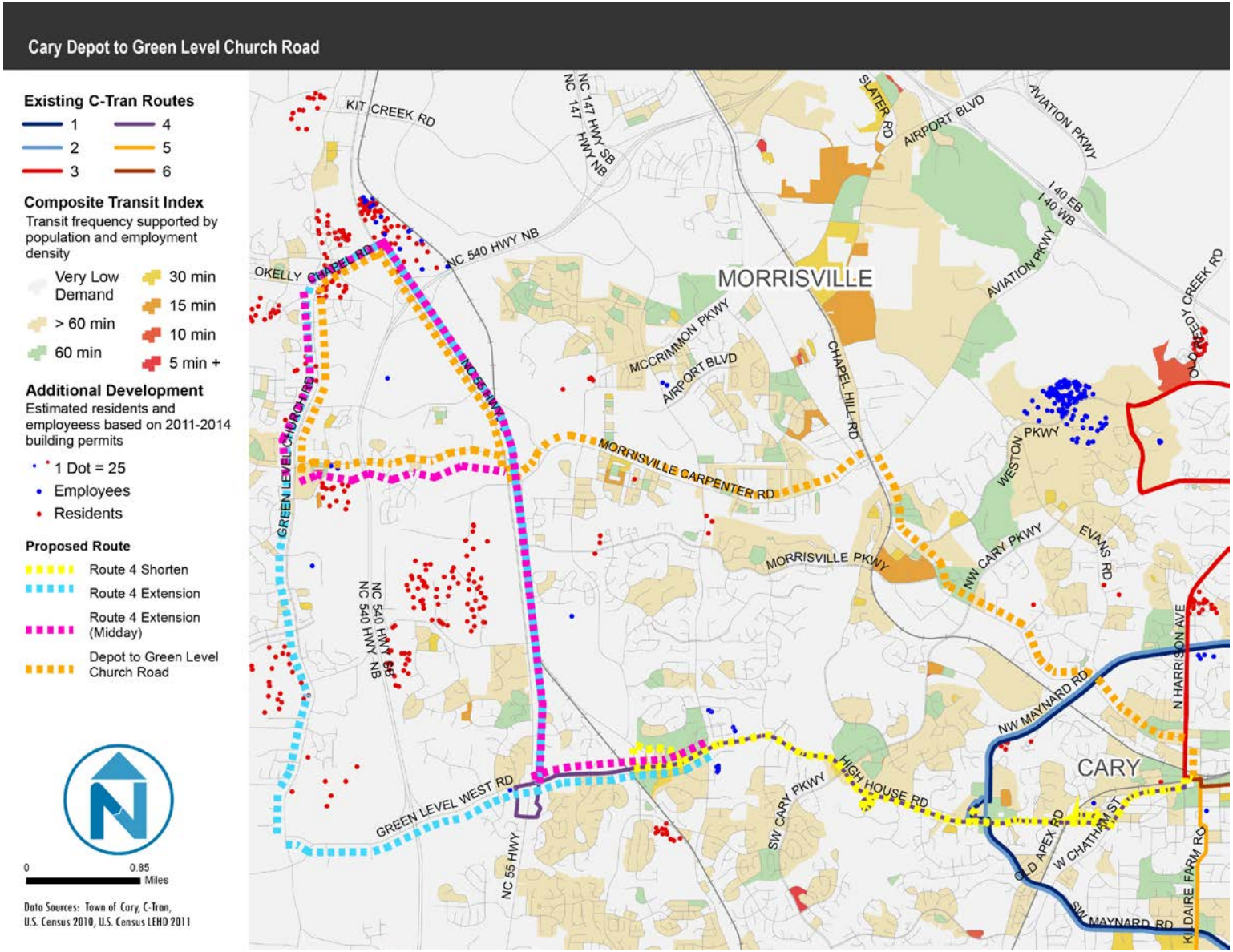


Figure 11 Cary Depot to Green Level Church Road Routes (Future Conditions - 2040 Projected Demographics)

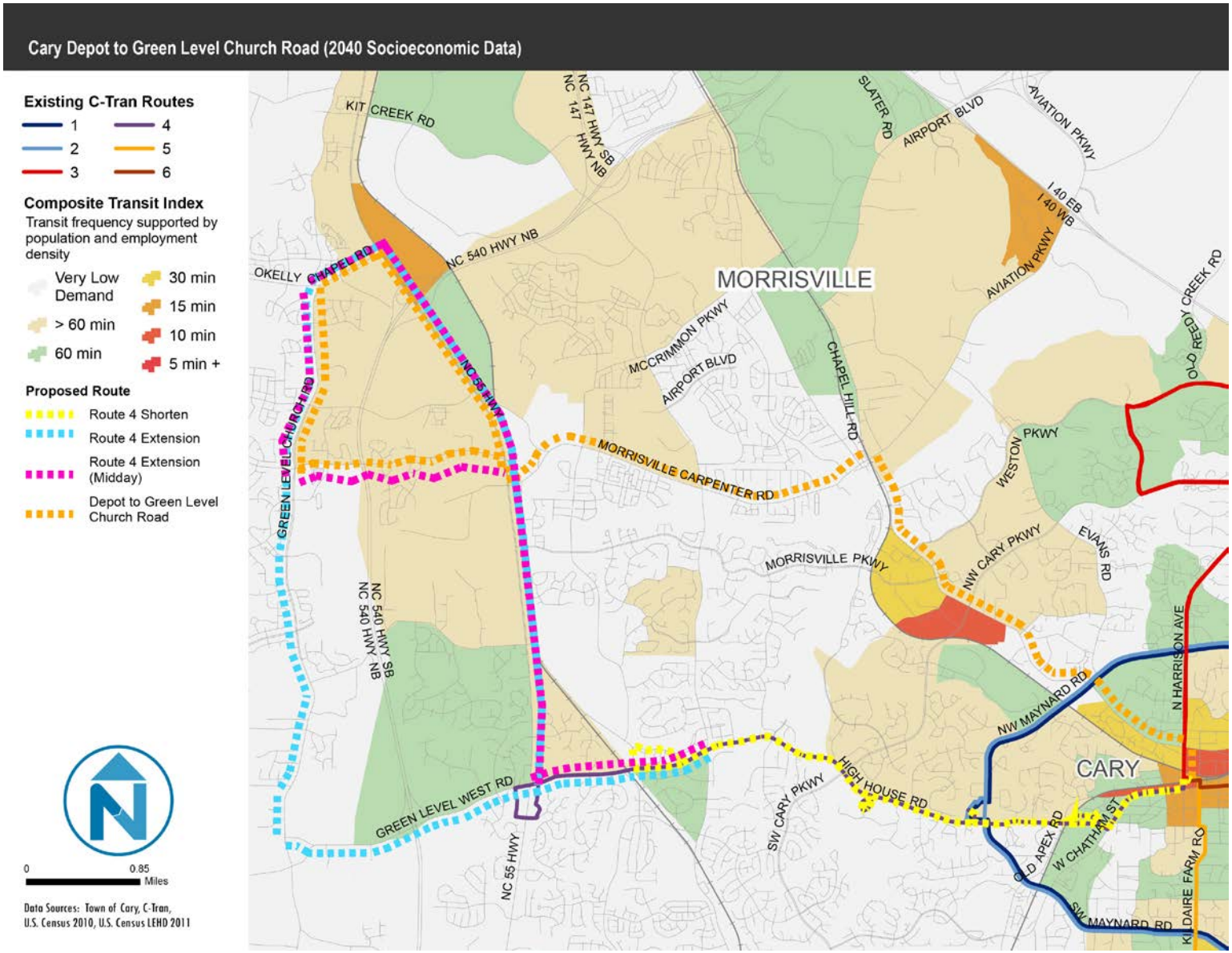


Figure 12 Apex to O'Kelly Chapel Road and McCrimmon Parkway (Current Conditions)

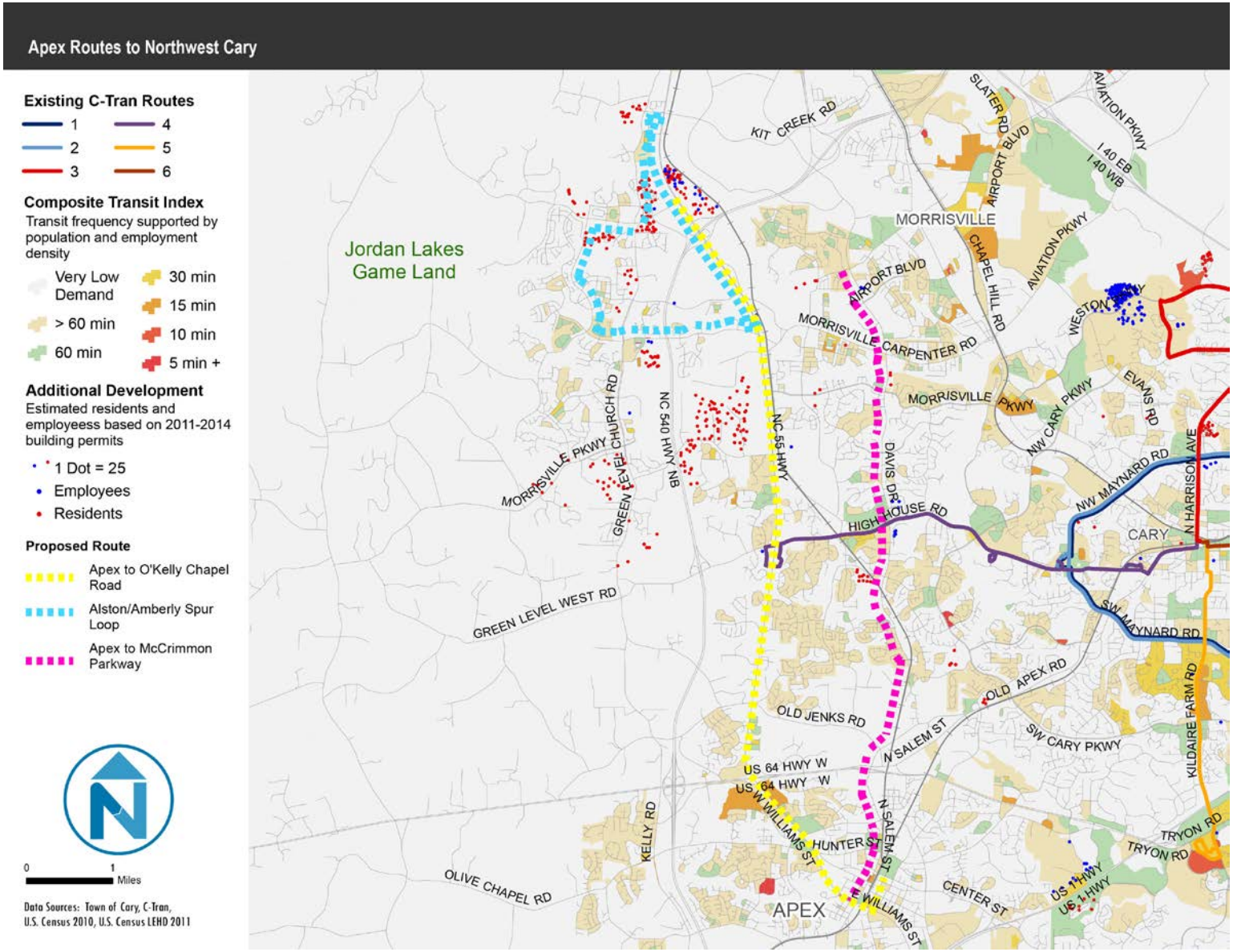
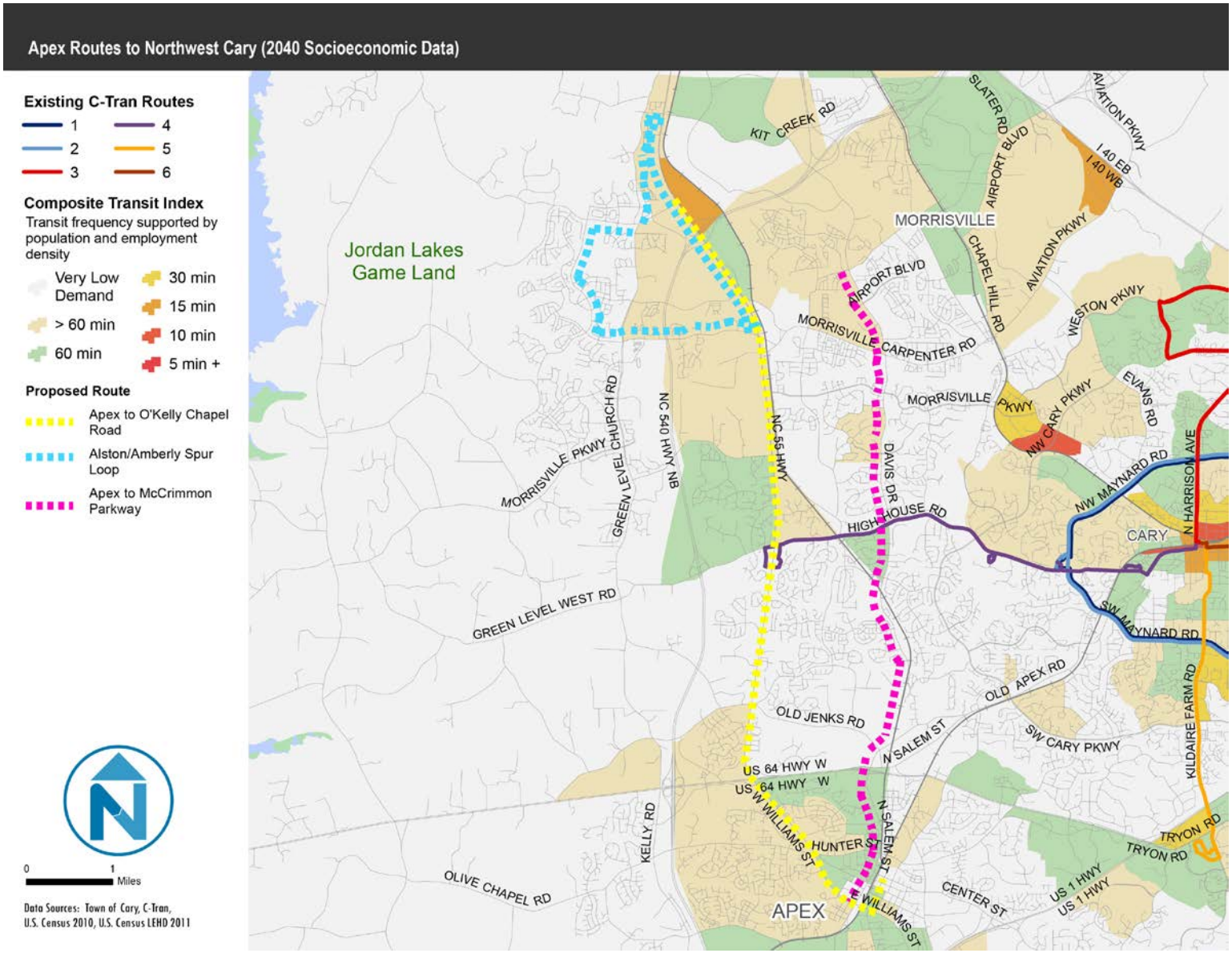


Figure 13 Apex to O'Kelly Chapel Road and McCrimmon Parkway (Future Conditions - 2040 Projected Demographics)



E. Cary Depot to Beaver Creek

The proposed Cary Depot to Beaver Creek route provides service along Old Apex Road, West Chatham Street, SW Maynard Road, Lake Pine Drive and Old Raleigh Road to Apex and the Beaver Creek Commons and Beaver Creek Crossings shopping centers. The route runs northwest along NC-55 Highway to Beaver Creek Commons Drive and loops back at Kelly Road. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways. There is currently no local transit service connecting the two rapidly growing communities of Cary and Apex. This route would provide residents in Cary and Apex with new non-auto travel options.

The proposed Cary Depot to Beaver Creek route is consistent with routes prioritized at the Imagine Cary Transit Planning Workshop on September 9, 2013, as well as recommendations from the Wake County Transit Plan.

Figure 14 Cary Depot to Beaver Creek Route Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles			Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Weekday	Sat.	Sun.		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions														
E2. Depot to Beaver Creek (WCTP)	14,367	7,152	897	74	10.85	36	2	2	1	10,423	1.38	3/6	0.69	6/6
2040 Projected Demographic Conditions														
E2. Depot to Beaver Creek (WCTP)	20,618	11,774			10.85	36	2	2	1	10,423	1.98	3/6	1.13	5/6
	Weekday		Saturday		Sunday									
Frequency	30		30		60									
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM									

Figure 15 Cary Depot to Beaver Creek Route (Current Conditions)

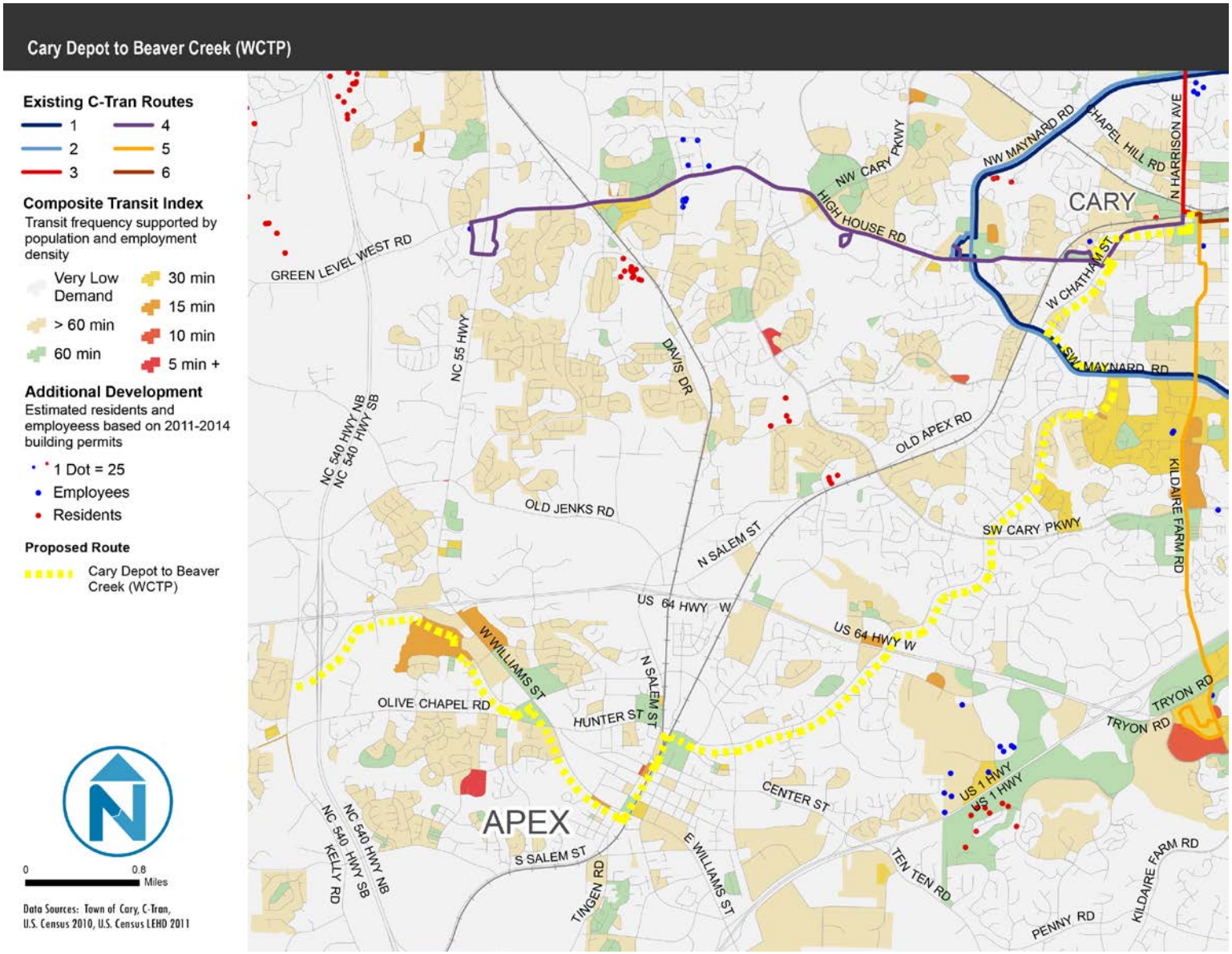
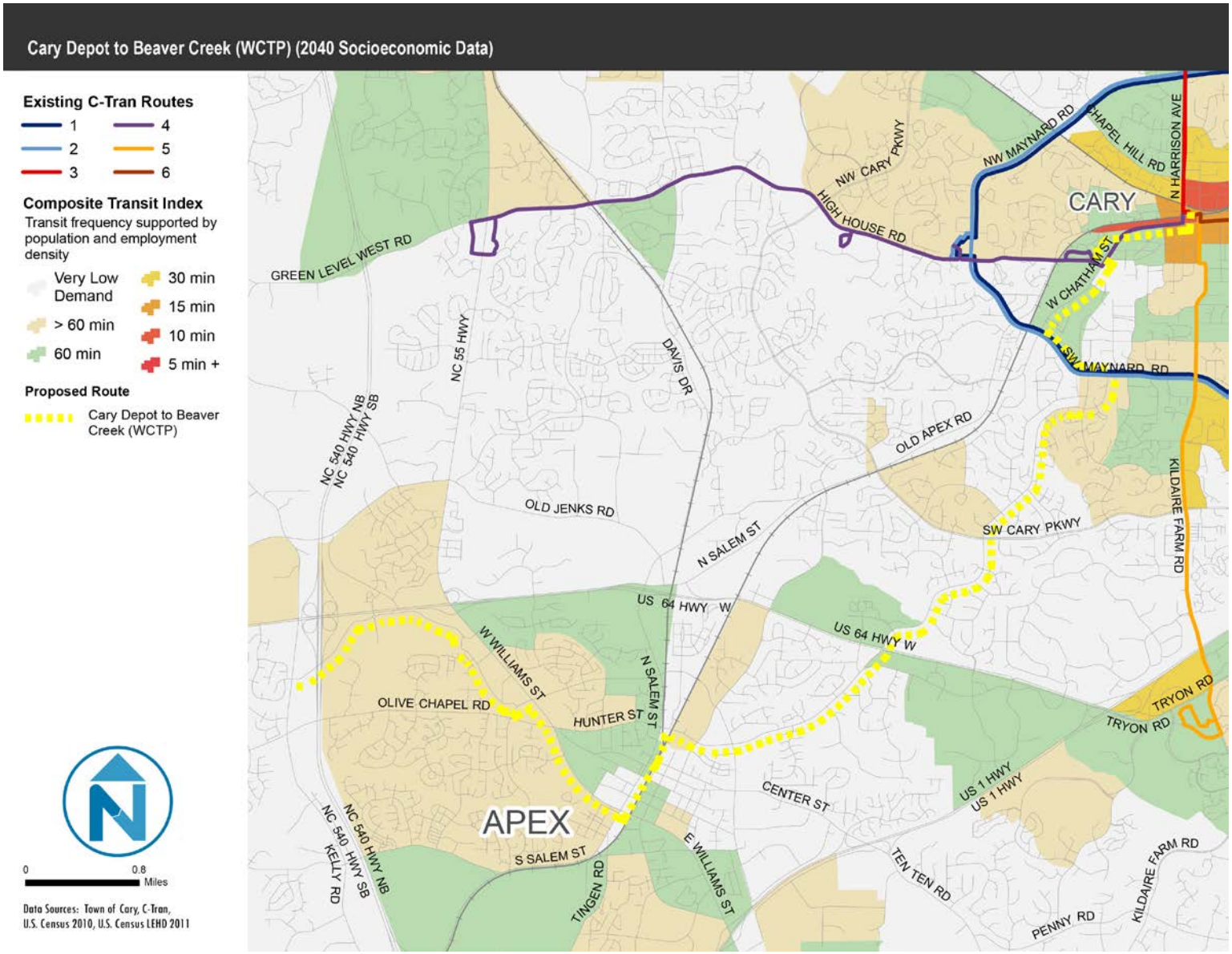


Figure 16 Cary Depot to Beaver Creek Route (Future Conditions - 2040 Projected Demographics)



F. Cary Parkway

The proposed Cary Parkway route travels between Crossroads Plaza and Park Village along Tryon Road and Cary Parkway. The route serves southwest Cary and provides transit connections to Welling Parking Shopping Center, Parkway Pointe, and Preston Corner. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways. There is currently no local or regional transit service in the Cary Parkway corridor. The proposed Cary Parkway route would provide residents and employees in this area with transit connections throughout Cary and the Triangle Region.

Figure 17 Cary Parkway Route Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles			Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Weekday	Sat.	Sun.		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions														
F. Cary Parkway	16,854	10,363	20	68	22.38	75	3	2	1	14,507	1.16	5/6	0.71	5/6
2040 Projected Demographic Conditions														
F. Cary Parkway	19,962	13,713			22.38	75	3	2	1	14,507	1.38	4/6	0.95	4/6
	Weekday		Saturday		Sunday									
Frequency	30		30		60									
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM									

Figure 18 Cary Parkway Route (Current Conditions)

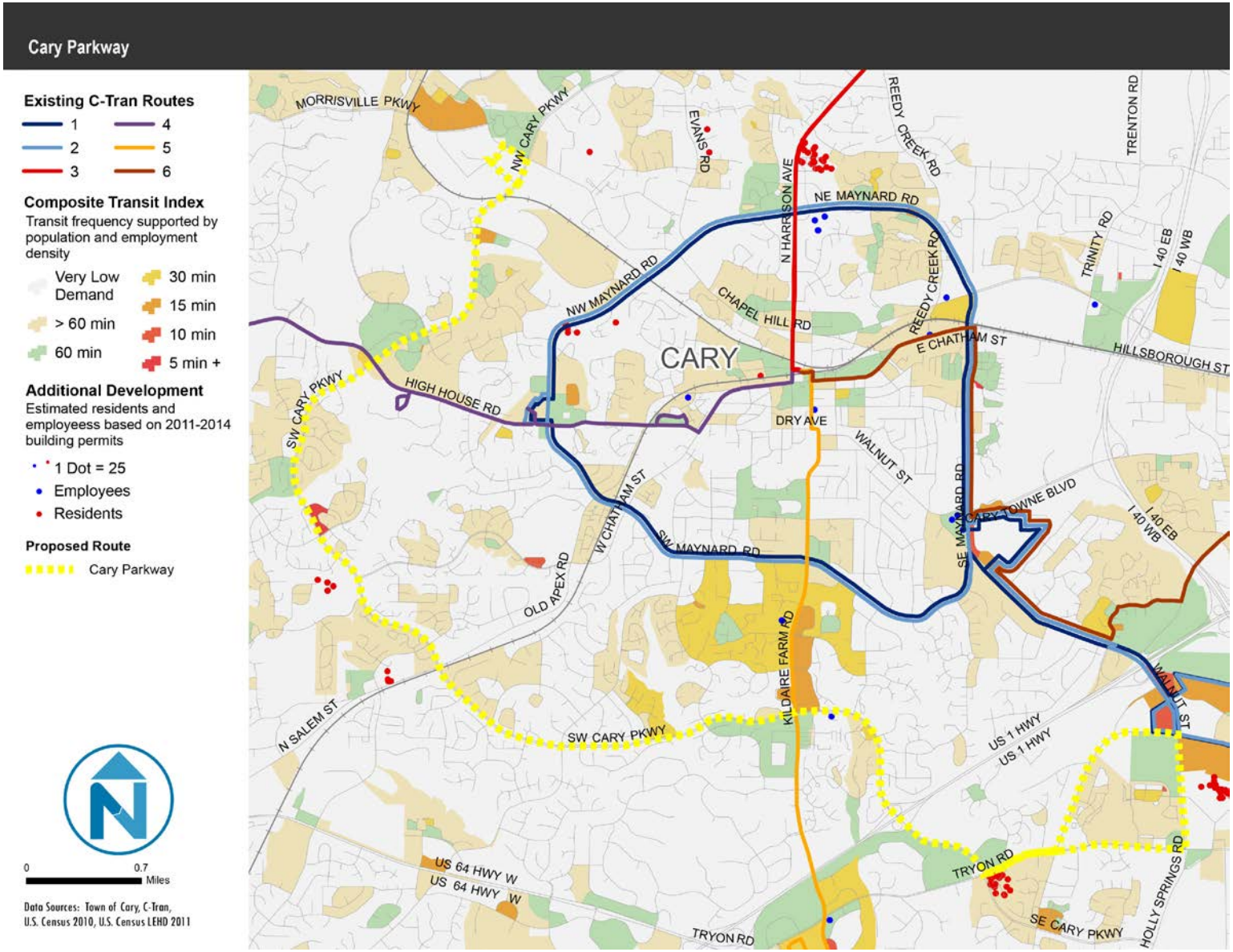
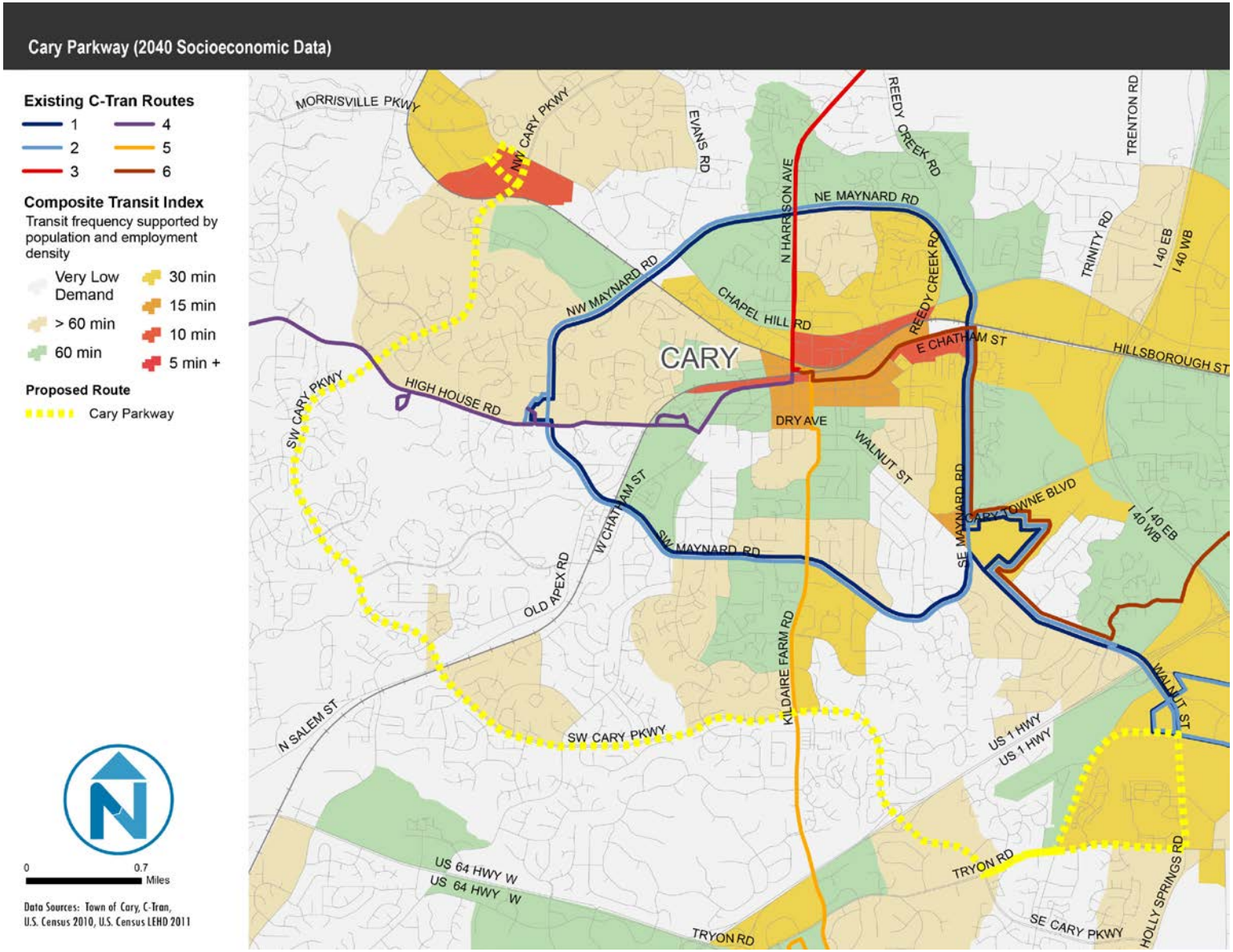


Figure 19 Cary Parkway Route (Future Conditions - 2040 Projected Demographics)



J. Cary Depot to Raleigh-Durham International Airport

The proposed Raleigh-Durham International Airport (RDU) route travels between Cary Depot and RDU along North Harrison Avenue and I-40. The route serves the airport and Cary Depot; no stops are made in between. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways. The service schedule could potentially be adjusted to fit employee shift schedules. There is currently no direct transit service from Cary to RDU. This proposed service would provide residents and employees with a transit option to RDU for work or travel. This service would only be successful if it operated as a Bus on Shoulder System, such as Go Triangle uses to allow buses to travel on shoulders between Harrison Avenue and Aviation Parkways to maintain transit schedules and bypass traffic congestion.

Figure 20 Cary Depot to RDU Route Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles		Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Peak	Off-Peak		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions													
J1. Depot to RDU	988	2,037	570	59	16.82	56	2	2	10,423	0.09	6/6	0..01	6/6
2040 Projected Demographic Conditions													
J1. Depot to RDU	1,399	4,020			16.82	56	2	2	10,423	0.13	6/6	0.39	6/6
	Weekday		Saturday		Sunday								
Frequency	30		30		60								
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM								

Figure 21 Cary Depot to Raleigh-Durham International Airport (Current Conditions)

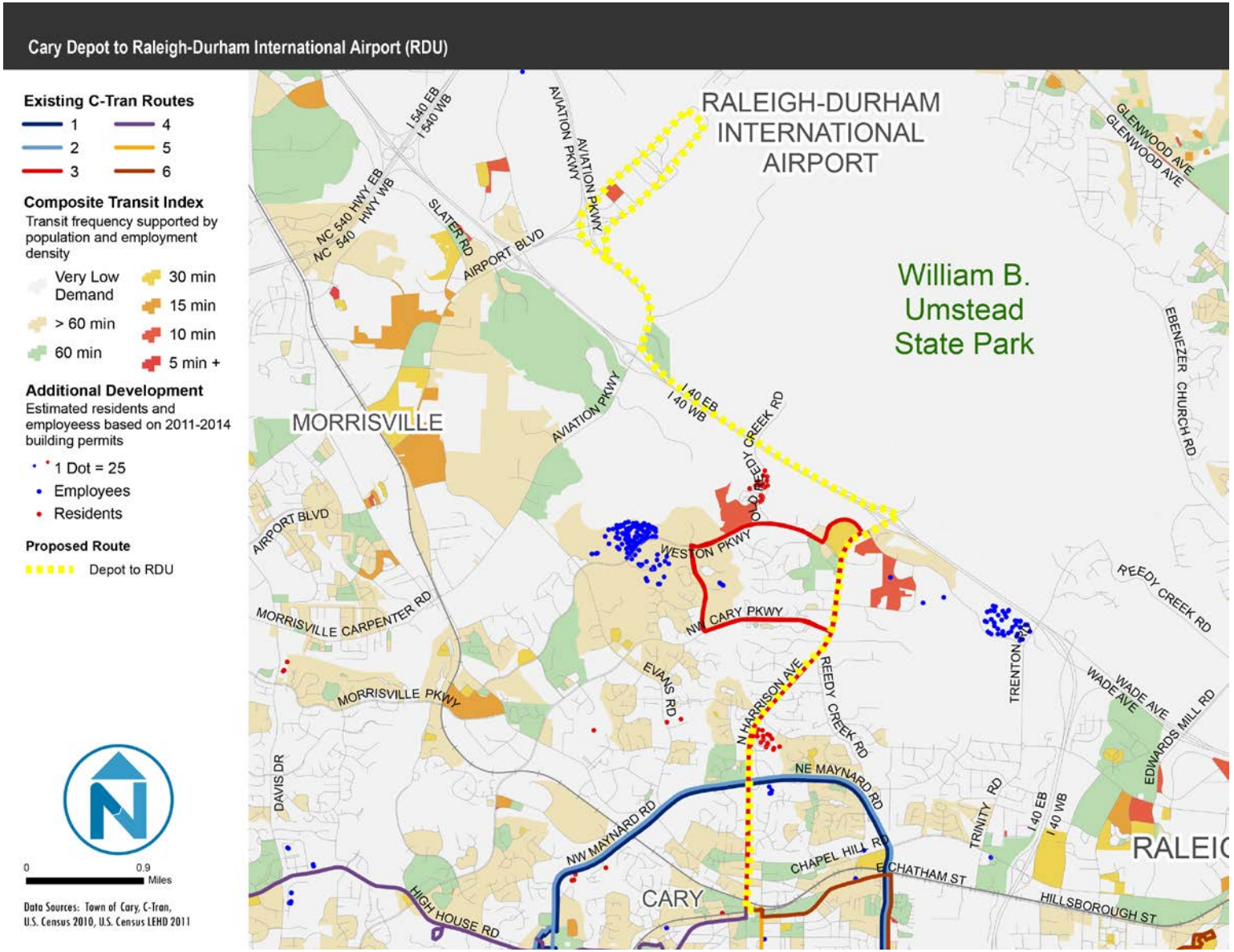
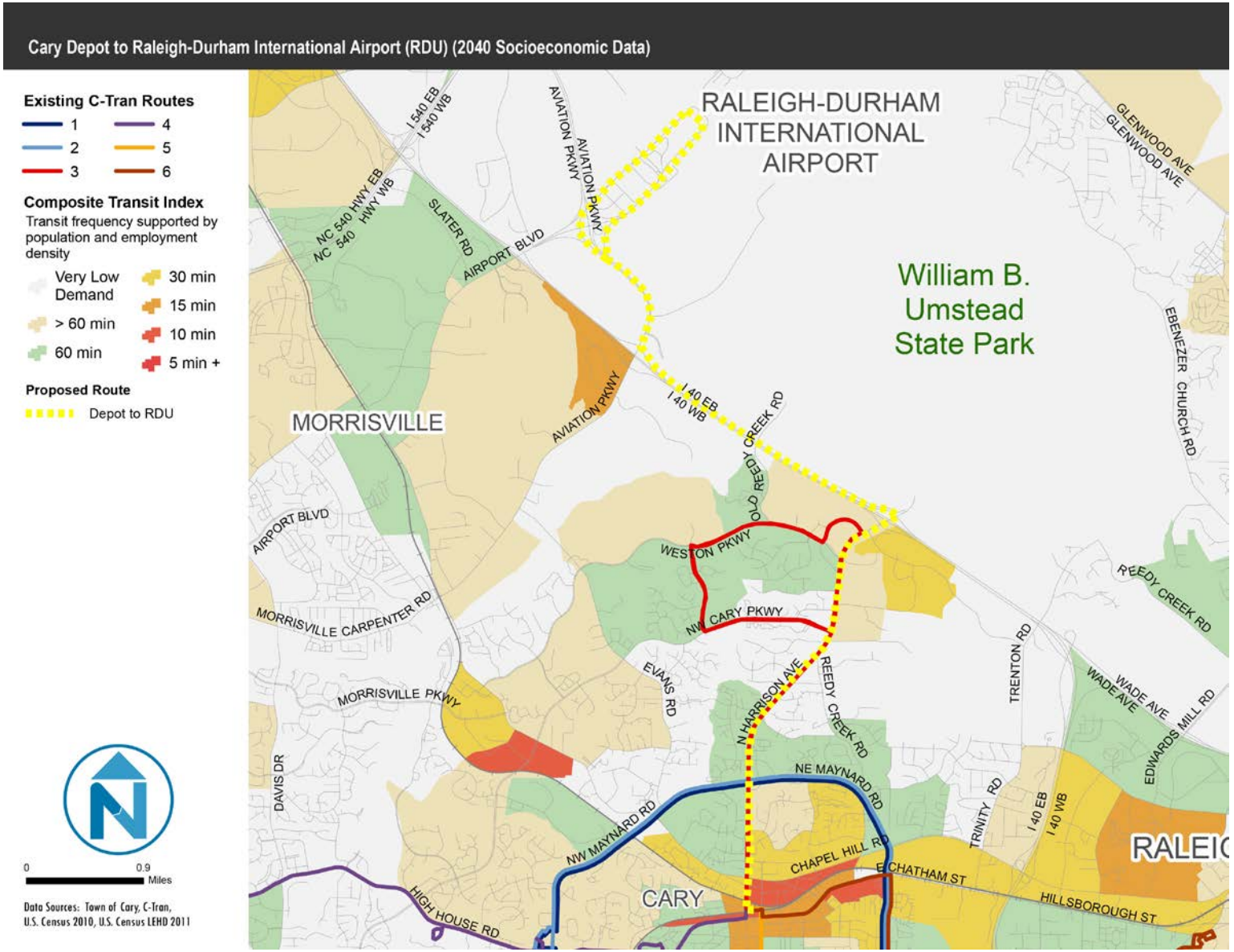


Figure 22 Cary Depot to Raleigh-Durham International Airport (Future Conditions - 2040 Projected Demographics)



ROUTE CHANGES

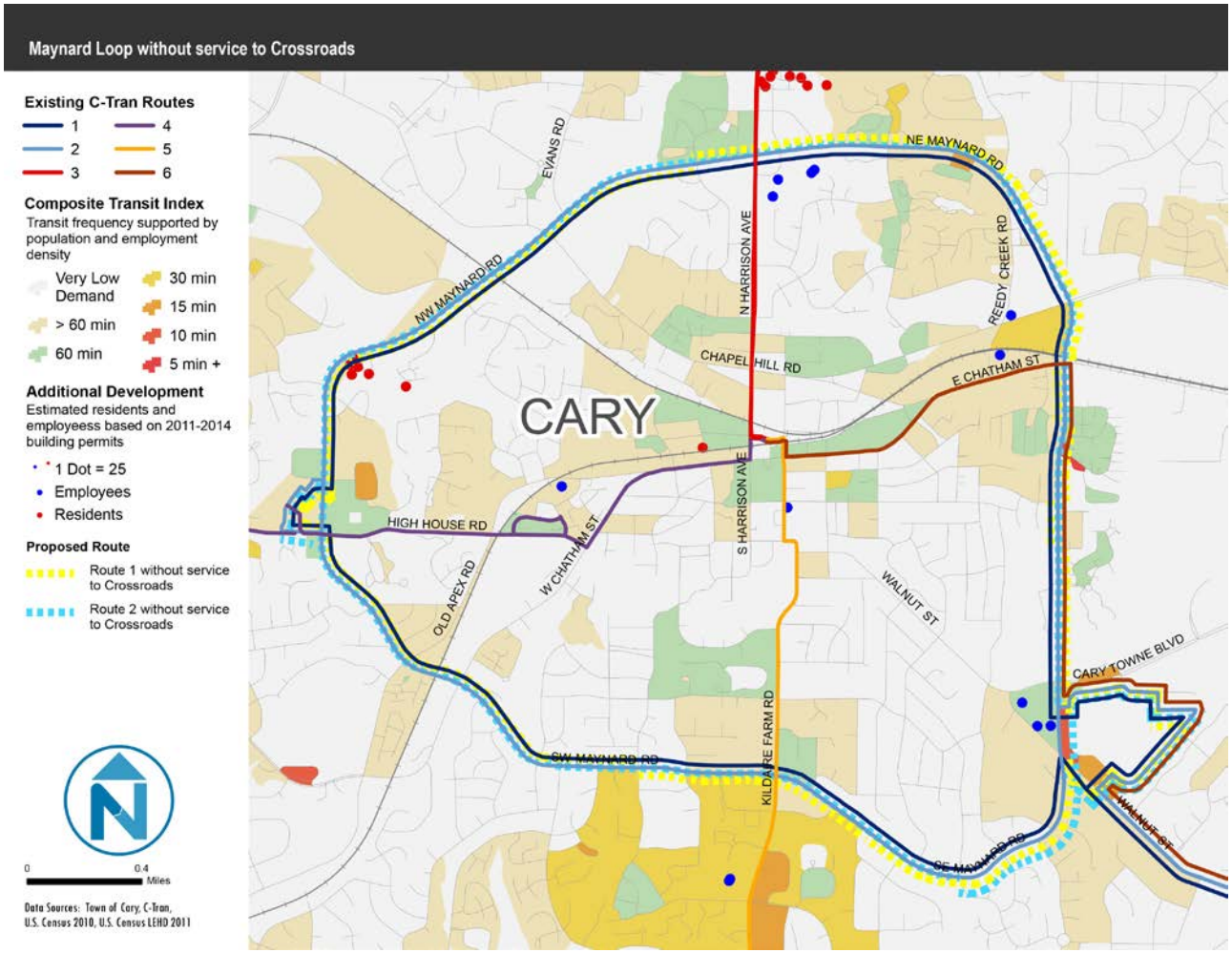
G. Maynard Loop Options

C-Tran Routes 1 and 2 currently operate in a loop along Maynard Road, including jogs to serve Cary Towne Center Mall and Crossroads Shopping Center. Transfer is available to Go Triangle Routes 301 and 303. Route 1 operates clockwise and Route 2 operates counterclockwise. Proposed route changes are described below Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways.

1. Eliminate Service to Crossroads

The first proposal is to eliminate the existing service to Crossroads, reducing travel time for vehicles traveling along the Maynard Loop. This change would be complimented by the proposed Cary Depot to Crossroads route. Eliminating service to Crossroads on Route 1 and 2 reduces travel time to allow 2 vehicles to serve each route with 30 minute headways, instead of the 4 vehicles required for increased frequency to Crossroads.

Figure 23 Maynard Loop Without Service to Crossroads



2. Add Service to Harrison Pointe

Option 2 is to maintain the existing service to Crossroads while providing service to the Harrison Pointe shopping center. With added service to Harrison Pointe, this route has the greatest population and number of jobs in the service area, as shown in Figure 18.

Figure 24 Maynard Loop to Harrison Pointe

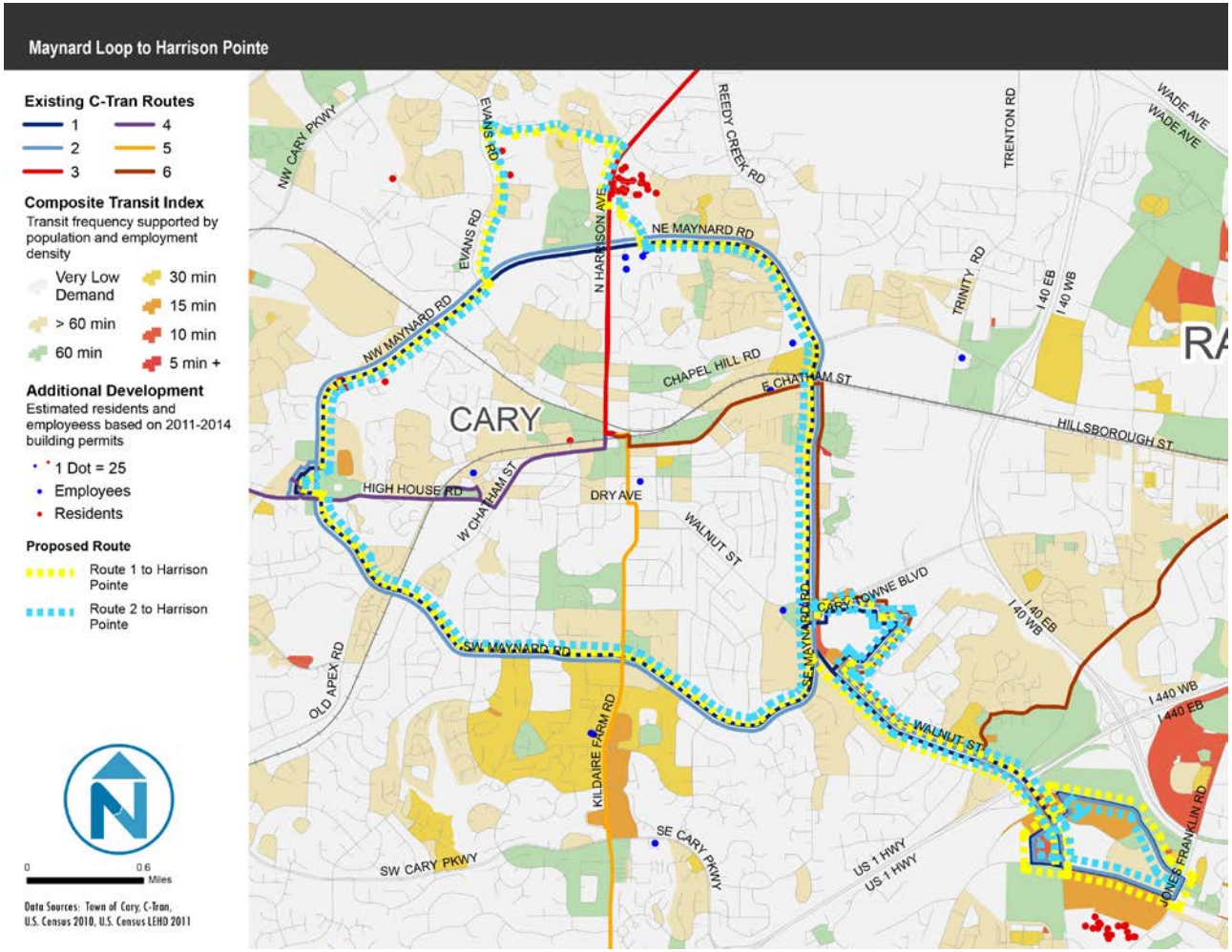


Figure 25 Maynard Loop to Harrison Pointe (Future Conditions - 2040 Projected Demographics)

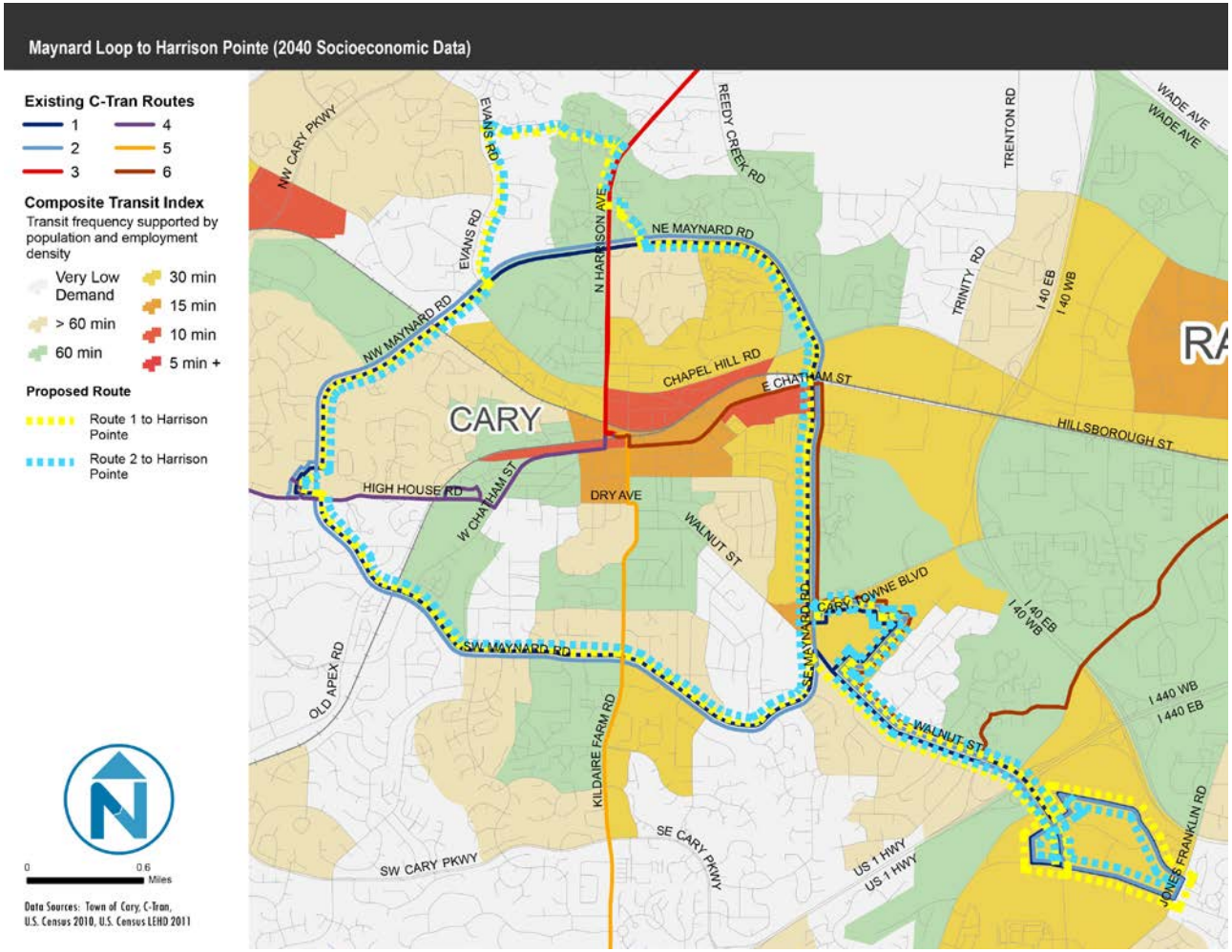


Figure 26 Maynard Loop Route Changes Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles			Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	M-F	Sat.	Sun.		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions														
1. Maynard Loop (Existing)	17,002	16,431	352	264	16.20	60	1	1	0	4,964	3.43	-	3.31	-
2. Maynard Loop (Existing)	17,340	16,509	450	261	16.40	60	1	1	0	4,964	3.49	-	3.33	-
1/2. Maynard Loops (Combined) (Existing)	17,171	16,470	401	262	-	-	-	-	-	9,928	1.73	2/6	1.66	2/6
1. Maynard Loop (Existing with 30 minute frequency)	17,002	16,431	352	264	16.20	60	2	2	1	10,423	1.63	-	1.58	-
2. Maynard Loop (Existing with 30 minute frequency)	17,340	16,509	450	261	16.40	60	2	2	1	10,423	1.66	-	1.58	-
1/2. Maynard Loops (Existing - 30 minute freq.)	17,171	13,288	401	262	-	-	-	-	-	20,846	0.82	6/6	0.79	5
G2-1. Maynard CW (No Crossroads)	14,119	7,636	296	234	9.81	33	2	2	1	10,423	1.35	-	0.73	-
G2-2. Maynard CCW (No Crossroads)	14,586	7,820	429	224	10.35	35	2	2	1	10,423	1.40	-	0.75	-
G2-1/2. Maynard Loops (No Crossroads) (Combined)	14,352	7,728	362	229	-	-	-	-	-	20,846	0.69	6/6	0.37	6/6
G5-1. To Harrison Pointe	19,481	16,620	959	262	16.66	56	2	2	1	10,423	1.87	-	1.59	-
G5-2. To Harrison Pointe	19,547	16,486	924	264	18.00	60	2	2	1	10,423	1.88	-	1.58	-
G5-1/2. Loops to Harrison Pointe (Combined)	19,514	16,553	942	263	-	-	-	-	-	20,846	0.94	6/6	0.79	5/6

2040 Projected Demographic Conditions														
1/2. Maynard Loops (Combined) (Existing)	27,278	20,875	-	-	-	-	-	-	-	27,278	2.75	6/6	2.10	5/6
1/2. Maynard Loops (Existing - 30 minute freq.)	27,278	20,875	-	-	-	-	-	-	-	27,278	1.31	6/6	1.00	5/6
G2-1/2. Maynard Loops (No Crossroads)	20,797	14,151	-	-	-	-	-	-	-	20,846	1.00	6/6	0.68	6/6
G5-1/2. Maynard Loops to Harrison Pointe	29,465	21,424	-	-	-	-	-	-	-	20,846	1.41	6/6	1.03	5/6
	Weekday		Saturday		Sunday									
Frequency	30		30		60									
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM									

H. Route 5 Extension

Route 5 provides service to southern Cary, currently traveling south on Kildare Farm Road to Crescent Commons and Walmart. The Route 5 extension adds a loop through Waverly Place Shopping Center and continues south along Kildare Farm Road to Wake Technical Community College at Ten Ten Road. Transfer is available at Crescent Commons to the proposed route between Cary Depot and Apex.

Figure 27 Route 5 Extension Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles		Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Peak	Off-Peak		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions													
5. Kildaire Farm Rd	5,429	10,897	16	144	8.40	28	1	1	4,033	1.35	3/6	2.70	1/6
5. Kildaire Farm Rd (Existing with 30 minute frequency)	5,429	10,897	16	144	8.40	28	1	1	5,212	1.04	6/6	2.09	2/6
H1. Route 5 South Extension	3,692	6,407	0	27	7.55	25	1	1	5,459	0.68	x/6	1.17	x/6
5/H1. Route 5 South (Existing & Extension)	9,122	17,304	16	171	15.95	53	2	2	10,423	0.88	6/6	1.66	2/6
H2. Route 5 West Extension	4,803	8,208	134	25	13.10	44	2	2	10,423	0.46	x/6	0.79	x/6
5/H2. Route 5 West (Existing & Extension)	9,721	13,637	152	143	20.12	67	3	3	15,882	0.61	6/6	0.86	4/6
2040 Projected Demographic Conditions													
5. Kildaire Farm Rd	9,081	11,352	-	-	8.40	28	1	1	4,033	2.25	4/6	2.81	1/6
5. Kildaire Farm Rd (Existing with 30 minute frequency)	9,081	11,352	-	-	8.40	28	1	1	5,212	1.74	6/6	2.18	4/6
5/H1. Route 5 South (Existing & Extension)	12,608	16,196	-	-	15.95	53	2	2	10,423	2.90	2/6	0.93	6/6
5/H2. Route 5 West (Existing & Extension)	14,472	21,045	-	-	20.12	67	3	3	15,882	2.77	3/6	1.33	5/6
	Weekday		Saturday		Sunday								
Frequency	30		30		60								
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM								

Figure 28 Route 5 Extension to Apex and Ten Ten Road (Current Conditions)

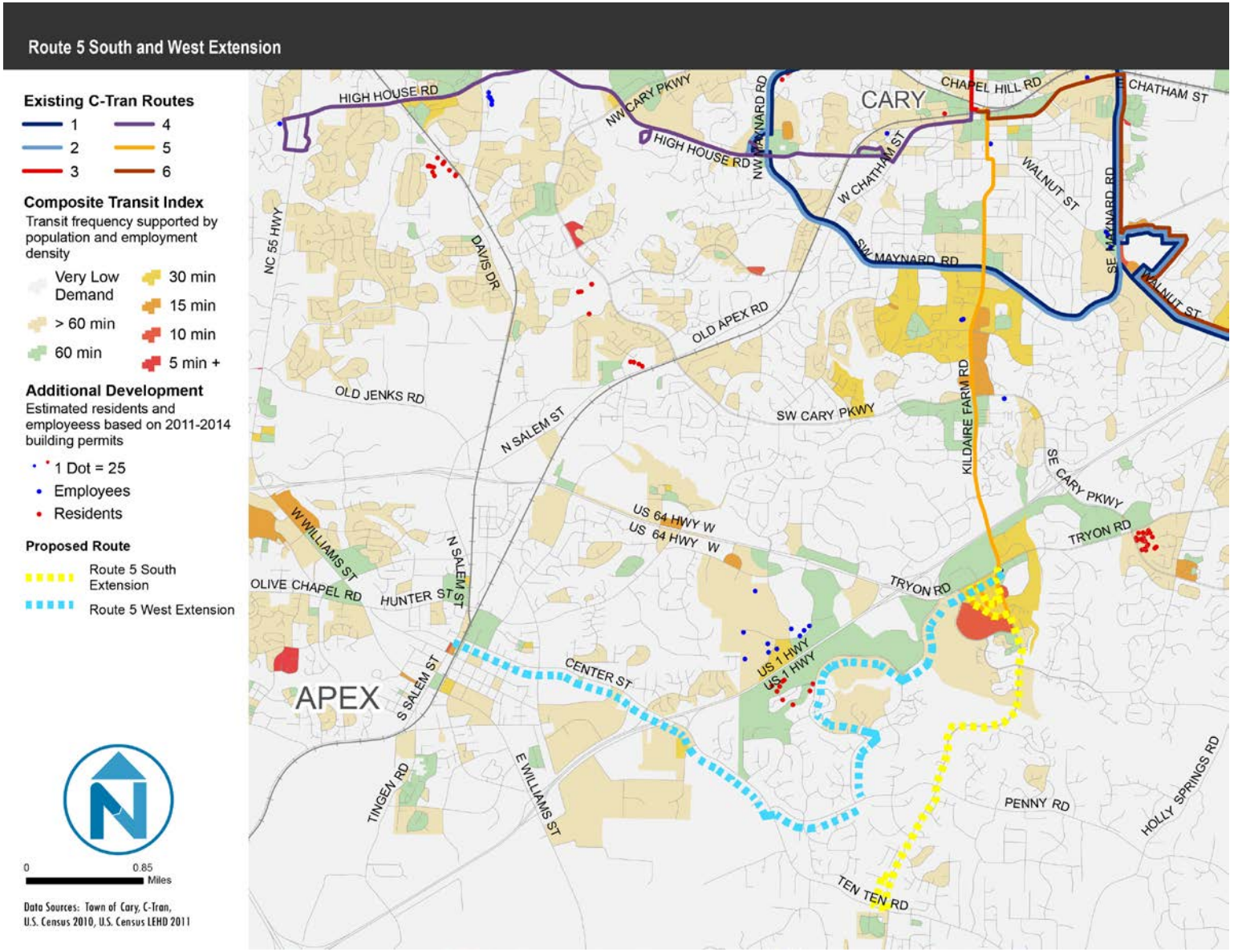
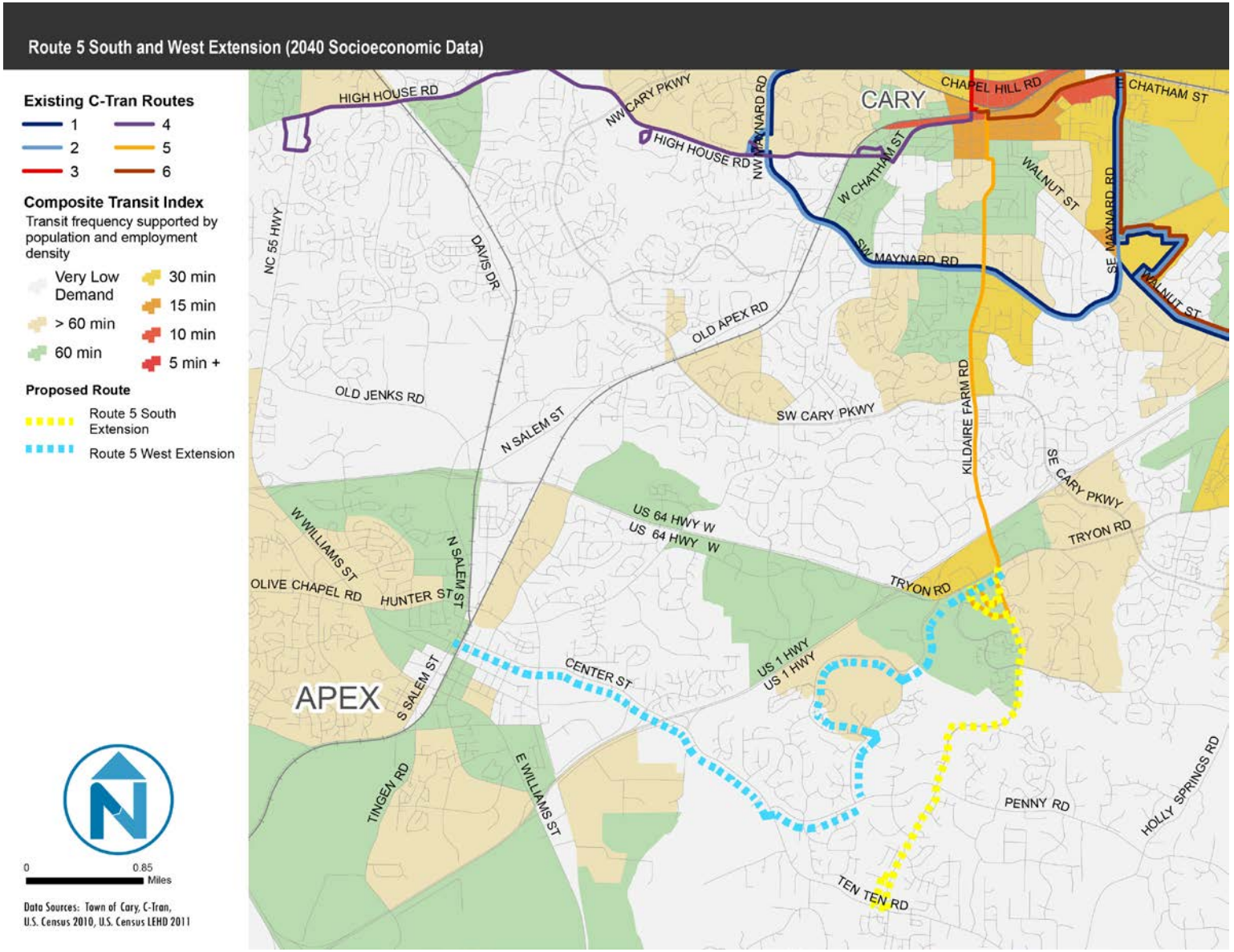


Figure 29 Route 5 Extension to Apex and Ten Ten Road (Future Conditions - 2040 Projected Demographics)



I. Route 6 Extension

Route 6 serves eastern Cary and Raleigh, operating between Downtown Cary east along East Chatham Street, south along Maynard Road, and out to Walnut Street and Buck Jones Road, turning around at the Plaza West Shopping Center in Raleigh. Transfer is available to CAT Route 11c and to Go Triangle Routes 301 and 303 at Park West Shopping Center. At the Moore Square Station, transfer is available to Go Triangle Routes 100, 102, 105, 301, 303, 305, CRX, DRX, KRX, WRX, and ZWX. Proposed route changes are described below. Service would operate on weekdays and Saturdays from 6:00 a.m. to 10:00 p.m. with 30 minute headways. On Sundays, the service would operate from 9:00 a.m. to 6:00 p.m. with 60 minute headways.

- **Route 6 Extended via Western Boulevard** –This extension of Route 6 would continue east on Western Boulevard, then turn north to North Carolina State University on Morrill Drive and Cates Avenue. The extension would continue onto Pullen Road and Western Boulevard before turning north on South Wilmington Street to Moore Square in Raleigh.
- **Route 6 Extended via Hillsborough Avenue** – This extension of Route 6 would continue east on Hillsborough Street to Moore Square in Raleigh, providing service to North Carolina State University.[6]
- **Route 6 Direct to Western Boulevard** – Under this option, Route 6 would be rerouted to East Chatham Street, traveling directly east to Western Boulevard and to Moore Square in Raleigh. This route change would not serve Cary Towne Center Mall.

The Route 6 extensions are consistent with routes prioritized at the Imagine Cary Transit Planning Workshop on September 9, 2013.

[6] As noted earlier in this document, the LEHD employment data used to calculate the population, jobs, and transit frequency supported by proposed routes and route changes has two drawbacks. Job location data for companies with multiple locations, such as North Carolina State University, sometimes suffers from "headquartering," where all or some employees are assigned to a central location that is different from where they typically report to work. Additionally, the student population may not be accurately represented as students may be counted by the Census at their campus residence, at their parent's home address, or both. This is especially important to recognize as university students generally ride transit at a higher rate than the general population.

Figure 30 Route 6 Extension Analysis

Route	1/4 Mile Buffer		1/4 Mile Buffer		Round Trip		Vehicles		Annual Revenue Hours	Population		Jobs	
	Pop.	Jobs	Est. Pop.	Est. Jobs	Route Length (mi.)	Travel Time (min.)	Peak	Off-Peak		Per Revenue Hour	Rank with Existing Routes	Per Revenue Hour	Rank with Existing Routes
Current Demographic Conditions													
6. Buck Jones Rd	10,575	6,916	18	166	14.10	56	2	1	8,067	1.31	4/6	0.86	4/6
6. Buck Jones Rd (Existing with 30 minute frequency)	10,575	6,916	18	166	14.10	56	2	2	10,423	1.01	6/6	0.66	5/6
I2. Route 6 Extended via Western Ave	24,617	22,876	0	167	25.55	85	3	3	15,882	1.55	3/6	1.44	4/6
I3. Route 6 Direct via Western Blvd	18,023	19,969	20	98	19.20	64	3	3	15,882	1.13	6/6	1.26	4/6
I4. Route 6 Extended via Hillsborough Ave	20,255	48,647	0	167	24.60	82	3	3	15,882	1.28	5/6	3.06	1/6
2040 Projected Demographic Conditions													
6. Buck Jones Rd	22,484	18,655	-	-	13.58	56	2	1	8,067	2.79	2/6	2.31	3/6
6. Buck Jones Rd (Existing with 30 minute frequency)	22,484	18,655	-	-	13.58	56	2	2	10,423	2.16	5/6	1.79	5/6
I2. Route 6 Extended via Western Blvd	34,662	65,390	-	-	25.55	85	3	3	25.55	2.18	5/6	4.12	1/6
I3. Route 6 Direct via Western Blvd	29,968	62,994	-	-	19.20	64	3	3	19.20	1.89	5/6	3.97	1/6
I4. Route 6 Extended via Hillsborough Ave	37,415	69,797	-	-	24.60	82	3	3	24.60	2.36	4/6	4.39	1/6
	Weekday		Saturday		Sunday								
Frequency	30		30		60								
Span of Service	6 AM-10 PM		6 AM-10 PM		9 AM-6 PM								

Figure 31 Route 6 Extension (Current Conditions)

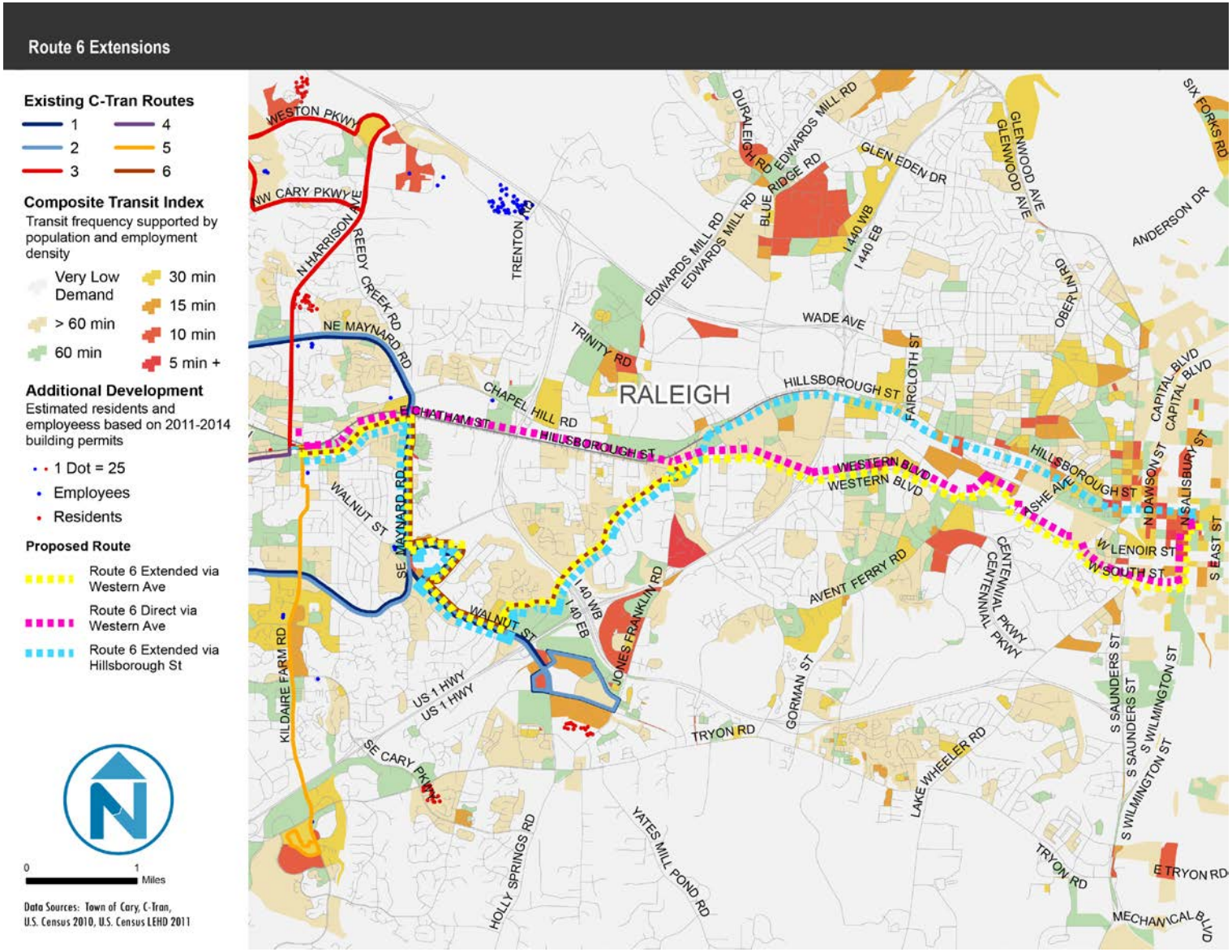
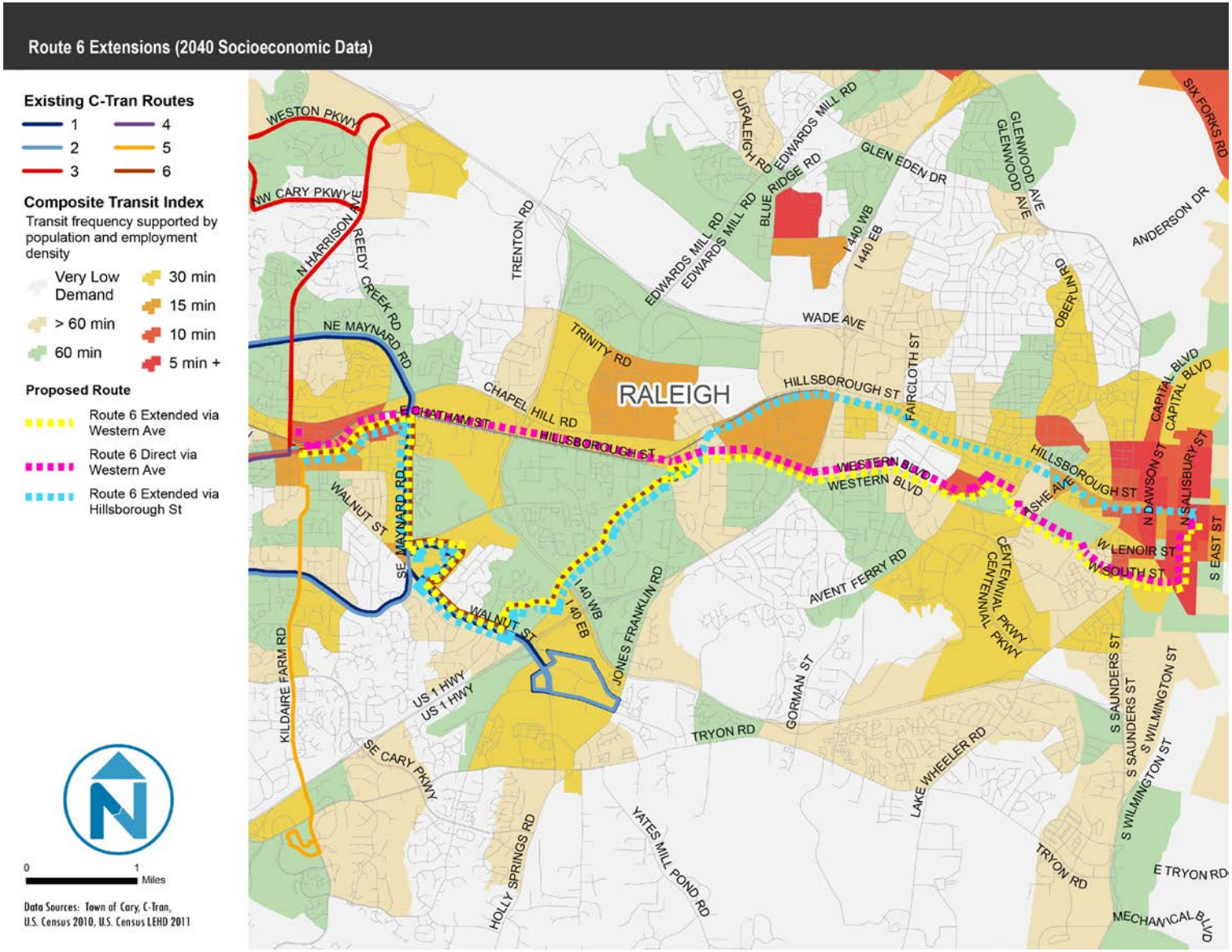


Figure 32 Route 6 Extension (Future Conditions - 2040 Projected Demographics)



COMPARISON OF PROPOSED ROUTES AND CHANGES

Figure 33 summarizes general effectiveness measures for all proposed routes and route changes described above. In general, proposed new routes on Weston Parkway, Cary Depot to Crossroads, Cary Depot to Beaver Creek, and Cary Parkway have a higher ratio of potential users to revenue hour cost. Among proposed route changes, the Route 6 extensions to Raleigh rank highest. Additionally, adding service to Harrison Pointe ranks higher than running the Maynard Loops without service to Crossroads. Both pairs of route alternatives are among those that present opportunities for refinement where travel times are between 30-35 and 60-65 minutes. Adjusting route alignments or operating speeds to reduce travel times below 30-minute and 60-minute thresholds will reduce cost by minimizing the number of vehicles required in operation. The costs shown in the following tables are the total cost of contracted services and do not take into account federal, state, passenger, and other local revenues. The cost also does not include C-Tran administrative costs and transit vehicle fueling needs. For the below new route proposals or changes to existing routes, there is potential for new transit revenues if a Countywide half-cent sales tax referendum is approved by voters in the near future.

Figure 33 Comparison of Proposed Routes and Changes – Existing and Projected Demographics

	Route	Round Trip Time (min)	Existing Demographics										Projected Demographics (2040)										Annual Revenue Hours	Cost (at $60 per Revenue Hour before FTA grant funds)
			Population					Jobs					Population					Jobs						
			.25 mile radius	per Revenue Hour	Rank	per Trip	Rank	.25 mile radius	per Revenue Hour	Rank	per Trip	Rank	.25 mile radius	per Revenue Hour	Rank	per Trip	Rank	.25 mile radius	per Revenue Hour	Rank	per Trip	Rank		
Existing Routes	1/2. Maynard Loops (Combined for Comparison)	60	17,171	1.73	2	89.43	3	16,470	1.66	3	85.78	4	401	0.04	9	2.09	9	262	0.03	10	1.37	9	9,928	$595,680
	3. Harrison Ave	27	7,100	1.76	1	45.51	13	6,240	1.55	4	40.00	12	721	0.18	3	4.62	5	305	0.08	2	1.95	6	4,033	$241,995
	4. High House Rd to Highway 55	57	9,224	1.14	8	59.13	8	3,601	0.45	14	23.08	14	20	0.00	16	0.13	15	329	0.04	5	2.11	5	8,067	$483,990
	5. Kildaire Farm Rd	28	5,429	1.35	5	34.80	19	10,897	2.70	1	69.85	5	16	0.00	15	0.10	17	144	0.04	6	0.93	12	4,033	$241,995
	6. Buck Jones Rd	56	10,575	1.31	6	67.79	6	6,916	0.86	9	44.33	10	18	0.00	17	0.12	16	166	0.02	11	1.07	10	8,067	$483,990
New Route Proposal	A1/A2. Weston Parkway (Weekday/Weekend)	38, 60	6,795	0.47	20	33.81	20	10,134	0.70	12	50.42	9	182	0.01	13	0.90	12	2,628	0.18	1	13.07	1	14,507	$870,420
	B1. Depot to Crossroads (Basic Route Alignment)	54	10,387	1.00	10	51.68	9	13,800	1.32	6	68.65	6	333	0.03	10	1.66	10	156	0.01	14	0.77	15	10,423	$625,380
	D1. Depot to Green Level Church Rd	65	12,097	0.76	16	60.19	7	3,531	0.22	18	17.57	16	2,417	0.15	4	12.03	1	467	0.03	8	2.32	4	15,882	$952,920
	D5. Route 4 Shortened to Davis Dr	38	7,679	0.74	12	38.20	13	3,506	0.34	11	17.44	12	20	0.00	13	0.10	14	312	0.03	4	1.55	5	10,423	$625,380
	D6. Route 4 Extension (Peak/Off Peak)	48	8,774	0.84	9	43.65	11	1,551	0.15	16	7.72	16	2,139	0.21	1	10.64	2	592	0.06	3	2.95	3	10,423	$625,380
	D7/D10. Route 4 Extension (Peak/Midday Route)	48, 43	8,288	0.80	10	41.23	12	1,553	0.15	15	7.72	15	2,038	0.20	2	10.14	3	604	0.06	2	3.00	2	10,423	$625,380
	D8/D9. Apex to O'Kelly Chapel Rd & Alston/Amberly Spur	29, 64	7,243	0.34	16	18.02	16	2,334	0.11	17	5.81	17	2,152	0.10	4	5.35	4	401	0.02	7	1.00	7	21,341	$1,280,460
	D11. Apex to McCrimmon Parkway	52	9,332	0.90	7	46.43	9	3,120	0.30	12	15.52	13	218	0.02	9	1.08	9	303	0.03	6	1.51	6	10,423	$625,380
	E2. Depot to Beaver Creek (WCTP)	36	14,367	1.38	2	71.48	4	7,152	0.69	9	35.58	9	20	0.00	13	0.10	14	68	0.01	14	0.34	16	10,423	$625,380
	F. Cary Parkway	75	16,854	1.16	3	83.85	3	10,363	0.71	7	51.56	6	897	0.06	5	4.46	5	74	0.01	17	0.37	15	14,507	$870,420
Route Change Proposal	G2-1/2. Maynard Loops (No Crossroads)	35, 33	14,352	0.69	13	35.70	14	7,728	0.37	10	19.22	10	362	0.02	10	0.90	11	229	0.01	11	0.57	13	20,846	$1,250,760
	G5-1/2. Maynard Loops to Harrison Pointe	60, 56	19,514	0.94	6	48.54	7	16,553	0.79	6	41.18	8	942	0.05	7	2.34	7	263	0.01	10	0.65	12	20,846	$1,250,760
	5/H1. Route 5 South (Existing & Extension)	53	9,122	0.88	8	45.38	10	17,304	1.66	1	86.09	3	16	0.00	15	0.08	16	171	0.02	8	0.85	8	10,423	$625,380
	5/H2. Route 5 West (Existing & Extension)	67	9,721	0.61	14	48.36	8	13,637	0.86	5	67.84	5	152	0.01	12	0.76	12	143	0.01	13	0.71	11	15,882	$952,920
	J1. Depot to RDU	56	988	0.09	17	4.92	17	2,037	0.20	14	10.13	14	570	0.05	6	2.84	6	59	0.01	16	0.29	17	10,423	$625,380
	I2. Route 6 (Existing & Extension)	85	24,617	1.55	1	122.47	1	22,876	1.44	2	113.81	1	0	0.00	17	0.00	17	167	0.01	12	0.83	9	15,882	$952,920
	I3. Route 6 Extension via Hillsborough	64	18,023	1.13	4	89.66	2	19,969	1.26	4	99.35	2	20	0.00	16	0.10	13	98	0.01	15	0.49	14	15,882	$952,920

Figure 34 summarizes general effectiveness measures for all proposed routes and route changes described above based on future conditions (projected population and employment in 2040). Based on the projected data, proposed new routes to Apex (D1, D6), Crescent Commons (5/H1, 5/H2), and show higher increases in population per revenue hour relative to all route proposals.

Figure 34 Comparison of Proposed Routes and Changes – Future Conditions - 2040 Projected Demographic

		Round Trip Time (min)	Future Conditions - 2040 Projected Demographics										Average Rank	Change in Rank		Annual Revenue Hours	Cost (at $60 per Revenue Hour)[7]
			Population					Jobs						Existing vs. 2040			
			.25 mile radius	per Revenue Hour	Rank	per Trip	Rank	.25 mile radius	per Revenue Hour	Rank	per Trip	Rank		Pop. Per Revenue Hour	Jobs Per Revenue Hour		
Existing Routes	1/2. Maynard Loops (Combined for Comparison)	60	27,278	2.75	5	142.07	4	20,875	2.10	6	108.73	4	6	3	3	9,928	$595,680
	3. Harrison Ave	27	11,986	2.97	1	76.83	13	10,277	2.55	4	65.88	11	6	0	0	4,033	$241,995
	4. High House Rd to Highway 55	57	14,589	1.81	12	93.52	10	7,794	0.97	13	49.96	14	11	4	-1	8,067	$483,990
	5. Kildaire Farm Rd	28	9,081	2.25	6	58.21	20	11,352	2.81	3	72.77	9	10	1	2	4,033	$241,995
	6. Buck Jones Rd	56	22,484	2.79	3	144.13	3	18,655	2.31	5	119.58	3	8	-3	-4	8,067	$483,990
New Route Proposal	A1/A2. Weston Parkway (Weekday/Weekend)	38, 60	13,497	0.93	21	67.15	16	18,293	1.26	9	91.01	6	12	1	-3	14,507	$870,420
	B1. Depot to Crossroads (Basic Route Alignment)	54	17,039	1.63	14	84.77	12	15,709	1.51	7	78.15	8	10	4	1	10,423	$625,380
	D1. Depot to Green Level Church Rd	65	26,957	1.70	13	134.11	5	18,076	1.14	10	89.93	7	9	-3	-8	15,882	$952,920
	D5. Route 4 Shortened to Davis Dr	38	12,745	1.22	14	63.41	15	7,273	0.70	13	36.18	13	12	2	2	10,423	$625,380
	D6. Route 4 Extension (Peak/Off Peak)	48	22,133	2.12	4	110.11	4	9,223	0.88	11	45.88	11	8	-5	-5	10,423	$625,380
	D7/D10. Route 4 Extension (Peak/Midday Route)	48, 43	20,394	1.96	6	101.46	6	8,977	0.86	12	44.66	12	8	-4	-3	10,423	$625,380
	D8/D9. Apex to O'Kelly Chapel Rd & Alston/Amberly Spur	29, 64	16,074	0.75	17	39.98	17	9,126	0.43	17	22.70	17	13	1	0	21,341	$1,280,460
	D11. Apex to McCrimmon Parkway	52	13,253	1.27	12	65.94	13	4,999	0.48	15	24.87	15	11	5	3	10,423	$625,380
	E2. Depot to Beaver Creek (WCTP)	36	20,618	1.98	5	102.58	5	11,774	1.13	7	58.58	8	9	3	-2	10,423	$625,380
	F. Cary Parkway	75	19,962	1.38	11	99.31	7	13,713	0.95	9	68.22	7	8	8	2	14,507	$870,420
Route Change Proposal	G2-1/2. Maynard Loops (No Crossroads)	35, 33	20,797	1.00	15	51.73	16	14,151	0.68	14	35.20	14	13	2	4	20,846	$1,250,760
	G5-1/2. Maynard Loops to Harrison Pointe	60, 56	29,465	1.41	10	73.30	11	21,424	1.03	8	53.29	9	8	4	2	20,846	$1,250,760
	5/H1. Route 5 South (Existing & Extension)	53	12,608	2.90	1	75.76	10	16,196	0.93	10	48.22	10	8	-7	9	10,423	$625,380
	5/H2. Route 5 West (Existing & Extension)	67	14,472	2.77	2	85.03	8	21,045	1.33	4	104.70	3	8	-12	-1	15,882	$952,920
	J1. Depot to RDU	56	1,399	0.13	17	6.96	17	4,020	0.39	17	20.00	17	15	0	3	10,423	$625,380
	I2. Route 6 (Existing & Extension)	85	34,662	2.18	3	172.45	1	65,390	4.12	1	325.33	1	6	2	-1	15,882	$952,920
	I3. Route 6 Extension via Hillsborough	64	29,968	1.89	7	149.10	2	62,994	3.97	2	313.41	2	7	3	-2	15,882	$952,920

Figure 35 and Figure 36 organize the proposed routes and route changes based on their potential effectiveness. The main factors that influence the demand for transit service are population and employment densities. Routes that serve higher density areas have higher ratios of populations and jobs per revenue, as shown below. The composite population and jobs per revenue hour combines these factors into a single factor that weights jobs twice as heavily as population, due to their more significant impact on ridership. In both current and projected conditions, the Route 6 extension to Raleigh (I2) show the greatest effectiveness in population and jobs served per revenue hour. Changes to Route 5 are also highly rated (high today; medium in 2040). New proposed routes B1 (Dept to Crossroads) and E2 (Depot to Beaver Creek) also rate Medium both today and under projected 2040 conditions.

[7] Cost does not include fuel cost, only contractual cost per revenue hour.

Figure 35 Prioritization of Proposed Routes and Changes – Current Conditions

Proposal	Route	Demographics		Estimated Demographics		Composite Population and Jobs per Revenue Hour
		Population per Revenue Hour	Jobs per Revenue Hour	Population per Revenue Hour	Jobs per Revenue Hour	Current
High Effectiveness (density supports 15- minute frequency)						
Change	I4. Route 6 Extended via Hillsborough Ave	1.28	3.06	0.00	0.01	7.42
Change	I2. Route 6 Extended via Western Ave	1.55	1.44	0.00	0.01	4.45
Change	5/H1. Route 5 South (Existing & Extension)	0.88	1.66	0.00	0.02	4.23
Medium Effectiveness (density supports 30 minute frequency)						
New	B1. Depot to Crossroads (Basic Route Alignment)	1.00	1.32	0.03	0.01	3.71
Change	I3. Route 6 Direct via Western Blvd	1.13	1.26	0.00	0.01	3.66
New	E2. Depot to Beaver Creek (WCTP)	1.38	0.69	0.00	0.01	2.77
New	F. Cary Parkway	1.16	0.71	0.06	0.01	2.66
Change	G5-1/2. Maynard Loops to Harrison Pointe	0.94	0.79	0.05	0.01	2.59
Change	5/H2. Route 5 West (Existing & Extension)	0.61	0.86	0.01	0.01	2.36
New	A1/A2. Weston Parkway (Weekday/Weekend)	0.47	0.70	0.01	0.18	2.24
Low Effectiveness (density supports 60 minute frequency)						
New	D11. Apex to McCrimmon Parkway	0.90	0.30	0.02	0.03	1.57
New	D5. Route 4 Shortened to Davis Dr	0.74	0.34	0.00	0.03	1.47
Change	G2-1/2. Maynard Loops (No Crossroads)	0.69	0.37	0.02	0.01	1.47
New	D6. Route 4 Extension (Peak/Off Peak)	0.84	0.15	0.21	0.06	1.46
New	D1. Depot to Green Level Church Rd	0.76	0.22	0.15	0.03	1.42
New	D7/D10. Route 4 Extension (Peak/Midday Route)	0.80	0.15	0.20	0.06	1.40
Very Low Effectiveness (density supports 60+ minute frequency)						
New	D8/D9. Apex to O'Kelly Chapel Rd & Alston/Amberly Spur	0.34	0.11	0.10	0.02	0.70
Change	J1. Depot to RDU	0.09	0.20	0.05	0.01	0.55

Figure 36 Prioritization of Proposed Routes and Changes – 2040 Projected Conditions

Proposal	Route	2040 Projected Demographics		Composite Population and Jobs per Revenue Hour
		Population per Revenue Hour	Jobs per Revenue Hour	Future
Very High Effectiveness (density supports 10 minute frequency)				
Change	I4. Route 6 Extended via Hillsborough Ave	2.36	4.39	11.15
Change	I2. Route 6 Extended via Western Ave	2.18	4.12	10.42
Change	I3. Route 6 Direct via Western Blvd	1.89	3.97	9.82
High Effectiveness (density supports 15 minute frequency)				
Change	5/H2. Route 5 West (Existing & Extension)	2.77	1.33	5.42
Change	5/H1. Route 5 South (Existing & Extension)	2.90	0.93	4.76
New	B1. Depot to Crossroads (Basic Route Alignment)	1.63	1.51	4.65
New	E2. Depot to Beaver Creek (WCTP)	1.98	1.13	4.24
Medium Effectiveness (density supports 30 minute frequency)				
New	D1. Depot to Green Level Church Rd	1.70	1.14	3.97
New	D6. Route 4 Extension (Peak/Off Peak)	2.12	0.88	3.89
New	D7/D10. Route 4 Extension (Peak/Midday Route)	1.96	0.86	3.68
Change	G5-1/2. Maynard Loops to Harrison Pointe	1.41	1.03	3.47
New	A1/A2. Weston Parkway (Weekday/Weekend)	0.93	1.26	3.45
New	F. Cary Parkway	1.38	0.95	3.27
New	D5. Route 4 Shortened to Davis Dr	1.22	0.70	2.62
Change	G2-1/2. Maynard Loops (No Crossroads)	1.00	0.68	2.36
New	D11. Apex to McCrimmon Parkway	1.27	0.48	2.23
Low Effectiveness (density supports 60 minute frequency)				
New	D8/D9. Apex to O'Kelly Chapel Rd & Alston/Amberly Spur	0.75	0.43	1.61
Very Low Effectiveness (density supports 60+ minute frequency)				
Change	J1. Depot to RDU	0.13	0.39	0.91

SERVICE CHANGES

Existing Service

C-Tran operates six fixed route services on weekdays and Saturdays between 6:00 a.m. and 10:00 p.m. During peak hours (6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 10:00 p.m.), service operates at 30 minute headways on Routes 3, 4, 5 and 6. Maynard Loop Routes 1 and 2 operate at 60 minute headways during peak hours. Between 9:00 a.m. and 3:00 p.m., all service headways are 60 minutes, as shown in Figure 37.

Figure 37 Summary of C-Tran Service

Existing Routes	Vehicles				Annual Revenue Hours			
	Weekday		Saturday		Weekday	Sat	Sun	Total
	30-min Peak	60-min Off-Peak	30-min Peak	60-min Off-Peak				
1. Maynard Loop	1	1	1	1	4,084	880	0	4,964
2. Maynard Loop	1	1	1	1	4,084	880	0	4,964
1/2. Maynard Loops (Combined for Comparison)	2	2	2	2	8,168	1,760	0	9,928
3. Harrison Ave	1	0.5*	1	0.5*	3,318	715	0	4,033
4. High House Rd to Highway 55	2	1	2	1	6,637	1,430	0	8,067
5. Kildaire Farm Rd	1	0.5*	1	0.5*	3,318	715	0	4,033
6. Buck Jones Rd	2	1	2	1	6,637	1,430	0	8,067
Total	8	4	8	4	28,078	6,050	0	34,128

*Routes 3 and 5 interline. Based on the 60-minute off-peak frequency, 1 bus serves both routes.

30-minute Weekday and Saturday Service

Increasing service frequencies on all existing routes requires additional revenue hours and vehicles to accommodate 30 minute headways on weekdays and Saturdays, as shown below.[8]

Figure 38 Summary of C-Tran Service with 30-minute Weekday and Saturday Service

Existing Routes	Total Vehicles for 30-minute Service Freq		Vehicle Change Over Existing		Annual Revenue Hours			Additional Annual Revenue Hours Change Over Existing			Additional Cost Over Existing ($60 per Revenue Hour)[9]		
	Weekday and Saturday		Weekday and Saturday										
	Peak	Off-Peak	Peak	Off-Peak	Wkdy	Sat	Total	Wkdy	Sat	Total	Wkdy	Sat	Total
1. Maynard Loop	2	2	1	1	8,168	1,760	10,423	4,084	880	4,964	$245,040	$52,800	$297,840
2. Maynard Loop	2	2	1	1	8,168	1,760	10,423	4,084	880	4,964	$245,040	$52,800	$297,840
1/2. Maynard Loops (Combined for Comparison)	4	4	2	2	16,336	3,520	20,846	8,168	1,760	9,928	$490,080	$105,600	$595,680
3. Harrison Ave	1	1	0	0.5*	4,084	880	5,212	766	165	931	$45,945	$9,900	$55,845
4. High House Road to Highway 55	2	2	0	1	8,168	1,760	10,423	1,532	330	1,862	$91,890	$19,800	$111,690
5. Kildaire Farm Rd	1	1	0	0.5*	4,084	880	5,212	766	165	931	$45,945	$9,900	$55,845
6. Buck Jones Rd	2	2	0	1	8,168	1,760	10,423	1,532	330	1,862	$91,890	$19,800	$111,690
Total	10	10	2	5	40,840	8,800	52,115	12,763	2,750	15,513	$765,750	$165,000	$930,750

*Routes 3 and 5 interline. Based on the 60-minute off-peak frequency, 1 bus serves both routes.

[8] Revenue hours are calculated with the assumption of 255 weekdays, 55 Saturdays, and 55 Sundays per year. These numbers do not reflect the nine holiday days when fixed route service does not operate.

[9] Cost does not include fuel cost, only contractual cost per revenue hour.

60-minute Sunday Service

C-Tran does not currently operate fixed route services on Sunday. Figure 39 describes the additional vehicle and revenue hour requirements to add Sunday service with 60 minute headways. Vehicles for Sunday service are available within the existing fleet as they are not currently in use on Sundays. However, using these vehicles for Sunday service e would increase their replacement cycle.

Figure 39 Summary of C-Tran Service with 60-minute Sunday Service

Existing Routes	Vehicles for 60-min Sunday Service	Annual Sunday Revenue Hours	Cost ($60 per Revenue Hour)[10]
1. Maynard Loop	1	495	$29,700
2. Maynard Loop	1	495	$29,700
1/2. Maynard Loops (Combined for Comparison)	2	990	$59,400
3. Harrison Ave	0.5*	248	$14,850
4. High House Road to Highway 55	1	495	$29,700
5. Kildaire Farm Rd	0.5*	248	$14,850
6. Buck Jones Rd	1	495	$29,700
Total	5	2,475	148,500

*Routes 3 and 5 interline. Based on the 60-minute off-peak frequency, 1 bus serves both routes.

[10] Cost does not include fuel cost, only contractual cost per revenue hour.

BUS RAPID TRANSIT

The following describes key aspects of Bus Rapid Transit (BRT) and an evaluation of potential BRT in the Cary to Raleigh corridor.

Bus Rapid Transit Features

BRT refers to bus service designed and operated to provide a level of service comparable to rail. The idea is to create fast and reliable service by operating in road space dedicated for the bus. Combined with fewer stops and more frequency, BRT can be as easy and convenient as rail. BRT systems also typically try to provide similar amenities as rail systems by serving "stations" rather than stops and equipping the stations with amenities such as ticket vending machines and information that tell passengers when the next vehicle will run.

The main advantage of a BRT system over rail is cost. BRT typically has much lower capital and operating costs than light rail or street car services. In addition, BRT systems can be constructed much faster, so the service is available sooner.

BRT uses various tools (dedicated running ways, longer distances between stations, off-vehicle fare collection, ITS, "clean" vehicles, frequent service) to produce a fast and convenient method of transportation. Following is a list of the key features of rapid transit, in increasing order of investment. These represent a continuum of enhancements that would support a rapid transit system, regardless of vehicle type:

- **Widely-spaced station stops**, spaced about three-quarters of a mile apart, similar to many rail lines.
- **Station amenities**, such as transit information, lighting, shelter, and real-time arrival displays, improve the passenger experience and visibility of the system to potential riders.
- **High level of coordination with connecting services**
- **Frequent service:** buses arrive as often as every 3-10 minutes during peak commuting times to allow for use without a schedule.
- **Real-time passenger information**
- **Unique branding and image** reinforces BRT's identity as a high quality transit service and an attractive alternative to automobile travel. The most common strategy is to distinguish BRT through a stylized vehicle design. Other common elements include distinct names, logos, color schemes, typography, station signage, and marketing materials.
- **Low-floor vehicles** with multi-door boarding and alighting reduce dwell times.
- **Fare pre-payment** allows all-door boarding and minimizes dwell time.
- **Bus priority at traffic signals** reduces delay by extending the green light or shortening the red light to help BRT vehicles get through intersections.
- **Queue jumps** give transit vehicles priority by creating a special transit-only lane at the intersection that allows a bus to move to the front of stopped traffic. When combined with bus priority at traffic signals, a queue jump lane can help buses stay on schedule and travel faster.
- **Bus bulbs** extend the sidewalk outwards for a bus stop, allowing the vehicle to stay in its lane while picking up or dropping off passengers, which saves time compared to pulling over to the curb.

- **Dedicated travel lanes** where transit service is very frequent (10 minutes or less), ridership is high, and traffic congestion significantly and routinely impedes transit operations. When BRT vehicles operating on dedicated running ways can save two to three minutes per mile, while those same vehicles driven on arterial streets normally save one to two minutes per mile when compared to regular bus lines.
- **Simple route layout** to make it easy for passengers to find, use, and remember.

Bus Rapid Transit in the Cary to Raleigh Corridor

In 2012, the Wake County Transit Plan recommended a light rail connection on the Western Corridor between Downtown Raleigh to Cary Parkway, Morrisville, and RDU. The Wake County Transit Investment Strategy, released in 2015, proposes 15-minute all day service on the Western Corridor, as part of the BRT strategy. Two BRT alternatives are presented, both of which invest in a combination of exclusive and mixed traffic BRT on the Western Corridor:

- The BRT Ridership Alternative focuses on generating as much ridership as possible by allocating transit frequency to corridors where density and walkability are able to support very frequent service. As such, the alternative is heavily focused on core areas of Raleigh.
- The BRT Coverage Alternatives focuses on maximizing the number of people and jobs that have some basic access to transit. As a result, the proposed network provides 30- and 60-minute service to more areas, at the expense of fewer resources for the frequent transit network.

The BRT alternatives are proposed in the Wake County Transit Investment Strategy as lower infrastructure alternatives to the Rail Rapid Transit RRT) alternative, which proposed 15-minute all day service via rail transit on the Western Corridor. The cost of the rail infrastructure diminishes the overall level of resources for buses available in both the RRT Coverage Alternative and the RRT Ridership Alternatives. In the BRT and RRT alternatives, feeder bus service is important to connect passengers in suburban, lower density areas with the BRT or RRT trunk line, which has higher frequency and capacity. A follow-up study will likely be necessary to address the final design of the BRT or RRT service if approved Wake County voters in November 2016.

The BRT proposals are consistent with the analysis presented in Figure 35 and Figure 36, which concludes that the extension of Route 6 is the highest priority option, supporting service every 15 minutes (and by extension, additional BRT-type improvements).

PARK AND RIDE

The following describes existing conditions and opportunities for park-and-ride facilities that serve commuters and major events.

Commuter Park-and-Ride

The major success factors for commuter park and rides are limited or costly parking, or significant vehicle traffic adding lengthy travel time. In general, parking in Cary is free and the Town experiences minimal congestion. In addition, all major trip generators, such as downtown, malls, hospitals, and employment centers, have plenty of excess parking capacity to accommodate new riders. These factors make provision of new park and ride lots unnecessary. Due to these

conditions, limited opportunities exist to encourage drivers to leave their car and transfer to a shuttle. The informal lots currently used by C-Tran patrons should continue to serve their current purpose, offering free parking on a first come, first served basis at the following locations:

- Wavery Place Shopping Center, located at Tryon Road and Kildaire Farm Road
- Cary Amtrak Station, located between Harrison Avenue and Academy Street in downtown Cary.
- Big Lots shopping plaza, located on the northwest corner of Kildaire Farm Road and Kilmayne Drive.

One potential site for a long-term commuter park-and-ride is located along the NC 55 corridor in Holly Springs, Apex, or Cary. On a daily basis, heavy commuter traffic travels the NC 55 corridor, the primary route for commuters traveling to Research Triangle Park from Holly Springs, Apex, and parts of Cary. Construction of a park and ride facility may increase mode choice for commuters, have positive air quality benefits, and encourage multiple occupancy travel. TTA and C-Tran could potentially use this as a transfer point. In 2009, Go Triangle submitted a CMAQ application to build a park-and-ride lot in Holly Springs. Although the application was successful, Go Triangle withdrew the application and the funds committed to the project were reallocated to another transit project in the CAMPO 2012-2018 Transportation Improvement Program.

Major Events Park-and-Ride

The Town of Cary currently runs shuttle services to two major festivals from the Town Hall Parking Deck and the Cary Towne Center Mall, as shown in Figure 40. Park-and-ride ride shuttle service to events could potentially mirror the "Go Bulls Express" served operated by Go Triangle from 2005 to 2007. The park-and-ride shuttle service provided express buses to Durham Bulls home games on weekend nights. By establishing one fare to park and ride that is comparable to the price to park on-site for any of these special events, Cary could offer residents an alternative travel option and reduce vehicular congestion on the regional roadway network.

Additional park-and-ride locations with shuttle services are proposed to serve major events are shown below.

- **WakeMed Soccer Park –** Located on East Chatham Street, west of I-40, positioned as a potential park-and-ride for shuttle service to the North Carolina State Fairgrounds. The round trip distance to North Carolina State Fairgrounds is 9.6 miles, traveling east on Hillsborough Street to Western Boulevard, turning onto Hillsborough Street to the Fairgrounds on Blue Ridge Road. The return route could travel west on Hillsborough Street to the Soccer Park.
- **Cary High School –** Located on Southeast Maynard Road and Walnut Street, Cary High School's location is a 9.6 mile round trip to events at the North Carolina State Fairgrounds, a 4.8 mile round trip to the Cary Town Hall Campus, and an 8.9 mile round trip to Fred G. Bond Metro Park. A route to North Caroline State Fairgrounds could travel north on SE Maynard Road, east on Cary Towne Boulevard, north on I-40, and east on Route 54 to the Fairgrounds on Blue Ridge Road. The return route is the same route in reverse. A shuttle route to Fred G. Bond Metro Park could travel west on SE Maynard Road to High House Road to the park, and return via the same route in reverse.
- **Green Hope High School –** Located on Carpenter Upchurch Road, south of Morrisville Parkway, is a potential western park-and-ride location. Shuttle service to Fred G. Bond Metro Park is a 7.6 mile round trip, while the Cary Town Hall Campus is a 12.8

mile round trip. The shuttle route could travel south on Carpenter Upchurch Road to High House Road to the park, and return via the same route in reverse.

Figure 40 Proposed Park-and-Ride Shuttle Routes