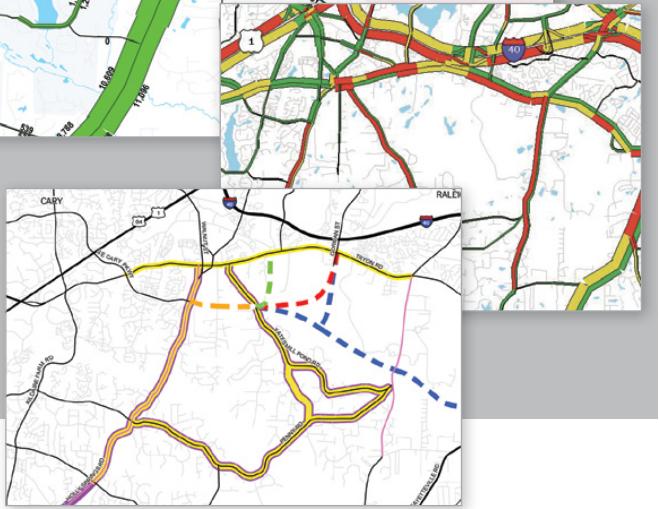
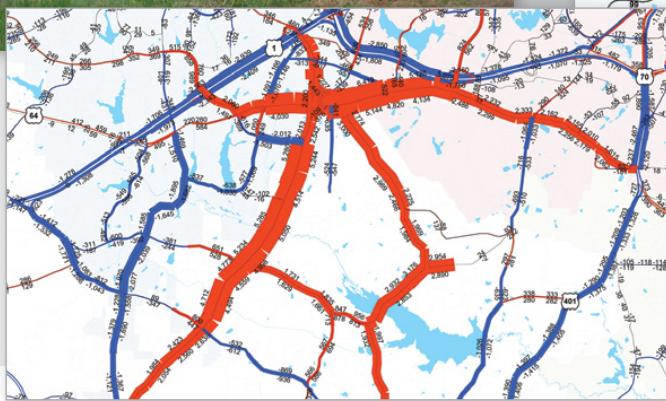


Swift Creek Area Network Study

Prepared for the:

Capital Area Metropolitan Planning Organization



Submitted by:

Martin/Alexiou/Bryson, P.C.

Introduction

This study focused on analyzing the impacts of projected future growth on the transportation network in the Swift Creek area surrounding Lake Wheeler Road, Penny Road, Tryon Road and Holly Springs Road. Holly Springs and Lake Wheeler Roads are significant in providing access and connectivity for local traffic to/from the area to other areas in the Triangle region. Therefore, various model runs were performed with improvements to these facilities to understand current and future travel demand patterns within the study area.

The project was discussed with the project steering committee comprising of members from Capital Area Metropolitan Planning Organization (CAMPO), City of Raleigh and Town of Cary. A kick-off meeting was organized with the committee members to discuss the alternatives to be evaluated. Another meeting was organized to discuss and review the results of the analysis.

The current Triangle Regional Model (TRMv5) developed by the TRM Service Bureau was used with a future year network for 2035. The socioeconomic data used for this study was developed by CAMPO using the latest CommunityViz software.

Analysis was performed to achieve the following goals:

- Evaluate the existing travel conditions on each roadway in the study area
- Identify and evaluate the feasibility of potential transportation network improvements in the study area
- Identify feasible roadway scenarios that address projected future year capacity deficiencies in the study area
- Identify potential impacts to the natural and human environment related to future transportation improvements in the study area
- Provide recommendations for future transportation improvements to meet current and future projected travel deficiencies and demands.

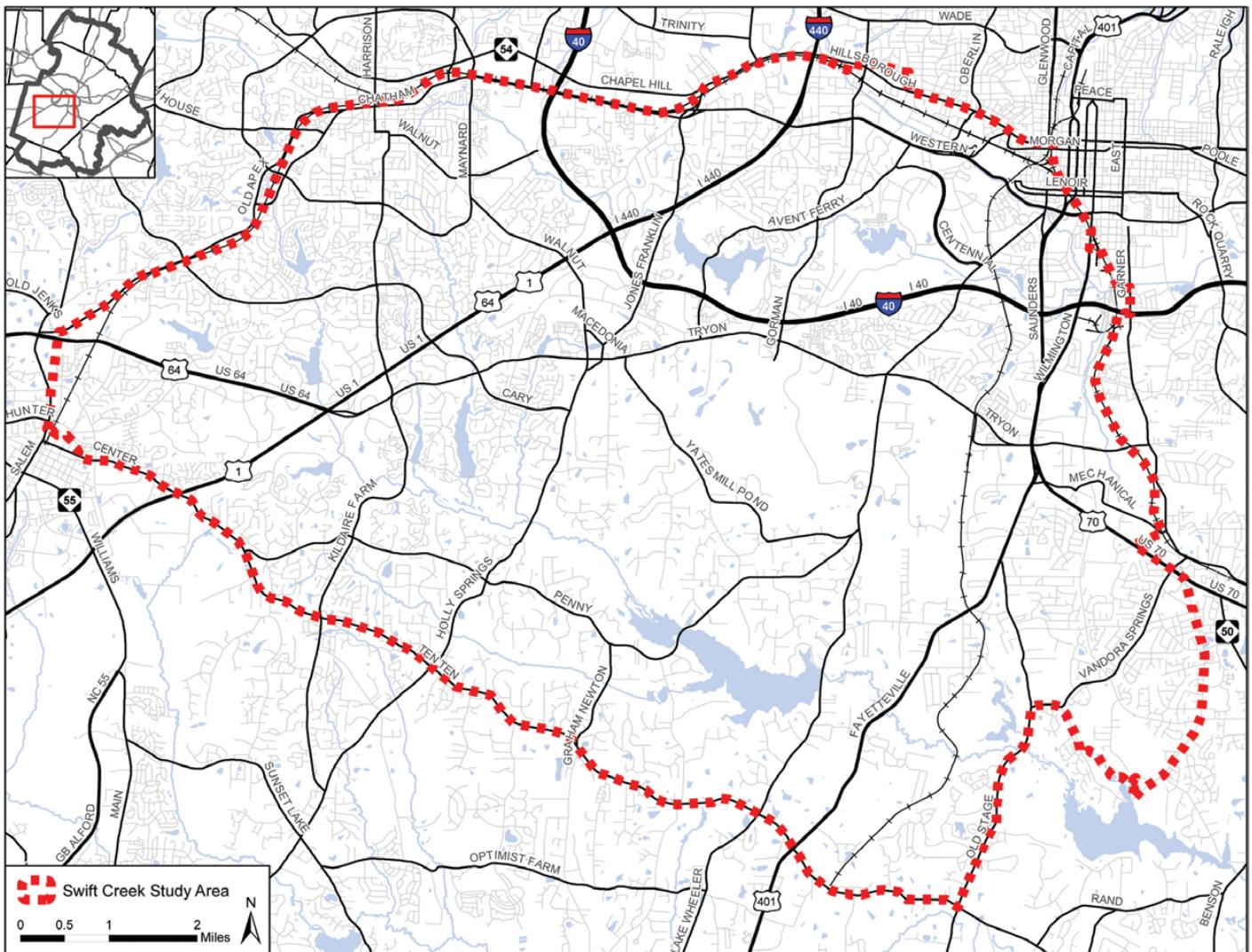
1. Alternative Analysis

An inventory of the transportation system improvements were studied and used to determine future levels of service (LOS) in the study area as well as associated current and long-term deficiencies. Using the transportation deficiencies identified above, a range of improvement alternatives were prepared. The alternatives modeled and analyzed under this study were:

- a. **No Build/LRTP Alternative** — includes no improvements to roadways in the study area as represented in the current 2035 CAMPO Long Range Transportation Plan (LRTP).
- b. **Existing CTP/Alternative 1** — Extend Cary Parkway to Gorman Street as a 4-lane divided local street with 45mph speed limit. The existing planned connection was modeled as shown in the Raleigh and Cary Comprehensive Transportation Plans (CTP) for comparison purposes only. Model results were presented at a meeting of the project steering committee so no additional runs were required.
- c. **Alternative 2** — Extend Cary Parkway to Yates Mill Pond Road as a 4-lane divided local facility with 45mph speed limit.
- d. **Alternative 3** — Widen the following existing roadway facilities within the study area:
 - Holly Springs Road from Cary Parkway to Tryon Road to a 6-lane divided minor arterial facility with a speed limit of 45mph; Holly Springs Road from Cary Parkway to Ten-Ten Road to a 4-lane divided minor arterial facility with a speed limit of 45mph.
 - Tryon Road from Cary Parkway to Gorman Street to a 6-lane divided minor arterial facility with a speed limit of 45mph.
 - Yates Mill Pond Road from Lake Wheeler Road to Tryon Road to a 4-lane divided collector facility with a 45mph speed limit.
 - Penny Road from Yates Mill Pond Road to Holly Springs Road to a 4-lane divided collector facility with a 45mph speed limit.
 - Old South Road from Penny Road to Yates Mill Pond Road to a 4-lane divided collector facility with a 45mph speed limit.

- e. **Alternative 4** — Extend Cary Parkway to Dillard Road as a 4-lane divided local facility with a 45mph speed limit.
- f. **Alternative 5** — Extend Cary Parkway to US-401 with a connection at Lake Wheeler Road near Yates Mill Pond/Penny Road and connect Gorman Street to this facility as a T-junction. Both connections were coded as a 4-lane divided local facility with 45mph speed limit. This alternative has been historically referred to as Cary-Garner Parkway.
- g. **Alternative 6** — Widen the following existing roadway facilities within the study area:
- Holly Springs Road from Cary Parkway to Tryon Road to a 6-lane divided minor arterial facility with a speed limit of 45mph; Holly Springs Road from Cary Parkway to Sunset Lake Road to a 4-lane divided minor arterial facility with a speed limit of 45mph.
 - Tryon Road from Cary Parkway to Gorman Street to a 6-lane divided minor arterial facility with a speed limit of 45mph.
 - Yates Mill Pond Road from Lake Wheeler Road to Tryon Road to a 4-lane divided collector facility with a 45mph speed limit.
 - Penny Road from Yates Mill Pond Road to Holly Springs Road to a 4-lane divided collector facility with a 45mph speed limit.
 - Old South Road from Penny Road to Yates Mill Pond Road to a 4-lane divided collector facility with a 45mph speed limit.

Figure 1. Swift Creek Area Network Study – Map



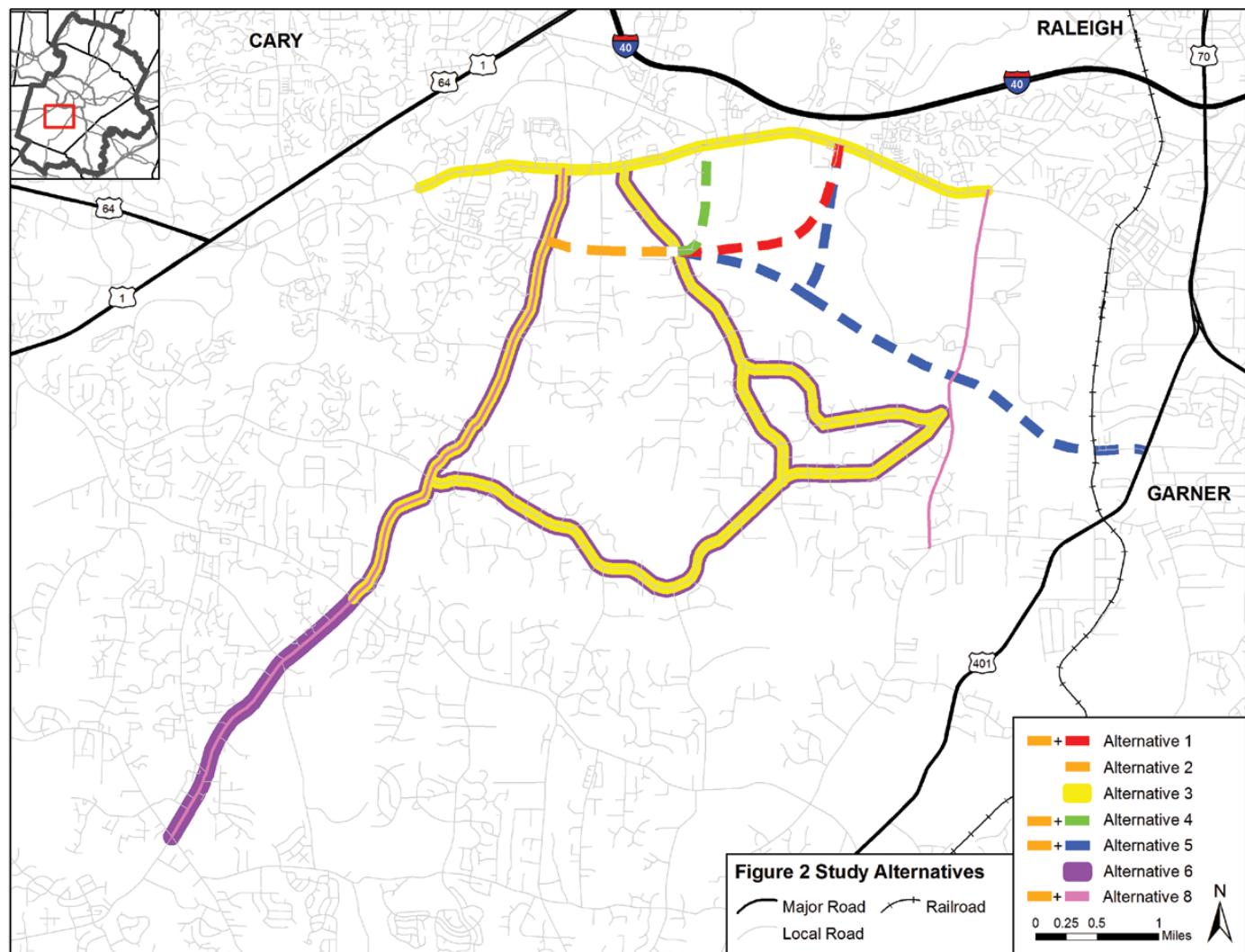
h. **Alternative 7** — Analyze Operational Improvements to existing Tryon, Holly Springs, Yates Mill Pond and possibly Lake Wheeler Roads as appropriate. Traffic operations analysis of turn lanes and signal timing at three signalized intersections on Tryon Road were performed.

i. **Alternative 8** — Combine the extension of Cary Parkway to Yates Mill Pond Road as in Alternative 2 with selective widening, including:

- Holly Springs Road from Cary Parkway to Tryon Road to a 6-lane divided minor arterial facility with a speed limit of 45mph and from Cary Parkway to Sunset Lake Road to a 4-lane divided minor arterial facility with a speed limit of 45mph
- Lake Wheeler Road from Tryon Road to Simpkins Road to a 4-lane divided collector facility with a 45mph speed limit.

TRMv5 model runs were performed for the No-Build alternative to forecast travel demand, traffic volumes and future deficiencies in the study area for each improvement alternative. For the future year, the 2035 LRTP network was used with the 2040 CommunityViz socioeconomic data. Based on the modeling for each alternative, daily volume maps (Appendix 1) and LOS maps were prepared for both AM and PM peak hour (Appendix 2). Volume difference maps were also created to analyze the shift of traffic on improvements between the LRTP and each alternative (Appendix 3). For specific locations in each alternative, select link analysis were performed on certain roadway segments to get information on origin and destination for trips using a particular link (Appendix 4).

Figure 2. Study Alternatives



The performance measures listed below were compared between each alternative (Appendix 5).

- a. Vehicle miles traveled (VMT) (daily and peak hour miles) (regional and study area);
- b. Total VMT change compared to No-Build/LRTP alternative (regional and study area);
- c. Vehicle hours traveled (VHT) (daily and peak hour minutes) (regional and study area);
- d. Total VHT change compared to No-Build/LRTP alternative (regional and study area);
- e. Peak period congested VMT traveled at $V/C > 1$ (regional and study area);
- f. VMT, VHT, & Lane-Miles/Route-Miles by V/C Ratio, by facility type (study area);
- g. Congested VMT, VHT, & Lane-Miles/Route-Miles by V/C Ratio, by facility type (study area);
- h. Total hours of delay: daily (study area);
- i. Average trip length: daily and peak hour for both time and distance (regional and study area);
- j. Average travel speed by facility type (study area);
- k. Transit mode share (daily and peak trips) (regional);

1.1 Summary and Findings

A summary of transportation analysis results for each alternative is presented below in terms of pros, cons, and general findings. Impacts on social and environmental factors are discussed in a later section.

1.1.a Existing CTP/Alternative 1: Cary Parkway/Gorman Street Extension

Pros:

- Slightly improves peak hour LOS on Tryon Road between Cary Parkway and Gorman Street by reducing daily volumes by 2,000-8,000 vehicles per day (vpd);
- Reduces daily volumes on US 1 by approximately 2,000 vpd between Cary Parkway and I-40 without significant improvement to the LOS;
- Reduces daily volumes on Lake Wheeler Road by 1,000-1,500 vpd;
- Reduces daily volumes at intersections of:
 - Tryon Road/Holly Springs Road
 - Tryon Road/Jones Franklin Road
 - Tryon Road/Yates Mill Pond Road
 - Tryon Road/Dillard Drive

Cons:

- Increases daily volumes on Yates Mill Pond Road by 3,000-4,000 vpd reducing the LOS;
- Increases daily volumes on existing Cary Parkway by 3,000-10,000 vpd between Tryon and Holly Springs Road;
- Provides no significant improvement in LOS (AM and PM) on Holly Springs Road, Lake Wheeler Road, and US 1;
- Reduces LOS in PM on westbound Tryon Road between Kildare Farm Road and Piney Plans Road;
- Significantly reduces LOS in PM on southbound Lake Wheeler Road.

General Findings:

This alternative results in localized improvements to traffic congestion on Tryon Road, between Cary Parkway and Gorman Street. This improves traffic flows at the intersections along Tryon Road between Holly Springs Road and Gorman Street and may allow Tryon Road to continue to operate as a four lane arterial.

1.1.b Alternative 2: Cary Parkway Extension to Yates Mill Pond Road

Pros:

- Reduces daily volumes on Tryon Road by 2,000-4,000 vpd between Cary Parkway and Yates Mill Pond Road, roughly half of volumes modeled for Alternative 1. There is no reduction in volume on Tryon Road west of Yates Mill Road hence, no significant improvement in the LOS on Tryon Road.

Cons:

- Increases daily volumes and reduces LOS on Yates Mill Pond Road south of new connector;
- Increases daily volumes on existing Cary Parkway by 2,000-7,000 vpd between Tryon and Holly Springs Road with no significant impact on the LOS;
- Provides no significant improvement in the peak hour LOS on any of the major roadways in study area.

General Findings:

Like Alternative 1, the impacts of this alternative are localized and are primarily on Tryon Road between Cary Parkway and Yates Mill Pond Road. The improvements result in no volume reductions for the Tryon Road segment and no measurable LOS improvement. Future widening of Tryon Road from Jones Franklin Road to Gorman Street would likely still be required to handle traffic growth.

1.1.c Alternative 3: Areawide Arterial Widening

Pros:

- Reduces daily volumes on multiple arterials in study area, including:
 - I-440: 2,500-4,600 vpd;
 - US 1: 1,500-5,500 vpd;
 - Kildaire Farm Road: 2,500-3,000 vpd;
 - Significantly improves peak hour LOS;
 - Ten-Ten Road between US 1 and Kildaire Farm Road: 2,000-3,000 vpd;
 - US 401: 1,500-2,000 vpd;
 - Lake Wheeler Road: 1,000-2,000 vpd;
 - Lochmere Drive: approximately 1,500 vph.
- Significantly improves peak hour LOS on Holly Springs Road and Yates Mill Road

Cons:

- Increases volume on Walnut Street through Crossroads area;
- Increases volume on Tryon Road east of Gorman Street;
- Provides no significant improvement in peak hour LOS on US 1, Lake Wheeler Road, or US 401.

General Findings:

Unlike the previous alternatives, the area impacted by the improvements in this alternative is quite large and in fact extends throughout the study area. The major impact of this alternative is the shift of north-south traffic destined to western Raleigh from multiple arterials across the area to the widened Holly Springs and Yates Mill Pond Road. The widening of Tryon Road results in improved LOS for its length across the study area except between Yates Mill Pond Road and Gorman Street. The additional volumes using Holly Springs Road and Yates Mill Pond Road reduce the LOS for this section.

1.1.d Alternative 4: Cary Parkway Extension to Dillard Drive

Pros:

- Reduces volumes on Tryon Road between Cary Parkway and Dillard Drive by 1,500-2,000 vpd with no impact on the peak hour LOS.

Cons:

- Increase volumes on Avent Ferry Road by 2,500-3,000 vpd;
- Increase volumes on Yates Mill Road by 3,000-5,000 vpd;
- Provides no significant improvement in LOS on study area roadways;
- Significantly reduces peak hour LOS on Yates Mill Pond Road.

General Findings:

Similar to Alternative 2, there are minimal benefits to this alternative and they are confined to a very short section of Tryon Road. The additional volumes on Avent Ferry Road are a significant impact to the peak hour LOS.

1.1.e Alternative 5: Cary – Garner Parkway Extension to US 401

Pros:

- Reduces volumes on Tryon Road by 6,000-9,000 vpd east of Gorman Street and 2,000-3,500 vpd west of Gorman Street;
 - Improves LOS on Tryon Road from Cary Parkway to US 401
- Reduces volume on US 1 by 3,000-3,500 vpd between Cary Parkway and I-40;
- Reduces volume on US 401 by approximately 3,000 vpd;
- Improves LOS on Lake Wheeler Road in AM peak for northbound direction.

Cons:

- Adds traffic volume to existing Cary Parkway 4,400-11,000 vpd;
- No significant improvement in LOS on I-40, US 1, and US 401.

General Findings:

This alternative results in benefits that are primarily concentrated on Tryon Road from Cary Parkway to US 401. The reductions in volumes to US 1, I-40, and US 401 do not significantly improve LOS for these roadways. Little or no impact is experienced on the north-south arterials of Holly Springs Road and Yates Mill Pond Road.

1.1.f Alternative 6: Areawide Arterial Widening except Tryon Road

Pros:

- Reduces volumes similar to Alternative 3, but to a smaller degree,
- Improves LOS on widened arterials of Holly Springs Road and Yates Mill Road;
- Improves LOS on Kildare Farm Road.

Cons:

- Provides no improvement to peak hour LOS along Tryon Road.

General Findings:

LOS improvements are largely confined to the widened roadways with no benefit to Tryon Road.

1.1.g Alternative 8: Cary parkway Extension to Yates Mill Pond Road with Widenings

Pros:

- Reduces daily volumes on following roadways:
 - Kildare Farm Road by 2,000-2,500 vpd, improving peak hour LOS;
 - Ten-Ten by 1,000-3,000 vpd, no significant improvement to LOS;
 - Tryon Road approximately 4,000 vpd from Cary Parkway to Yates Mill Pond Road, no significant improvement to LOS.
- Improves peak hour LOS for US 401, Holly Springs Road and Lake Wheeler Road.

Cons:

- Increases volume on existing Cary Parkway by 2,000-6,000 vpd. This reduces the peak hour LOS in this area;
- Increases volume on Walnut Street through Crossroads area, decreasing the LOS;
- Provides minimal improvement to peak hour LOS for Tryon Road.

General Findings:

Similar to Alternative 6, this alternative provides additional capacity to the north-south arterials in the study. In this alternative, Lake Wheeler Road is widened rather than Yates Mill Road. The resulting benefit is reduction of traffic using US 401. The two widened roadways support traffic demand from and through the study area to western and Downtown Raleigh, much like Cary Parkway/Gorman Street Extension.

1.1.h Alternative 7: Operational Improvements

Analyzing operational improvements such as proposed in Alternative 7 is challenging using traditional macro-scale transportation models such as TRMv5. In order to compare Alternative 7 to the modeled alternatives, micro-scale traffic operations analysis of three signalized intersections on Tryon Road was conducted to assist with the project. The three intersections include:

- Tryon Road at Holly Springs Road/Walnut Street
- Tryon Road at Jones Franklin Road
- Tryon Road at Yates Mill Pond Road/Asher View Court

Intersection analyses were conducted using model volumes for the No-Build/LRTP alternative and tested under two scenarios: No-Build (2035) and No-Build (2035) with Improvements. The No-Build (2035) scenario accounts for 2035 traffic forecast with existing lane geometrics and re-optimized traffic signal timings. The No-Build (2035) with Improvements scenario assumes limited geometric improvements with additional turning lanes where necessary but not additional through lanes.

Three adjacent signalized intersections were also included in the network even though they are not represented in the model results. These intersections are (1) Tryon Road at Tryon Springs Drive/Colonial Baptist Church; (2) Tryon Road at Dillard Drive; and (3) Jones Franklin Road at Holly Springs Road. Inclusion of these intersections was intended to properly model traffic progressions due to traffic signals. Therefore, the levels of service (LOS) and delay at these adjacent intersections were not summarized.

PM peak hour traffic forecasts from the 2035 LRTP were used for traffic analysis under both scenarios. At adjacent intersections where traffic forecasts were not available, traffic volumes were projected based on a one-hundred percent (100%) growth over 2008 turning movement counts. Volume balancing was then applied along the mainline between these intersections and the intersections with traffic forecasts.

Traffic operations analyses were performed at the study intersections using Synchro/SimTraffic software, with the results summarized in Table 1 below. At intersections where geometric improvements take place, traffic signal timings were coded and optimized based on intersection capacity analysis guidelines published by the NCDOT Congestion Management Section.

Table 1. Traffic Operations analysis for alternatives

Intersection	No-Build (2035)		No-Build (2035) w. Improvements		
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	% Change
Tryon & Holly Springs/Walnut	F	124.5	F	97.7	-21.5%
Tryon & Jones Franklin	F	529.9	F	275.3	-48.0%
Tryon & Yates Mill	F	141.7	F	110.8	-21.8%

As shown in Table 1, all three study intersections are projected to operate at failing levels of service under the No-Build (2035) conditions. Traffic delay can also be reduced through conventional turning lane improvements. However, all the study intersections are projected to remain operating at LOS F even with the additional turning lanes. Among the study intersections, the worst-performing intersection is the Tryon Road at Jones Franklin Road intersection, which is projected to operate at LOS F with an average delay of 275.3 seconds per vehicle even with the assumed turning lane improvements in place.

The results confirmed the presumption that traditional turning lane improvements are inadequate to accommodate future traffic demand at the three study intersections. Details of traffic analysis can be found in the attached Synchro output (Appendix 6).

2. Environmental and Social Screening

A GIS-level qualitative screening was performed to assess the potential environmental impacts of the roadway project alternatives. This analysis consisted of overlaying project alignments/locations onto a series of maps depicting sensitive natural and community resources (see Table 2 for impact matrix). Any proposed project determined to encroach on a sensitive area was identified and assigned a class (described below). Although all transportation projects impact the environment, some projects, such as new roadway construction, may have a significantly higher potential impact. A road widening is typically assumed to be less disruptive to the natural environment than a comparable project on new alignment. On the other hand, widening may be more disruptive than a new facility in terms of community impacts, depending on available right-of-way, alignment, type of development, and other factors. Refer to Appendix 7 for details of environmental impact by alternatives.

Potential project impacts (if any) were classified on a scale from “N/A” to “Major” depending upon their proximity to the GIS dataset features. This determination is based on a combination of objective and subjective criteria. Alternatives 3, 6 and 8 are all roadway widening and therefore the maximum possible rank is “Moderate.” The following guidelines were used to rate possible impacts in this screening process:

- No Impact/ Does Not Apply: New alignment / widening is greater than $\frac{1}{4}$ mile distance from the feature and is not expected to pose any future impact.
- Minor Impacts: New alignment / widening is located near or crosses a single (small) feature, or is located upstream within the same local watershed (drainage area).
- Moderate Impacts: New alignment / widening shares a boundary with or involves multiple crossings of environmentally sensitive features. This is the maximum allowable rank for a roadway widening project.
- Major Impacts: New alignment includes a new roadway alignment that crosses several environmentally sensitive features. This is the maximum allowable ranking for a new roadway alignment project.

Environmental factors have been grouped into five categories based upon similar data sources, and to provide clarity of the mapping products. The five categories selected are: (1) Hydrologic; (2) Environmental; (3) Recreation; (4) Historic and Cultural; and (5) Socioeconomic.

2.1 Description of Environmental Impacts

This analysis was used to evaluate project alternatives against one another and identify any “fatal” flaws, or environmental impacts that were considered potentially too severe to justify the project. The information obtained from this analysis allows proposed roadway alignments to be adjusted or refined to minimize possible environmental impacts. This screening process allows early identification of likely impacts and areas of uncertainty that will need to be investigated in detail for future studies.

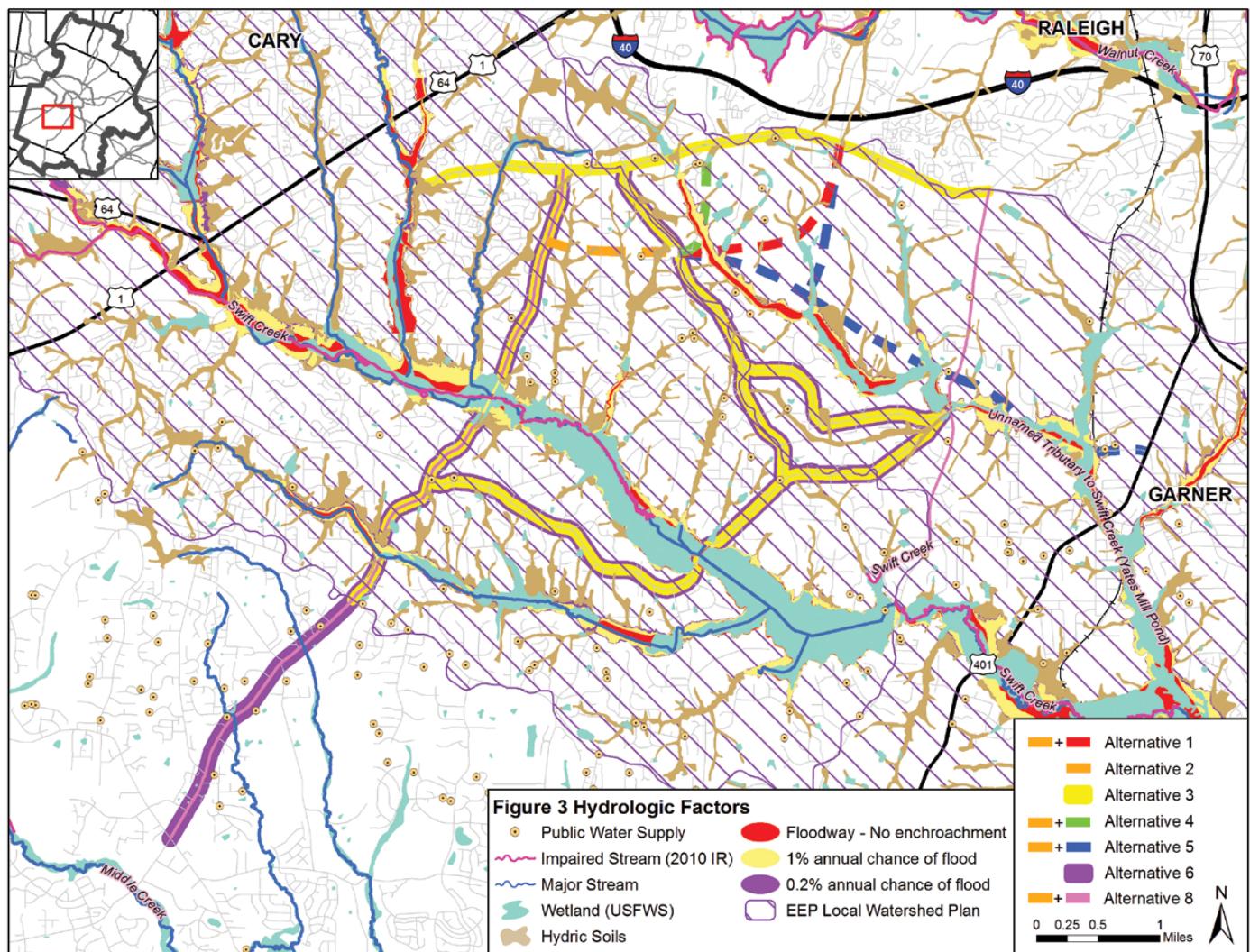
2.1.a Hydrologic Factors

Alternative 1 will directly impact hydric soils in several locations, as well as areas of wetlands, and floodplains. There are also two public water supply wells located in close proximity to the proposed alignment.

Alternative 2 will directly impact hydric soils in three locations, and since this alignment is also part of Alternatives 1, 4, 5 and 8 the same impact is expected for all. There are no wetlands or designated floodplains associated with Alternative 2. One public water supply well may be impacted, however its existence should be field verified.

Alternatives 3 and 6 are very similar and will likely impact a larger number of hydric soil formations, wetlands, and streams due to the length and location of the roadway widenings. The degree of possible impact is considered less severe because the proposed widening is along existing roadways through previously disturbed natural areas. Two locations of importance are bridges across Swift Creek at Holly Springs Road, and Penny Road, which may require reconfiguration or replacement at a significant expense.

Figure 3. Screening of Hydrologic Factors



Alternative 4 will likely impact the natural environment to the same degree as Alternative 1 because of its similar alignment and close proximity.

Alternative 5 stands out as having the greatest possible impact to hydrologic factors because it is the longest new roadway alignment and crosses the greatest number of hydric soils, wetlands and floodplains. See Figure 3.

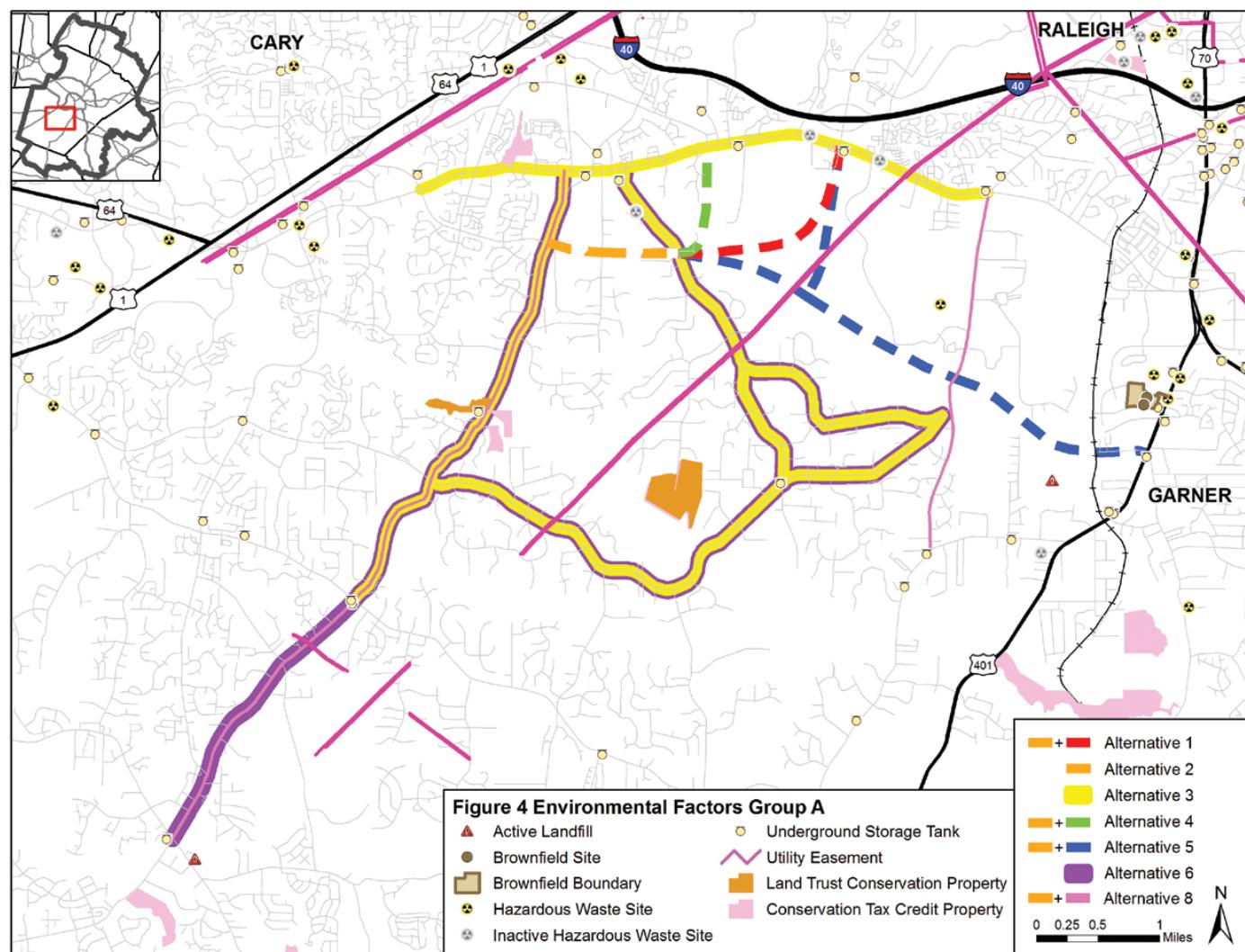
The entire Swift Creek watershed is designated as a water supply watershed, meaning that a surface water intake facility is located downstream (approximately 8 miles) of this area and stormwater runoff from all roadways will drain to this facility. All alternatives (1-8) are located within this watershed and therefore all would be subject to the NC Division of Water Quality water supply watershed regulations. The Swift Creek watershed is located within a low to moderately developed (WS-III) area, is classified as nutrient sensitive (NSW) and protected for Class C human use. This class includes secondary recreation activities like wading, boating, and other uses involving human body contact with water.

2.1.b Environmental Factors – Group A

The entire study area is exempt from future agricultural regulation in terms of prime farmland soils because it is within the Raleigh urbanized area according to the Census 2010 dataset.

Alternative 1 terminates near an underground storage tank at the intersection of Gorman Street and Tryon Road. The potential impact is “Minimum” because the tanks are likely to be located beyond the roadway right-of-way; however, this should be confirmed in the field.

Figure 4. Screening of Environmental Factors Group A



Alternatives 2 and 4 are not expected to impact any other Group A environmental factors.

Alternatives 3, 6, and 8 are all roadway widening projects that will likely impact businesses with roadway frontages along Tryon Road, Holly Springs Road, Yates Mill Pond Road and even Penny Road. For this reason the datasets for inactive hazardous waste sites and underground storage tanks show minimum or moderate possible impact for these alternatives. Impact may be avoided or minimized through coordination with the NC-DENR Division of Waste Management.

Alternative 5 will likely cross or travel adjacent to the property boundary for an active landfill site (Buffaloe Landfill), located off of US 401 / Fayetteville Road. The degree of impact may be moderate to minimal, however a field inspection should be performed to confirm its existence and whether it is active or not.

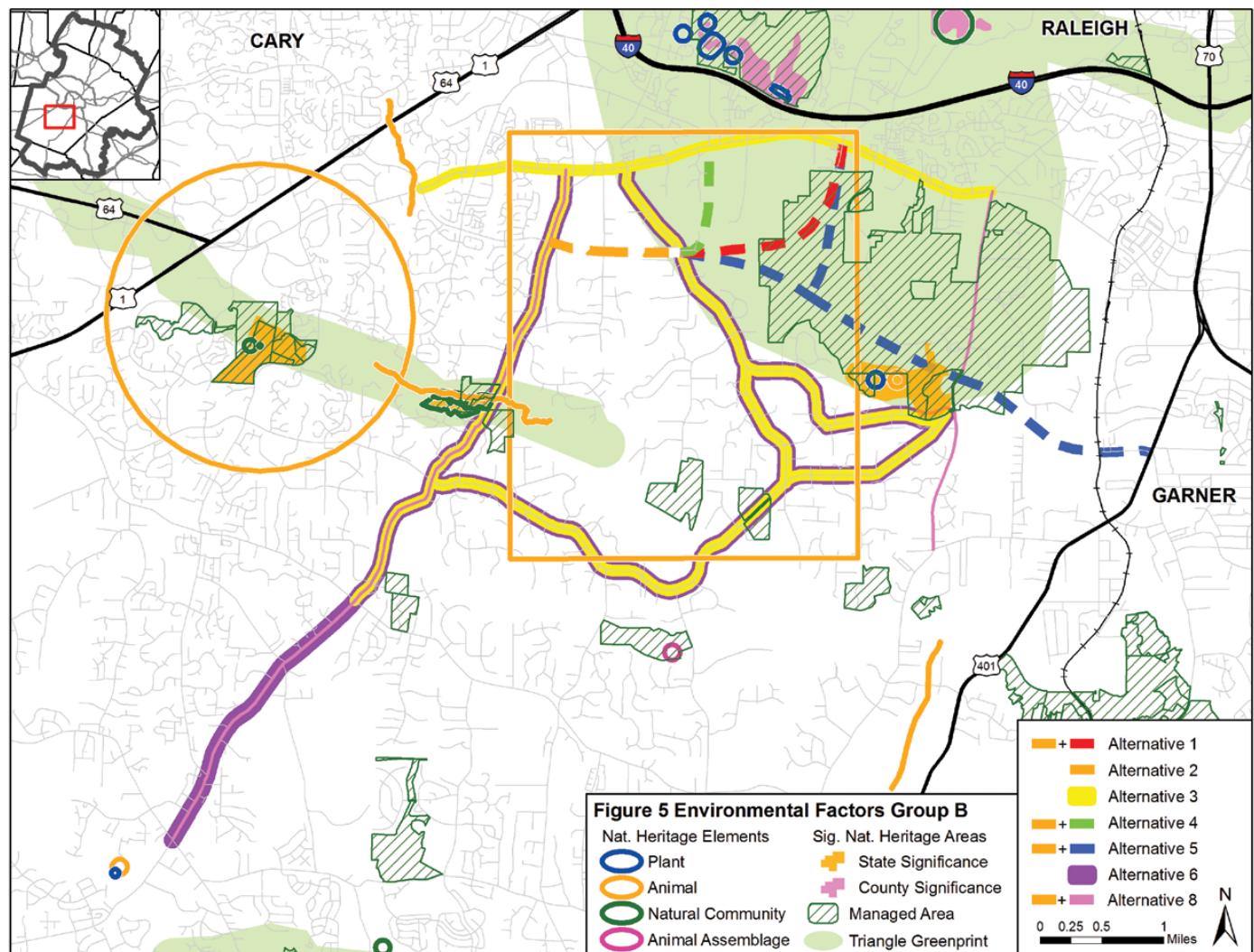
The Swift Creek Bluffs Natural Area is a conservation property located along the river near its intersection with Holly Springs Road. Alternatives 3, 6, and 8 all involve roadway widening of Holly Springs Road and therefore the impact is moderate for all three alternatives.

Overhead electricity transmission lines traverse through the study area however are not considered to be impacted because they are dedicated utility easements that will be avoided. See Figure 4.

2.1.c Environmental Factors – Group B

All alternatives are likely to impact one or more designated natural heritage element (species) as identified by the NC-DENR Natural Heritage Program (NHP). For privacy and protection of endangered species the locations of protected plants, animals and

Figure 5. Screening of Environmental Factors Group B



natural communities are buffered (generalized) and therefore coordination with the NHP will be needed to determine the possible impact for each alternative. Refer to Figure 5.

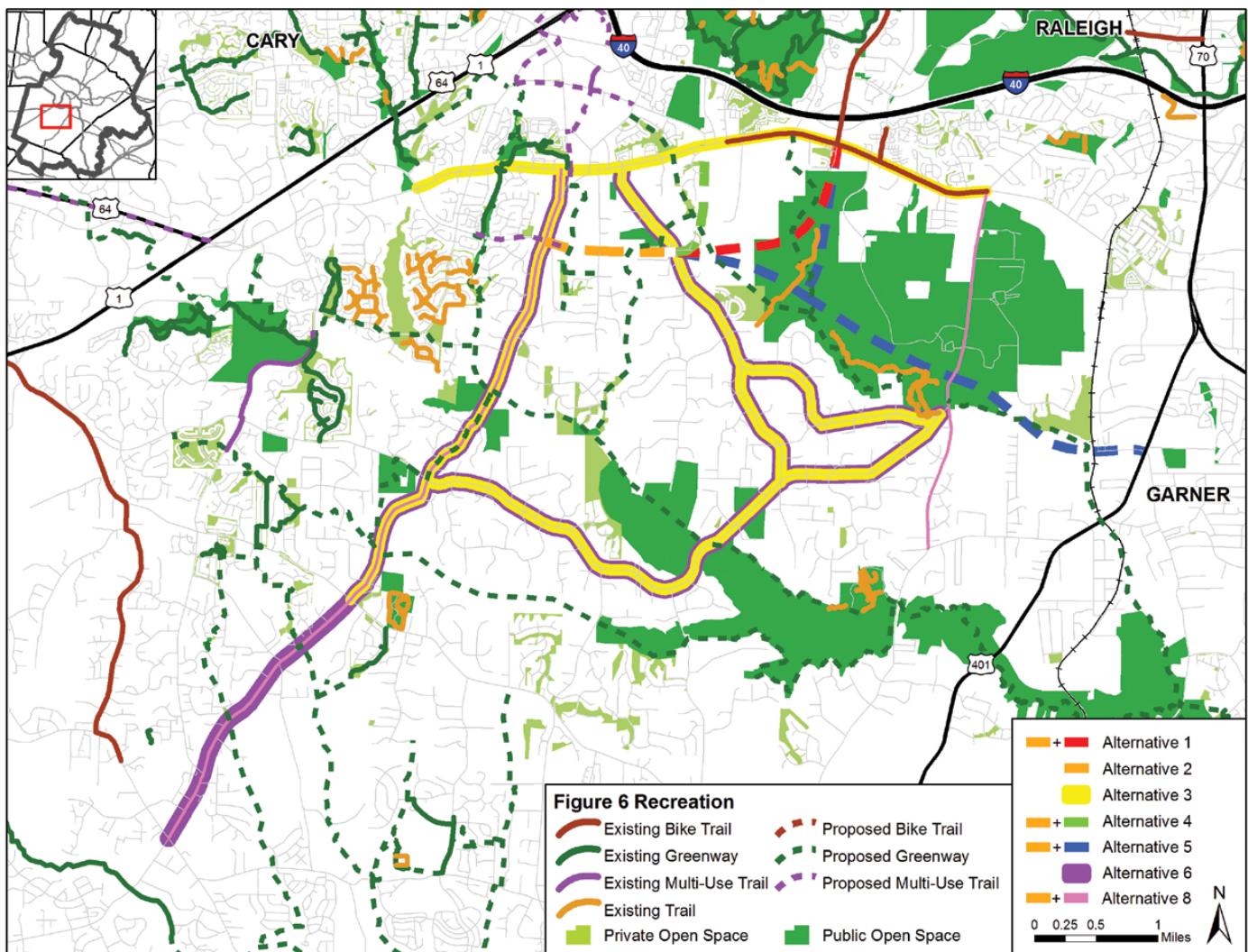
Alternatives 3, 5, 6, and 8 all intersect designated managed areas as well as significant natural heritage areas located along stream corridors. The Swift Creek Bluffs Natural Area is a designated managed lands also identified by the conservation lands dataset. The Yates Mill Pond natural heritage area is also a designated managed land owned by NC State University (Lake Wheeler Agricultural Research Land). These features are not redundant, however the properties overlap one another in some locations and therefore they may show up as possible impacts for several datasets.

The Triangle Greenprint dataset is a regional conservation and open space initiative to connect lands for recreational activities. This dataset identifies two corridors (Upper Swift Creek, and Western Raleigh Greenspace) that may be impacted by all alternatives.

Recreation

All alternatives cross the boundaries of open space (public and private) and planned greenway trail datasets, as provided by the Wake County GIS website. Open spaces identified by these datasets have already been identified as conservation lands, managed lands, and/or natural heritage areas. Proposed greenway trails, however, are illustrative in nature and any future impact may be avoided through coordination with the City of Raleigh and Wake County Parks, Recreation and Open Space department. See Figure 6.

Figure 6. Screening of Recreational Features



2.1.d Historic & Cultural Factors

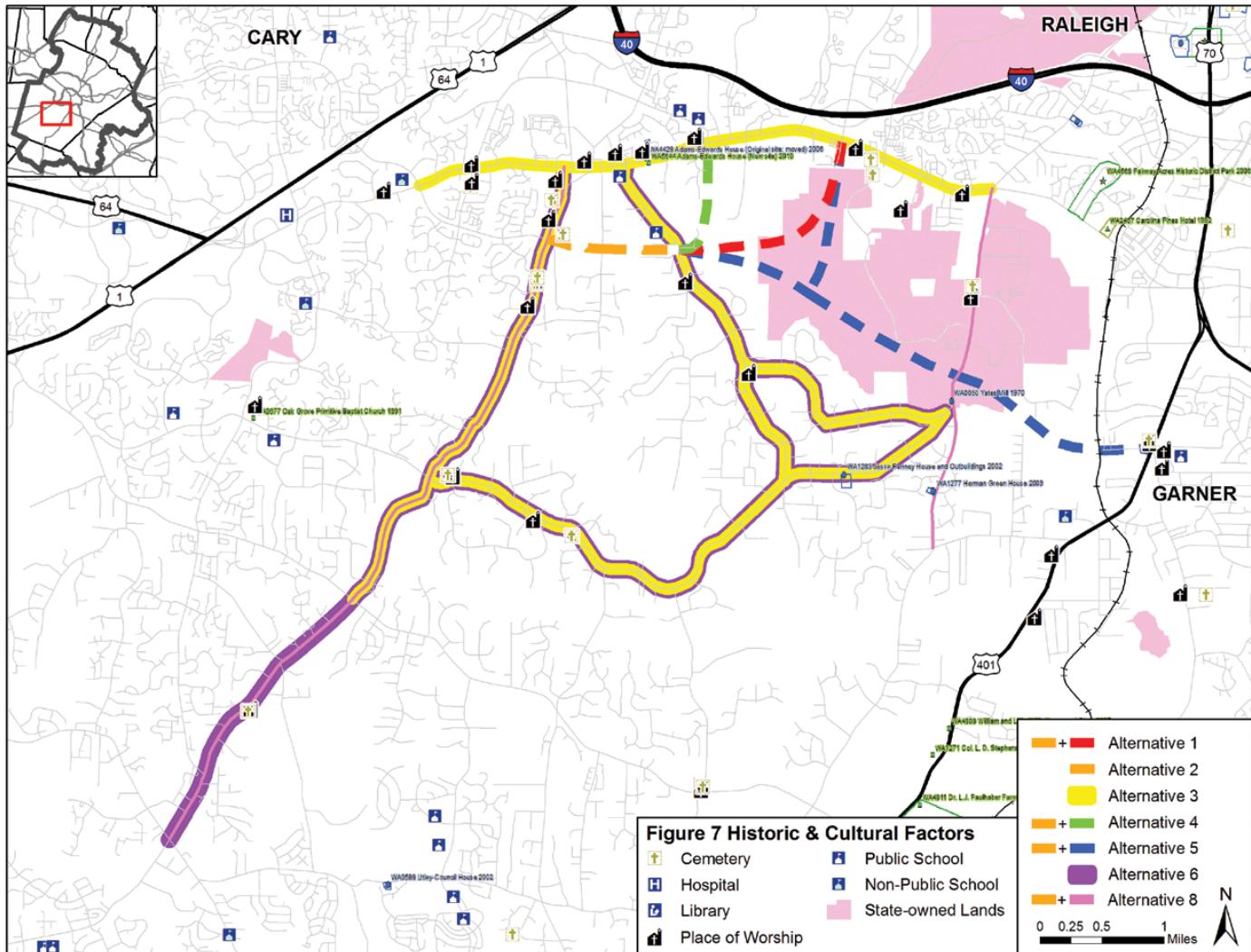
There are a number of cemeteries, churches, and schools throughout the study area(s) that may be minimally to moderately impacted by alternatives, however mitigation efforts will likely limit or eliminate a majority of concerns. Two locations of particular importance should be referenced specifically. The first is Franklin Cemetery located along Holly Springs Road at the intersection of Cary Parkway. This is also the project beginning for Alternatives 1, 2, 4, and 5 (all of the new alignment alternatives). The second location of importance is Yates Mill Elementary School located along Yates Mill Pond Road, adjacent to the proposed new roadway alignment. All four new roadway alignment alternatives include this portion of roadway, and therefore the minimum level of impact to Franklin Cemetery and Yates Mill Elementary will be the same for Alternatives 1, 2, 4, and 5.

Alternatives 3, 6, and 8 may impact additional churches and schools along Tryon Road, Holly Springs Road, Yates Mill Pond Road, and Lake Wheeler, and therefore the expected impact is “Moderate.”

Three properties that are listed on the National Register of Historic Properties are located along roadways considered for widening, which will impact Alternatives 3, 6, and 8. Yates Mill (listed in 1970) located at the intersection of Lake Wheeler Road and Yates Mill Pond Road may be impacted by all three of these widening alternatives. The Herman Green House (listed in 2003) located along Penny Road may be impacted by Alternatives 3 and 6. The Jesse Penney House (listed in 2002) located along Lake Wheeler Road may be impacted by Alternative 8 because it is only 35' off of the existing roadway.

Alternative 3 may impact two additional historic properties located along Tryon Road. The Adams Edwards House property (listed 2006) is located on the north side of Tryon Road, however the building itself has been relocated to the south side of Tryon Road,

Figure 7. Screening of Historic and Cultural Factors



and is listed on the NC State Study List (listed 2010). The building is more than 120' off of Tryon Road and is not expected to be directly impacted by this possible widening project, and is include on the table as a "Minimum."

Alternatives 1 and 5 cross directly through the NC State University Agricultural Research Land, and therefore received a "Major" ranking for state-owned lands. See Figure 7.

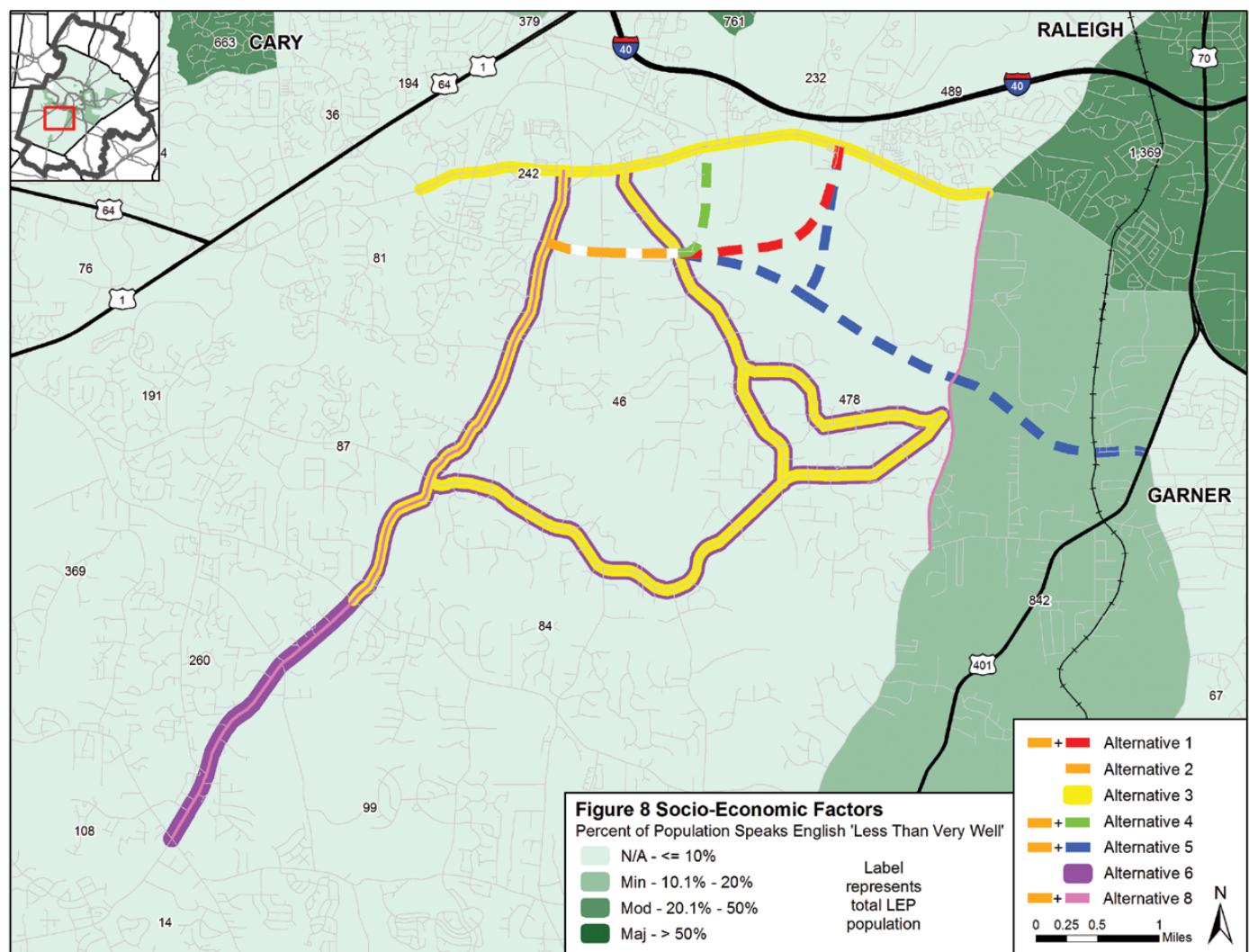
2.2 Socio-Economic Factors

This environmental screening analysis compared ACS 5-year estimates and Census 2010 data at the tract level, which is the smallest unit available at the time of this analysis. The three socio-economic categories compared were (1) Limited English proficiency; (2) Minority population; and (3) Poverty population, in accordance with the NCDOT Community Studies group recommendations.

Limited English proficiency is calculated as the sum of individuals who have identified themselves as speaking English: (a) well; (b) not well; and (c) not at all. Minority population is calculated as the sum of individuals who identified themselves as a category other than white-alone; this includes the two-or-more races category, however excludes the Hispanic population category. Poverty population is calculated as the sum of individuals who identified themselves as earning: (a) under 0.5 and (b) between 0.5 and 0.99 of the computed poverty line categories.

The aggregate sum per tract for all three categories is then divided by the estimated total population from each individual category and not the total population of the tract. The reason for this being the sample size for LEP, minority, and poverty categories are all

Figure 8. Screening of Socio- Economic Factors (English Proficiency)



unique, and smaller than the sample size for estimated total population. Dividing by a larger total population would skew results to smaller percentages and greater margins of error.

Alternative 5 is the only alignment that crosses into a tract with an LEP population greater than 10%, and has therefore been assigned an impact rank of “Minimum.” All other alternatives are not anticipated to have an impact. See Figure 8.

The possible impact to minority populations is “Minimum” for all alternatives except Alternative 2, in part because it is a very short new roadway alignment. See Figure 9.

The spatial pattern for poverty percentages is very similar to the minority population for the Swift Creek study area. The anticipated impact on the poverty population is “Minimum” for all alternatives other than alternative 2. See Figure 10.

Figure 9. Screening of Socio- Economic Factors (Below Poverty)

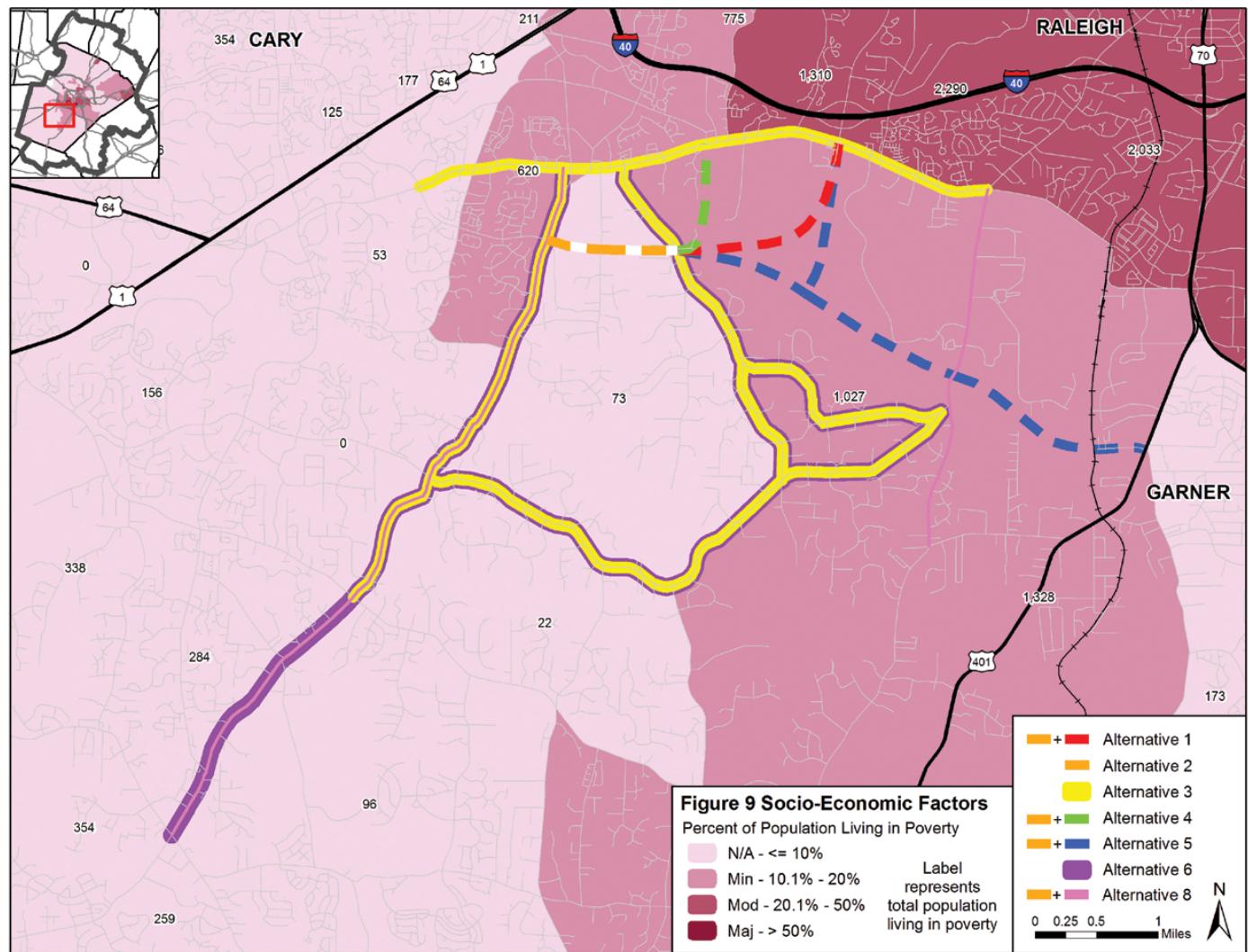
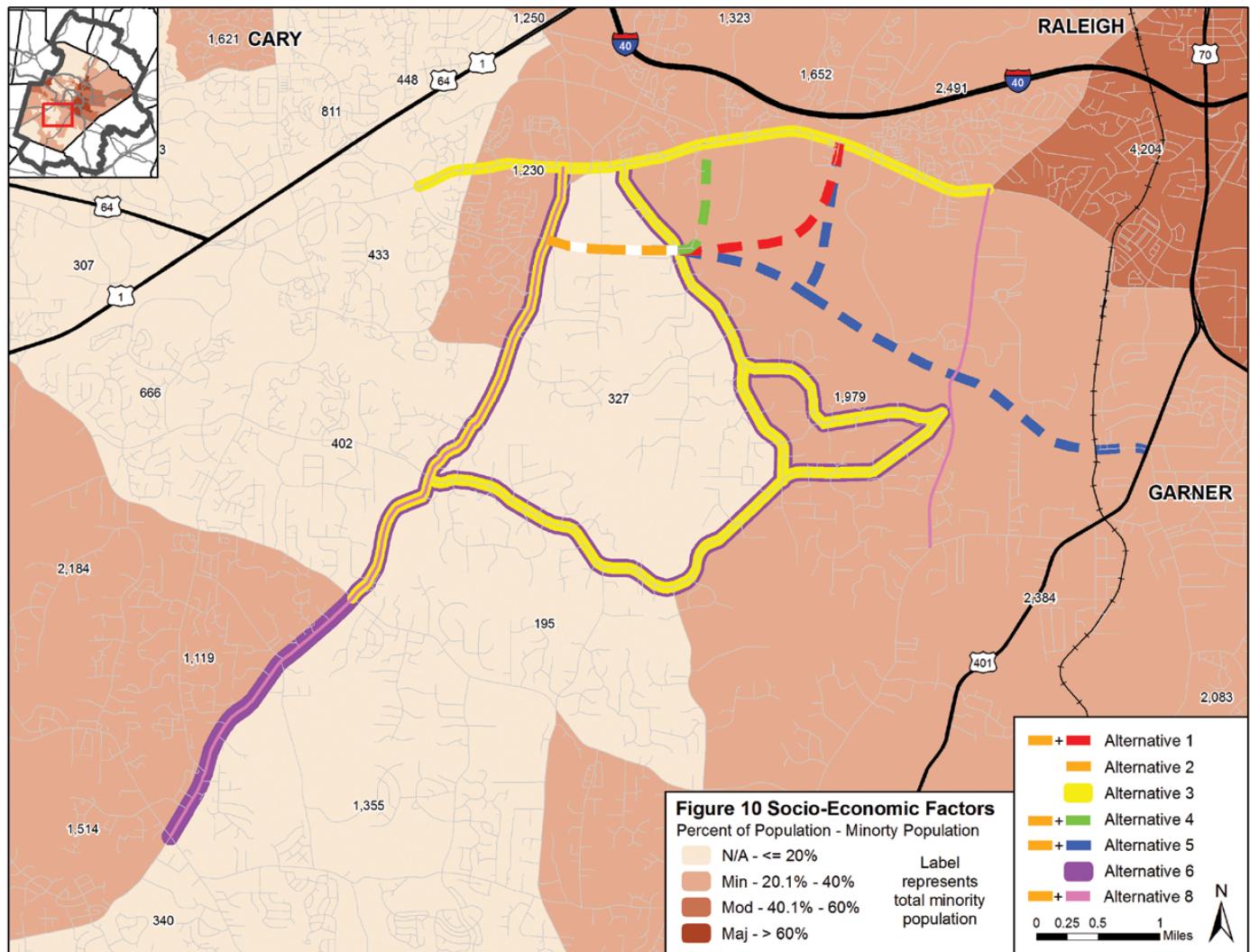


Figure 10. Screening of Socio- Economic Factors (Minority Population)



Conclusion/Summary

The effects of network changes are localized only improving peak hour LOS on the major and minor arterials in the vicinity of the study area. A more detailed analysis of volume and LOS improvements is required to study the impact outside of the study area. Alternative 2, 6 and 8 should be studied in more detail to finalize the impact of widening and possible extensions of Cary Parkway to relieve future congestion on the roadways in the study area, and also a wider area. A more detailed study would involve widening one roadway facility per alternative and analyzing the impacts. The Town of Cary is not in favor of widening Tryon Road to a 6-lane facility hence a detailed operational analysis of various intersections on Tryon for the preferred alternative will be required to alleviate congestion and signal queuing.

The social and environmental impacts evaluated in this study represent broad level GIS-based examination. A detailed impact analysis will be required at a later stage once the preferred alternatives are shortlisted.

Table 2. Environmental Screening Matrix

Table 2 - Environmental Screening Analysis of Swift Creek Area Study		Figure 3 Hydrologic Factors										Figure 4 Environmental Factors Group A										Figure 5 Environmental Factors Group B										Figure 6 Recreation										Figures 8 - 10 Socio-Economic Factors									
Alt	Description	Model Runs					Maximum Possible Score (2)					Model Runs					Model Runs					Model Runs					Model Runs					Maximum Possible Score (2)					Model Runs					Maximum Possible Score (2)									
1	Gorman Connector	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
2	Yates Mill Pond Connector	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
3	Widening Option	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
4	Dillant Connector	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
5	US-401 Connector	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
6	Widening Option	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
7	Yates Mill Pond Connector + Widening	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									
8	Yates Mill Pond Connector + Widening	Mod	N/A	Min	Mod	N/A	Mod	Mod	Mod	Mod	N/A	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod	Mod									

General Notes
(1) This table represents a qualitative environmental screening only. Observations made by overlapping projects and various GIS data layers

(2) Widening projects are assigned a (Mod) maximum value. New roadway alignment projects are assigned a (Mod) maximum value.
(3) Water County GIS File, from <http://www.watacto.com/itservices/gis.htm>.

(4) All others are best available state-wide datasets.

(5) Utility Easement is assumed to be high power overhead transmission lines, that will not be impacted by roadway projects

(6) Layers are too detailed to be displayed adequately and therefore not included on figures

(7) Layers are not present within the study area and therefore not included on figures

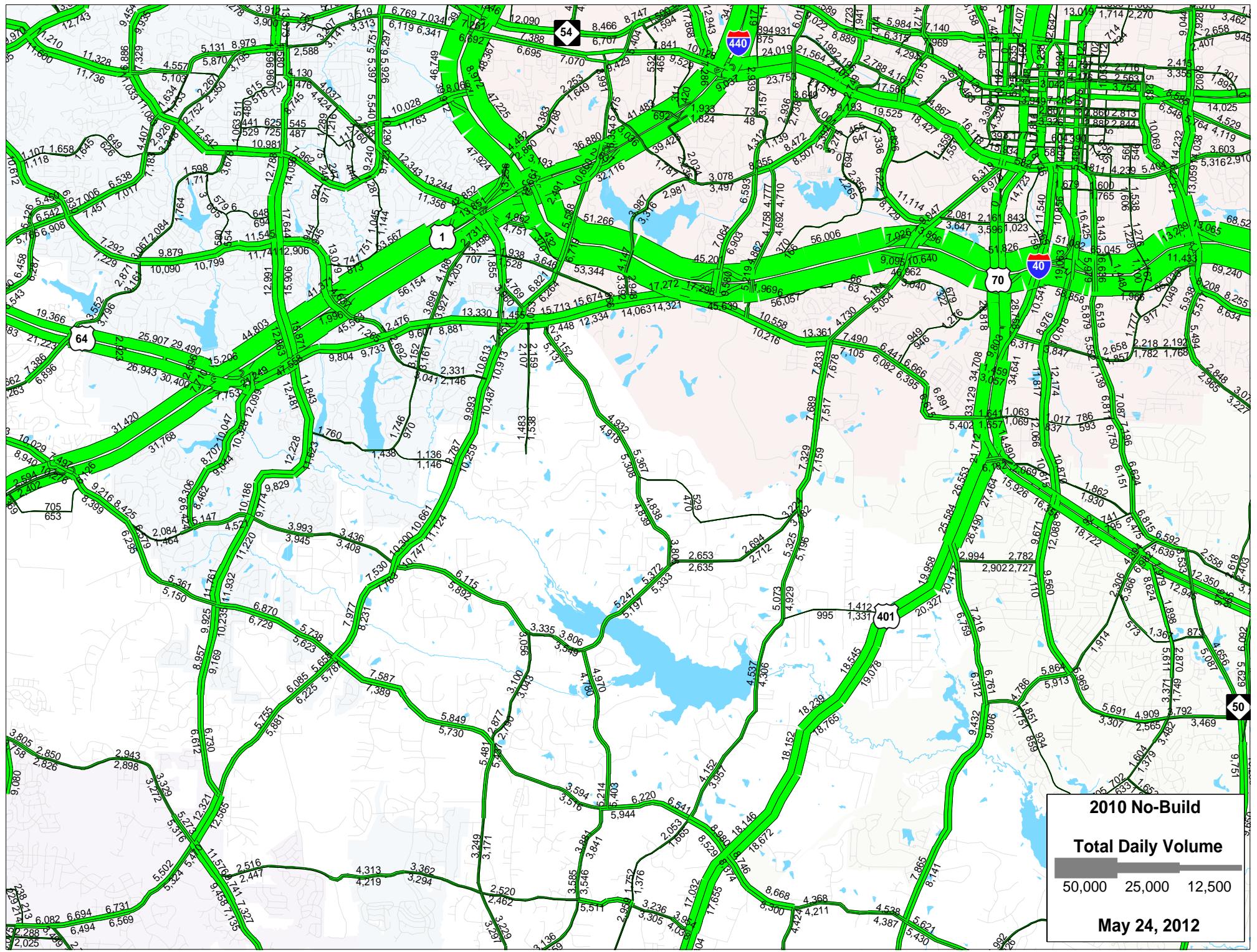
Legend

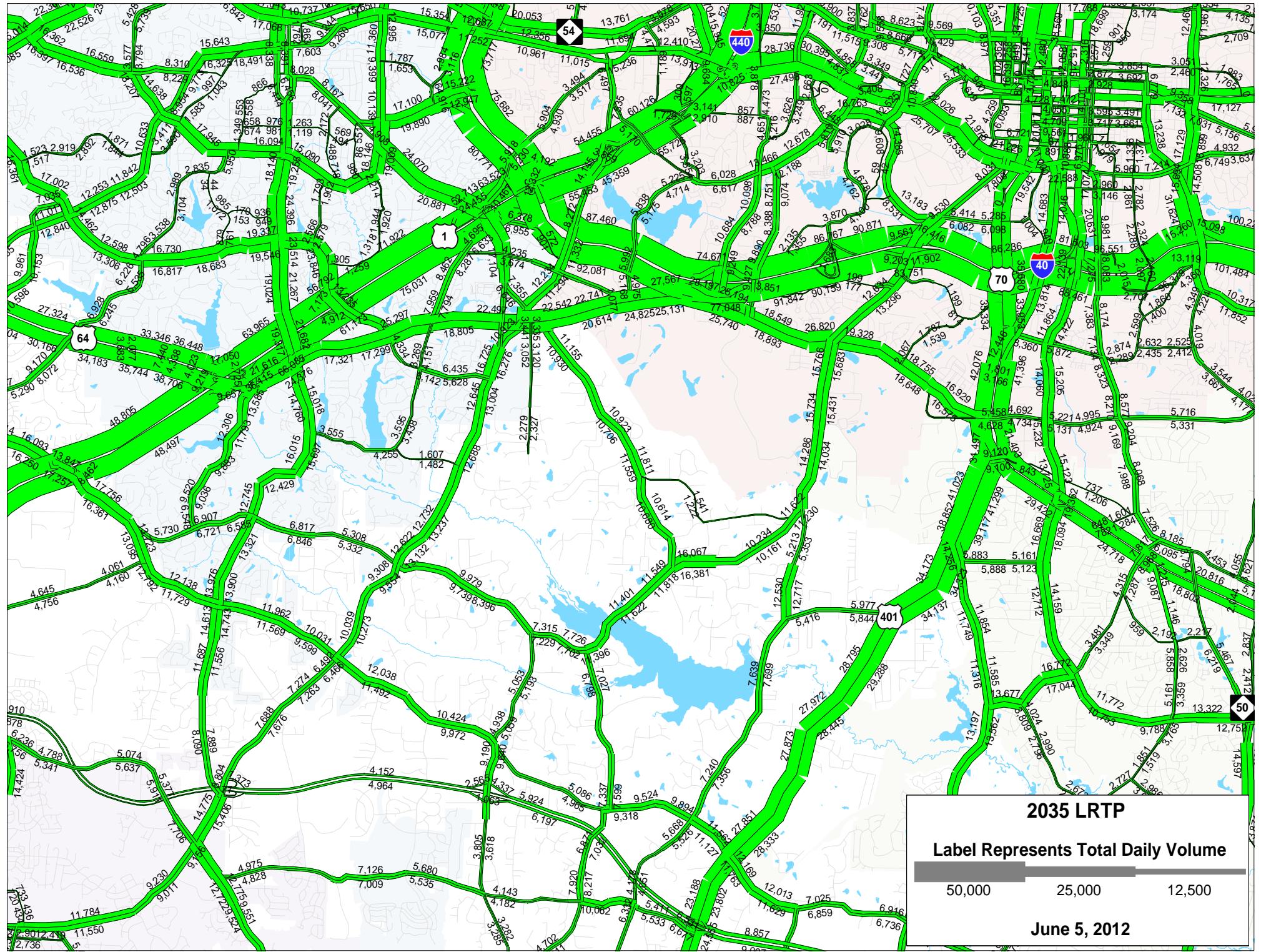
- (1) DOES NOT APPLY - beyond 1/4 mile distance from project
- (2) Minor Impact, single small stream crossing; near environmentally sensitive area
- (3) Moderate Impact, multiple small stream crossings; cross or near edge of environmentally sensitive area
- (4) Major Impact
- (5) Utility Easement
- (6) Layers are too detailed to be displayed adequately and therefore not included on figures
- (7) Layers are not present within the study area and therefore not included on figures

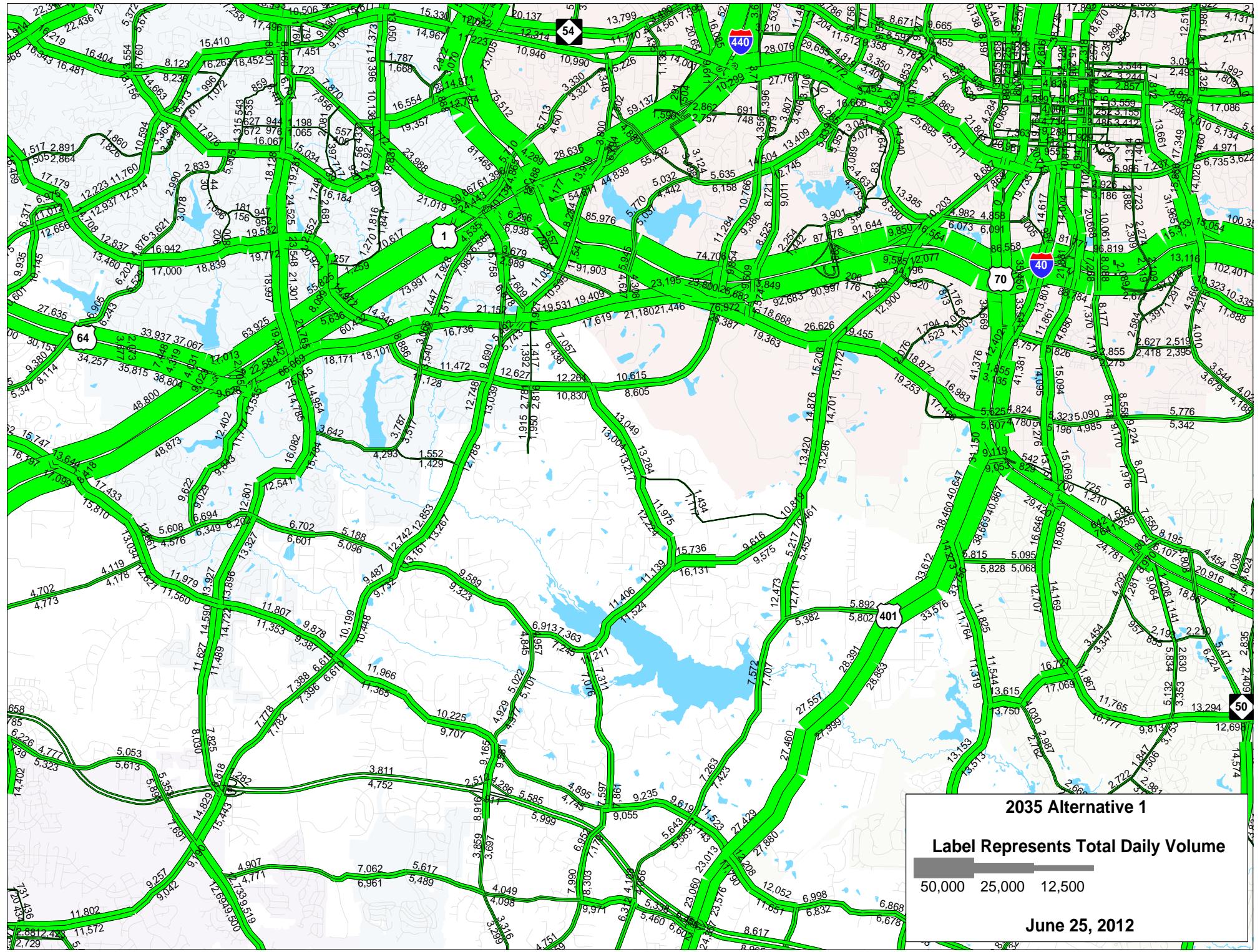
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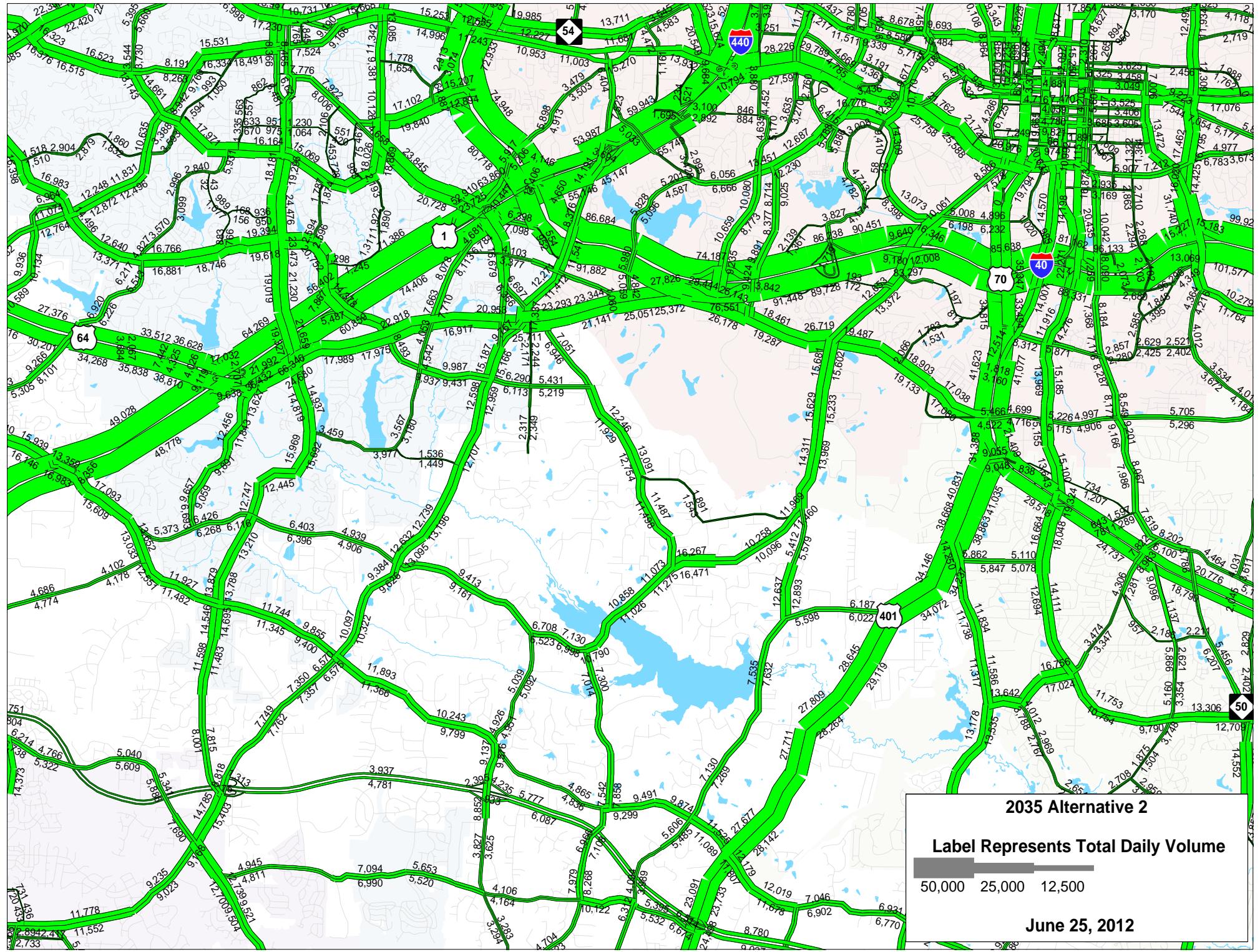
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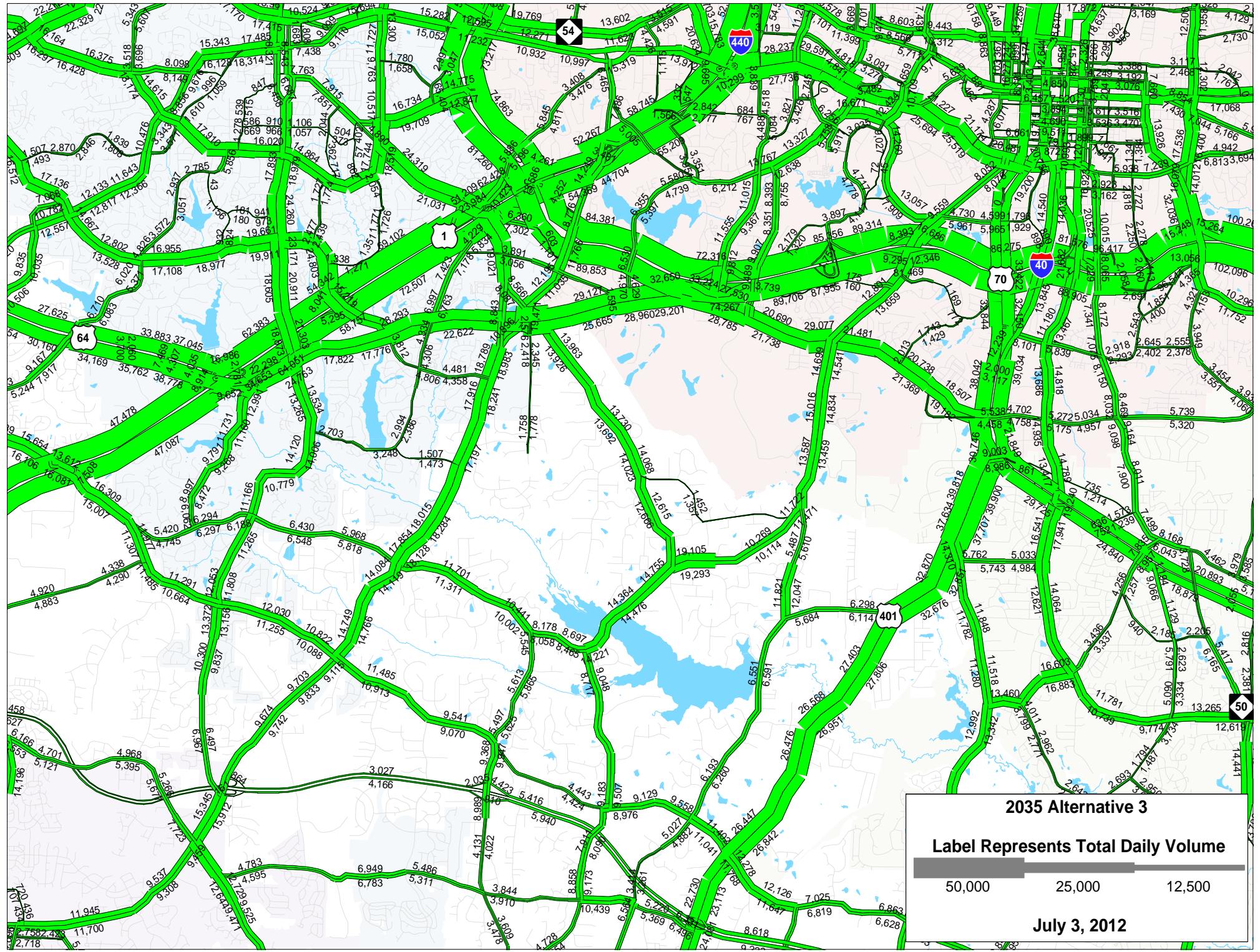


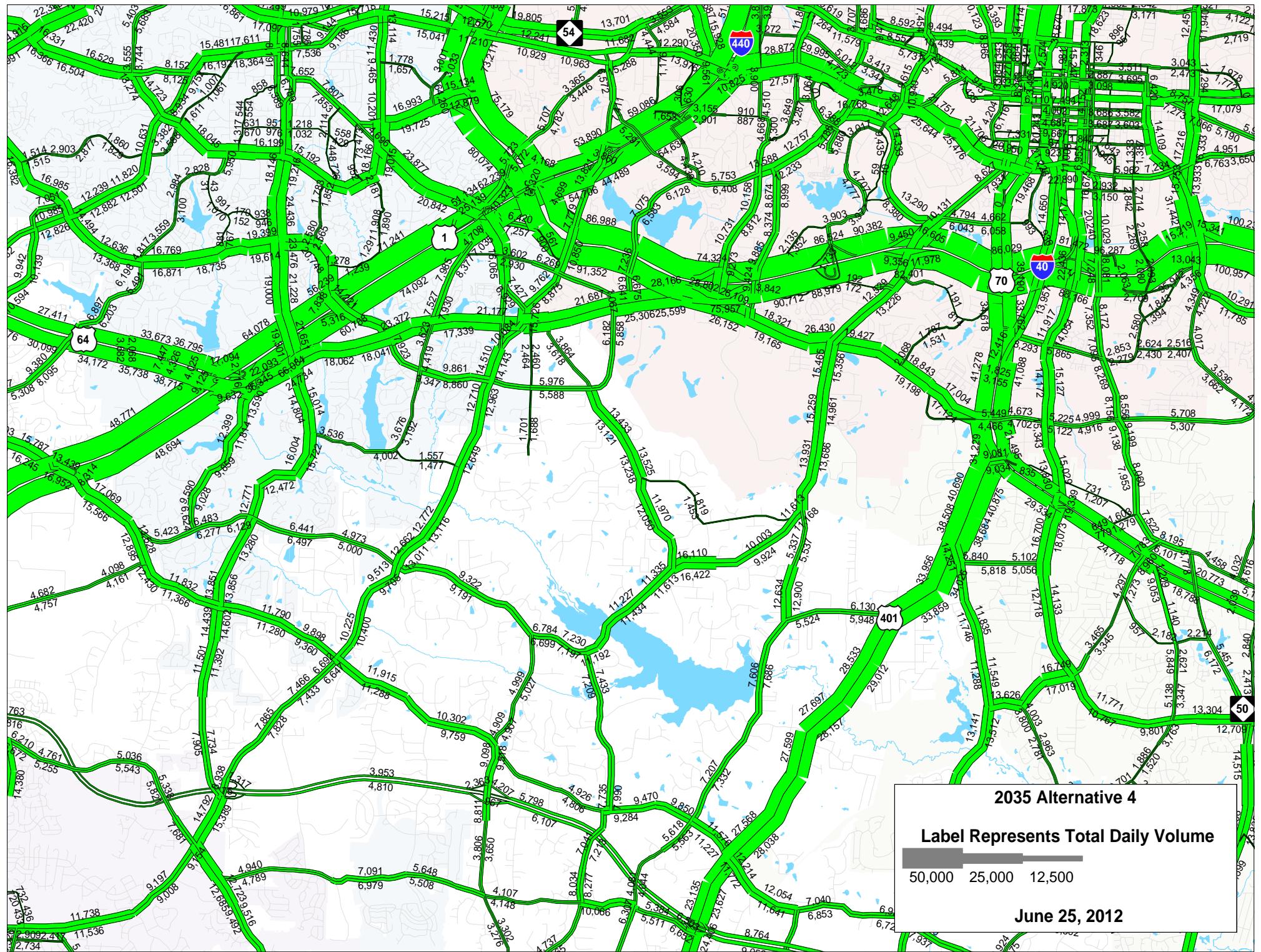


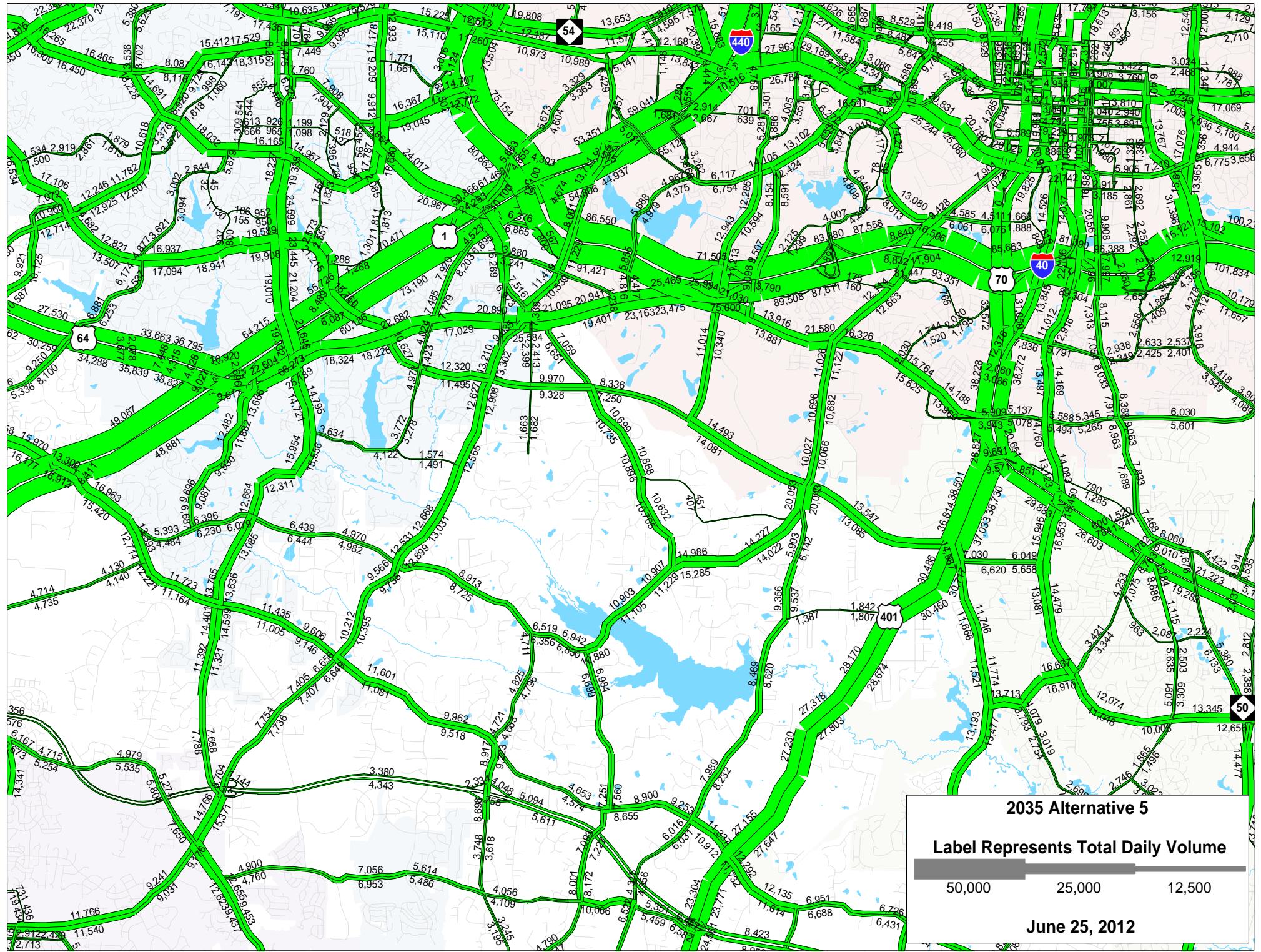


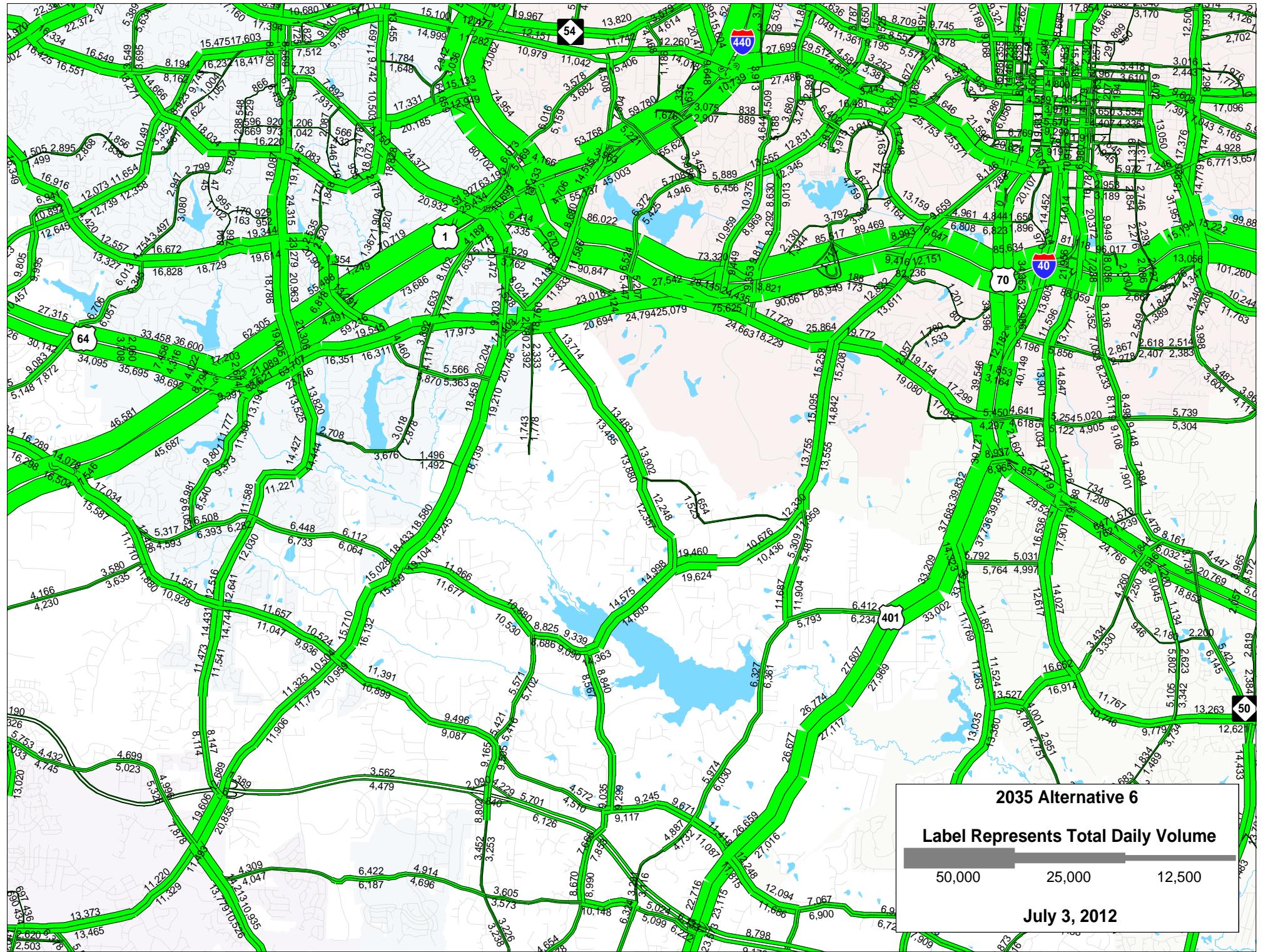


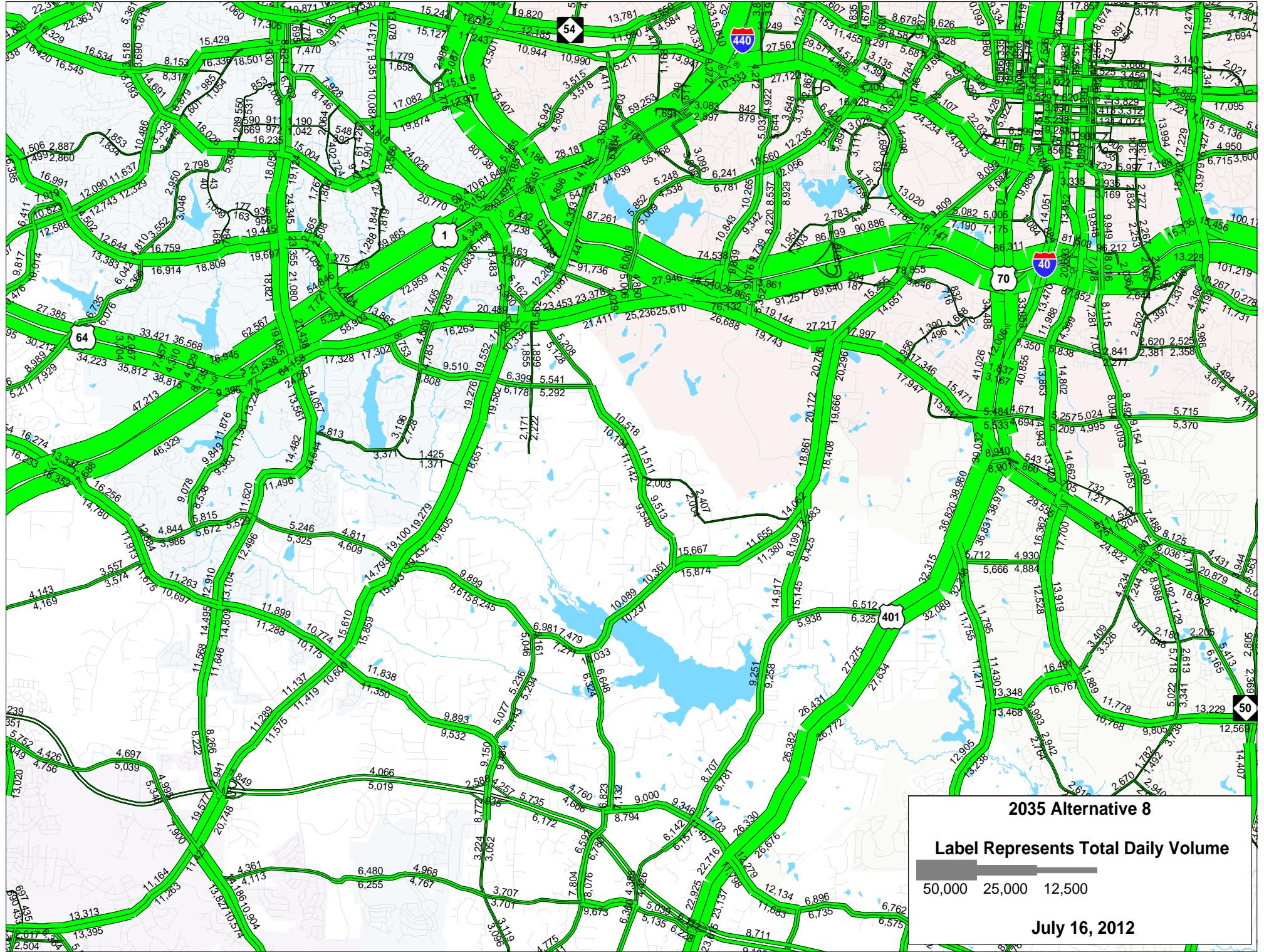






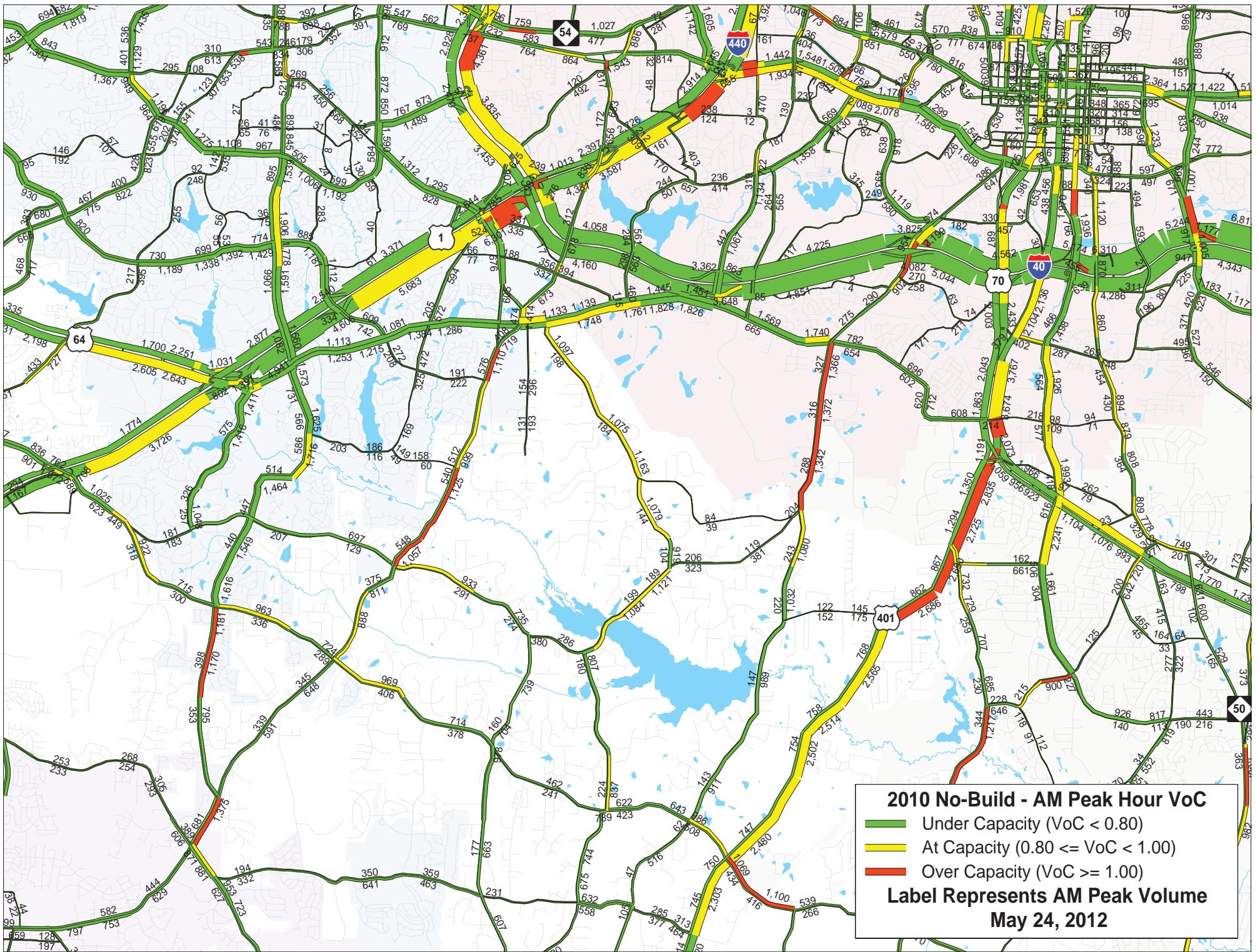


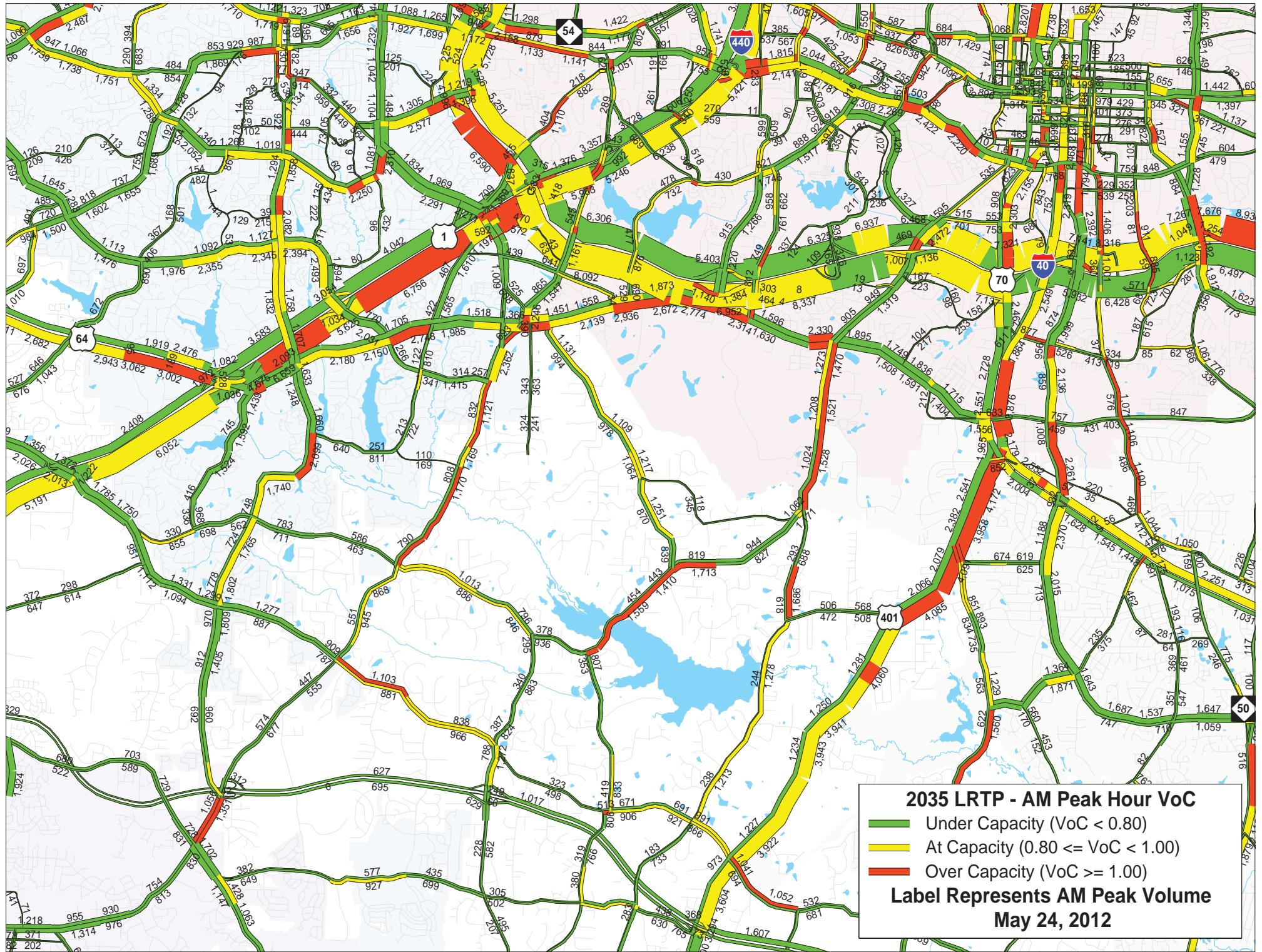


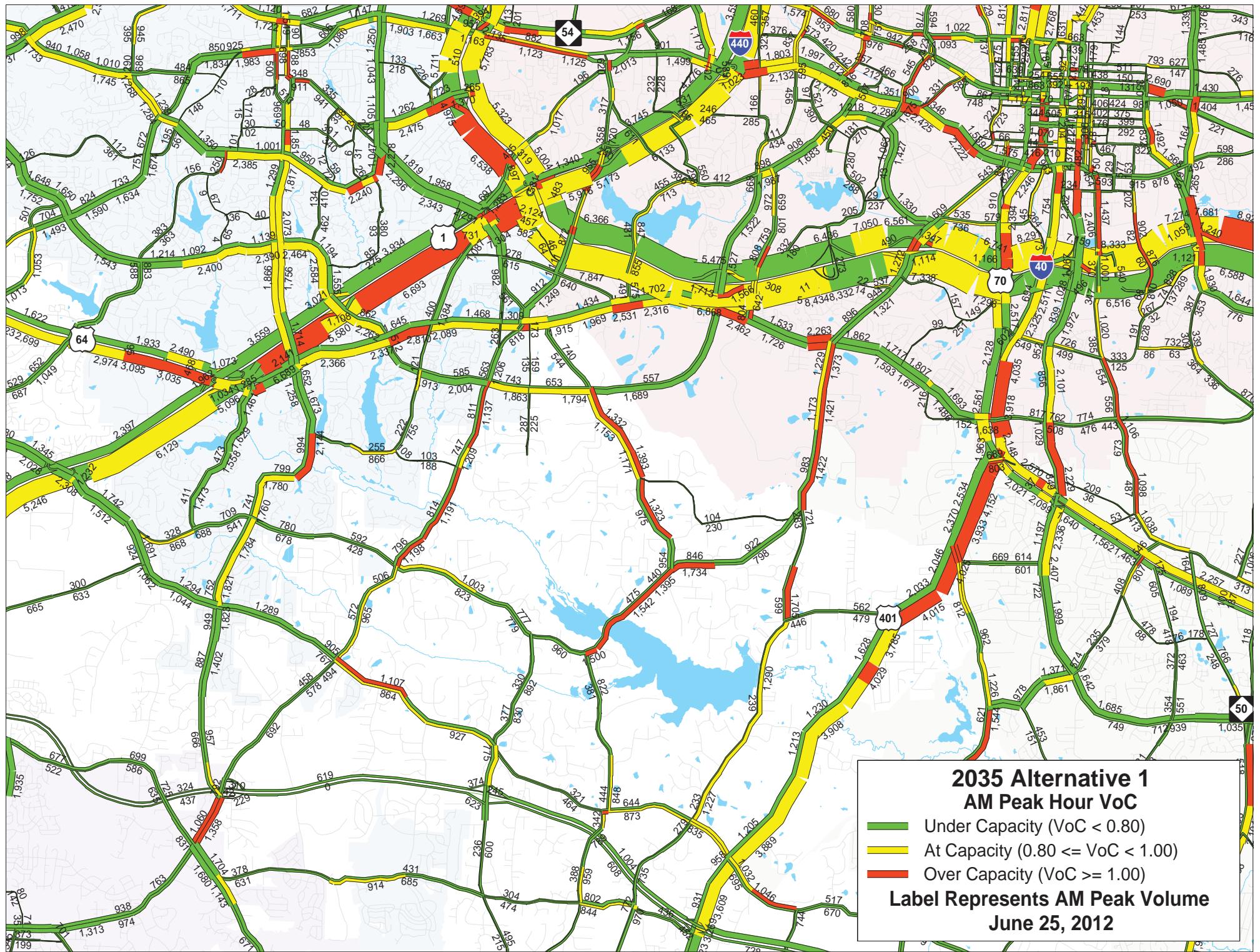


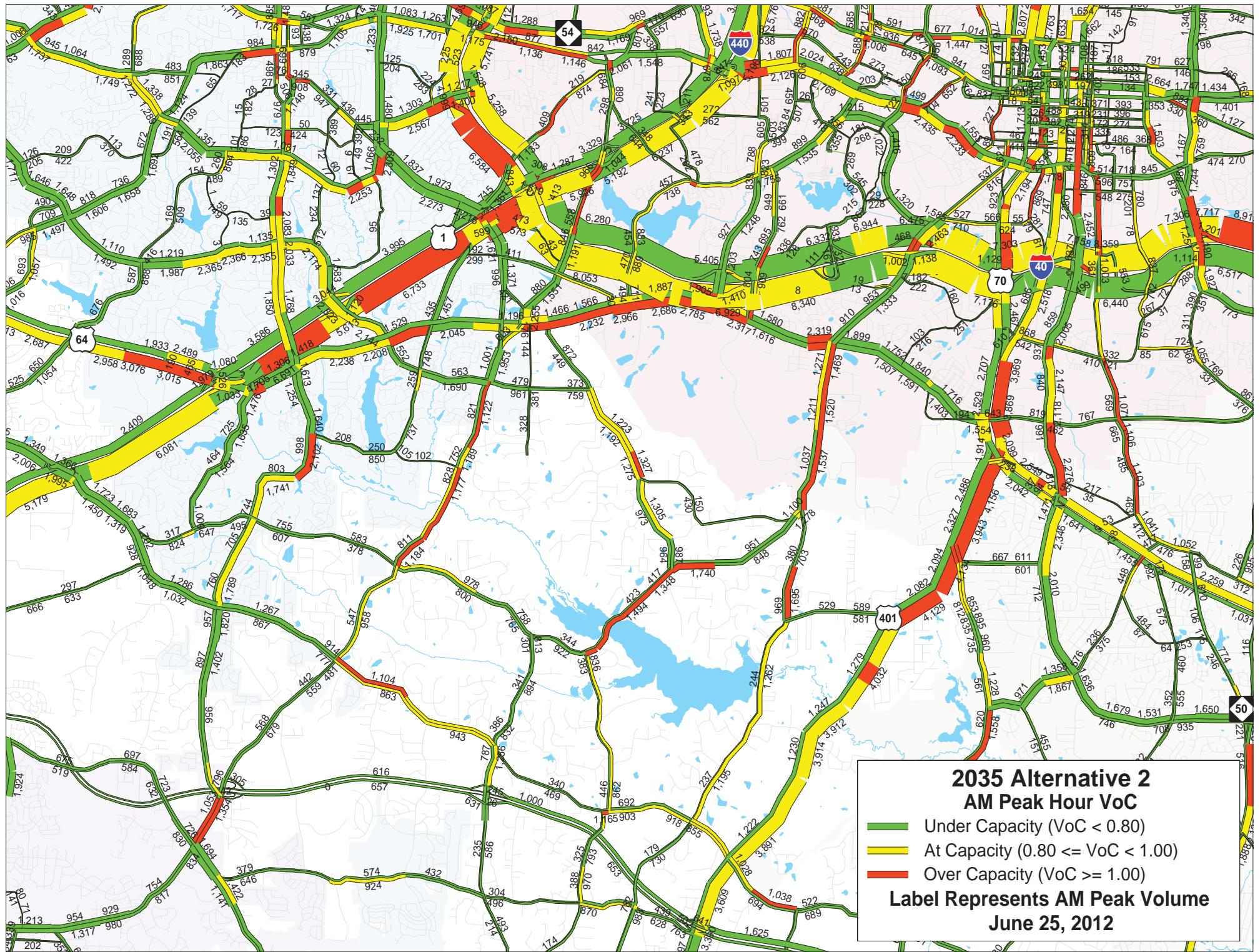
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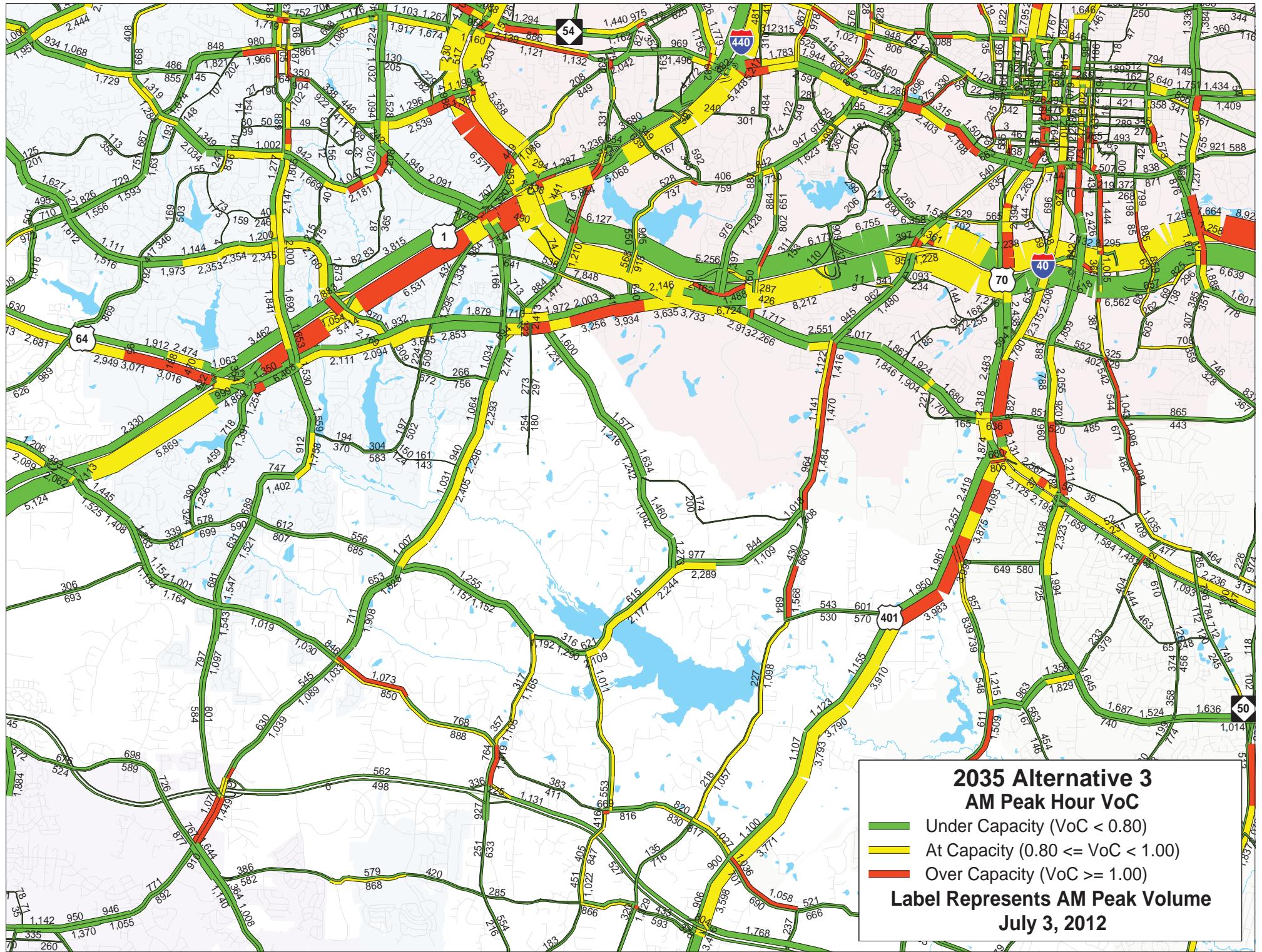
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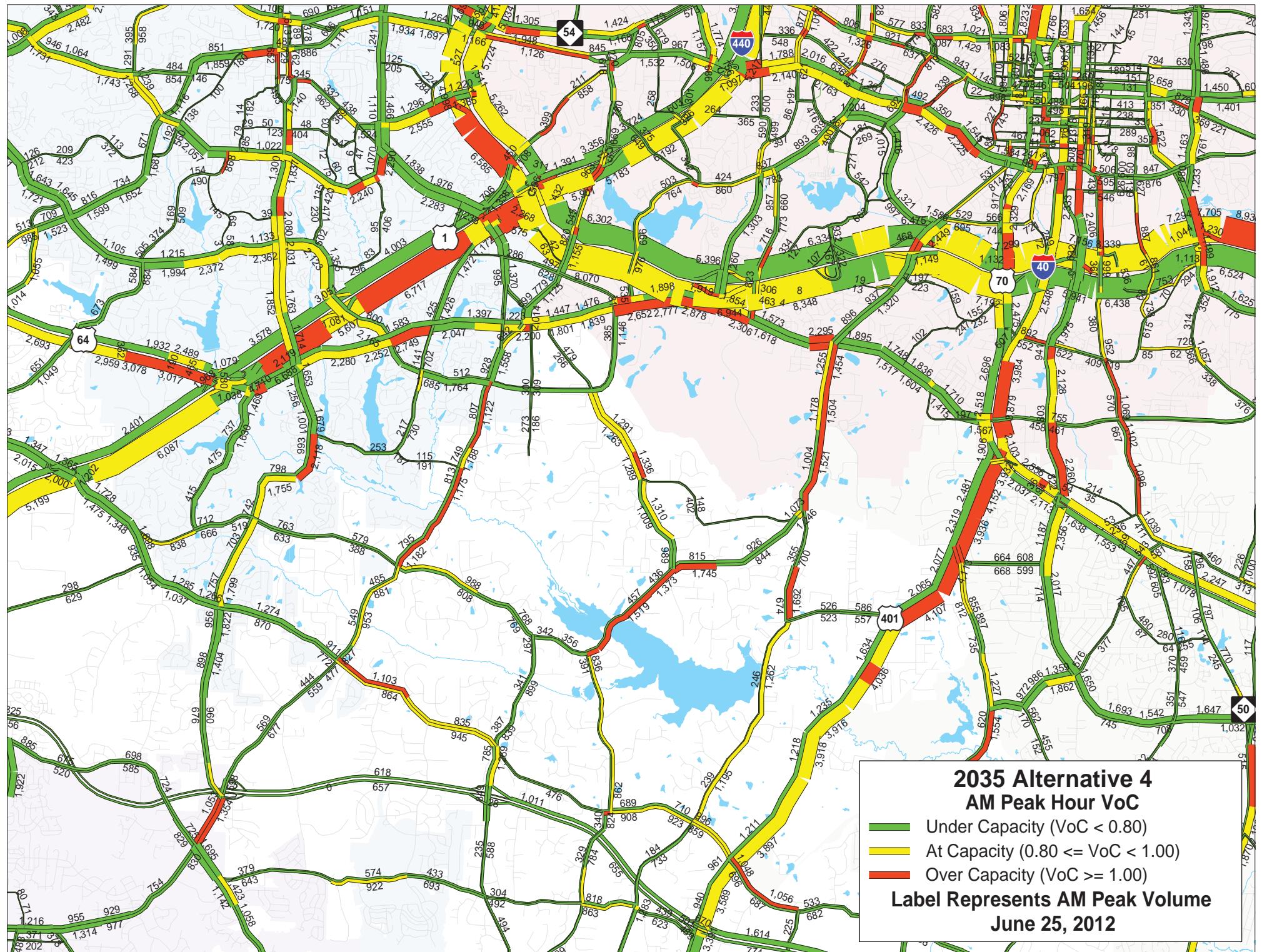


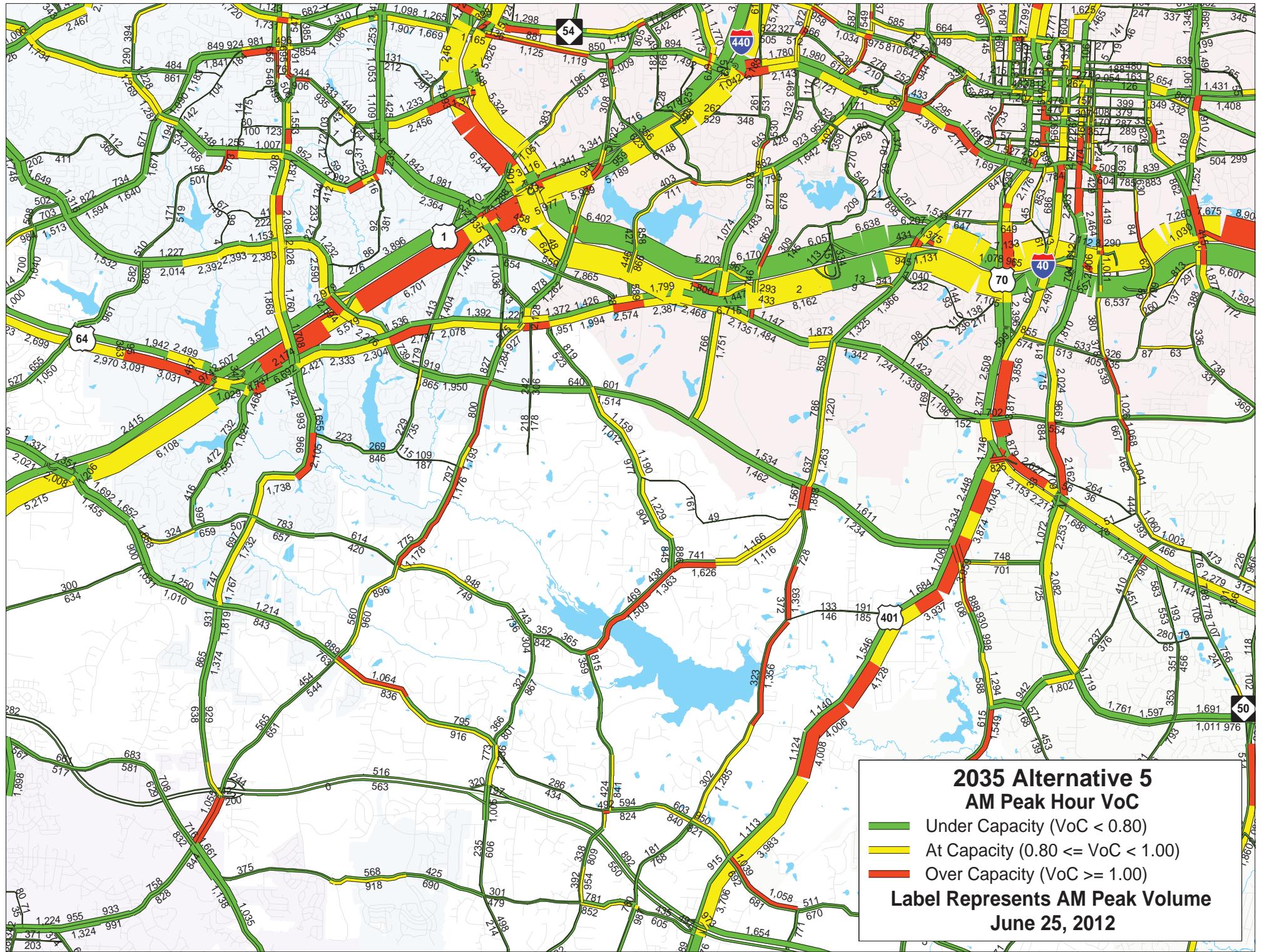


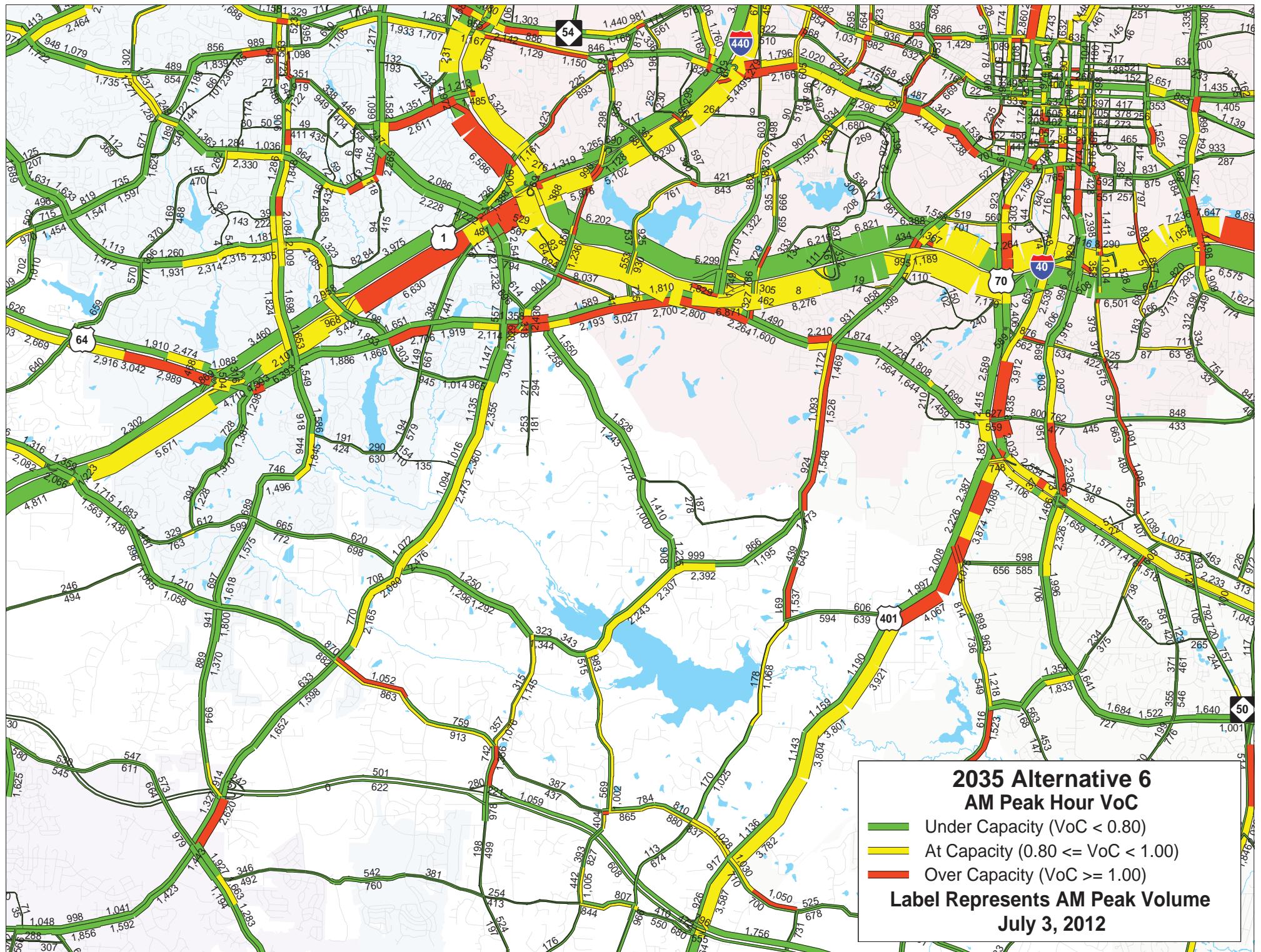


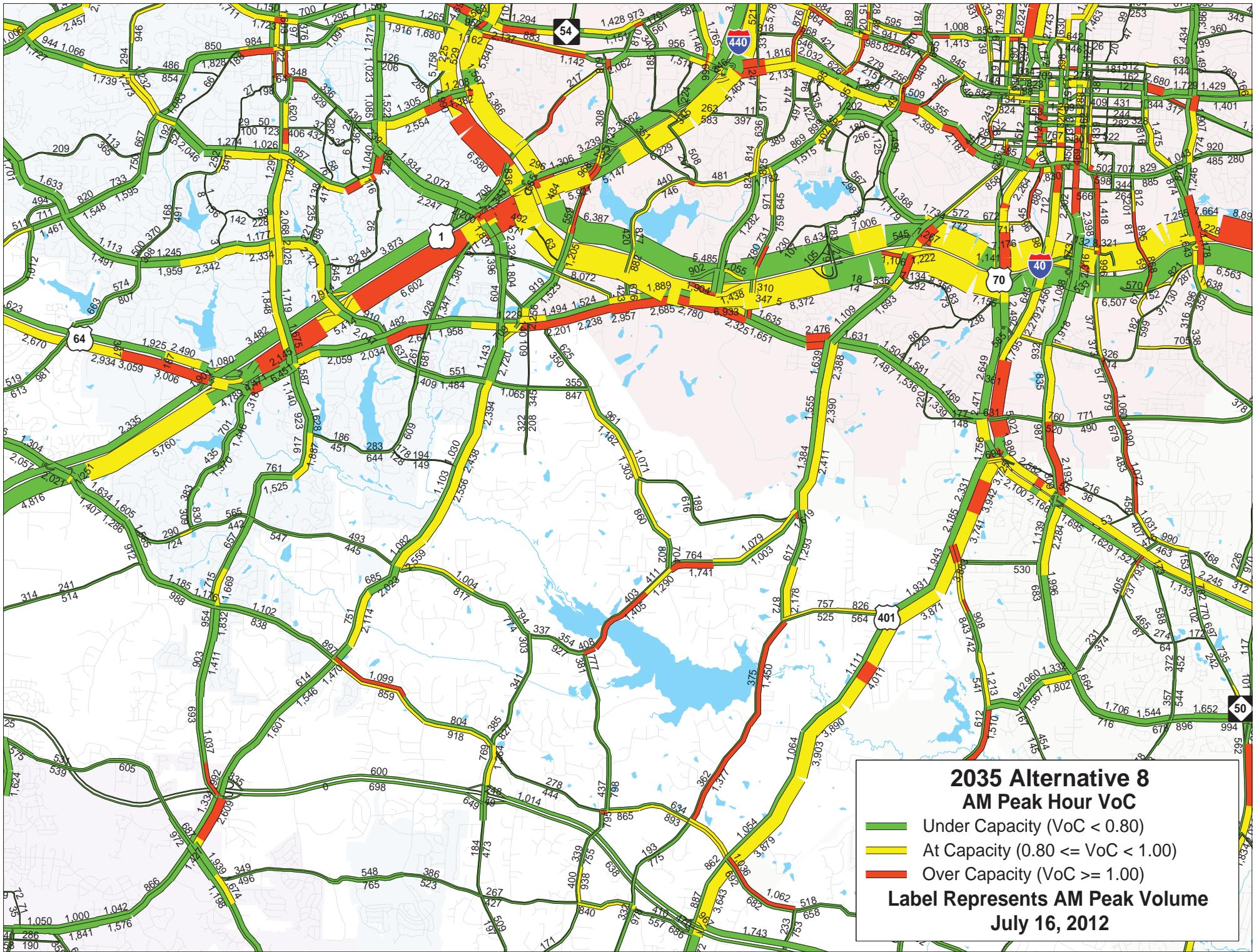


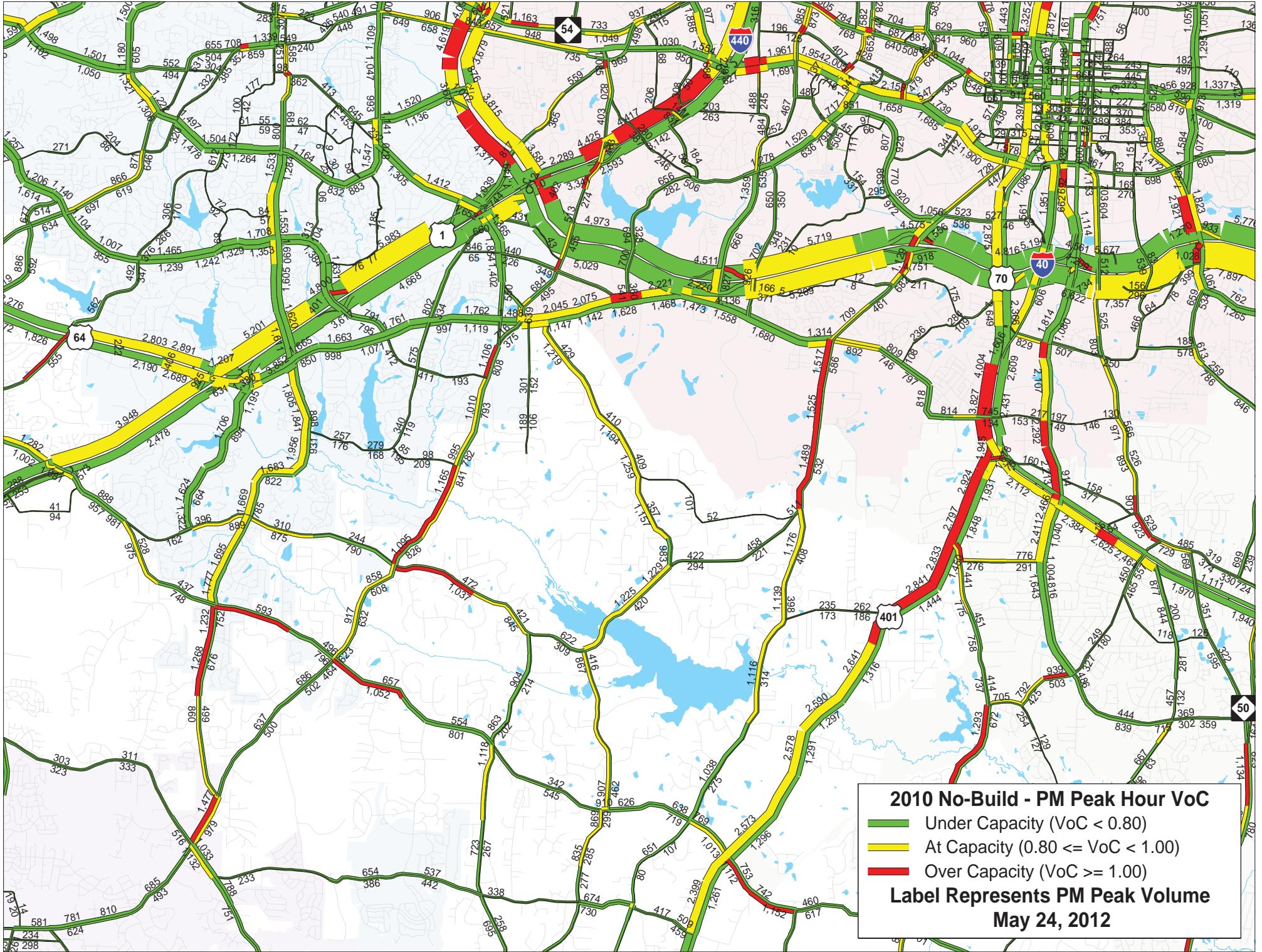


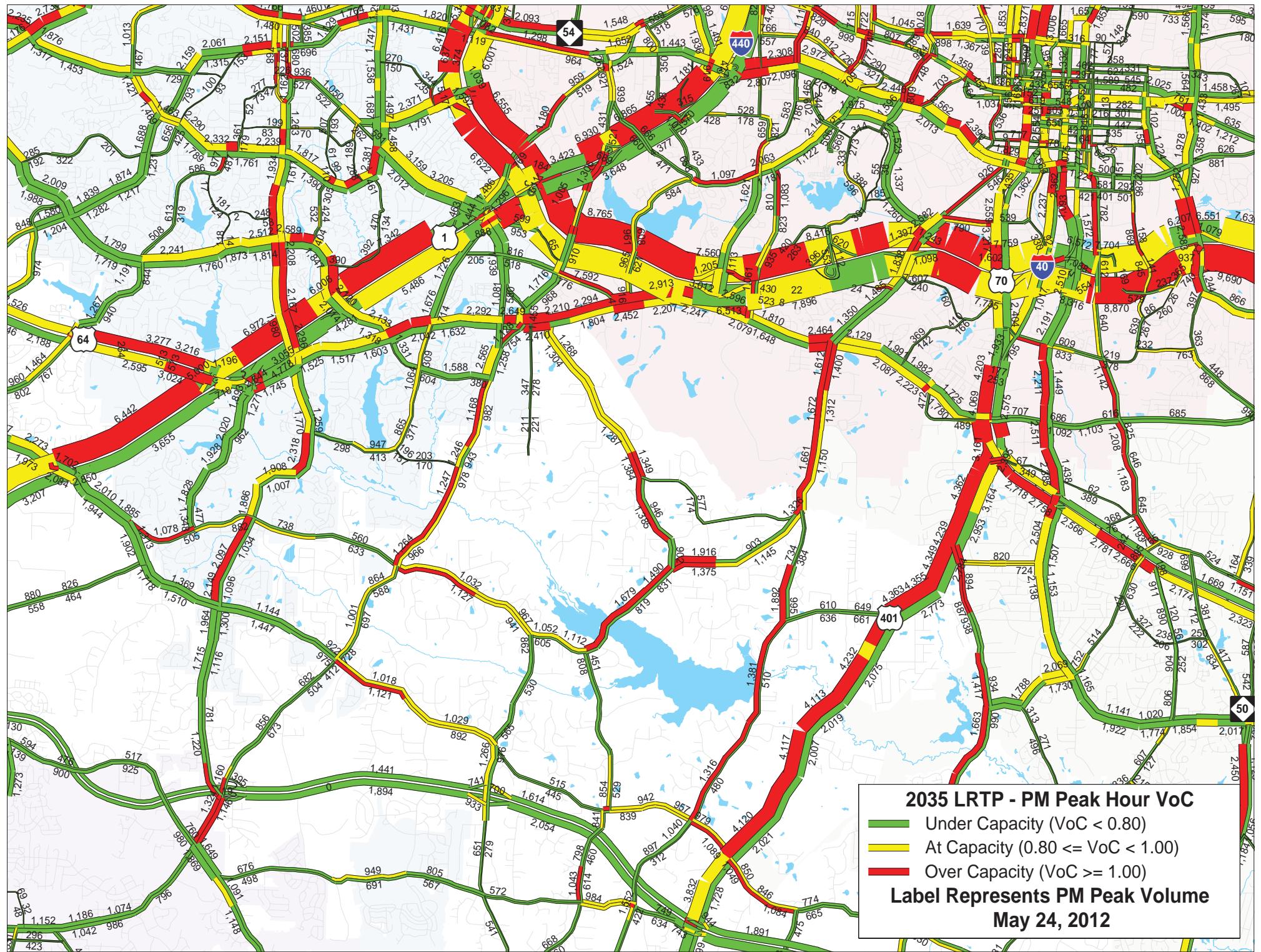


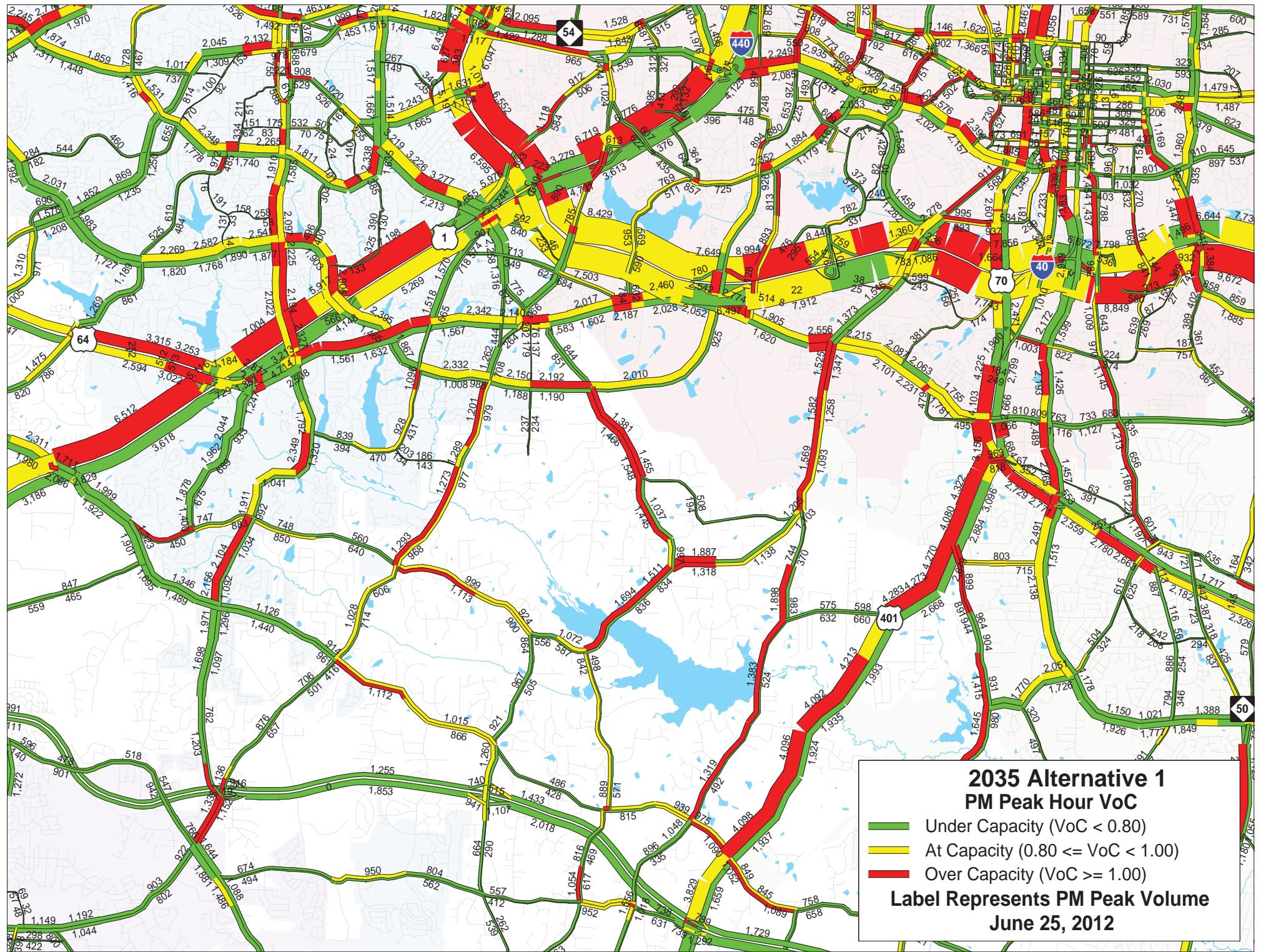


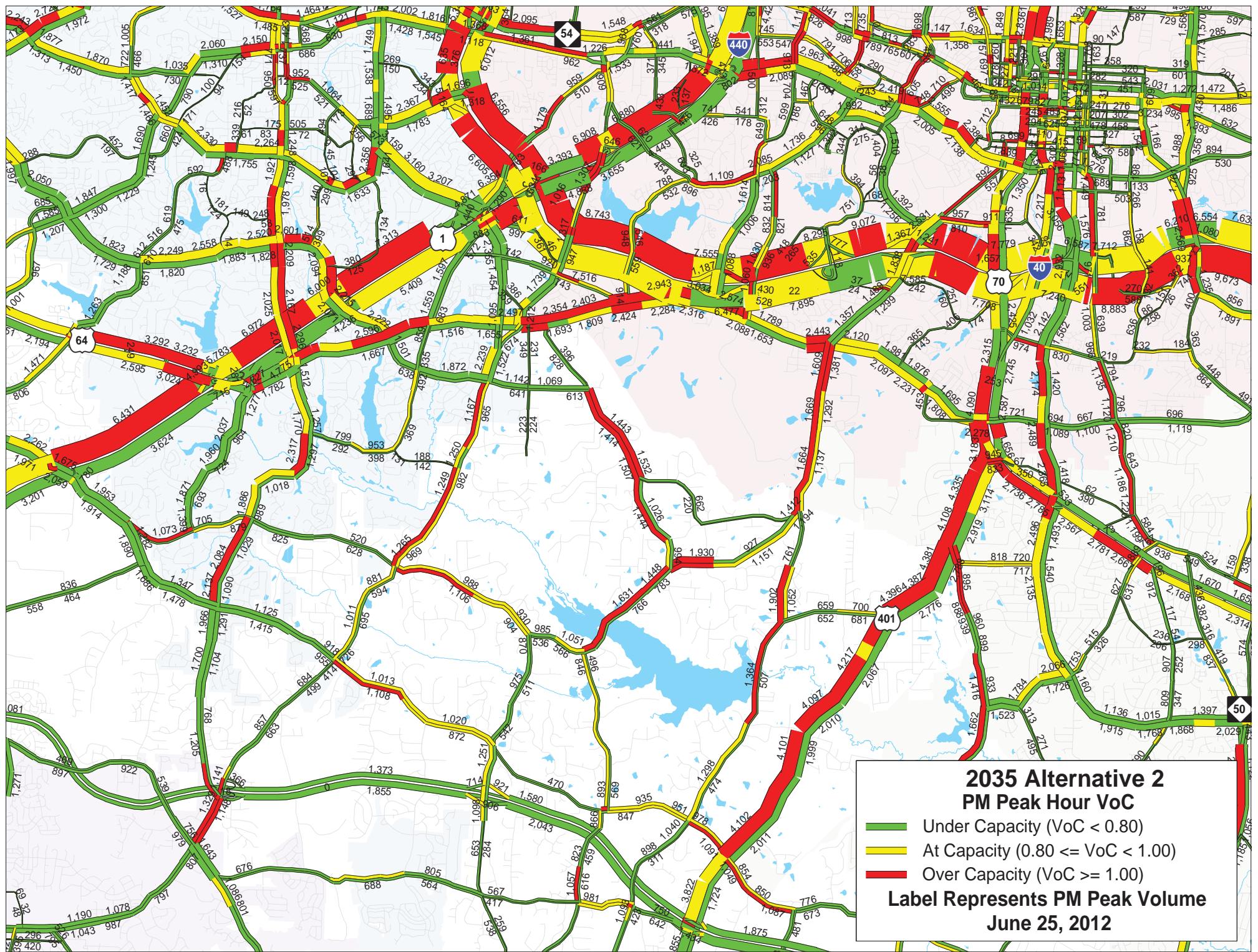


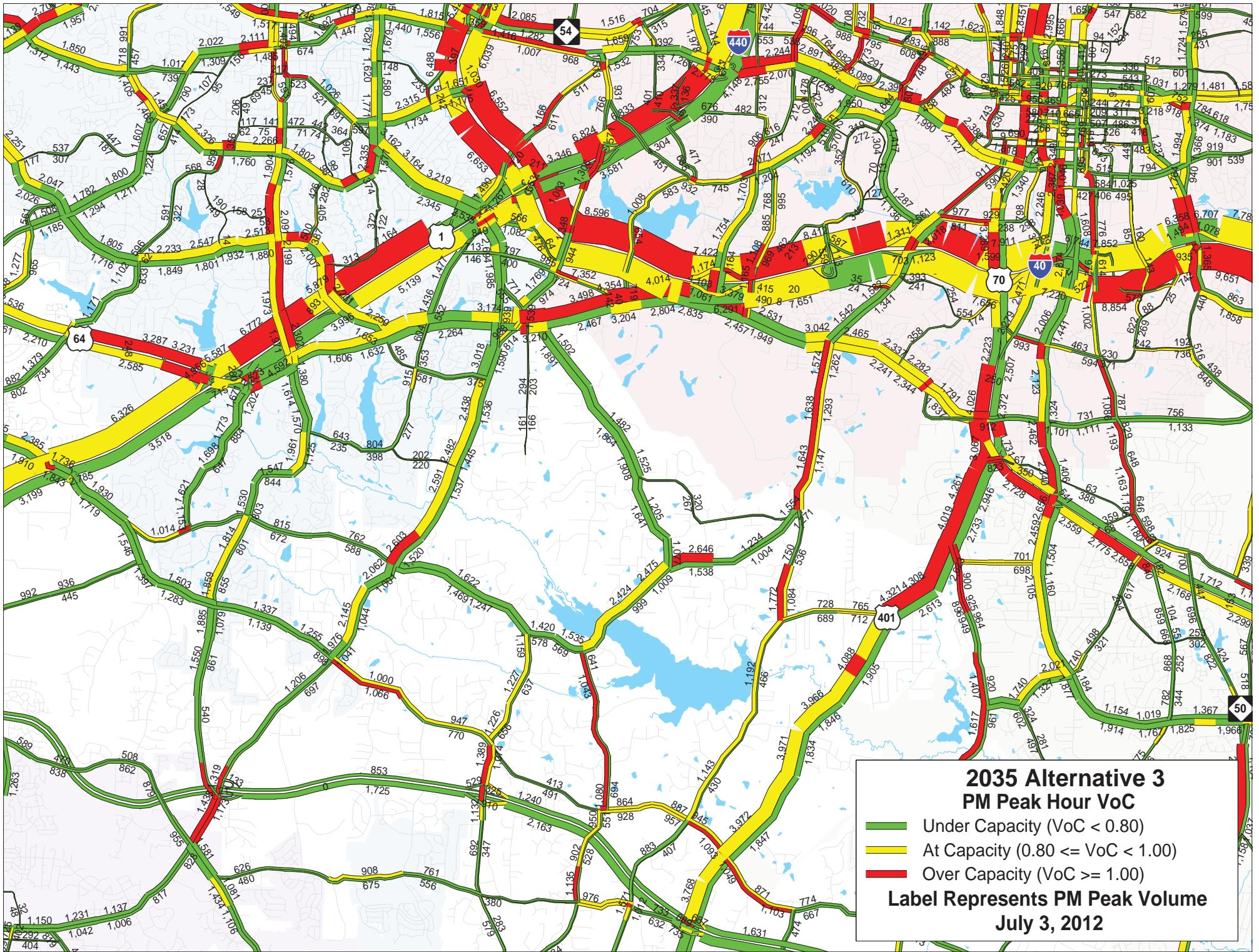


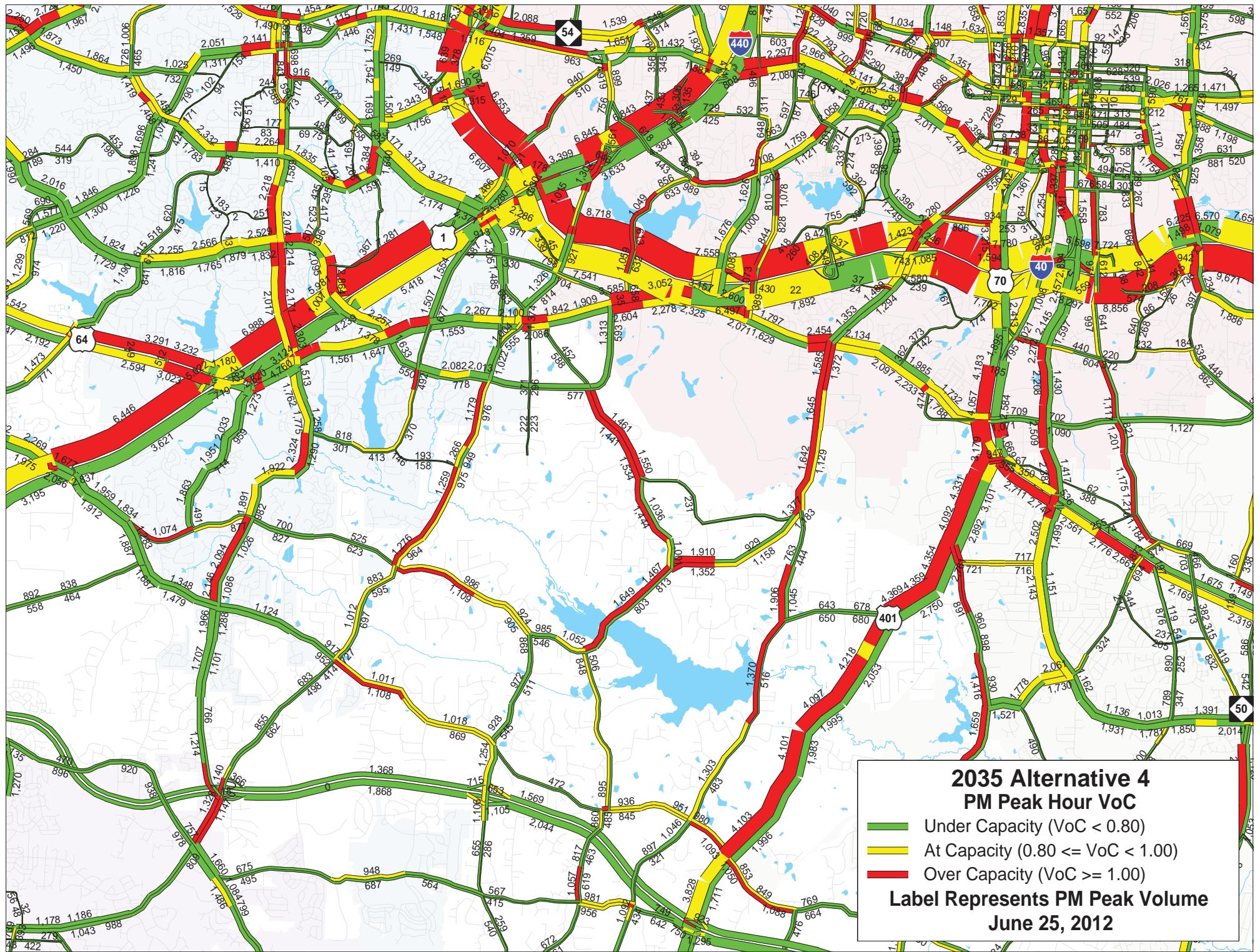


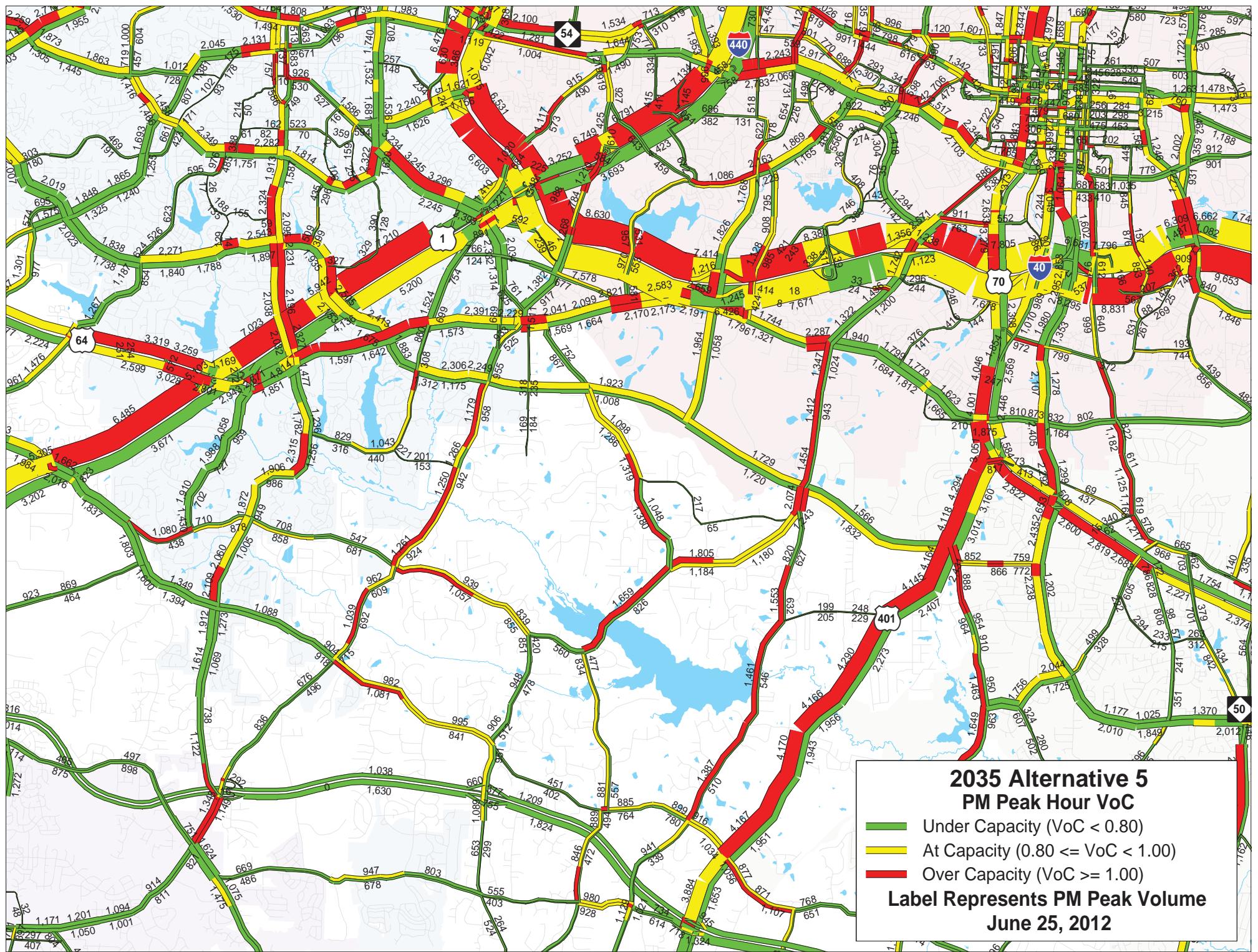


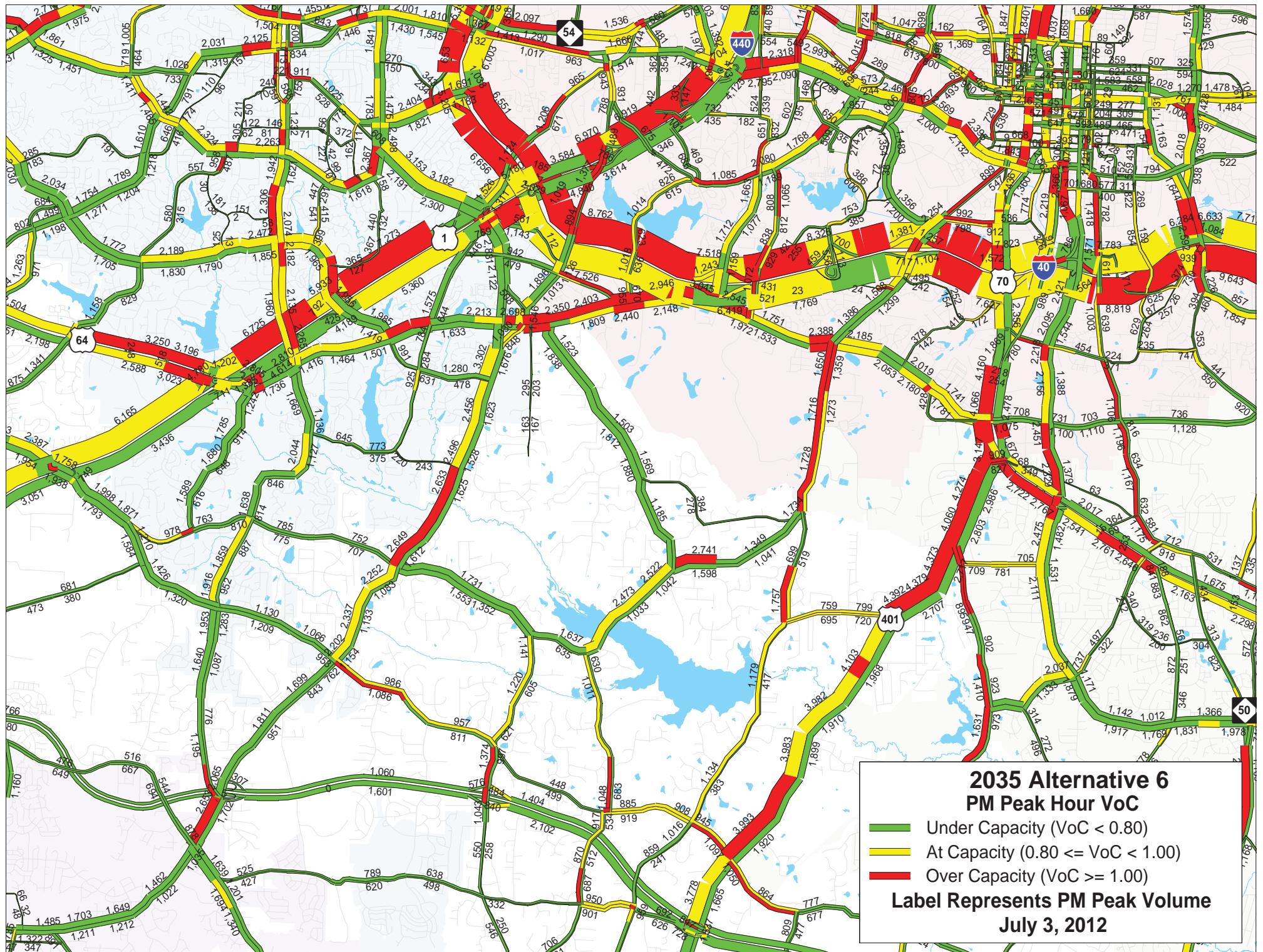


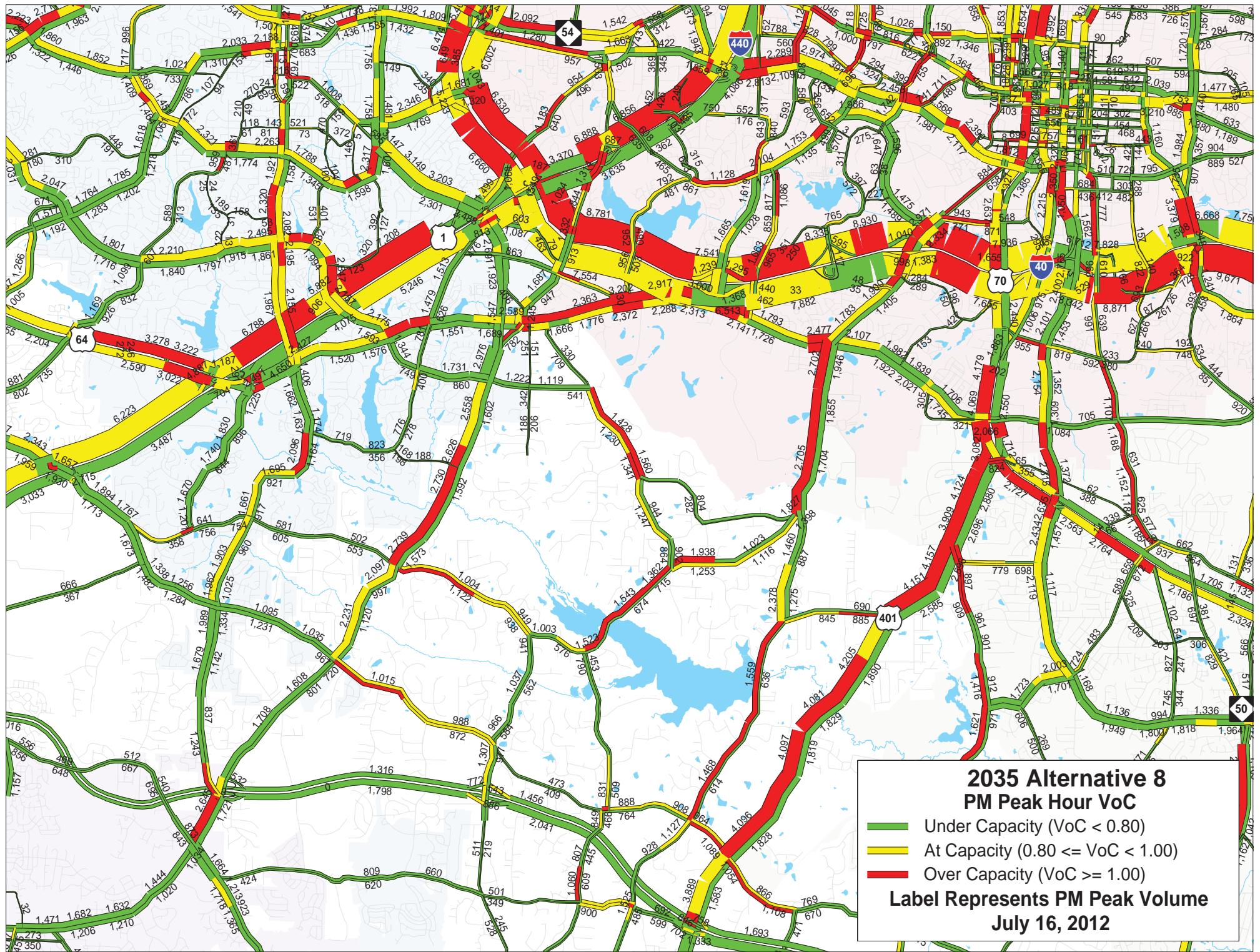






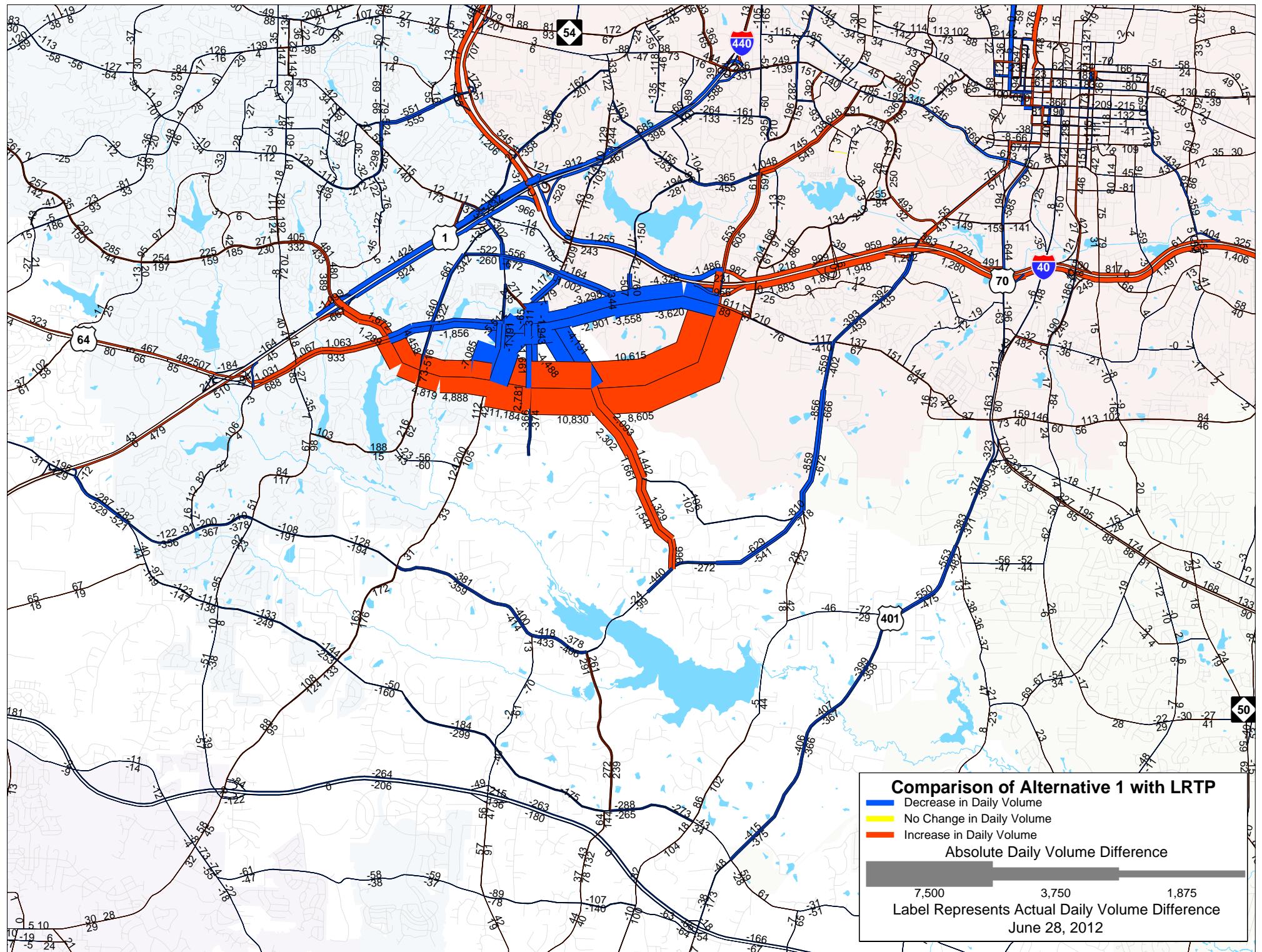


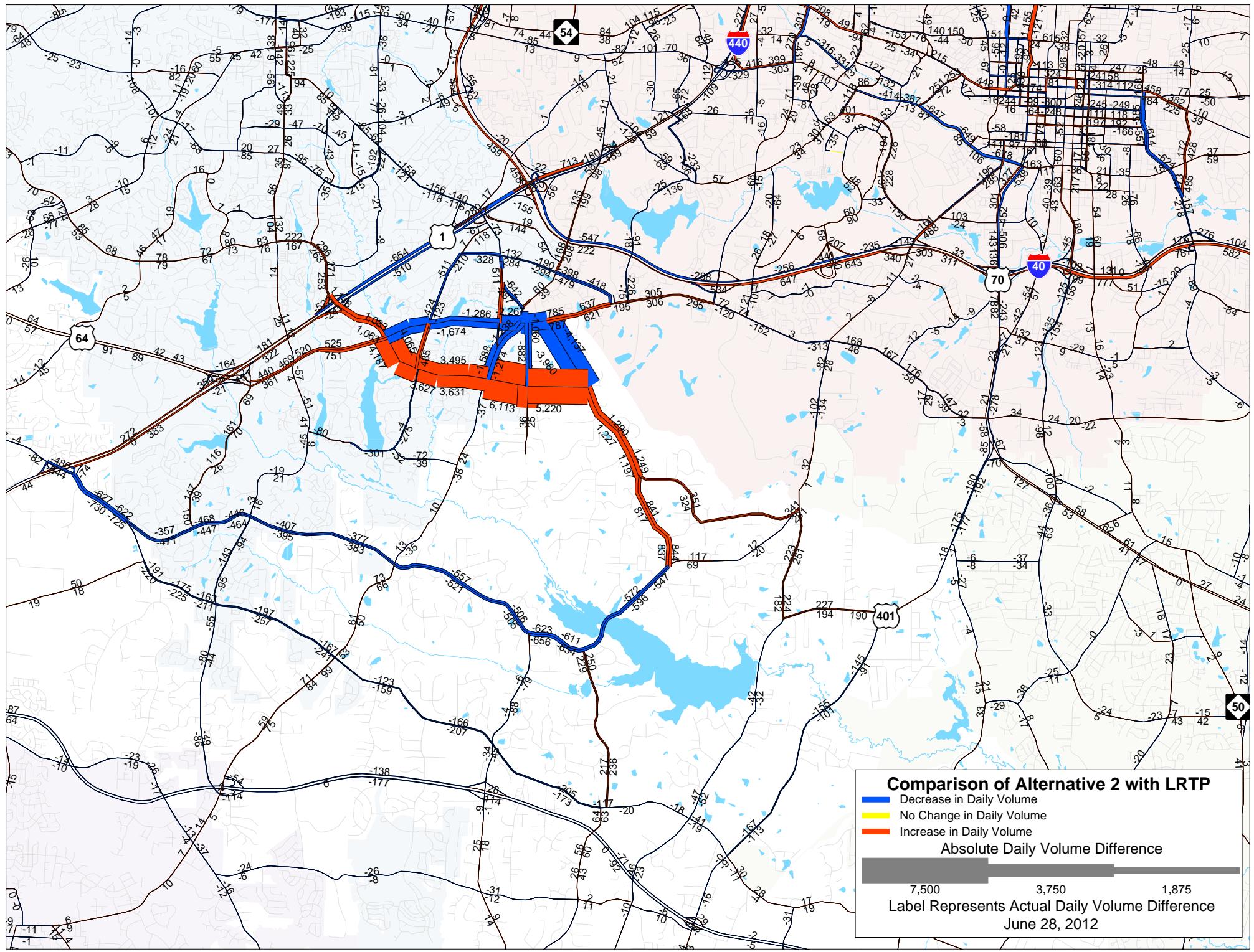


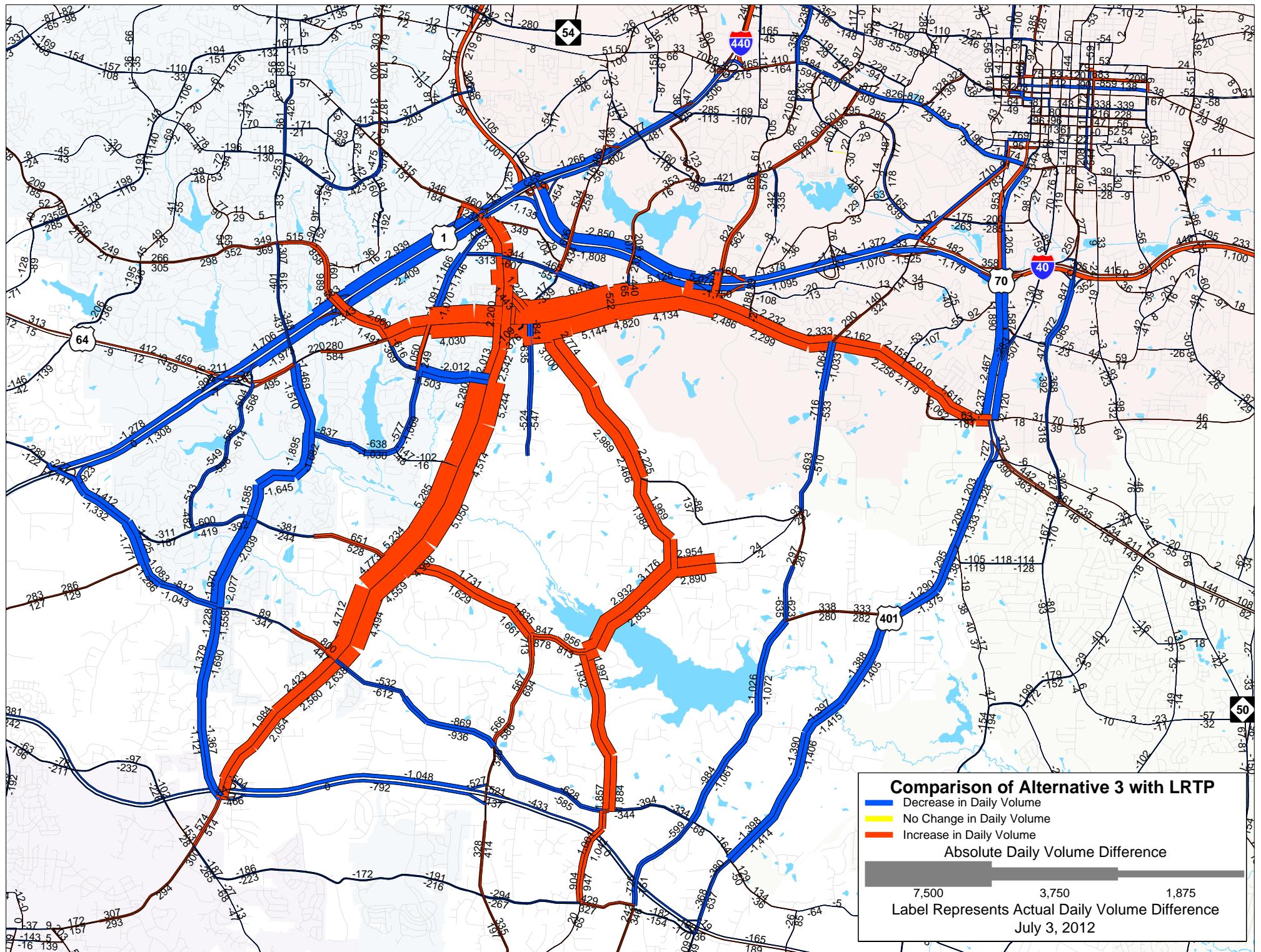


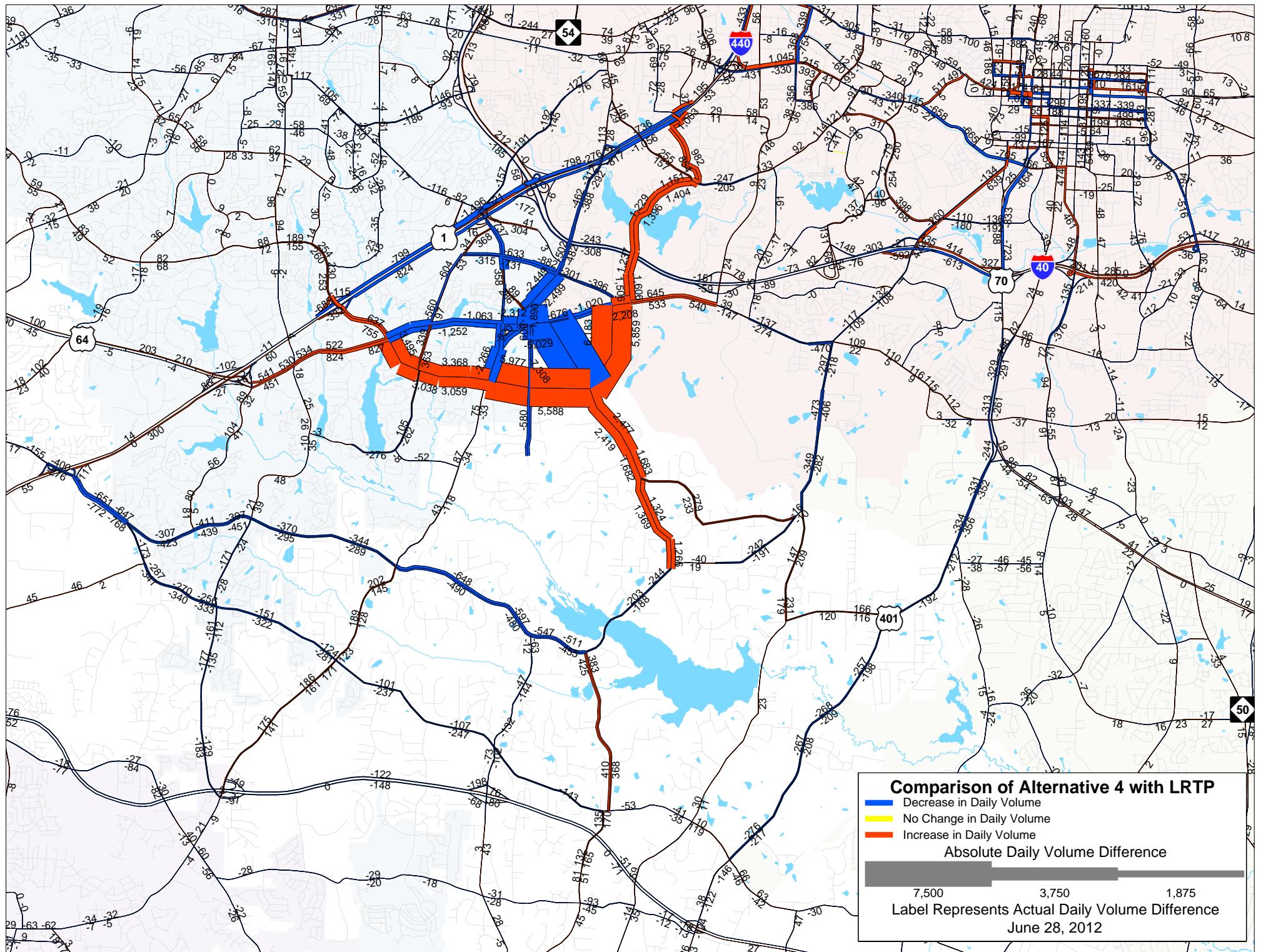
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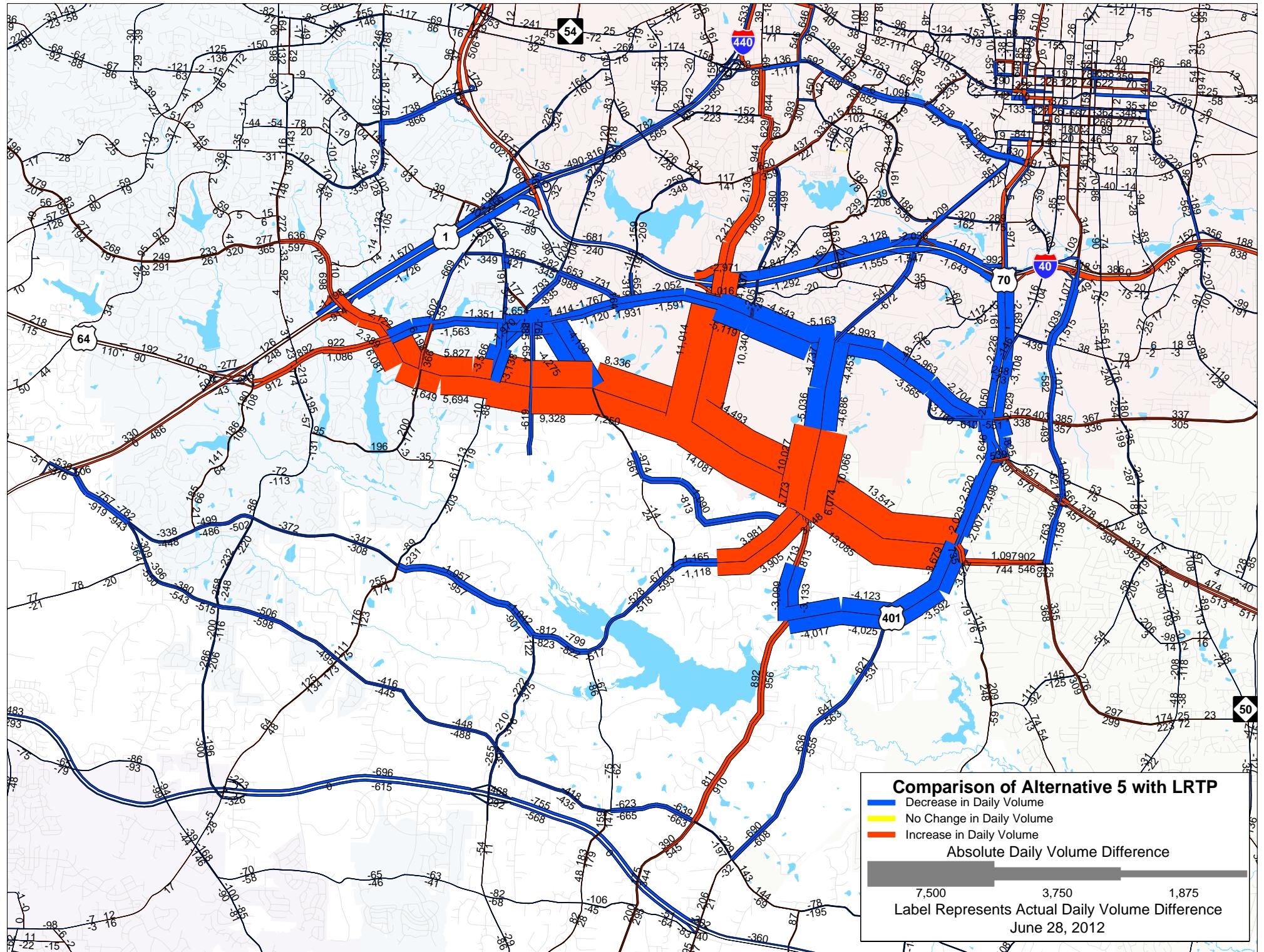
Volume Comparison between LRTP
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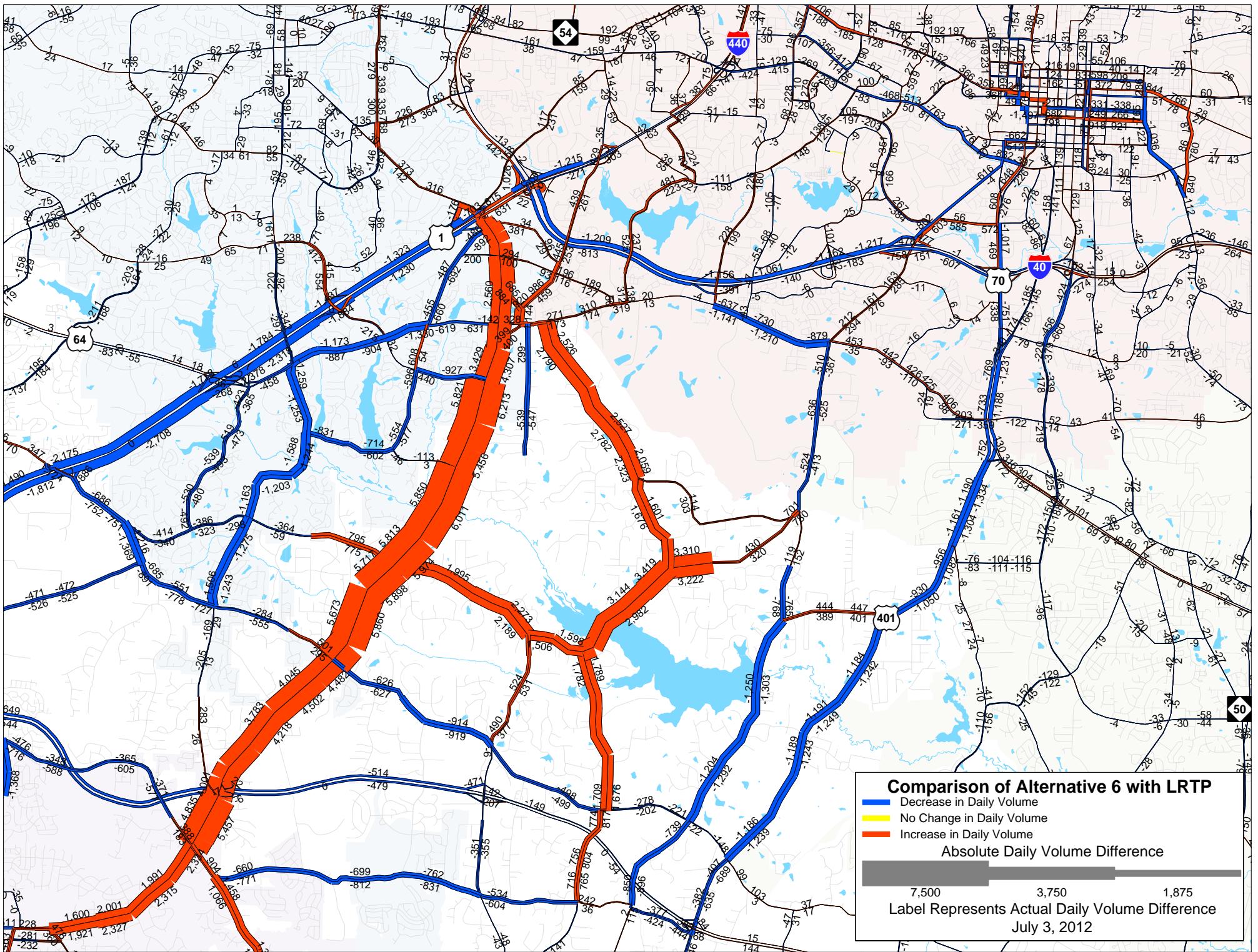


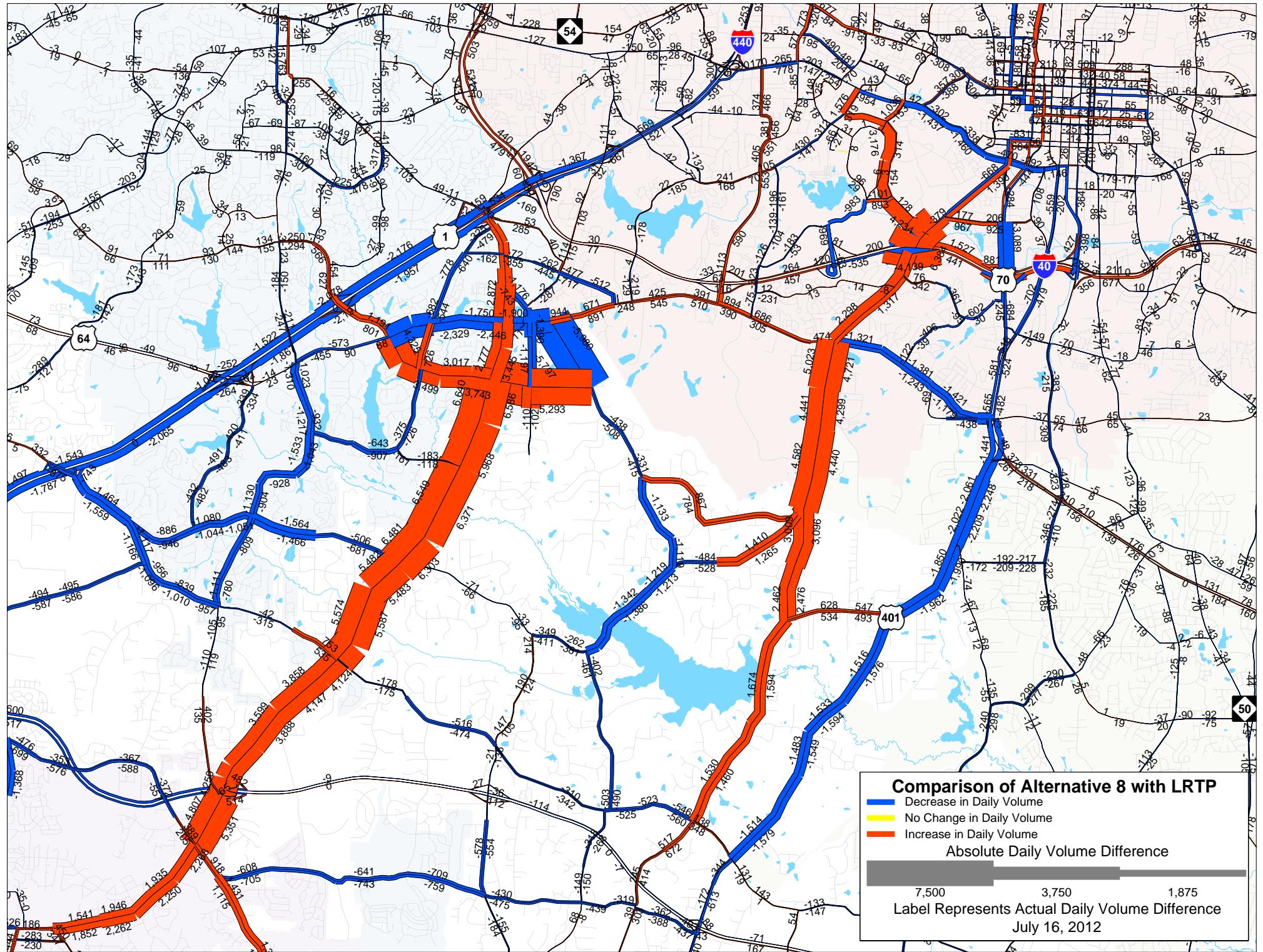






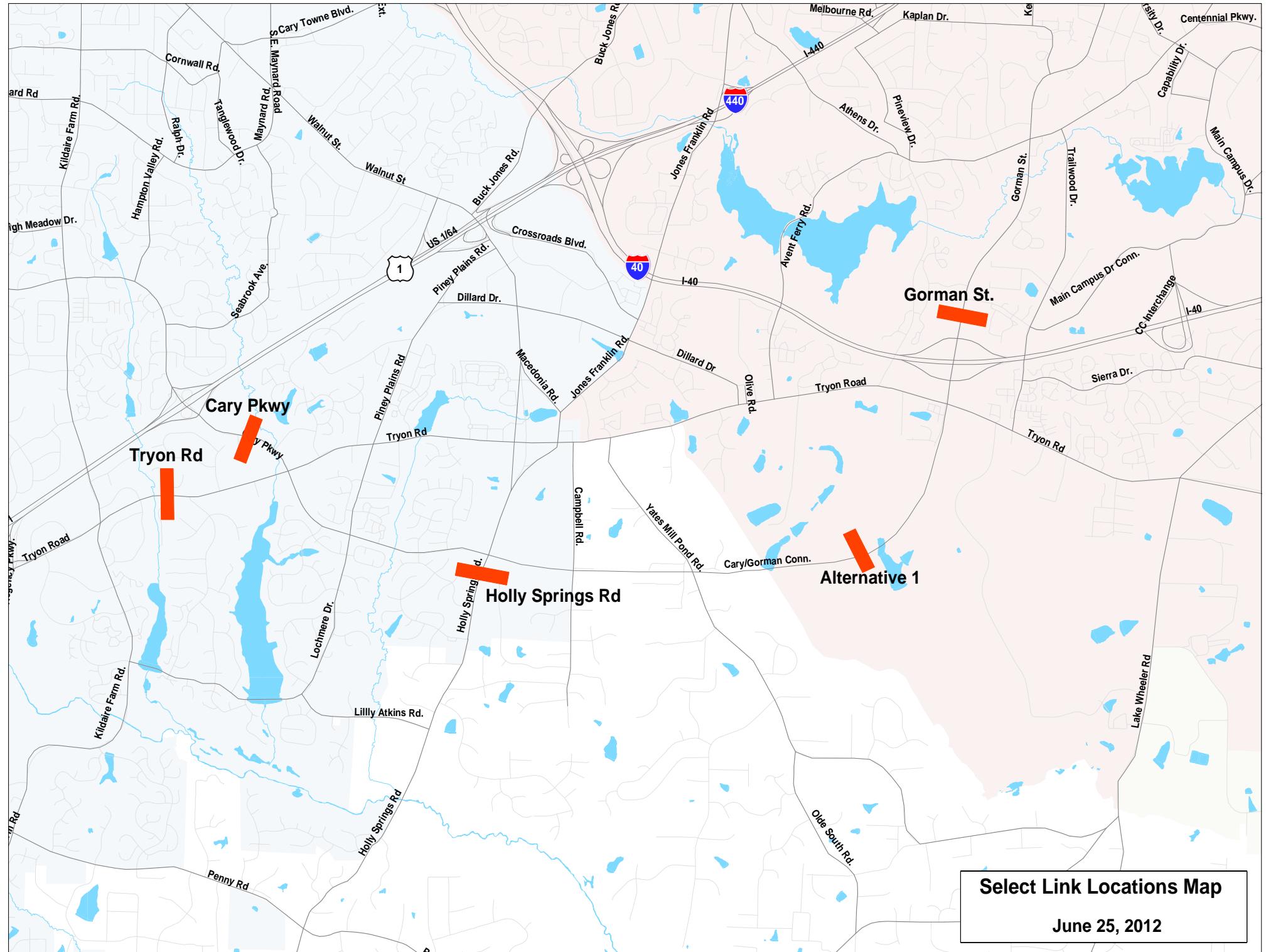






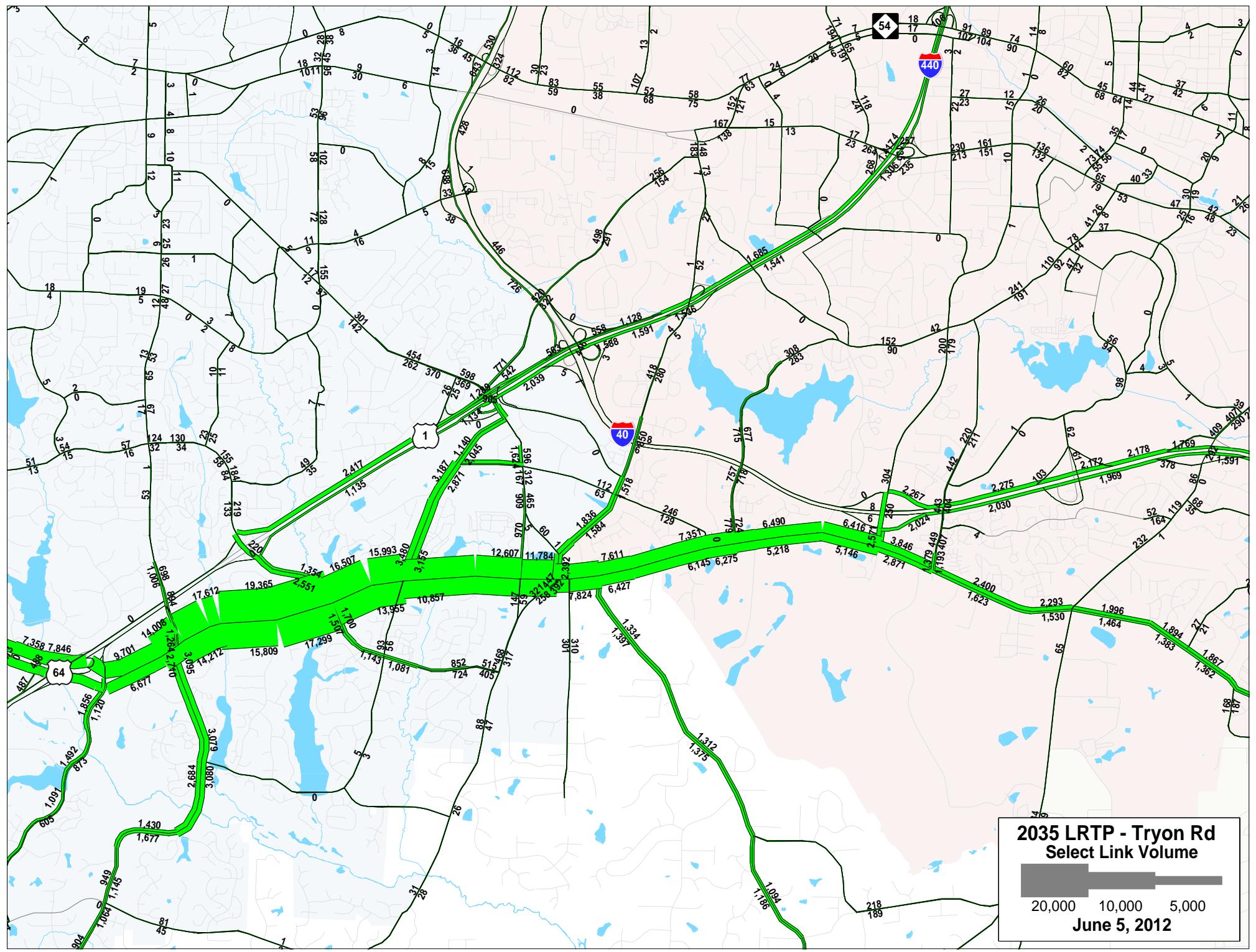
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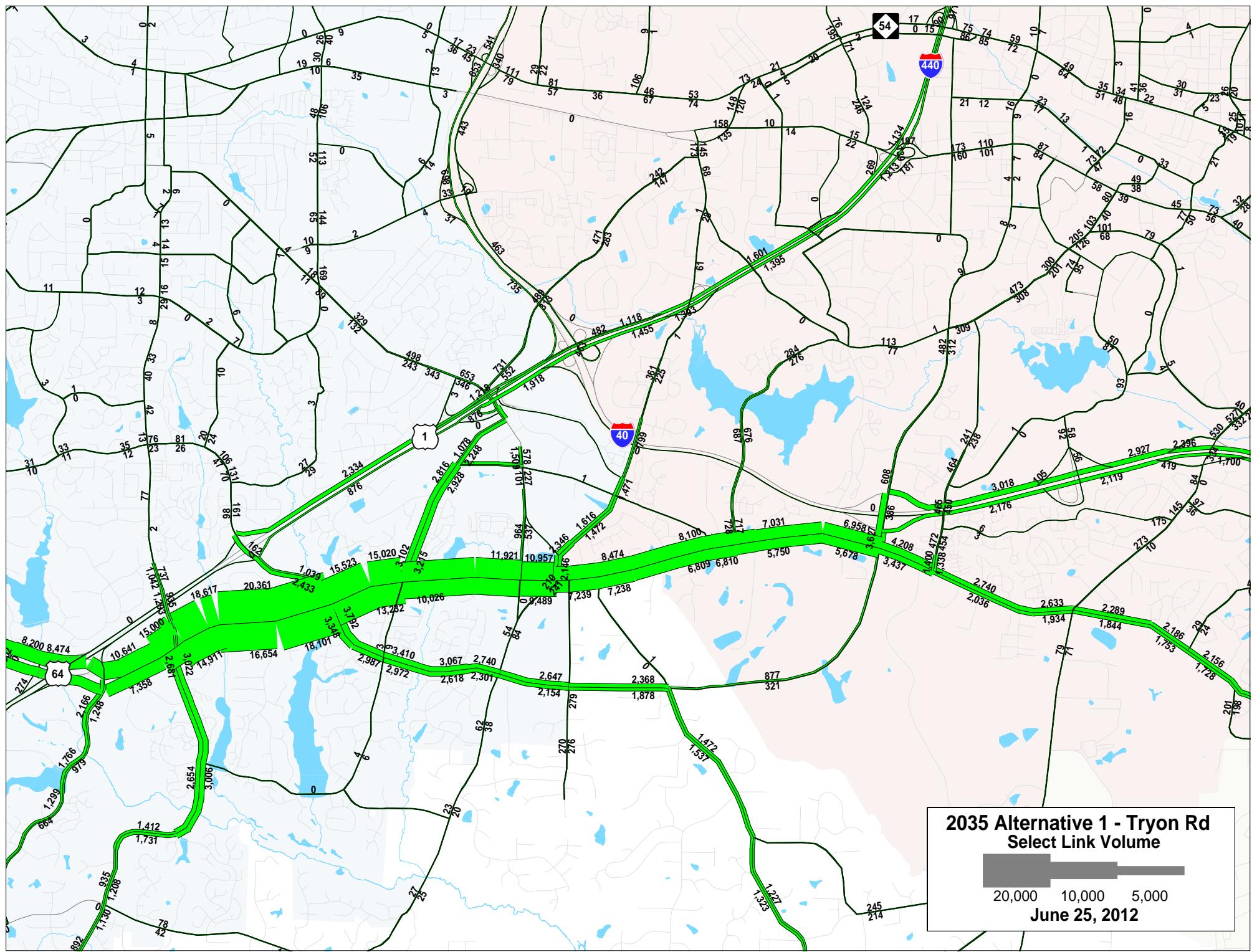
Select Link Analysis

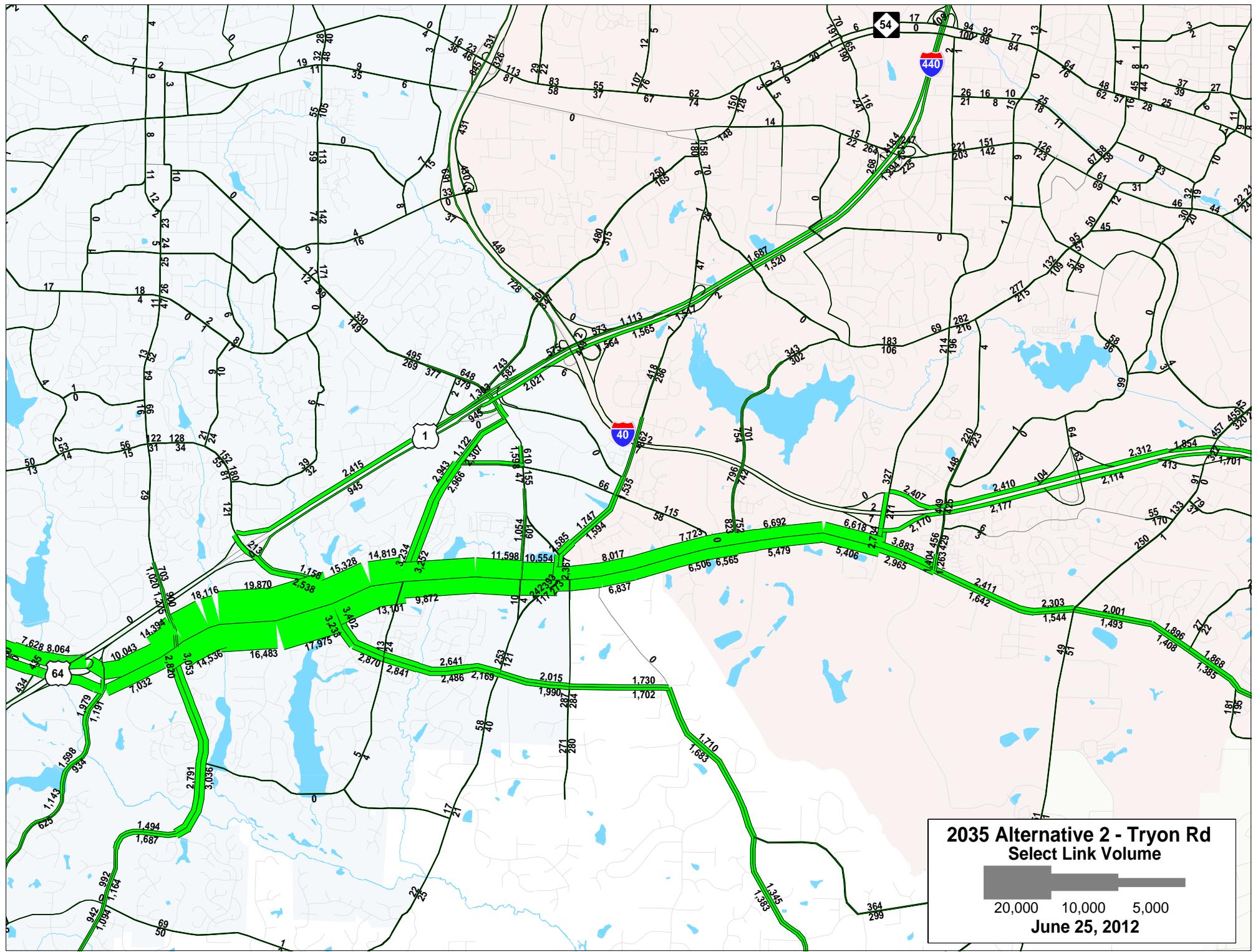


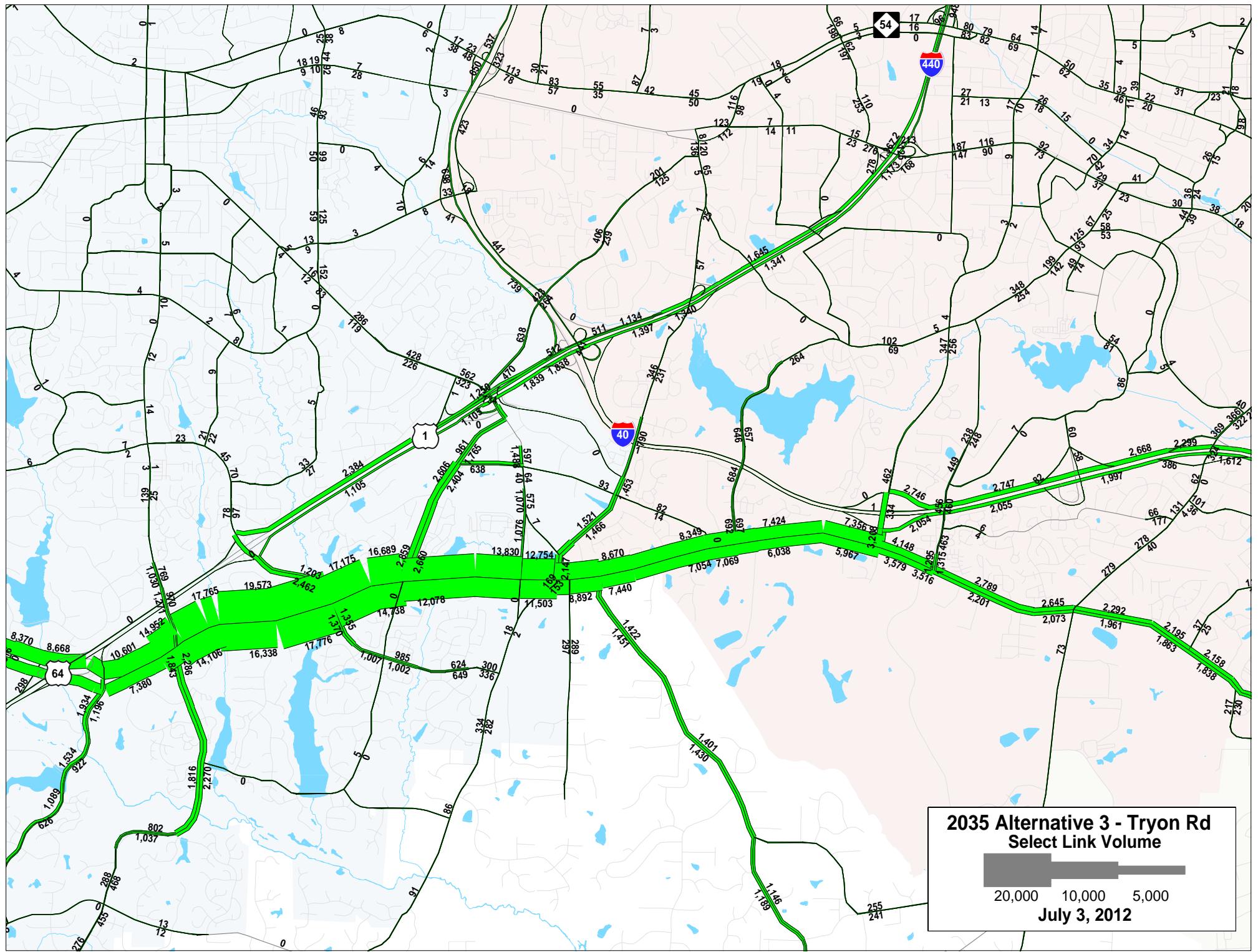
Select Link Locations Map

June 25, 2012



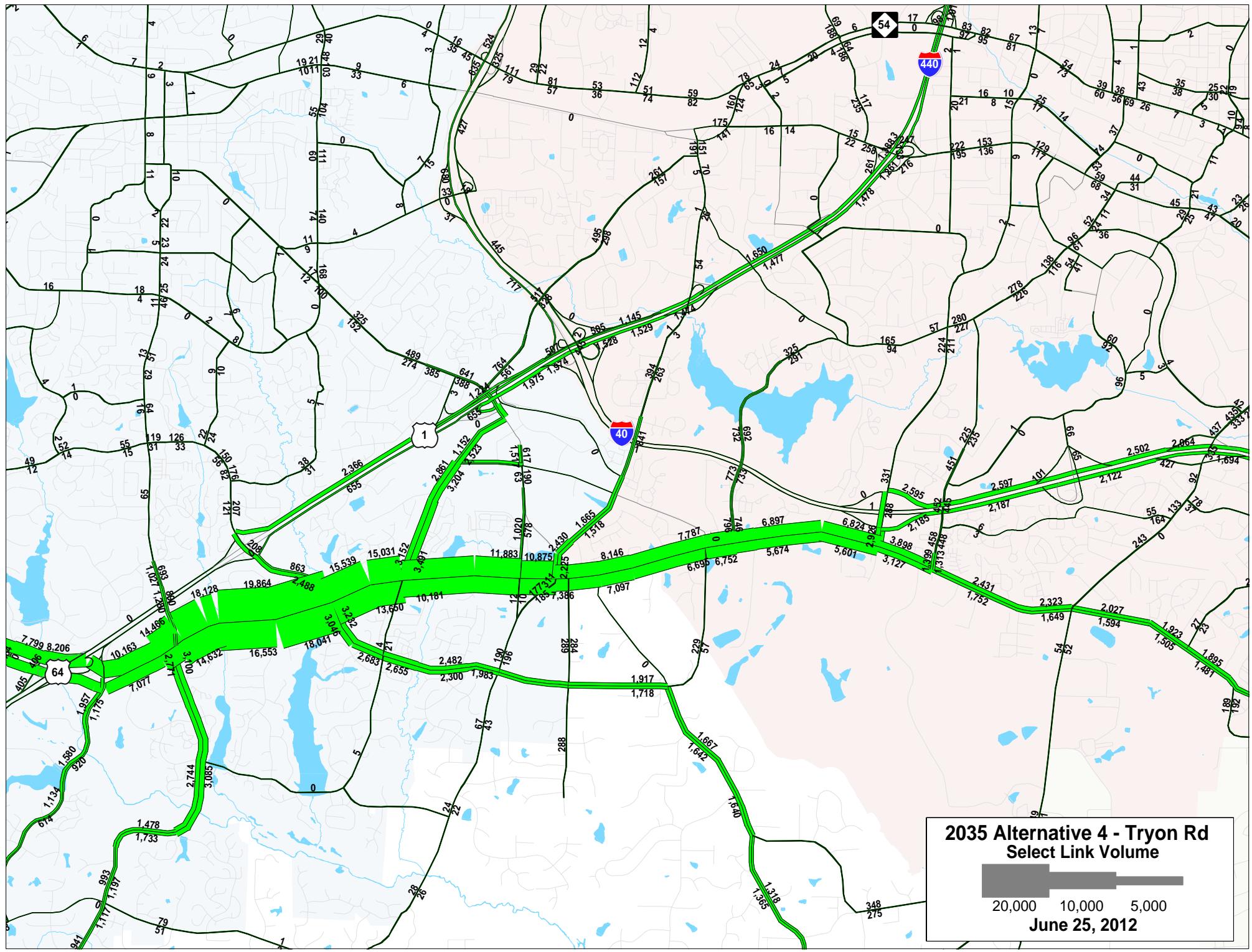


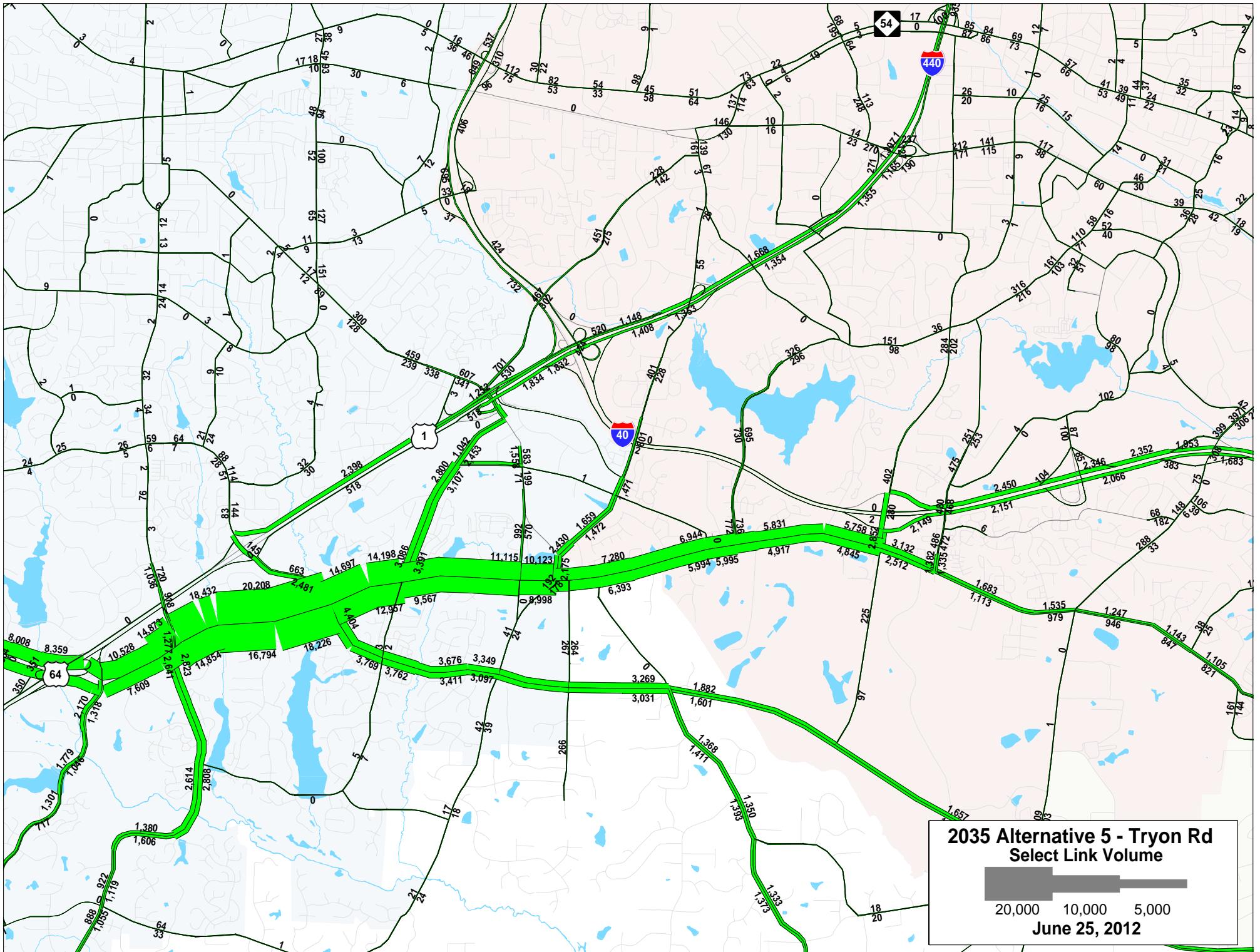


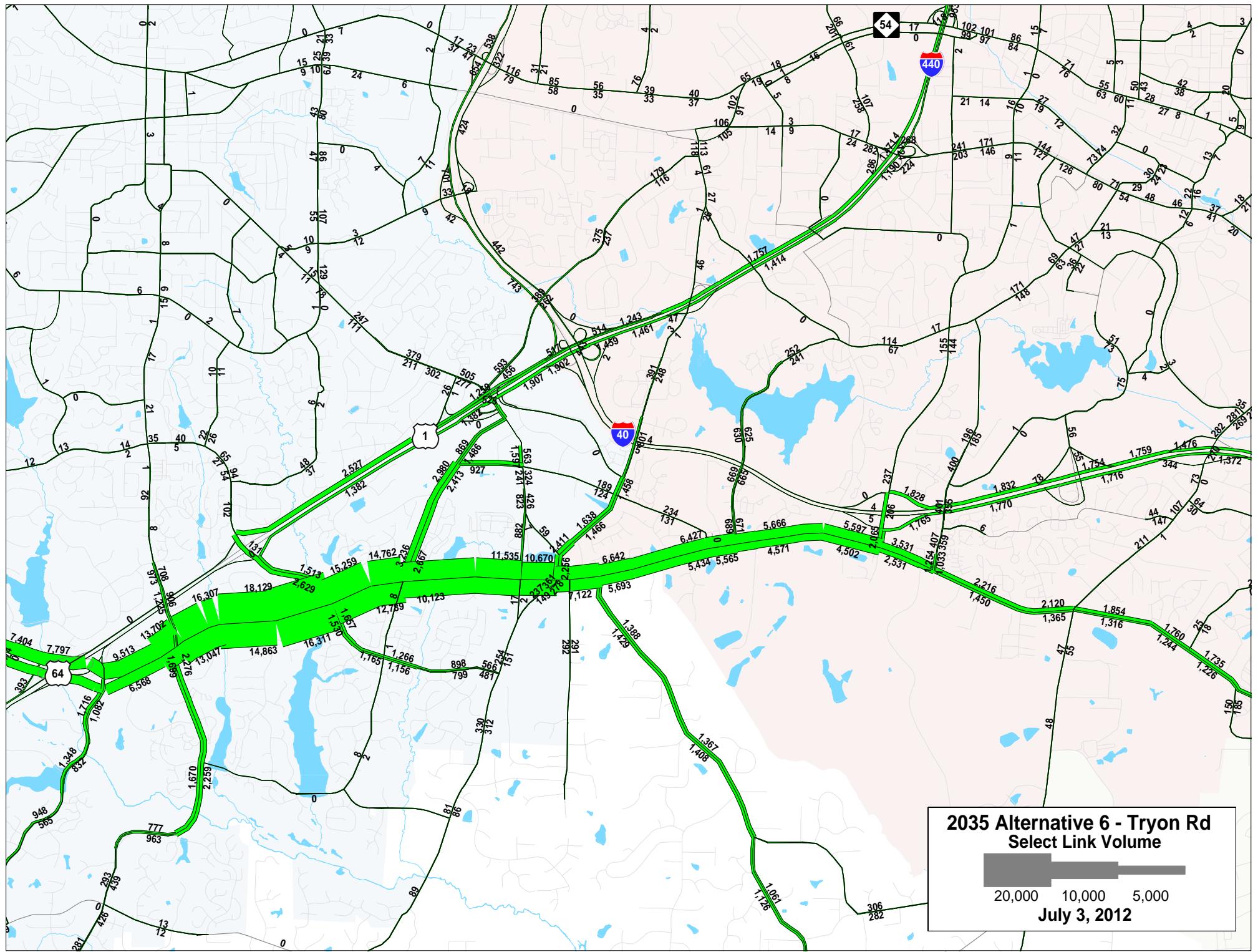


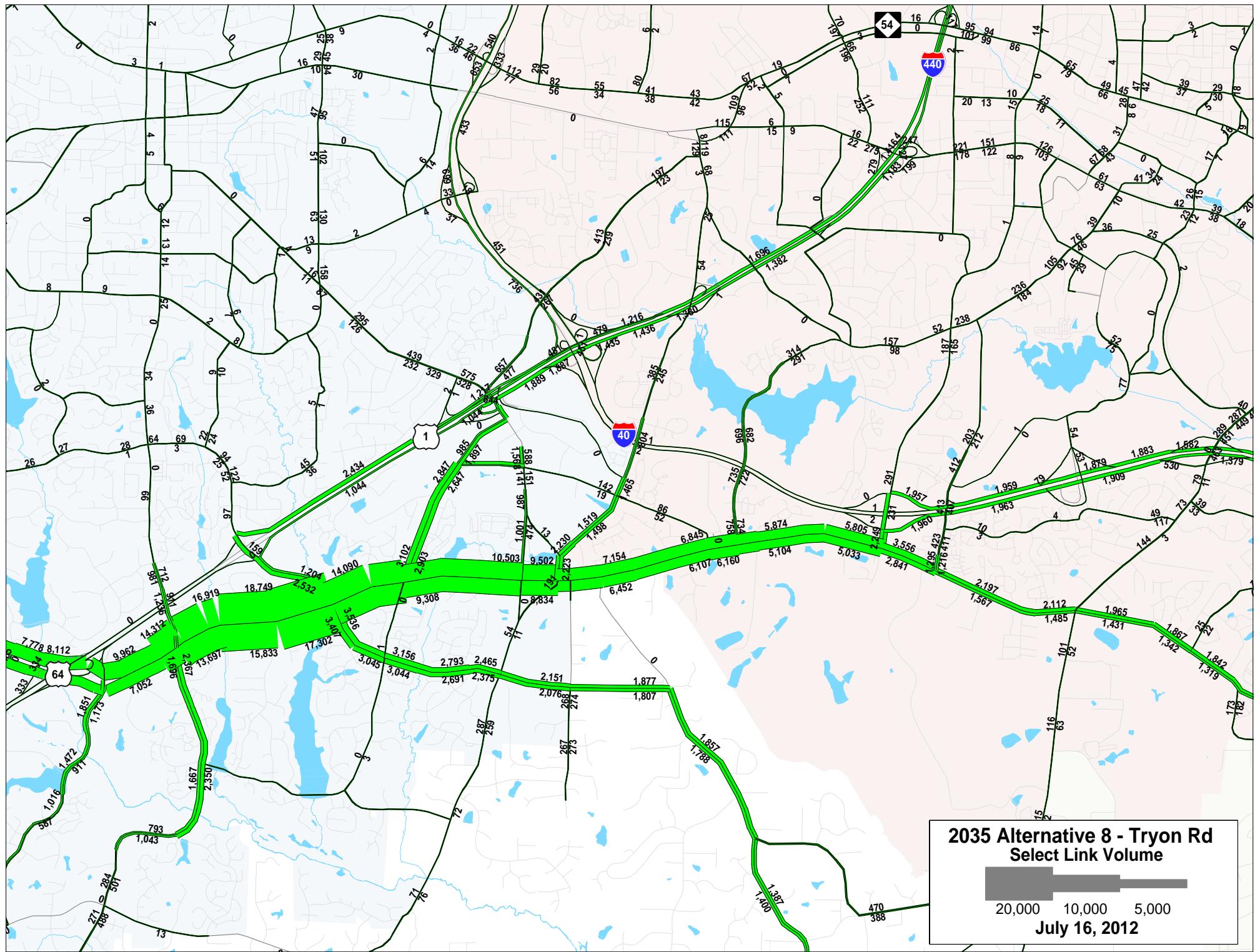
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Select Link Volume

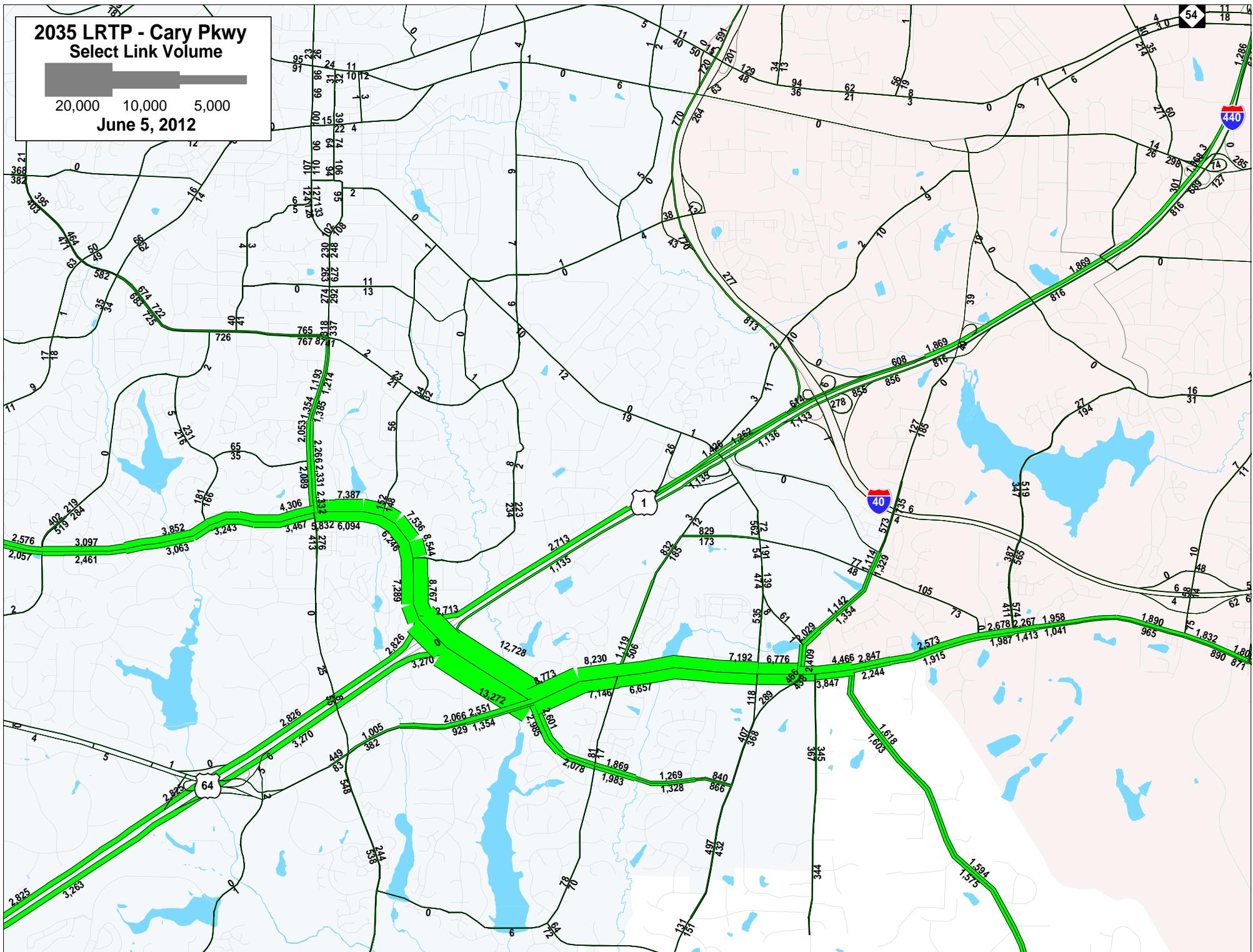
20,000 10,000 5,000
July 3, 2012







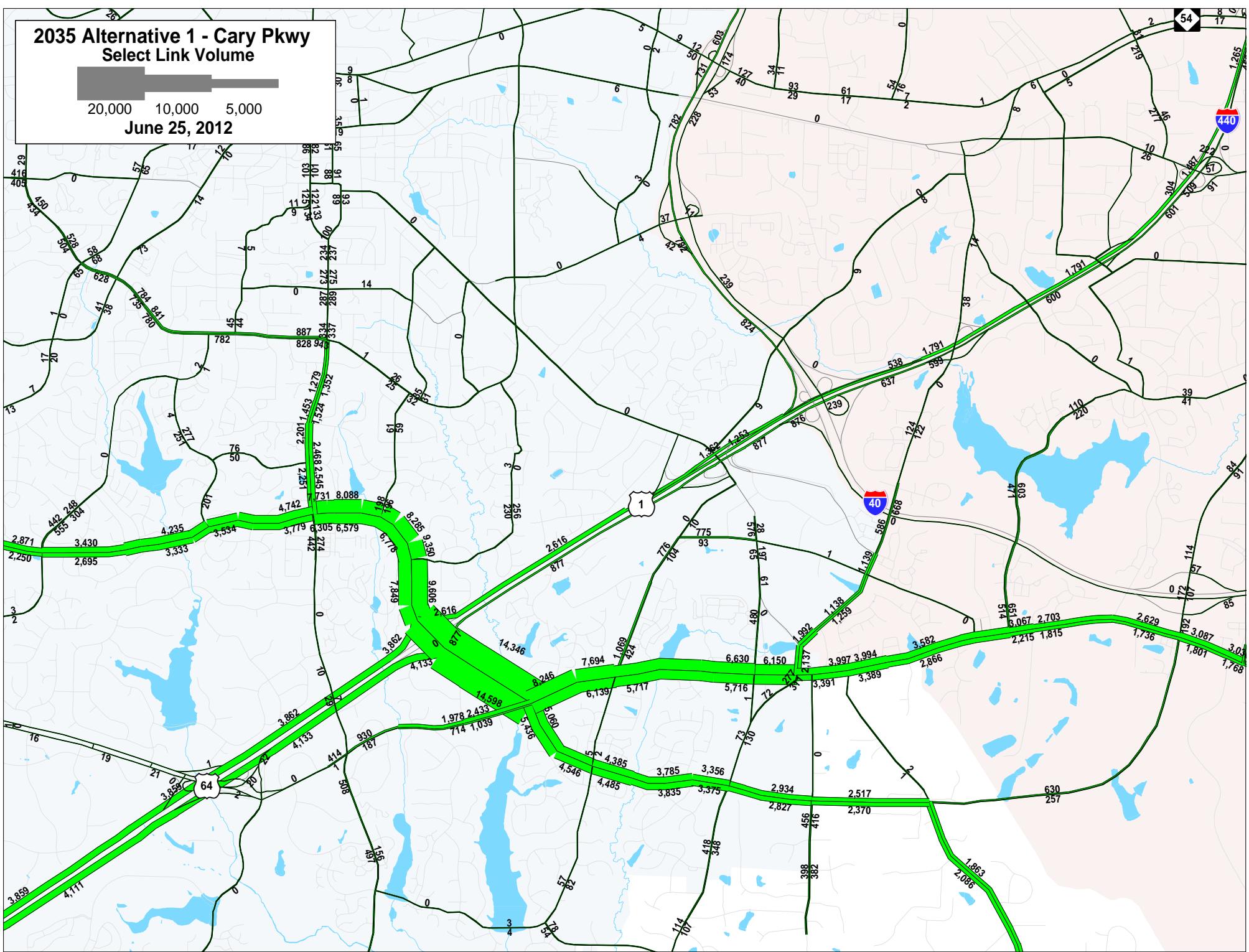




2035 Alternative 1 - Cary Pkwy Select Link Volume

20,000 10,000 5,000

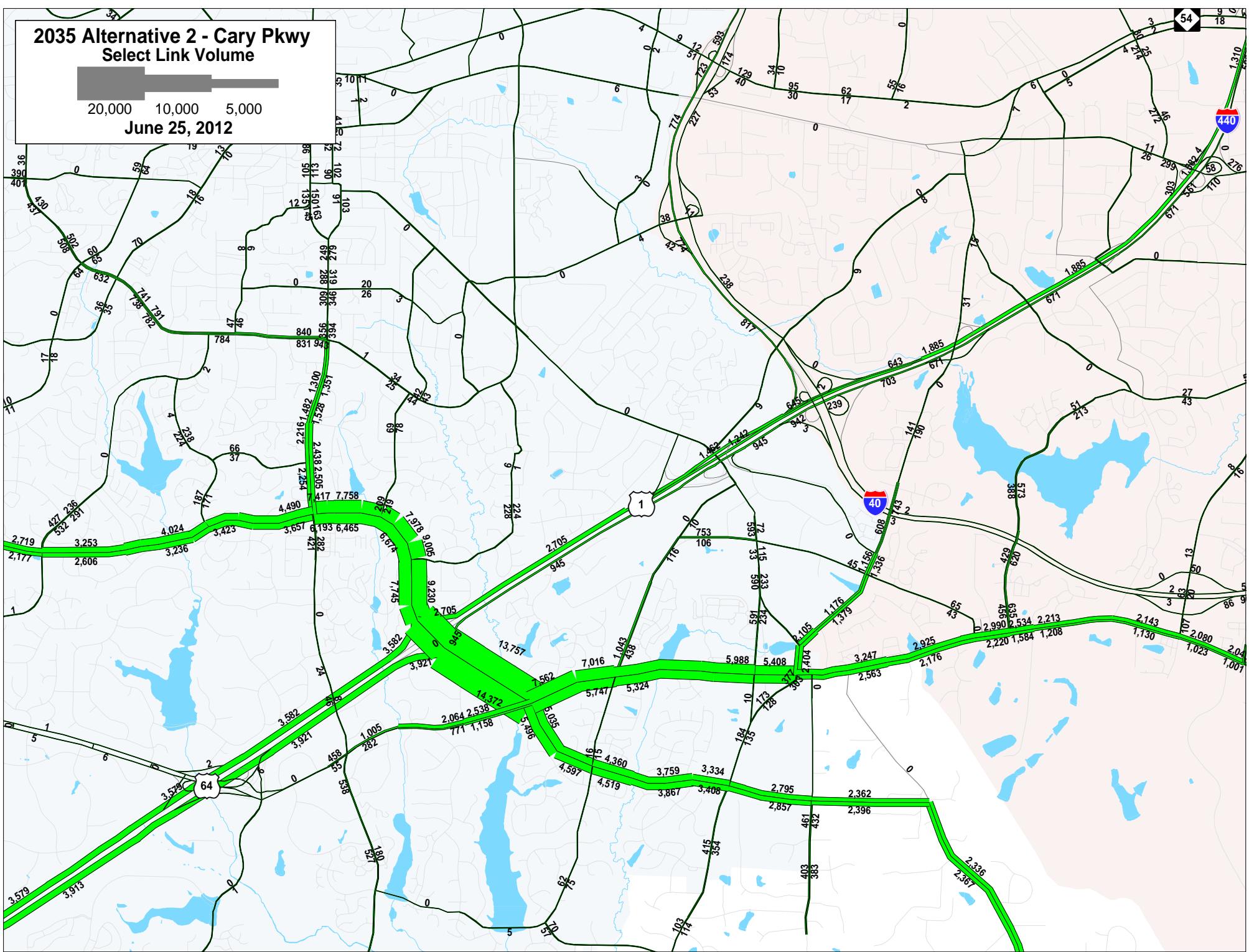
June 25, 2012



2035 Alternative 2 - Cary Pkwy Select Link Volume

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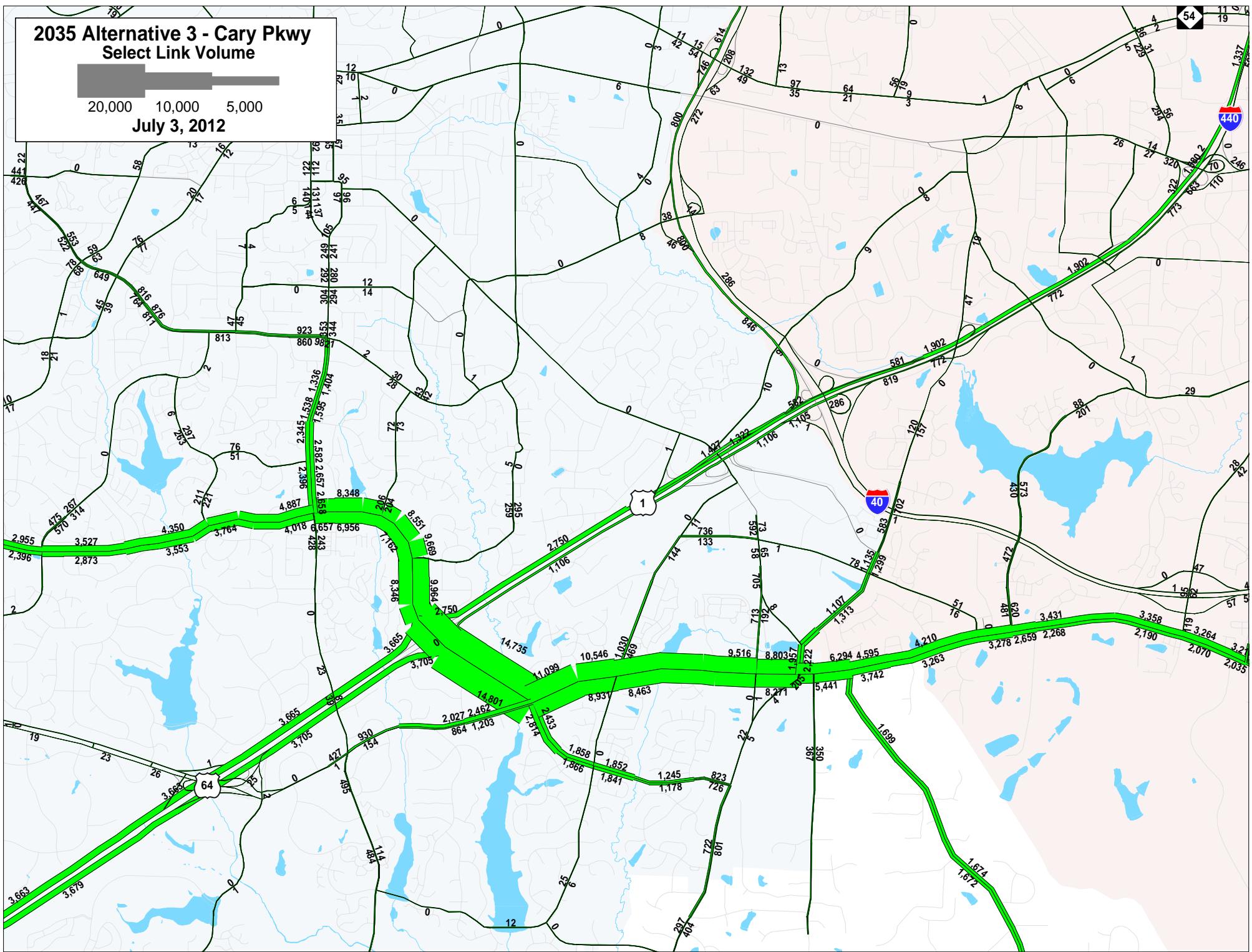
June 25, 2012



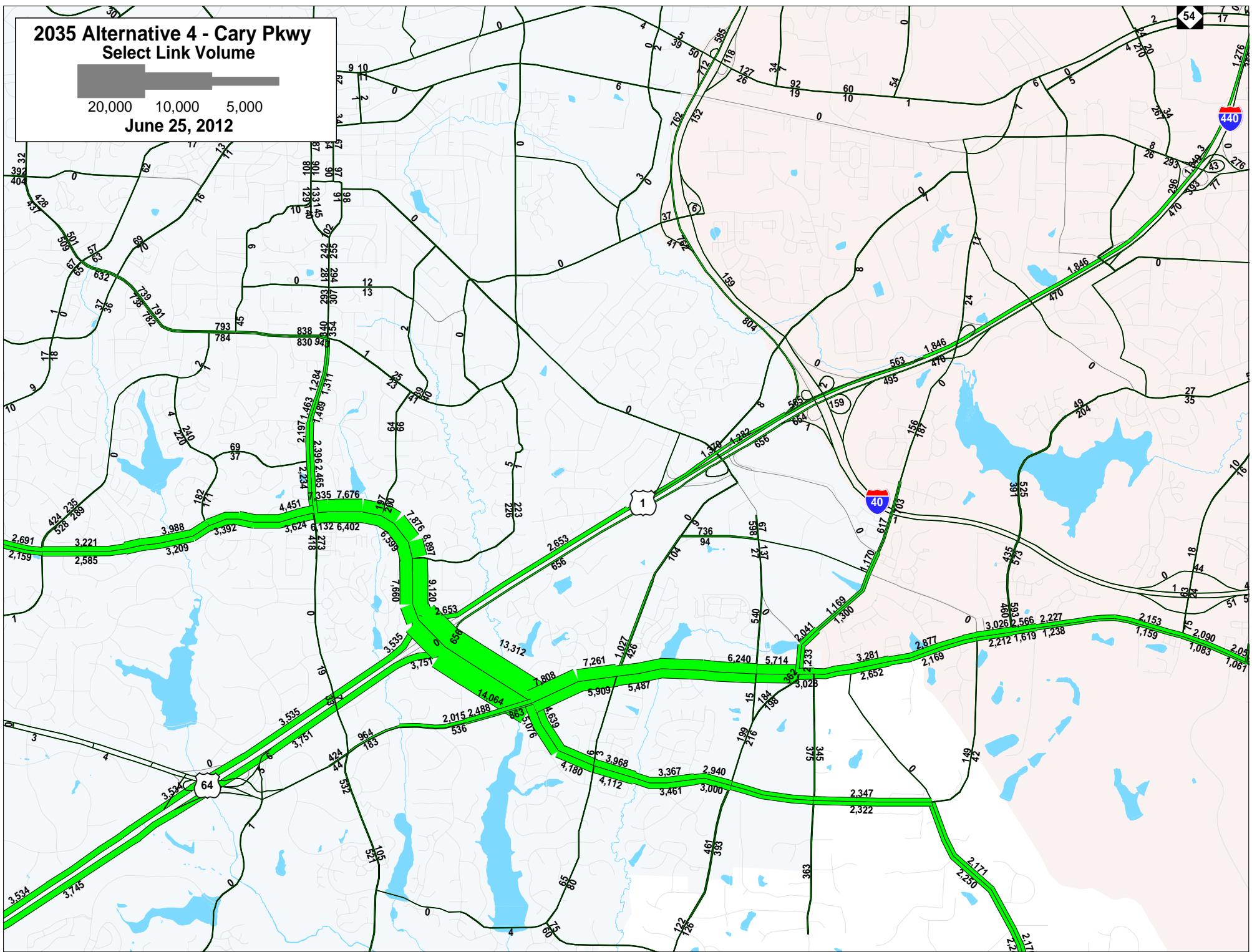
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July 3, 2012



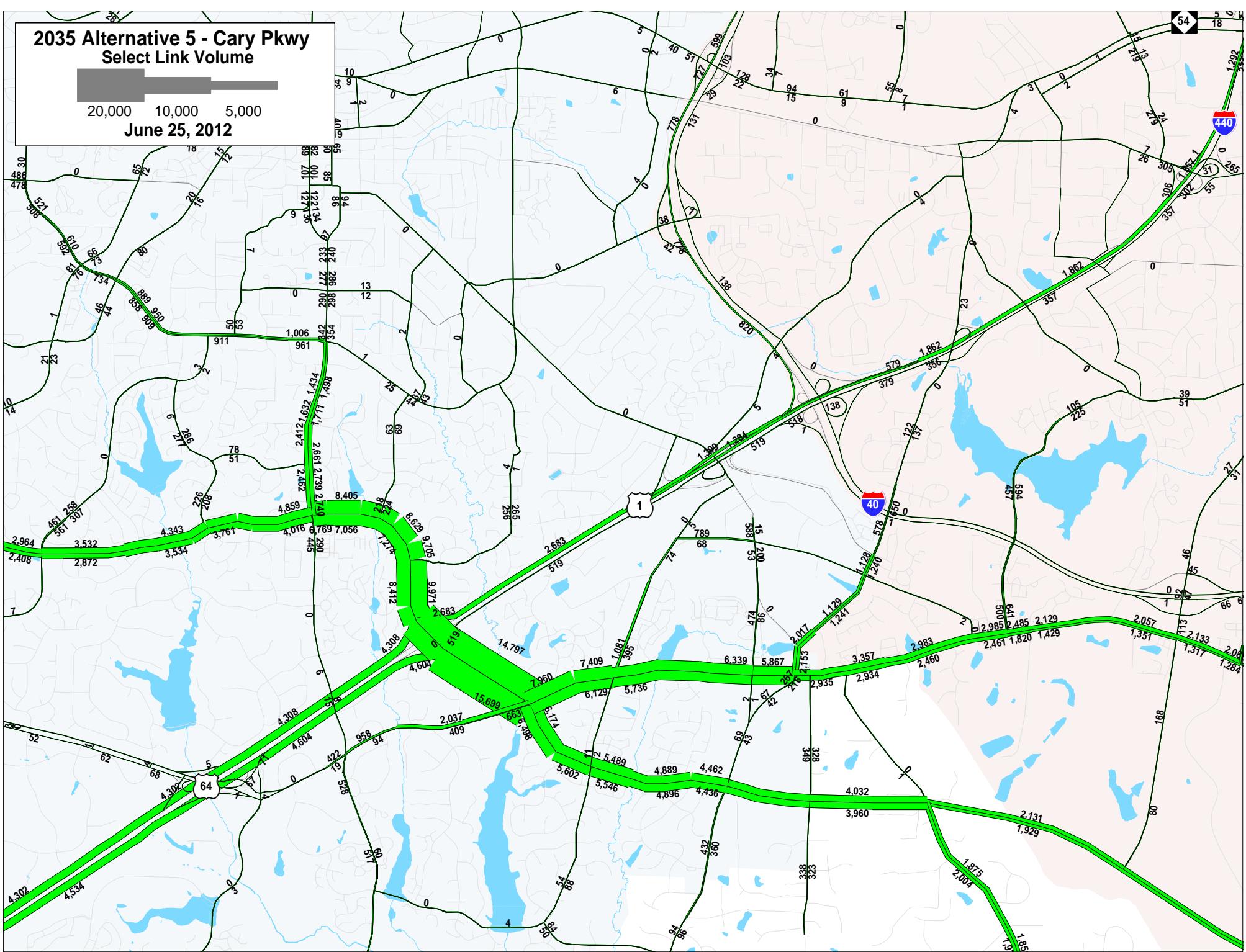
2035 Alternative 4 - Cary Pkwy
Select Link Volume



2035 Alternative 5 - Cary Pkwy Select Link Volume

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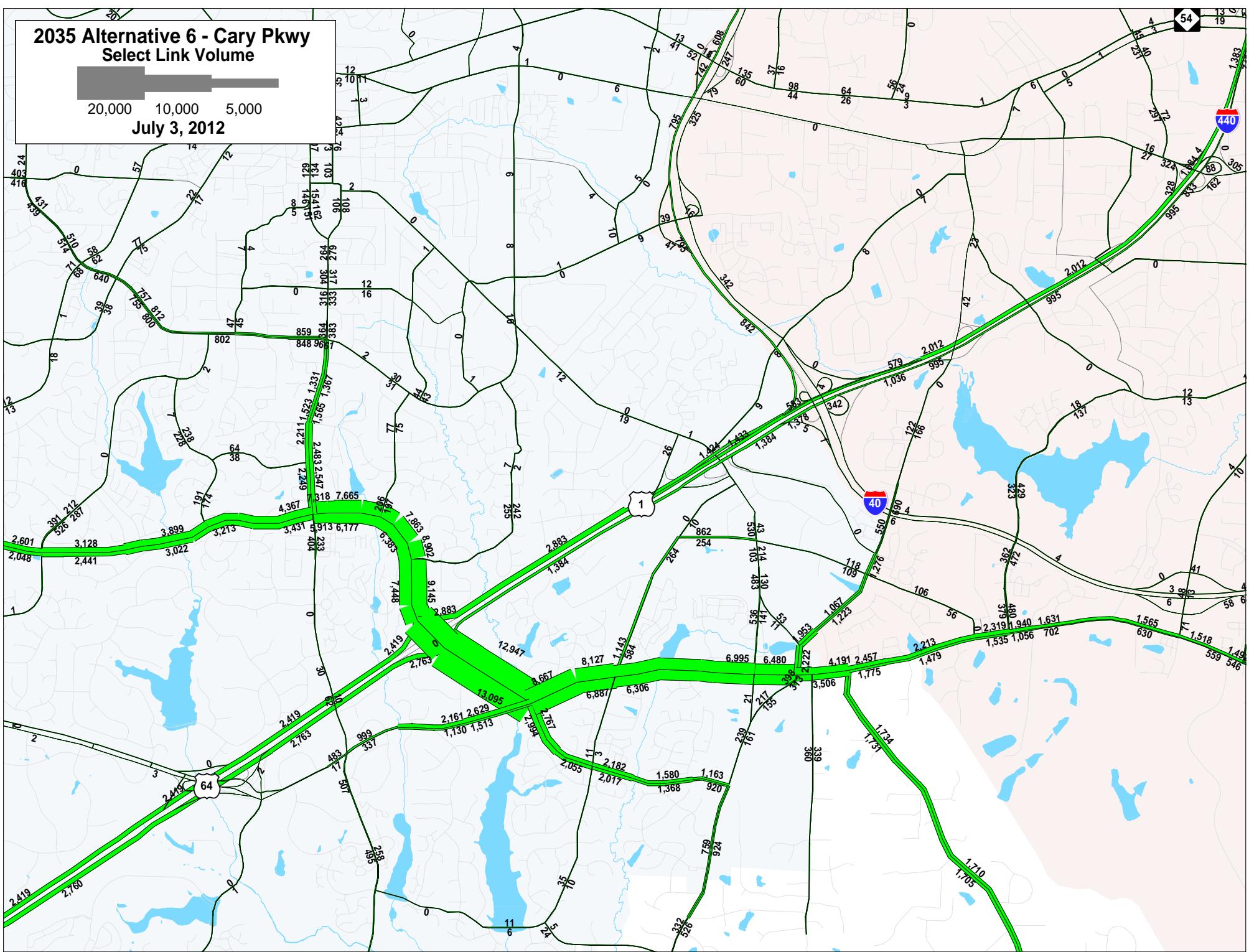
June 25, 2012



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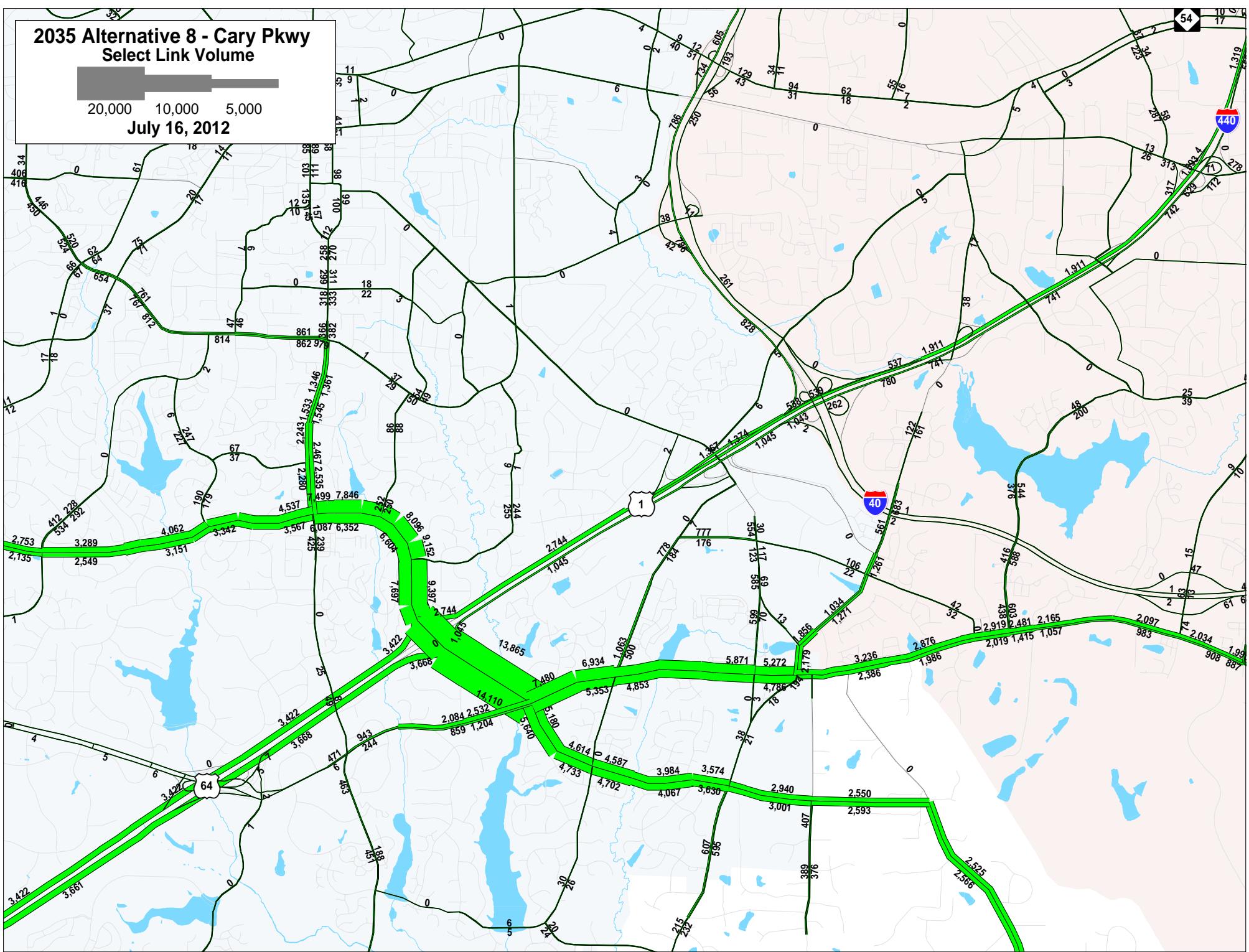
July 3, 2012

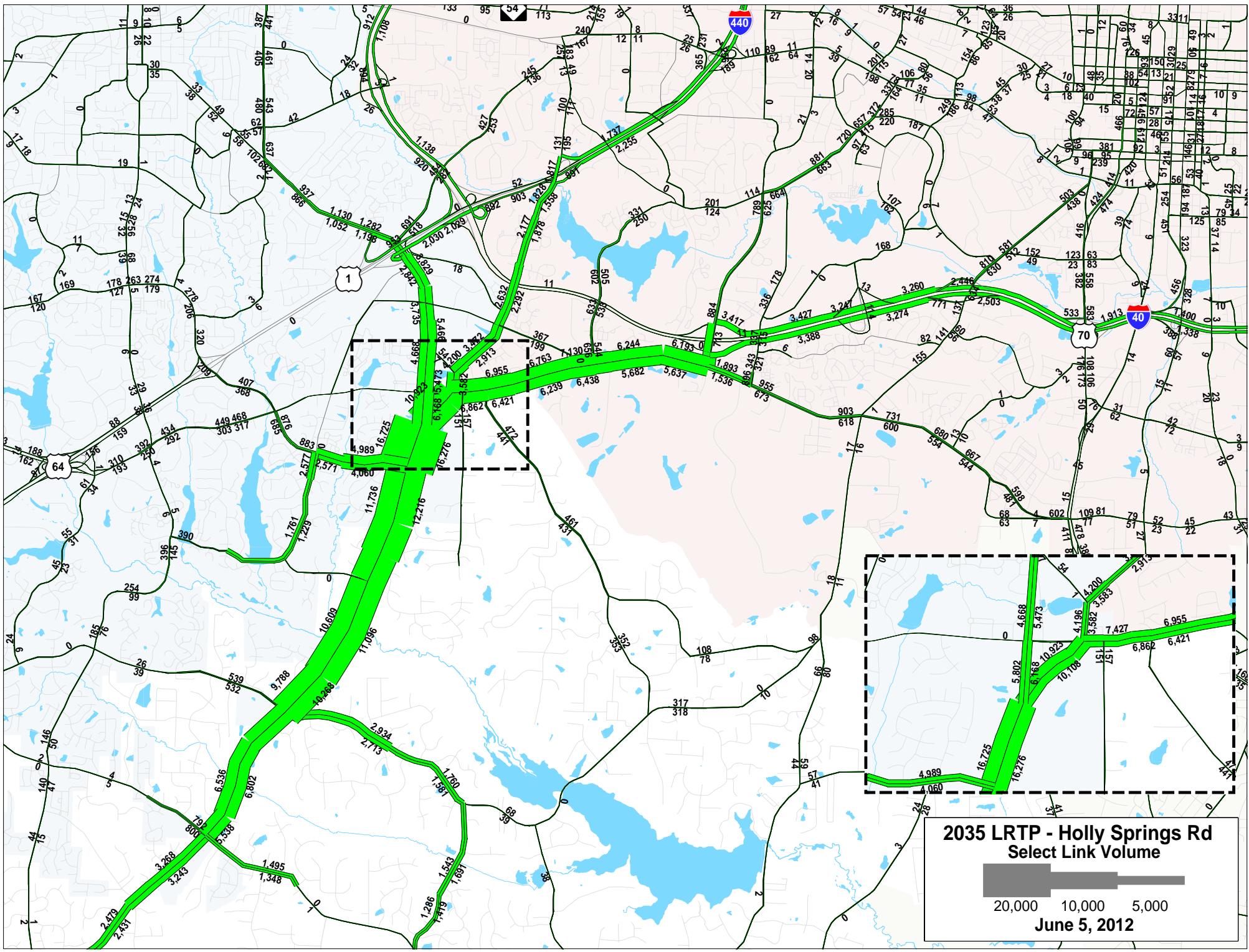


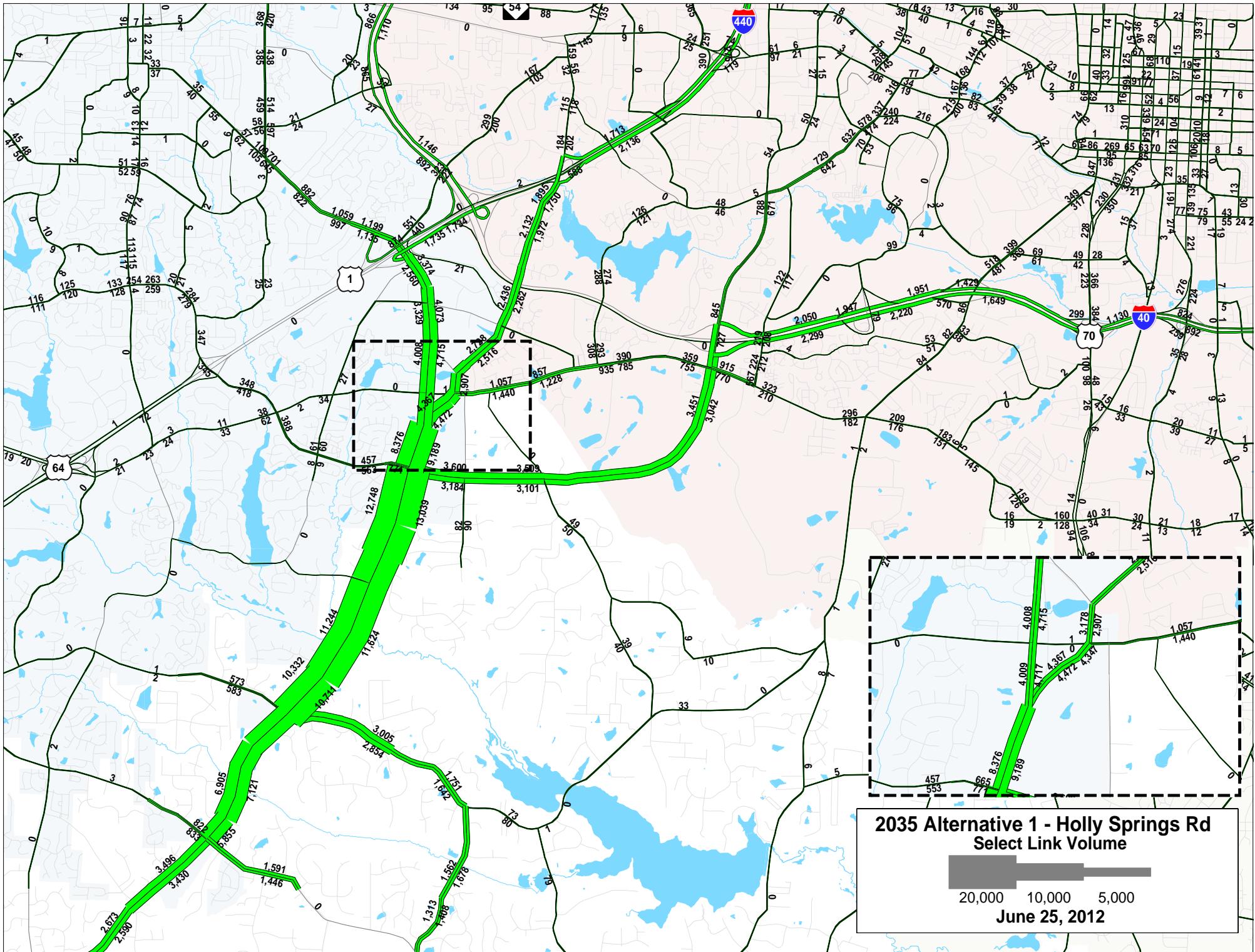
2035 Alternative 8 - Cary Pkwy Select Link Volume

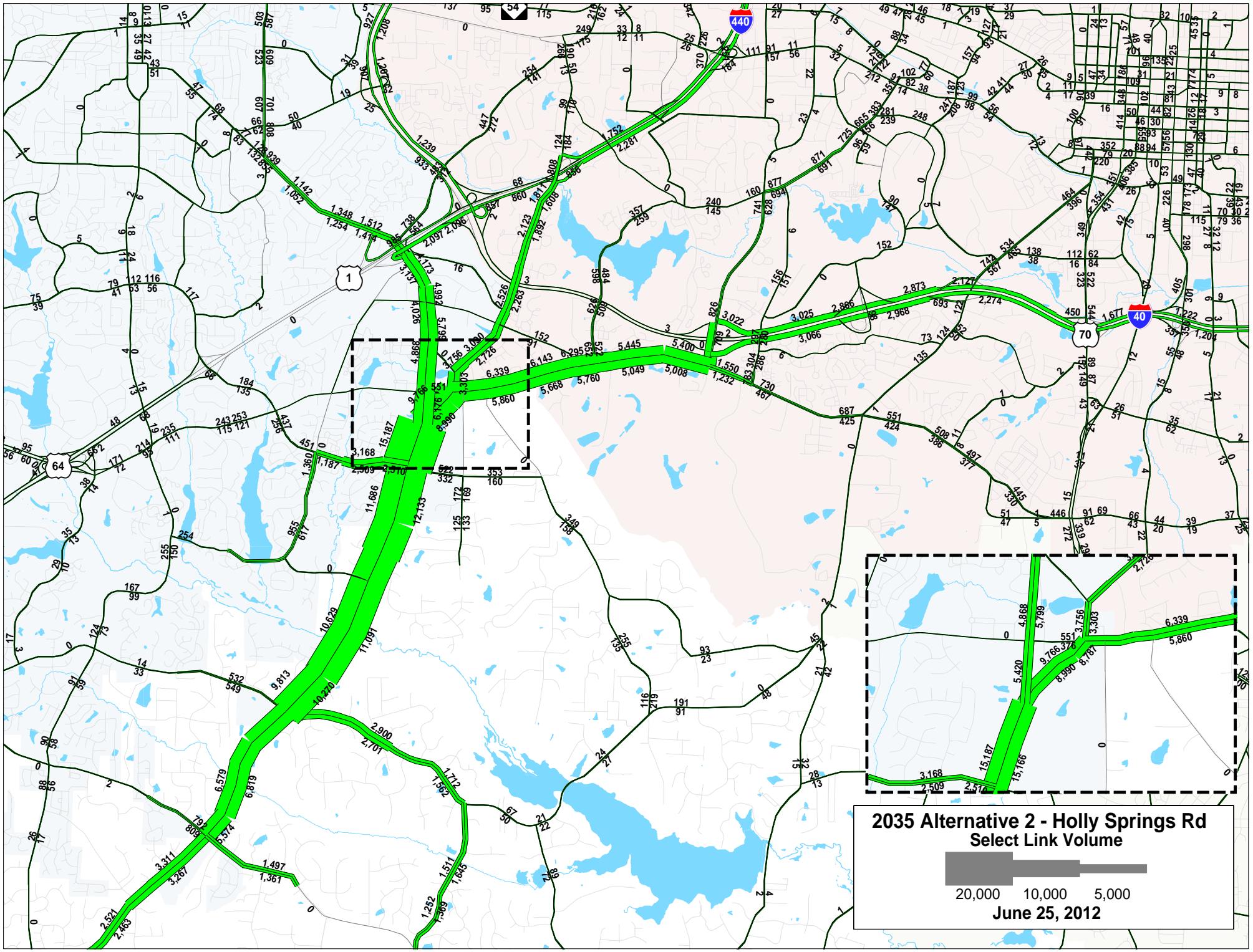
20,000 10,000 5,000

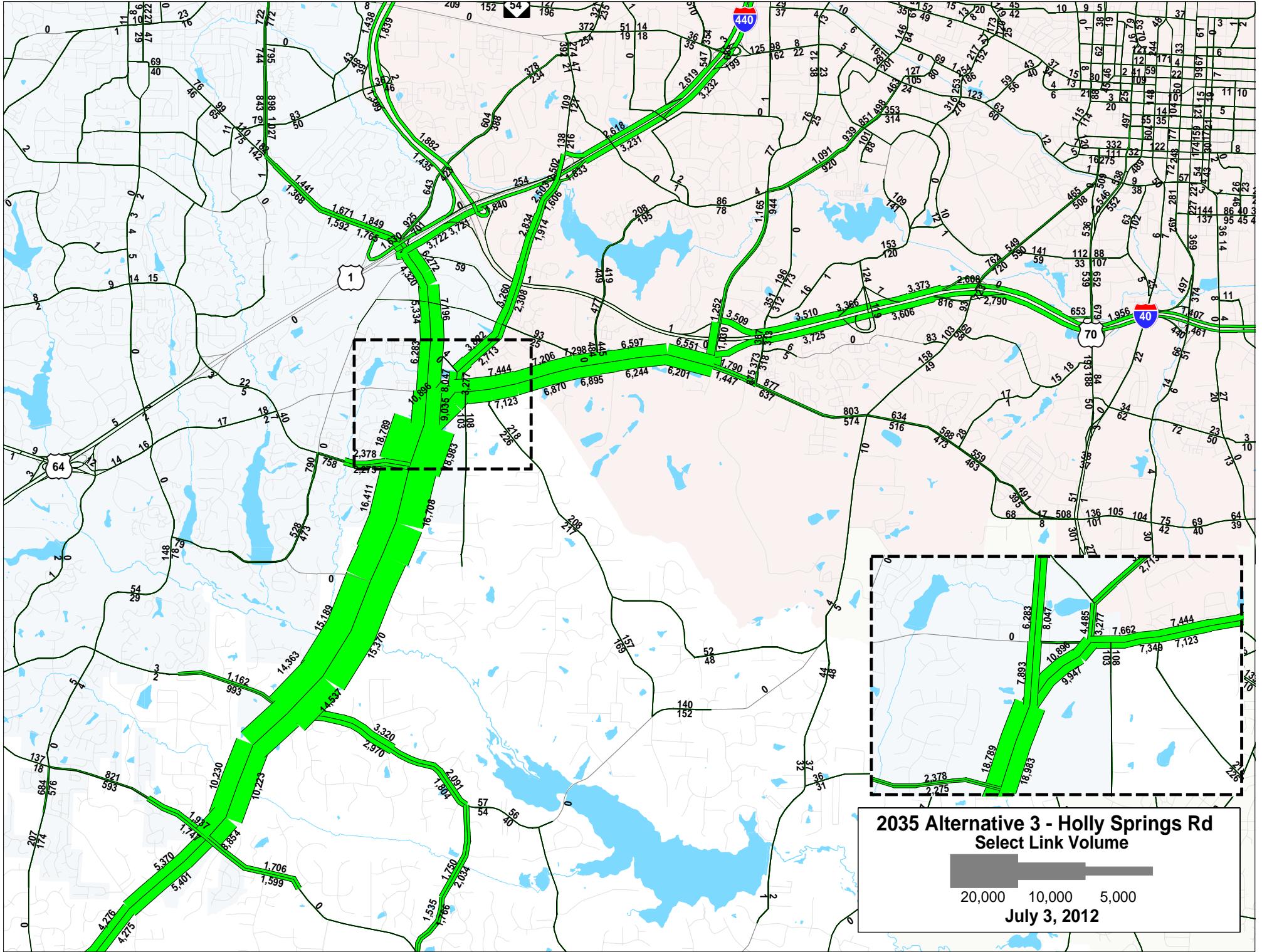
July 16, 2012

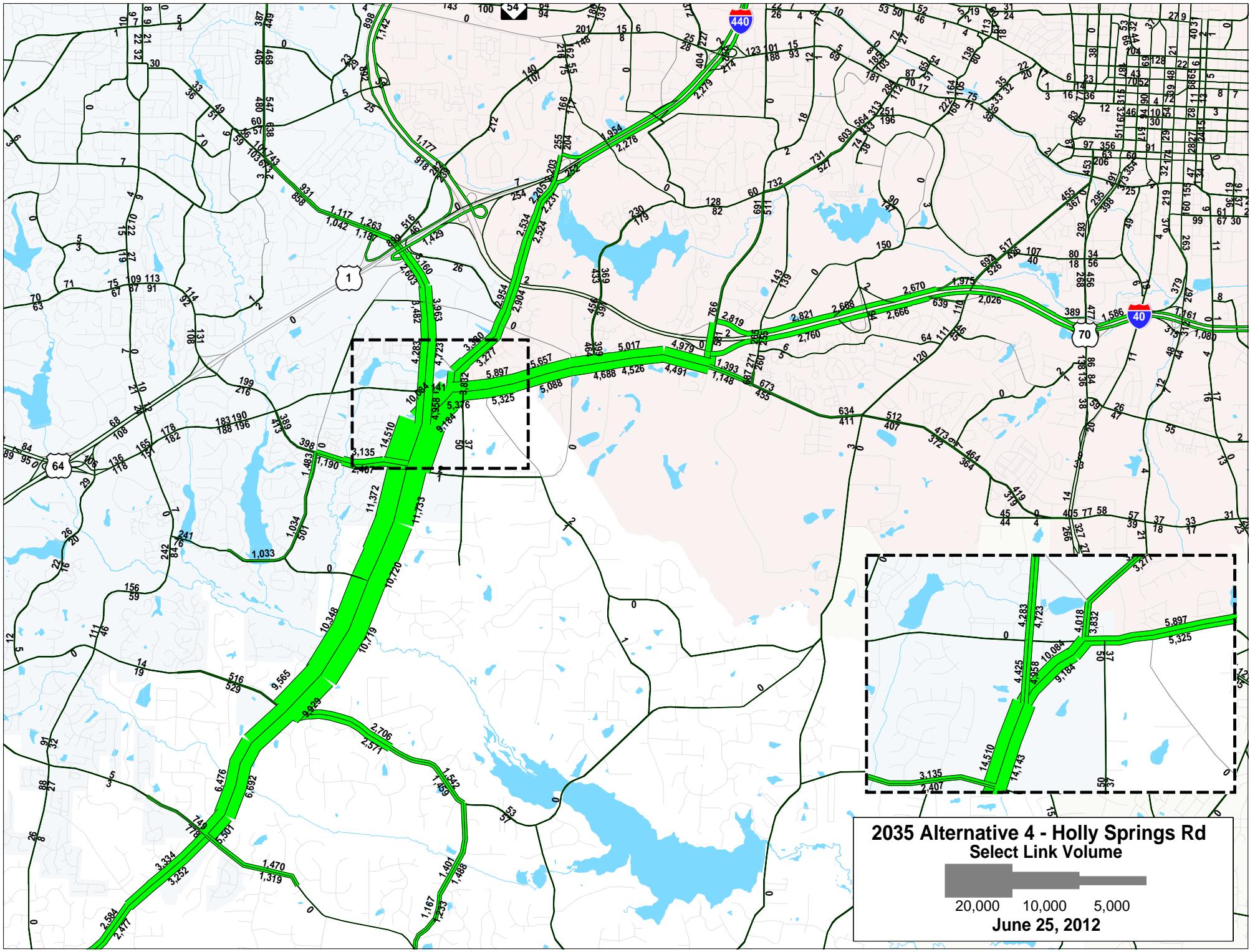


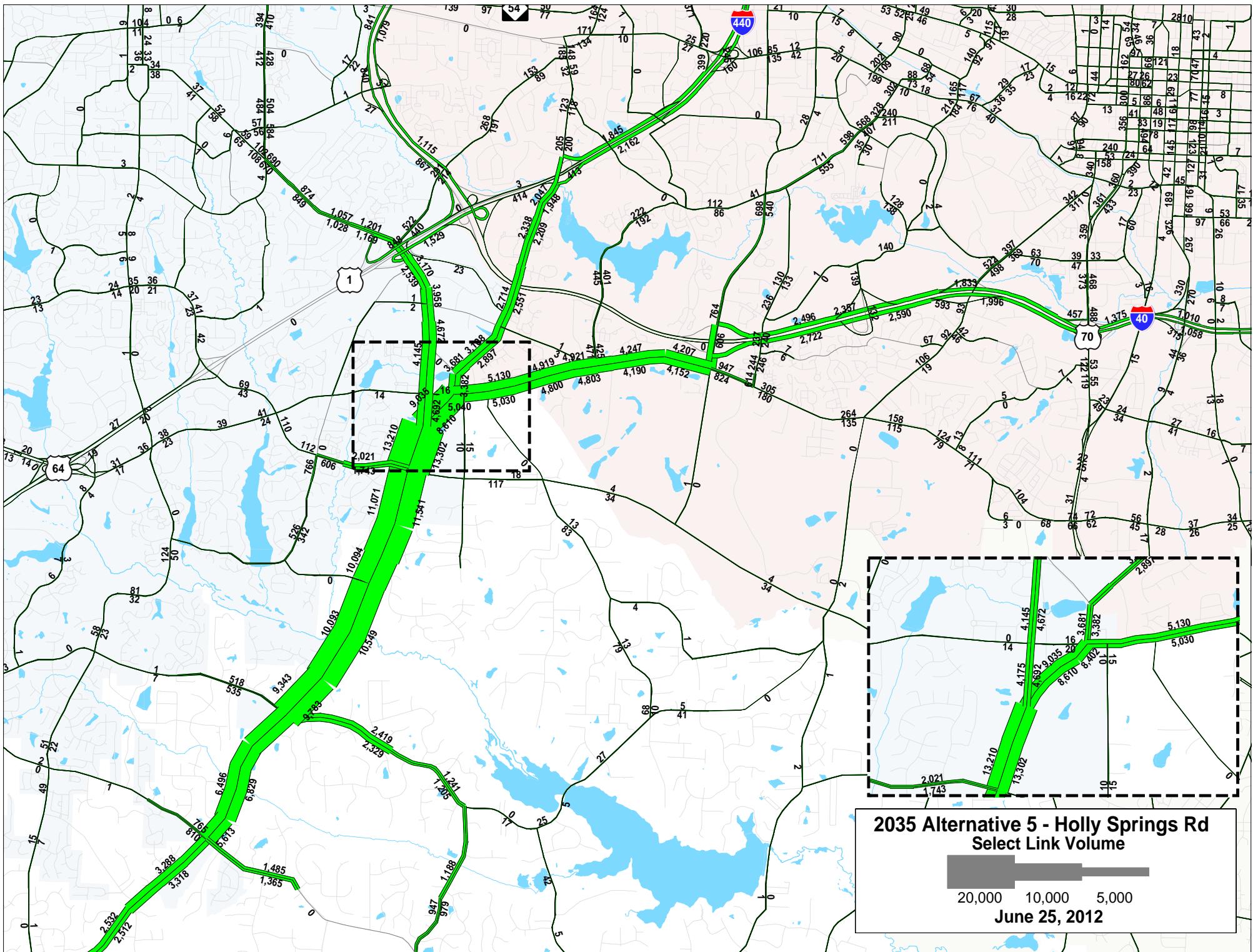


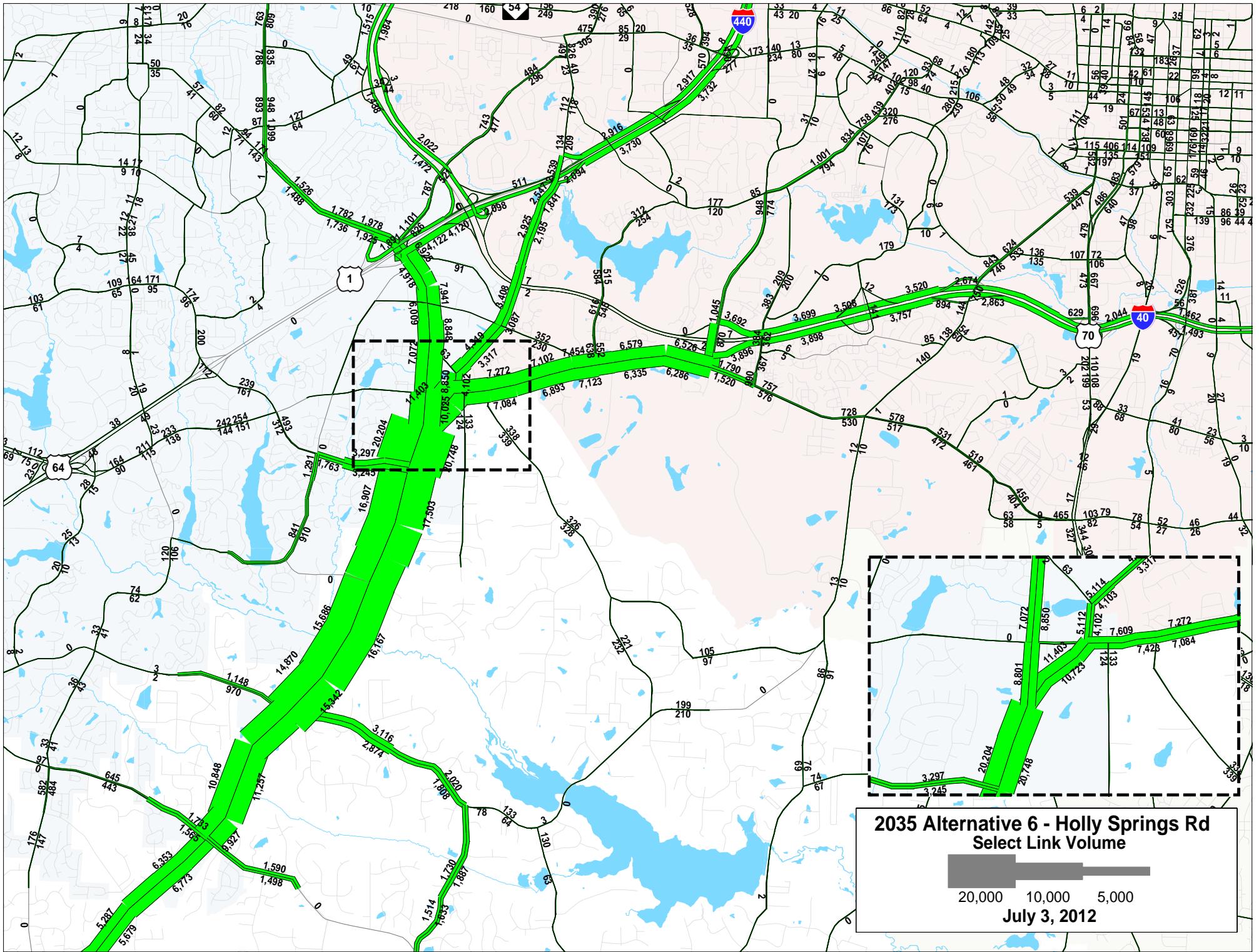


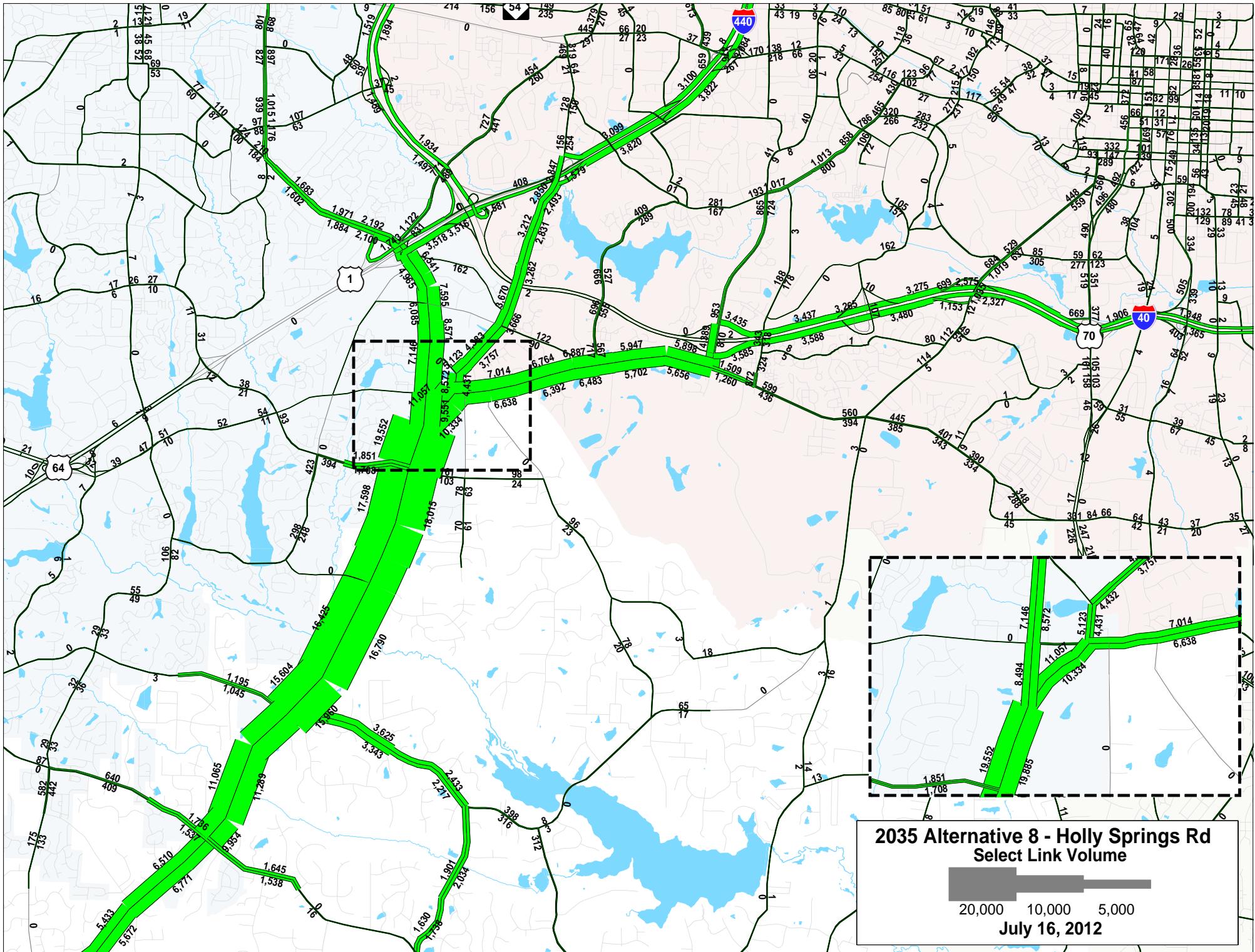


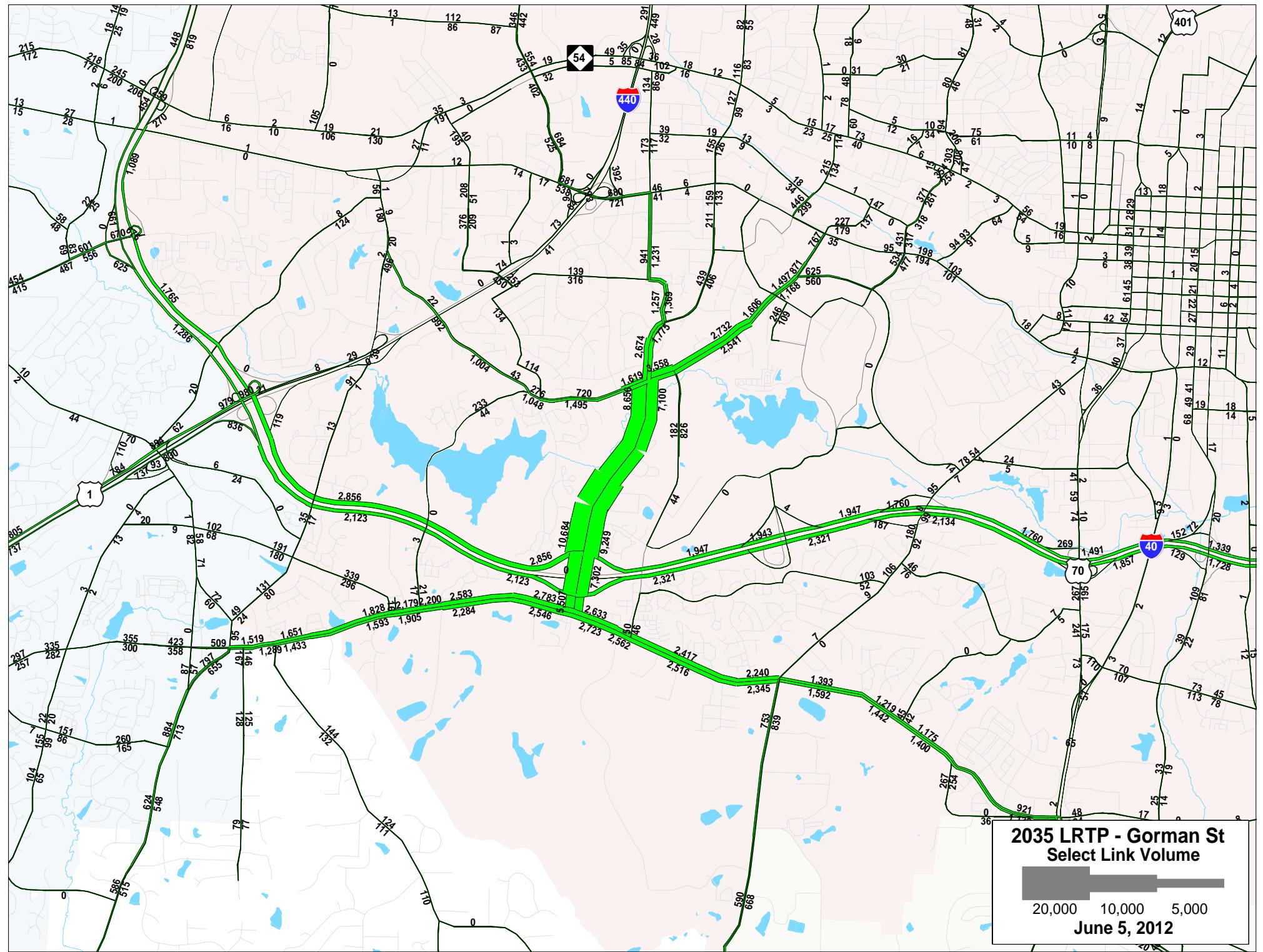


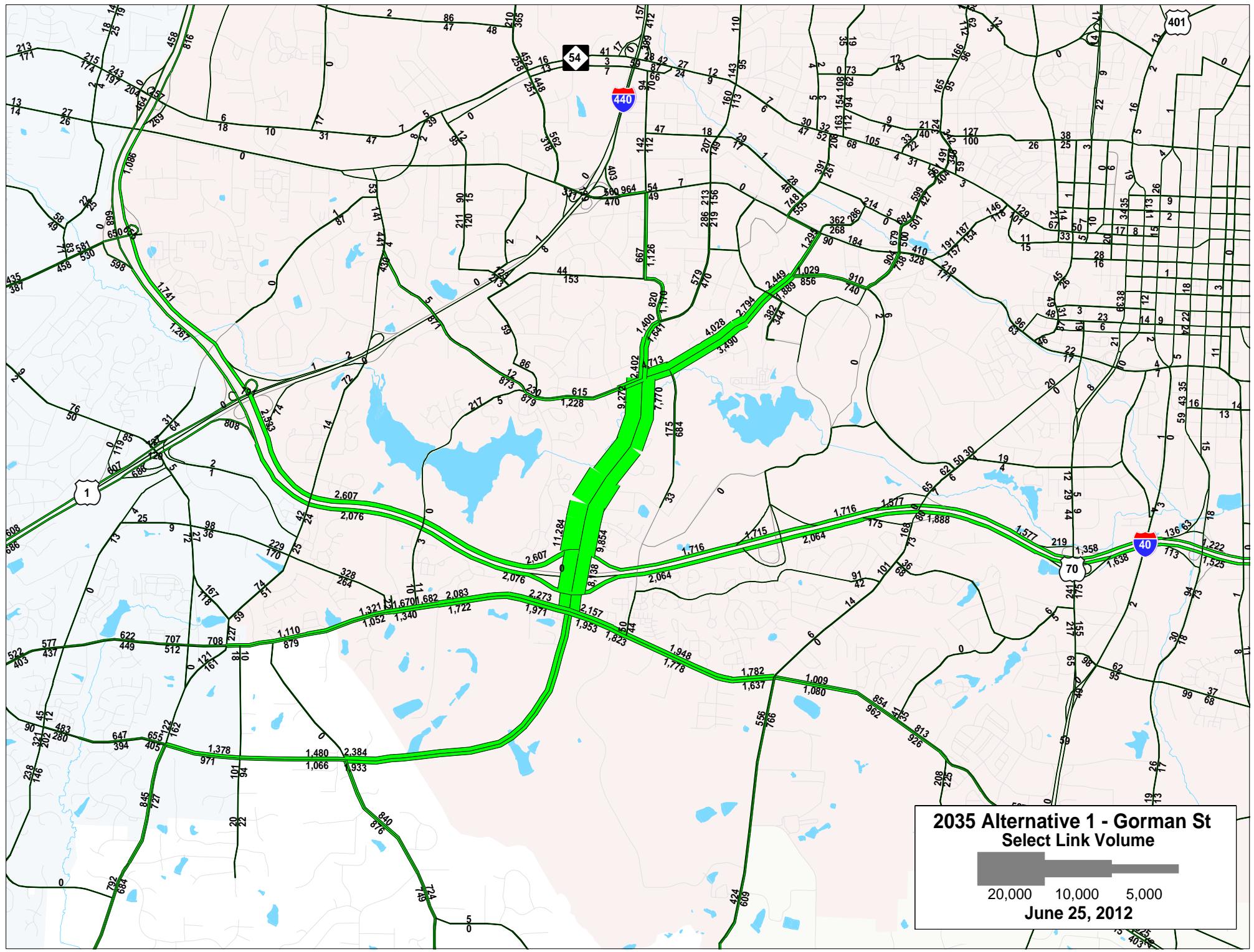


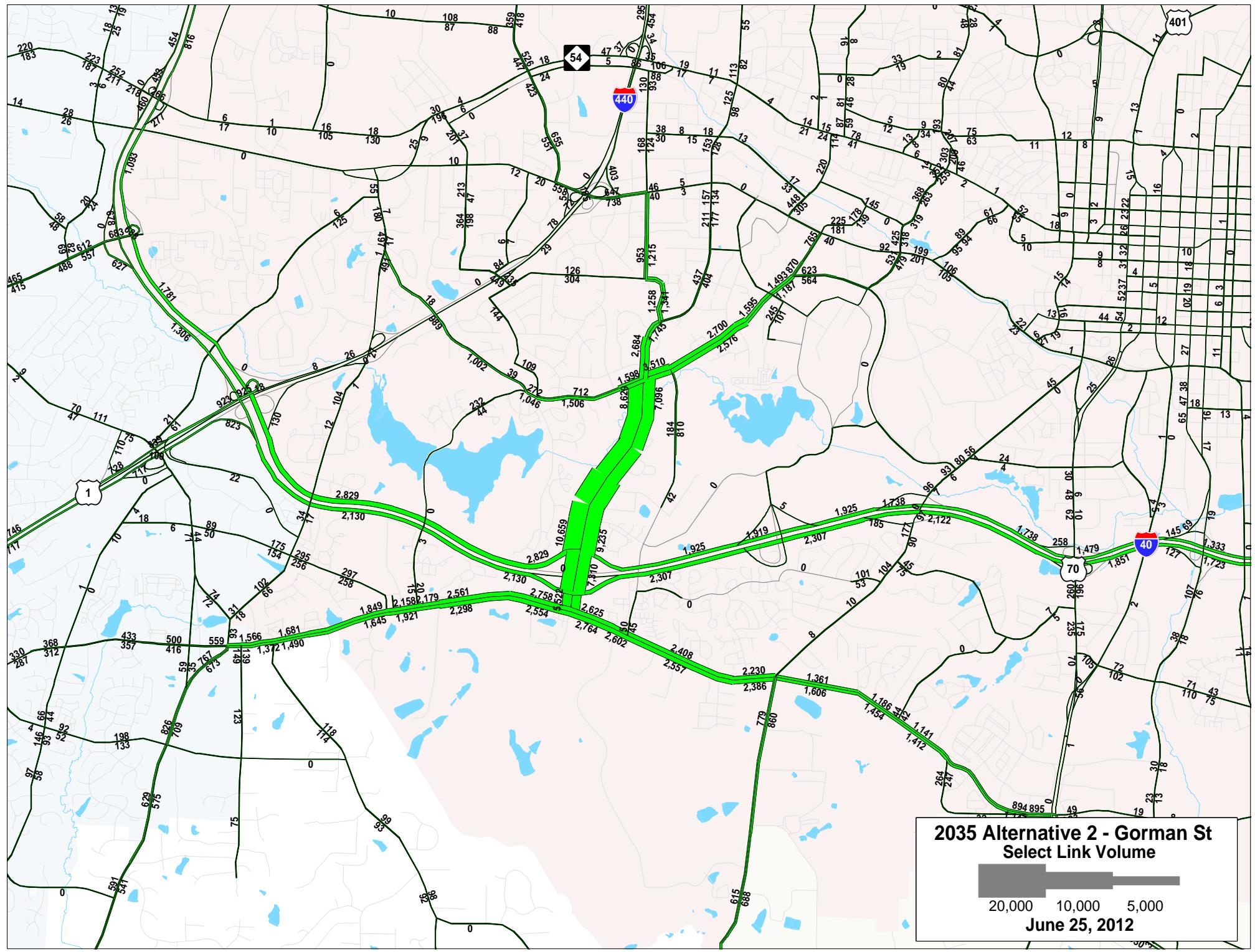


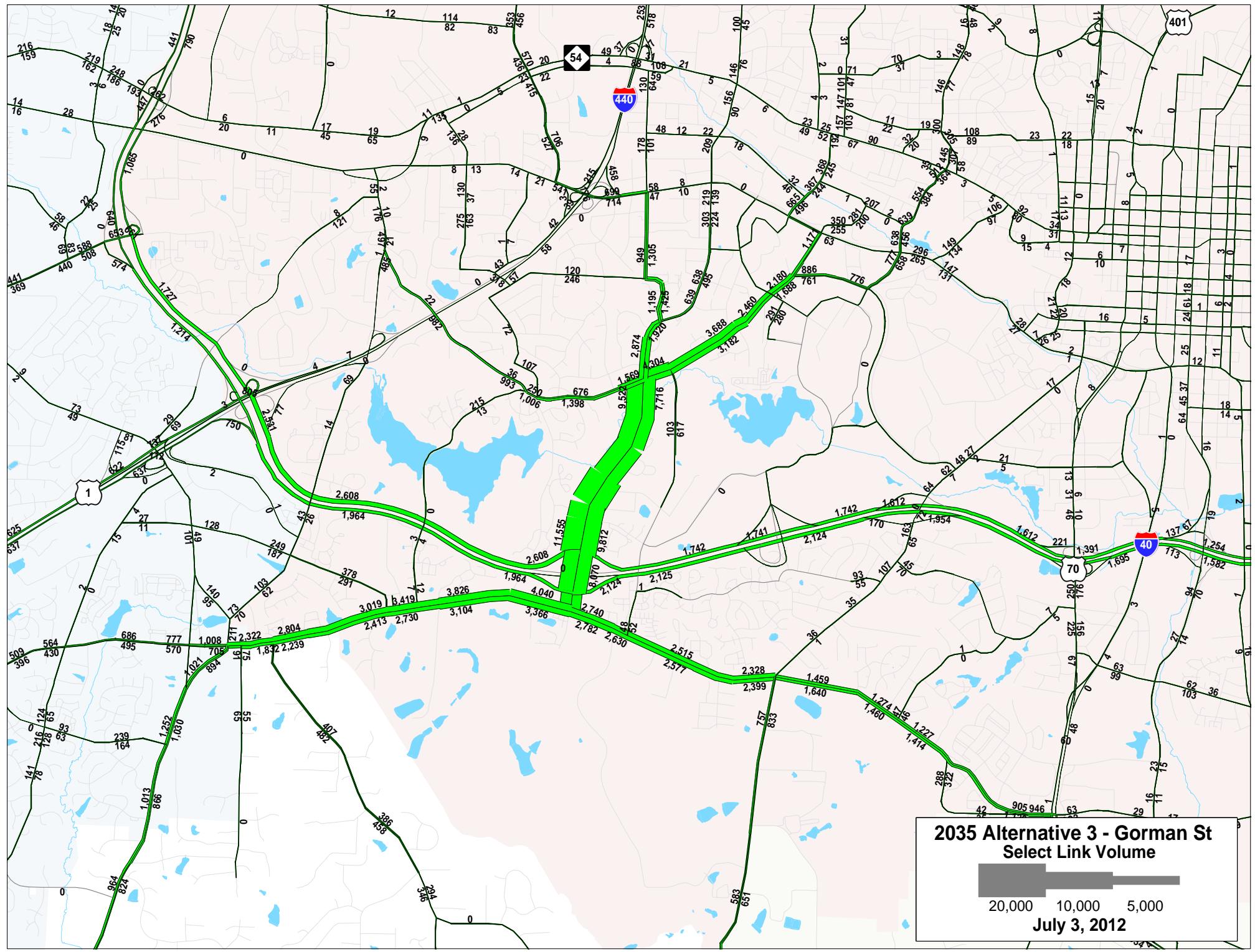


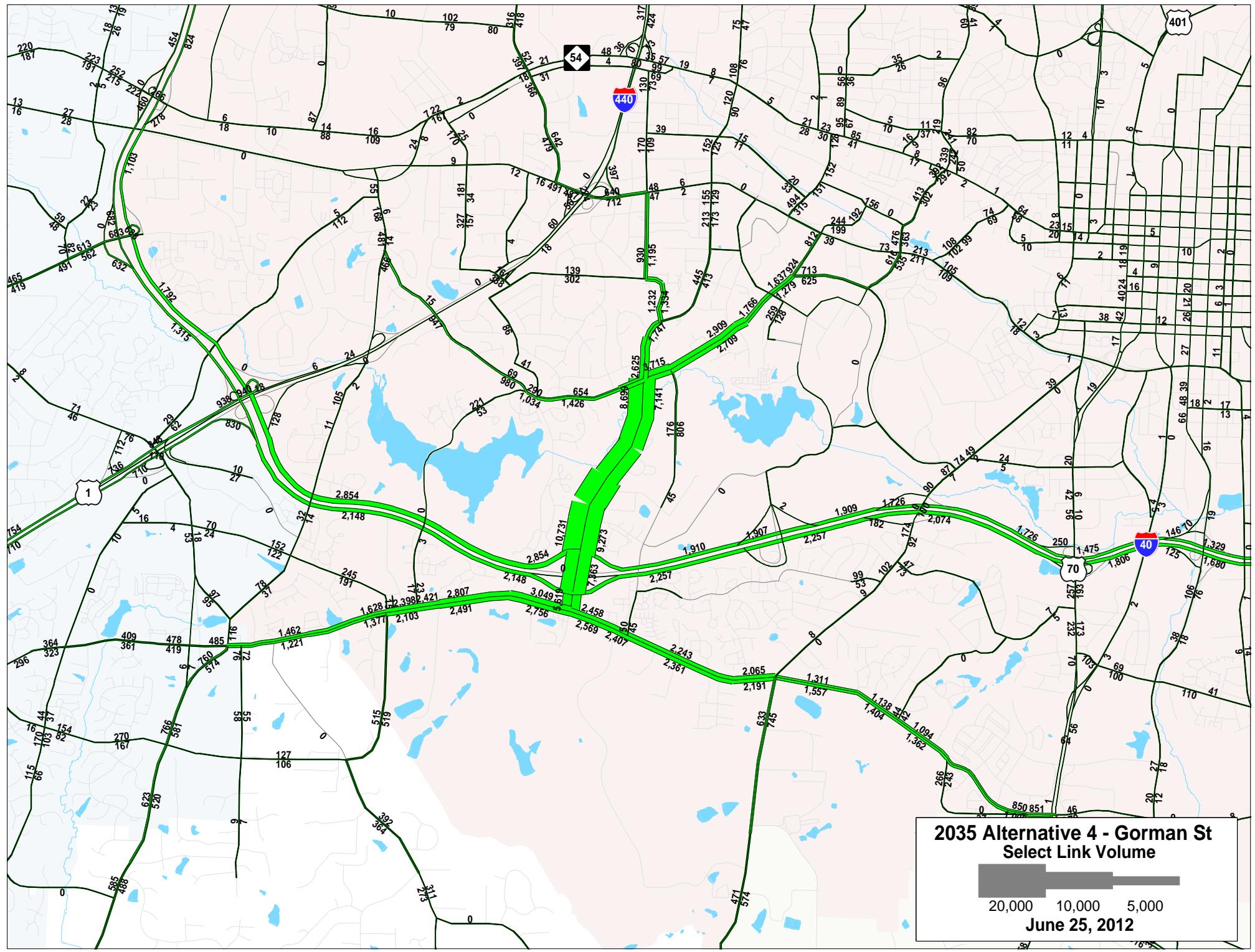


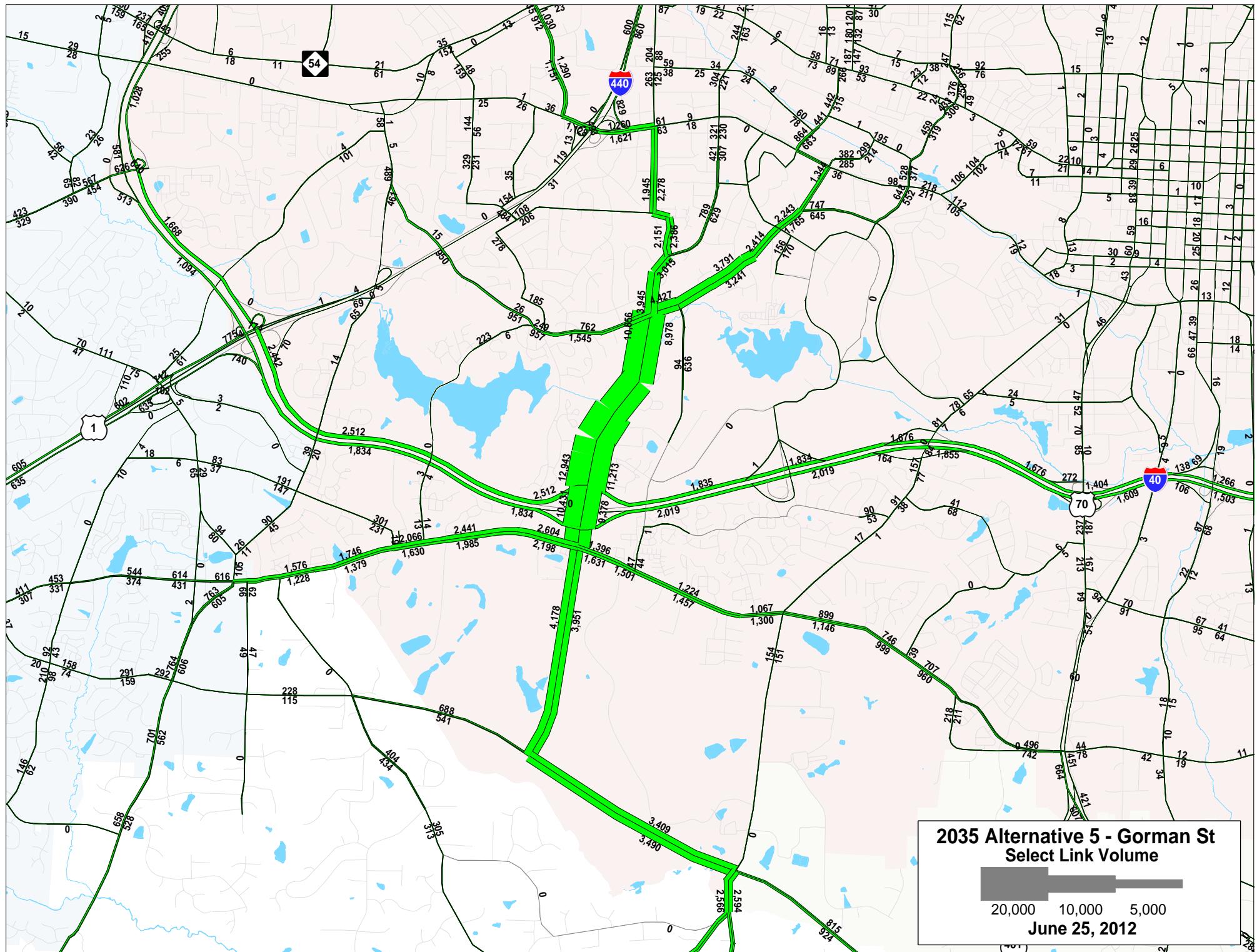


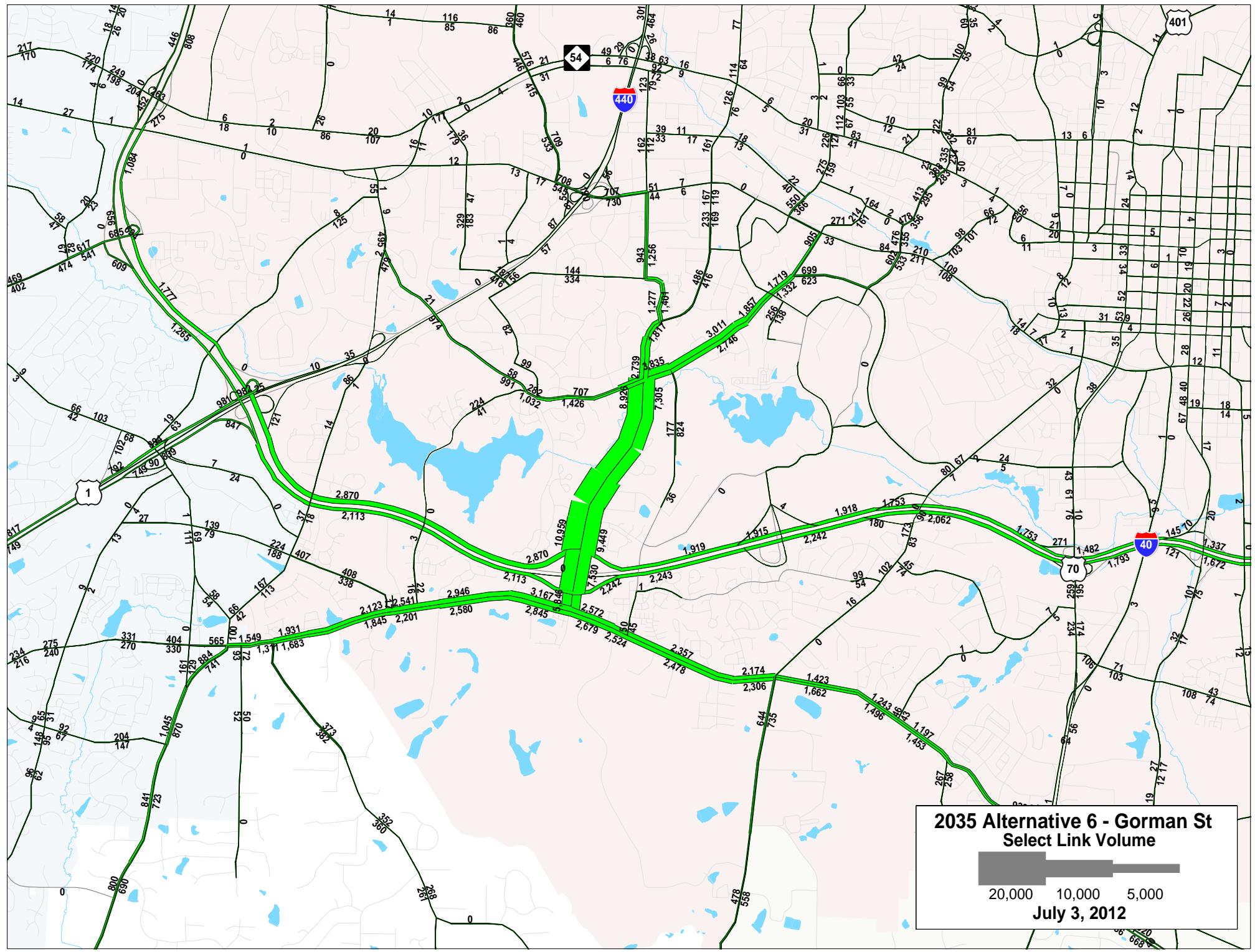


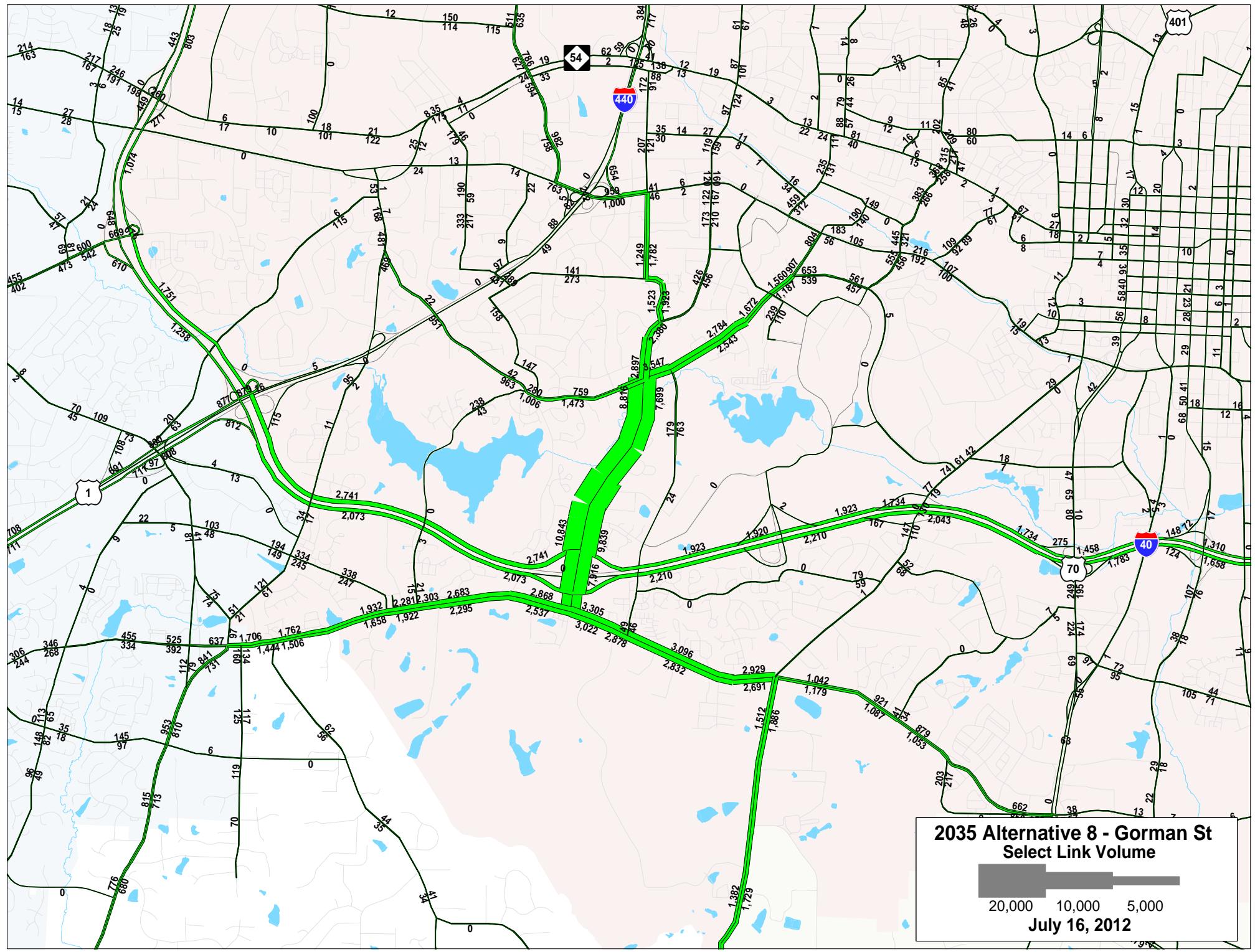


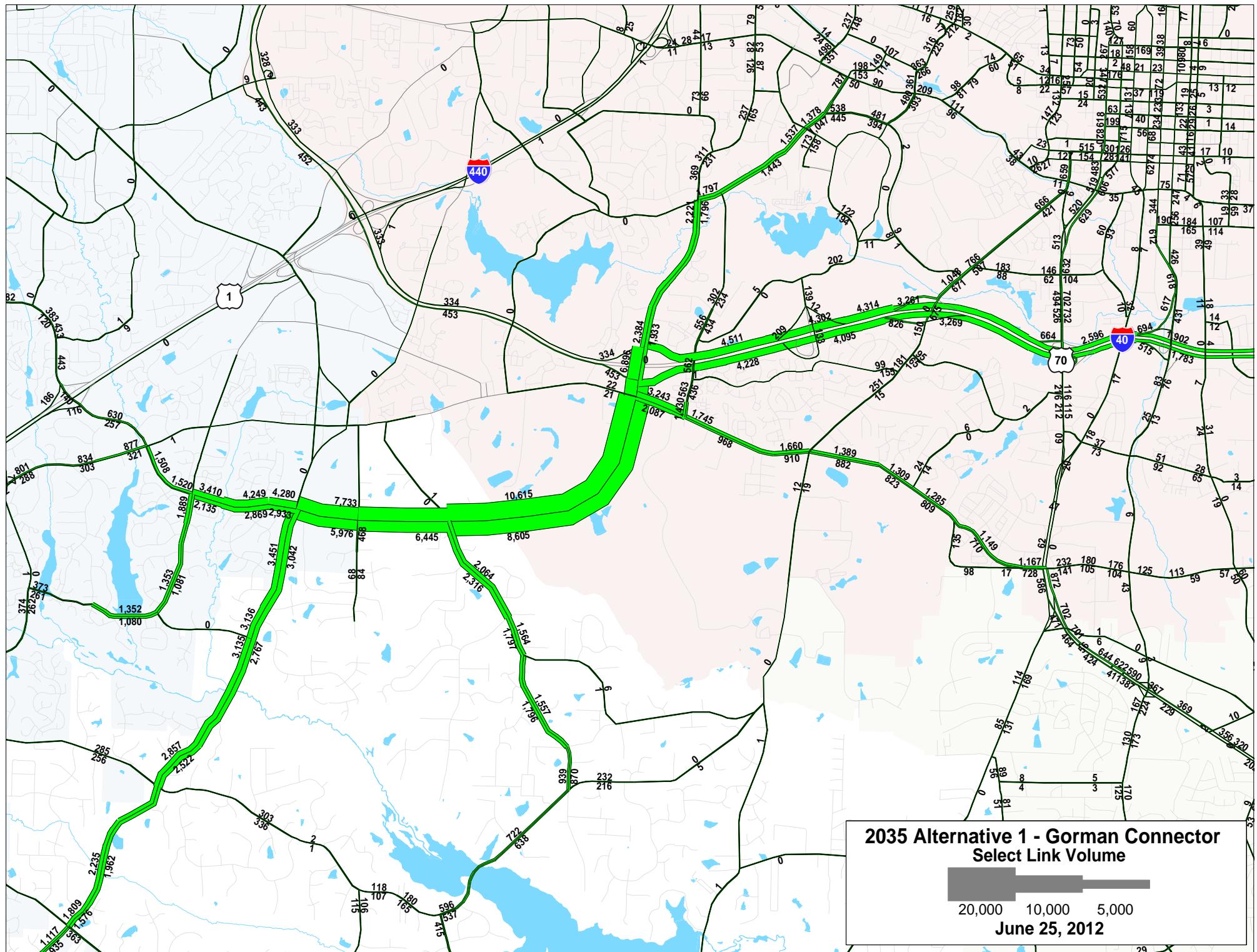








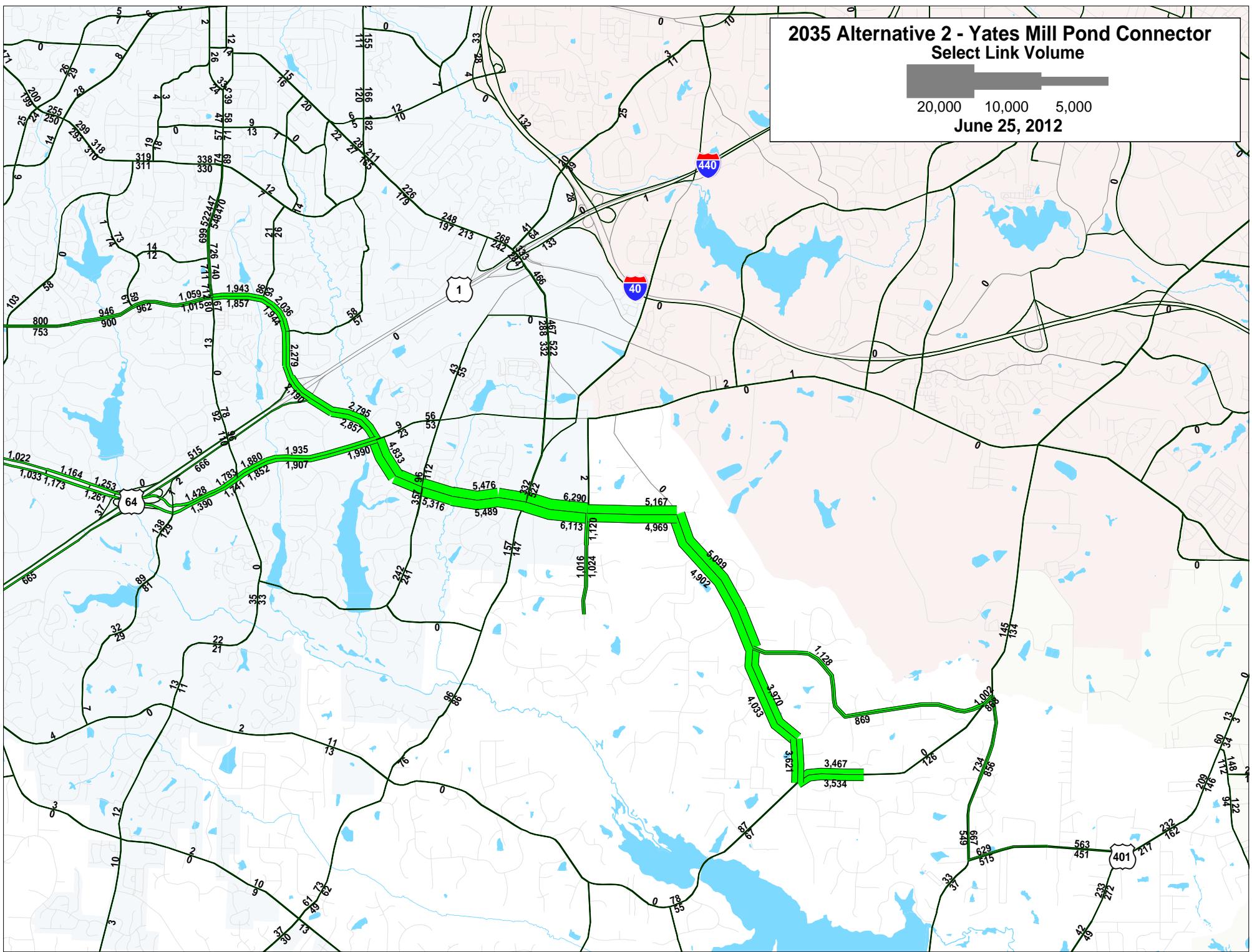


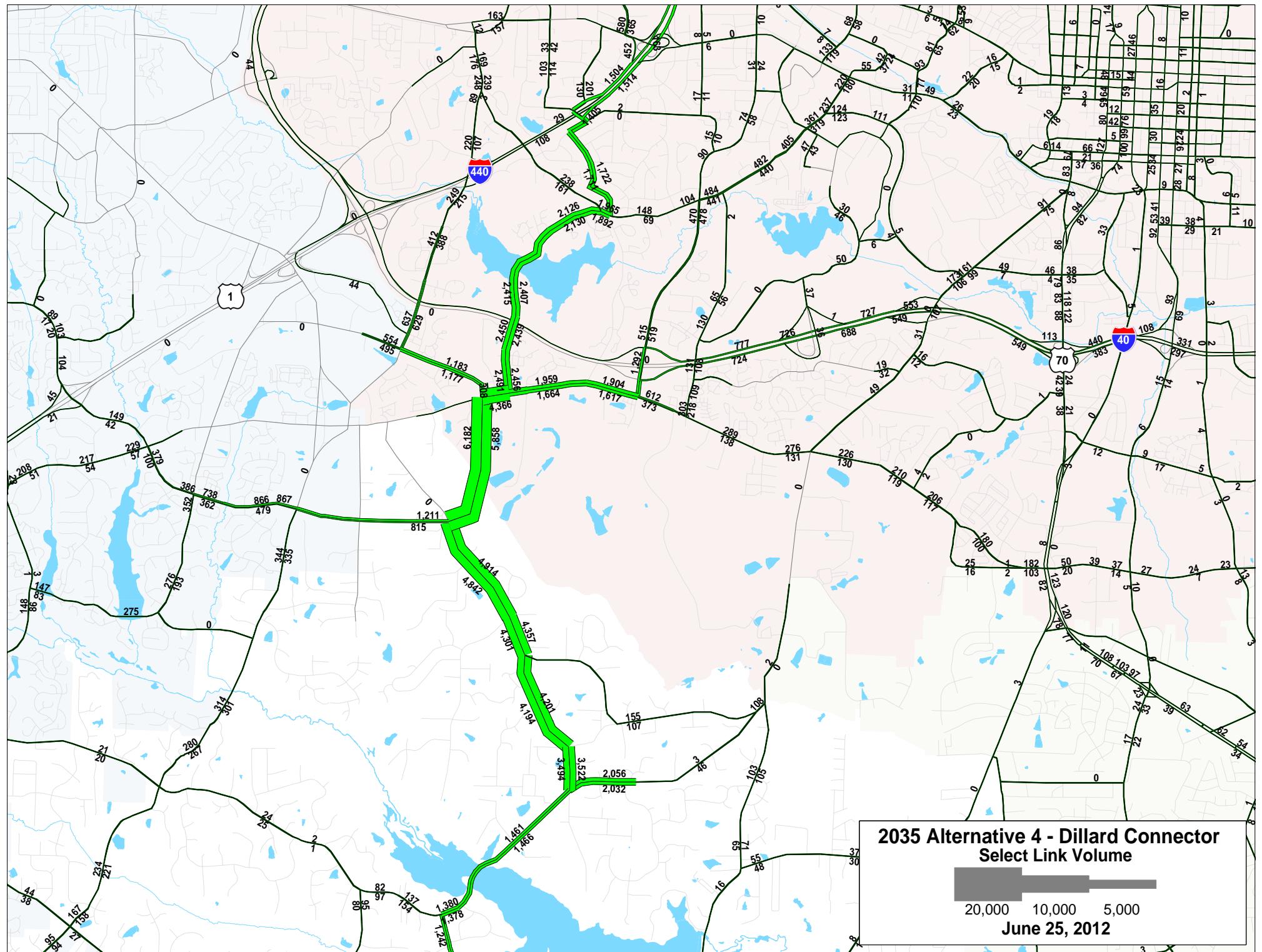


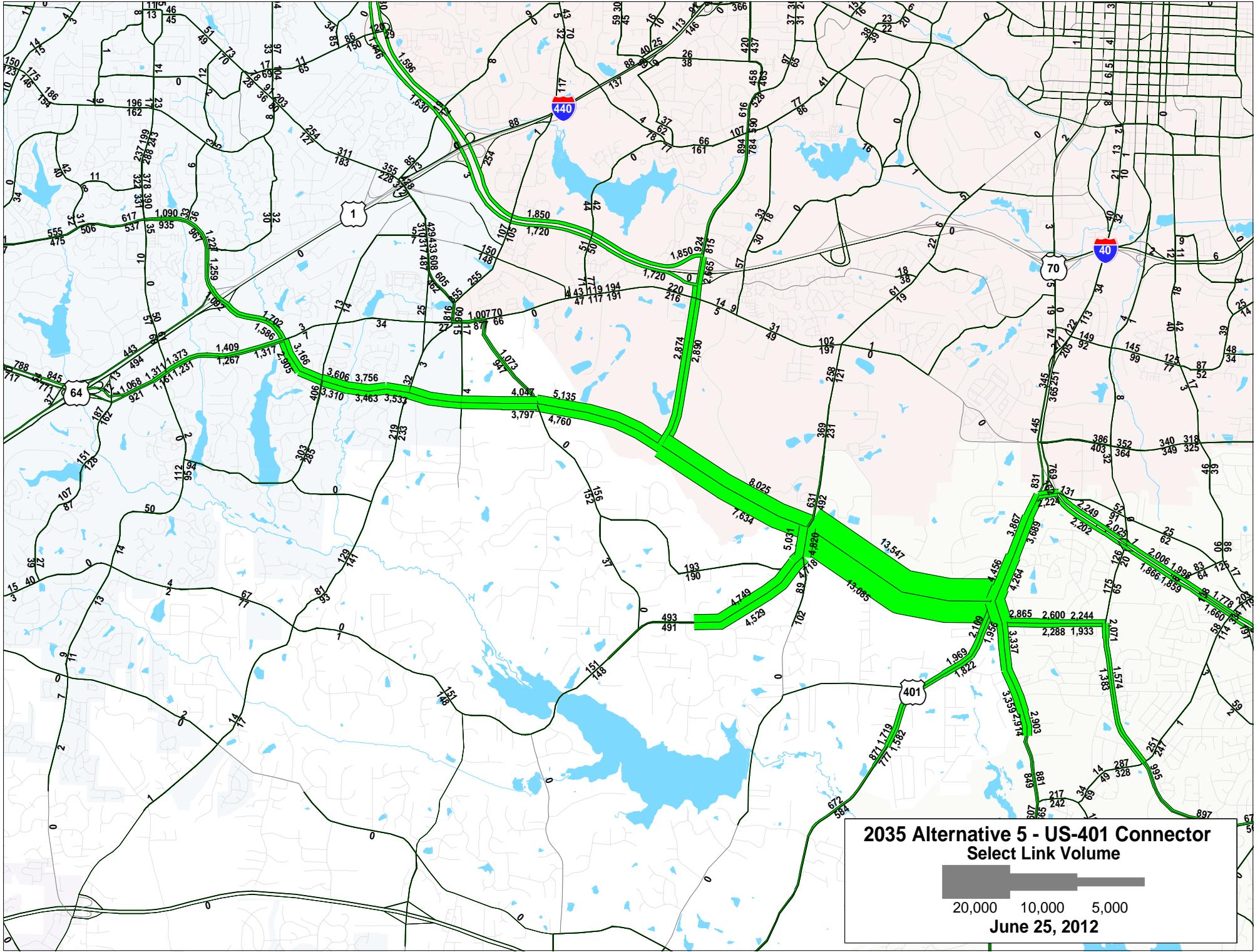
2035 Alternative 2 - Yates Mill Pond Connector
Select Link Volume

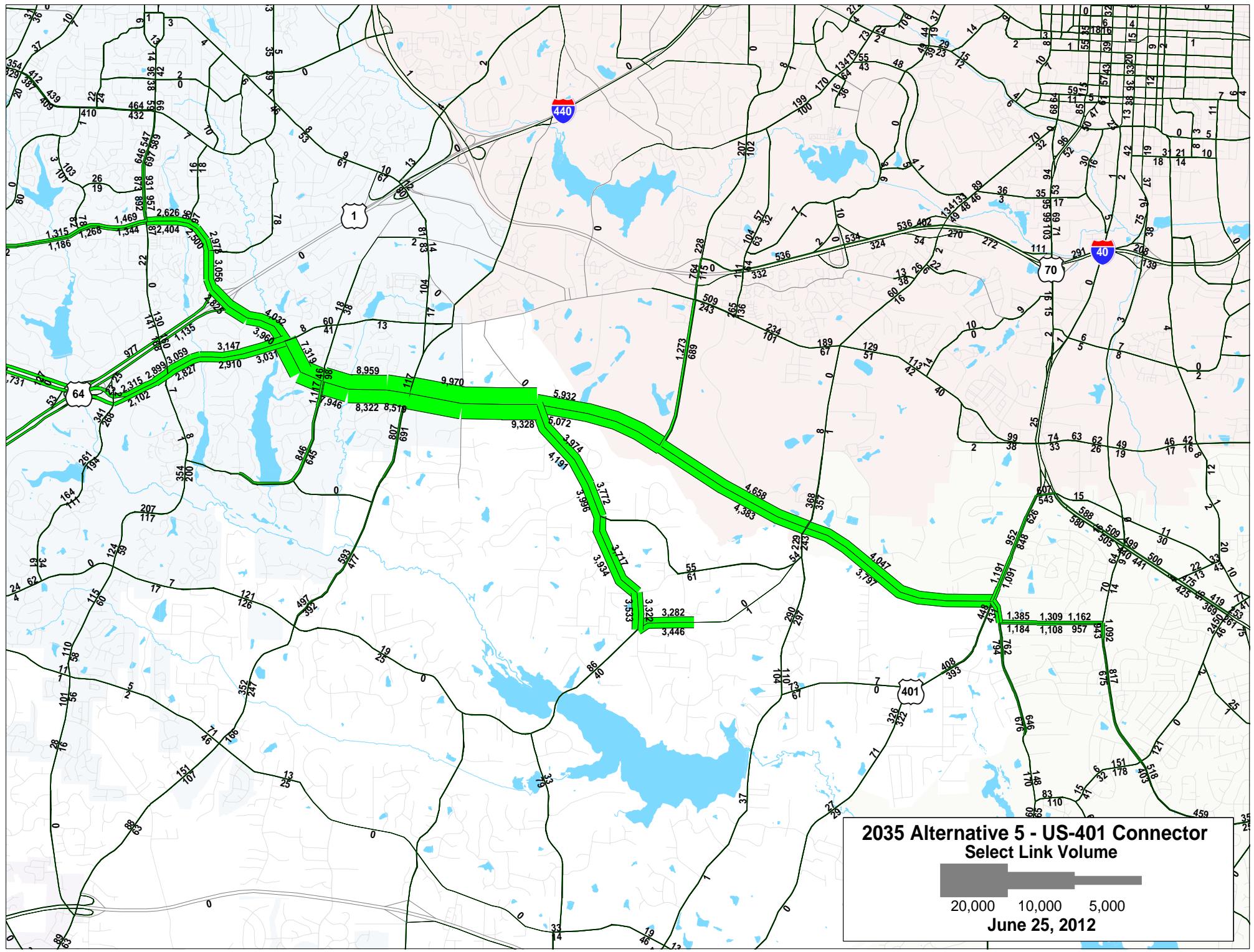
20,000 10,000 5,000

June 25, 2012





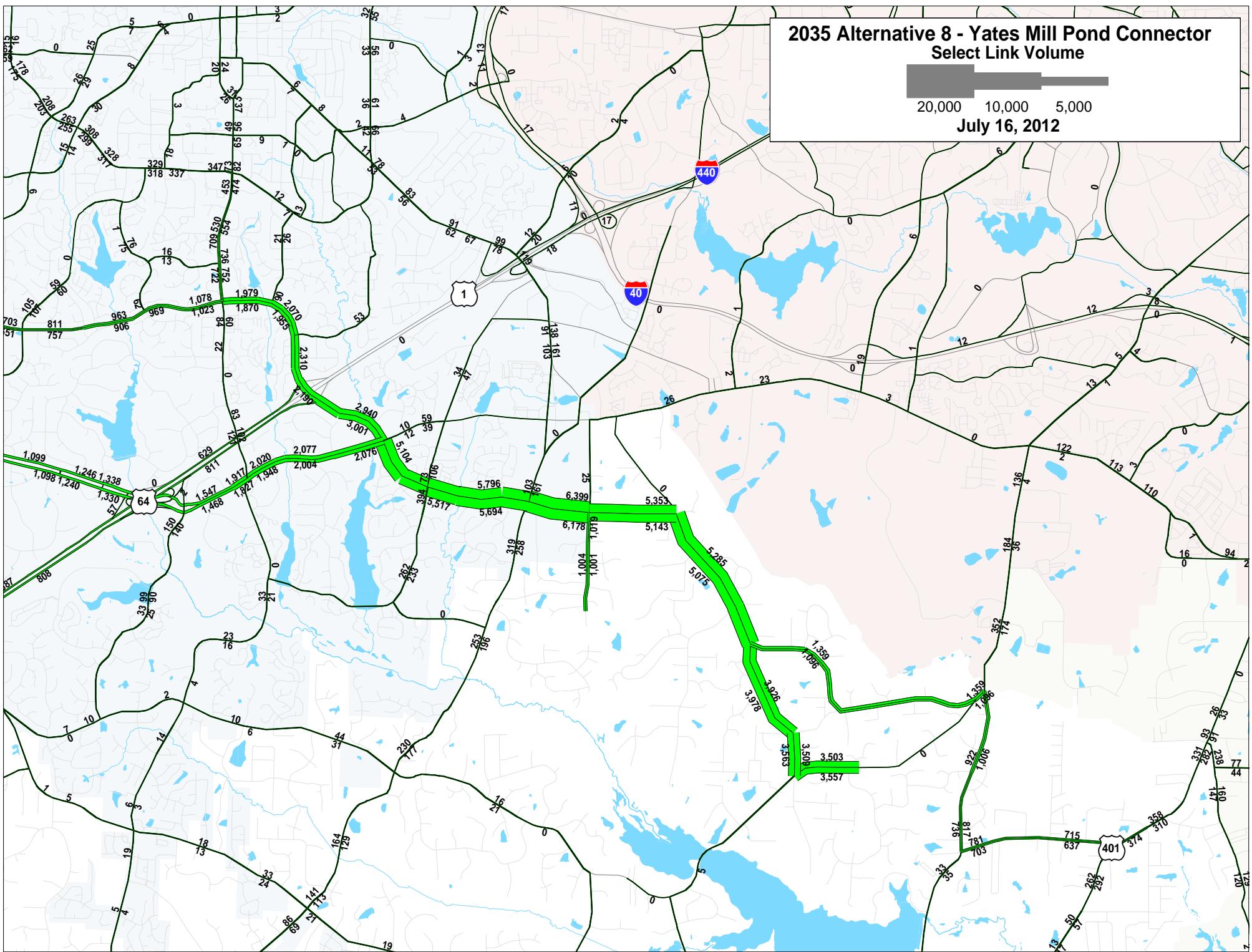




2035 Alternative 8 - Yates Mill Pond Connector
Select Link Volume

20,000 10,000 5,000

July 16, 2012



Appendix 5

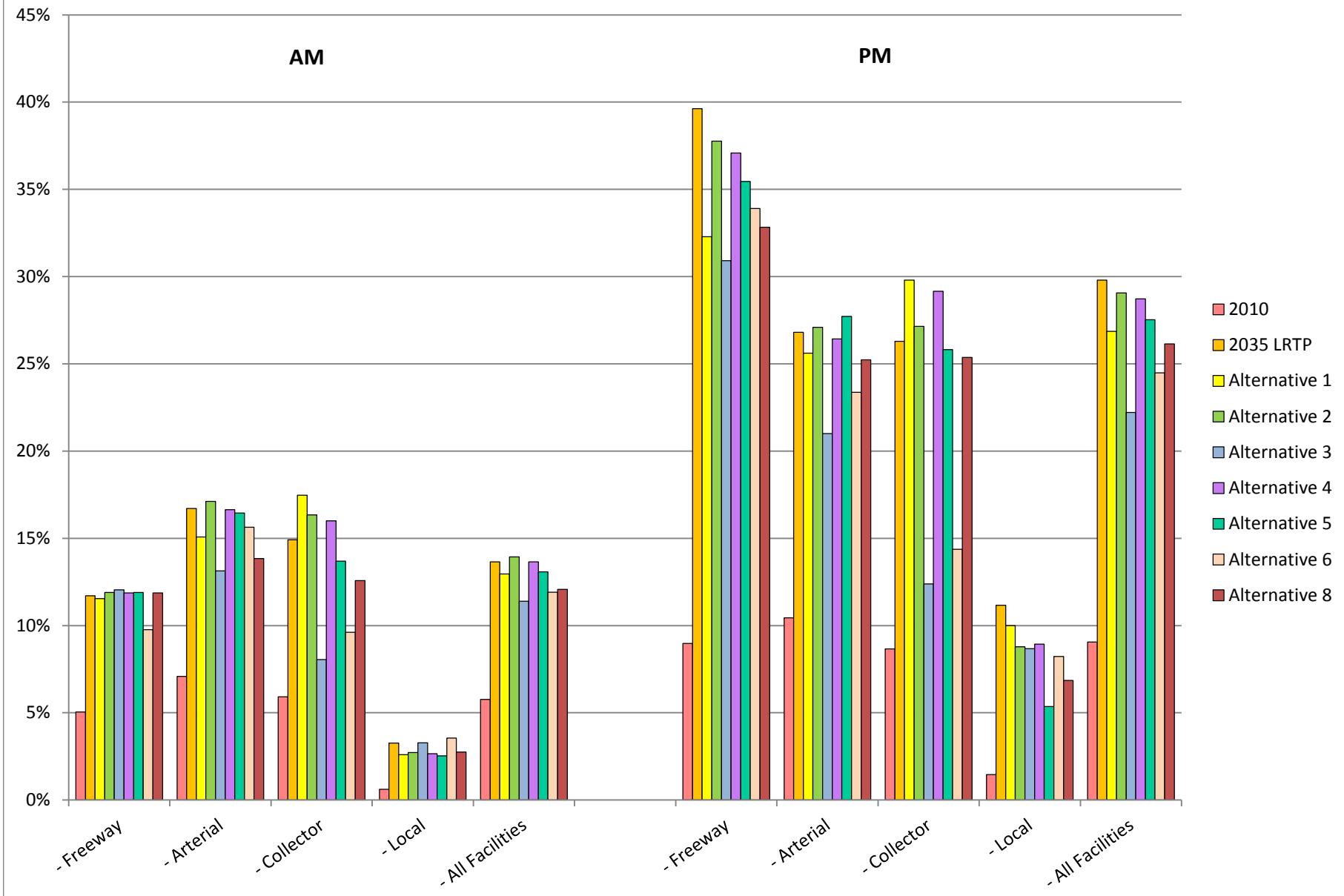
Performance Measures

Swift Creek Area Network Study

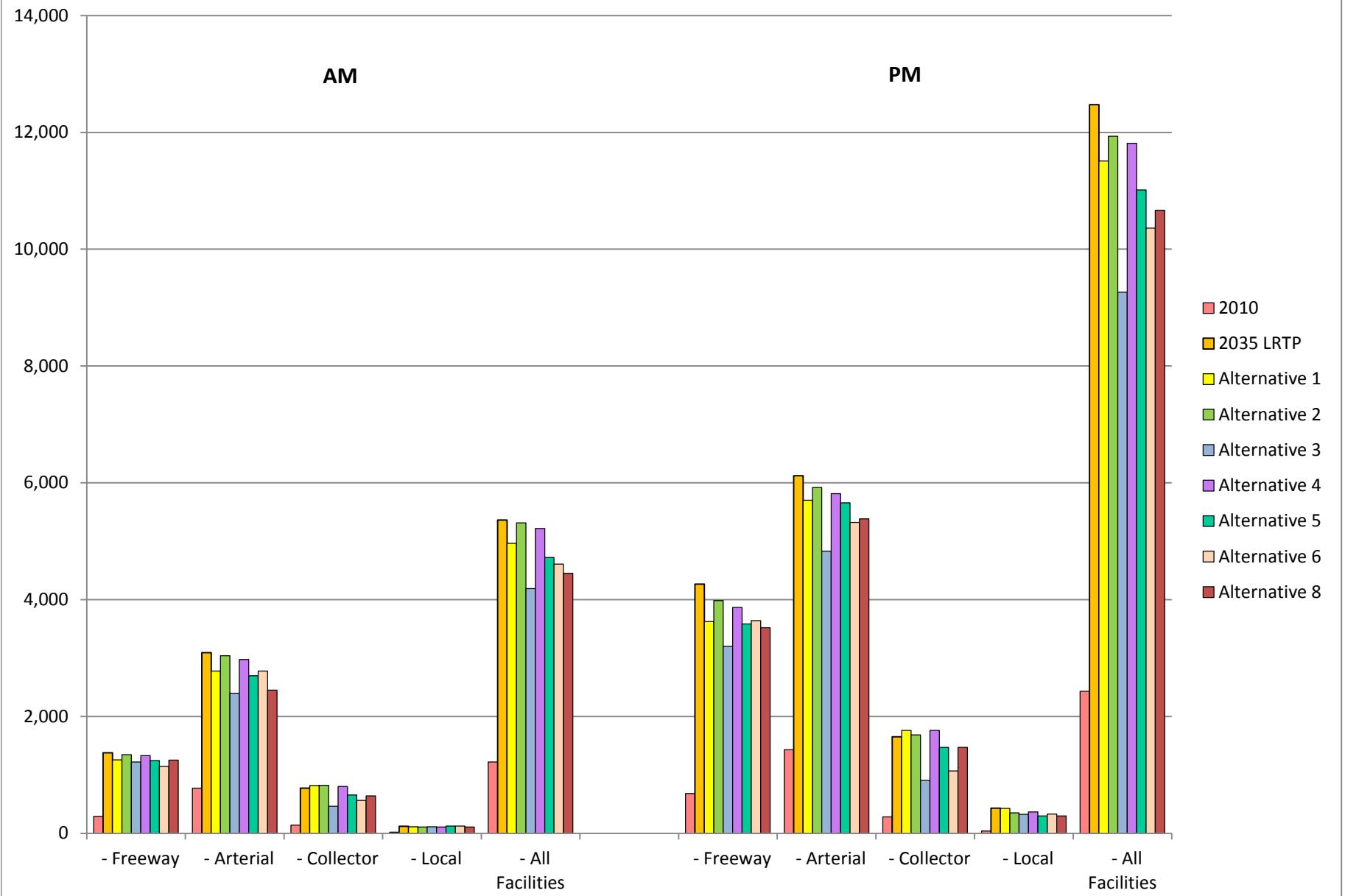
	2010	2035*	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 8
Performance									
Total VMT (daily)	4,595,223	7,378,917	7,442,738	7,181,939	7,207,509	7,178,418	7,206,413	7,192,211	7,188,207
Total VMT (AMPeakHr)	410,879	644,257	649,120	629,396	634,165	629,697	634,447	632,678	632,117
Total VMT (PMPeakHr)	493,593	755,481	765,130	736,277	744,919	736,404	744,711	742,617	740,491
Total VHT (daily)	100,793	180,488	179,994	175,505	172,093	175,306	173,874	173,437	173,194
Total VHT (AMPeakHr)	10,278	19,560	19,298	19,124	18,351	19,090	18,709	18,677	18,650
Total VHT (PMPeakHr)	13,453	26,843	26,576	26,042	24,995	25,972	25,527	25,479	25,415
Total VMT change from 2035 LRTP			63,821	-196,978	-171,408	-200,499	-172,504	-186,706	-190,710
Total VHT Change from 2035 LRTP			-494	-4,983	-8,395	-5,182	-6,614	-7,051	-7,294
VMT experiencing congestion - AM Peak									
- Freeway	7,472	26,807	26,663	26,495	26,405	26,455	26,258	21,480	26,234
- Arterial	13,389	48,604	43,460	48,108	38,141	46,665	45,368	44,701	39,419
- Collector	2,668	10,847	12,510	11,680	6,148	11,379	9,621	7,384	9,238
- Local	176	1,690	1,519	1,469	1,571	1,474	1,718	1,776	1,459
- All Facilities	23,704	87,947	84,152	87,752	72,266	85,972	82,965	75,341	76,350
VMT experiencing congestion - PM Peak									
- Freeway	15,310	102,700	84,995	94,846	76,511	92,935	88,152	84,486	81,843
- Arterial	23,975	92,011	87,176	89,780	72,226	87,203	90,436	78,744	84,725
- Collector	4,901	23,136	25,848	23,384	11,533	25,094	21,872	13,471	22,410
- Local	540	7,252	7,469	5,950	5,248	6,240	4,556	5,162	4,599
- All Facilities	44,727	225,098	205,489	213,960	165,518	211,472	205,016	181,863	193,577
Percent of VMT experiencing congestion - AM Peak									
- Freeway	5%	12%	12%	12%	12%	12%	12%	10%	12%
- Arterial	7%	17%	15%	17%	13%	17%	16%	16%	14%
- Collector	6%	15%	17%	16%	8%	16%	14%	10%	13%
- Local	1%	3%	3%	3%	3%	3%	3%	4%	3%
- All Facilities	6%	14%	13%	14%	11%	14%	13%	12%	12%
Percent of VMT experiencing congestion - PM Peak									
- Freeway	9%	40%	32%	38%	31%	37%	35%	34%	33%
- Arterial	10%	27%	26%	27%	21%	26%	28%	23%	25%
- Collector	9%	26%	30%	27%	12%	29%	26%	14%	25%
- Local	1%	11%	10%	9%	9%	9%	5%	8%	7%
- All Facilities	9%	30%	27%	29%	22%	29%	28%	24%	26%
VHT experiencing congestion - AM Peak									
- Freeway	291	1,379	1,257	1,347	1,221	1,332	1,245	1,144	1,252
- Arterial	774	3,091	2,776	3,040	2,398	2,976	2,697	2,779	2,452
- Collector	139	775	818	821	461	803	655	562	642
- Local	19	119	112	107	110	108	125	123	106
- All Facilities	1,222	5,364	4,963	5,316	4,190	5,220	4,722	4,608	4,453
VHT experiencing congestion - PM Peak									
- Freeway	681	4,268	3,623	3,984	3,201	3,867	3,583	3,642	3,520
- Arterial	1,430	6,123	5,702	5,918	4,832	5,816	5,659	5,323	5,382
- Collector	283	1,651	1,762	1,683	906	1,761	1,472	1,066	1,470
- Local	39	431	425	350	324	368	298	329	297
- All Facilities	2,433	12,472	11,511	11,935	9,262	11,812	11,012	10,360	10,669
Lane-Miles experiencing congestion - AM Peak									
- Freeway	4	13	13	12	13	12	12	10	12
- Arterial	11	40	36	39	32	38	37	37	33
- Collector	2	9	10	10	5	9	8	6	8
- Local	0	2	2	2	2	2	2	2	2
- All Facilities	17	63	60	63	51	61	60	55	55
Lane-Miles experiencing congestion - PM Peak									
- Freeway	7	47	39	43	35	43	41	39	38
- Arterial	21	73	70	71	58	69	72	62	67
- Collector	4	18	20	18	10	20	18	11	18
- Local	1	7	7	6	5	6	5	5	5
- All Facilities	33	146	137	139	109	137	135	118	128
Hours of Delay (daily)									
VMT Daily									
V/C less than 0.8									
- Freeway	1,623,094	2,108,271	2,152,844	2,044,694	2,079,372	2,077,329	2,046,839	2,041,972	2,051,214
- Arterial	1,868,931	2,651,736	2,647,730	2,556,578	2,687,888	2,555,157	2,538,921	2,623,225	2,628,818
- Collector	389,297	614,572	608,610	598,728	676,285	604,186	598,025	672,788	629,195
- Local	282,715	464,969	520,128	486,338	441,482	497,624	597,044	455,074	486,877
- All Facilities	4,164,037	5,839,548	5,929,312	5,686,339	5,885,027	5,734,297	5,780,829	5,793,059	5,796,103
V/C from 0.8 to 1.0									
- Freeway	130,623	534,564	570,500	520,519	478,620	484,603	514,505	502,879	510,980
- Arterial	178,812	485,131	468,056	473,261	443,331	471,968	431,070	452,838	440,921
- Collector	31,365	76,775	68,927	76,783	57,845	72,953	72,893	57,236	62,776
- Local	7,644	26,789	37,194	29,630	30,872	29,844	44,242	31,437	27,354
- All Facilities	348,443	1,123,259	1,144,677	1,100,193	1,010,668	1,059,369	1,062,711	1,044,389	1,042,030
V/C greater than 1.0									
- Freeway	28,807	176,362	136,968	160,770	129,773	156,213	142,379	153,211	141,552
- Arterial	44,275	184,555	173,858	180,119	148,844	175,901	173,801	164,225	

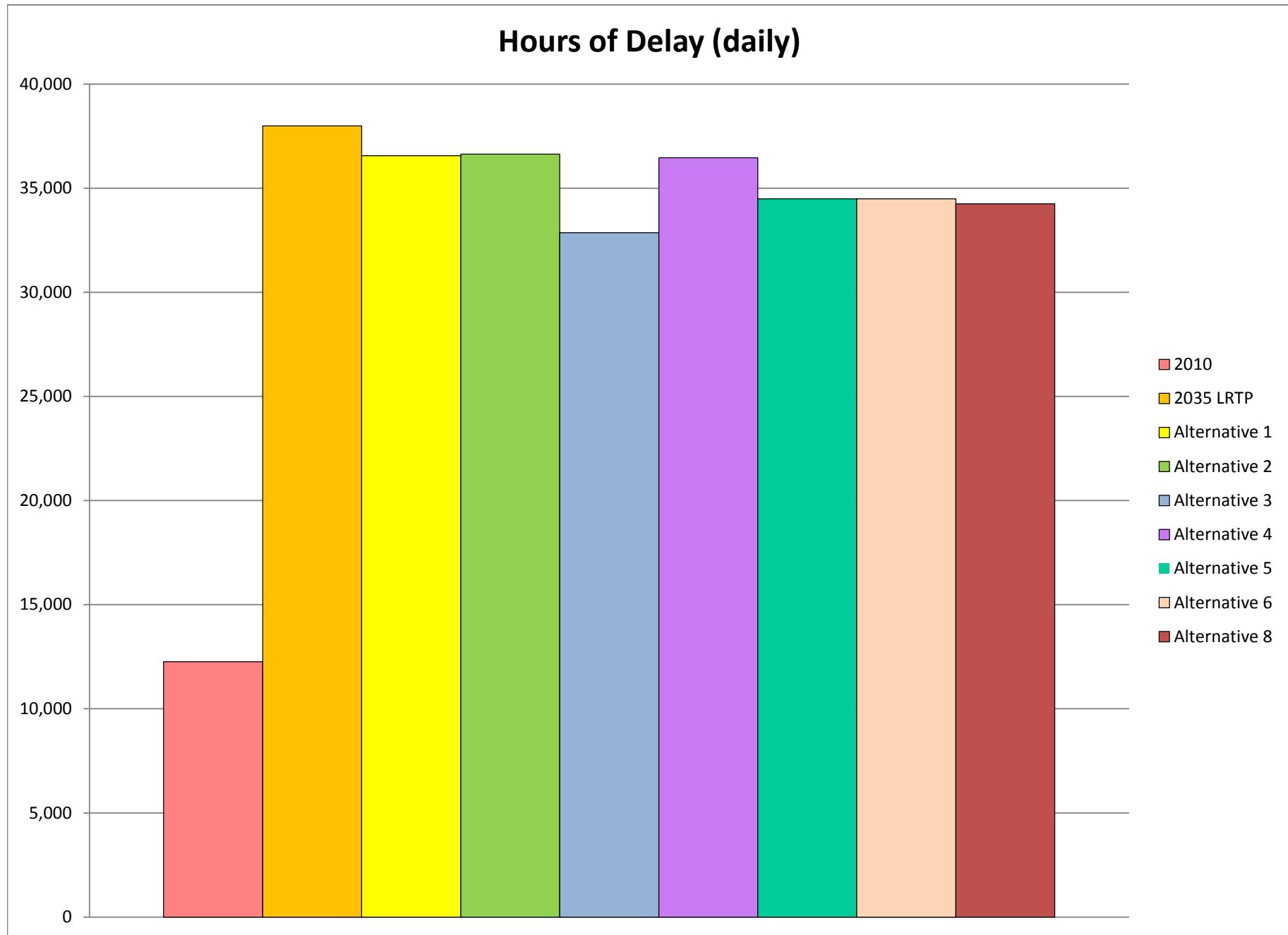
Swift Creek Area Network Study

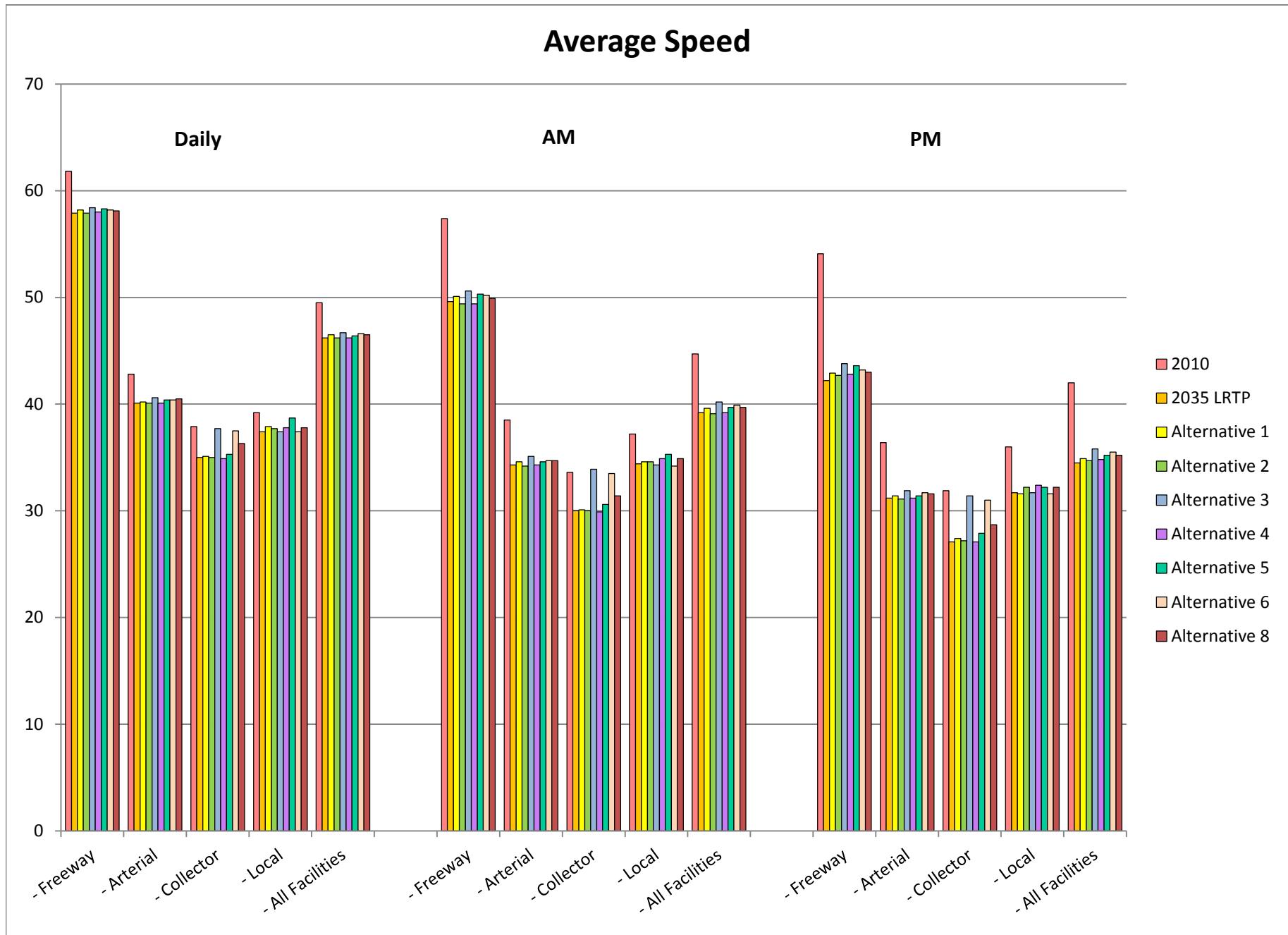
Percent of VMT experiencing congestion



VHT experiencing congestion







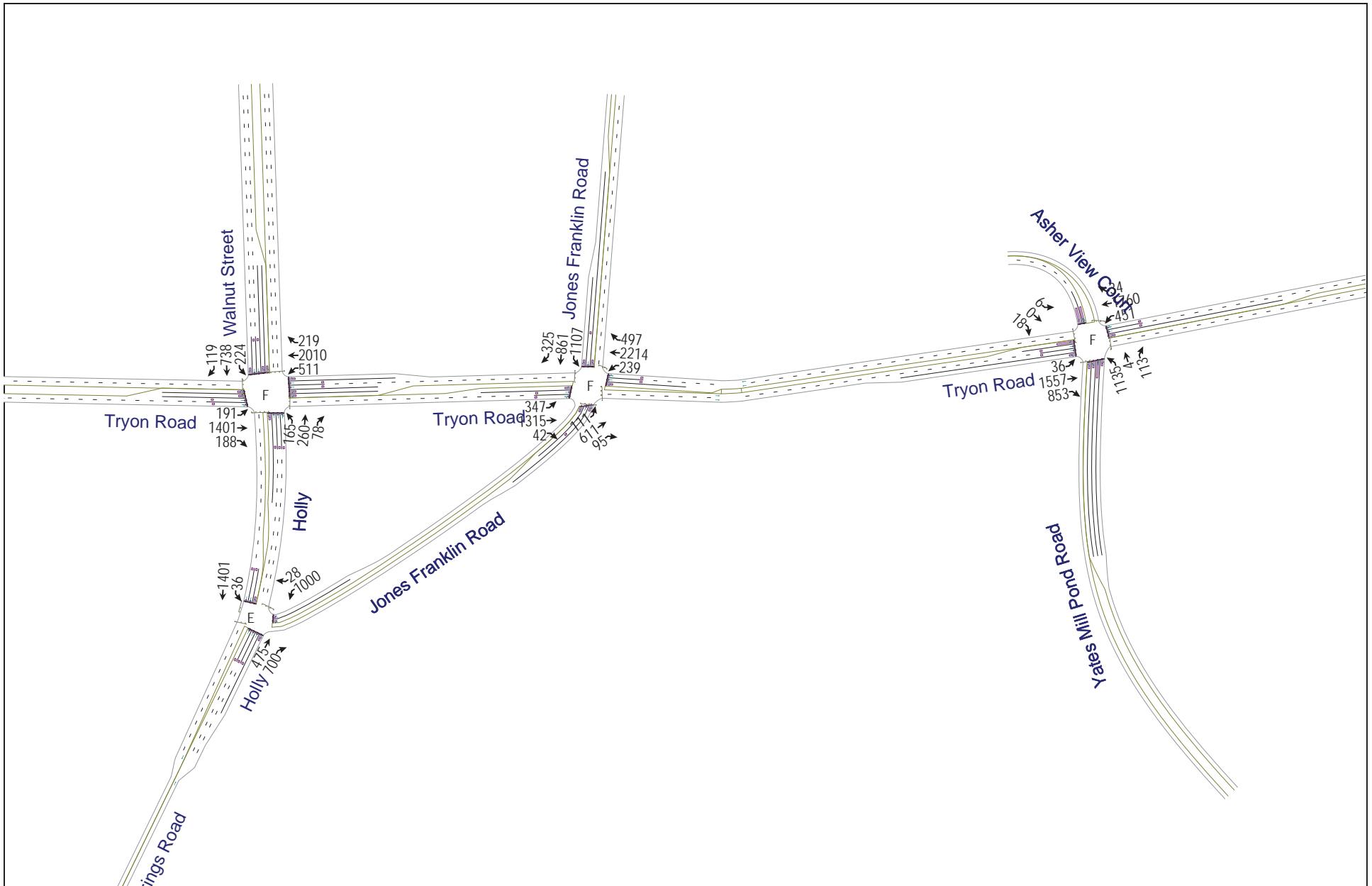
Triangle Regional Model

	2010	2035*	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 8
Performance									
Total VMT (daily)	47,777,027	77,050,475	77,045,839	76,869,134	76,848,023	76,864,480	76,847,687	76,842,761	76,839,094
Total VMT (AMPeakHr)	4,029,529	6,682,020	6,681,106	6,668,051	6,664,906	6,668,169	6,665,678	6,664,093	6,662,809
Total VMT (PMPeakHr)	5,047,864	8,272,931	8,268,900	8,252,427	8,246,109	8,251,595	8,246,120	8,246,334	8,244,328
Total VHT (daily)	988,876	1,779,967	1,777,923	1,774,139	1,769,394	1,774,461	1,771,224	1,770,966	1,770,329
Total VHT (AMPeakHr)	92,418	185,209	184,723	184,552	183,413	184,501	183,811	183,738	183,651
Total VHT (PMPeakHr)	123,007	254,608	253,946	253,616	251,841	253,458	252,463	252,371	252,279
Total VMT change from 2035 LRTP			-4,636	-181,341	-202,452	-185,995	-202,788	-207,714	-211,381
Total VHT Change from 2035 LRTP			-2,044	-5,828	-10,573	-5,506	-8,743	-9,001	-9,638
VMT experiencing congestion - AM Peak									
- Freeway	48,184	278,538	278,673	273,554	277,806	277,566	277,013	273,060	278,310
- Arterial	88,470	339,007	328,856	333,613	321,092	325,010	329,147	327,038	317,934
- Collector	8,716	66,946	66,539	67,914	61,983	67,302	64,333	63,260	64,908
- Local	5,501	42,169	42,241	40,538	41,278	41,554	41,504	41,934	41,496
- All Facility	150,872	726,660	716,309	715,619	702,159	711,432	711,997	705,291	702,649
VMT experiencing congestion - PM Peak									
- Freeway	95,781	498,340	479,012	496,713	477,557	494,774	490,584	485,512	482,172
- Arterial	152,414	599,476	592,861	596,141	573,241	589,942	590,308	581,261	584,456
- Collector	15,979	128,465	131,164	128,436	116,568	130,692	126,143	117,638	126,887
- Local	13,823	98,009	96,576	93,662	92,765	93,863	93,854	94,159	91,635
- All Facility	277,997	1,324,290	1,299,613	1,314,952	1,260,130	1,309,271	1,300,888	1,278,570	1,285,149
Percent of VMT experiencing congestion - AM Peak									
- Freeway	3.52%	13.69%	13.71%	13.49%	13.75%	13.68%	13.70%	13.51%	13.77%
- Arterial	5.25%	12.19%	11.84%	12.02%	11.54%	11.71%	11.89%	11.77%	11.45%
- Collector	1.70%	6.89%	6.86%	7.01%	6.37%	6.95%	6.66%	6.49%	6.69%
- Local	1.19%	4.71%	4.68%	4.52%	4.65%	4.63%	4.57%	4.72%	4.65%
- All Facility	3.74%	10.87%	10.72%	10.73%	10.54%	10.67%	10.68%	10.58%	10.55%
Percent of VMT experiencing congestion - PM Peak									
- Freeway	6%	19%	18%	19%	18%	19%	19%	19%	19%
- Arterial	7%	18%	18%	18%	17%	18%	18%	18%	18%
- Collector	2%	11%	11%	11%	10%	11%	10%	10%	11%
- Local	2%	9%	8%	8%	8%	8%	8%	8%	8%
- All Facility	6%	16%	16%	16%	15%	16%	16%	16%	16%
VHT experiencing congestion - AM Peak									
- Freeway	2,129	13,792	13,616	13,549	13,449	13,651	13,491	13,451	13,556
- Arterial	5,582	24,678	24,131	24,352	23,678	24,001	23,938	23,904	23,397
- Collector	503	4,745	4,697	4,796	4,408	4,759	4,525	4,509	4,573
- Local	313	2,844	2,862	2,771	2,801	2,817	2,808	2,834	2,818
- All Facility	8,527	46,059	45,306	45,467	44,336	45,227	44,762	44,698	44,344
VHT experiencing congestion - PM Peak									
- Freeway	4,499	25,440	24,719	25,347	24,368	25,177	24,785	24,837	24,706
- Arterial	9,952	46,056	45,487	45,740	44,301	45,490	45,141	44,808	44,689
- Collector	1,055	9,469	9,576	9,486	8,695	9,596	9,210	8,809	9,228
- Local	795	7,184	7,092	6,926	6,882	6,947	6,937	6,975	6,846
- All Facility	16,300	88,148	86,874	87,499	84,245	87,209	86,072	85,428	85,470
Lane-Miles experiencing congestion - AM Peak									
- Freeway	26	134	135	132	135	134	134	132	135
- Arterial	79	285	277	280	272	273	277	277	269
- Collector	8	55	55	56	52	56	53	53	54
- Local	5	38	38	37	37	37	38	38	37
- All Facility	118	513	505	505	495	500	502	500	495
Lane-Miles experiencing congestion - PM Peak									
- Freeway	51	234	224	233	224	232	231	228	226
- Arterial	135	497	493	495	477	489	490	482	485
- Collector	15	104	106	104	95	106	103	96	103
- Local	13	89	88	85	84	85	85	86	83
- All Facility	214	924	911	917	881	912	908	892	897
Hours of Delay (daily)	99,469	316615	314697	314,098	309,856	314,592	311,499	311,433	310,910
VMT Daily									
V/C less than 0.8									
- Freeway	16,150,360	21,128,491	21,170,958	21,120,318	21,206,143	21,107,495	21,175,460	21,067,086	21,029,963
- Arterial	18,145,584	26,890,547	26,869,551	26,851,886	26,978,965	26,835,022	26,822,029	26,947,255	26,931,464
- Collector	5,425,645	9,366,404	9,358,123	9,340,339	9,416,839	9,344,392	9,337,323	9,418,960	9,377,802
- Local	4,575,044	8,222,505	8,278,833	8,222,628	8,175,814	8,234,716	8,337,859	8,178,609	8,214,281
- All Facility	44,296,634	65,607,947	65,677,465	65,535,171	65,777,761	65,521,625	65,672,671	65,611,911	65,553,509
V/C from 0.8 to 1.0									
- Freeway	1,465,232	4,292,527	4,289,460	4,232,508	4,122,856	4,254,111	4,152,112	4,244,757	4,306,761
- Arterial	1,218,253	3,315,610	3,308,783	3,285,482	3,255,120	3,297,600	3,253,130	3,245,137	3,257,172
- Collector	111,123	468,449	467,063	465,748	443,551	465,428	4		

Triangle Regional Model

Appendix 6

Operational Analysis



Lanes, Volumes, Timings
2100: Tryon Road & Walnut Street

7/10/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	1401	188	511	2010	219	165	260	78	224	738	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-1%			-1%			1%		
Storage Length (ft)	225		0	250		300	250		0	300		0
Storage Lanes	2		0	2		1	1		0	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	0.97	0.95	0.95	0.97	0.95	1.00	1.00	0.91	0.91	0.97	0.95	1.00
Fr _t	0.982			0.850			0.965			0.850		
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3476	0	3450	3557	1591	1778	4932	0	3416	3522	1575
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3476	0	3450	3557	1591	1778	4932	0	3416	3522	1575
Right Turn on Red	Yes			Yes			Yes			Yes		
Satd. Flow (RTOR)	12			123			43			9		
Link Speed (mph)	45			45			45			45		
Link Distance (ft)	1034			916			633			875		
Travel Time (s)	15.7			13.9			9.6			13.3		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	212	1766	0	568	2233	243	183	289	87	249	820	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	1766	0	568	2233	243	183	376	0	249	820	132
Turn Type	Prot			Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8		7	4	5
Permitted Phases						6						4
Detector Phase	5	2		1	6	7	3	8		7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	12.0		7.0	12.0	7.0
Minimum Split (s)	15.0	42.0		15.0	41.0	15.0	15.0	35.0		15.0	34.0	15.0
Total Split (s)	15.0	80.0	0.0	25.0	90.0	19.0	18.0	36.0	0.0	19.0	37.0	15.0
Total Split (%)	9.4%	50.0%	0.0%	15.6%	56.3%	11.9%	11.3%	22.5%	0.0%	11.9%	23.1%	9.4%
Maximum Green (s)	8.0	72.8		18.0	82.8	12.0	11.0	29.3		12.0	30.3	8.0
Yellow Time (s)	4.0	4.7		4.0	4.7	4.0	4.0	4.7		4.0	4.7	4.0
All-Red Time (s)	3.0	2.5		3.0	2.5	3.0	3.0	2.0		3.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.2	1.0	-2.0	-2.2	-2.0	-1.7	1.0	-2.0	-1.7	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead		Lag	Lag	Lag	Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min	None	None	None		None	None	None
Walk Time (s)	7.0			7.0			7.0			7.0		
Flash Dont Walk (s)	27.0			26.0			21.0			20.0		
Pedestrian Calls (#/hr)	0			0			0			0		
Act Effct Green (s)	10.0	75.0		20.0	85.0	112.1	13.0	17.9		27.1	32.0	42.0
Actuated g/C Ratio	0.06	0.47		0.12	0.53	0.70	0.08	0.11		0.17	0.20	0.26
v/c Ratio	0.99	1.08		1.32	1.18	0.21	1.27	0.64		0.43	1.16	0.31
Control Delay	116.4	79.1		178.7	115.1	1.4	202.3	34.5		62.9	143.4	32.6
Queue Delay	0.0	0.0		30.0	48.4	0.0	0.0	0.0		0.0	10.2	0.0
Total Delay	116.4	79.1		208.7	163.5	1.4	202.3	34.5		62.9	153.6	32.6

Lanes, Volumes, Timings
2100: Tryon Road & Walnut Street

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	E		F	F	A	F	C		E	F	C
Approach Delay		83.1			159.0			89.5			121.5	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	118	-1060		~384	~1425	10	~241	124		122	-533	83
Queue Length 95th (ft)	m#170	m#1159		m124	m143	m0	#410	160		173	#669	135
Internal Link Dist (ft)		954			836			553			795	
Turn Bay Length (ft)	225			250		300	250			300		
Base Capacity (vph)	215	1636		431	1890	1151	144	990		578	704	420
Starvation Cap Reductn	0	0		0	159	0	0	0		0	0	0
Spillback Cap Reductn	0	0		21	0	0	0	0		0	14	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.99	1.08		1.39	1.29	0.21	1.27	0.38		0.43	1.19	0.31

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 4 (3%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 124.5

Intersection LOS: F

Intersection Capacity Utilization 107.6%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

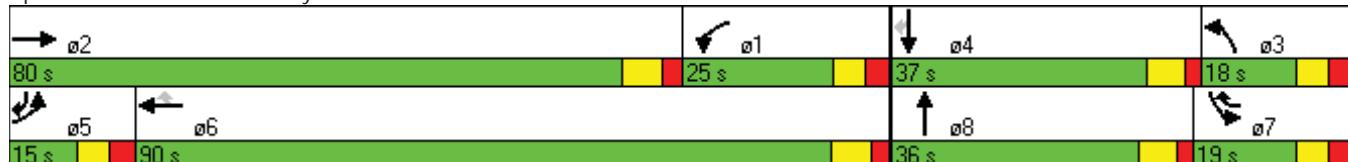
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2100: Tryon Road & Walnut Street



Lanes, Volumes, Timings

127: Tryon Road & Jones Franklin Road

7/10/2012

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↑		↑	↑↑		↑	↑	↑	↑	↑	↑
Volume (vph)	347	1315	42	239	2214	497	111	611	95	1107	861	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		3%			-1%			4%			1%	
Storage Length (ft)	250		0	350		0	175		275	550		250
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.995			0.973				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1743	3469	0	1778	3461	0	1734	1825	1552	1761	1853	1575
Flt Permitted	0.072			0.074			0.083			0.076		
Satd. Flow (perm)	132	3469	0	139	3461	0	152	1825	1552	141	1853	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			18				2			
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		916			397			1176			822	
Travel Time (s)		13.9			6.0			17.8			12.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	386	1461	47	266	2460	552	123	679	106	1230	957	361
Shared Lane Traffic (%)												
Lane Group Flow (vph)	386	1508	0	266	3012	0	123	679	106	1230	957	361
Turn Type	pm+pt			pm+pt			Perm		pm+ov	pm+pt		pm+ov
Protected Phases	5	2		1	6			8	1	7	4	5
Permitted Phases	2			6			8		8	4		4
Detector Phase	5	2		1	6		8	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	36.0		15.0	34.0		35.0	35.0	15.0	15.0	32.0	15.0
Total Split (s)	18.0	60.0	0.0	16.0	58.0	0.0	53.0	53.0	16.0	31.0	84.0	18.0
Total Split (%)	11.3%	37.5%	0.0%	10.0%	36.3%	0.0%	33.1%	33.1%	10.0%	19.4%	52.5%	11.3%
Maximum Green (s)	11.0	53.8		9.0	51.8		46.8	46.8	9.0	25.0	77.8	11.0
Yellow Time (s)	4.0	4.7		4.0	4.7		4.7	4.7	4.0	4.0	4.7	4.0
All-Red Time (s)	3.0	1.5		3.0	1.5		1.5	1.5	3.0	2.0	1.5	3.0
Lost Time Adjust (s)	-2.0	-1.2	1.0	-2.0	-1.2	1.0	-1.2	-1.2	-2.0	-1.0	-1.2	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag	Lead	Lead		Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min		None	C-Min		None	None	None	None	Min	None
Walk Time (s)		7.0			7.0		7.0	7.0			7.0	
Flash Dont Walk (s)		22.0			20.0		21.0	21.0			18.0	
Pedestrian Calls (#/hr)		0			0		0	0			0	
Act Effct Green (s)	68.0	55.0		64.0	53.0		48.0	48.0	64.0	79.0	79.0	97.0
Actuated g/C Ratio	0.42	0.34		0.40	0.33		0.30	0.30	0.40	0.49	0.49	0.61
v/c Ratio	2.06	1.26		1.58	2.60		2.67	1.24	0.17	3.69	1.05	0.38
Control Delay	512.4	145.9		293.0	742.9		821.3	163.6	29.0	1235.0	81.6	17.5
Queue Delay	0.0	0.0		30.8	0.0		0.0	0.0	0.0	0.0	12.5	0.0
Total Delay	512.4	145.9		323.8	742.9		821.3	163.6	29.0	1235.0	94.1	17.5

Lanes, Volumes, Timings

127: Tryon Road & Jones Franklin Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	F		F	F		F	F	C	F	F	B
Approach Delay		220.6			708.9			237.0			634.0	
Approach LOS			F			F			F			F
Queue Length 50th (ft)	~581	-1047		~339	-2796		~218	-882	69	-2278	-1083	185
Queue Length 95th (ft)	m#568	m#966		m#312	m#2286		m#293	#1138	m107	#2550	#1345	256
Internal Link Dist (ft)		836			317			1096			742	
Turn Bay Length (ft)	250			350			175		275	550		250
Base Capacity (vph)	187	1194		168	1158		46	548	622	333	915	955
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		7	0		0	0	0	0	28	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	2.06	1.26		1.65	2.60		2.67	1.24	0.17	3.69	1.08	0.38

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 40 (25%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 3.69

Intersection Signal Delay: 529.9

Intersection LOS: F

Intersection Capacity Utilization 206.4%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

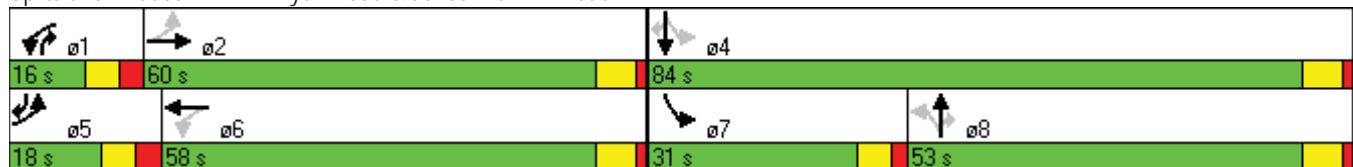
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 127: Tryon Road & Jones Franklin Road



Lanes, Volumes, Timings

1110: Tryon Road & Yates Mill Pond Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	1	1	2	1	1	1	1	1	1	1
Volume (vph)	36	1557	853	451	1760	34	1135	4	113	6	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			1%			1%			2%	
Storage Length (ft)	150		500	500		0	550		550	0		0
Storage Lanes	1		1	1		0	2		1	0		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850		0.997				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	3522	1575	1761	3511	0	3416	1853	1575	0	1752	1567
Flt Permitted	0.079			0.072			0.950				0.755	
Satd. Flow (perm)	146	3522	1575	133	3511	0	3416	1853	1575	0	1392	1567
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			650		2				126			3
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1031			1684			1402			376	
Travel Time (s)		15.6			25.5			21.2			10.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	1730	948	501	1956	38	1261	4	126	7	0	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1730	948	501	1994	0	1261	4	126	0	7	20
Turn Type	Perm		pm+ov	pm+pt			Prot		Perm	Perm		Perm
Protected Phases		2	3	1	6		3	8			4	
Permitted Phases	2		2	6					8	4		4
Detector Phase	2	2	3	1	6		3	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	12.0	12.0	7.0	7.0	12.0		7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	34.0	34.0	15.0	15.0	30.0		15.0	35.0	35.0	36.0	36.0	36.0
Total Split (s)	58.0	58.0	39.0	27.0	85.0	0.0	39.0	75.0	75.0	36.0	36.0	36.0
Total Split (%)	36.3%	36.3%	24.4%	16.9%	53.1%	0.0%	24.4%	46.9%	46.9%	22.5%	22.5%	22.5%
Maximum Green (s)	51.6	51.6	32.4	20.7	78.7		32.4	68.7	68.7	29.7	29.7	29.7
Yellow Time (s)	4.4	4.4	3.0	3.0	4.4		3.0	4.4	4.4	3.7	3.7	3.7
All-Red Time (s)	2.0	2.0	3.6	3.3	1.9		3.6	1.9	1.9	2.6	2.6	2.6
Lost Time Adjust (s)	-1.4	-1.4	-1.6	-1.3	-1.3	1.0	-1.6	-1.3	-1.3	-1.3	-1.3	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead	Lead			Lead		Lag	Lag	Lag	
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	None	None	C-Min		None	None	None	None	None	None
Walk Time (s)	7.0	7.0			7.0			7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0			16.0			21.0	21.0	22.0	22.0	22.0
Pedestrian Calls (#/hr)	0	0			0			0	0	0	0	0
Act Effct Green (s)	53.0	53.0	92.0	107.1	107.1		34.0	42.9	42.9	9.2	9.2	9.2
Actuated g/C Ratio	0.33	0.33	0.58	0.67	0.67		0.21	0.27	0.27	0.06	0.06	0.06
v/c Ratio	0.83	1.48	0.80	0.85	0.85		1.74	0.01	0.25	0.09	0.22	
Control Delay	42.2	241.1	15.6	51.0	3.6		372.9	38.5	7.2	73.2	68.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.2	241.1	15.6	51.0	3.6		372.9	38.5	7.2	73.2	68.9	

Lanes, Volumes, Timings

1110: Tryon Road & Yates Mill Pond Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	F	B	D	A		F	D	A	E	E	
Approach Delay		159.5			13.1			338.8			70.0	
Approach LOS		F			B			F			E	
Queue Length 50th (ft)	27	-1287	848	412	81		~1003	3	0	7	17	
Queue Length 95th (ft)	m14	m360	m38	m394	m76		#1140	13	50	25	48	
Internal Link Dist (ft)		951			1604			1322			296	
Turn Bay Length (ft)	150		500	500			550		550			
Base Capacity (vph)	48	1167	1182	589	2352		726	811	760	270	306	
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	
Reduced v/c Ratio	0.83	1.48	0.80	0.85	0.85		1.74	0.00	0.17	0.03	0.07	

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 68 (43%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.74

Intersection Signal Delay: 141.7

Intersection LOS: F

Intersection Capacity Utilization 119.6%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

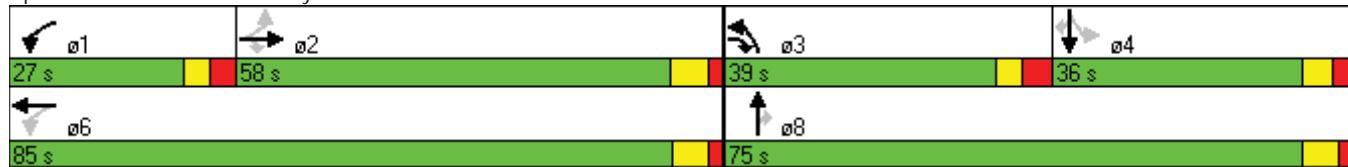
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1110: Tryon Road & Yates Mill Pond Road



Lanes, Volumes, Timings

2178: Jones Franklin Road & Holly Springs Road

7/10/2012



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑	↑	↑↑↑	↑	↑	↑↑
Volume (vph)	1000	28	475	700	36	1401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%		0%			1%
Storage Length (ft)	0	250		250	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	100	100		100	100	
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.95
Fr _t		0.850		0.850		
Flt Protected	0.950			0.950		
Satd. Flow (prot)	1770	1583	5085	1583	1761	3522
Flt Permitted	0.950			0.399		
Satd. Flow (perm)	1770	1583	5085	1583	740	3522
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		15		778		
Link Speed (mph)	45		45		45	
Link Distance (ft)	1176		477		633	
Travel Time (s)	17.8		7.2		9.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1111	31	528	778	40	1557
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1111	31	528	778	40	1557
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0	12.0	12.0	12.0
Minimum Split (s)	40.0	40.0	23.0	23.0	19.0	19.0
Total Split (s)	92.0	92.0	68.0	68.0	68.0	68.0
Total Split (%)	57.5%	57.5%	42.5%	42.5%	42.5%	42.5%
Maximum Green (s)	85.3	85.3	62.5	62.5	61.7	61.7
Yellow Time (s)	3.0	3.0	4.3	4.3	4.8	4.8
All-Red Time (s)	3.7	3.7	1.2	1.2	1.5	1.5
Lost Time Adjust (s)	-1.7	-1.7	-0.5	-0.5	-1.3	-1.3
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	26.0	26.0	10.0	10.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	87.0	87.0	63.0	63.0	63.0	63.0
Actuated g/C Ratio	0.54	0.54	0.39	0.39	0.39	0.39
v/c Ratio	1.15	0.04	0.26	0.71	0.14	1.12
Control Delay	104.5	5.6	33.3	6.1	5.1	68.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	8.6
Total Delay	104.5	5.6	33.3	6.1	5.1	76.5

Lanes, Volumes, Timings

2178: Jones Franklin Road & Holly Springs Road

7/10/2012



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	F	A	C	A	A	E
Approach Delay	101.8		17.1			74.7
Approach LOS	F		B			E
Queue Length 50th (ft)	~1391	7	136	0	5	~958
Queue Length 95th (ft)	m#1101	m6	168	98	m4	m98
Internal Link Dist (ft)	1096		397			553
Turn Bay Length (ft)		250		250	100	
Base Capacity (vph)	962	868	2002	1095	291	1387
Starvation Cap Reductn	0	0	0	0	0	24
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.15	0.04	0.26	0.71	0.14	1.14

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 88 (55%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.15

Intersection Signal Delay: 63.8

Intersection LOS: E

Intersection Capacity Utilization 102.5%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

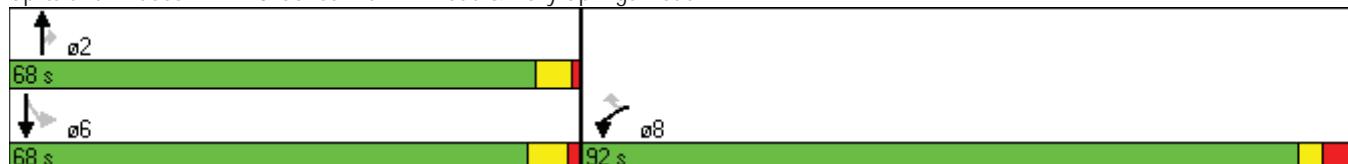
Queue shown is maximum after two cycles.

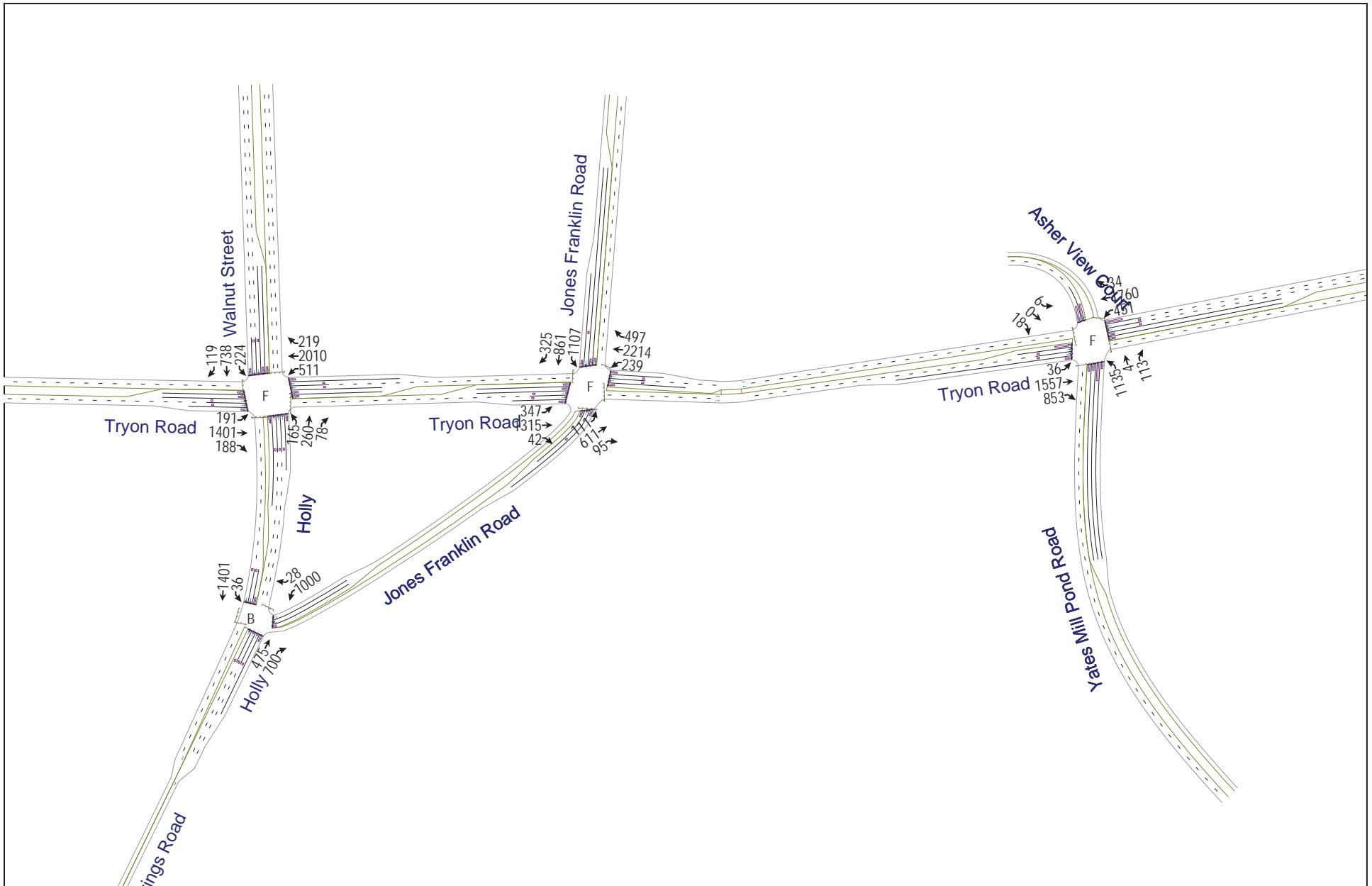
95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2178: Jones Franklin Road & Holly Springs Road





Lanes, Volumes, Timings
2100: Tryon Road & Walnut Street

7/10/2012

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	191	1401	188	511	2010	219	165	260	78	224	738	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)	0%			-1%			-1%			1%		
Storage Length (ft)	225		150	250		300	250		150	300		0
Storage Lanes	2		1	2		1	1		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.95	1.00
Fr _t			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	3539	1583	3450	3557	1591	1778	5111	1591	3416	3522	1575
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3433	3539	1583	3450	3557	1591	1778	5111	1591	3416	3522	1575
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			6			99			14			10
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1034			916			633			875	
Travel Time (s)		15.7			13.9			9.6			13.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	212	1557	209	568	2233	243	183	289	87	249	820	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	212	1557	209	568	2233	243	183	289	87	249	820	132
Turn Type	Prot	pm+ov										
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases			2			6			8			4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	12.0	7.0	7.0	12.0	7.0
Minimum Split (s)	15.0	42.0	15.0	15.0	41.0	15.0	15.0	35.0	15.0	15.0	34.0	15.0
Total Split (s)	15.0	80.0	19.0	32.0	97.0	23.0	19.0	35.0	32.0	23.0	39.0	15.0
Total Split (%)	8.8%	47.1%	11.2%	18.8%	57.1%	13.5%	11.2%	20.6%	18.8%	13.5%	22.9%	8.8%
Maximum Green (s)	8.0	73.0	12.0	25.0	90.0	16.0	12.0	28.0	25.0	16.0	32.0	8.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lead	Lag	Lag	Lead	Lead
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min	None	None	C-Min	None						
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		27.0			26.0			21.0			20.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	10.0	75.0	94.0	27.0	92.0	123.0	14.0	17.0	49.0	31.0	34.0	44.0
Actuated g/C Ratio	0.06	0.44	0.55	0.16	0.54	0.72	0.08	0.10	0.29	0.18	0.20	0.26
v/c Ratio	1.05	1.00	0.24	1.04	1.16	0.21	1.25	0.57	0.19	0.40	1.16	0.32
Control Delay	134.0	62.4	25.6	60.7	97.0	0.4	211.4	61.3	23.9	64.1	146.3	34.8
Queue Delay	0.0	0.0	0.0	0.0	36.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	134.0	62.4	25.6	60.7	133.4	0.4	211.4	61.3	23.9	64.1	146.3	34.8



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	E	C	E	F	A	F	E	C	E	F	C
Approach Delay		66.2			109.2			104.6			117.0	
Approach LOS		E			F			F			F	
Queue Length 50th (ft)	~133	689	125	~341	~1510	2	~257	115	62	127	~567	88
Queue Length 95th (ft)	m#185	m#1033	m153	m175	m154	m1	#427	149	44	178	#705	142
Internal Link Dist (ft)		954			836			553			795	
Turn Bay Length (ft)	225		150	250		300	250		150	300		
Base Capacity (vph)	202	1561	878	548	1925	1178	146	902	469	623	704	415
Starvation Cap Reductn	0	0	0	0	127	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	1.00	0.24	1.04	1.24	0.21	1.25	0.32	0.19	0.40	1.16	0.32

Intersection Summary

Area Type: Other

Cycle Length: 170

Actuated Cycle Length: 170

Offset: 40 (24%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.25

Intersection Signal Delay: 97.7

Intersection LOS: F

Intersection Capacity Utilization 107.6%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

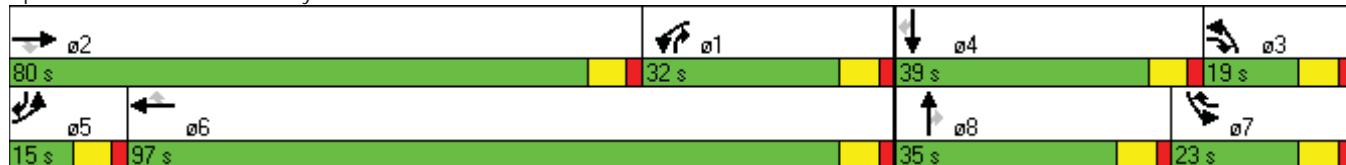
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2100: Tryon Road & Walnut Street



Lanes, Volumes, Timings

127: Tryon Road & Jones Franklin Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑	↑	↑↑	↑	↑↑	↑	↑	↑↑	↑↑	↑
Volume (vph)	347	1315	42	239	2214	497	111	611	95	1107	861	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)					-1%			4%				1%
Storage Length (ft)	250			150	350		150	175		275	550	250
Storage Lanes	2			1	1		1	1		1	2	1
Taper Length (ft)	100			100	100		100	100		100	100	100
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Fr _t				0.850			0.850			0.850		0.850
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	3382	3486	1560	1778	3557	1591	1734	1825	1552	3416	1853	1575
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	3382	3486	1560	1778	3557	1591	1734	1825	1552	3416	1853	1575
Right Turn on Red				Yes			Yes			Yes		Yes
Satd. Flow (RTOR)				17			19			4		5
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		916			397			1176			822	
Travel Time (s)		13.9			6.0			17.8			12.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	386	1461	47	266	2460	552	123	679	106	1230	957	361
Shared Lane Traffic (%)												
Lane Group Flow (vph)	386	1461	47	266	2460	552	123	679	106	1230	957	361
Turn Type	Prot		pm+ov									
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	5
Permitted Phases				2			6			8		4
Detector Phase	5	2	3	1	6	7	3	8	1	7	4	5
Switch Phase												
Minimum Initial (s)	7.0	12.0	7.0	7.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	15.0	36.0	14.0	15.0	34.0	15.0	14.0	35.0	15.0	15.0	32.0	15.0
Total Split (s)	18.0	69.0	14.0	20.0	71.0	35.0	14.0	46.0	20.0	35.0	67.0	18.0
Total Split (%)	10.6%	40.6%	8.2%	11.8%	41.8%	20.6%	8.2%	27.1%	11.8%	20.6%	39.4%	10.6%
Maximum Green (s)	11.0	62.0	7.0	13.0	64.0	28.0	7.0	39.0	13.0	28.0	60.0	11.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag	Lead									
Lead-Lag Optimize?				Yes				Yes				
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	C-Min	None	None	C-Min	None	None	None	None	None	Min	None
Walk Time (s)		7.0			7.0			7.0			7.0	
Flash Dont Walk (s)		22.0			20.0			21.0			18.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	13.0	64.0	78.0	15.0	66.0	101.0	9.0	41.0	61.0	30.0	62.0	80.0
Actuated g/C Ratio	0.08	0.38	0.46	0.09	0.39	0.59	0.05	0.24	0.36	0.18	0.36	0.47
v/c Ratio	1.49	1.11	0.06	1.69	1.78	0.58	1.34	1.54	0.19	2.04	1.42	0.49
Control Delay	288.8	82.0	4.9	356.3	383.4	22.2	257.5	293.8	35.1	505.5	235.1	33.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	288.8	82.0	4.9	356.3	383.4	22.2	257.5	293.8	35.1	505.5	235.1	33.2

Lanes, Volumes, Timings

127: Tryon Road & Jones Franklin Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	F	F	A	F	F	C	F	F	D	F	F	C
Approach Delay		122.2			320.4			258.7			337.0	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	~302	-1000	7	~431	-2160	377	~177	~1065	78	-1104	-1428	269
Queue Length 95th (ft)	m#322	m#1029	m10	m#414	m#1810	m395	#320	#1319	128	#1241	#1693	369
Internal Link Dist (ft)		836			317			1096			742	
Turn Bay Length (ft)	250		150	350		150	175		275	550		250
Base Capacity (vph)	259	1312	725	157	1381	953	92	440	559	603	676	744
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.49	1.11	0.06	1.69	1.78	0.58	1.34	1.54	0.19	2.04	1.42	0.49

Intersection Summary

Area Type: Other

Cycle Length: 170

Actuated Cycle Length: 170

Offset: 68 (40%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 2.04

Intersection Signal Delay: 275.3

Intersection LOS: F

Intersection Capacity Utilization 151.5%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

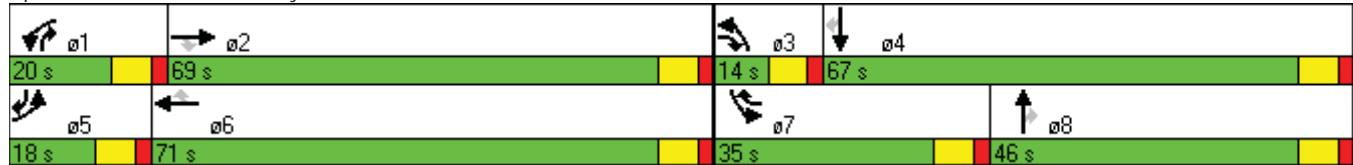
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 127: Tryon Road & Jones Franklin Road



Lanes, Volumes, Timings

1110: Tryon Road & Yates Mill Pond Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	1	2	1	2	1	2	1	2	1	2
Volume (vph)	36	1557	853	451	1760	34	1135	4	113	6	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			1%			1%			2%	
Storage Length (ft)	150		500	500		0	550		550	0		0
Storage Lanes	1		1	2		1	2		1	0		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00
Fr _t			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1761	3522	1575	3416	3522	1575	3416	1853	1575	0	1752	1567
Flt Permitted	0.066			0.950			0.950				0.755	
Satd. Flow (perm)	122	3522	1575	3416	3522	1575	3416	1853	1575	0	1392	1567
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			704			17			1			3
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		1031			1684			1402			376	
Travel Time (s)		15.6			25.5			21.2			10.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	1730	948	501	1956	38	1261	4	126	7	0	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1730	948	501	1956	38	1261	4	126	0	7	20
Turn Type	Perm		pm+ov	Prot		Perm	Prot		pm+ov	Perm		Perm
Protected Phases		2	3	1	6		3	8	1		4	
Permitted Phases	2		2			6			8	4		4
Detector Phase	2	2	3	1	6	6	3	8	1	4	4	4
Switch Phase												
Minimum Initial (s)	12.0	12.0	7.0	7.0	12.0	12.0	7.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	34.0	34.0	15.0	15.0	30.0	30.0	15.0	35.0	15.0	36.0	36.0	36.0
Total Split (s)	66.0	66.0	45.0	23.0	89.0	89.0	45.0	81.0	23.0	36.0	36.0	36.0
Total Split (%)	38.8%	38.8%	26.5%	13.5%	52.4%	52.4%	26.5%	47.6%	13.5%	21.2%	21.2%	21.2%
Maximum Green (s)	59.0	59.0	38.0	16.0	82.0	82.0	38.0	74.0	16.0	29.0	29.0	29.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead	Lead			Lead		Lead	Lag	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	C-Min	C-Min	None	None	C-Min	C-Min	None	None	None	None	None	None
Walk Time (s)	7.0	7.0			7.0	7.0		7.0		7.0	7.0	7.0
Flash Dont Walk (s)	20.0	20.0			16.0	16.0		21.0		22.0	22.0	22.0
Pedestrian Calls (#/hr)	0	0			0	0		0		0	0	0
Act Effct Green (s)	63.2	63.2	108.2	42.4	110.6	110.6	40.0	49.4	96.8		10.0	10.0
Actuated g/C Ratio	0.37	0.37	0.64	0.25	0.65	0.65	0.24	0.29	0.57		0.06	0.06
v/c Ratio	0.89	1.32	0.75	0.59	0.85	0.04	1.57	0.01	0.14		0.09	0.21
Control Delay	44.8	165.6	13.5	65.3	7.9	0.3	302.1	38.2	17.4		77.2	72.4
Queue Delay	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0
Total Delay	44.8	165.6	13.8	65.3	7.9	0.3	302.1	38.2	17.4		77.2	72.4

Lanes, Volumes, Timings

1110: Tryon Road & Yates Mill Pond Road

7/10/2012



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	F	B	E	A	A	F	D	B	E	E	E
Approach Delay		110.9			19.3			275.6			73.6	
Approach LOS		F			B			F			E	
Queue Length 50th (ft)	27	-1300	924	229	343	1	~1021	3	61	8	19	
Queue Length 95th (ft)	m17	m443	m67	m225	m361	m0	#1159	13	97	26	50	
Internal Link Dist (ft)		951			1604			1322			296	
Turn Bay Length (ft)	150		500	500			550		550			
Base Capacity (vph)	45	1310	1259	852	2292	1031	804	828	897	254	288	
Starvation Cap Reductn	0	0	41	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.89	1.32	0.78	0.59	0.85	0.04	1.57	0.00	0.14	0.03	0.07	

Intersection Summary

Area Type: Other

Cycle Length: 170

Actuated Cycle Length: 170

Offset: 106 (62%), Referenced to phase 2:EBTL and 6:WBT, Start of 1st Green

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.57

Intersection Signal Delay: 110.8

Intersection LOS: F

Intersection Capacity Utilization 110.2%

ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

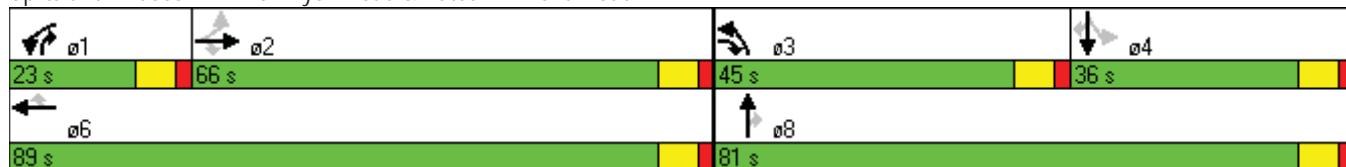
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1110: Tryon Road & Yates Mill Pond Road



Lanes, Volumes, Timings

2178: Jones Franklin Road & Holly Springs Road

7/10/2012



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↑↑	↑	↑↑↑	↑	↑	↑↑
Volume (vph)	1000	28	475	700	36	1401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%		0%			1%
Storage Length (ft)	250	250		250	100	
Storage Lanes	1	1		1	1	
Taper Length (ft)	100	100		100	100	
Lane Util. Factor	0.97	1.00	0.91	1.00	1.00	0.95
Frt		0.850		0.850		
Flt Protected	0.950			0.950		
Satd. Flow (prot)	3433	1583	5085	1583	1761	3522
Flt Permitted	0.950				0.429	
Satd. Flow (perm)	3433	1583	5085	1583	795	3522
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		21		778		
Link Speed (mph)	45		45		45	
Link Distance (ft)	1176		477		633	
Travel Time (s)	17.8		7.2		9.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1111	31	528	778	40	1557
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1111	31	528	778	40	1557
Turn Type		Perm		Perm	Perm	
Protected Phases	8		2			6
Permitted Phases		8		2	6	
Detector Phase	8	8	2	2	6	6
Switch Phase						
Minimum Initial (s)	7.0	7.0	12.0	12.0	12.0	12.0
Minimum Split (s)	40.0	40.0	24.0	24.0	19.0	19.0
Total Split (s)	73.0	73.0	97.0	97.0	97.0	97.0
Total Split (%)	42.9%	42.9%	57.1%	57.1%	57.1%	57.1%
Maximum Green (s)	66.0	66.0	90.0	90.0	90.0	90.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	C-Min	C-Min	C-Min	C-Min
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	26.0	26.0	10.0	10.0		
Pedestrian Calls (#/hr)	0	0	0	0		
Act Effct Green (s)	62.8	62.8	97.2	97.2	97.2	97.2
Actuated g/C Ratio	0.37	0.37	0.57	0.57	0.57	0.57
v/c Ratio	0.88	0.05	0.18	0.63	0.09	0.77
Control Delay	28.6	7.5	18.1	3.7	6.4	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.8
Total Delay	28.6	7.5	18.1	3.7	6.4	16.4

Lanes, Volumes, Timings

2178: Jones Franklin Road & Holly Springs Road

7/10/2012



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
LOS	C	A	B	A	A	B
Approach Delay	28.0		9.5			16.2
Approach LOS	C		A			B
Queue Length 50th (ft)	527	7	101	0	5	183
Queue Length 95th (ft)	m371	m7	132	60	m4	m73
Internal Link Dist (ft)	1096		397			553
Turn Bay Length (ft)	250	250		250	100	
Base Capacity (vph)	1373	646	2908	1239	454	2014
Starvation Cap Reductn	0	0	0	0	0	193
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.05	0.18	0.63	0.09	0.86

Intersection Summary

Area Type: Other

Cycle Length: 170

Actuated Cycle Length: 170

Offset: 118 (69%), Referenced to phase 2:NBT and 6:SBTL, Start of 1st Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Intersection Signal Delay: 17.4

Intersection LOS: B

Intersection Capacity Utilization 75.6%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2178: Jones Franklin Road & Holly Springs Road

