

# *Sketching Chapel Hill*

## MAKING TRANSPORTATION DECISIONS AT A LOCAL LEVEL

February 4, 2013

**MARTIN  
ALEXIOU  
BRYSON**

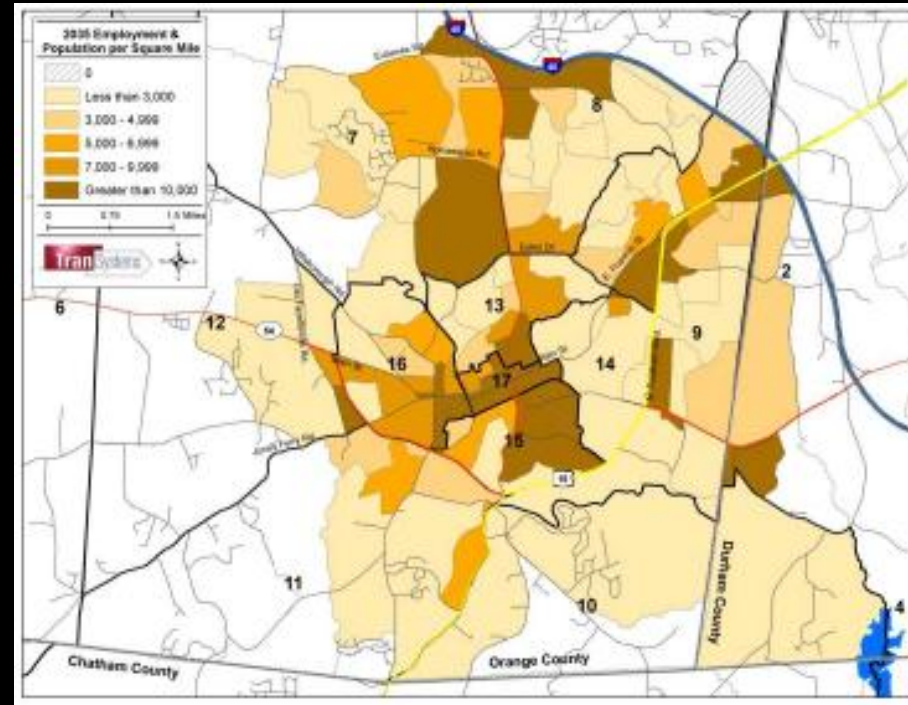
# Topics

- Transportation Planning and Decision Making
- Site Development Planning and Impacts
- Status of Transportation in Study Area

# Transportation Planning at the Broader Level

# General Notes

- Regional transportation planning develops plan to meet collective regional needs
- 25-30 year planning horizon
- Transportation demands (how much, what mode) based on land use projections
- Zoning and other development attributes for sites are used to projects number of jobs and households
- Aggregated into zones for modeling in the travel forecasting model
- Extensive public involvement in development the transportation plan



# Transportation Planning Process

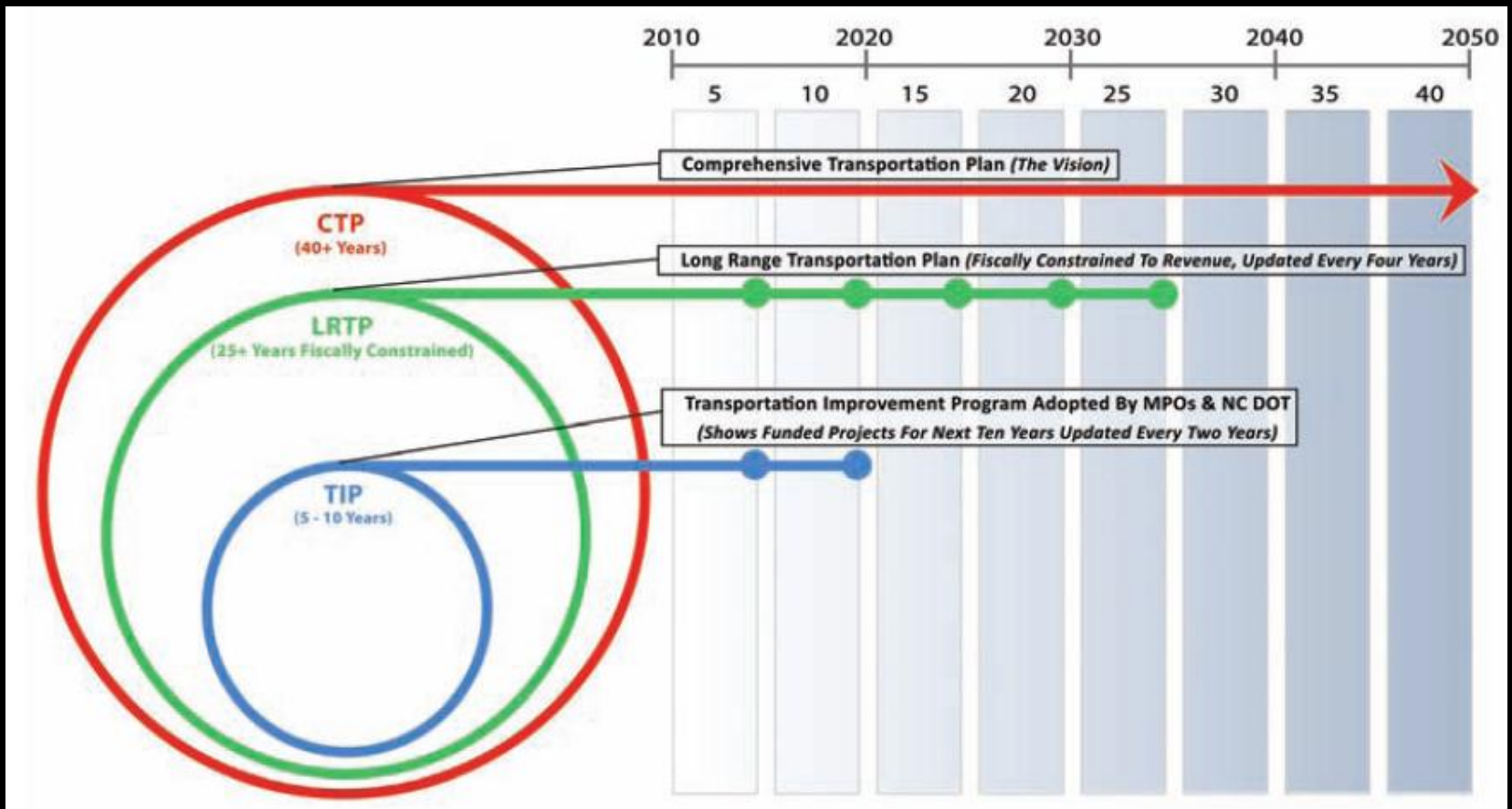


*The Transportation Planning Process Key Issues: A Briefing Book for Transportation Decisionmakers, Officials, and Staff*

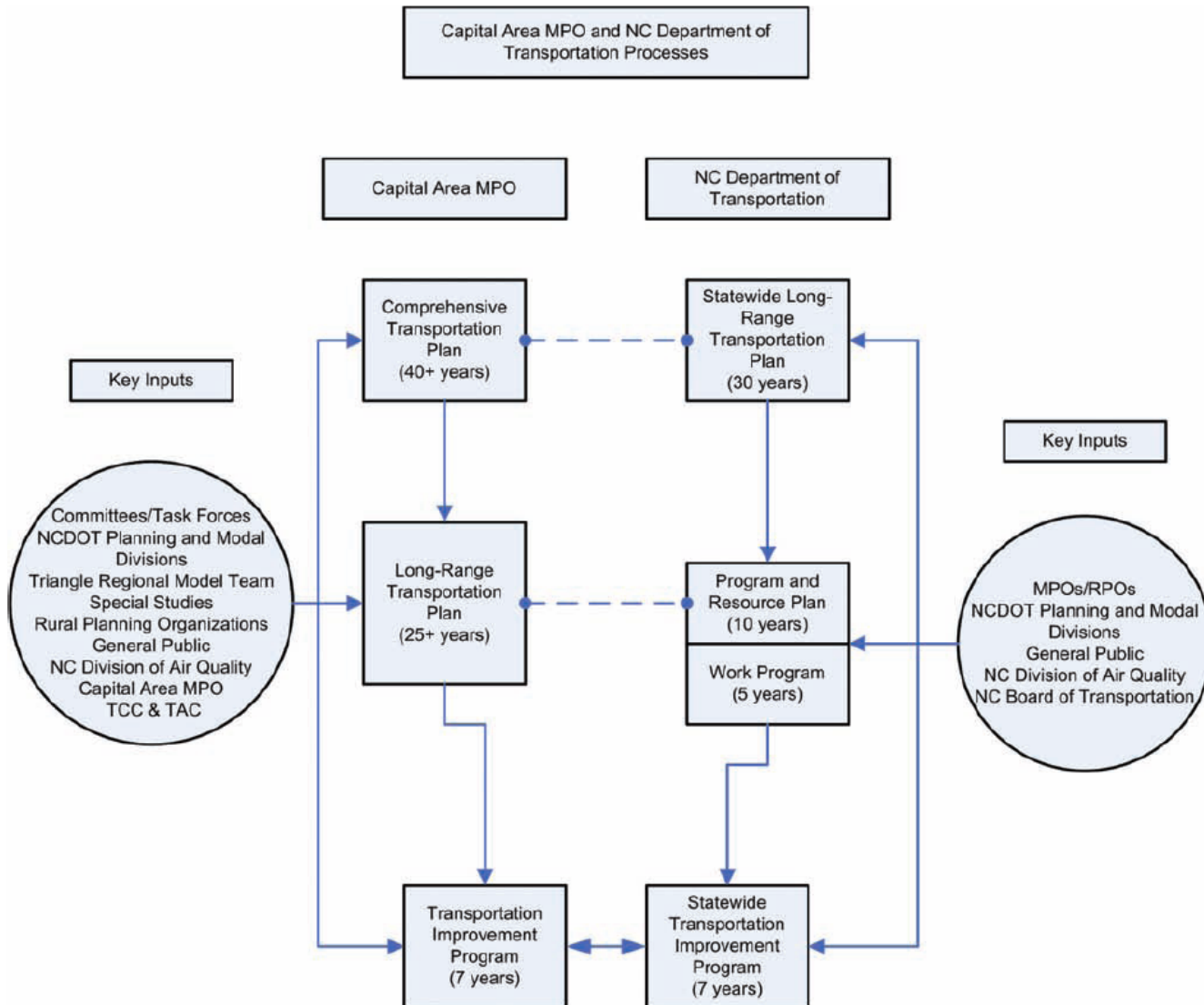
FHWA-HEP-07-039

[http://www.planning.dot.gov/documents/briefingbook/bbook\\_07.pdf](http://www.planning.dot.gov/documents/briefingbook/bbook_07.pdf)

# Products



# MPO and NCDOT



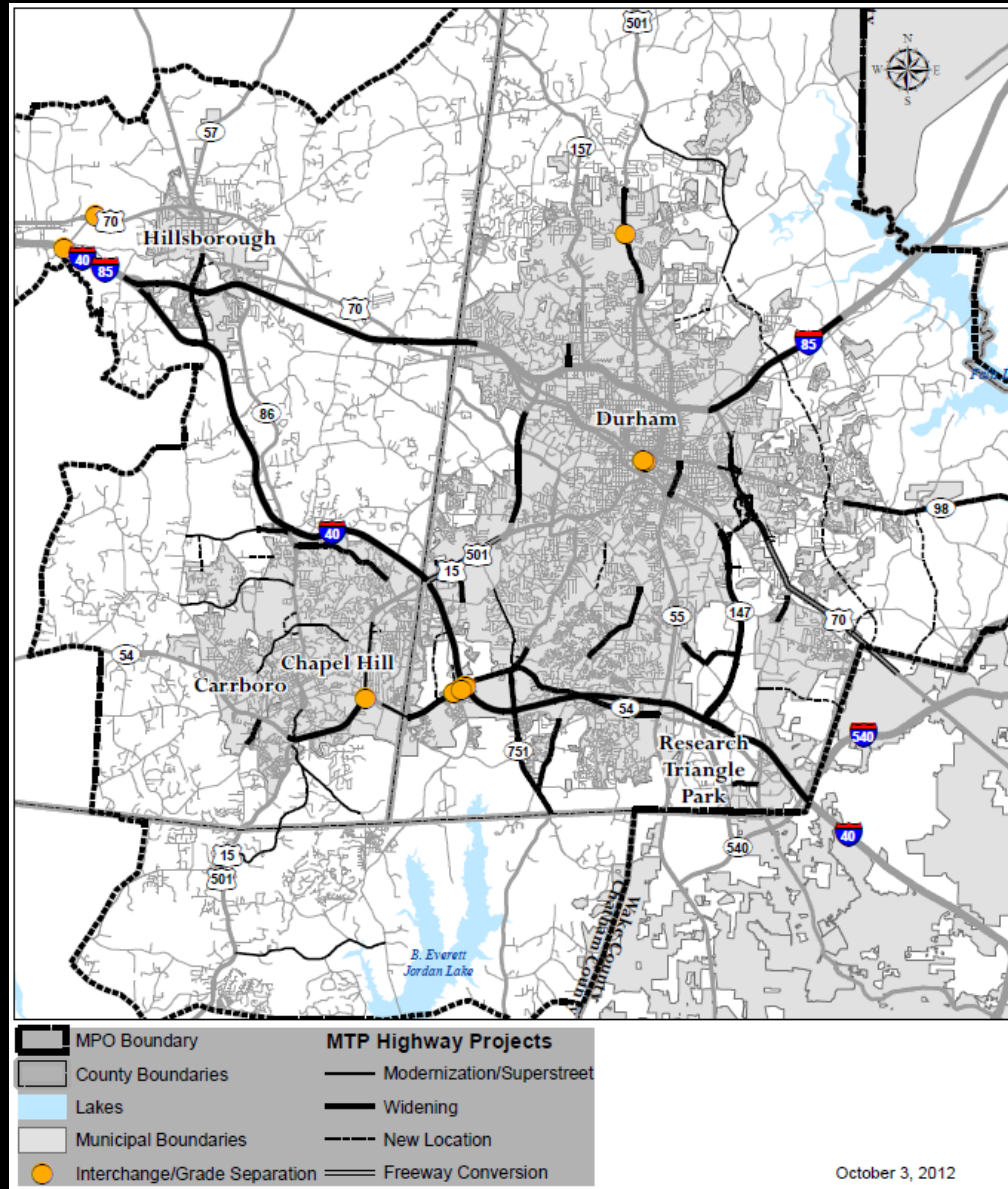
# Metropolitan Transportation Plans

## **LRTP Overview**

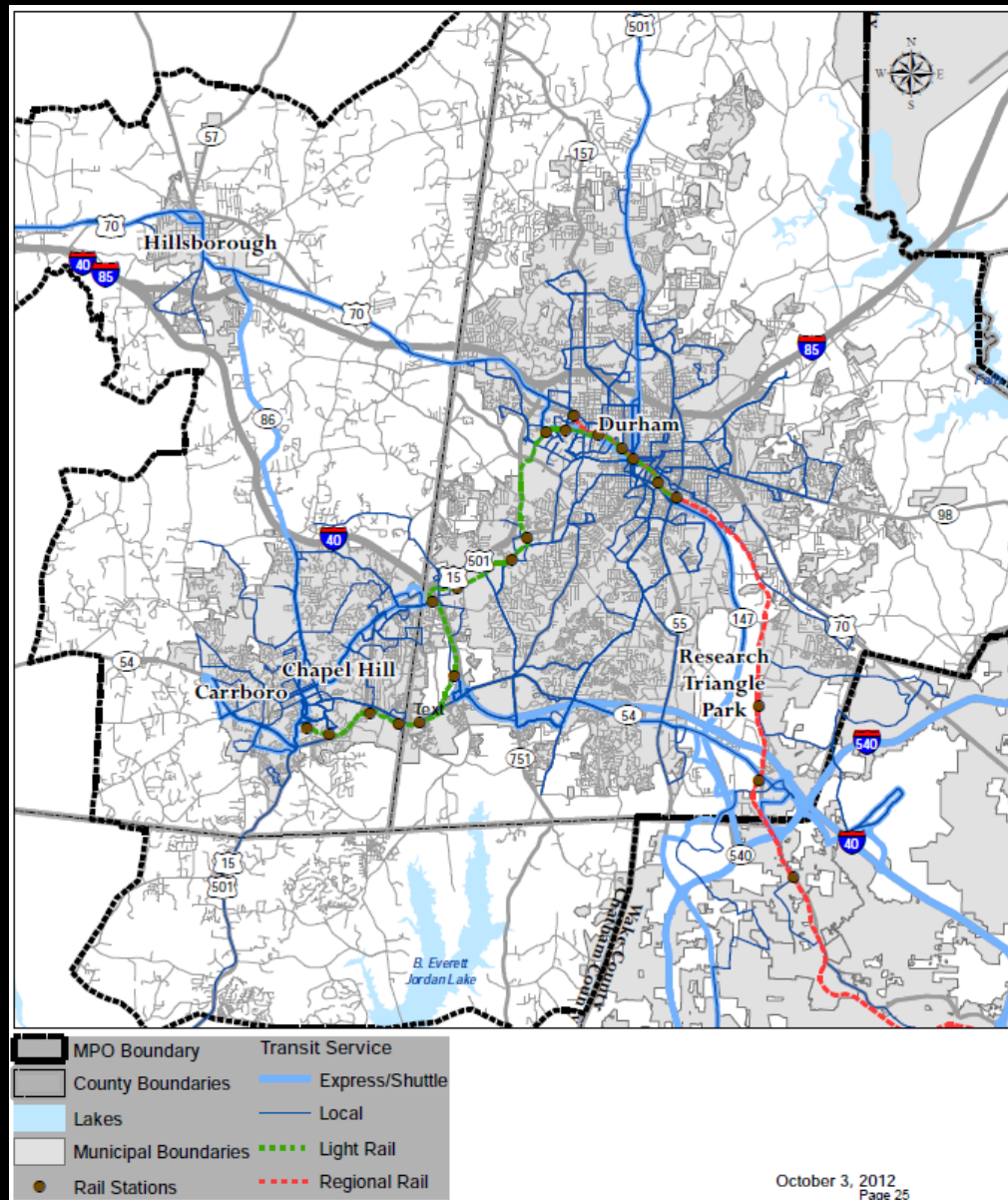
- Takes the "wish list" and filters it through a budget of available funds.
- Projects that make the cut are put into a construction time frame over 25 years.
- This plan is a federal requirement and is also used when a region is not meeting federal air quality standards; the plan must show that the projects in plan will help improve air quality.
- One of the most important parts of the LRTP is the Travel Demand Model—the output informs the project "purpose and need" for federal requirements and the design team will use it to scope the scale of the project.



# Highway Element



# Transit Element



# Travel Model Overview

- Model Study Area & Network
- Trip Generation – How many trips are made?
- Trip Distribution – Where do trips go?
- Mode Choice – What mode of travel is used?
- Traffic Assignment – What routes are used?

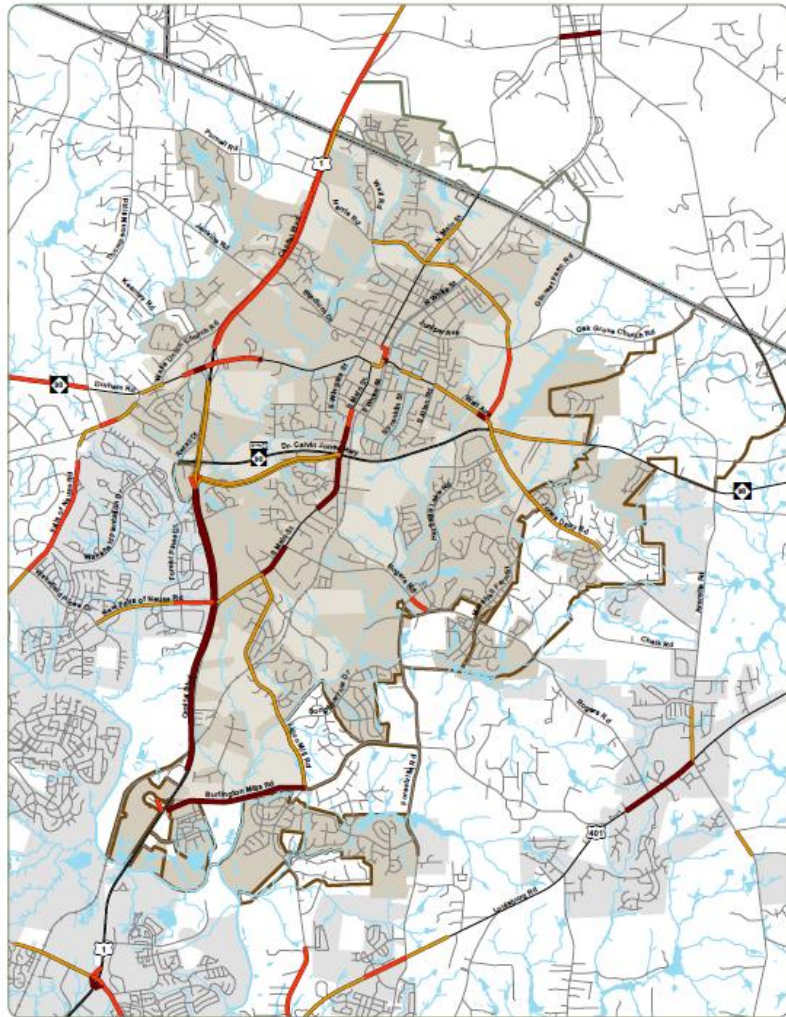


# Triangle Regional Model



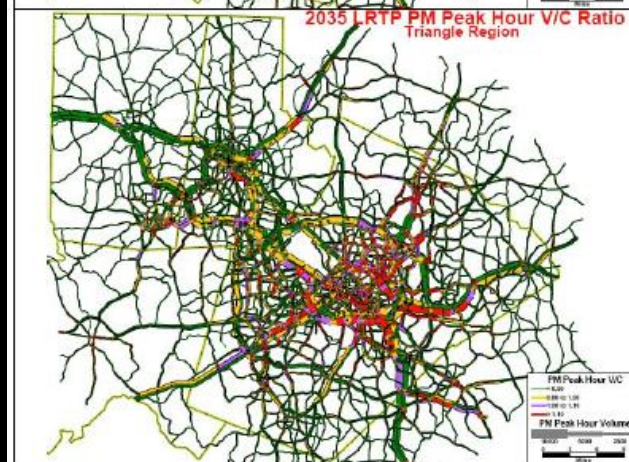
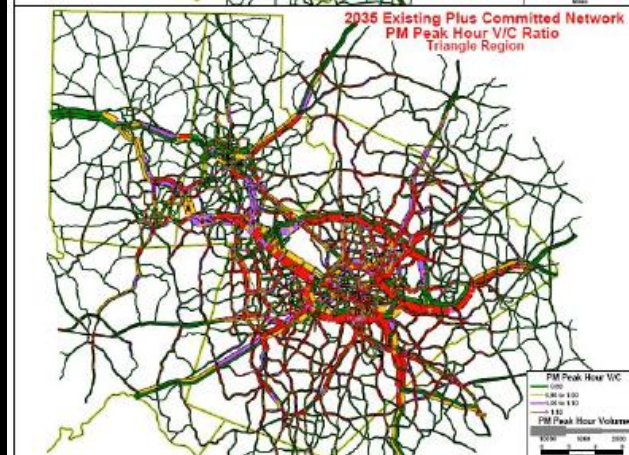
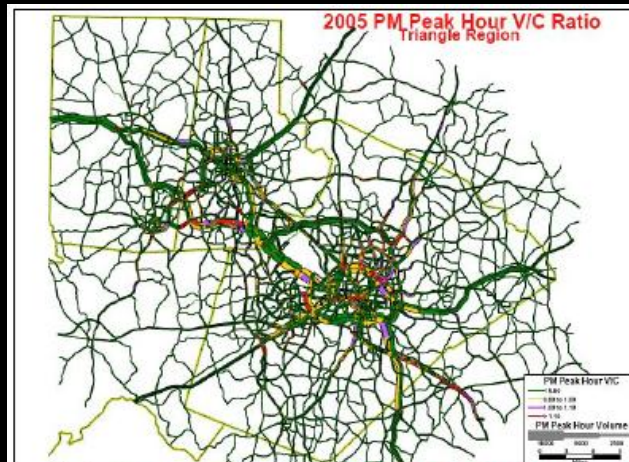
Figure 4.6

2035 Congested Corridors



— Highway  
 — Street  
 — Railroad  
 Body of Water  
 Stream/River  
 Wake Forest  
 Other Municipality  
 Wake Forest ETJ  
 County Boundary  
 Wake Forest Urban Service Area  
 Proposed Youngsville Annexation Line

**2035 Congested Corridors (V/C)**  
 Approaching Capacity (0.8 to 1.0)  
 At Capacity (1.0 to 1.2)  
 Over Capacity (Greater than 1.2)



The top map shows levels of congestion during the 2005 “base year.” The afternoon rush hour (the “PM Peak Hour”) is used since it is the heaviest travel period of the day. Congestion is calculated using a “volume to capacity ratio,” or v/c ratio, which indicates the volume of traffic using each roadway segment divided by the capacity of vehicles that can use each segment before it breaks down. These v/c ratios are color coded as follows:

< 0.80  
 0.80 to 1.00  
 1.00 to 1.10  
 > 1.10

The middle map shows the same type of information, but it is for the population and job levels we forecast in the Year 2035 but only those new road and transit facilities that are already well-underway, which is called the “existing plus committed” transportation network.

The bottom map is based on the same growth assumptions as the previous map: Year 2035 population and jobs, but this time with all the new road and transit facilities included in this 2035 Long Range Transportation Plan.

Conditions will be better than if we only build what is already in the pipeline, but congestion is forecast to exceed the levels in our 2005 base year. Larger versions of all three maps are available from the DCHC MPO and CAMPO staffs.

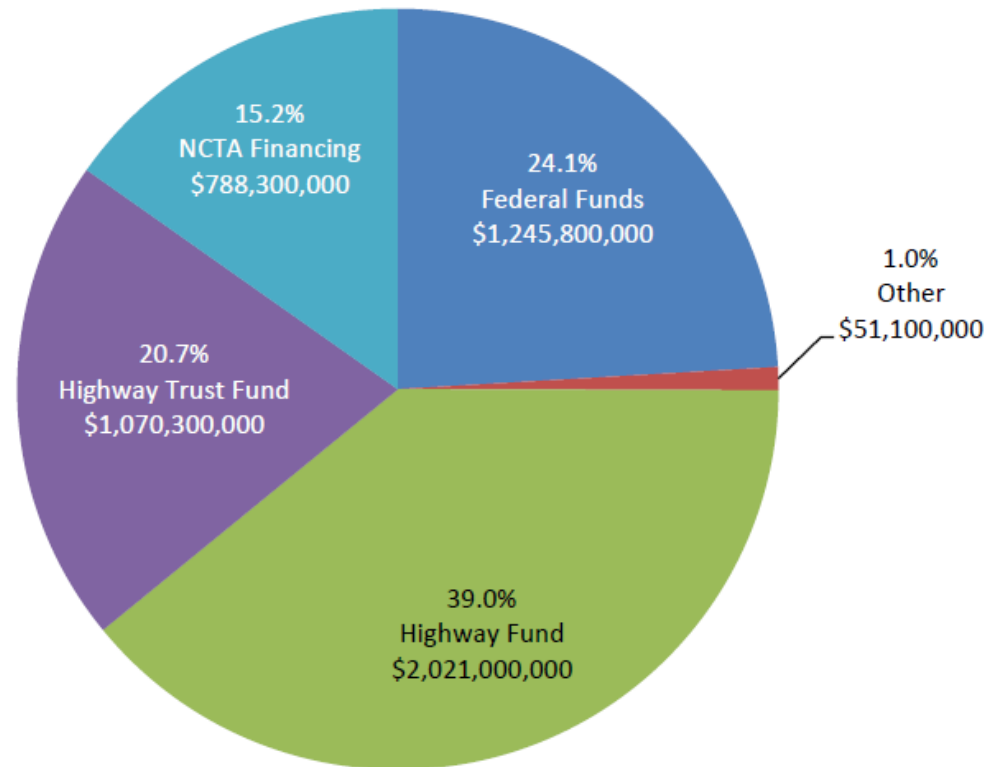
# NCDOT Revenue Sources

## Sources of Funds SFY 2012-13 by Major Funding Source Total Funding = \$5.2 Billion

Note: NCTA budget based on successful financing

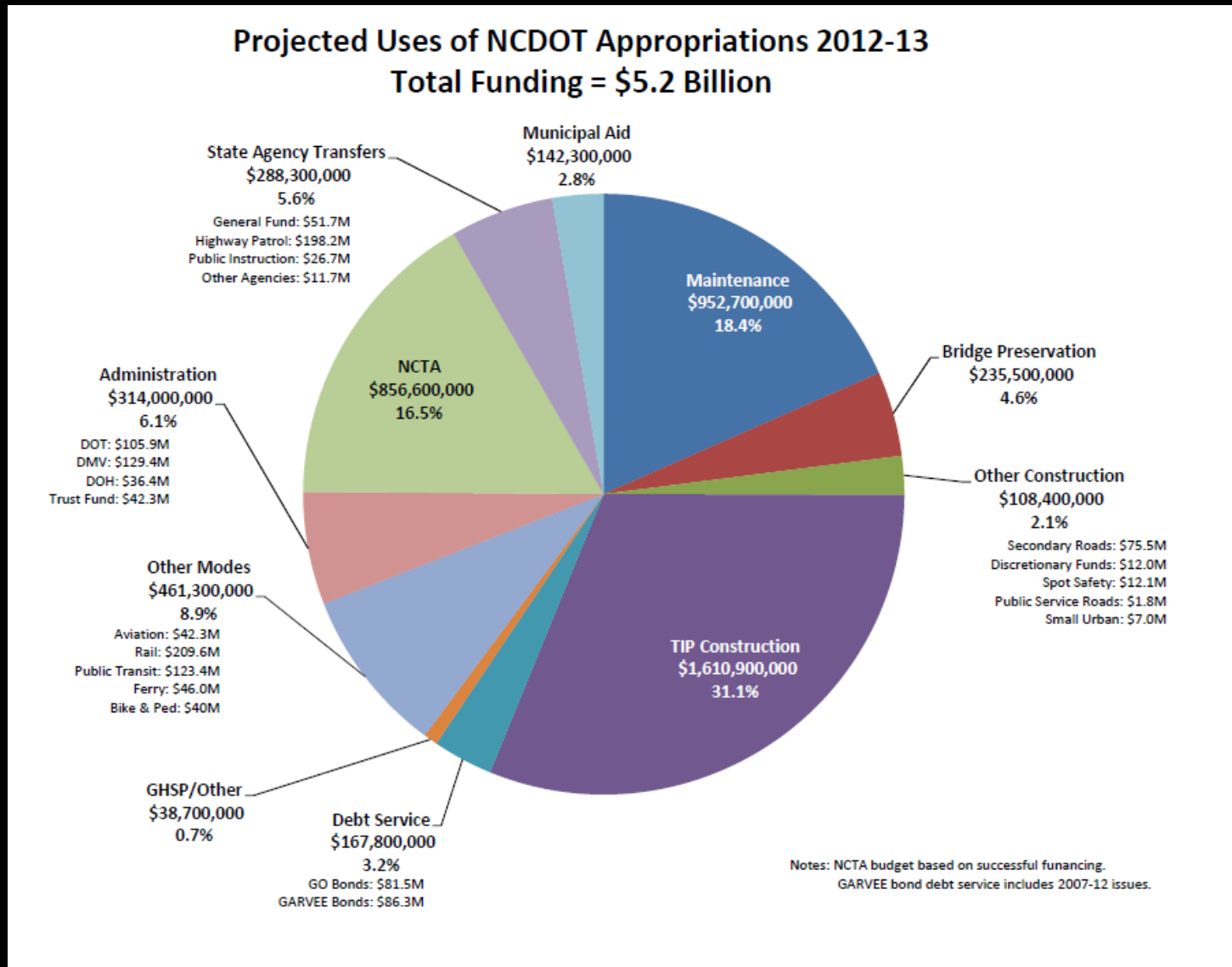
### Excluding NCTA:

Highway Trust Fund 25%  
Highway Fund 46%  
Federal Funds 28%  
Other 1%



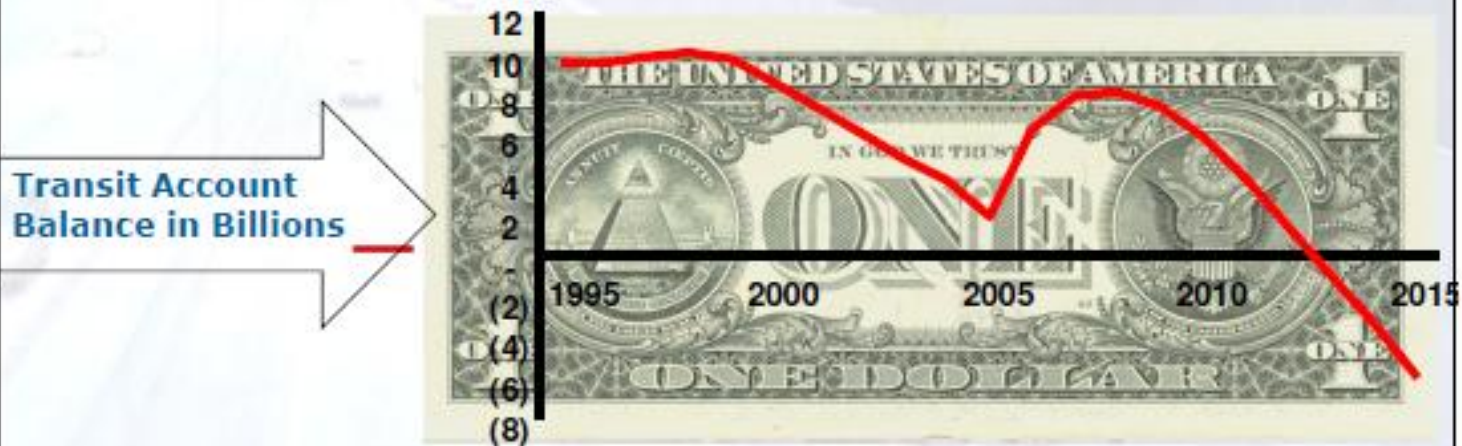


# Projected NCDOT Spending



# Funding Projections (and not just Federal level)

## Present – Federal Outlook



# Transportation Factors to Consider in Site Development



# Transportation Factors at Site Level

## Land Use:

- Trips generated
  - Peak
  - Daily
- Distribution of Trips to/from site

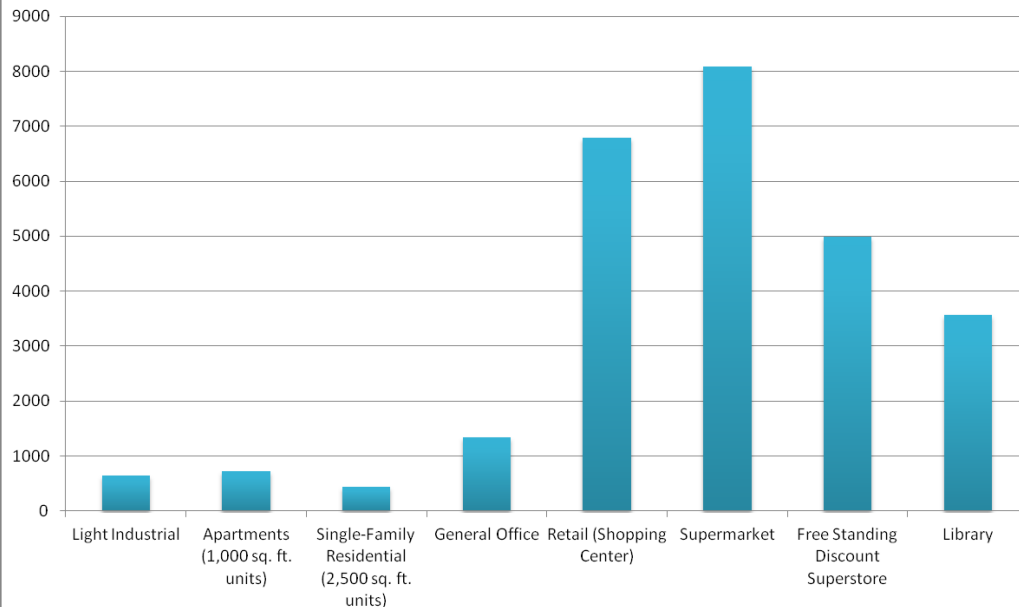
## Transportation System:

- Alternative Modes
- Routing
  - Site access points
  - Roadway capacity– INTERSECTION CAPACITY IS TYPICALLY BIGGEST CONSTRAINT TO DEVELOPMENT
  - Committed improvements
  - Financial capacity of development to make improvements (all modes)

# Steps for Projected Site Trips

- Four steps to determine volume of site trips:
  - Trip Generation
  - Mode Split
  - Trip Distribution
  - Trip Assignment

Average Daily Trips (ADT) for a 100,000 sq. ft. Development



## General Office Building (710)

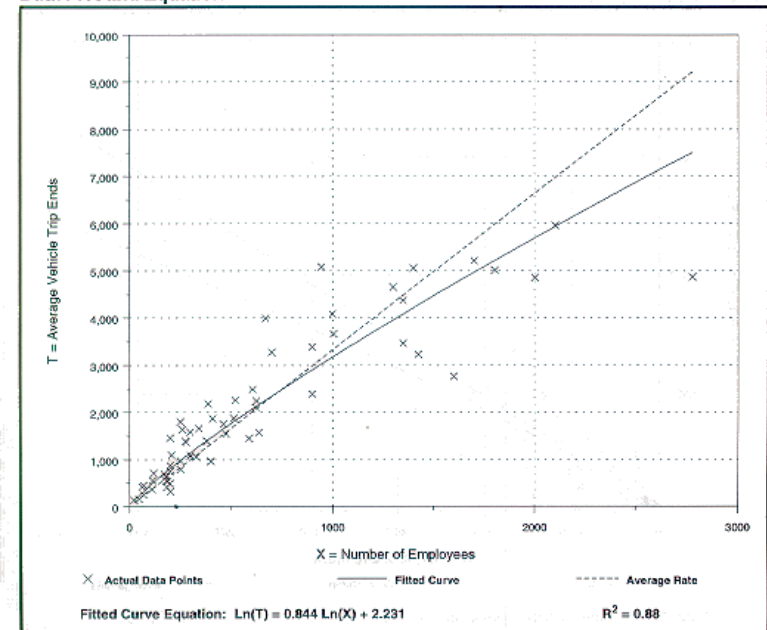
Average Vehicle Trip Ends vs: Employees  
On a: Weekday

Number of Studies: 62  
Avg. Number of Employees: 610  
Directional Distribution: 50% entering, 50% exiting

### Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
3.32	1.59 - 7.28	2.16

### Data Plot and Equation



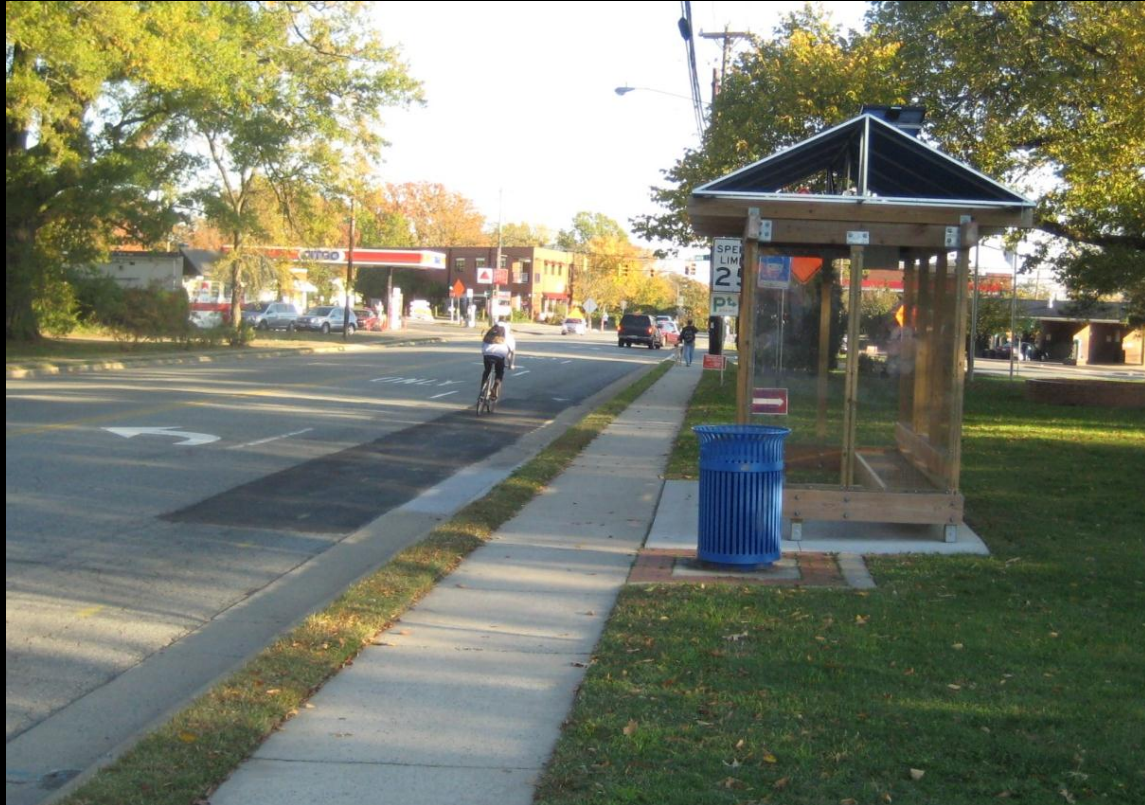
# Vehicular Trip Reductions

- Mixed use
- Transit Oriented Development (TOD)
- Transit service
- Sidewalks/connectivity
- Bike facilities
- Incentives



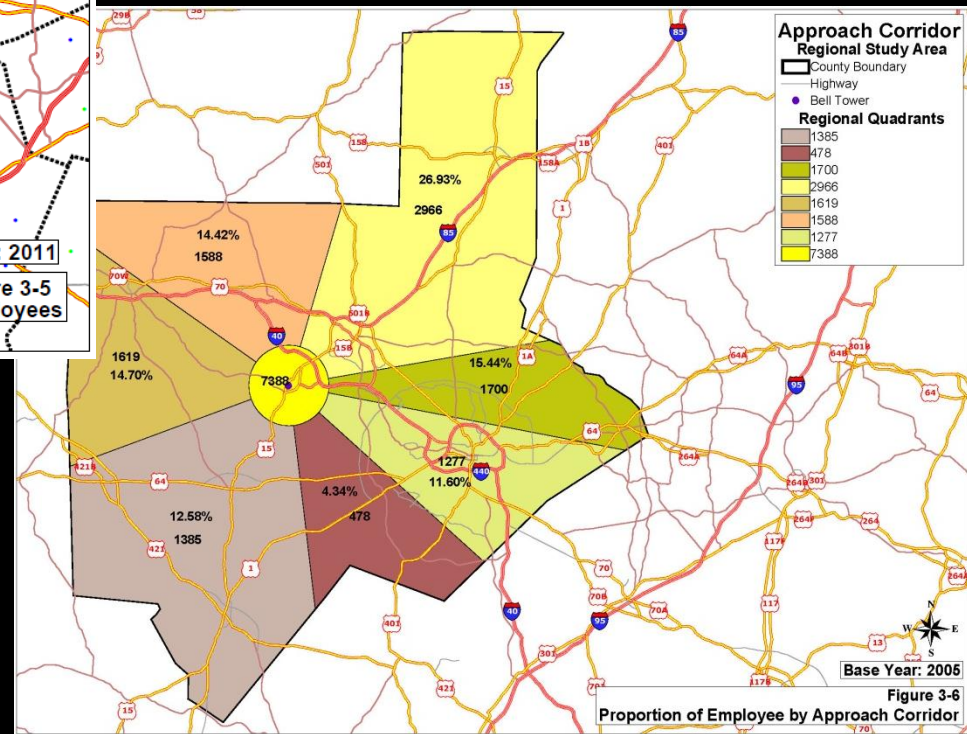
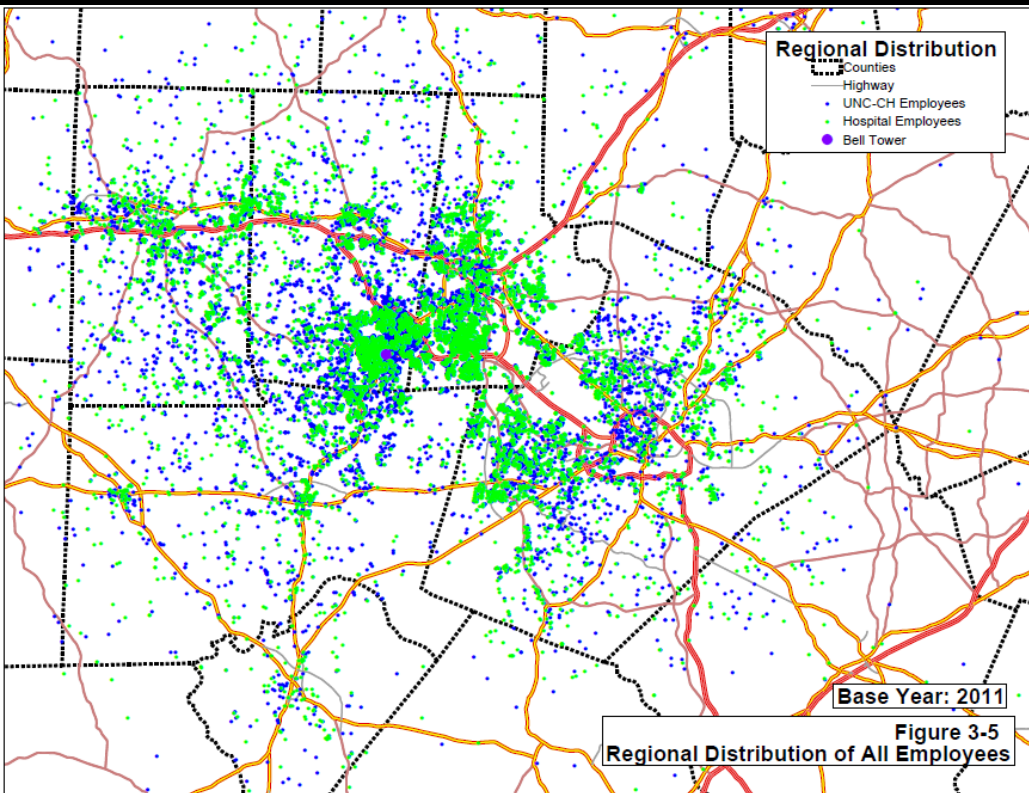
# Mode Split

- How people travel:
  - Options (including road capacity)
  - Relative travel times
  - Cost
  - General availability
  - Practical rules of thumb
  - other





# Tool for Work Trip Distribution

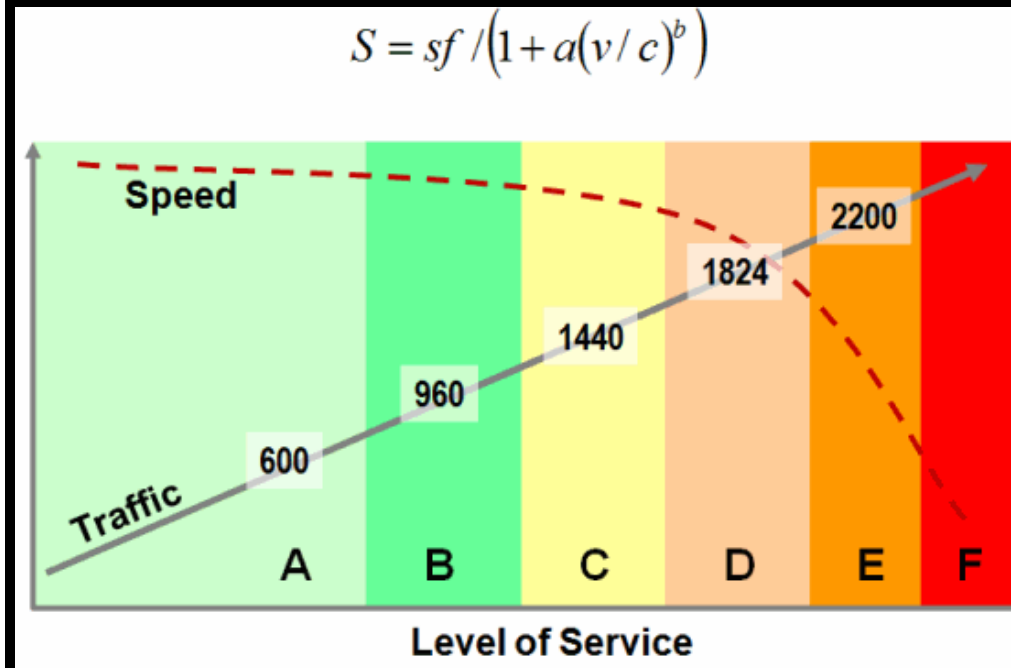
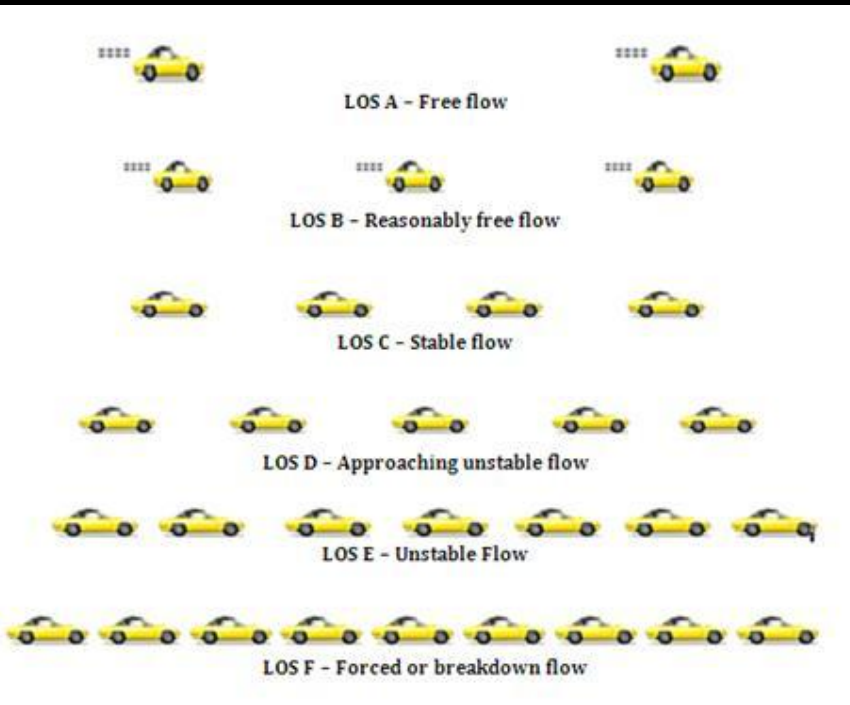


# Traffic Level of Service (LOS)

Assessment of road system performance:

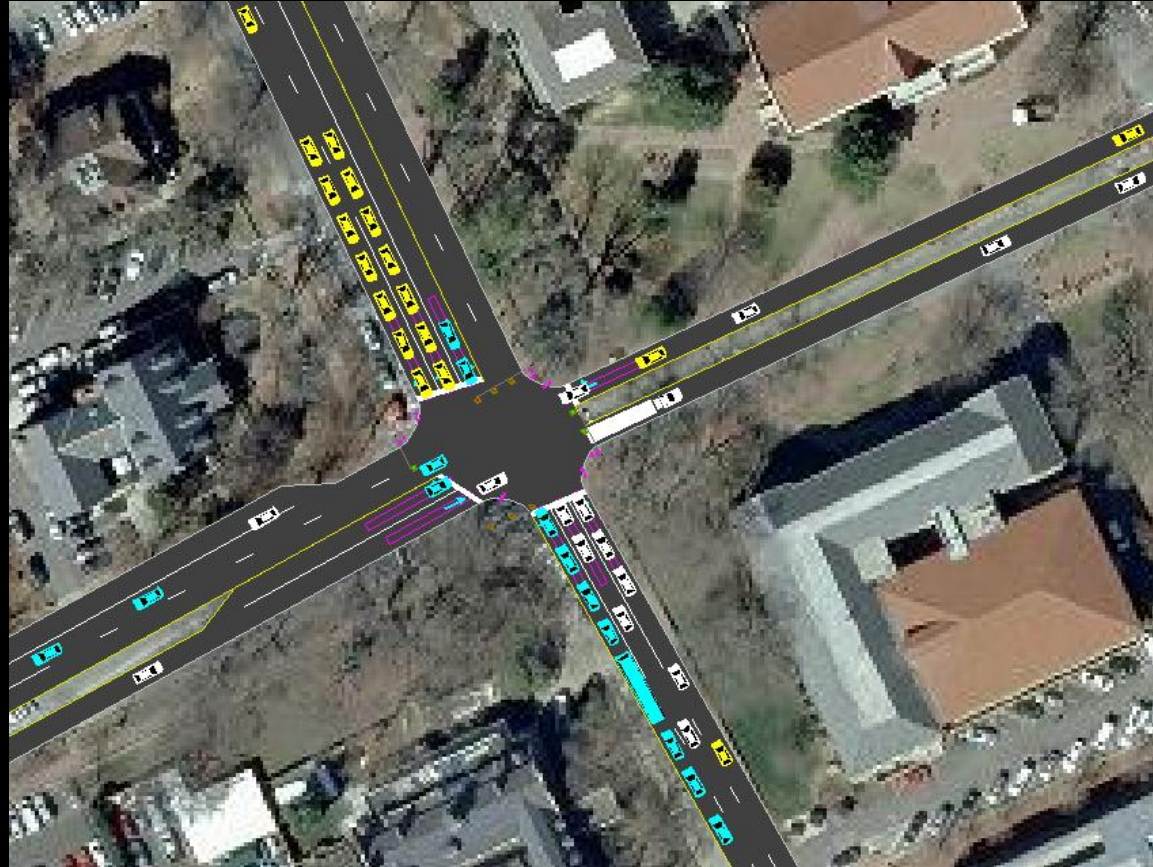
- Today
- Year that project opens but without project
- Year that project opens with project
- LOS measures traffic delay for an approach or intersection as a whole
- Applies to both signalized and unsignalized intersections
- Grades A through F
- Signalized Intersections
  - Overall LOS D generally considered as acceptable level of service for urban areas
  - Careful to provide ample time for side streets
- Unsignalized Intersections
  - Not based on overall intersection LOS, only measures the stopped approach
  - Not uncommon for side streets to operate at LOS E or F
  - Does not necessarily indicate over-congestion or the need for signalization

# Traffic Level of Service (LOS)



# Traffic Impact Analysis (TIA)

- 1) Insure that the transportation system is adequate, safe and efficient
- 2) To determine the difference between perception and accepted practices
- 3) Promote more coordination between state and local officials
- 4) Help provide elected officials with enough information to make a decision





# Benefits of Traffic Study



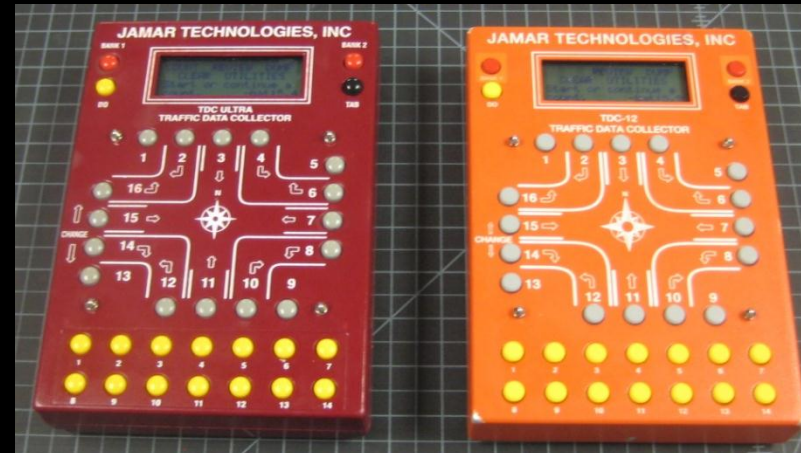
**Better Long Term  
Access to Each Site**

**Better Site Design**

**Better Corridor Planning**

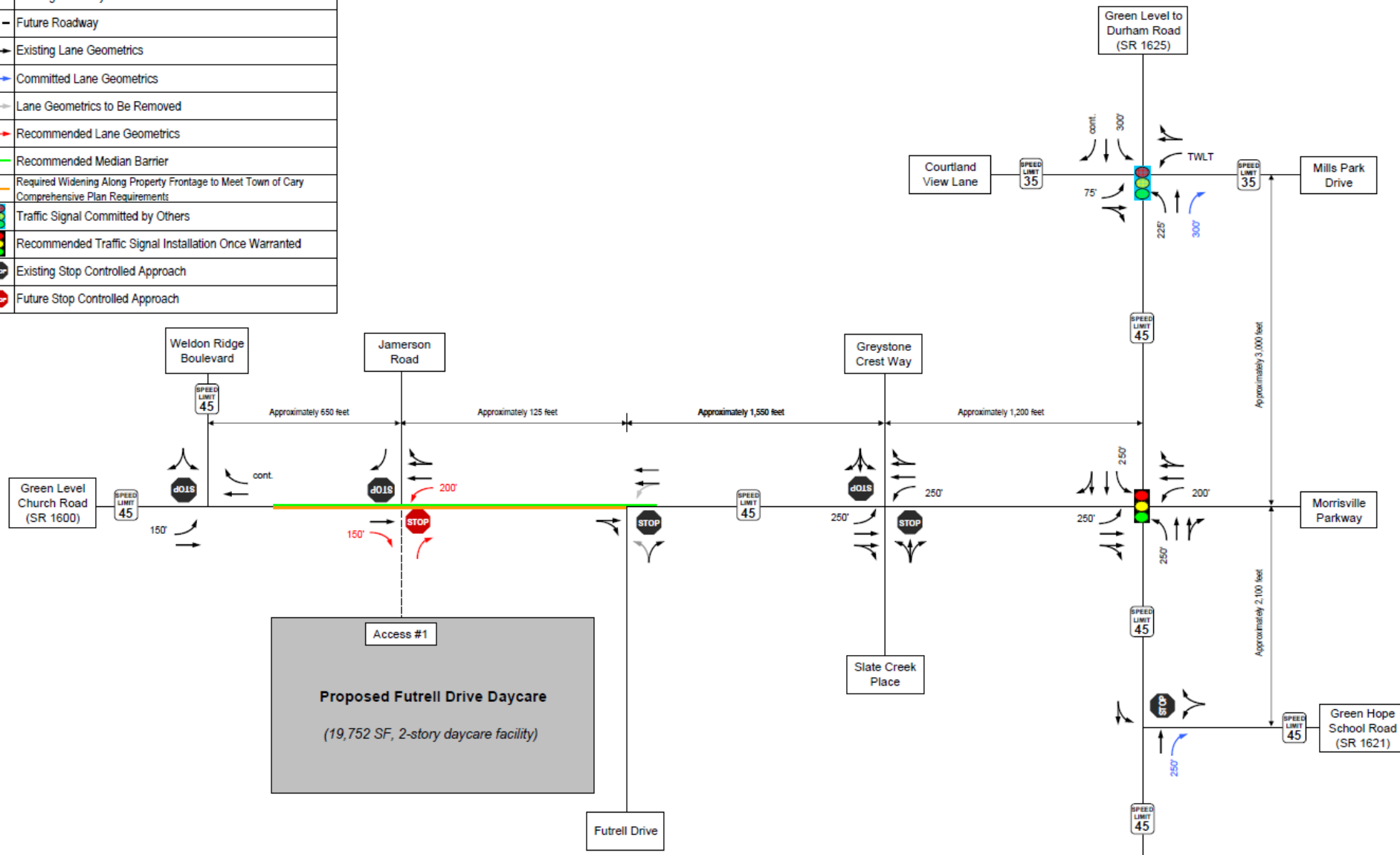
# Traffic Impact Analysis Elements

- Scoping
- Data Collection
- Traffic Data Analysis
  - Existing Data
  - Background Growth Trips
  - Site Trips
    - Trip Generation, Distribution, & Assignment
- Traffic Analyses
  - Existing, No-Build, & Build
- Report
  - Conclusions & Recommendations



# Recommendations

	Existing Roadway
	Future Roadway
	Existing Lane Geometrics
	Committed Lane Geometrics
	Lane Geometrics to Be Removed
	Recommended Lane Geometrics
	Recommended Median Barrier
	Required Widening Along Property Frontage to Meet Town of Cary Comprehensive Plan Requirements
	Traffic Signal Committed by Others
	Recommended Traffic Signal Installation Once Warranted
	Existing Stop Controlled Approach
	Future Stop Controlled Approach



# Town Requirements

## Guidelines for Traffic Impact Analysis

**Town of Chapel Hill, North Carolina**

**Effective Date: October 1, 2001**  
Adopted by the Town Council on June 11 2001

### Table of Contents

I.	Introduction .....	1
II.	Requirements for Traffic Impact Analysis .....	1
III.	Responsibilities for Traffic Impact Analysis .....	2
IV.	Traffic Impact Study Overview: Requirements, Meetings, and Waivers .....	2
V.	Planning Horizons and Roadway Network Assumptions .....	2
VI.	Traffic Impact Report Requirements and Format .....	3
A.	Summary .....	4
B.	Introduction .....	4
1.	Project Overview .....	4
2.	Site Location & Study Area Boundaries .....	4
3.	Description of Site .....	5
4.	Existing & Proposed Uses in the Vicinity of Site .....	5
5.	Existing & Committed Surface Traffic Network .....	5
C.	Existing Traffic Conditions .....	6
D.	Future Traffic Conditions Without Proposed Development .....	6
E.	Proposed Project Traffic .....	7
1.	Trip Generation .....	7
2.	Adjustments to Trip Generation Rates .....	7
3.	Trip Generation Budget .....	8
4.	Trip Distribution .....	8
5.	Project Trip Assignment .....	9
F.	Future Traffic Forecasts with the Proposed Development .....	9
G.	Project Impacts .....	9
1.	Generalized Daily Traffic Volume LOS .....	9
2.	Access Analysis .....	9
3.	Intersection Analysis .....	9
4.	Peak Hour Intersection LOS .....	10
5.	Turn Lane Storage Requirements .....	11
6.	Sight Distance .....	11
7.	Acceleration/Deceleration Lanes .....	11
8.	Pedestrian and Bicycle Access .....	11
9.	Public Transportation Analysis .....	11
H.	Special Analysis/Issues .....	11
I.	Mitigation Measures/Recommendations .....	11
VII.	Traffic Impact Analysis Attachments .....	13

# Transportation In Study Area

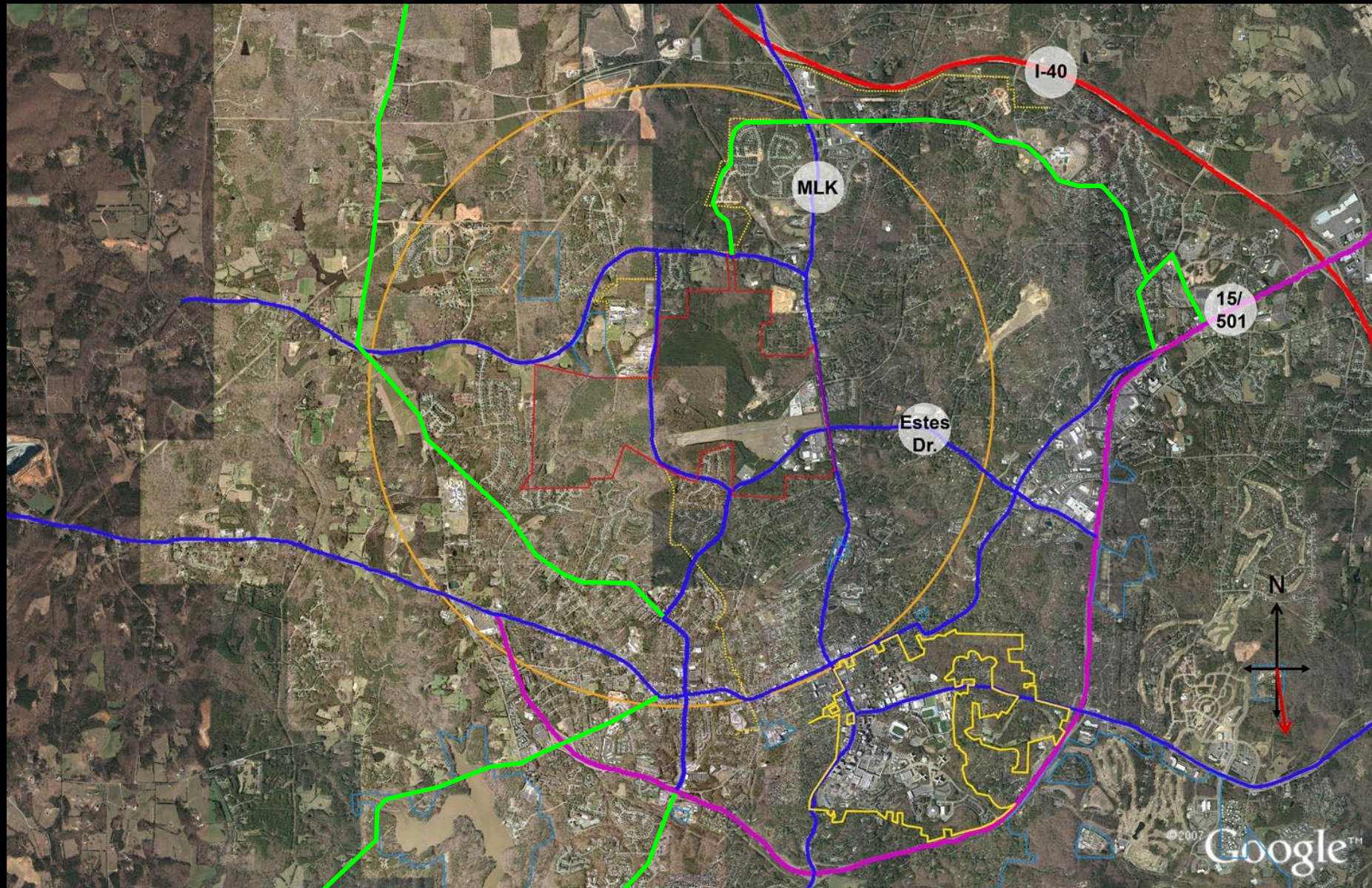


# Transportation in Area

- Roads
- Transit
- Bike  
facilities/greenways
- Pedestrian  
paths/sidewalks
- Current and planned

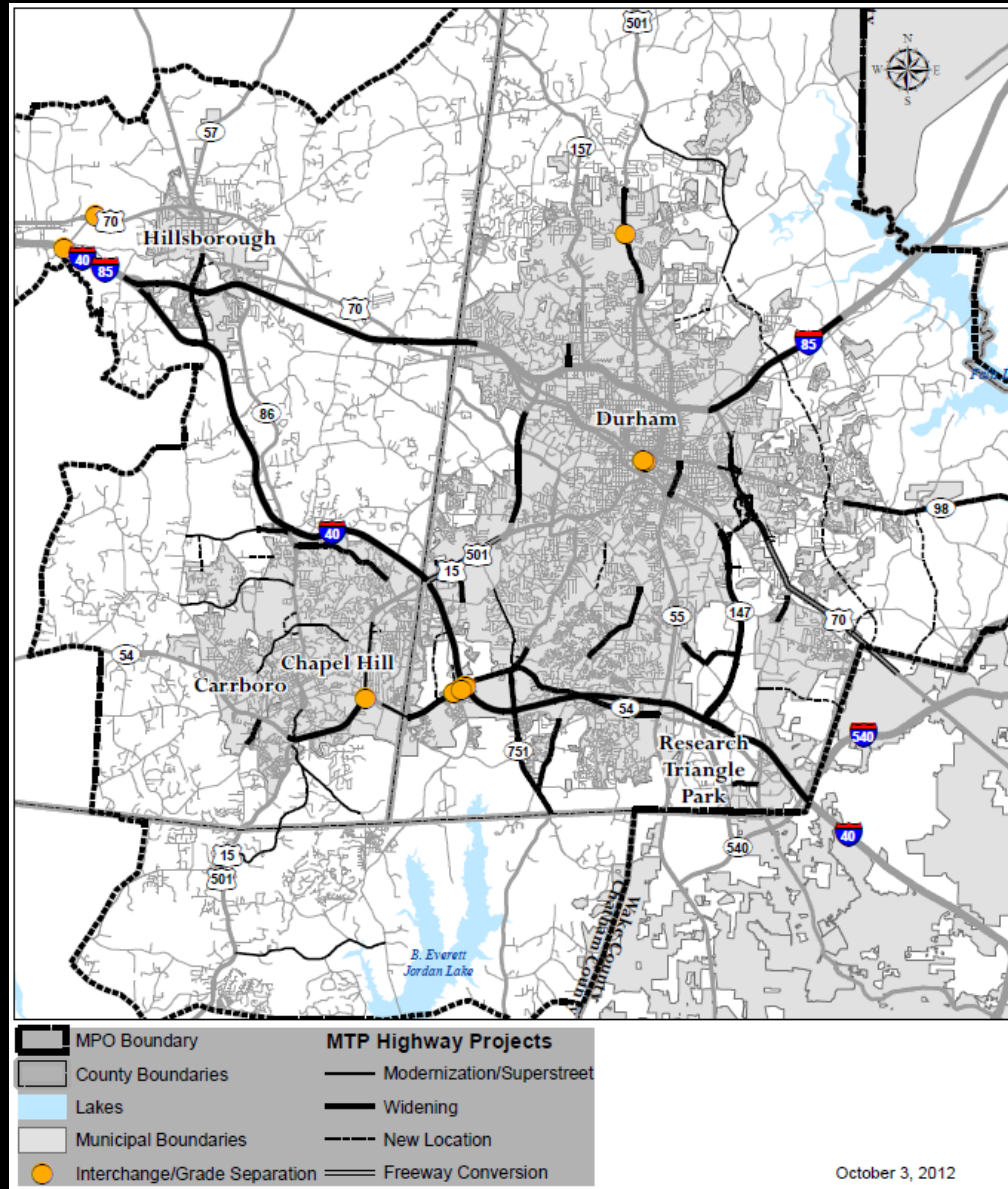


# Existing Roads



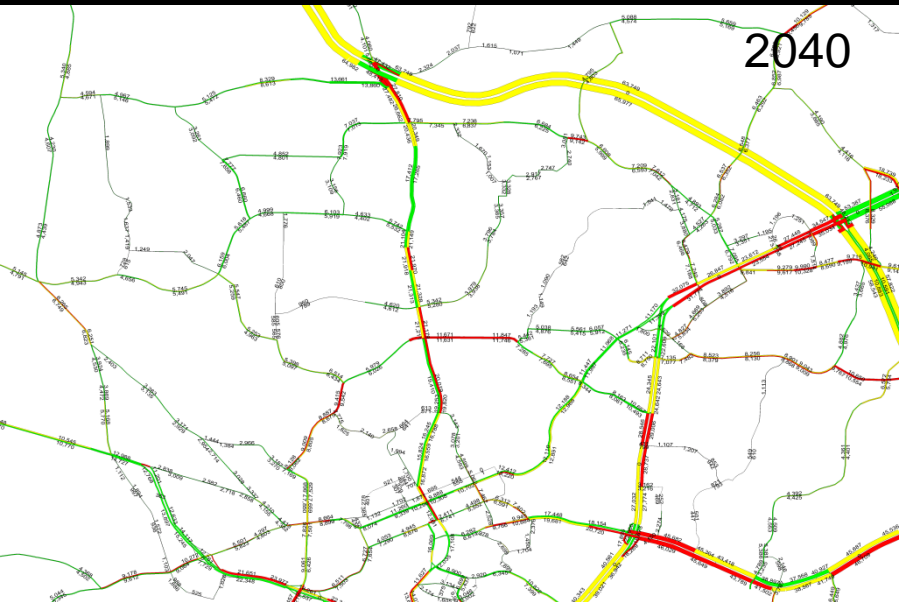
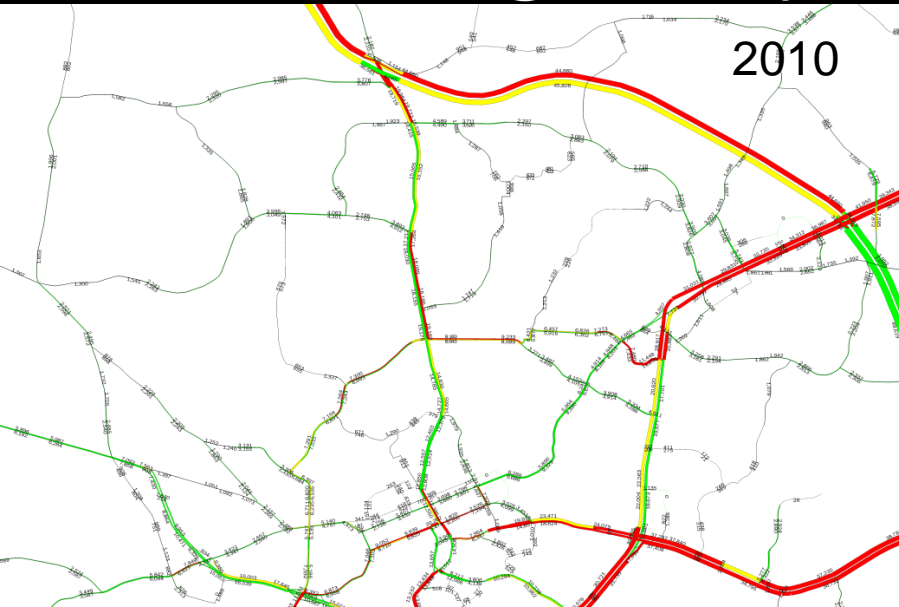


# Highway Element

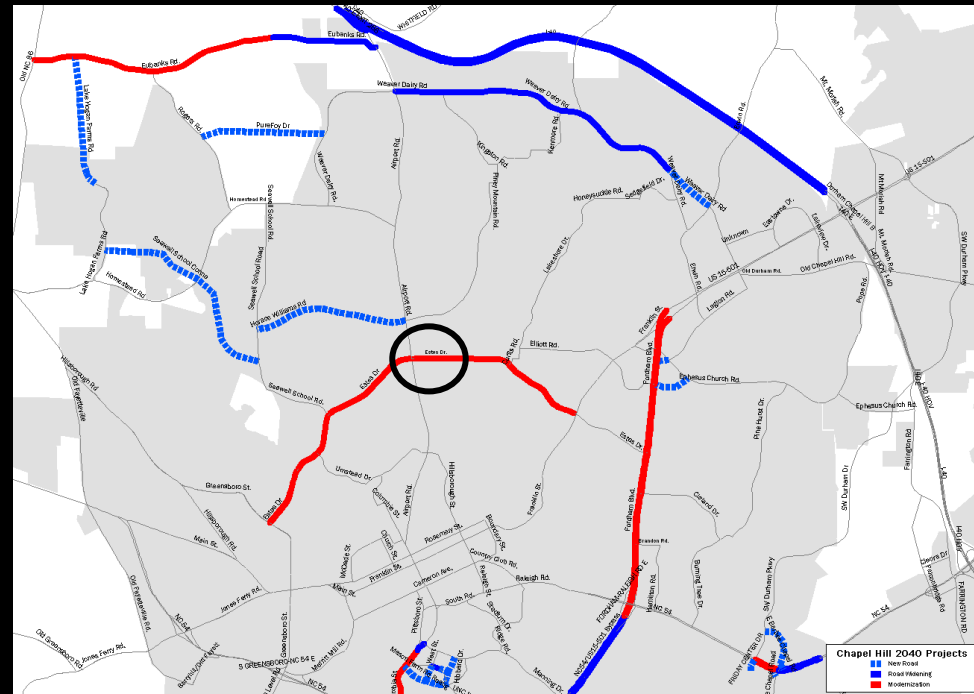




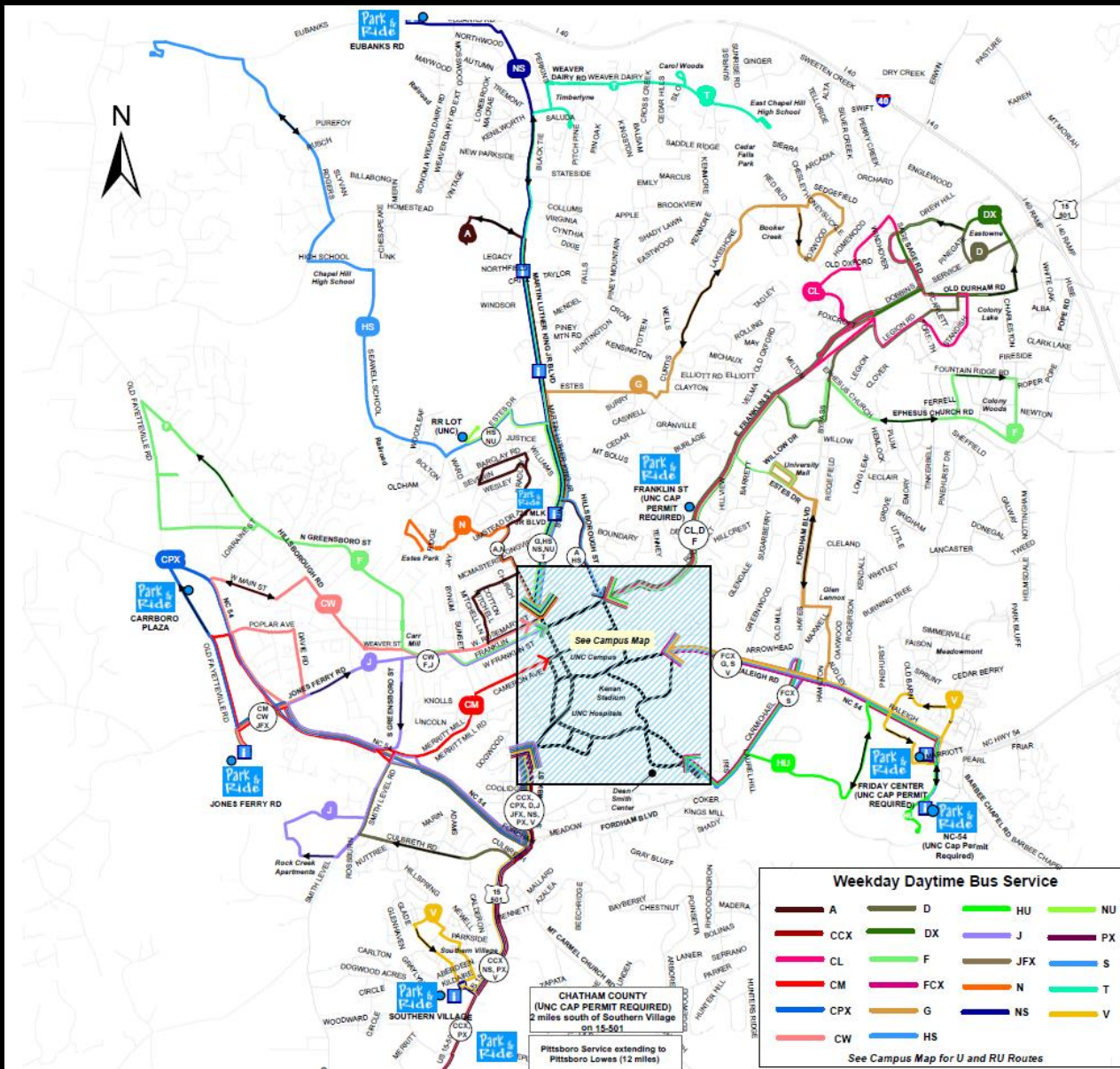
# Highway Performance



## 2040 Planned Projects



# Current CHT Services



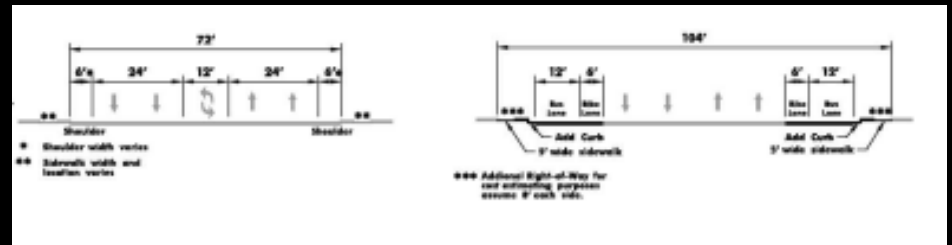
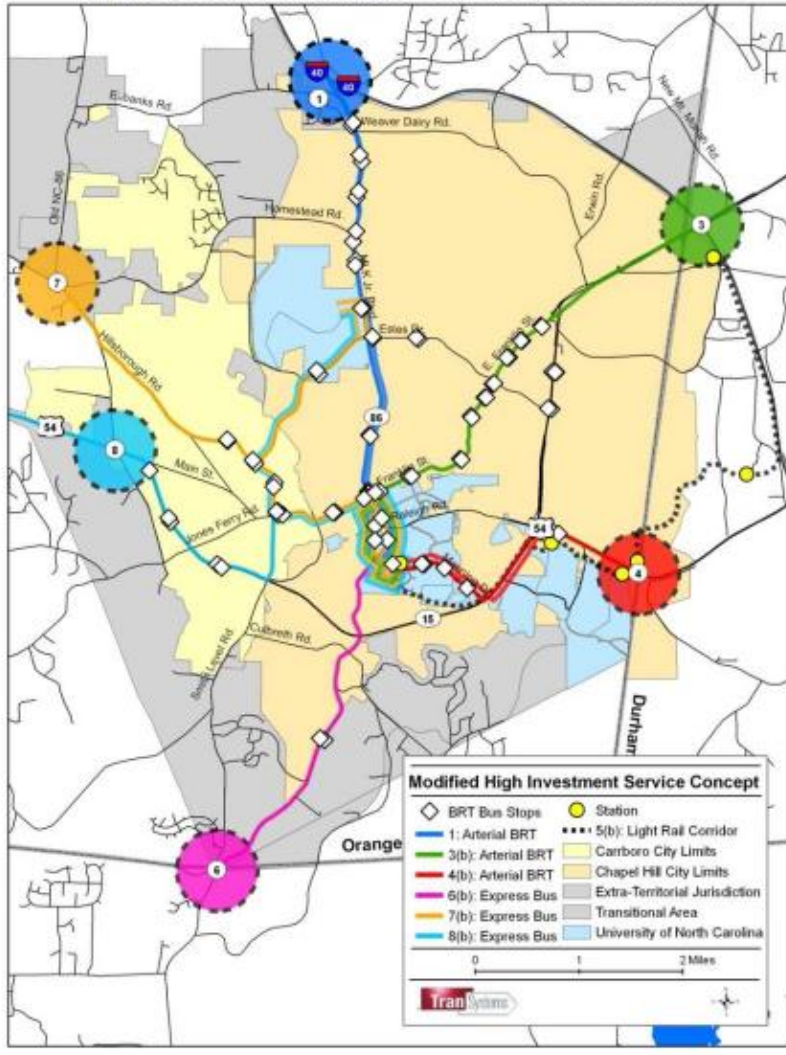
Peak period service frequency:  
 NS – 10 min  
 A – 30 min  
 T – 35 min  
 G – 50 min



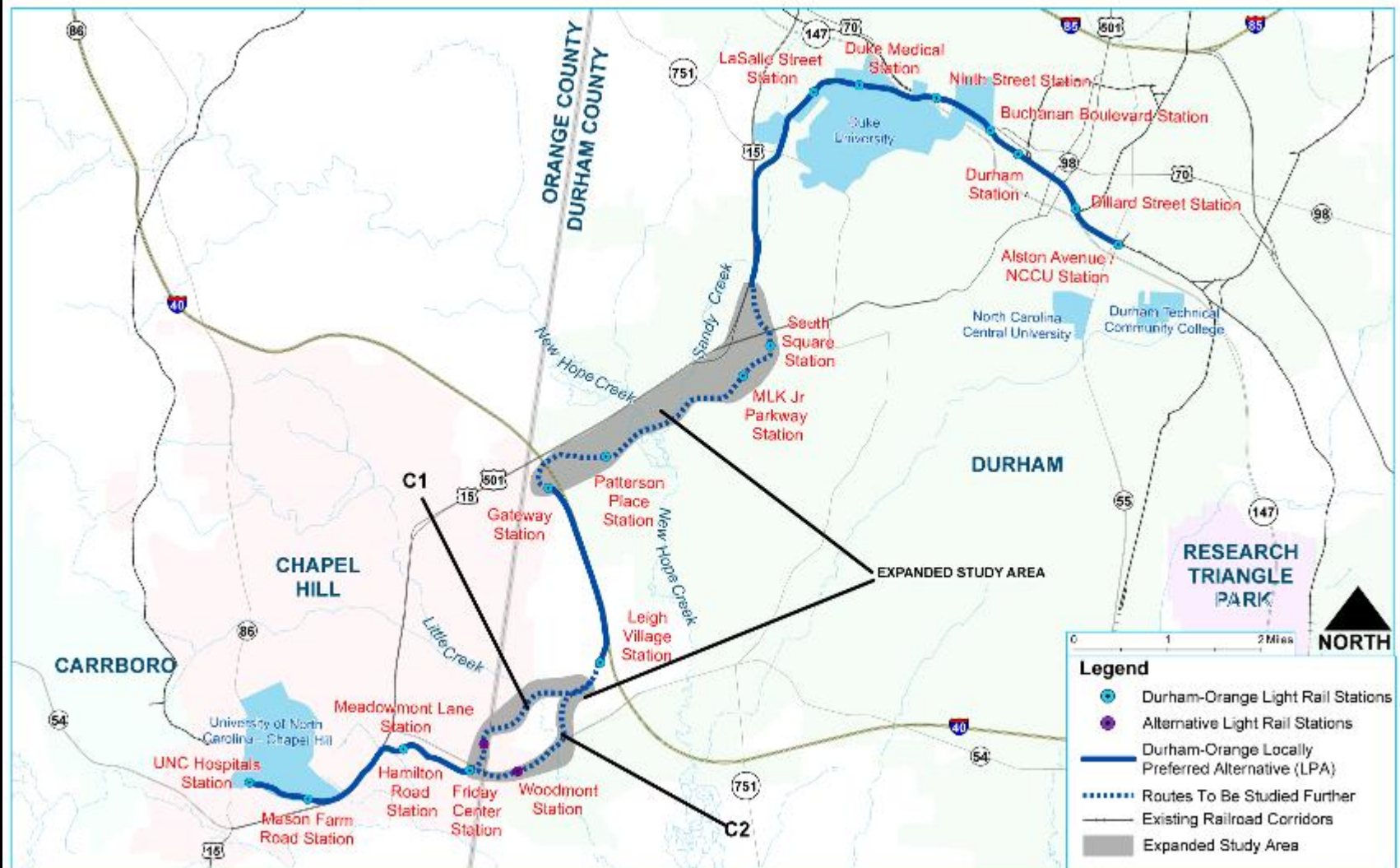
# 2009 Transit Study

(more detailed study for MLK corridor planned for 2013)

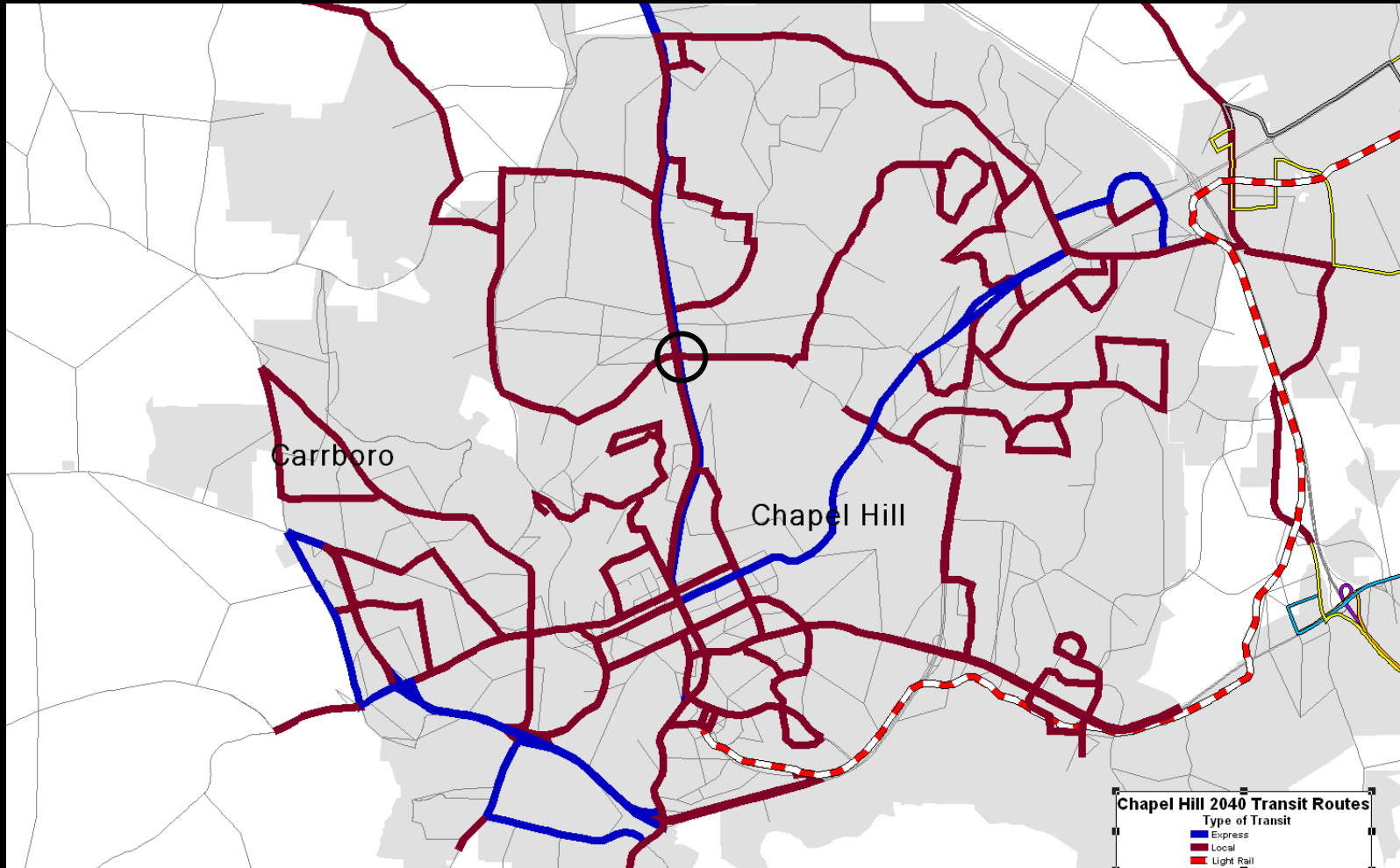
Figure 0-5: Modified High Investment Service Concept



# Adopted Durham- Chapel Hill Light Rail line

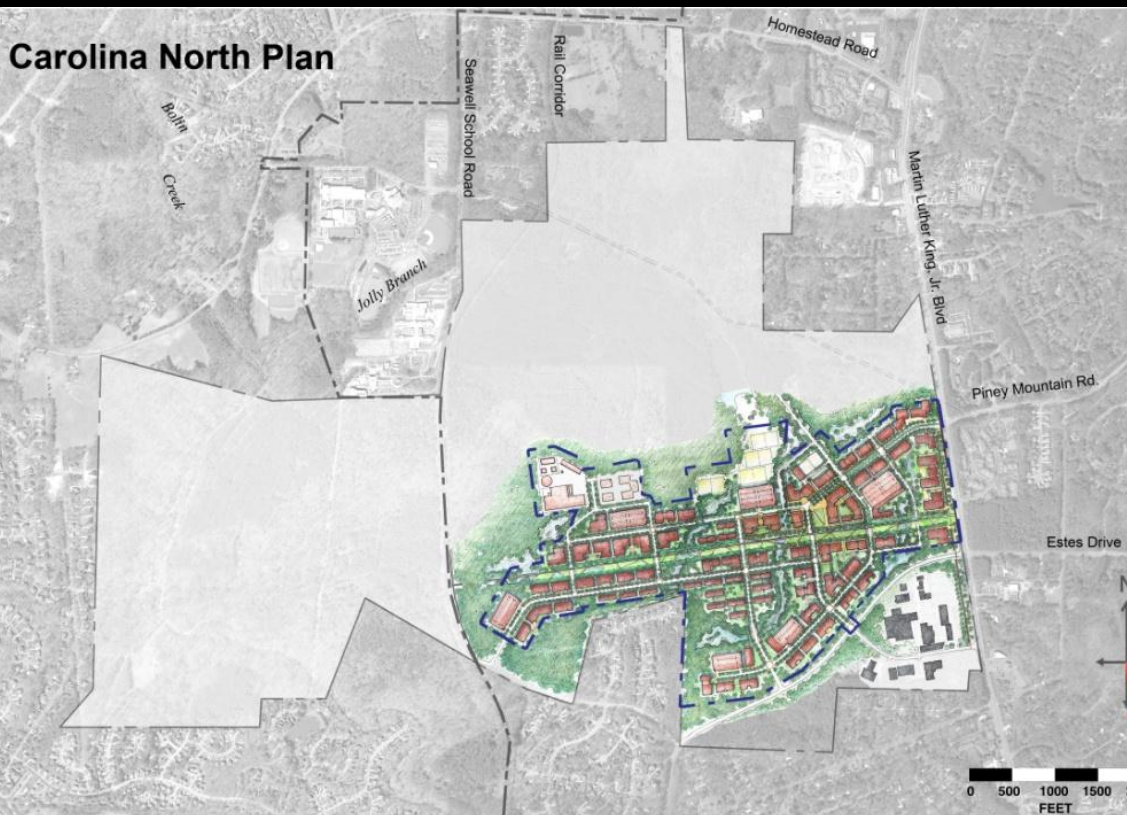


# 2040 Transit Plan





# Carolina North Master Plan and Phase 1 Plan



# Carolina North Transit Context

## Legend



Regional transit  
(options shown)



I-40 Park-and-ride  
(options shown)



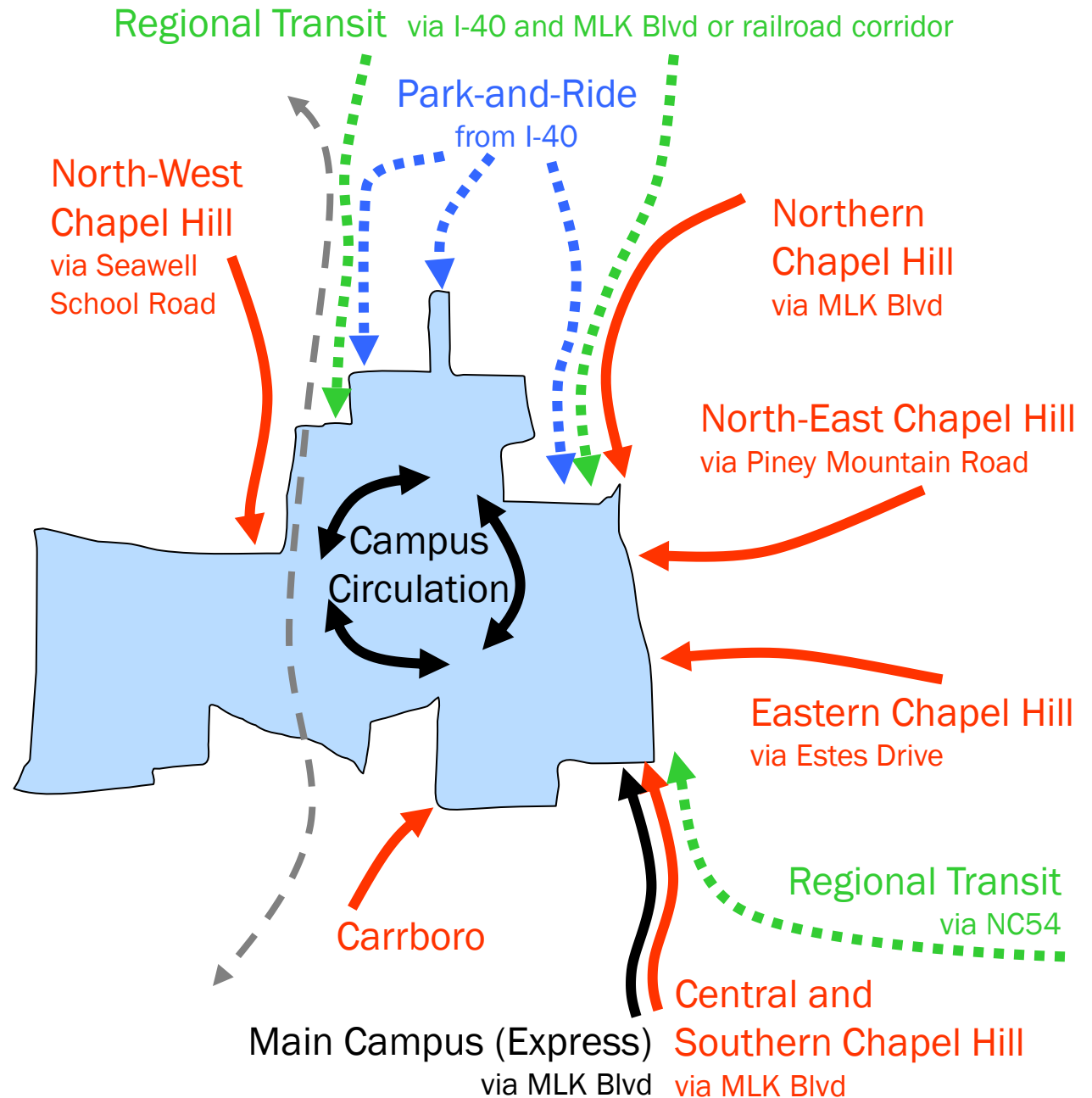
Campus shuttles



Potential local transit

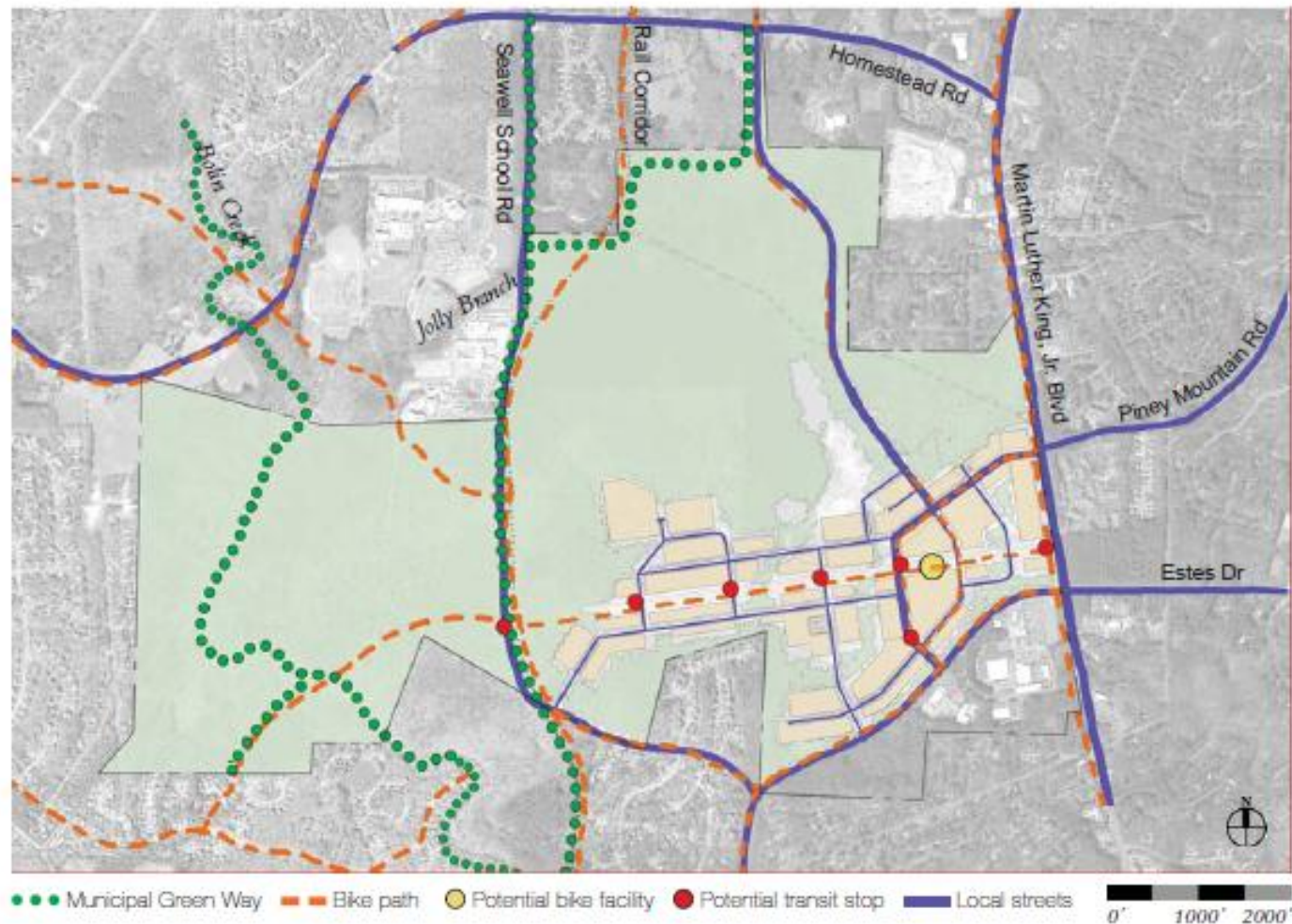


Railroad corridor



# Bicycle Improvements

Campus Connections





# 2005 Pedestrian Plan



## Sidewalks

- Existing Sidewalk
- Proposed Sidewalk

## Off Road Path (Bicycle/Pedestrian)

- Existing
- Proposed

## Greenways Master Plan

- Paved Greenway
- Unpaved Greenway
- Future Greenway



Corridor Improvement

## Other Improvement Needs

- Crossing Improvements
- Pedestrian Underpass
- Bicycle/Pedestrian Bridge
- Intersection Improvement Study

## Boundaries

- Urban Services Boundary
- Chapel Hill City Limits
- Carrboro City Limits
- Durham City Limits

## Carrboro Sidewalks (Carrboro Data)

- Existing Sidewalk
- Planned Future Sidewalk
- Streams

# Key Conclusions

## CONSTRAINTS

- Limited highway capacity
- Constraints to adding additional capacity
- Planned long-term improvements cannot be considered at time of development application

## OPPORTUNITIES

- Good transit access with plans for significant enhancements
- Park-and-rides coupled with quality transit provide a real alternative to driving
- Over time bike and pedestrian access will improve
- Mixed use/transit-oriented development will enable a higher level of development