

ATTACHMENT A

A RESOLUTION RECEIVING AN UPDATE ON REGIONAL TRANSPORTATION  
PLANNING ACTIVITIES  
Resolution No. 41/2010-2011

WHEREAS, *Carrboro Vision 2020* states that the "safe and adequate flow of bus, auto, bicycle and pedestrian traffic within and around Carrboro is essential" (Objective 4.0); and

WHEREAS, *Carrboro Vision 2020* recommends that the "town should cooperate with Chapel Hill and other regional entities in a comprehensive transportation plan to include: regional transit service conducted by the Triangle Transit Authority, seamless connections among all the region's public transit systems, and shorter routes and more frequent service" (Policy 4.13); and

WHEREAS, the Town of Carrboro participates in regional transportation planning, including the adoption of long- and short-range transportation improvement programs, through the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization; and

WHEREAS, the Town of Carrboro is a partner, along with the Town of Chapel Hill and UNC, in the Public Transit Committee that sets the policy direction for Chapel Hill Transit;

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Board receives the update on regional transportation planning activities.

This is the 9<sup>th</sup> day of November in the year 2010.

A RESOLUTION PROVIDING COMMENTS ON TRANSIT PLANNING ACTIVITIES  
Resolution No. 42/2010-11

WHEREAS, *Carrboro Vision 2020* recommends that the “town should cooperate with Chapel Hill and other regional entities in a comprehensive transportation plan to include: regional transit service conducted by the Triangle Transit Authority, seamless connections among all the region’s public transit systems, and shorter routes and more frequent service” (Policy 4.13); and

WHEREAS, the *Carrboro Vision 2020* states that “Carrboro should support a passenger rail connection between the Horace Williams’ property, through Carrboro’s downtown, and the main campus of the University of North Carolina at Chapel Hill” (Policy 4.14); and

WHEREAS, the Board of Aldermen have long supported a future regional transit connection to Carrboro, including, most recently, resolutions on January 19, 2010, and June 22, 2010; and

WHEREAS, Triangle Transit is conducting an Alternatives Analysis to examine future regional transit investments; and

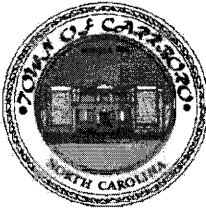
WHEREAS, the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization is beginning to develop its 2040 Long Range Transportation Plan to guide future transportation investments in the Triangle; and

WHEREAS, the Orange County Transit Plan is being developed to direct transit investments in the county;

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that:

1. Provision of light rail or another higher-order transit service to Carrboro should continue to be analyzed in future transportation planning processes, including the 2040 Long Range Transportation Plan;
2. Town staff are directed to explore resources for a feasibility study on opportunities and constraints of extending regional rail service to Carrboro, coordinating with the Town of Chapel Hill;
3. The design of a regional rail segment to UNC Hospitals should not preclude extensions to Downtown Chapel Hill, Downtown Carrboro, and Carolina North;
4. The following comments are provided on the Orange County Transit Plan service priorities, capital investments, goals, and emphasis areas:
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
  - c. \_\_\_\_\_

This is the 9<sup>th</sup> day of November in the year 2010.



## TOWN OF CARRBORO

NORTH CAROLINA

### MEMORANDUM

DELIVERED VIA: ☒ HAND ☐ MAIL ☐ FAX ☐ EMAIL

**DATE:** November 4, 2010

**TO:** Steven Stewart, Town Manager  
Mayor and Board of Aldermen

**CC:** Patricia McGuire, Planning Administrator

**FROM:** Jeff Brubaker, Transportation Planner

**RE:** Update on regional transportation planning activities

This memo provides an update on the implications for Carrboro of various regional transportation planning activities.

#### **Draft 2011-2020 Metropolitan Transportation Improvement Plan (MTIP)**

##### *Process*

NCDOT is completing the 2011-2020 Statewide Transportation Improvement Plan (STIP). The MTIP is a subset of the STIP containing transportation projects in the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC-MPO) planning area.

Project inclusion in the MTIP is influenced by regional transportation priorities approved by the MPO. The MPO Transportation Advisory Committee (TAC) approved the Regional Priority List in February 2009. This included top-priority highway, transit, bicycle, and pedestrian projects separated by highway division (Div. 7 for Carrboro). NCDOT then revised its process for prioritizing all projects to be included in the STIP and asked the MPO to submit revised priority lists. Instead of separating projects by highway division, the revised lists for highways and bike-ped projects were to be MPO-wide. The TAC approved its revised Top 25 highway priority list in October 2009 and its Top 10 bicycle and pedestrian priority list in January 2010.

##### *Projects*

Table 1 below presents a summary of Carrboro project statuses in the draft 2011-2020 STIP compared with the current 2009-15 STIP.

## ATTACHMENT B-2

Project	Change	09-15 STIP	11-20 STIP	Funding source	Notes
Jones Creek to Twin Creeks Connector trail	New project	-	\$300,000; Constr. 2015	CMAQ	Cost estimate has increased to \$350,000. MPO has applied for additional CMAQ funding.
Smith Level Road	Updated cost/ funding	\$5.4m; Constr. 2011	\$7.45m; Constr. 2013	State	Board of Aldermen approved revised design 9/28/2010
Bolin Creek Greenway	No change	\$737,500	\$737,500	STP-DA	Proposed to fund Phase 1B of greenway
Morgan Creek Greenway	Updated cost/funding	\$600,000	\$535,000*	STP-DA	*New funding total needed administrative clarification; NCDOT staff have indicated that full \$600,000 is still available
Estes Drive improvements	Updated cost/funding	\$7.6m; <u>post-year</u>	\$6.86m; <u>post-year</u>	STP	Bike lanes, sidewalks, transit accommodations
Homestead Road improvements	No change	<u>Post-year</u>	<u>Post-year</u>	STP	Bike lanes, sidewalks, transit accommodations, safety improvements
Seawell School Road	Project deleted	<u>Post-year</u>	-	STP	Bicycle and pedestrian improvements

**Table 1. Carrboro project status in the draft 2011-2020 STIP. "Post-year" indicates project is not scheduled to be funded within the 2011-2020 timeframe. STP-DA and CMAQ funding shown is total cost, including the 80% federal share and 20% local match.**

Table 2 shows the projects on the Town's Local Priority List, approved September 16, 2008, by the Board of Aldermen. The third column shows how the projects fared when ranked on the MPO-wide priority lists via the MPO's approved ranking methodology. No Carrboro bike-ped projects were ranked in the Top 10 list; the table shows their old division-specific ranking. However, some projects funded via STP-DA funding are not listed here.

Priority #	Description	MPO-wide rank (type)	STIP Project status
1	Old Fayetteville Road - Add bike lanes and transit accommodations on both sides of the road and sidewalk on the east side from McDougle Middle School to NC 54.	Removed from list b/c already in progress	Completed (ARRA project)
2	Homestead Rd. - Add bike lanes, sidewalks, and transit accommodations on both sides of the road from Seawell School Road to Old NC 86.	26 (highway)	Post-year
3	Transit Capital Projects - Fund transit capital projects as identified by Chapel Hill Transit and agreed to by the Transit Partner's Committee.	1 (transit)	Various
4	Estes Drive - Add bike lanes, sidewalks, and transit accommodations on both sides of the road from Greensboro Street to Town limits, as well as a multi-use path from Williams Street to Estes Drive to provide an alternative bicycle-pedestrian connection.	13 (highway), Greensboro to NC-86 (CH-C combined project)	Post-year; Wilson Park MU Path in design phase using STP-DA funding
5	South Greensboro Street - Add sidewalks on the west sides of the road from Old Pittsboro road to Merritt Mill Road.	22 (Div. 7 bike-ped)	--

## ATTACHMENT B-3

Priority #	Description	MPO-wide rank (type)	STIP Project status
6	Old NC 86 - Add bike lanes and transit accommodations on both sides of the road, and sidewalk on the east side from Hillsborough Road to Homestead Road.	15 (Div. 7 bike-ped)	--
7	Old NC 86 - Add bike lanes, sidewalks, and transit accommodations on both sides of the road from Homestead Road to Eubanks Road.	18 (Div. 7 bike-ped)	--
8	Eubanks Rd - Add bike lanes, sidewalks, and transit accommodations on both sides of the road from Old NC 86 to Rogers Road.	24 (Div. 7 bike-ped)	--
9	Franklin / Main / Merritt Mill / Brewer Intersection - Make changes to improve operation and safety for motorists, pedestrians, bicyclists, and transit.	15 (highway)	--
10	N. Greensboro corridor from Weaver Street to Shelton - bicycle and pedestrian improvements	11 (highway)	--
11	Seawell School Rd - Add bike lanes, sidewalks, and transit accommodations on both sides of the road from Homestead Road to Estes Drive.	27 (highway)	Project deleted from STIP; bike-ped facilities a requirement of Carolina North development agreement
12	N. Greensboro/Estes Ext. intersection roundabout	21 (highway)	--
13	Fixed Guideway - Connection to Carolina North / Horace Williams property utilizing existing railroad right-of-way from University Power Plant to Carolina North	Transit	Programmed in STIP; Triangle Transit Alternatives Analysis underway (see below)
14	NC 54 from James St. to Anderson Park - side path on the northern side to accommodate two-direction bicycle transportation.	8 (Div. 7 bike-ped)	--

Table 2. Carrboro Local Priority List, approved by the Board of Aldermen on September 16, 2008.

### Triangle Regional Transit Program

The 2035 Long Range Transportation Plan recommended a light rail transit (LRT) investment from northeast Raleigh to UNC Hospitals, including Cary, Morrisville, RTP, and Durham. Triangle Transit is pursuing federal funding to support implementation of this regional LRT corridor. The agency has completed a *Transitional Analysis*, which determines what segments of the overall LRT corridor will be put forward for federal funding at this time, assuming that it is not feasible to build the entire corridor in one phase.<sup>1</sup>

The corridors include:

- Wake County: Northwest Cary to Northeast Regional Center (Triangle Town Center), Raleigh
- Durham-Orange Counties: UNC Hospitals to Alston Ave.
- West Durham to Southeastern Wake County (focus will be on commuter rail option)

<sup>1</sup> The analysis is available here: <http://ourtransitfuture.org/index.php/newsroom/project-materials>

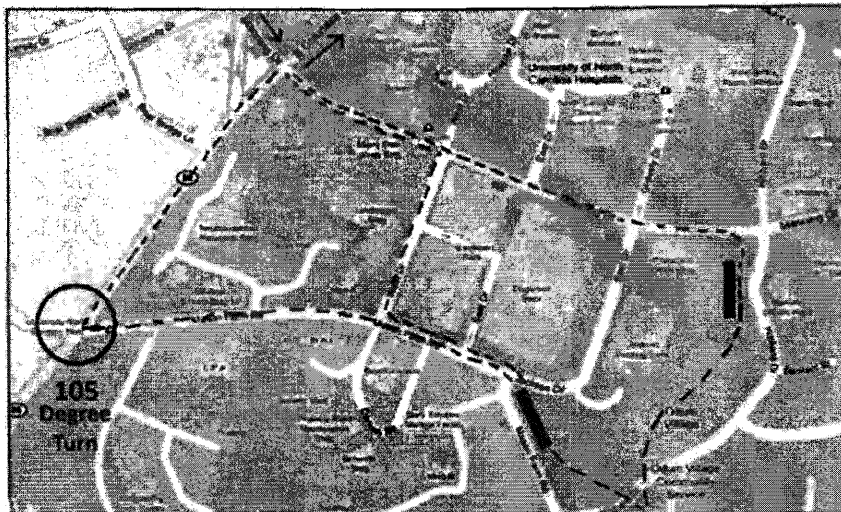
*Potential future connection of regional transit service to Carrboro*

While the 2035 LRTP does not extend light rail to Carrboro, the *Transitional Analysis* states that, during the first round of public hearings for the study, Carrboro was the most frequently-mentioned municipality as meriting a future connection. In response to this significant input and past Board of Aldermen support of a Carrboro connection to a regional transit corridor – including, most recently a June 22, 2010 resolution (*Attachment C*) – Triangle Transit has included in the *Transitional Analysis* a strategic issue paper on a future connection to Carrboro (*Attachment D*). This details some strategic and technical issues and potential solutions with an extension of rail service west through downtown Chapel Hill and into Carrboro, potentially going north from there.

*\* The strategic paper does not mean that an extension is being implemented. It only outlines the issues that need to be considered if an extension were planned.*

The bullet points below summarize the main points in the issue paper:

- The LRT is proposed to terminate on Mason Farm Rd., south of the UNC Hospitals parking decks. Any possibility of westward extension to downtown Chapel Hill and Carrboro would need to get past the parking decks.
- The paper recommends that trains run in a one-way pair: north on S. Columbia and south on Pittsboro St. coming back the other way.
- Topography, sharp turning radii, and potential operational impacts on Manning Dr. are challenges for alternative alignments getting from the parking decks up to S. Columbia St. (Figure 1).



**Figure 1. Possible westward extensions of proposed light rail line, which is expected to stop on Mason Farm Rd. on UNC's campus, south of the UNC Hospitals parking deck. Source: Triangle Transit Transitional Analysis**

- If Pittsboro St. is extended north to Franklin St., this could present an opportunity for rail line routing.
- The route would travel down W. Franklin St./E. Main St., with possible alternatives being Cameron Ave. / Libba Cotten Bikeway or Rosemary St.

## ATTACHMENT B-5

- A location for a station in Carrboro would need to be determined. The paper suggests three possible locations, each with benefits and drawbacks, as shown in Figure 2 below.

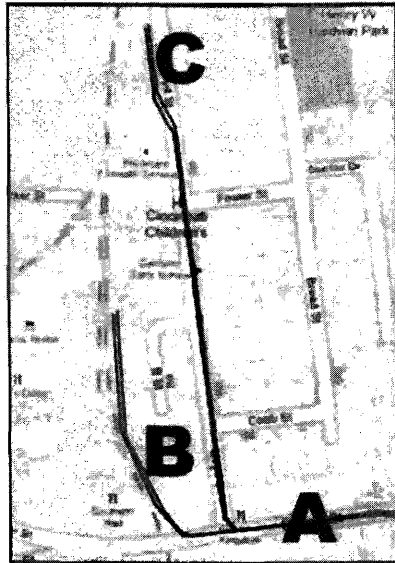


Figure 2. Possible light rail stations in Carrboro. Source: Triangle Transit Transitional Analysis

- Two issues arise for a light rail alignment stopping in Carrboro.
  - Trains will need to turn around and head in the other direction. This requires additional track. (This is not needed in Carrboro if rail is built all the way to Carolina North.)
  - Trains running on-street will have an impact on vehicle traffic operations.

The paper concludes with the following suggested action steps:

- “Establishing that the design [of] a first segment of rail to UNC Hospital will not preclude extensions to Downtown Chapel Hill, Downtown Carrboro, and Carolina North
- Identifying a schedule and resources for a more detailed study of the opportunities and constraints that exist in extending rail to Carrboro
- Conduct a corridor or feasibility study examining these or other potential rail extension alternatives that might best connect Downtown Chapel Hill, the UNC Main Campus, Carrboro, and Carolina North with the proposed first phase of light rail at UNC Hospital
- Consider inclusion of any rail extensions in Orange County in the fiscally constrained 2040 DCHC LRTP”

If the Board chooses to pursue these action steps, they are included in the draft resolution in *Attachment A-2*.

### Orange County Transit Plan

Building a regional transit system in the Triangle will require a mix of federal, state, and local funds. House Bill 148, adopted by the State Legislature in the 2009-2010 session, allows Triangle counties to hold ½-cent sales tax referendums to invest in improved transit service. In order to hold a referendum, counties must adopt transit plans that outline the transit services in

## ATTACHMENT B-6

which investments will be made. The legislation requires plans to address congestion, air quality and energy consumption, ped-bike connections, transit-friendly land use planning, housing, service for lower-income communities, and other factors.

Staff from various Orange County jurisdictions and the Transit Partners have been meeting to identify transit improvements to be funded with ½-cent sales tax revenues. Some of the revenues will support a proposed regional light rail alternative from Durham to Orange County (Alston Ave. to UNC Hospitals). It is expected that there will be sales tax revenues remaining to apply for other transit needs in the county, such as local and regional bus service and capital improvements in support of transit.

The following have been proposed by staff as Carrboro's priorities.

### *New or expanded service priorities*

- Carrboro-Chapel Hill-Durham, via 15-501, Rt 405 regional bus service
- Expand Saturday local bus service
- Introduce Sunday local bus service
- Improve peak hour local bus frequency
- Homestead-Calvander to Carolina North local bus service

Based on comments at the recent Public Transit Forum, staff propose to include another priority:

- Extend evening local bus service

### *Existing service costs*

HB 148 allows revenues "to supplement and not to supplant or replace existing funds or other resources for public transportation systems" (NCGS Sec. 105-511.4(b)). However, there may be an opportunity for some revenues to be used to offset the inflationary cost of existing services.

### *Capital investments*

Capital improvements could include park-and-ride lots, transfer centers, bus shelters, or sidewalks and bikeways in the vicinity of transit stops.

Each jurisdiction's priorities will be pooled into various scenarios dependent on how much money is left for local bus services and capital improvements after the regional rail allocation is accounted for. Changes in costs of transit capital and operating expenses, as well as changes in sales tax revenue projections, could affect the amount of money available for these priorities.

The priorities will be ranked based on the following goals and emphasis areas:

### *Goals*

- Maintain existing service
- Fill in gaps in existing service



- Improve connectivity
- Improve weekend/night service (off peak)
- Increase frequency in peak-hour high use corridors (work trips)

*Emphasis areas*

- Provide geographic equity/countywide service distribution (urban, rural, small towns)
- Support improved capital facilities (pedestrian/bicycle connections, transfer facilities)
- Provide positive impact on air quality
- Improve mobility for transit dependent (senior, young, disabled, low-income, no car-ownership)
- Support transit-supportive land use

The Board may provide input on the above lists in order to inform Carrboro input into the process of developing the plan. The draft resolution in *Attachment A-2* (point #4) allows for this action.

**Chapel Hill Transit update**

*Comprehensive Operations Analysis*

Chapel Hill Transit is undertaking a Comprehensive Operations Analysis to examine the effectiveness of its fixed-route services. The analysis will not include EZ Rider services. It will provide recommendations on potential route changes, reduction or elimination of unproductive routes, and introduction of new routes where warranted.

*Attachment E* provides more information.

*Long Range Transit Plan*

Chapel Hill Transit has renewed discussions on this plan, which was considered by the Board of Aldermen, Chapel Hill Town Council, and UNC last winter, but not approved due to various concerns with the plan's methodology and recommendations. Chapel Hill Transit proposes to create a new document – and route map – that takes into account the transit plan's recommendations but is also informed by other transit planning processes, such as the Orange County Transit Plan. There have been two staff meetings on the plan. The timeline for presenting to the Transit Partners and respective Boards is yet to be determined.



## TOWN OF CARRBORO

NORTH CAROLINA

The following resolution was introduced by Alderman Dan Coleman and duly seconded by Alderman Joal Hall Broun.

### A RESOLUTION RECOMMENDING THAT THE TRIANGLE REGIONAL TRANSIT PROGRAM ALTERNATIVES ANALYSIS INCLUDE A FULL AND DETAILED STUDY OF SERVICE PROVISION TO THE TOWN OF CARRBORO

Resolution No. 191/2009-10

WHEREAS, the Town of Carrboro has the highest transit ridership per capita in North Carolina according to the 2000 Census (9%); and

WHEREAS, the Town of Carrboro supports higher-density, transit-supportive-development, a critical element of a successful and efficient transit service; and

WHEREAS, the Towns of Carrboro and Chapel Hill and the University of North Carolina have worked together to provide public transit service to the local community for over thirty years; and

WHEREAS, the Town of Carrboro continues to lead in making investments in bicycling and pedestrian infrastructure, which expand the usefulness of existing and future transit in the community; and

WHEREAS, the objectives in the Carrboro Vision 2020 plan state that the Town of Carrboro should cooperate in the regional planning processes to provide regional transit service conducted by the Triangle Transit Authority and that the Town of Carrboro should support a passenger rail connection between the Horace Williams' property, through Carrboro's downtown, and the main campus of the University of North Carolina at Chapel Hill; and

WHEREAS, the extension of light rail from UNC Hospital to Carrboro would benefit stakeholders outside of Carrboro, such as businesses along West Franklin Street in Chapel Hill and the Northside neighborhood in Chapel Hill, and provide a seamless rail connection to Carrboro from Durham, Duke University, Meadowmont, the East 54/Glen Lennox area; and

WHEREAS, on January 29, 2010, the Board of Aldermen approved the recommended revisions to the Chapel Hill and Carrboro 2035 Long Range Transit Plan (resolution no. 93/2009-10) stating that the "provision of light rail or another higher-order transit service to Carrboro should continue to be analyzed in future transportation planning processes" and that "further analysis should determine if extending regional light rail service into Carrboro is feasible and cost-effective given the potential ridership of a Carrboro station";

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Board encourages the full inclusion of the Town of Carrboro in the Triangle Regional Transit Program

Alternatives Analysis study to determine the feasibility of providing higher order transit service to the Town of Carrboro.

BE IT FURTHER RESOLVED that the Board encourages at least one public meeting on the Alternatives Analysis to be held in Carrboro.

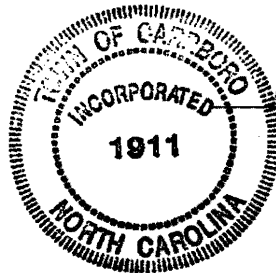
The following resolution having been submitted to a vote received the following vote and was duly adopted this 22nd day of June 2010:

Ayes: Dan Coleman, Lydia Lavelle, Joal Hall Broun, Jacquelyn Gist, Randee Haven-O'Donnell

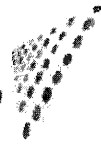
Noes: None

Absent or Excused: Mark Chilton and Sammy Slade

I, Sarah C. Williamson, Town Clerk of the Town of Carrboro, North Carolina, do hereby certify that the foregoing is a true and correct copy of a resolution adopted by the Carrboro Board of Aldermen on June 22, 2010.



*Sarah C. Williamson*  
Town Clerk



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## Appendix C

### White Paper Study of Future Extension to Carrboro Implementation Analysis

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September 24, 2010

**TRIANGLE REGIONAL TRANSIT PROGRAM**  
**Future Extension to Carrboro Implementation Analysis**  
**Strategic Issues and Possible Alignments**  
**September 24, 2010**

**BACKGROUND**

During the first round of public meetings for the Triangle Regional Transit Program in the summer of 2010, the town of Carrboro was the most frequently mentioned municipality among statements of interest for rail extensions beyond the corridors specified in the adopted 2035 LRTP. Additionally, the Carrboro Board of Aldermen also passed a resolution requesting that the Alternatives Analysis process assess the feasibility of extending rail from UNC Hospital to Carrboro.

Further comments from DCHC TAC members at the September 2010 TAC meeting indicated that while the TAC did not recommend expanding the Alternatives Analysis to include Carrboro in this phase of the analysis, that the Town of Carrboro has gone on record numerous times in support of examining how to bring rail to Carrboro, and that a document providing an overview of the strategic issues that need addressing to extend rail to Carrboro would be welcome and appreciated by citizens, elected officials, and members of the DCHC TAC.

This document attempts to provide a high-level view of those issues, and provide a foundation of knowledge upon which the feasibility of rail to Carrboro can be explored in greater detail in the future.

**CURRENT RECOMMENDATION FOR RAIL IN ORANGE COUNTY**

As the Transitional Analysis portion of the Alternatives Analysis comes to a close, the technical team is recommending that the corridor from Alston Avenue in Durham to UNC Hospital in Chapel Hill be advanced to the next stage of analysis for detailed study. This detailed study phase will compare the performance of Bus Rapid Transit, Light Rail Transit, Traffic System Management (TSM) alternative, and a "No Build" option in the corridor. This paper assumes that any rail connection to Carrboro will be made as an extension of an initial light rail investment that terminates near UNC Hospital.

DRAFT

September 24, 2010

## KEY STRATEGIC ISSUES

In considering how rail could be extended from UNC Hospital to Carrboro, several key issues need to be addressed. Those issues are:

- What is the most technically feasible way to extend rail past UNC Hospital?
- Where will rail vehicles run between UNC Hospital and Carrboro, and where might stations be placed?
- How will trains reverse direction if Carrboro becomes an end-of-line station?
- How will trains interact with and impact traffic if they run in the street?
- How would an extension to Carrboro be funded?
- What actions need to be taken to further advance planning for rail to Carrboro?

## EXTENDING PAST UNC HOSPITAL

If rail is to be extended past UNC Hospital to points north and west, the primary transportation corridor that can fulfill this need is the Pittsboro St/Columbia St pair of roads.

Could light rail cut through the UNC campus instead of using city streets to go north and west? While perhaps technically possible, it would be challenging to move across campus without impacting buildings and other important activities, such as emergency vehicle access to UNC Hospital. Different turning movements for light rail may also be fatally flawed for alignments that cut across campus. Most importantly, UNC has a campus master plan which plans for significant uses in terms of buildings and public spaces to be developed between existing and current buildings under construction.

An in-depth study of alignment alternatives from UNC west and north could explore the tradeoffs of using campus land between UNC Hospital and South Rd to begin moving north and west from the hospital, but this analysis suggests that street-running should be the default approach, with other alignment approaches compared to street-running for cost:benefit analysis.

Light rail trains successfully operate in streets in other cities in the US and abroad, either in their own exclusive lane or in mixed traffic (streetcar operation) with cars, trucks and buses. Figure 1 below shows light rail in Minneapolis, MN in the center of the street operating bidirectionally. (where cars are not allowed to drive on the tracks) Cars drive in the same direction of the train on either side. Figure 2 shows mixed-traffic running (where cars CAN drive on the tracks) in San Francisco.

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September 24, 2010

Figure 1. Center of Street Light Rail Operations in Minneapolis

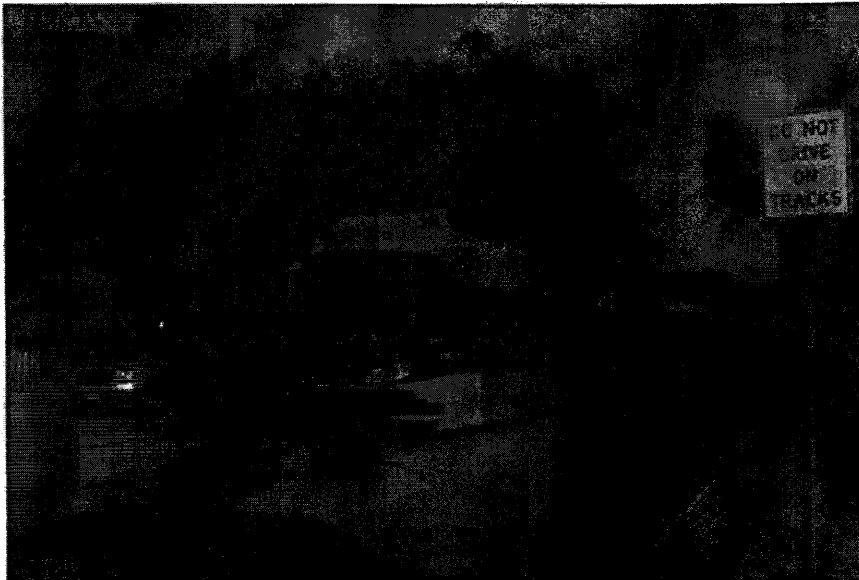


Figure 2. Mixed Traffic Light Rail Operations in San Francisco, CA



Photo Courtesy of Peter Ehrlich

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September 24, 2010

The current proposed alignment and station options for initial study in the region's Alternatives Analysis identify two primary potential locations for a UNC Hospital station, which are shown as green and blue platforms in Figure 3 below.

Possible routes north and west from these stations include:

- Mason Farm Rd from Hibbard to South Columbia Street (see Figure 3, green dotted line)
- Mason Farm Rd. from Hibbard to West St to Manning Drive (Figure 3, red dotted line)
- Manning Drive from Hibbard to the South Columbia/Pittsboro/Manning intersection. (Figure 3, blue dotted line).

Given the limitations of right of way of Columbia Street, Pittsboro Street, Franklin Street and Manning Drive, is it envisioned that the light rail extension will operate in mixed traffic thereby not removing any of the existing travel lanes. The light rail will obey all existing traffic signals with no preemption. How to optimize the signal timing is typically something that is investigated in the design phase.

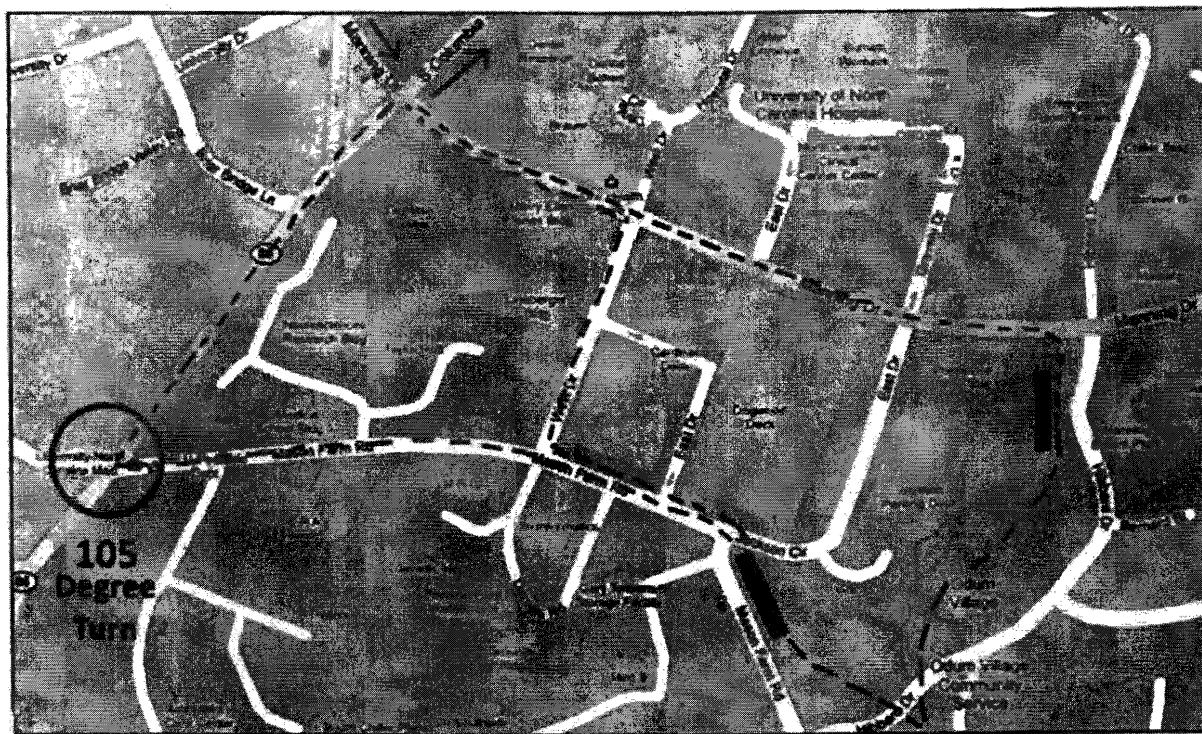
In assessing these two potential alignments, a key constraint is the potential 105-degree turn from Mason Farm Rd onto South Columbia Street. A train's minimum turning radius is preferably kept to 100 feet. Such a radius would severely cut off the corner of the intersection. This turn also has some grade issues. Running in the street typically prohibits the use of superelevation (where the outside rail is higher than the inside rail in a curve) for the tracks, and instead street running employs a flat surface. Both Mason Farm Rd and South Columbia St. slope toward the intersection of the two streets. Introduction of a flat track surface would introduce two grade breaks in each street. If the tracks were superelevated for this sharp curve, the cross section would be in the opposite slope of the street grade compounding this problem. This geometry is an issue for both the rail and street traffic.



DRAFT

September 24, 2010

Figure 3. Potential Light Rail paths proceeding North and West from UNC Hospital Station Locations



Additional detailed analysis will be needed to further assess either the Manning or Mason Farm alternative.

#### UNIVERSITY CONCERNS WITH MANNING DRIVE

In meetings with UNC representatives, campus officials voiced particular concerns regarding the following issues:

- Impacts on Pedestrian Bridges over Manning Drive
- Utility impacts under the street
- Emergency Vehicle access to the hospital
- Overall traffic levels on Manning Drive

A brief discussion of each follows.

#### Discussion: Pedestrian Bridges Over Manning Drive from Parking Decks

Within the area immediately in front of UNC Hospital's main entrance, there are three pedestrian overpasses that lead from the south side of Manning Drive to the hospital complex on the north side. On-site investigations by URS engineering staff indicated that street-running light rail vehicles will not interfere with the three bridges during construction and operations because URS had them surveyed and they are over 16 feet high, which provides the needed clearance for light rail.

DRAFT

September 24, 2010

**Discussion: Utilities**

If light rail were to do any street running in the vicinity of UNC Hospital, tracks would likely be embedded in the street. Standard practice for embedded track anticipates a concrete slab encapsulating the rail and this slab is 15 to 18 inches in depth.

There is typically no impact since the distributed axle load of a light rail vehicle is comparable to the axle load distribution of a HS-20 truck. This has been demonstrated on numerous other street running light rail projects.

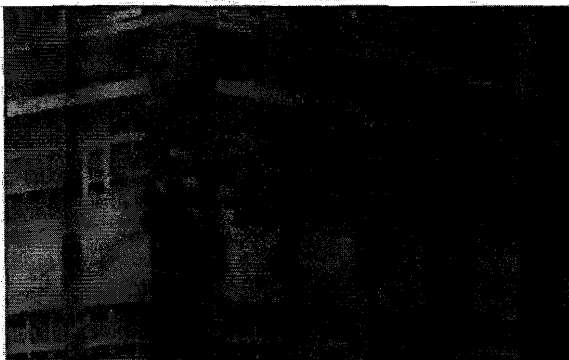
Detailed information on the location and depth of utilities in the hospital area, above and below streets, and in-between buildings, would help staff determine what, if any impacts may occur on utilities during light rail construction and operations.

**Discussion: Emergency Vehicles**

Access for ambulances and other emergency vehicles is a critical issue for any hospital complex. Whereas many locations in a city need to plan for comparatively rare use by emergency vehicles, at UNC Hospital their presence is a constant and daily part of hospital operations.

The emergency room is located on Emergency Room Drive, which extends north from the Hibbard/Manning intersection. According to emergency room staff onsite, this is the road ALL ambulances use to bring patients to UNC Hospital.

Figure 4. UNC Emergency Room Access Rd



Movements of trains in and out of Manning Drive from a station adjacent to Hibbard Drive would need to be managed carefully to maximize the speed and safety of vehicles getting to the Emergency Room. Other transit properties such as Houston have installed light rail signal pre-emption for emergency vehicles using OPTICON technology, which recognizes the strobe lights on modern ambulances, fire and police vehicles and gives those vehicles priority over train movements. These technologies could be explored for local application, and should be examined in greater detail in an additional study.

DRAFT

September 24, 2010

**Discussion: Overall Traffic Congestion On Manning Drive**

In a July 2010 meeting, University officials raised concerns that light rail trains running on Manning Drive would increase the level of traffic congestion in front of UNC Hospital and some of its key entrances. While adding trains to the mix of street traffic will certainly introduce a new mobility element for pedestrians, cyclists, bus operators and motorists to negotiate, it is not clear whether or not adding rail service to Manning Drive would increase traffic congestion or reduce it.

Prior estimates indicate that a light rail installation bringing 6 trains per hour to the hospital from the Friday Center could replace 24 to 30 peak period buses per hour currently operated by Chapel Hill Transit and Triangle Transit. The additional capacity of the trains may also divert more motorists who currently drive and park near the hospital to transit.

A detailed traffic impact study that includes assumptions and projections about mode shifts from bus and car to rail would be needed to address this concern at an appropriate level of analysis.

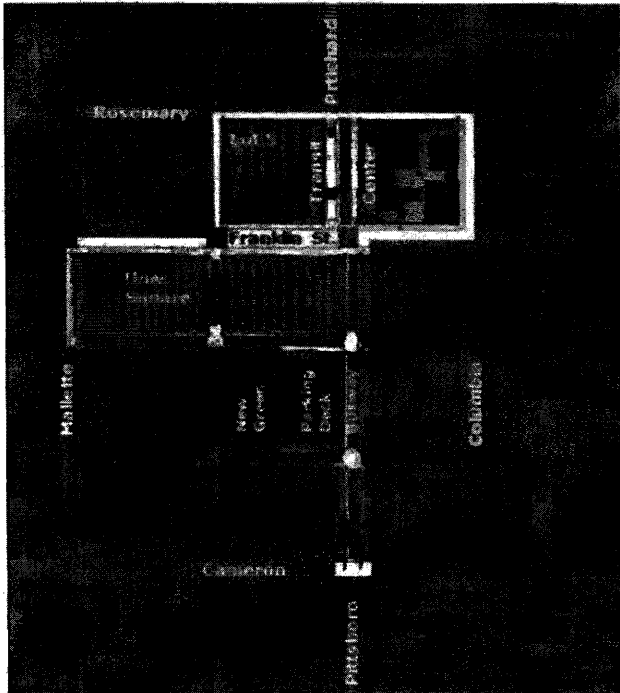
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September 24, 2010

**POSSIBLE PATHS FOR TRAINS FROM UNC HOSPITAL TO CARRBORO**

Assuming light rail trains can move forth from the hospital area, this analysis assumes that trains would travel north on S. Columbia Street, and south on Pittsboro St. The recently released downtown Chapel Hill development framework indicates a possible extension of Pittsboro St through to Franklin Street. If this came to happen, light rail could take advantage of this development.

Figure 4. Downtown Chapel Hill Framework Proposal to Extend Pittsboro Street

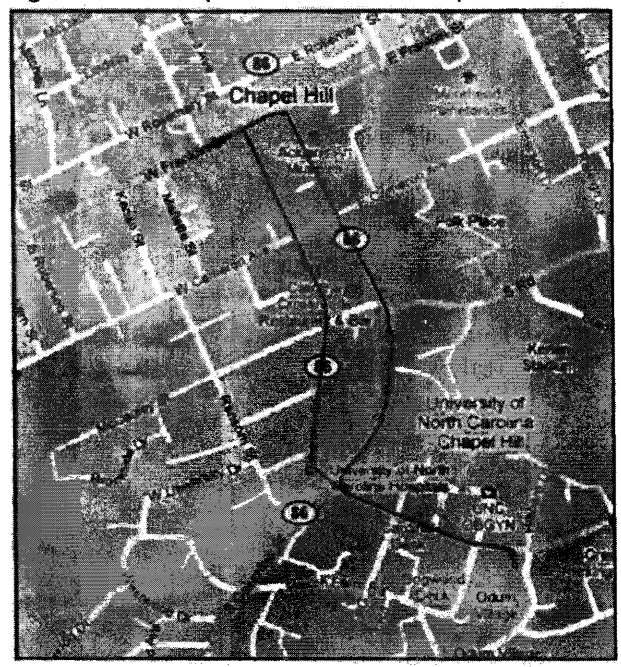


With the proposed street extensions envisioned above, light rail could get to downtown Chapel Hill using the purple line in Figure 5 for westbound travel, and the green line for eastbound travel.

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September 24, 2010

Figure 5. UNC Hospital to Downtown Chapel Hill – Potential Concept



This alignment allows for “tail tracks” to store trains up to 2 cars in length in the center of the street in the block of West Franklin St between Church St and the extended Pittsboro St. If financial or other considerations only made it possible to get to downtown Chapel Hill in an interim phase before reaching downtown Carrboro, this would be one way to provide end-of-line capacity to have trains layover in the less-busy midday or be ready for early morning departures.

For downtown Chapel Hill, the north/westbound station could be placed in front of the Ackland Art Museum on the side of South Columbia Street, and the south/eastbound station could be placed on the eastern side of a redeveloped University Square parcel on the side of the Pittsboro street extension.

Once in downtown Chapel Hill, the environment is such that if you can get an automobile to downtown Carrboro and back, you can probably get a train to downtown Carrboro and back—though how to do that will take careful and thoughtful planning and detailed study.

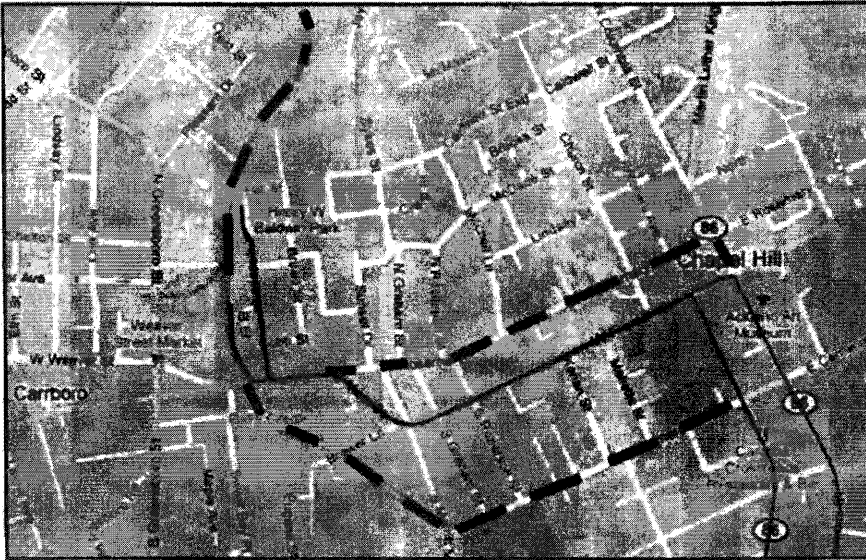
Figure 6 on the next page demonstrates how this alignment could proceed west to downtown Carrboro via West Franklin Street, operating in a manner similar to the Minneapolis train shown in Figure 1. (Franklin St is wider than the street in MN) Once reaching Main St in Carrboro, the train would operate more like the Portland example in Figure 2 until it returned to the rail corridor behind Harris Teeter.

Other possible routings that could be explored in detail include the black dotted lines in Figure 6, which utilize Cameron Avenue and the University rail spur/Libba Cotton bikeway, or utilize Rosemary Street.

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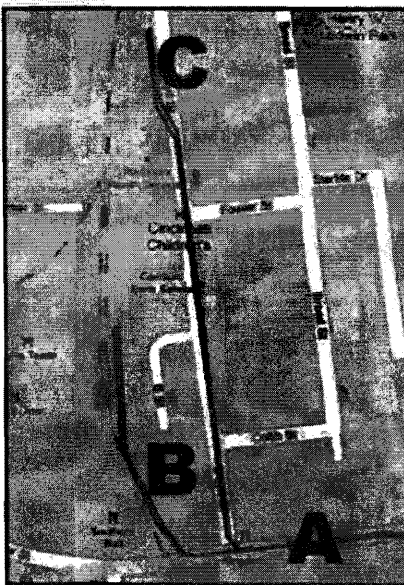
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Figure 6. Downtown Chapel Hill to Downtown Carrboro – Potential Concept



Within downtown Carrboro, a station location will need to be found. Figure 7 shows two possible ways to get from Main Street in Carrboro into the University Railroad corridor to then travel on to Carolina North. Three potential station sites, A, B, and C are identified. Each has benefits and drawbacks in terms of access for pedestrians, impact on adjacent buildings from station or track elements, and potential for ridership.

Figure 7. Downtown Carrboro Station Locations and Rail Corridor Access



DRAFT

September 24, 2010

## REVERSING TRAINS

If light rail is extended to Carrboro, and not on to Carolina North at the same time, then there will need to be infrastructure near the Carrboro station that allows for storage of a trainset or two, called "tail tracks." In most end-of-line stations, these tail tracks are just after the end station. Since midday trains are stored on these tracks, the tail track cannot be located in a street if the light rail is operating as a streetcar through that street segment. Hence, tail tracks would need to be located off-street with a signalized transition in and out of the street.

Unlike the tail tracks described for Franklin Street earlier in this document, it is more difficult to find a location in downtown Carrboro for tail tracks that are not adjacent to the existing rail corridor. This means that the best location for tail tracks may be on the east side of the University railroad tracks and west of Lloyd St if an eventual extension to Carolina North is to be held open as a possibility.

On the other hand, if the rail segment to Carolina North opened at the same time as the segment to Carrboro, it would remove the need to place tail tracks in or near downtown Carrboro, and train switching and storage could be managed closer to Carolina North, simplifying some train management in and near downtown.

## TRAINS AND TRAFFIC

In an ideal world, we would be able to deploy trains to Carrboro and avoid all interactions with motor vehicle traffic, but the urban geography of Carrboro and Chapel Hill makes this challenging, and elevated track and tunneling come at a cost likely to render the project financially infeasible. Therefore, an extension to Carrboro will probably involve some interactions between trains and cars.

However, light rail trains and cars coexist successfully in many other US cities, with millions of annual miles of safe operation, despite the likelihood of conflicts between trains and cars being higher than in a rail-only operating environment. The federal government's *Transit Cooperative Research Program Report 17: Integration of Light Rail Transit Into City Streets* provides a detailed analysis of best practices in how trains, buses, pedestrians, cyclists and cars can coexist safely and successfully.

## FUNDING

Currently, there is no rail extension specified to Carrboro in the fiscally constrained 2035 Long Range Transportation Plan for the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization. Rail to Carrboro and Carolina North was included in previous plans (2025,2030) but was removed in order to match planned investments to available revenue projected for the 2005-2035 timeframe.

The fixed guideway transit investment chosen by the MPO in the spring of 2011 will likely be funded by a mix of federal, state, and local funds, with the Orange County half-cent sales tax specified in House Bill 148 representing the primary revenue source to fund major transit capital projects.

DRAFT

September 24, 2010

While it would be speculative at best to try to specify ways to fund an extension to Carrboro, it is reasonable to suggest that the mix of funding opportunities available for rail transit to UNC Hospital would also be available in similar percentages to extend to Carrboro if a successful line were up and running by the early to mid-2020s.

#### **ACTION STEPS**

To consider extending light rail or other higher-order transit from UNC Hospital to Carrboro in the future, the next steps may include:

- Establishing that the design a first segment of rail to UNC Hospital will not preclude extensions to Downtown Chapel Hill, Downtown Carrboro, and Carolina North
- Identifying a schedule and resources for a more detailed study of the opportunities and constraints that exist in extending rail to Carrboro
- Conduct a corridor or feasibility study examining these or other potential rail extension alternatives that might best connect Downtown Chapel Hill, the UNC Main Campus, Carrboro, and Carolina North with the proposed first phase of light rail at UNC Hospital
- Consider inclusion of any rail extensions in Orange County in the fiscally constrained 2040 DCHC LRTP



## CHAPEL HILL TRANSIT COMPREHENSIVE OPERATIONAL ANALYSIS (COA) PROJECT

The purpose of the Comprehensive Operational Analysis (COA) project is to assist Chapel Hill Transit (CHT) in undertaking a detailed review of its current fixed-route bus system. This review will lead to recommendations for service design and improvements for overall system efficiency and operational effectiveness.

This project will examine all possible alternatives to address the existing service, as well as currently known, but unmet service requests and service requests that are anticipated in conjunction with new areas of development. In addition, this project will define an on-going methodology for system evaluation and update performance guidelines.

The project will include the following activities:

1. Analyze the performance of CHT's fixed-route (local and express) bus services.
2. Examine the efficiency and effectiveness of the current system:
  - a. A review of the transit route structure
  - b. A review of the service levels including transit service frequencies as well as time of the day, evening and weekend coverage
3. Develop recommendations to address service needs, including but not limited to:
  - a. Realignment of existing services
  - b. New routes and services
  - c. Discontinuation of non-productive routes/services.
4. Identify a methodology for the on-going evaluation of the fixed-route system.
5. Evaluate staffing and other organizational factors that contribute to and support operation of the transit system.
6. Run Cut (optional) - provide assistance with run cutting and run bid preparation to implement study recommendations.

A project team, headed by Chapel Hill Transit (CHT), will manage the study in a collaborative effort. A Project Oversight Committee (POC) and Technical Advisory Committee (TAC) will be created to provide technical, policy and public guidance to the consulting team (AECOM) selected to conduct the study.

The makeup of the committees and their respective roles are not static, and will evolve as the study progresses. The following is a summary of the committees and their general responsibilities:

### **Project Oversight Committee**

The Project Oversight Committee (POC) will be responsible for the overall direction of the study and will be comprised of a representative from each of the Partners in CHT:

Town of Chapel Hill  
 Town of Carrboro  
 University of North Carolina at Chapel Hill

POC members will provide policy guidance throughout the study process. The committee will meet at major milestones during the study to facilitate the analysis, community input and project deliverables.

**Technical Advisory Committee**

The Technical Advisory Committee (TAC) will be responsible for advising the consultant team on technical issues during the study. The TAC will include:

Chapel Hill Transit  
Steve Spade  
Brian Litchfield  
Nick Pittman

Town of Carrboro  
Jeff Brubaker

University of North Carolina at Chapel Hill  
Ray Magyar  
George Alexiou (MAB)

**Project Stakeholders**

The consultant team will coordinate with CHT to identify key audiences that will be tapped for input throughout the project, including, but not limited to:

Chapel Hill Town Manager  
Carrboro Town Manger  
Chapel Hill Planning Department  
Carrboro Planning Department  
Chapel Hill Transportation Management Team  
Chapel Hill and Carrboro Advisory Boards  
UNC Hospitals  
UNC TDM Coordinator  
Triangle Transit  
Chamber  
Disadvantaged/minority advocacy groups  
Neighborhood Organizations/Homeowner Associations