(61)

ATTACHMENT 9

TOWN OF CHAPEL HILL PARKING LOT #5

MIXED-USE REDEVELOPMENT

TRAFFIC IMPACT STUDY

EXECUTIVE SUMMARY

Prepared for:

The Town of Chapel Hill
Engineering Department

Prepared by:

HNTB North Carolina, PC

343 East Six Forks Road
Suite 200
Raleigh, NC 27609

February, 2007

NORTH CAROLINA PROFESSIONAL SEAL 023010 ENGINEER CRAIG R SCHEPPLER

2-22-07

EXECUTIVE SUMMARY

Project Overview

Redevelopment of the existing Town of Chapel Hill Parking Lot #5, located in the block bordered by West Franklin Street, Church Street, and Rosemary Street, is being proposed in Chapel Hill. The redevelopment of Lot #5 will consist of a mix of residential and retail development with additional structured parking. Lot #5 currently has 165 surface parking spaces. The proposed project will result in 333 parking spaces serving 137 residential dwelling units and 28,540 square feet of retail space on the existing site, as well as continuing to provide public parking. **Figure ES-1** shows the general location of the site. The project is anticipated to be complete by 2010. This report analyzes the full build-out scenario for the year 2011 (one year after full buildout), the no-build scenario for 2011, as well as 2006 existing year traffic conditions.

The proposed changes at Lot #5 will allow direct, full movement access to Rosemary Street. No direct access is proposed onto Church Street or W. Franklin Street. **Figure ES-2** displays the preliminary site plans for the proposed Lot #5 development and nearby roadways.

Existing Conditions

Study Area

The study area contains Franklin Street and Rosemary Street and their intersections with the north-south facilities of Church Street, and Columbia Street. Site traffic for the Lot #5 development is expected use one full-movement entrance and exit driveway to access the on-site underground parking deck off of Rosemary Street. Franklin Street is a major arterial connecting Carrboro and downtown Chapel Hill through the study area. Columbia Street is a major arterial connecting northern and southern areas of Chapel Hill with the downtown and UNC-Chapel Hill campus. Rosemary Street is a minor arterial serving areas of west Chapel Hill/Carrboro and downtown. Church Street is a local roadway providing access to residential and commercial developments to the north of downtown.

This report analyzes and presents the transportation impacts that the Lot #5 site will have on the following intersections in the project study area:

- West Franklin Street and Church Street
- West Rosemary Street and Church Street
- Franklin Street and Columbia Street
- Rosemary Street and North Columbia Street
- West Rosemary Street and Parking Lot Entrance/Exit

All major intersections are currently signalized. The existing parking lot exit is stop-controlled.

Site Traffic Generation

With the addition of new peak hour trips during the AM, noon, and PM peak hours, there are potential site traffic impacts to the study area intersections. **Table ES-1** shows the site trip generation details, with generation rates taken from the *ITE Trip Generation Manual, Volume 7.* Additional trip generation for net increases in potential public parking or leased parking spaces were also accounted for in the analysis. No trip reductions for "pass-by" type tripmaking were conducted for this study. Trip reductions of 10% for transit and 10% for non-motorized trips were accounted for due to the proximity of the proposed site to transit routes, the downtown area and the UNC campus.

Table ES-1
Weekday Vehicle Trip Generation Summary
Proposed Lot #5 Redevelopment

Daily Weekday Vehicle Trip Generation Summary

LU Code	Land Use	Density	Generation Rate	% Entering	% Exiting	Trips		Total
						In	Out	
230	Residential Condominium/Townhouse	137 du	5.86	50%	50%	401	402	803
820	Shopping Center	28,540 sf	42.94	50%	50%	613	613	1226
						1014	1015	2029
	10% Transit Reduction					-101	-102	-203
	10% Pedestrian Reduction					-101	-102	-203
	Total Development Trips					812	811	1623
	Parking Lot (net gain)	168 spaces	3.69*	50%	50%	310	310	620
	Total New Trips					1122	1121	2243

* - From data provided by Town of Chapel Hill Parking Services staff, March, 2006

Table ES-1 (Continued)
Weekday Vehicle Trip Generation Summary
Proposed Lot #5 Redevelopment

AM Peak Weekday Vehicle Trip Generation Summary

LU Code	Land Use	Density	Generation Rate	% Entering	% Exiting	Trips		Total
						In	Out	
230	Residential Condominiu/Townhouse	137 du	0.44	17%	83%	10	51	61
820	Shopping Center	28,540 sf	1.03	61%	39%	18	11	29
						28	62	90
	10% Transit Reduction					-3	-6	-9
	10% Pedestrian Reduction					-3	-6	-9
	Total Development Trips					22	50	72
	Parking Lot (net gain)	168 spaces	0.12	79%	21%	16	4	20
	Total New Trips					**38**	**54**	**92**

Noon Peak Weekday Vehicle Trip Generation Summary

LU Code	Land Use	Density	Generation Rate	% Entering	% Exiting	Trips		Total
						In	Out	
230	Residential Condominiu/Townhouse	137 du	0.48	42%	58%	27	38	65
820	Shopping Center	28,540 sf	2.39	55%	45%	37	31	68
						64	69	133
	10% Transit Reduction					-6	-7	-13
	10% Pedestrian Reduction					-6	-7	-13
	Total Development Trips					52	55	107
	Parking Lot (net gain)	168 spaces	0.44	39%	61%	29	46	75
	Total New Trips					**81**	**101**	**182**

PM Peak Weekday Vehicle TripGeneration Summary

LU Code	Land Use	Density	Generation Rate	% Entering	% Exiting	Trips		Total
						In	Out	
230	Residential Condominiu/Townhouse	137 du	0.52	67%	33%	48	23	71
820	Shopping Center	28,540 sf	3.75	48%	52%	51	56	107
						99	79	178
	10% Transit Reduction					-10	-8	-18
	10% Pedestrian Reduction					-10	-8	-18
	Total Development Trips					79	63	142
	Parking Lot (net gain)	168 spaces	0.53	20%	80%	18	71	89
	Total New Trips					**97**	**134**	**231**

Background Traffic
Five Town of Chapel Hill-approved background traffic generators are located in the study area and are listed below:

- The Franklin Hotel
- Rosemary Street Apartments
- Chipotle Restaurant
- Shortbread Lofts
- Greenbridge Development

Background traffic methodologies and trip generation/distribution/assignment were made using information contained in previous traffic impact studies and existing traffic patterns. It was assumed that all five projects would be complete and fully operational by the 2011 design year. An ambient area-wide traffic growth percentage of two percent per year was applied to existing traffic volumes based on information from previous traffic impact studies in the area and the Town of Chapel Hill.

Impact Analysis

Peak Hour Intersection Level of Service
Even with the addition of AM, noon, and PM peak hour site-generated trips to the projected 2011 background traffic volumes, no existing study area intersections will experience overall deficient traffic operations. A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding Level-of-Service (LOS) is shown in **Table ES-3** below.

The impact of the proposed site redevelopment on overall study area traffic operations can be considered insignificant, except at the Lot #**5** driveway exit onto W. Rasemary Street in the PM peak hour. Marginal increases in delay occur for most intersections when compared to the 2011 No-Build and 2011 individual site analyses. No degradation of signalized intersection operations to a LOS E or F is expected. Additional delay and queuing for some movements near or at capacity can be expected at the Franklin Street / Columbia Street intersection. There is also the potential for excessive delay at some approaches at the Rosemary Street / N. Columbia Street intersection that may be corrected by adjustments to signal timing based on actual traffic demand once the site build-out occurs. 2011 capacity analyses include the effects of pedestrian signal head/signal phases at the Rosemary Street intersection with Church Street, and changes to signal splits/offsets at Franklin Street / Columbia Street and Rosemary Street / N. Columbia Street intersections to meet the LOS D overall intersection operations threshold.

Table ES-3. LOS and Delay (sec/vehicle) Summary

Intersections	Time Period	2006 Existing		2011 No-Build		2011 Build (Lot #5)		2011 Mitigated	
		Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
West Franklin Street and Church Street	AM	7.2	A	5.4	A	5.5	A	N/A	N/A
	NOON	10.7	B	7.9	A	9.6	A	NIA	N/A
	PM	11.8	B	15.8	B	21.1	C	N/A	N/A
West Rosemary Street and Church Street	AM	7.0	A	9.5	A	9.9	A	N/A	N/A
	NOON	7.5	A	8.0	A	8.2	A	N/A	N/A
	PM	11.7	B	16.9	B	15.7	B	NIA	N/A
Franklin Street and Columbia Street	AM	28.2	C	29.9	C	30.2	C	NIA	N/A
	NOON	36.8	D	43.9	D	44.8	D	N/A	N/A
	PM	36.2	D	45.4	D	51.0	D	NIA	N/A
Rosemary Street and N. Columbia Street	AM	21.7	C	36.3	D	42.0	D	N/A	N/A
	NOON	20.8	C	30.3	C	40.1	D	NIA	N/A
	PM	29.7	C	41.4	D	54.9	D	NIA	N/A
W. Rosemary Street and Lot #5 Entrance/Exit	AM	11.9	B	13.7	B	13.6	B	N/A	N/A
	NOON	13.8	B	18.2	C	***40.3***	E	***42.9***	***E***
	PM	16.4	C	23.9	C	***109.2***	F	***77.9***	***F***

NIA – Not Applicable or No Improvements Necessary

Access Analysis

Vehicular site access is to be accommodated via one site driveway for Lot #5 (see **Figure ES-2** for details). The driveway throat length for Lot #5, as shown on the proposed site redevelopment plan, is indeterminate. The concept plan only shows a short length (25-50 feet) of driveway that would serve below-grade parking facilities. No layout of such facilities is indicated on the proposed concept plan. It is important to note that up to ten vehicles (approximately 250 feet of required storage) may queue at the driveway exit in the 2011 PM peak hour and that internal provisions for such a condition should be accounted for in the below-grade parking lot design plan. From an operations standpoint to shorten the exiting vehicular queue, provision for separate left-turn and right-turn exit lanes would reduce the vehicular queues to approximately four vehicles (100 feet of storage) for the exclusive left-turn exit lane. The proposed concept plan also shows the entrance and exit lane arrows to be reversed from conventional operations (traffic flow on the right-side of the road).

An existing entrance-only driveway access point along Church Street is eliminated in the Lot #5 site concept plan. This is a positive improvement that would remove conflict points at this driveway along Church Street. No vehicular access is shown along W. Franklin Street.

Driveway distances from the signalized intersection of West Rosemary Street at Church Street are acceptable, based on recommendations of 100 foot minimum corner clearance as set forth in the 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways* and the 2003 *Town of Chapel Hill Design Manual.* The Town Design Manual recommends 250 foot minimum spacing between an intersection and driveway along an arterial. This is not an issue, with no direct exiting access being proposed along Franklin Street. Rosemary Street could be considered a minor arterial street in the study area. However, it functions more as a local access street, due to the many existing driveways along its length. No new access points are being proposed along Rosemary Street. The amount of vehicular conflicts occurring between the West Rosemary Street / Church Street and Rosemary Street / North Columbia Street intersections and the site driveways are limited by the light to moderate traffic volumes on Rosemary Street and the expectation that driveway volumes from the parking facilities will not be overly excessive.

Access for pedestrians and bicyclists is currently acceptable. As previously discussed, there is good sidewalk connectivity, at least in the local study area. Bicycle access is possible to and from the site, although no specific bicycle amenities are provided on local roadways.

Sight Distance Analysis

In general, sight distance issues entering and exiting the proposed driveways would be minimal. Sight distance along Rosemary Street is adequate, with little horizontal or vertical curvature that would affect sight distance present in the study area. There is some vertical curvature that limits sight distance at the intersection of Rosemary Street/N. Columbia Street, but this has little impact on sight distance from the parking lot access along Rosemary Street. Traffic exiting the site will need to be cognizant of traffic

queues on Rosemary Street at the signalized intersections of North Columbia Street and Church Street. No additional limitations or problems due to the site development or site traffic impacts are expected at these intersections. Based on the proposed site concept plan, shrubbery/trees are shown immediately to the left and right of the proposed driveway exit. It is recommended that any vegetation placed near the driveway access conform to Town of Chapel Hill design standards and/or American Association of State Highway and Transportation Officials (AASHTO) standards for sight distance set-backs for vegetation at driveway access points.

Intersection Crash Analysis

Crash information for the Franklin Street intersections exhibits a moderate trend for rear-end, angle, and side-swipe accidents along Franklin Street, potentially attributable to congested traffic operations. 54 total accidents were recorded at the Franklin Street I Columbia Street intersection between 2003 and 2006, and four total accidents were recorded at the West Franklin Street 1 Church Street intersection.

There were 39 accidents at the Columbia Street 1 Rosemary Street intersection over the three year period, with a high volume of angle crashes. This could be due excessive lane changing to get in the correct lane before motorists reach the intersection. 16 crashes were also reported along Rosemary Street at the existing site driveway. At the Rosemary Street 1 Church Street intersection, 14 crashes occurred with a high occurrence of rear-end and angle crashes.

9 crashes with pedestrians or bicycles occurred in the study area in a three year period out of a total of 135 crashes in the study area.

Other Transportation-Related Analyses

Other transportation-related analyses relevant to the 2001 Town of Chapel Hill Guidelines for the preparation of Traffic Impact Studies were completed as appropriate. The following topics, listed in Table ES-4 on the next page, are germane to the scope of this study.

Table ES-4. Other Transportation-Related Analyses

Analysis	Comment
Generalized Peak Hour and/or Daily LOS Analysis	Planning-level corridor LOS Analyses shows that the most roadways in the study area will operate at an acceptable LOS in 2030. Increases in daily traffic in the study area related to the redevelopment of the proposed site will not cause any major changes to daily planning-level LOS of the existing transportation network..
Signal Phasing Analysis	Signal phasing for existing and future conditions produces adequate traffic operations at the signalized intersections under study. Some minor signal timing adjustments to individual phase splits may be necessary for optimal operations, based on ambient, background, and site-related traffic volume growth.
Progression Analysis	Traffic signals in the project study area are part of the Town of Chapel Hill signal system and run under coordinated conditions for all three peak periods analyzed for this study. The new traffic signal at W. Franklin Street and Church Street is incorporated into the signal coordination and this assumption was used for all 2011 analyses in this study.
Turn Lane Storage Requirements	Field observation and analysis estimates from HCS and Synchro indicate that existing storage bays at study area intersections should have adequate length to accommodate turning traffic in all conditions analyzed.
Appropriateness of Acceleration / Deceleration Lanes	Given the proposed configuration of site driveways, the lane geometrics and traffic patterns and posted speeds on Franklin Street and Rosemary Street, no special acceleration or deceleration lanes are required due to the proposed Lot #5 redevelopment.
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity is excellent through the study area. Besides some additional pavement width on outside lanes on Rosemary Street west of Columbia Street, no roadways with specific bicycle amenities exist in the study area.
Public Transportation Analysis	Public transportation service to the site is excellent, with on-street bus stops within walking distance to the sites and multiple routes serving the study area.

Special Analysis/Issues Related to Project

Based on discussions with Town of Chapel Hill staff, no special issues or analysis is required for the Lot #5 Redevelopment project.

IV. MITIGATION MEASURES / RECOMMENDATIONS

A.) Planned Improvements

The Town of Chapel Hill and the North Carolina Department of Transportation are expected to make traffic signal improvements in the study area within the design year time frame of 2007-2009. The intersection of West Franklin Street and Church Street has recently been signalized. NCDOT currently has a spot safety project to install protected / permitted phases to the northbound and southbound left-turns on Columbia Street at Rosemary Street, though field observation noted that this project has not been completed as of February, 2007. The Town of Chapel Hill has a project to install pedestrian signal heads and phases to the signal at Rosemary Street / Church Street.

B.) Background Committed Improvements

No background improvements are committed by other area project developments.

C.) Applicant Committed Improvements

Based on the concept plan provided, there are no transportation-related improvements to be made external to the site property.

D.) Necessary Improvements

The proposed Lot #5 redevelopment access driveway along Rosemary Street may operate over capacity in the 2011 design year, given expected traffic generated by the Lot #5 parking facilities in the PM peak hour. This driveway, shown on preliminary site plans to have a single exit lane, may need to be widened and realigned for separate left-turn and right-turn exit lanes to prevent vehicular queues blocking efficient operations within the below-grade parking lot. Since no conceptual design for this facility was available for this analysis, it is recommended to incorporate this feature in the final design of the parking facility, if possible.

If the exit lanes are separated, maximum vehicular queues for the exclusive left-turn lane is approximately four vehicles, which could be stored more efficiently at the parking deck exit currently shown in the preliminary site concept plan. This separation of exiting traffic would reduce per-vehicle delay in the PM peak hour for left-turn movements by 31 seconds and right-turning vehicles by 92 seconds. At least 100 feet of exclusive turn lane storage would be required for each lane, based on the anticipated PM peak hour maximum queues.