



TOWN OF CHAPEL HILL NORTH CAROLINA

MEMORANDUM

TO: Transportation and Connectivity Advisory Board

FROM: David C. Bonk, Long Range and Transportation Planning Manager

SUBJECT: **Tri City Medical Office – Transportation Impact Analysis**

Background: At the June 23, 2015 Transportation and Connectivity Board meeting, the Board received presentations from staff and the applicant regarding the Tri City Medical Office, Special Use Permit application. After discussion of the project, the Board agreed not to consider a recommendation for the SUP application until the Town Council took action on a preferred light rail alignment and indicated whether or not they supported the proposed grade separation at the Barbee Chapel/NC54 intersection.

The Tri-City Medical Office Special Use Permit application is scheduled for a Council discussion and possible decision in the Fall 2015, prior to a final decision on the alignment. The Council has charged this advisory board with advising them on these matters and if the Board does not make a recommendation at this time, you may not have an additional opportunity to do so.

Therefore, staff encourages the Board to consider providing a recommendation on the current proposal to the Council for their consideration. We believe the Board could undertake a provisional review of the Tri City proposal based on the selection of either light rail alignments. The Board's evaluation and recommendations for the project would be conditional, based on the action of the Council with regard to the selection of a light rail alignment.

The following is an excerpt from the NC54 Corridor Study addressing the proposed interchange at Barbee Chapel Road and NC54.

NC54 Corridor Study – Intersection NC54/Barbee Chapel Road (page 6-25).

“Turning movement counts indicate more than 550 vehicles are traveling northbound on Barbee Chapel Road and turn left to go westbound on NC 54 in the morning peak hour. In the PM peak, almost 700 vehicles are making the reciprocal movement - eastbound to southbound. The current intersection configuration with Stancell Drive (Old Hwy 54) does not meet NCDOT standards for access management and intersection spacing, and complicates operating conditions during peak hours. These high turning volumes with the heavy east-west through traffic, combined with the substandard geometry, make this intersection a logical location for grade separation, which will eliminate the traffic signal.

The recommended functional design for grade separation at the intersection of Barbee Chapel Road and NC 54 assumes that the light rail alignment C1 as later discussed in this chapter is

constructed. If alignment C2 is carried forward into the design stages, this functional design must be modified. Alignment C2 will parallel NC 54 on the south side. Potential designs for accommodating light rail with grade separation could include moving the light rail alignment 500 feet to the south and extending the bridge over NC 54 so that the light rail goes under the bridge but does not conflict with the ramp on the south side. This would likely abandon the potential connection of Marriott Way and impact the Marriott property.

Alternatively, the southbound ramp could be abandoned with only one ramp on the north side and a signal to control movements at NC 54, which would hamper the benefits of providing grade separation. Other costlier three-level interchange designs could also be considered. Further traffic analysis would be necessary to determine whether such designs would operate safely and effectively.

The configuration of the grade separated intersection of Barbee Chapel Road and NC 54 is shown in Figure 6-16. Barbee Chapel Road will cross over NC 54 with an overpass, connected to NC 54 by two ramps. These ramps will connect to Barbee Chapel Road without movement restrictions. All movements will be accommodated at this interchange. Vehicles exiting NC 54 from either direction can turn left or right to go northbound or southbound. Similarly, vehicles traveling along Barbee Chapel Road from either direction will be able to access NC 54 in both directions. Stancell Drive, the frontage road that parallels the south side of NC 54, would no longer connect to Barbee Chapel Road, eliminating the safety problems of the current configuration. Access to the gas station and other parcels in the southeast quadrant of the interchange can be provided internally through the Hillmont development. (Note: The Hillmont Master Plan and Special Use Permit have subsequently expired).

The northern intersection of Barbee Chapel Road and the westbound ramps can be implemented with a stop sign for the off-ramp traffic. The southern intersection of Barbee Chapel Road and the eastbound ramps can be constructed as a roundabout that connects existing Pearl Lane to the east and the future extension of Marriott Way. The one-lane roundabout will ensure slow speeds for pedestrian safety and reduce delays as compared to a typical traffic signal. A slip lane from Marriott Way to southbound Barbee Chapel will allow traffic from the Friday Center and future light rail station to go southbound on Barbee Chapel Road without delay and access NC 54.

The Marriott Way extension will greatly improve the traffic patterns at this intersection and at Friday Center Drive and Meadowmont Lane intersection with NC 54. It is a key component of the design. This connection will allow drivers to choose between multiple routes to access NC 54, improving circulation and flexibility for bus routes and non-motorized travelers, and provide network redundancy for emergency vehicles. If the roundabout cannot be constructed, Figure 6-17 shows an alternative design. Marriott Way could intersect with Barbee Chapel Road with partial access, where a median would prohibit left turns. This configuration would route more traffic through the intersection of Friday Center Drive and NC 54.”

Comparison TriCity TIA and LOS Traffic Count

The information in the TriCity Medical TIA and the NC54 Corridor Study shows similar data for existing conditions at the intersection of Barbee Chapel Road/NC54. Both studies found the

existing overall AM peak hour level of service to be D and PM peak hour to be C. Traffic counts found that approximately 500 vehicles make left turns onto NC54 from Barbee Chapel Road in the AM peak period, and approximately 700 right turns in the PM peak. Based on the current traffic volume and anticipated volume increase in the future, the NC54 Corridor Study recommended a grade separation at NC54/Barbee Chapel Road.

Attachments: We have provided a list of tables and maps from the NC54 Corridor Study regarding the Barbee Chapel Road and NC54 Intersection:

- Overall Intersection Delay & Level of Service, NC54 Corridor Study
- Roadway Transportation Recommendations, NC54 Corridor Study
- Map Barbee Chapel Road/NC54 Intersection Proposed Improvements, NC54 Corridor Study

Table 6-5: Overall Intersection Delay (seconds) & Level of Service

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR					
	Existing		Future w/out Improvements		Future w/ Improvements		Existing		Future w/out Improvements		Future w/ Improvements	
NC 54 & Leigh Farm Road/ Quadrangle Drive	10	A	50	D	30	C	20	B	80	E	30	C
NC 54 & I-40 Westbound Ramps	120	F	40	D	20	B	50	D	40	D	20	B
NC 54 & I-40 Eastbound Ramps	90	F	190	F	20	C	110	F	290	F	10	A
NC 54 & Farrington Road	170	F	430	F	-	-	160	F	400	F	-	-
NC 54 & East Barbee Chapel Road	50	D	170	F	-	-	30	C	100	F	-	-
NC 54 & Meadowmont Lane/ Friday Center Drive	70	E	80	F	40	D	60	E	140	F	10	D
NC 54 & West Barbee Chapel Road	10	B	20	B	10	C	30	C	40	D	20	C
NC 54 & Burning Tree Drive/ Finley Golf Course Road	10	A	20	C	10	B	10	B	40	D	30	C
NC 54 & Hamilton Road	25	C	90	F	60	E	20	C	60	E	50	D
NC 54 & US 15-501 Northbound Ramps	Model limitations produce inaccurate results for the current configuration.				40	D	Model limitations produce inaccurate results for the current configuration.				20	C
NC 54 & US 15-501 Southbound Ramps	none	A	40	D	30	C	none	A	gridlock	F	10	B

Table 6-8: Roadway Transportation Recommendations

ROADWAY				
Description	Location	Jurisdiction	Phase	Cost ¹
Construct Farrington Rd slip ramp for northbound traffic on Farrington Rd to access eastbound I-40 directly. Modify on-ramp to allow for transition.	Farrington Rd	Durham	Short Term (2012-2020)	\$3,400,000
Construct collector street system including turn lanes on NC 54.	As specified in the adopted Southwest Durham – Southeast Chapel Hill Collector Street Plan	Durham	Short Term (2012-2020)	\$31,400,000
Construct access road behind the Farrington Road shopping center for connection between Farrington Rd and Falconbridge Rd.	Between Farrington Rd and Falconbridge Rd	Durham	Short Term (2012-2020)	\$400,000
Obtain Marriot Way, then upgrade to NCDOT standards and extend to Barbee Chapel Rd.	Between Friday Center Dr and E Barbee Chapel Rd	Chapel Hill	Short Term (2012-2020)	\$800,000
Construct other connections as opportunities arise through development proposals.	Through study area	Durham & Chapel Hill	Short to Long Term	Variable cost
Close Glenwood Square shopping center driveways along NC 54 and provide access via Hamilton Rd	Glenwood Square Shopping Center at US 15-501 interchange	Chapel Hill	Short Term (2012-2020)	\$100,000 ³
Construct dual exit lanes for I-40 WB to NC 54 WB loop ramp plus two thru lanes on NC 54 WB. Widen bridge for four EB lanes, three WB lanes, and 10-foot sidewalk on south side.	I-40 Interchange with NC 54	Durham	Mid-Term (2020-2025)	\$6,100,000 ⁴
Add new partial cloverleaf ramp for I-40 EB to NC 54 EB, remove existing signal and install yield sign at the I-40 EB to NC 54 WB ramp. Reconfigure EB approach at I-40 EB on-ramps for two free-flow lanes to EB I-40.	I-40 Interchange with NC 54	Durham	Mid-Term (2020-2025)	\$2,100,000
Widen NC 54 to six lanes east of Barbee Chapel Rd to match six lane section to the west. Construct the multiuse path concurrent with the road project.	Barbee Chapel Rd to I-40 Interchange	Durham	Mid-Term (2020-2025)	\$22,700,000
Implement superstreet configuration at Crossland Drive.	Future western collector street ⁵ & NC 54	Durham	Mid-Term (2020-2025)	\$3,900,000
Convert Farrington Rd intersection to an overpass over NC 54 with pedestrian facilities.	Farrington Rd at NC 54	Durham	Mid-Term (2020-2025)	\$6,500,000
Convert Falconbridge Rd intersection to a grade separated interchange with pedestrian facilities.	Falconbridge Rd at NC 54	Durham	Mid-Term (2020-2025)	\$9,800,000
Implement superstreet configuration at Meadowmont Ln/ Friday Center Dr.	Meadowmont Ln/ Friday Center Dr & NC 54	Chapel Hill	Mid-Term (2020-2025)	\$4,300,000
Construct Barbee Chapel RdgGrade separation.	Barbee Chapel Rd & NC 54	Chapel Hill	Mid-Term (2020-2025)	\$9,200,000
Construct partial cloverleaf redesign of US 15-501 interchange.	US 15-501 & NC 54 interchange	Chapel Hill	Long Term (2025-2035)	\$17,300,000
Implement superstreet configurations at W Barbee Chapel Rd and Burning Tree Dr/ Finley Golf Course Rd.	NC 54 intersections with W Barbee Chapel Rd and Burning Tree Dr/ Finley Golf Course Rd	Chapel Hill	Long Term (2025-2035)	\$4,900,000



Figure 6-16: Recommended Barbies Chapel Grade Separation Design.



Figure 6-17: Alternative Barbies Chapel Grade Separation Design.



Revised Mar 28, 12; C-2 location approximate