(106)

ATTACHMENT 19

TRAFFIC IMPACT ANALYSIS REPORT

FOR THE

PROPOSED WOODMONT MIXED-USE DEVELOPMENT

Prepared For
Town of Chapel Hill
Chapel Hill, North Carolina

Prepared By
Ramey Kemp & Associates, Inc.
5808 Faringdon Place
Raleigh, North Carolina

RKA Project # 07028

April 2007

NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

4/19/07

(107)

TABLE OF CONTENTS

1. INTRODUCTION 1
   - 1.1. Site Location and Study Area 1
   - 1.2. Proposed Land Use 2
   - 1.3. Existing Land Uses 3
   - 1.4. Site Access and Existing Roadways 3
   - 1.5. Bicycle Routes and Sidewalks 4
   - 1.6. Public Transportation 5

2. EXISTING (2007) PEAK HOURCONDITIONS 5
   - 2.1. Existing (2007) Peak Hour Traffic 5
   - 2.2. Analysis of Existing (2007) Peak Hour Traffic 6

3. FUTURE (2010) TRAFFIC CONDITIONS WITHOUT DEVELOPMENT 9
   - 3.1. Future (2010) Peak Hour Traffic Volumes 9
   - 3.2. Future Roadway Improvements 9
   - 3.3. Approved Adjacent Developments 9
   - 3.4. Future (2010) Peak Hour Traffic Volumes with Adjacent Development 10
   - 3.5. Analysis of Future (2010) Peak Hour Traffic Volumes with Adjacent Development 10

4. SITE TRAFFIC 13
   - 4.1. Trip Generation 13
   - 4.2 Trip Generation Budget 14
   - 4.3. Site Trip Distribution and Assignment 14

5. FUTURE (2010) TRAFFIC CONDITIONS WITH PHASE ONE DEVELOPMENT 15
   - 5.1. Analysis of Future (2010) Traffic with Development 15

6. FUTURE (2013) TRAFFIC CONDITIONS WITHOUT DEVELOPMENT 18
   - 6.1. Future (2013) Peak Hour Traffic Volumes 18
   - 6.2. Future Roadway Improvements 18
   - 6.3. Approved Adjacent Developments 18
   - 6.4. Future (2013) Peak Hour Traffic Volumes with Adjacent Development 18
   - 6.5. Analysis of Future (2013) Peak Hour Traffic Volumes with Adjacent Development 19

7. FUTURE (2013) TRAFFIC CONDITIONS WITH PHASE TWO DEVELOPMENT 22
   - 7.1. Analysis of Future (2013) Traffic with Development 22

8. FUTURE (2018) TRAFFIC CONDITIONS WITHOUT DEVELOPMENT 25
8.1. Future (2018) Peak Hour Traffic Volumes 25
8.2. Future Roadway Improvements 25
8.3. Approved Adjacent Developments 25
8.4. Future (2018) Peak Hour Traffic Volumes with Adjacent Development 25
8.5. Analysis of Future (2018) Peak Hour Traffic Volumes with Adjacent Development 26
9. FUTURE (2018) TRAFFIC CONDITIONS WITH PHASE THREE DEVELOPMENT 29
9.1. Analysis of Future (2018) Traffic with Development 29
10. PROJECT IMPACTS 32
10.1. Link Levels of Service 32
10.2. Access Analysis 33
10.3. Signal Warrant Analysis 34
10.4. Crash Analysis 37
10.5. Peak Hour Intersection Levels of Service 40
10.6. Turn Lane Storage Requirements 43
10.7. Sight Distance 43
10.8. Appropriateness of Acceleration or Deceleration Lanes 43
10.9. Pedestrian and Bicycle Analysis 43
10.10. Public Transportation Analysis 43
11. RECOMMENDATIONS 44

(109)

LIST OF TABLES

Table 1 Highway Capacity Manual Levels of Service and Delay 7
Table 2 Analysis of Existing (2007) Peak Hour Traffic 8
Table 3 Analysis of Future (2010) Peak Hour Traffic without Recommended Improvements 11
Table 4 Analysis of Future (2010) Peak Hour Traffic with Recommended Improvements 12
Table 5 Trip Generation 13
Table 6 Analysis of Future (2010) Traffic with Proposed Development without Recommended Improvements 16
Table 7 Analysis of Future (2010) Traffic with Proposed Development without Recommended Improvements 17
Table 8 Analysis of Future (2013) Peak Hour Traffic without Recommended Improvements 20
Table 9 Analysis of Future (2013) Peak Hour Traffic with Recommended Improvements 21
Table 10 Analysis of Future (2013) Traffic with Proposed Development without Recommended Improvements 23
Table 11 Analysis of Future (2013) Traffic with Proposed Development without Recommended Improvements 24
Table 12 Analysis of Future (2018) Peak Hour Traffic without Recommended Improvements 27
Table 13 Analysis of Future (2018) Peak Hour Traffic with Recommended Improvements 28
Table 14 Analysis of Future (2018) Traffic with Proposed Development without Recommended Improvements 30
Table 15 Analysis of Future (2018) Traffic with Proposed Development without Recommended Improvements 31
Table 16 Link Analysis Summary 33
Table 17 Signal Warrant Summary – NC 54 and Site Driveway #2 36
Table 18 Crash Analysis Summary 38

LIST OF FIGURES

Figure 1	Site Location Map
Figure 2	Preliminary Site Plan
Figure 3	Existing Lane Configurations
Figure 4	Existing (2007) Peak Hour Traffic
Figure 5	Future (2010) Peak Hour Traffic
Figure 6	Total Adjacent Development Traffic – Phase One
Figure 7	Future (2010) Peak Hour Traffic + Adjacent Development Traffic
Figure 8	Site Trip Distribution Percentages – Phase One
Figure 9	Site Trip Assignment – Phase One
Figure 10	Future (2010) Peak Hour Traffic with Proposed Development
Figure 11	Future (2013) Peak Hour Traffic
Figure 12	Total Adjacent Development Traffic – Phase Two
Figure 13	Future (2013) Peak Hour Traffic + Adjacent Development Traffic
Figure 14	Site Trip Distribution Percentages – Phase Two
Figure 15	Site Trips – Phase Two
Figure 16	Future (2013) Peak Hour Traffic with Proposed Development
Figure 17	Future (2018) Peak Hour Traffic
Figure 18	Total Adjacent Development Traffic – Phase Three
Figure 19	Future (2018) Peak Hour Traffic + Adjacent Development Traffic
Figure 20	Site Trip Distribution Percentages – Phase Three
Figure 21	Site Trip Assignment – Phase Three
Figure 22	Future (2018) Peak Hour Traffic with Proposed Development
Figure 23	Recommended Improvements

(iii)

TECHNICAL APPENDIX

Appendix A	Figures
Appendix B	Traffic Counts
Appendix C	Capacity Calculations - Existing (2007) Traffic Conditions
Appendix D	Adjacent Development Information
Appendix E	Capacity Calculations – Future (2010) without Recommended Improvements
Appendix F	Capacity Calculations – Future (2010) with Recommended Improvements
Appendix G	Capacity Calculations – Future (2010) with Proposed Development without Recommended Improvements
Appendix H	Capacity Calculations – Future (2010) with Proposed Development with Recommended Improvements
Appendix I	Capacity Calculations – Future (2013) without Recommended Improvements
Appendix J	Capacity Calculations – Future (2013) with Recommended Improvements
Appendix K	Capacity Calculations – Future (2013) with Proposed Development without Recommended Improvements
Appendix L	Capacity Calculations – Future (2013) with Proposed Development with Recommended Improvements
Appendix M	Capacity Calculations – Future (2018) without Recommended Improvements
Appendix N	Capacity Calculations – Future (2018) with Recommended Improvements
Appendix O	Capacity Calculations – Future (2018) with Proposed Development without Recommended Improvements
Appendix P	Capacity Calculations – Future (2018) with Proposed Development with Recommended Improvements
Appendix Q	Signal Warrant Analysis Report
Appendix R	Crash Information

(112)

TRAFFIC IMPACT ANALYSIS REPORT
PROPOSED WOODMONT DEVELOPMENT
CHAPEL HILL, NORTH CAROLINA

1. INTRODUCTION

The contents of this report present the findings of the Traffic Impact Analysis (TIA) conducted for the proposed Woodmont Development in Chapel Hill, North Carolina. The purpose of this study is to determine the potential impact on the surrounding transportation system created by traffic generated by the proposed development as well as recommend improvements to mitigate the impacts. The development is proposed to be constructed in three (3) phases thus, in order to accomplish the objective, the study analyzes existing (2007) traffic conditions, future (2010) traffic conditions without the proposed development plus adjacent development traffic, future (2010) traffic conditions with adjacent development and the proposed development [Phase One], future (2013) traffic conditions without the proposed development, future (2013) traffic conditions with the proposed development [Phase Two], future (2018) traffic conditions without the proposed development and future (2018) traffic conditions with the proposed development [Phase Three] during the weekday AM, midday and PM peak hours.

1.1. Site Location and Study Area

The proposed Woodmont Development is located along the south side of NC 54, between Barbee Chapel Road and Little John Road in Chapel Hill, North Carolina. Refer to Figure 1 in Appendix A for the site location map. The scope of this project was developed through coordination with the Town of Chapel Hill and consists of the following intersections:

1) NC 54 and Hamilton Road – (Signalized)
2) NC 54 and Finley Golf Course Road/Burning Tree Drive – (Signalized)
3) NC 54 and West Barbee Chapel Road – (Signalized)
4) NC 54 and Meadowmont Lane/Finley Center Drive – (Signalized)
5) NC 54 and Barbee Chapel Road – (Signalized)
6) NC 54 and Hunting Ridge Road – (Signalized)
7) NC 54 and Farrington Road – (Signalized)

8) NC 54 and I-40 Eastbound On-/Off-Ramps– (Signalized)
9) NC 54 and I-40 Westbound On-/Off-Ramps– (Signalized)
10) NC 54 and Downing Creek Parkway– (Unsignalized)
11) NC 54 and Little John Road – (Unsignalized)
12) Barbee Chapel Road and Stancell Drive – (Unsignalized)
13) Barbee Chapel Road and Finley Forest Drive – (Unsignalized)
14) East Barbee Chapel Road and Meadowmont Lane – (Signalized)
15) NC 54/Stancell Drive and Site Access – (Proposed Signalized)

1.2. Proposed Land Use

The development is proposed to consist of a total of 480,200 square feet of office space and sixty (60) residential condominium units. The development is proposed to be constructed in three (3) phases. Phase One, which is expected to be complete in 2009, is proposed to consist of 91,500 square feet of office space and sixty (60) residential condominium units. Phase Two, which is expected to be complete in 2012, is proposed to consist of an additional 96,300 square feet of office space. Phase Three, which is expected to be complete in 2017, is proposed to consist of an additional 292,400 square feet of office space. Per the Town of Chapel Hill requirements, analyses were conducted for future traffic conditions with and without the proposed development for the years 2010, 2013 and 2018, one year beyond each of the phase build-out years.

Access to the development is proposed via a full-movement access along Barbee Chapel Road, opposite the existing Finley Forest Drive, and a signalized, full-movement access at a relocated median break along NC 54, approximately 1,300 feet east of Barbee Chapel Road. The access along Barbee Chapel Road is proposed to be constructed during Phase One of the development and the access along NC 54 is proposed to be constructed during Phase Two of the development. A signal warrant analysis for the proposed access along NC 54 is provided in a subsequent section of the report. Refer to Figures 2A, 2B, 2C and 2D in Appendix A for copies of the phased construction site plans.

1.3. Existing Land Uses

Existing land uses along NC 54 in the study area consist of a mixed-use of residential, commercial and office uses. The Meadowmont mixed-use development is located on the north side of NC 54 in the vicinity of the proposed development.

A review of the Town of Chapel Hill Land Use Plan shows the proposed site property as primarily medium residential use with four to eight units per acre. Surrounding property is planned to consist of a mix of low (one to four units per acre) to high (eight to fifteen units per acre) residential and commercial uses.

1.4. Site Access and Existing Roadways

Access to the development is proposed via a full-movement access along Barbee Chapel Road, opposite the existing Finley Forest Drive, and a signalized, full-movement access at a relocated median break along NC 54, approximately 1,300 feet east of Barbee Chapel Road. The access along Barbee Chapel Road is proposed to be constructed during Phase One of the development and the access along NC 54 is proposed to be constructed during Phase Two of the development. A signal warrant analysis for the proposed access along NC 54 is provided in a subsequent section of the report.

NC 54 (Raleigh Road) is a major arterial and carries traffic in an east-west direction. In the study area, NC 54 provides access from the UNC-Chapel Hill campus to I-40 and Durham. The cross-section of NC 54 varies from a four-lane to six-lane divided facility through the study area. Exclusive left- and right-turn lanes exist at the major signalized intersections through the study area. Transit stops are located in several areas along NC 54 and sidewalk and/ore bicycle paths are prevalent. The posted speed limit varies from 45 miles per hour (mph) near I-40 to Barbee Chapel Road to 35 mph to the west of Barbee Chapel Road.

Barbee Chapel Road is primarily a two-lane minor arterial that provides access to NC 54 for residential developments to the south. The posted speed limit along Barbee Chapel Road is 35 mph.

Hamilton Road is primarily a two-lane collector roadway that provides access to NCD 54 for the Glen Lennox residential development to the north and various commercial businesses to the south. The posted speed limit is 25 mph.

Finley Golf Course Road is primarily a two-lane collector roadway that provides access to NC 54 for residential developments to the north and the Finley Golf Course to the south. The posted speed limit is 25 mph along the north leg and 35 mph along the south leg.

West Barbee Chapel Road is primarily a three-lane collector that provides access to NC 54 from the Meadowmont mixed-use development. The posted speed limit is 25 mph.

Meadowmont Lane/Friday Center Drive is primarily a four-lane minor arterial and provides access to NC 54 from the Meadowmont mixed-use development to the north and the Friday Center and other various office and institutional developments to the south. The posted speed limit is 25 mph.

Hunting Ridge Road is primarily a two-lane collector roadway that provides access to NC 54 for residential developments to the south. The posted speed limit is 25 mph along the north leg and 35 mph along the south leg.

Existing lane configurations (number of traffic lanes on the intersection approach), lane widths, storage capacities, bicycle lane locations, sidewalk locations, bus stop locations and other roadway information was collected through field reconnaissance by Ramey Kemp & Associates, Inc. (RKA). Refer to Figure 3 in Appendix A for an illustration of the existing lane configurations within the study area.

1.5. Bicycle Routes and Sidewalks

The Meadowmont mixed-use development, located on the north side of NC 54 along Meadowmont Lane and West Barbee Chapel Road contains designated bicycle facilities. In addition, separate bicycle lanes exist along several sections of NC 54 within the study area.

(116)

1.6. Public Transportation

The Town of Chapel Hill transit system provides service to various areas within the study area, primarily to locations to the west of Barbee Chapel Road. In addition, the Triangle Transit Authority (TTA) provides regional service to the area with trips provided to Durham and the Research Triangle Park.

Based on discussions with the Town of Chapel Hill, a transit reduction rate of 10% will be applied to the proposed site trips.

2. EXISTING (2007) PEAK HOUR CONDITIONS

2.1. Existing (2007) Peak Hour Traffic

Existing peak hour traffic volumes at the following study intersections were determined based on traffic counts conducted in February, 2007 by RKA during the weekday AM (7:00 AM to 9:00 AM), midday (11:30 AM to 1:30 PM) and PM (4:30 PM to 6:30 PM) peak periods.

1) NC 54 and East Barbee Chapel Road – (Signalized)
2) NC 54 and Hunting Ridge Road – (Signalized)
3) NC 54 and Farrington Road – (Signalized)
4) NC 54 and I-40 Eastbound On-/Off-Ramps– (Signalized)
5) NC 54 and I-40 Westbound On-/Off-Ramps– (Signalized)
6) NC 54 and Downing Creek Parkway– (Unsignalized)
7) NC 54 and Little John Road – (Unsignalized)
8) Barbee Chapel Road and Stancell Drive – (Unsignalized)
9) Barbee Chapel Road and Finley Forest Drive – (Unsignalized)
10) East Barbee Chapel Road and Meadowmont Lane – (Signalized)

The Town of Chapel Hill provided recent turning movement counts during the noted peak periods at the following intersections.

(117)

1) NC 54 and Hamilton Road – (Signalized)
2) NC 54 and Finley Golf Course Road – (Signalized)
3) NC 54 and West Barbee Chapel Road – (Signalized)
4) NC 54 and Meadowmont Lane – (Signalized)

Through traffic along NC 54 and Barbee Chapel Road at adjacent intersections was balanced were applicable. It should be noted that the traffic count data received from the Town of Chapel Hill was collected during 2005 thus, per Town direction, a 2% per year compounded growth rate was applied to all movements to generate the existing (2007) traffic volumes. Refer to Figure 4 in Appendix A for the existing (2007) weekday AM, midday and PM peak hour traffic volumes. Copies of the raw traffic count data are provided in Appendix B of the report.

2.2. Analysis of Existing (2007) Peak Hour Traffic

Traffic analyses at the study intersections were completed using Synchro 5.0. Synchro 5.0 is a comprehensive software package developed by Trafficware that allows the user to model and optimize signal timing for coordinated and uncoordinated signalized intersections to determine level of service (based on thresholds specified in the 2000 HCM). In addition, Synchro allows unsignalized analyses to be performed utilizing the methodologies outlined in the 2000 Highway Capacity Manual. Therefore, all analyses were performed using Synchro 5.0 exclusively.

Analysis results for signalized intersections provide level of service calculations for all approaches and an overall resulting level of service. The capacity analysis for an unsignalized intersection does not provide an overall level of service, but rather a level of service for movements and/or approaches that have a conflicting movement. Capacity and level of service are the design criteria for this study.

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a

given time period under prevailing roadway, traffic, and control conditions". Level of Service (LOS) is a term used to represent different driving conditions, and is defined as a "qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers". Level of service varies from LOS "A", representing free flow, to LOS "F" where greater vehicle delays are evident. Refer to Table 1 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay." In previous versions of the HCM, the delay includes only stopped delay. As shown in Table 1, levels of service are stated in terms of average control delay.

TABLE 1
Highway Capacity Manual Levels of Service and Delay

UNSIGNALIZED INTERSECTION		SIGNALIZED INTERSECTION	
LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (SECONDS)
A	0-10	A	0-10
B	10-15	B	10-20
C	15-25	C	20-35
D	25-35	D	35-55
E	35-50	E	55-80
F	>50	F	>80

The existing (2007) weekday AM, midday and PM peak hour traffic volumes were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. Lane widths, grades, and geometric information gathered from field data collection was included in the analysis files. Traffic signal timings and phasing plans for the signalized study intersections were provided by NCDOT or the Town of Chapel Hill. Peak hour factors were determined for each approach based on the existing traffic counts. The midday analyses were conducted utilizing the PM peak hour signal timing and phasing plans. A summary of the analysis results is presented in Table 2. Refer to Appendix C of this report for computer printouts of these analyses.

(19)

TABLE 2
Analysis of Existing (2007) Peak Hour Traffic

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D D F A	C	A B D A	A	A C F A	A
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- E	B	A A -- D	A	B A -- E	B
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	E D E F	E	C B C D	C	F D E F	F
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A D D D	C	A A D D	A	B A E E	B
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- C[2]	N/A	-- -- C[2]	N/A	-- -- D[2]	N/A
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	N/A	-- B[1] D[2]	N/A	-- E[1] F[2]	N/A
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F F C	E	A B D C	A	A B E D	B
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1 LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	D B D D	C	B B D D	B	D B D D	C
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D D	A	A A A D	A	A B D E	A
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	B A D E	B	B A D D	B	C A E F	C
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	A	B A D D	A	C A D D	B
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	A	A A A A	A	A A A A	A
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	B[2] -- A[1]	N/A	B[2] -- A[1]	N/A	B[2] -- A[1]	N/A
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB)	EB NB SB	1 LT-RT 1 LT-TH 1 TH, 1 RT	D[2] A[1] --	N/A	B[2] A[1] --	N/A	E[2] A[1] --	N/A

1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

3. FUTURE (2010) TRAFFIC CONDITIONS WITHOUT DEVELOPMENT

In order to account for growth of traffic and subsequent traffic conditions at a future year, future traffic projections are needed. Future traffic includes existing traffic plus traffic due to growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed expansion is constructed. As required by the Town of Chapel Hill, the future analysis year for Phase One of the development is 2010, one year beyond the assumed build out year of 2009.

3.1. Future (2010) Peak Hour Traffic Volumes

Per the Town of Chapel Hill direction, the existing (2007) peak hour traffic volumes were projected to the future year 2010 using a compounded annual growth rate of two percent (2%). Refer to Figure 5 in Appendix A for the future (2010) peak hour traffic volumes without Phase One of the proposed development and without adjacent development traffic.

3.2. Future Roadway Improvements

It is our understanding that there are no planned roadway improvement projects that would impact the study area prior to build out of the proposed expansion.

3.3. Approved Adjacent Developments

Approved adjacent development information was provided by the Town of Chapel Hill and was utilized to determine the approved adjacent development traffic. The following developments are included in this adjacent development traffic:

1) UNC Hospitals Clinical Facility
2) University Village
3) Belvedere
4) Gateway Bank and Trust

It should be noted that the Leigh Farms Office Complex was discussed as an adjacent development. The Traffic Impact Analysis for this development was conducted in 1998 and indicated a full build-out year of 2009. Portions of the development are constructed

thus the volumes were obtained in the turning movement counts. Since it is likely that the majority of the development that will be constructed is complete, it was determined that the two percent (2%) per year annual growth rate that has been applied to existing volumes would account for any minor additional development of the Leigh Farm Office Complex. Thus, no additional projected traffic from the Leigh Farms Office Complex was added to the background traffic conditions.

This study assumes all approved adjacent development will be completely built out by the Phase One design year 2010. Refer to Figure 6 in Appendix A for the peak hour total approved adjacent development traffic. See Appendix D for the total adjacent development information used in the study.

3.4. Future (2010) Peak Hour Traffic Volumes with Adjacent Development

To determine future (2010) traffic conditions with adjacent development, the future (2010) traffic volumes (Figure 5) were combined with the total adjacent development traffic (Figure 6). The future (2010) plus adjacent development peak hour traffic without Phase One of the proposed development is illustrated in Figure 7 in Appendix A.

3.5. Analysis of Future (2010) Peak Hour Traffic with Adjacent Development

Study intersections were analyzed with the future (2010) traffic volumes with adjacent development traffic and without the proposed development to determine the levels of service. All intersections were analyzed with existing lane configurations and traffic control as well as with any improvements necessary to achieve a desirable level of operation. A summary of the analysis results, based on existing lane configurations, is presented in Table 3. A summary of the analysis results, based on improvements required to provide an acceptable LOS, is presented in Table 4. Refer to Appendix E of the report for computer printouts of the analyses without improvements and Appendix F of the report for computer printouts of the analyses with improvements noted. Figure 23 in Appendix A provides a graphical display of the improvements identified for future (2010) peak hour traffic with adjacent development. In addition, a summary of all identified improvements is provided in Section 12.

(122)

TABLE 3
Analysis of Future (2010) Peak Hour Traffic without Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D E F A	D	A A D A	A	A C F A	A
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- E	B	A A -- D	A	B B -- F	B
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	F F F F	F	C B D D	C	F E F F	F
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A E E D	D	A A D D	A	D C E E	C
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	N/A	-- -- C[2]	N/A	-- -- E[2]	N/A
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	N/A	-- C[1] E[2]	N/A	-- E[1] F[2]	N/A
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B F F C	F	A B D C	B	A C F F	C
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1 LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	D B D D	C	A B D C	B	F B D D	E
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D D	A	A A A D	A	B B D F	B
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	B B F F	C	B A D C	B	F B F D	F
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	A	B A D D	A	E A D D	D
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	A	A A A A	A	A A A A	A
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	B[2] -- A[1]	N/A	B[2] -- A[1]	N/A	B[2] -- A[1]	N/A
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB)	EB NB SB	1 LT-RT 1 LT-TH 1 TH, 1 RT	E[2] A[1] --	N/A	C[2] A[1] --	N/A	F[2] A[1] --	N/A

1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

(123)

TABLE 4
Analysis of Future (2010) Peak Hour Traffic with Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D E F A	**D**	A A D A	**A**	B C F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- E	**C**	A A -- D	**B**	B A -- F	**B**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	**2 LT, 3 TH, 1 RT** **2 LT, 3 TH, 1 RT** **2 LT, 2 TH**, 1 RT **2 LT, 2 TH**, 1 RT	D B E F	**D**	C B D D	**C**	D C F F	**D**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A E E D	**D**	A A D D	**A**	D C E E	**C**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	**N/A**	-- -- C[2]	**N/A**	-- -- E[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	**N/A**	-- C[1] E[2]	**N/A**	-- F[1] F[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT **2 LT, 1 TH, 1 RT** 1 LT, 1 TH-RT	A E F E	**D**	A B D D	**B**	A B E F	**C**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 2 LT, 1 TH, 1 RT 2 LT, 1 TH, 1 RT	C B D D	**C**	B A D D	**B**	E B D D	**D**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D D	**A**	A A A D	**A**	A B D F	**B**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT **1 LT**, 1 TH-RT **1 LT**, 1 TH-RT	B A E E	**B**	B A D D	**B**	E B E F	**D**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	**A**	B A D D	**A**	E A D D	**D**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A A A	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT **2 TH**, 1 TH-RT 1 LT-TH	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB)	EB NB SB	1 LT-RT 1 LT-TH 1 TH, 1 RT	E[2] A[1] --	**N/A**	C[2] A[1] --	**N/A**	F[2] A[1] --	**N/A**

Note: **BOLD** denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

4. SITE TRAFFIC

4.1. Trip Generation

As indicated, the subject development is proposed to be constructed in three (3) phases. Phase One, which is expected to be complete in 2009, is proposed to consist of 91,500 square feet of office space and sixty (60) residential condominium units. Phase Two, which is expected to be complete in 2012, is proposed to consist of an additional 96,300 square feet of office space. Phase Three, which is expected to be complete in 2017, is proposed to consist of an additional 292,400 square feet of office space.

Average weekday daily, AM peak hour, midday peak hour and PM peak hour trips for each phase of the proposed development were calculated utilizing methodology contained within the ITE *Trip Generation* Manual, 7th Edition. A detailed breakdown of the trip generation results can be found in Table 5.

TABLE 5
Trip Generation

PHASE	ITE LAND USE (Code)	DENSITY	DAILY TRIPS (vpd)	AM PEAK HOUR		MIDDAY PEAK HOUR		PM PEAK HOUR	
				Entering	Exiting	Entering	Exiting	Entering	Exiting
Phase One	General Office (710)	91,500 square feet	1,246	154	21	31	150	31	150
	Residential Condominium/Townhouse (230)	60 units	416	6	28	26	13	26	13
Phase Two	General Office (710)	96,300 square feet	921	119	16	18	90	18	90
Phase Three	General Office (710)	292,400 square feet	2,299	306	42	56	272	56	272
--	-- Total		4,882	585	107	131	525	131	525

It should be noted that the trip generation for the office development was based on the cumulative square footage of office space that is proposed to be constructed under each phase as opposed to the individual density proposed under each phase. In addition, the ITE Trip Generation Manual does not provide midday peak hour traffic for the proposed land

uses. Midday traffic count data that was obtained for a similar office development was utilized to determine the midday trip generation for the subject development.

4.2. Trip Generation Budget

Although it is possible that some internal trip capture will occur between the proposed office and residential land uses on the site, due to the low number of proposed residential units, no internal trip capture rate was applied. Due to the proximity of transit bus stops to the proposed development, a transit reduction was applied to the proposed site trips. In addition, the Developer indicated that the proposed development would provide a shuttle service during the midday peak hour to various commercial locations in the area. Based on discussions with the Town of Chapel Hill, a transit reduction percentage of ten percent (10%) was applied to the estimate site trips during all peak hours.

4.3. Site Trip Distribution and Assignment

Distribution percentages used in assigning site traffic for this expansion were developed based on a combination of existing traffic patterns, population density in and around the study area and engineering judgment. In addition, the distribution percentages utilized in the Traffic Impact Analysis for the University Village development were reviewed and considered in the development of the proposed site distribution percentages.

It should be noted that the site trip distribution percentages were modified for Phase Two build-out due to the proposed site driveway being constructed along NC 54.

Refer to Figure 8 in Appendix A for an illustration of the site distribution percentages assumed for Phase One of the proposed development. The trip generation data from Table 5 was applied to the distributions shown in Figure 8. Refer to Figure 9 in Appendix A for an illustration of the site trips during the weekday AM, midday, and PM peak hours for Phase One of the proposed development.

5. FUTURE (2010) TRAFFIC CONDITIONS WITH PHASE ONE DEVELOPMENT

In order to estimate weekday traffic conditions with Phase One of the proposed development complete, the Phase One weekday site trips (Figure 9) were added to weekday future (2010) with adjacent development traffic volumes (Figure 7) to determine weekday future (2010) traffic conditions with Phase One of the proposed development traffic. Refer to Figure 10 in Appendix A for an illustration of the weekday future (2010) peak hour traffic volumes with Phase One of the proposed development traffic.

5.1. Analysis of Future (2010) Traffic with Phase One Development

The study intersections were analyzed with the future (2010) traffic volumes with Phase One of the proposed development using the same methodology previously discussed for future plus adjacent development traffic conditions. The study intersections were analyzed with existing lane configurations and traffic control as well as with any improvements necessary to achieve a desirable level of service. Capacity analysis results at the study intersections, based on existing lane configurations, are presented in Table 6. Capacity analysis results at the study intersections, based on improvements required to provide an acceptable LOS, are presented in Table 7. Refer to Appendix G of the report for computer printouts of the analyses without improvements and Appendix H of the report for computer printouts of the analyses with improvements noted. Figure 23 in Appendix A provides a graphical display of the improvements identified for future (2010) peak hour traffic with Phase One development. In addition, a summary of all identified improvements is provided in Section 12.

TABLE 6
Analysis of Future (2010) Peak Hour Traffic with Proposed Development without Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D F F A	D	A A D A	A	A C F A	B
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- E	B	A A -- D	A	B B -- F	B
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	F F F F	F	C B D D	C	F E F F	F
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A E E D	D	A A D D	A	D C E E	D
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	N/A	-- -- C[2]	N/A	-- -- E[2]	N/A
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	N/A	-- C[1] F[2]	N/A	-- F[1] F[2]	N/A
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F F C	F	A B D C	B	D C D F	D
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1 LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	D C D D	C	A B D C	B	F B D D	E
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D D	A	A A A D	A	B B D F	B
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	B C F F	C	B A D C	B	F B F E	F
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	A	B A D D	A	E A D D	D
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	A	A A A A	A	A A A A	A
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	C[2] -- A[1]	N/A	B[2] -- A[1]	N/A	C[2] -- A[1]	N/A
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] C[2] A[1] B[1]	N/A	D[2] B[2] A[1] A[1]	N/A	F[2] C[2] A[1] A[1]	N/A

1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

(128)

TABLE 7
Analysis of Future (2010) Peak Hour Traffic with Proposed Development with Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D F F A	**D**	A B D A	**A**	B C F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- E	**C**	A A -- D	**A**	B A -- F	**B**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 2 LT, 2 TH, 1 RT 2 LT, 2 TH, 1 RT	D B E F	**D**	C B D D	**C**	D C F F	**D**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A E E D	**D**	A A D D	**A**	D C E E	**D**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	**N/A**	-- -- C[2]	**N/A**	-- -- E[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	**N/A**	-- C[1] F[2]	**N/A**	-- F[1] F[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 2 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	A E F E	**E**	A B D D	**B**	B B F F	**C**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 2 LT, 1 TH, 1 RT 2 LT, 1 TH, 1 RT	C B D D	**C**	B A D D	**B**	E B D D	**D**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D D	**A**	A A A D	**A**	A B D F	**B**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A E E	**B**	B A D D	**B**	F B E F	**E**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	**B**	B A D D	**A**	E A D D	**D**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A A A	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 2 TH, 1 TH-RT 1 LT-TH	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] C[2] A[1] B[1]	**N/A**	D[2] B[2] A[1] A[1]	**N/A**	F[2] C[2] A[1] A[1]	**N/A**

Note: **BOLD** denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

6. FUTURE (2013) TRAFFIC CONDITIONS WITHOUT DEVELOPMENT

In order to account for growth of traffic and subsequent traffic conditions at a future year, future traffic projections are needed. Future traffic includes existing traffic plus traffic due to growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed expansion is constructed. As required by the Town of Chapel Hill, the future analysis year for Phase Two of the development is 2013, one year beyond the assumed build out year of 2012.

6.1. Future (2013) Peak Hour Traffic Volumes

Existing (2007) peak hour traffic volumes were projected to the future year 2013 using a compound annual growth rate of two percent (2%), based on direction from the Town of Chapel Hill. Refer to Figure 11 in Appendix A for the future (2013) peak hour traffic volumes without Phase Two of the proposed development and without adjacent development traffic.

6.2. Future Roadway Improvements

It is our understanding that there are no planned roadway improvement projects that would impact the study area prior to build out of the proposed expansion.

6.3. Approved Adjacent Developments

Approved adjacent developments for Phase Two build-out consists of the adjacent developments noted for Phase One as well as the Phase One site build-out. Refer to Figure 12 in Appendix A for the peak hour total approved adjacent development traffic for Phase Two.

6.4. Future (2013) Peak Hour Traffic Volumes with Adjacent Development

To determine future (2013) traffic conditions with adjacent development, the future (2013) traffic volumes (Figure 11) were combined with the total adjacent development traffic (Figure 12). The future (2013) plus adjacent development peak hour traffic without Phase Two of the proposed development is illustrated in Figure 13 in Appendix A. It should be noted that the Phase One site volumes are included as adjacent development volumes.

6.5. Analysis of Future (2013) Peak Hour Traffic with Adjacent Development

Study intersections were analyzed with the future (2013) traffic volumes with adjacent development traffic and without Phase Two of the proposed development to determine the levels of service. All intersections were analyzed with existing lane configurations and traffic control as well as with any improvements necessary to achieve a desirable level of operation. A summary of the analysis results, based on existing lane configurations, is presented in Table 8. A summary of the analysis results, based on improvements required to provide an acceptable LOS, is presented in Table 9. Refer to Appendix I of the report for computer printouts of the analyses without improvements and Appendix J of the report for computer printouts of the analyses with improvements noted. Figure 23 in Appendix A provides a graphical display of the improvements identified for future (2013) peak hour traffic with adjacent development. In addition, a summary of all identified improvements is provided in Section 12.

(131)

TABLE 8
Analysis of Future (2013) Peak Hour Traffic without Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D F F A	D	A B D A	A	B C F A	B
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- F	C	A A -- D	A	B B -- F	C
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	F F F F	F	D B D D	C	F E F F	F
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F E D	E	A A D D	A	E C E E	D
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	N/A	-- -- C[2]	N/A	-- -- F[2]	N/A
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	N/A	-- C[1] F[2]	N/A	-- F[1] F[2]	N/A
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F F C	F	A B D C	B	C C F F	D
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1 LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	E C D D	D	A B D C	B	F B D D	E
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	A	A A A D	A	B B D F	B
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	B D F F	D	B A D C	B	F B F E	F
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	B	B A D D	A	F A D D	E
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	A	A A A A	A	A A B B	A
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	C[2] -- A[1]	N/A	B[2] -- A[1]	N/A	C[2] -- A[1]	N/A
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] C[2] A[1] B[1]	N/A	E[2] B[2] A[1] A[1]	N/A	F[2] C[2] A[1] A[1]	N/A

1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

(132)

TABLE 9
Analysis of Future (2013) Peak Hour Traffic with Proposed Development with Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D F F A	**D**	A B D A	**A**	B C F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B B -- F	**C**	A A -- D	**A**	B B -- F	**B**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	**2 LT, 3 TH, 1 RT** **2 LT, 3 TH, 1 RT** **2 LT, 2 TH, 1 RT** **2 LT, 2 TH, 1 RT**	E B F F	**D**	C B D D	**C**	E C F F	**E**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F E D	**E**	A A D D	**A**	E C E E	**D**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	**N/A**	-- -- C[2]	**N/A**	-- -- F[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	**N/A**	-- C[1] F[2]	**N/A**	-- F[1] F[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT **2 LT, 1 TH, 1 RT** 1 LT, 1 TH-RT	A F F E	**E**	A B D D	**B**	C C F F	**D**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT **2 LT, 1 TH, 1 RT** 2 LT, 1 TH, 1 RT	D B E D	**C**	B A D D	**B**	E B D E	**D**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	**A**	A A A D	**A**	B B D F	**B**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B B E E	**B**	B A D D	**B**	D B F F	**D**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	**B**	B A D D	**B**	E A E E	**D**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A B B	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT **2 TH, 1 TH-RT** 1 LT-TH	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**	C[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] C[2] A[1] B[1]	**N/A**	E[2] B[2] A[1] A[1]	**N/A**	F[2] C[2] A[1] A[1]	**N/A**

Note: **BOLD** denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

7. FUTURE (2013) TRAFFIC CONDITIONS WITH PHASE TWO DEVELOPMENT

Refer to Figure 14 in Appendix A for an illustration of the site distribution percentages assumed for Phase Two of the proposed development. The trip generation data from Table 5 was applied to the distributions shown in Figure 14. Refer to Figure 15 in Appendix A for an illustration of the site trips during the weekday AM, midday, and PM peak hours for Phase Two of the proposed development.

In order to estimate weekday traffic conditions with Phase Two of the proposed development complete, the Phase Two weekday site trips (Figure 15) were added to weekday future (2013) with adjacent development traffic volumes (Figure 13) to determine weekday future (2013) traffic conditions with Phase Two of the proposed development traffic. Refer to Figure 16 in Appendix A for an illustration of the weekday future (2013) peak hour traffic volumes with Phase Two of the development traffic.

7.1. Analysis of Future (2013) Traffic with Phase Two Development

The study intersections were analyzed with the future (2013) traffic volumes with Phase Two of the proposed development using the same methodology previously discussed for future plus adjacent development traffic conditions. The study intersections were analyzed with existing lane configurations and traffic control as well as with any improvements necessary to achieve a desirable level of service. Capacity analysis results at the study intersections, based on existing lane configurations, are presented in Table 10. Capacity analysis results at the study intersection, based on improvements required to provide an acceptable LOS, are presented in Table 11. Refer to Appendix K of the report for computer printouts of the analyses without improvements and Appendix L of the report for computer printouts of the analyses with improvements noted. Figure 23 in Appendix A provides a graphical display of the improvements identified for future (2013) peak hour traffic with Phase Two development. In addition, a summary of all identified improvements is provided in Section 12.

(134)

TABLE 10
Analysis of Future (2013) Peak Hour Traffic with Proposed Development without Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D F F A	D	A B D A	A	B C F A	B
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B C -- F	C	A A -- D	B	C B -- F	C
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	F F F F	F	C B D D	C	F F F F	F
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F E D	E	A A D D	A	E C E E	D
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	N/A	-- -- C[2]	N/A	-- -- F[2]	N/A
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	N/A	-- C[1] F[2]	N/A	-- F[1] F[2]	N/A
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F F C	F	A B D C	B	C C F F	D
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1 LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	E C D D	D	A B D D	B	F B D D	E
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	A	A A A D	A	B B D F	B
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	B D F F	D	B B D C	B	F B F E	F
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	B	B A D D	A	F A D D	E
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	A	A A A A	A	A A B B	A
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	C[2] -- A[1]	N/A	B[2] -- A[1]	N/A	C[2] -- A[1]	N/A
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] C[2] A[1] B[1]	N/A	D[2] B[2] A[1] A[1]	N/A	F[2] C[2] A[1] A[1]	N/A
NC 54 (EB/WB) And Site Drive #2 (NB)	EB WB NB	2 TH, 1 RT 1 LT, 2 TH 1 LT, 1 RT	-- E[1] F[2]	N/A	-- C[1] D[2]	N/A	-- F[1] F[2]	N/A

1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

(135)

TABLE 11
Analysis of Future (2013) Peak Hour Traffic with Proposed Development with Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	D F F A	**D**	A B D A	**A**	B C F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	B C -- F	**C**	A A -- D	**B**	B A -- F	**B**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	**2 LT, 3 TH, 1 RT** **2 LT, 3 TH, 1 RT** **2 LT, 2 TH, 1 RT** **2 LT, 2 TH, 1 RT**	E B F F	**D**	C B C D	**C**	D C F F	**E**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F E D	**E**	A A D D	**A**	E C E E	**D**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- D[2]	**N/A**	-- -- C[2]	**N/A**	-- -- F[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- C[1] F[2]	**N/A**	-- C[1] F[2]	**N/A**	-- F[1] F[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT **2 LT**, 1 TH, **1 RT** 1 LT, 1 TH-RT	A F F E	**E**	A B D D	**B**	B C F F	**C**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT **2 LT**, 1 TH, 1 RT 2 LT, 1 TH, 1 RT	D B D D	**C**	B A D D	**B**	E B D E	**D**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	**A**	A A A D	**A**	B B D F	**B**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT **1 LT**, 1 TH-RT **1 LT**, 1 TH-RT	B B E E	**B**	B A D D	**B**	E B F F	**D**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	**B**	B A D D	**B**	E A E E	**D**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A B B	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT **2 TH**, 1 TH-RT 1 LT-TH	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] C[2] A[1] B[1]	**N/A**	D[2] B[2] A[1] A[1]	**N/A**	F[2] C[2] A[1] A[1]	**N/A**
NC 54 (EB/WB) And Site Drive #2 (NB)	EB WB NB	2 TH, 1 RT 1 LT, 2 TH 1 LT, 1 RT	-- E[1] F[2]	**N/A**	-- C[1] D[2]	**N/A**	-- F[1] F[2]	**N/A**

Note: **BOLD** denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

8. FUTURE (2018) TRAFFIC CONDITIONS WITHOUT DEVELOPMENT

In order to account for growth of traffic and subsequent traffic conditions at a future year, future traffic projections are needed. Future traffic includes existing traffic plus traffic due to growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed expansion is constructed. As required by the Town of Chapel Hill, the future analysis year for Phase Three of the development is 2018, one year beyond the assumed build out year of 2017.

8.1. Future (2018) Peak Hour Traffic Volumes

Existing (2007) peak hour traffic volumes were projected to the future year 2018 using a compound annual growth rate of two percent (2%), per direction from the Town of Chapel Hill. Refer to Figure 17 in Appendix A for the future (2018) peak hour traffic volumes without Phase Three of the proposed development and without adjacent development traffic.

8.2. Future Roadway Improvements

It is our understanding that there are no planned roadway improvement projects that would impact the study area prior to build out of the proposed expansion.

8.3. Approved Adjacent Developments

Approved adjacent developments for Phase Three build-out consists of the adjacent developments noted for Phase One as well as the Phase One and Phase Two site build-outs. Refer to Figure 18 in Appendix A for the peak hour total approved adjacent development traffic for Phase Three.

8.4. Future (2018) Peak Hour Traffic Volumes with Adjacent Development

To determine future (2018) traffic conditions with adjacent development, the future (2018) traffic volumes (Figure 17) were combined with the total adjacent development traffic (Figure 18). The future (2018) plus adjacent development peak hour traffic without Phase Three of the proposed development is illustrated in Figure 19 in Appendix A. It should be noted the Phase One and Two site volumes are included as adjacent development volumes.

8.5. Analysis of Future (2018) Peak Hour Traffic with Adjacent Development

Study intersections were analyzed with the future (2018) traffic volumes with adjacent development traffic and without Phase Three of the proposed development to determine the levels of service. All intersections were analyzed with existing lane configurations and traffic control as well as with any improvements necessary to achieve a desirable level of operation. A summary of the analysis results, based on existing lane configurations, is presented in Table 12. A summary of the analysis results, based on improvements required to provide an acceptable LOS, is presented in Table 13. Refer to Appendix M of the report for computer printouts of the analyses without improvements and Appendix N of the report for computer printouts of the analyses with improvements noted. Figure 23 in Appendix A provides a graphical display of the improvements identified for future (2018) peak hour traffic with adjacent development. In addition, a summary of all identified improvements is provided in Section 12.

(138)

TABLE 12
Analysis of Future (2018) Peak Hour Traffic with Proposed Development without Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	E F F A	E	A B D A	A	B D F A	B
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	C D -- F	D	A A -- D	A	D B -- F	C
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	F F F F	F	D B E E	D	F F F F	F
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B F E D	F	A A D D	A	F E E E	F
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- E[2]	N/A	-- -- C[2]	N/A	-- -- F[2]	N/A
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 LT-RT	-- D[1] F[2]	N/A	-- C[1] F[2]	N/A	-- F[1] F[2]	N/A
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A F F D	F	A B D C	B	D C F F	D
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1.LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	F E D D	E	A B D D	B	F B D D	F
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	A	A A A D	A	C B D F	C
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	C F F F	E	C B D C	B	F B F F	F
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A D D	B	B A D D	B	F A D D	F
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	A	A A A A	A	A A B B	A
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	C[2] -- A[1]	N/A	B[2] -- A[1]	N/A	C[2] -- A[1]	N/A
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] D[2] A[1] B[1]	N/A	E[2] B[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A
NC 54 (EB/WB) And Site Drive #2 (NB)	EB WB NB	2 TH, 1 RT 1 LT, 2 TH 1 LT, 1 RT	-- F[1] F[2]	N/A	-- C[1] E[2]	N/A	-- F[1] F[2]	N/A

1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

(139)

TABLE 13
Analysis of Future (2018) Peak Hour Traffic with Proposed Development with Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	E F F A	**E**	A A F A	**A**	B D F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	D D -- F	**D**	B B -- E	**B**	E B -- F	**D**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	**2 LT, 3 TH, 1 RT** **2 LT, 3 TH, 1 RT** **2 LT, 2 TH, 2 RT** **2 LT, 2 TH, 1 RT**	D C F F	**D**	C B E F	**D**	E D F F	**E**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, **2 TH**, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B D E E	**C**	B A D D	**A**	C B E E	**C**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	**3 TH**, 1 RT **3 TH** 1 RT	-- -- C[2]	**N/A**	-- -- B[2]	**N/A**	-- -- D[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	**3 TH**, 1 RT 1 LT, **3 TH** 1 LT-RT	-- D[1] F[2]	**N/A**	-- C[1] F[2]	**N/A**	-- F[1] F[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT **3 LT**, 1 TH, 1 RT 1 LT, 1 TH-RT	A F F F	**E**	A B D D	**B**	D C E F	**D**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT **2 LT**, 1 TH, 1 RT 2 LT, 1 TH, 1 RT	E C E D	**D**	B A D D	**B**	D B F F	**D**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	**A**	A A A D	**A**	B A E F	**B**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT **1 LT**, 1 TH-RT **1 LT**, 1 TH-RT	B D E E	**C**	B A D D	**B**	F C F F	**F**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B B D D	**B**	B A D D	**B**	F B E E	**E**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A B B	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT **2 TH**, 1 TH-RT 1 LT-TH	B[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**	C[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	F[2] D[2] A[1] B[1]	**N/A**	E[2] B[2] A[1] A[1]	**N/A**	F[2] D[2] A[1] A[1]	**N/A**
NC 54 (EB/WB) And Site Drive #2 (NB)	EB WB NB	3 TH, 1 RT 1 LT, 3 TH 1 LT, 1 RT	-- F[1] F[2]	**N/A**	-- C[1] D[2]	**N/A**	-- F[1] F[2]	**N/A**

Note: BOLD denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

9. FUTURE (2018) TRAFFIC CONDITIONS WITH PHASE THREE DEVELOPMENT

Refer to Figure 20 in Appendix A for an illustration of the site distribution percentages assumed for Phase Three of the proposed development. The trip generation data from Table 5 was applied to the distributions shown in Figure 20. Refer to Figure 21 in Appendix A for an illustration of the site trips during the weekday AM, midday, and PM peak hours for Phase Three of the proposed development.

In order to estimate weekday traffic conditions with Phase Three of the proposed development complete, the Phase Three weekday site trips (Figure 21) were added to weekday future (2018) with adjacent development traffic volumes (Figure 19) to determine weekday future (2018) traffic conditions with Phase Three of the proposed development traffic. Refer to Figure 22 in Appendix A for an illustration of the weekday future (2018) peak hour traffic volumes with Phase Three of the proposed development traffic.

9.1. Analysis of Future (2018) Traffic with Phase Three Development

The study intersections were analyzed with the future (2018) traffic volumes with Phase Three of the proposed development using the same methodology previously discussed for future plus adjacent development traffic conditions. The study intersections were analyzed with existing lane configurations and traffic control as well as with any improvements necessary to achieve a desirable level of service. Capacity analysis results at the study intersections, based on existing lane configurations, are presented in Table 14. Capacity analysis results at the study intersections, based on improvements required to provide an acceptable LOS, are presented in Table 15. Refer to Appendix O of the report for computer printouts of the analyses without improvements and Appendix P of the report for computer printouts of the analyses with improvements noted. Figure 23 in Appendix A provides a graphical display of the improvements identified for future (2018) peak hour traffic with Phase Three development. In addition, a summary of all identified improvements is provided in Section 12.

(141)

TABLE 14
Analysis of Future (2018) Peak Hour Traffic with Proposed Development without Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	E F F A	**E**	A B D A	**A**	B D F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	C E -- F	**D**	A A -- D	**B**	D B -- F	**C**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	F F F F	**F**	D B E E	**D**	F F F F	**F**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B F E D	**F**	A A E E	**A**	F E E E	**F**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	2 TH, 1 RT 2 TH 1 RT	-- -- C[2]	**N/A**	-- -- B[2]	**N/A**	-- -- F[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	1 U-T, 2 TH, 1 RT 1 LT, 2 TH 1 RT	-- F[1] C[2]	**N/A**	-- E[1] B[2]	**N/A**	-- F[1] F[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B F F D	**F**	A C D C	**B**	F D E E	**F**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT 1 LT, 1 LT-TH-RT, 1 RT 2 LT, 1 TH, 1 RT	F E D D	**E**	A B D D	**B**	F A D D	**F**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A D E	**A**	A A A D	**A**	C B D F	**C**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT	C F F F	**E**	C B D C	**C**	F B F F	**F**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B B D D	**B**	B A D D	**B**	F A D D	**F**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A B B	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT 1 TH, 1 TH-RT 1 LT-TH	C[2] -- A[1]	**N/A**	C[2] -- A[1]	**N/A**	C[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH, 1 RT 1 LT, 1 TH, 1 RT	F[2] D[2] A[1] B[1]	**N/A**	F[2] B[2] A[1] A[1]	**N/A**	F[2] F[2] A[1] A[1]	**N/A**
NC 54 (EB/WB) And Site Drive #2 (NB) **Signalized**	EB WB NB	2 TH, 1 RT 1 LT, 2 TH 1 LT, 1 RT	B F D	**E**	A A D	**A**	F A E	**F**

Note: BOLD denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

(142)

TABLE 15
Analysis of Future (2018) Peak Hour Traffic with Proposed Development with Recommended Improvements

INTERSECTION	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY MIDDAY PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall	Approach	Overall
NC 54 (EB/WB) and I-40 Westbound On-/Off-Ramps	EB WB NB SB	1 LT, 2 TH 1 TH, 1 RT 1 LT-TH-RT 2 RT (Free Flow)	E F F A	**E**	A B D A	**A**	B D F A	**B**
NC 54 (EB/WB) and I-40 Eastbound On-/Off-Ramps	EB WB NB SB	1 TH, 1 TH-RT, 1 RT 1 LT, 3 TH -- 1 LT-TH, 1 RT	D E -- F	**E**	A A -- D	**B**	E B -- F	**D**
NC 54 (EB/WB) and Watkins Road (NB)/ Farrington Road (SB)	EB WB NB SB	**2 LT, 3 TH, 1 RT** **2 LT, 3 TH, 1 RT** **2 LT, 2 TH, 2 RT** 2 LT, 2 TH, 1 RT	D C F F	**D**	C B D D	**C**	E D F F	**E**
NC 54 (EB/WB) and Hunting Ridge Road (NB)/ Service Road (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B E E E	**D**	A A E E	**A**	D B E E	**C**
NC 54 (EB/WB) and Downing Creek Parkway (NB)	EB WB NB	**3 TH, 1 RT** **3 TH** **1 RT**	-- -- B[2]	**N/A**	-- -- A[2]	**N/A**	-- -- C[2]	**N/A**
NC 54 (EB/WB) and Little John Road (NB)	EB WB NB	**3 TH, 1 RT** **1 LT, 3 TH** **1 RT**	-- E[1] A[2]	**N/A**	-- C[1] A[2]	**N/A**	-- F[1] C[2]	**N/A**
NC 54 (EB/WB) and Barbee Chapel Road (NB)/ East Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT **3 LT, 1 TH, 1 RT** 1 LT, 1 TH-RT	A F F F	**E**	A B D D	**B**	D C F F	**D**
NC 54 (EB/WB) and Friday Center Drive (NB)/ Meadowmont Lane (SB)	EB WB NB SB	2 LT, 3 TH, 1 RT 2 LT, 3 TH, 1 RT **2 LT**, 1 TH, 1 RT 2 LT, 1 TH, 1 RT	E C E E	**D**	A A D D	**B**	D B F F	**D**
NC 54 (EB/WB) and Office Driveway (NB)/ West Barbee Chapel Road (SB)	EB WB NB SB	1 LT, 3 TH, 1 RT 1 LT, 3 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A A E E	**A**	A A A D	**A**	B A E F	**B**
NC 54 (EB/WB) and Finley Golf Course Road (NB)/ Burning Tree Drive (SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT **1 LT**, 1 TH-RT **1 LT**, 1 TH-RT	C C E F	**C**	B A D D	**B**	F B F F	**E**
NC 54 (EB/WB) and Hamilton Road (NB/SB)	EB WB NB SB	1 LT, 2 TH, 1 TH-RT 1 LT, 2 TH, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	B A E E	**B**	B A D D	**B**	F B E E	**E**
West Barbee Chapel Road (EB)/ East Barbee Chapel Road (WB) and Meadowmont Lane (NB/SB)	EB WB NB SB	1 LT, 1 TH-RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT	A A A A	**A**	A A A A	**A**	A A B B	**A**
Barbee Chapel Road (NB/SB) and Stancell Drive (WB)	WB NB SB	1 LT-RT **2 TH**, 1 TH-RT 1 LT-TH	C[2] -- A[1]	**N/A**	B[2] -- A[1]	**N/A**	C[2] -- A[1]	**N/A**
Barbee Chapel Road (NB/SB) and Finley Forest Drive (EB) / Site Drive #1 (WB)	EB WB NB SB	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT-TH, 1 RT 1 LT, 1 TH, 1 RT	F[2] D[2] A[1] B[1]	**N/A**	F[2] B[2] A[1] A[1]	**N/A**	F[2] F[2] A[1] A[1]	**N/A**
NC 54 (EB/WB) And Site Drive #2 (NB) **Signalized**	EB WB NB	**3 TH**, 1 RT 1 LT, **3 TH** 1 LT, 1 RT	A A E	**A**	A A D	**A**	A A E	**A**

Note: **BOLD** denotes improvements.
1. Level of service for left-turn movement on major-street approach.
2. Level of service for minor street approach.

10. PROJECT IMPACTS

Based on the results of this report, traffic impacts to the adjacent roadway network due to the proposed Woodmont Development are expected to be minor. The following is a more detailed interpretation of the analysis results presented in this report.

10.1. Link Levels of Service

NC 54 (Raleigh Road) is a major arterial and carries traffic in an east-west direction. In the study area, NC 54 provides access from the UNC-Chapel Hill campus to I-40 and Durham. The cross-section of NC 54 varies from a four-lane to six-lane divided facility through the study area. Exclusive left- and right-turn lanes exist at the major signalized intersections through the study area. Transit stops are located in several areas along NC 54 and sidewalk and/ore bicycle paths are prevalent. The posted speed limit varies from 45 miles per hour (mph) near I-40 to Barbee Chapel Road to 35 mph to the west of West Barbee Chapel Road. In addition, ADT volumes are available for some side streets that connect to NC 54. These side streets are two lane facilities and include Farrington Road, Watkins Road, Barbee Chapel Road, burning Tree Drive, and Finley Golf Course Road.

ADT volumes for 2005 on these facilities were obtained from the NCDOT Traffic Survey Division. A 2% annual growth rate was applied to the 2005 volumes to obtain the 2007 volumes. The 2010 volumes include traffic expected to be generated by Phase One of the proposed development. The 2013 volumes include traffic expected to be generated by Phases One and Two of the proposed development. The 2018 and 2030 volumes include traffic expected to be generated by the proposed development at full build out. The daily site traffic was applied to the roadway facilities with the same percentages that were used for the peak hour volumes.

The capacities of roadway facilities are based on the thresholds set by the Florida Department of Transportation. Refer to Table 16 for a summary of the roadway capacity and ADT volume data.

(44)

TABLE 16
Link Analysis Summary

Road Segment	Facility	Capacity (vpd)	2007 ADT (vpd)	2010 ADT (vpd)	2013 ADT (vpd)	2018 ADT (vpd)	2030 ADT (vpd)
NC 54 - West of Farrington Road	6 Lane	47,000	44,700	48,200	51,500	57,800	72,700
Farrington Road - North of NC 54	2 Lane	12,000	10,400	11,100	11,800	13,200	16,600
Watkins Road - South of NC 54	2 Lane	12,000	11,400	12,200	13,000	14,400	18,300
NC 54 - East of Barbee Chapel Road	4 Lane	33,000	43,700	47,100	50,400	56,500	71,100
Barbee Chapel Road - South of NC 54	2 Lane	12,000	7,100	8,900	8,800	10,400	12,800
NC 54 - East of Burning Tree Drive	6 Lane	47,000	44,700	47,900	51,100	56,900	71,900
Burning Tree Drive - North of NC 54	2 Lane	12,000	2,000	2,100	2,300	2,500	3,200
Finley Golf Course Rd - South of NC 54	2 Lane	12,000	2,400	2,500	2,700	3,000	3,800

Link analysis indicates that NC 54, Farrington Road, and Watkins Road are all currently operating near or over capacity. Barbee Chapel Road is expected to reach capacity sometime before 2030. It is expected that these facilities will require improvements in order to accommodate the expected future traffic volumes.

10.2. Access Analysis

Access to the development is proposed via a full-movement driveway along Barbee Chapel Road, opposite the existing Finley Forest Drive, and a signalized, full-movement access at a relocated median break along NC 54, approximately 1,300 feet east of Barbee Chapel Road. The access along Barbee Chapel Road is proposed to be constructed during Phase One of the development and the access along NC 54 is proposed to be constructed during Phase Two of the development.

A review of the proposed access points indicate that, with the addition of auxiliary lanes, as noted in the recommendations, site traffic should operate efficiently. A key issue in access to the site is the ability to provide a full-movement, signalized intersection along NC 54. Spacing to the adjacent traffic signal at Barbee Chapel Road is approximately 1,300 feet, which is adequate. If the proposed traffic signal along NC 54 is not approved, it is likely that the majority of site traffic destined to the west along NC 54 would utilize the driveway along Barbee Chapel Road to access the existing signalized intersection at NC 54, thus already adding to an already high left-turn volume.

It is recommended that consideration be given to maintaining Downing Creek Parkway as a right-in/right-out roadway while also maintaining the segment of Stancell Drive between Little John Road and Downing Creek Parkway. Since a leftover is proposed at Little John Road, it is unlikely that adjacent leftovers would be necessary.

10.3. Signal Warrant Analysis

A traffic signal warrant analysis was conducted for the intersection of the proposed site driveway and NC 54. The purpose of the analysis is to determine if a traffic signal is warranted at the intersection under future traffic conditions with full build out of the proposed site.

A traffic signal must be warranted prior to its installation and operation. The Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD) has nationally standardized criteria for determining the warrants for traffic signals. Some warrants are based on actual or historical data such as accident history, pedestrian activity or minor street delay. Traffic volume-based warrants compare the major street and minor street traffic volumes to volume thresholds for various lengths of time of an average weekday.

The MUTCD traffic volume signal warrants are based on traffic volumes on the major street and the highest volume side street. The volume thresholds required to meet these

warrants vary based on the number of travel lanes on both the major and minor streets and the travel speed on the major street. The northbound approach of the site driveway will consist of a separate left turn lane and a separate right turn lane. The westbound approach of NC 54 will consist of one (1) left-turn lane and multiple through lanes. The eastbound approach of NC 54 will consist of one (1) right-turn lane and multiple through lanes. The posted speed limit along NC 54 is 45 mph.

In order to determine the projected hourly volumes for the intersection, a 24-hour mainline traffic count was conducted along NC 54. Refer to Appendix Q for the hourly turning movement volumes at the subject intersection and 24-hour count data.

The existing mainline volumes in the vicinity of the study intersection were projected to background traffic conditions by applying a 2% per year compounded growth rate. Refer to Appendix Q for the background traffic volumes.

In order to determine the projected hourly traffic volumes generated by the proposed development, the hourly distribution rates for an office complex and a residential development, as determined by a review of a traffic count conducted at similar facilities, were applied to the total projected ADT. Refer to Appendix Q for the projected hourly site-generated traffic volumes. The site-generated traffic volumes were distributed at the study intersection based on the trip distribution percentages discussed in a subsequent section. Refer to Appendix Q for the site-generated trips distributed at the study intersection. The hourly site-generated volumes were combined with the hourly background volumes to derive the hourly combined traffic volumes at the study intersection, as shown in Appendix Q.

The analysis volumes shown in Appendix Q were applied to the signal warrant analysis criteria, utilizing PC-Warrants software. Refer to Appendix Q for the computer printouts of the signal warrant analysis report. The results of the analysis are provided in Table 16.

(147)

TABLE 17

Signal Warrant Analysis Results - NC 54 and Site Driveway #2

TIME	VEHICLE COUNT		WARRANTS (2000)			
	MAJOR	MINOR	#1A	#1B	#2	#3A
7 am to 8 am	6,294	94	N	Y	Y	N
8 am to 9 am	6,630	65	N	N	N	N
9 am to 10 am	4,400	44	N	N	N	N
10 am to 11 am	3,302	29	N	N	N	N
11 am to 12 pm	3,432	90	N	Y	Y	N
12 pm to 1 pm	3,933	127	N	Y	Y	Y
1 pm to 2 pm	3,898	92	N	Y	Y	N
2 pm to 3 pm	3,966	34	N	N	N	N
3 pm to 4 pm	4,518	45	N	N	N	N
4 pm to 5 pm	5,209	104	N	Y	Y	Y
5 pm to 6 pm	5,814	196	Y	Y	Y	Y
6 pm to 7 pm	4,528	64	N	N	N	N
7 pm to 8 pm	3,221	20	N	N	N	N
8 pm to 9 pm	2,272	15	N	N	N	N
9 pm to 10 pm	2,246	2	N	N	N	N
WARRANTS MET			**N**	**N**	**Y**	**Y**

* The warrant analysis was performed using PC-WARRANTS software, which uses the 2000 MUTCD methodology. The changes in methodologies for signal warrant analysis between the 2000 and the 2003 versions of the MUTCD are minor and do not affect this analysis.

As shown in Table 16 the requirements for Warrants #2 and #3-B are satisfied for the intersection of NC 54 and Site Driveway #2 under combined (2018) conditions with the site fully built-out. The installation of a traffic signal at this location would primarily provide a safe and efficient means for traffic to exit the proposed site and travel westbound along NC 54.

A new traffic signal along a State-maintained route such as NC 54 must be approved by the North Carolina Department of Transportation prior to its design and installation. The proposed signal location is approximately 1,200 feet from the existing traffic signal at Barbee Chapel Road thus, the spacing would likely meet the NCDOT's desired minimum spacing. However, it should be noted that a new signal along a heavily traveled corridor such as NC 54 may not be desired by NCDOT in order to minimize mainline delays.

(148)

10.4. Crash Analysis

Crash data for the study period of November 1, 2003 through October 31, 2006 for the study intersections was provided by NCDOT. Table 17 provides a summary of the crash data and comparison to statewide averages for similar types of facilities. Refer to Appendix R for detailed accident data at each of the study intersections.

A review of the accident date through the study area indicates that rear-end collisions are the predominant type of accident. The heavy volume of through of traffic along NC 54, coupled with the number of signalized intersections, is likely the primary causal factor of these collisions. Improved signal progression along the corridor, which likely will result with the new signal timing plans, may provide a means of reducing the rear-end collisions.

The majority of the additional accidents along the corridor consist of angle and left-turn collisions. A significant number of left-turn collisions were noted at the intersections with only minor-street permissive phasing. Nighttime and wet weather accidents were not typically observed as significant occurrences thus it does not appear that poor skid resistance or lack of adequate lighting along the corridor are problematic.

As shown in Table 17, the accident history along the corridor is generally lower than statewide rates for a similar facility.

TABLE 18
Crash Data Summary

INTERSECTION	CRASH TYPE	# OF CRASHES	CRASHES PER 100 MILLION VEHICLES ENTERED	STATEWIDE RATE
NC 54 and I-40 Westbound On-/Off-Ramps	Total	18	31.89	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	4	7.09	83.06
	Night	4	7.09	61.58
	Wet Pavement	1	1.77	40.41
NC 54 and I-40 Eastbound On-/Off-Ramps	Total	27	47.84	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	7	12.40	83.06
	Night	3	5.32	61.58
	Wet Pavement	4	7.09	40.41
NC 54 and Watkins Road/Farrington Road	Total	84	143.26	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	14	23.88	83.06
	Night	21	35.81	61.58
	Wet Pavement	17	28.99	40.41
NC 54 and Hunting Ridge Road	Total	28	58.60	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	5	10.46	83.06
	Night	4	8.37	61.58
	Wet Pavement	6	12.56	40.41
NC 54 and Downing Creek Parkway	Total	4	8.29	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	0	0.00	83.06
	Night	3	6.22	61.58
	Wet Pavement	1	2.07	40.41
NC 54 and Little John Road	Total	2	4.27	228.15
	Fatal	1	2.14	1.78
	Non-Fatal Injury	0	0.00	83.06
	Night	2	4.27	61.58
	Wet Pavement	0	0.00	40.41
NC 54 and Barbee Chapel Road/East Barbee Chapel Road	Total	34	65.45	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	12	23.10	83.06
	Night	9	17.32	61.58
	Wet Pavement	6	11.55	40.41
NC 54 and Friday Center Drive/Meadowmont Lane	Total	16	33.10	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	6	12.41	83.06
	Night	1	2.07	61.58
	Wet Pavement	2	4.14	40.41

NC 54 and Office Driveway/West Barbee Chapel Road	Total	12	25.17	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	4	8.39	83.06
	Night	4	8.39	61.58
	Wet Pavement	1	2.10	40.41
NC 54 and Finley Golf Course Road/Burning Tree Drive	Total	10	20.01	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	2	4.00	83.06
	Night	1	2.00	61.58
	Wet Pavement	0	0.00	40.41
NC 54 and Hamilton Road	Total	32	65.32	228.15
	Fatal	0	0.00	1.78
	Non-Fatal Injury	11	22.45	83.06
	Night	6	12.25	61.58
	Wet Pavement	5	10.21	40.41
West Barbee Chapel Road/East Barbee Chapel Road and Meadowmont Lane	Total	4	91.24	407.09
	Fatal	0	0.00	2.69
	Non-Fatal Injury	1	22.81	138.676
	Night	1	22.81	128.24
	Wet Pavement	0	0.00	71.42
Barbee Chapel Road and Stancell Drive	Total	3	0.35	407.09
	Fatal	0	0.00	2.69
	Non-Fatal Injury	1	0.12	138.676
	Night	1	0.12	128.24
	Wet Pavement	1	0.12	71.42
Barbee Chapel Road and Finley Forest Drive	Total	1	12.33	407.09
	Fatal	0	0.00	2.69
	Non-Fatal Injury	1	12.33	138.676
	Night	0	0.00	128.24
	Wet Pavement	0	0.00	71.42

10.5. Peak Hour Intersection Levels of Service

Summaries of the peak hour LOS at each of the study intersections under each of the build-out conditions are provided in the report tables. A general overview of the resultant LOS at each study intersection for the analysis period is provided below.

Existing (2007) Traffic Conditions

- All of the signalized study intersections currently operate at an overall LOS C or better during each of the analysis periods with the exception of the NC 54 and Watkins Road/Farrington Road intersection, which currently operates at LOS E and LOS F during the AM and PM peak hours, respectively.
- The northbound approach of Little John Road at NC 54 currently operates at LOS F during the AM and PM peak hours.

Future (2010) Traffic Conditions

- The NC 54 and Watkins Road/Farrington Road intersection is expected to operate at an overall LOS F during the AM and PM peak hours without improvements. With the improvements shown in Table 4, the intersection is expected to operate at an overall LOS D during the AM and PM peak hours.
- The unsignalized approach of Little John Road at NC 54 is expected to operate at LOS E/F during each of the analysis hours. The unsignalized approach of Downing Creek Parkway at NC 54 is expected to operate at LOS E during the PM peak hour.
- The NC 54 and Barbee Chapel Road/East Barbee Chapel Road intersection is expected to operate at an overall LOS F during the AM peak hour. With the improvements shown in Table 4, the intersection is expected to operate at an overall LOS D during the AM peak hour.
- The NC 54 and Friday Center Drive/Meadowmont Lane intersection is expected to operate at an overall LOS E during the PM peak hour. With the improvements shown in Table 4, the intersection is expected to operate at an overall LOS D during the PM peak hour.
- The NC 54 and Finley Golf Course Road/Burning Tree Drive intersection is expected to operate at an overall LOS F during the PM peak hour. With the improvements shown

in Table 4, the intersection is expected to operate at an overall LOS D during the PM peak hour. It should be noted that these improvements are proposed by the University Village development.

Future (2010) Traffic Conditions with Phase One Development

- Based on the addition of site traffic from Phase One of the subject development, the NC 54 and Barbee Chapel Road/East Barbee Chapel Road intersection is expected to degrade from an overall LOS D to an overall LOS E during the AM peak hour. It should be noted that improvements required to maintain a LOS D would likely consist of a third northbound left-turn lane which was determined to not be feasible at this build-out phase.
- In addition, the NC 54 and Finley Golf Course Road/Burning Tree Drive intersection is expected to degrade from an overall LOS D to an overall LOS E during the PM peak hour primarily due to the extremely heavy eastbound through movements. It is likely that an additional through lane along NC 54 would be required which was determined to not be feasible at this build-out phase.
- Site Driveway # 1 along Barbee Chapel Road is expected to operate at LOS C or better during each analysis period.

Future (2013) Traffic Conditions

- Analysis results at the NC 54 and Watkins Road/Farrington Road intersection are similar for 2010 and 2013 conditions.
- Analysis results at the unsignalized Downing Creek Parkway and Little John Road intersections are similar for 2010 and 2013 conditions.
- Similar results are expected for the Barbee Chapel Road/East Barbee Chapel Road, Friday Center Drive/Meadowmont Lane, Finley Golf Course Road/Burning Tree Drive at NC 54 intersections for 2010 and 2013 conditions.
- The Hunting Ridge Road and Hamilton Road intersections at NC 54 are expected to degrade to an overall LOS E during the AM and PM peak hours, respectively. Improvements are provided, as shown in Table 9, that would provide an expected overall LOS D.

Future (2013) Traffic Conditions with Phase Two Development

- The addition of Phase Two development traffic is not expected to have a significant impact on the LOS at the study intersections, as shown by comparing Tables 9 and 11.
- It should be noted that a traffic signal is not warranted at the NC 54 and Site Driveway #2 intersection, based on Phase Two development build-out thus the minor-street is expected to operate at LOS F during the AM and PM peak hours. However, it is likely that the majority of site traffic destined for westbound NC 54 will utilize Site Driveway #1 to access Barbee Chapel Road.

Future (2018) Traffic Conditions

- Analysis results at the study intersections indicate that it is not anticipated that the LOS will vary significantly from 2013 to 2018.

Future (2018) Traffic Conditions with Phase Three Development

- A comparison of Tables 13 and 15 indicate that the addition of Phase Three development traffic to the roadway network is not expected to have a significant impact on overall operation along NC 54 and at the study intersections. The NC 54 and Eastbound I-40 On-/Off-Ramps intersection is expected to degrade to an overall LOS E during the AM peak hour, based on the addition of Phase Three development traffic however, it should be noted that this intersection is expected to operate at an overall LOS D during the PM peak hour.

General Analysis Comments

- In general, the proposed site is not expected to have a significant impact on the operation of the study intersections. Heavy through volumes along NC 54 during the peak hours dictate the need for improvements at each of the study horizon years. Additional through lanes along each direction of NC 54 would be required in order to maintain an acceptable level of service for background traffic volumes.
- The improvements recommended at the proposed site driveways, including the signalization of the NC 54 and Site Driveway #2 intersection, are expected to mitigate the overall impact of the proposed development.

10.6. Turn Lane Storage Requirements

Separate left- and right-turn lanes are recommended at the proposed site driveway along Barbee Chapel Road. Storage lengths of 225 feet and 100 feet, respectively, are recommended for the auxiliary lanes. Separate left- and right-turn lanes are also recommended at the proposed signalized site driveway along NC 54 with approximately 30 feet and 100 feet of storage recommended, respectively. It should be noted that during peak hours, it may be difficult for site traffic to enter these turn lanes due to significant queuing of through traffic along NC 54.

10.7. Sight Distance

Based on a field review, adequate sight distance is available along Barbee Chapel Road at the proposed site driveway as well as along NC 54 at the proposed signalized site driveway. Traffic exiting the site along NC 54 and traveling in the westbound direction should be aware of potential vehicle queuing from the adjacent traffic signal at NC 54 and Barbee Chapel Road.

10.8. Appropriateness of Acceleration or Deceleration Lanes

Auxiliary turn lanes are recommended at the Barbee Chapel Road and Site Drive 1 intersection as well as at the NC 54 and Site Drive 2 intersection. The separate left and right-turn lanes will provide a means for site traffic to exit the mainline traffic flow and minimize delays to major-street traffic.

10.9. Pedestrian and Bicycle Analysis

The Meadowmont mixed-use development, located on the north side of NC 54 along Meadowmont Lane and West Barbee Chapel Road contains designated bicycle facilities. In addition, separate bicycle lanes exist along several sections of NC 54 within the study area.

10.10. Public Transportation Analysis

The Town of Chapel Hill transit system provides service to various areas within the study area, primarily to locations to the west of Barbee Chapel Road. In addition, the Triangle Transit Authority (TTA) provides regional service to the area with trips provided to Durham and the Research Triangle Park.

11. RECOMMENDATIONS

Based on the findings of this study, the following improvements are recommended at the study intersections to achieve a desirable level of operation for each build-out and study phase. Refer to Figure 23 in Appendix A for a summary of the recommended improvements at each of the intersections.

NC 54 and I-40 Westbound On-/Off-Ramps

- No improvements identified.

NC 54 and I-40 Eastbound On-/Off-Ramps

- No improvements identified.

NC 54 and Farrington Road/Watkins Road

Improvements Identified Under Future (2010) Without Development Conditions

- Provide an additional eastbound and westbound left-turn lane along NC 54.
- Provide a separate eastbound and westbound right-turn lane along NC 54.
- Provide an additional northbound and southbound left-turn lane along Watkins Road and Farrington Road, respectively.
- Provide an additional northbound and southbound through lane along Watkins Road and Farrington Road, respectively.

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional northbound right-turn lane along Watkins Road.

NC 54 and Hunting Ridge Road

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional eastbound and westbound through lane along NC 54.

NC 54 and Downing Creek Parkway

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional eastbound and westbound through lane along NC 54.

NC 54 and Little John Road

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional eastbound and westbound through lane along NC 54.

NC 54 and East Barbee Chapel Road/Barbee Chapel Road

Improvements Identified Under Future (2010) Without Development Conditions

- Provide an additional northbound left-turn lane along Barbee Chapel Road.
- Provide a separate northbound right-turn lane along Barbee Chapel Road.

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional northbound left-turn lane along Barbee Chapel Road.

NC 54 and Friday Center Drive/Meadowmont Lane

Improvements Identified Under Future (2010) Without Development Conditions

- Provide an additional northbound left-turn lane along Friday Center Drive.

NC 54 and West Barbee Chapel Road/Office Driveway

- No improvements identified.

NC 54 and Finley Golf Course Road/Burning Tree Drive

Improvements Identified Under Future (2010) Without Development Conditions

- Lengthen eastbound and westbound left-turn lanes along NC 54 to provide a minimum of 250 feet of storage. [Improvement recommended by University Village development]
- Provide separate northbound left-turn lane along Finley Golf Course Road. [Improvement recommended by University Village development]

- Provide separate southbound left-turn lane along Burning Tree Drive.

NC 54 and Hamilton Road

- No improvements identified.

West Barbee Chapel Road/East Barbee Chapel Road and Meadowmont Lane

- No improvements identified.

Barbee Chapel Road and Stancell Drive

Improvements Identified Under Future (2010) Without Development Conditions

- Provide an additional northbound through lane along Barbee Chapel Road.

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional northbound through lane along Barbee Chapel Road.

Barbee Chapel Road and Finley Forest Drive/Site Drive #1

Improvements Identified Under Future (2010) With Development Conditions

- Provide a separate southbound left-turn lane along Barbee Chapel Road with a minimum of 225 feet of storage and appropriate taper.
- Construct Site Drive #1 as a three-lane section with one (1) ingress lane and two (2) egress lanes – one (1) shared left-turn/through lane and one (1) separate right-turn lane.

Improvements Identified Under Future (2018) With Development Conditions

- Provide a separate northbound right-turn lane with a minimum of 100 feet of storage and appropriate taper.

NC 54 and Site Drive #2

Improvements Identified Under Future (2013) With Development Conditions

- Provide a separate westbound left-turn lane along NC 54 with a minimum of 200 feet of storage and appropriate taper.

- Provide a separate eastbound right-turn lane along NC 54 with a minimum of 100 feet of storage and appropriate taper.
- Construct Site Drive #2 as a three-lane section with one (1) ingress lane and two (2) egress lanes – one (1) left-turn lane and one (1) right-turn lane.

Improvements Identified Under Future (2018) Without Development Conditions

- Provide an additional eastbound and westbound through lane along NC 54.

Improvements Identified Under Future (2018) With Development Conditions

- Lengthen the westbound left-turn lane to provide a minimum of 300 feet of storage and appropriate taper.
- Construct a traffic signal at the intersection. It is recommended to monitor traffic at the intersection to determine if a traffic signal is warranted prior to full build-out of Phase Three. As indicated, projected traffic volumes at the intersection, based on build-out of Phase Two of the development, do not indicate that a traffic signal is warranted. However, actual traffic volumes at some time in the future may indicate that a signal is warranted.