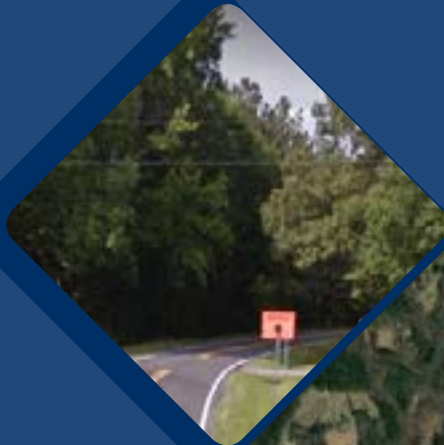


19-TAR-447
Mt Pisgah Tract Final Draft
Cary, North Carolina



TRAFFIC ANALYSIS REPORT

FOR

**MT. PISGAH TRACT (19-TAR-447)
FINAL DRAFT**

LOCATED

IN

CARY, NORTH CAROLINA

Prepared For:
Town of Cary
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Cary, NC 27512

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July 2019

**TRAFFIC ANALYSIS REPORT – FINAL DRAFT
MT. PISGAH TRACT (19-TAR-447)
CARY, NORTH CAROLINA**

EXECUTIVE SUMMARY

1. Development Overview

This report summarizes the findings of the Traffic Analysis Report (TAR) conducted for the proposed residential development located in the southeast quadrant at the intersection of New Hope Church Road and Mt. Pisgah Church Road in Cary, North Carolina. A build-out year of 2024 was assumed for analysis purposes per LDO guidelines. The proposed development is expected to consist of 165 single-family detached homes, according to the TAR application. Access to the site will two (2) full access driveways along Mt. Pisgah Church Road and two (2) full access driveways along New Hope Church Road.

2. Existing (2019) Traffic Volumes

Existing (2019) peak hour traffic volumes were collected in May 2019 during the weekday AM peak period (7:00 AM – 9:00 AM) and PM peak period (4:00 PM – 6:00 PM). Traffic counts were balanced, where appropriate. The turning movement counts were conducted on a typical weekday when schools were in session and the traffic volumes were balanced where applicable. It should be noted that Earnest Jones Road is partially unpaved east of Mt. Pisgah Baptist Church.

3. Future Traffic Volumes, Traffic Growth, and Adjacent Development Trips

Background traffic considers new trips from approved adjacent development and ambient traffic growth. An ambient traffic growth rate of 2% per year was used for study intersections.

Based on discussions with Town staff, the following adjacent developments were considered in the analysis of future traffic conditions:

- 17-REZ-13 Weldon Ridge PDD
- 14-SB-005 Montvale Subdivision

4. Site Trip Generation

The proposed development is expected to consist of 165 single-family homes according to the application. Table E-1 provides a summary of the trip generation potential for the site.

Table E-1: Trip Generation Summary

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	AM Peak Hour Trips (vph)			PM Peak Hour Trips (vph)		
			Enter	Exit	Total	Enter	Exit	Total
Single Family Detached Housing (210)	165 units	1,650	30	92	122	103	61	164

It is estimated that the proposed development will generate 1,650 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 122 trips (30 entering and 92 exiting) will occur during the weekday AM peak hour and 164 (103 entering and 61 exiting) will occur during the weekday PM peak hour.

5. Capacity Analysis Summary

This study analyzes weekday AM and PM peak hour traffic for existing (2019), background (2024), and combined (2024) conditions. Refer to the Table 2 on page E-3 for a summary of the levels-of-services for all analysis scenarios.

Table 2 – Capacity Analysis Summary

Intersection	Approach	Existing (2019) Conditions		Background (2024) Conditions		Combined (2024) Conditions	
		AM	PM	AM	PM	AM	PM
Morrisville Parkway and E Ferrell Road	EB	A ¹ (8)	A ¹ (8)	A ¹ (8)	A ¹ (8)	A ¹ (8)	A ¹ (8)
	WB	--	--	--	--	--	--
	SB	A ² (9)	A ² (10)	C ² (15)	B ² (11)	C ² (17)	B ² (11)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
E Ferrell Road and Yates Store Road	WB	A ² (9)	A ² (9)	B ² (10)	A ² (9)	B ² (10)	A ² (9)
	NB	--	--	--	--	--	--
	SB	A ¹ (7)	A ¹ (7)	A ¹ (8)	A ¹ (7)	A ¹ (8)	A ¹ (7)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Mt. Pisgah Church Road and Earnest Jones Road	WB	A ² (9)	A ² (9)	A ² (9)	A ² (9)	A ² (9)	A ² (9)
	NB	--	--	--	--	--	--
	SB	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (7)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Yates Store Road and New Hope Church Road / Rolling Springs Drive	EB	B ² (11)	B ² (11)	B ² (15)	B ² (12)	C ² (15)	B ² (13)
	WB	A ² (9)	B ² (10)	B ² (11)	B ² (11)	B ² (11)	B ² (12)
	NB	A ¹ (7)	A ¹ (8)	A ¹ (8)	A ¹ (8)	A ¹ (8)	A ¹ (8)
	SB	A ¹ (8)	A ¹ (7)	A ¹ (8)	A ¹ (8)	A ¹ (8)	A ¹ (8)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
New Hope Church Road and Mt. Pisgah Church Road / Shad Lane	EB	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (8)	A ¹ (7)
	WB	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (7)	A ¹ (8)	A ¹ (8)
	NB	A ² (9)	A ² (9)	A ² (10)	A ² (9)	A ² (10)	A ² (10)
	SB	A ² (9)	A ² (9)	A ² (10)	A ² (10)	B ² (10)	A ² (10)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
NC 751 and New Hope Church Road	WB	C ² (17)	C ² (20)	C ² (23)	C ² (22)	C ² (25)	C ² (22)
	NB	--	--	--	--	--	--
	SB	A ¹ (9)	A ¹ (8)	A ¹ (10)	A ¹ (8)	A ¹ (10)	A ¹ (9)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
New Hope Church Road and Site Drive 1	EB	--	--	--	--	--	--
	WB	--	--	--	--	A ¹ (8)	A ¹ (8)
	NB	--	--	--	--	A ² (9)	A ² (9)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
New Hope Church Road and Site Drive 2	EB	--	--	--	--	--	--
	WB	--	--	--	--	A ¹ (8)	A ¹ (8)
	NB	--	--	--	--	A ² (9)	A ² (9)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Mt. Pisgah Church Road and Site Drive 3	WB	--	--	--	--	A ² (9)	A ² (9)
	NB	--	--	--	--	--	--
	SB	--	--	--	--	A ¹ (7)	A ¹ (7)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A
Mt. Pisgah Church Road and Site Drive 4	WB	--	--	--	--	A ² (9)	A ² (9)
	NB	--	--	--	--	--	--
	SB	--	--	--	--	A ¹ (7)	A ¹ (7)
	Overall	N/A	N/A	N/A	N/A	N/A	N/A

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the Town's LDO and NCDOT Congestion Management Guidelines. Refer to Section 6.1 of this report for a detailed description of any adjustments to these guidelines made throughout the analysis.

Intersection Capacity Analysis Summary

Based on the Town's Land Development Ordinance (LDO), improvements are needed to mitigate intersections where the combined LOS is worse than that of background conditions when below LOS D. All the study area intersections (including the proposed site driveways) are expected to operate at acceptable levels-of-service under existing and future year conditions.

6. Recommendations

Based on the findings of this study, specific geometric and traffic control improvements have been identified at study intersections. The improvements are summarized below and are illustrated in Figure E-1.

Recommended Improvements by Developer

Required Frontage Improvements per Cary Community Plan's Planned Roadway Widths Map at the time of Development Plan

- New Hope Church Road
 - Widen one-half section of New Hope Church Road along the site frontage to this roadway's ultimate section (2-lane thoroughfare). Applicant will be required to dedicate a minimum of one-half of 60-foot right-of-way and construct a minimum of one-half of the 37-foot road section along the site frontage. Refer to Appendix N for a copy of the associated Frontage Roadway Improvement Standard Detail Drawing.
- Mt. Pisgah Church Road
 - Widen one-half section of Mt. Pisgah Church Road along the site frontage to this roadway's ultimate section (local street). Applicant will be required to dedicate a minimum of one-half of 50-foot right-of-way and construct a

minimum of one-half of the 27-foot road section along the site frontage. Refer to Appendix N for a copy of the associated Frontage Roadway Improvement Standard Detail Drawing.

New Hope Church Road and Site Drive 1

- Construct the northbound approach (Site Drive 1) with one ingress lane and one egress lane.
- Provide stop control for the northbound approach.
- Construct an exclusive westbound left-turn lane with a minimum of 50 feet of full width storage and appropriate deceleration and taper length.

New Hope Church Road and Site Drive 2

- Construct the northbound approach (Site Drive 2) with one ingress lane and one egress lane.
- Provide stop control for the northbound approach.
- Construct an exclusive westbound left-turn lane with a minimum of 50 feet of full width storage and appropriate deceleration and taper length.

Mt. Pisgah Church Road and Site Drive 3

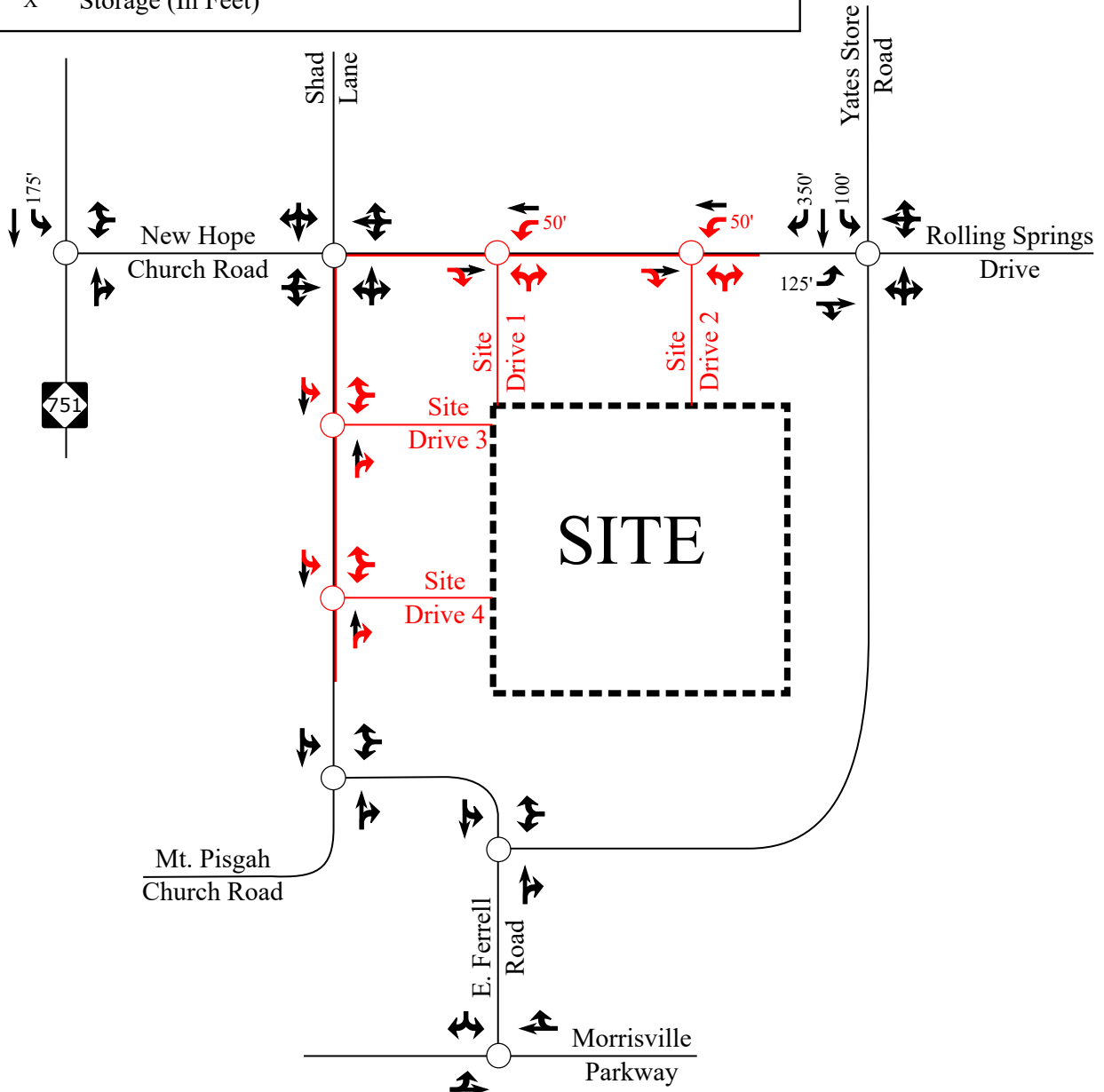
- Construct the westbound approach (Site Drive 3) with one ingress lane and one egress lane.
- Provide stop control for the westbound approach.

Mt. Pisgah Church Road and Site Drive 4

- Construct the westbound approach (Site Drive 4) with one ingress lane and one egress lane.
- Provide stop control for the westbound approach.

LEGEND

○	Unsignalized Intersection	➔	Improvement by Developer
➔	Existing Lane	—	CCP Required Frontage Improvement
X'	Storage (In Feet)		



Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Recommended
Lane Configurations

Scale: Not to Scale

Figure E-1

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Appendix B:	Scoping Information
Appendix C:	Adjacent Development Information
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TRAFFIC ANALYSIS REPORT – FINAL DRAFT

MT. PISGAH TRACT (19-TAR-447)

CARY, NORTH CAROLINA

1. INTRODUCTION

This report summarizes the findings of the Traffic Analysis Report (TAR) conducted for the proposed Mt. Pisgah Tract development will be located in the southeast quadrant at the intersection of New Hope Church Road and Mt. Pisgah Church Road in Cary, North Carolina. The Town of Cary (Town) requires that all proposed developments expected to generate at least 100 trips during the peak hour to have a TAR completed, per Section 3.4.1 (D) of the Land Development Ordinance. The purpose of this study is to determine the potential impacts to the surrounding transportation system created by traffic generated by the proposed development, as well as recommend improvements to mitigate the impacts.

The proposed development will have an analysis year of 2024 per the Town's Land Development Ordinance analysis guidelines. The site is expected to consist of 165 single family homes according to the application. The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- Existing (2019) Traffic Conditions
- Background (2024) Traffic Conditions
- Combined (2024) Traffic Conditions

1.1. Site Location and Study Area

The proposed development will be located in the southeast quadrant at the intersection of New Hope Church Road and Mt. Pisgah Church Road in Cary, North Carolina. Refer to Figure 1 for the site location map.

The scope of the study for the project was developed through coordination with NCDOT and Town staff and it was determined that the study area would consist of the following intersections:

- New Hope Church Road and Mt. Pisgah Church Road / Shad Lane

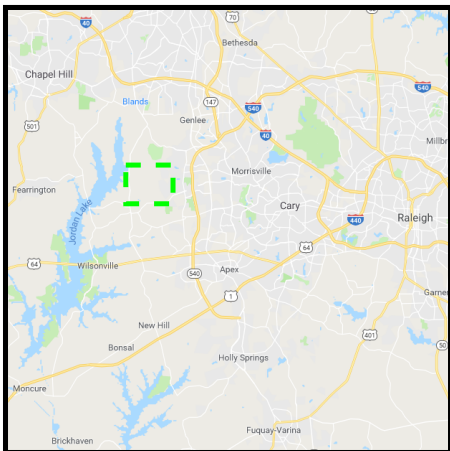
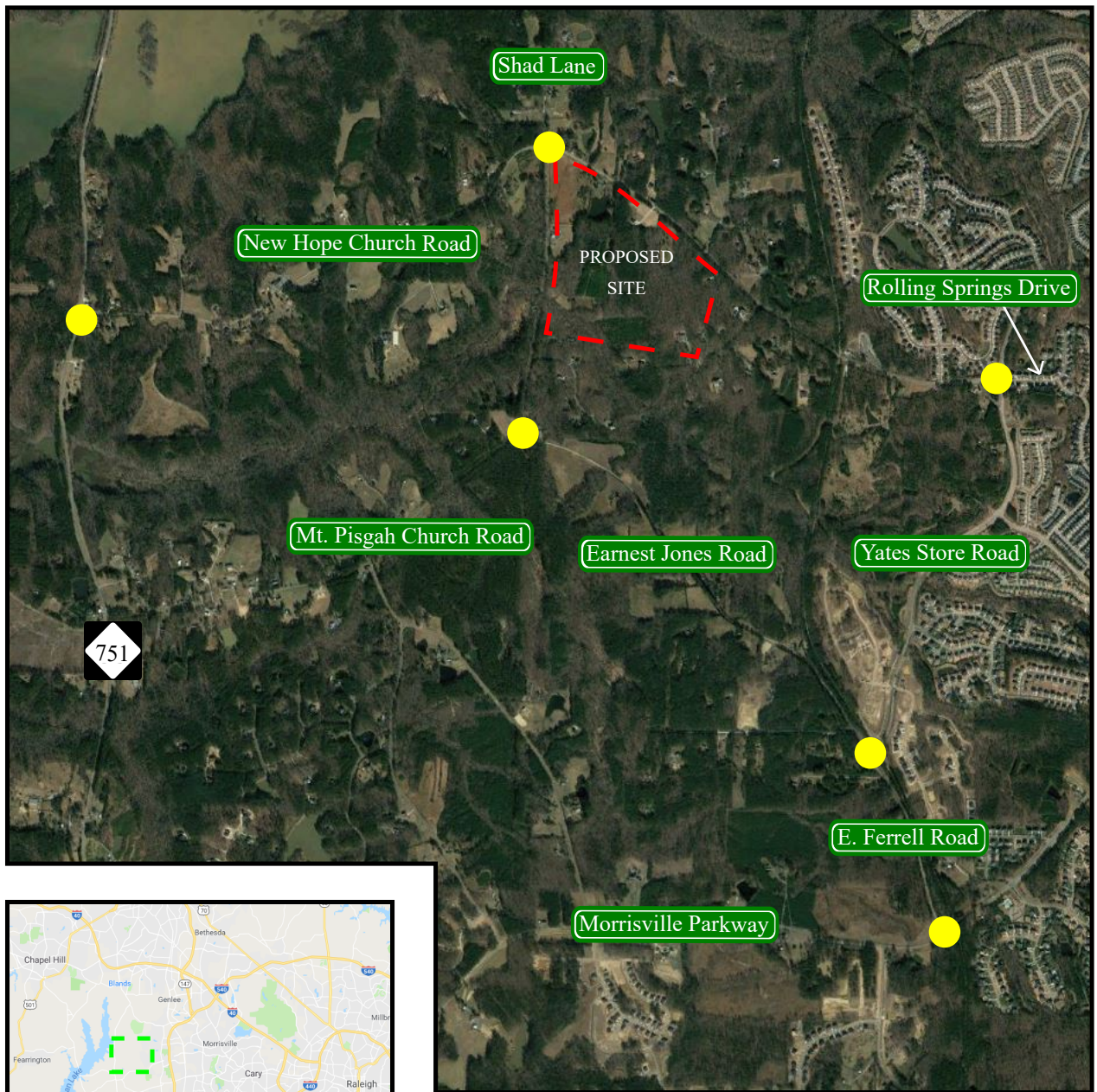
- Mt. Pisgah Church Road and Earnest Jones Road
- New Hope Church Road / Rolling Springs Drive and Yates Store Road
- Yates Store Road and E Ferrell Road
- Morrisville Parkway and E Ferrell Road
- New Hope Church Road and NC 751
- Mt. Pisgah Church Road and Site Drive 1
- Mt. Pisgah Church Road and Site Drive 2
- New Hope Church Road and Site Drive 3
- New Hope Church Road and Site Drive 4

1.2. Proposed Land Use and Site Access

The proposed development will have an analysis year of 2024 and is expected to consist of 165 single family homes according to the application. Access to the site will be provided via two (2) full access driveways along Mt. Pisgah Church Road and two (2) full access driveways along New Hope Church Road. Refer to Figure 2 for an illustration of the preliminary site plan.

1.3. Adjacent Land Uses

Existing land uses in the vicinity of the site consist of primarily residential and retail developments. Based on discussion with NCDOT and Town staff, there are two (2) approved developments to be considered in the analysis of future conditions. These developments are discussed in more detail in Section 4.



LEGEND

- Proposed Site Location
- Study Intersection
- Study Area

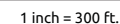


Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Site Location Map

Scale: Not to Scale

Figure 1



1. IF ACCESS LOCATIONS ARE SUBSTANTIALLY CHANGED OR RELOCATED, THE APPLICANT MAY BE REQUIRED TO CONDUCT AN UPDATED TAR STUDY AT THEIR OWN EXPENSE AND SCHEDULE.
2. IF THE LAND USE OR SIZE OF THE PARCEL IS CHANGED, THE APPLICANT MAY BE REQUIRED TO CONDUCT AN UPDATED TAR STUDY AT THEIR OWN EXPENSE AND SCHEDULE.

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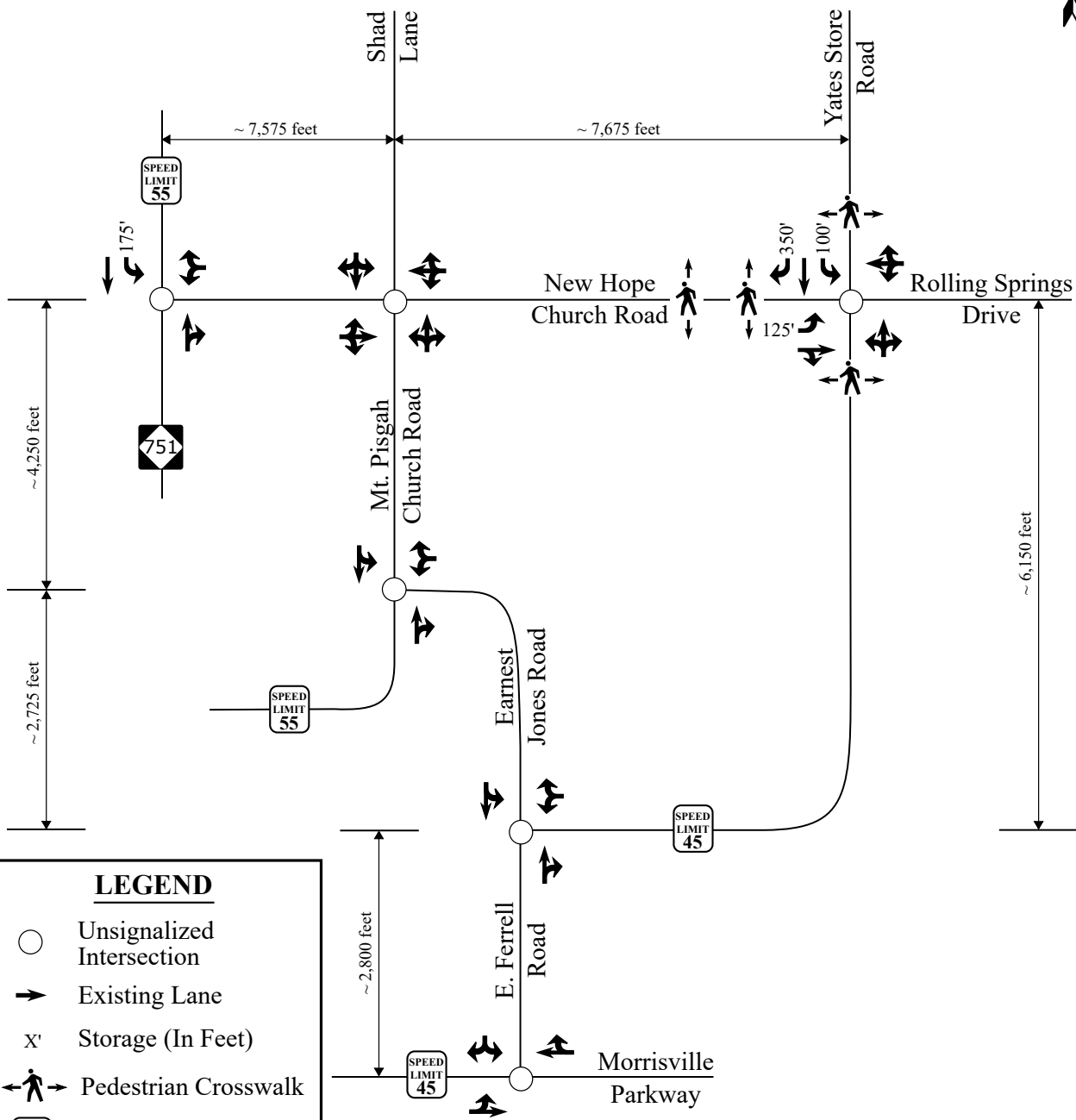
1.4. Existing Roadways

Existing lane configurations (number of traffic lanes on each intersection approach), lane widths, storage capacities, and other intersection and roadway information were collected through field reconnaissance by Ramey Kemp & Associates, Inc. (RKA). Table 1 on the following page provides a summary of the field data collected. Refer to Figure 3 for an illustration of the existing lane configurations within the study area.

Table 1: Existing Roadway Inventory

Road Name	Route Number	Typical Cross Section	Speed Limit	Maintained By	AADT (vpd)
New Hope Church Road	SR 1733	2-lane undivided	55 mph (assumed)	NCDOT	690 ³
NC 751	NC 751	2-lane undivided	55 mph	NCDOT	8,500 ²
Mt. Pisgah Church Road	SR 1736	2-lane undivided	55 mph	NCDOT	430 ⁴
Shad Lane	N/A	2-lane undivided	25 mph (assumed)	Private	100 ¹
Earnest Jones Road	SR 1737	2-lane undivided (partially unpaved)	45 mph (assumed)	NCDOT	100 ¹
Yates Store Road	SR 1716	2-lane undivided / 4-lane divided	45 mph	NCDOT	3,400 ¹
Rolling Springs Drive	N/A	2-lane undivided	25 mph (assumed)	Town	500 ¹
E Ferrell Road	SR 1627	2-lane undivided	45 mph (assumed)	NCDOT	400 ¹
Morrisville Parkway	SR 3120	2-lane undivided	45 mph	NCDOT	5,800 ²

1. ADT based on the traffic counts from 2018 and assuming the weekday PM peak hour volume is 10% of the average daily traffic.
2. NCDOT 2017 AADT Information
3. NCDOT 2016 AADT Information
4. NCDOT 2015 AADT Information



LEGEND

- Unsignalized Intersection
- ➔ Existing Lane
- x' Storage (In Feet)
- ➔ Pedestrian Crosswalk
- Posted Speed Limit



Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Existing
Lane Configurations

Scale: Not to Scale

Figure 3

New Hope Church Road and Mt. Pisgah Church Road / Shad Lane



Looking west on New Hope Church Road



Looking north on Mt. Pisgah Church Road

Mt. Pisgah Church Road and Earnest Jones Road



Looking south on Mt. Pisgah Church Road



Looking west on Earnest Jones Road

New Hope Church Road / Rolling Springs Drive and Yates Store Road



Looking east on Rolling Springs Drive



Looking south on Yates Store Road

Yates Store Road and E Ferrell Road



Looking west on Yates Store Road



Looking north on E Ferrell Road

Morrisville Parkway and E Ferrell Road



Looking east on Morrisville Parkway



Looking south on E Ferrell Road

New Hope Church Road and NC 751



Looking west on New Hope Church Road



Looking north on NC 751

2. EXISTING (2019) PEAK HOUR CONDITIONS

2.1. Existing (2019) Peak Hour Traffic

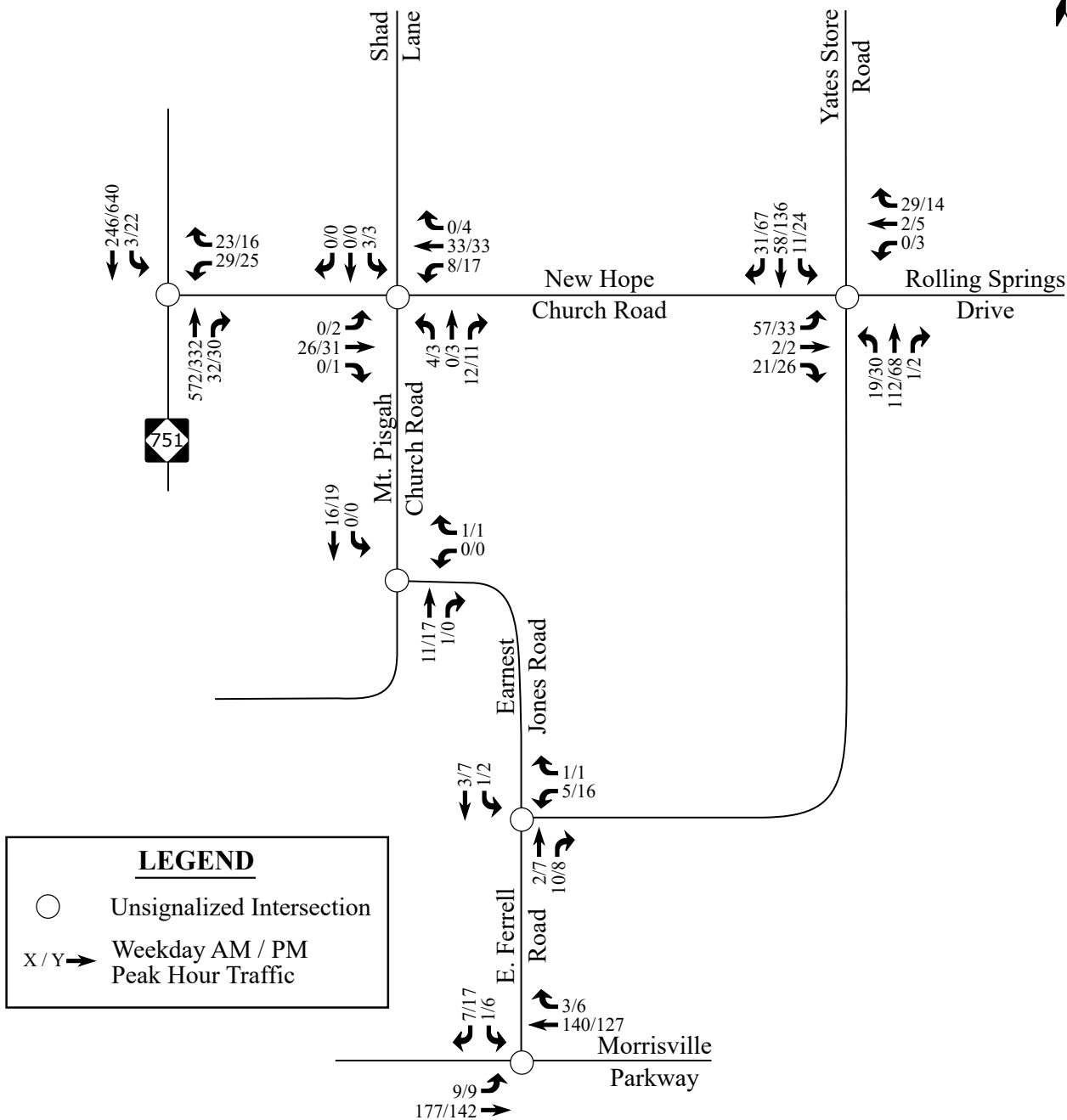
Traffic counts were collected by Quality Counts (QC) in May 2019, while schools were in session, during the weekday AM peak period (7:00 AM – 9:00 AM) and PM peak period (4:00 PM – 6:00 PM) at the following intersections:

- New Hope Church Road and Mt. Pisgah Church Road / Shad Lane
- Mt. Pisgah Church Road and Earnest Jones Road
- New Hope Church Road / Rolling Springs Drive and Yates Store Road
- Yates Store Road and E Ferrell Road
- Morrisville Parkway and E Ferrell Road
- New Hope Church Road and NC 751

Refer to Figure 4 for the existing (2019) weekday AM and PM peak hour traffic volumes. A summary of the traffic count data is provided in Appendix A of this report. It should be noted that the turning movement counts were conducted on a typical weekday when schools were in session and the traffic volumes were balanced where appropriate.

2.2. Analysis of Existing (2019) Peak Hour Traffic

The existing (2019) weekday AM and PM peak hour traffic volumes at the study intersections were analyzed to determine the current levels-of-service under existing roadway conditions and traffic control. All analyses were performed in accordance with the Town and NCDOT guidelines. The results of the analysis are presented in Section 7 of this report.



Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Existing (2019)
Peak Hour Traffic

Scale: Not to Scale

Figure 4

3. BACKGROUND (2024) PEAK HOUR CONDITIONS

In order to account for growth of traffic and subsequent traffic conditions at a future year, background traffic projections are needed. Background traffic is the component of traffic due to the growth of the community and surrounding area that is anticipated to occur regardless of whether or not the proposed development is constructed. Background traffic growth includes two components – ambient traffic growth and new trips from approved, but not built, adjacent developments.

3.1. Ambient Traffic Growth

Based on a review of traffic growth patterns and adjacent development information, an annually compounded growth rate of 2% per year was used to project existing traffic volumes at the study intersections to the analysis year of 2024. This growth rate is typical of the historical data for the area and has been used in other studies in the area. The ambient traffic growth rate was applied to all intersections within the study area. The projected (2024) traffic volumes are shown in Figure 5.

3.2. Adjacent Development Traffic

Based on discussion with the Town and NCDOT staff, the following adjacent developments were considered in the analysis of future traffic conditions:

- 17-REZ-13 Weldon Ridge PDD
- 14-SB-005 Montvale Subdivision

Weldon Ridge consists of 104 single-family homes and a 1,300-student private school serving grades K-12 and is located south of New Hope Church Road and west of Yates Store Road in Cary, North Carolina. The development is expected to be built-out by 2022.

Montvale consists of 120 single-family homes located east of E Ferrell Road and north of Morrisville Parkway in Cary, North Carolina. Access to the development is expected to be provided via two (2) left-over driveways along the extended Yates Store Road. The development is expected to be complete by the build-out of the proposed Mt. Pisgah Tract development.

As a result of the site driveways for the above listed adjacent developments, the trips associated with these developments do not balance between our study intersections. Refer to Figure 6 for an illustration of the total peak hour adjacent development trips. Adjacent development information can be found in Appendix C.

3.3. Future Roadway Improvements

Based on coordination with the NCDOT and the Town, there are no planned future roadway improvements in the study area.

3.4. Background (2024) Peak Hour Traffic Volumes

The background (2024) peak hour traffic volumes were determined by adding the projected (2024) peak hour traffic volumes (Figure 5) and the total adjacent development trips (Figure 6). Refer to Figure 7 for an illustration of the background (2024) weekday AM and PM peak hour traffic volumes.

3.5. Analysis of Background (2024) Peak Hour Traffic Conditions

Background (2024) traffic volumes were analyzed with the existing lane configurations. The results of the background (2024) traffic conditions analyses are presented in Section 7 of this report.

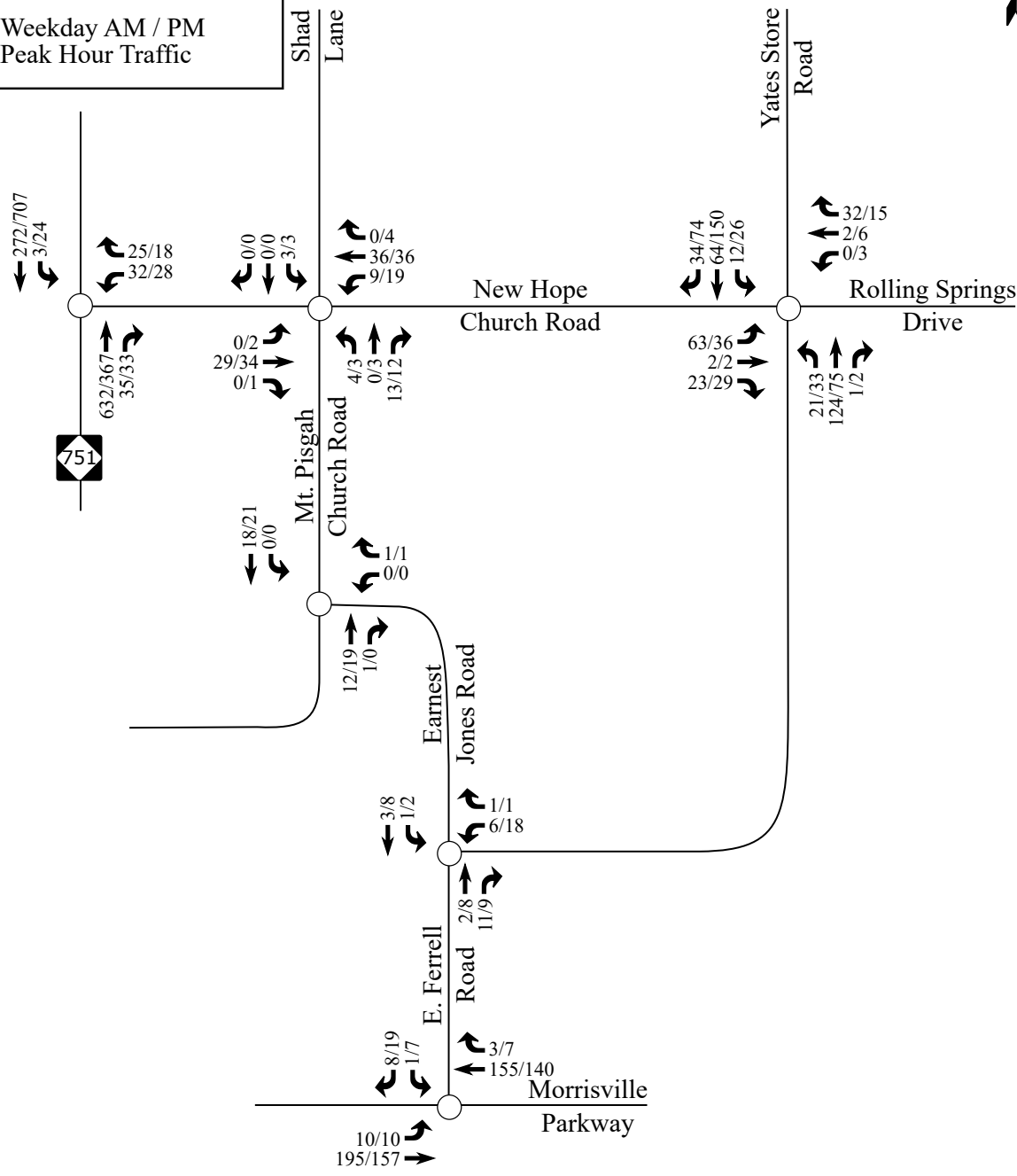
LEGEND

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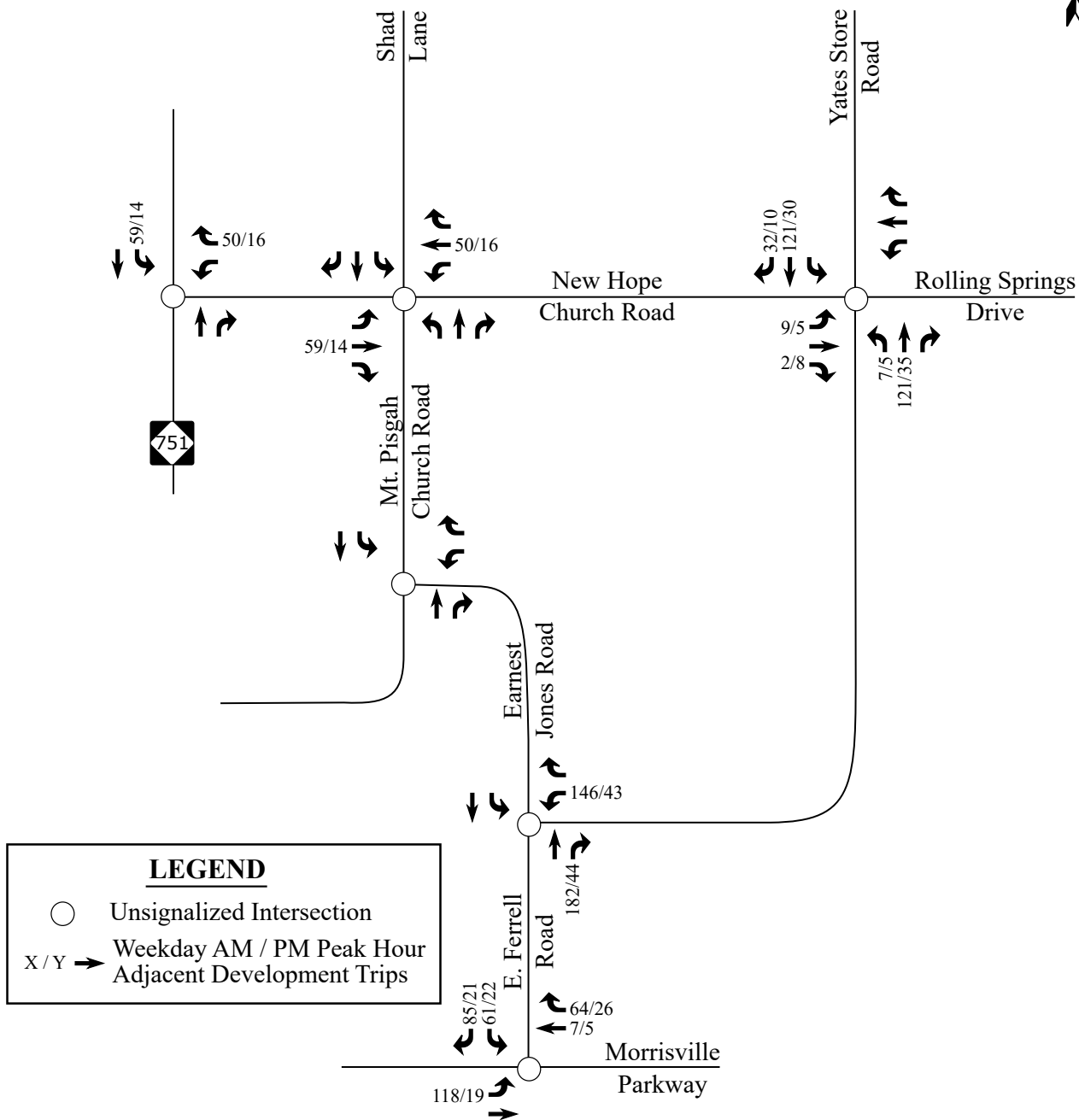
Unsignalized Intersection

X / Y →

Weekday AM / PM Peak Hour Traffic



 RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Mt. Pisgah Tract (19-TAR-447) Cary, NC	Projected (2024) Peak Hour Traffic	
		Scale: Not to Scale	Figure 5

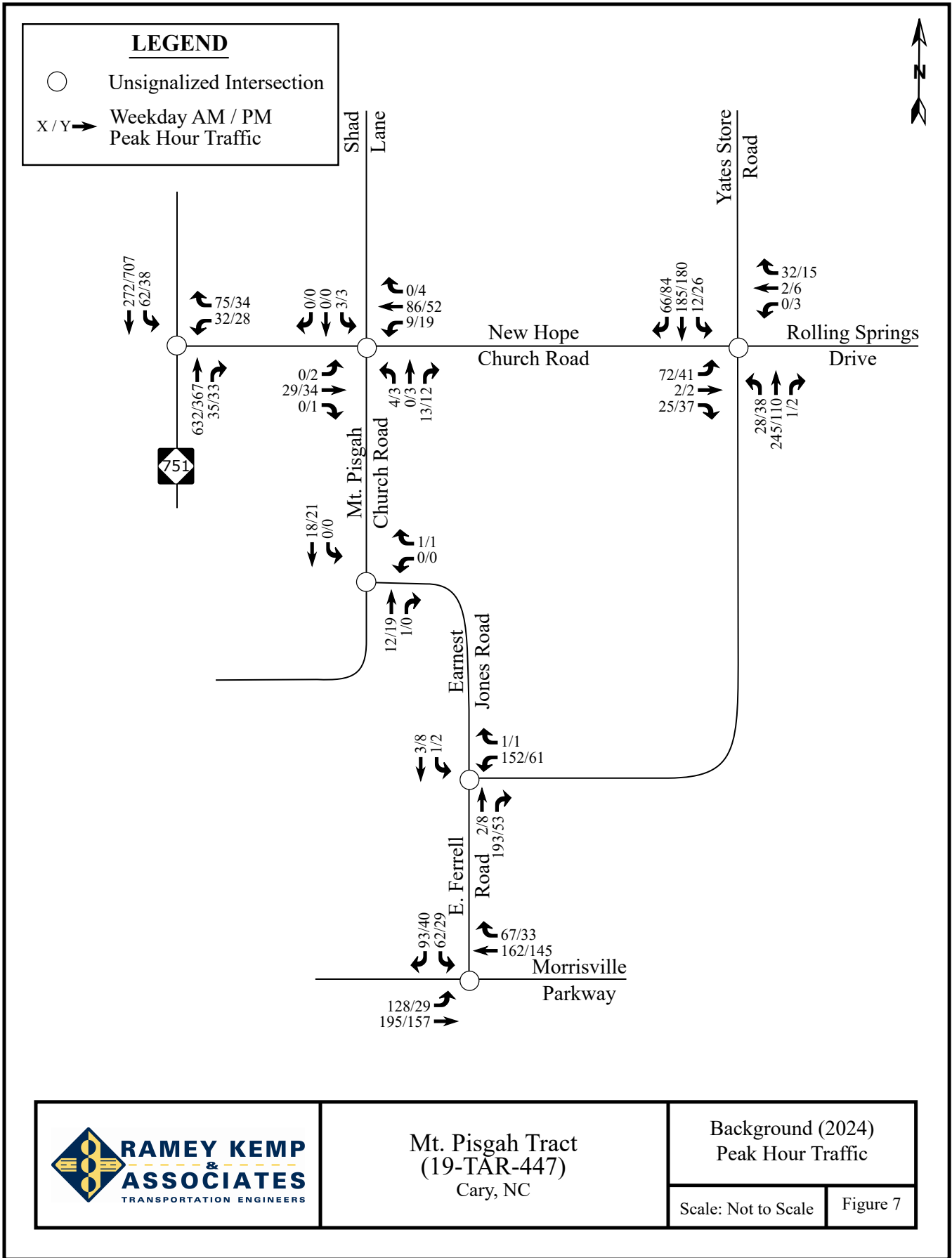


Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Peak Hour Adjacent
Development Trips

Scale: Not to Scale

Figure 6



4. SITE TRIP GENERATION AND DISTRIBUTION

4.1. Trip Generation

The proposed development is expected to consist of 165 single-family homes, according to the TAR application form. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 10th Edition. Table 2 provides a summary of the trip generation potential for the site.

Table 2: Trip Generation Summary

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	AM Peak Hour Trips (vph)			PM Peak Hour Trips (vph)		
			Enter	Exit	Total	Enter	Exit	Total
Single-Family Detached (210)	165 units	1,650	30	92	122	103	61	164

It is estimated that the proposed development will generate approximately 1,650 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 122 trips (30 entering and 92 exiting) will occur during the weekday AM peak hour and 164 (103 entering and 61 exiting) will occur during the weekday PM peak hour.

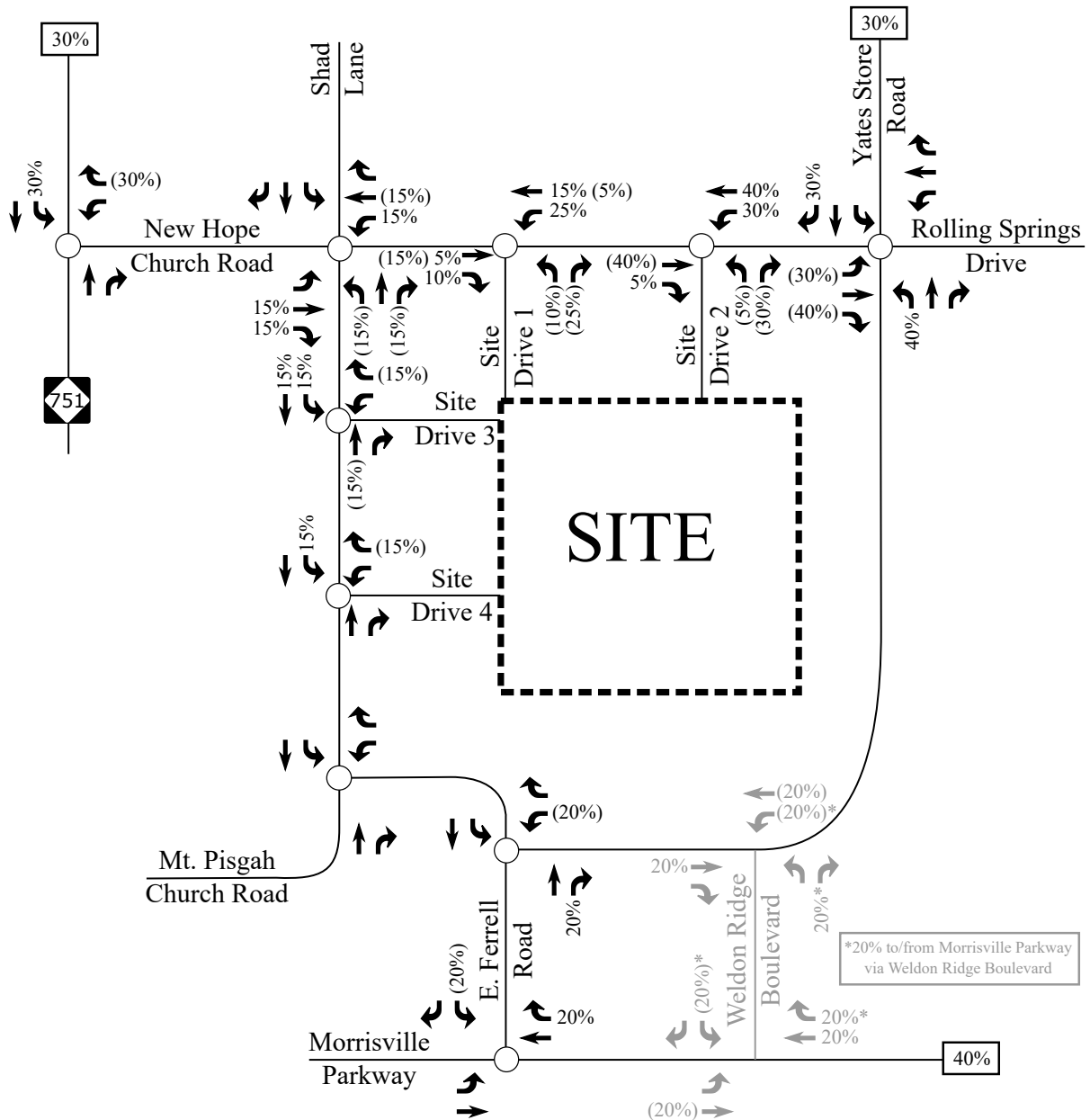
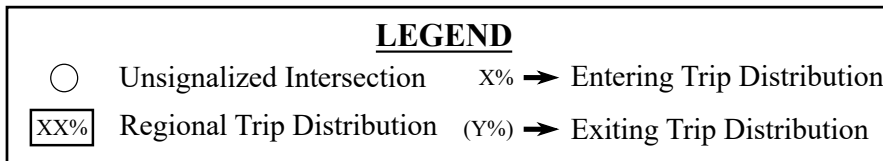
4.2. Site Trip Distribution and Assignment

The site trips are distributed based on the locations of existing traffic patterns, population centers adjacent to the study area, and engineering judgment. A summary of the regional distribution is below:

- 30% to/from the north via New Hope Church Road
- 30% to/from the north via Yates Store Road
- 40% to/from the east via Morrisville Parkway

It should be noted that a portion of the trips to/from the east via Morrisville Parkway are expected to utilize Weldon Ridge Boulevard to/from Yates Store Road. Half of the vehicles to/from the east via Morrisville Parkway were estimated to utilize E Ferrell Road to be conservative. It should also be noted that no site related traffic is expected to utilize the intersection of Earnest Jones Road and Mt. Pisgah Church Road because Earnest Jones Road is

unpaved east of Mt. Pisgah Baptist Church. Based on this distribution, no site related traffic is expected to access NC 751 via Mt. Pisgah Church Road. The site trip distribution is shown in Figure 8. Refer to Figure 9 for the site trip assignment.



*20% to/from Morrisville Parkway via Weldon Ridge Boulevard



Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Site Trip Distribution

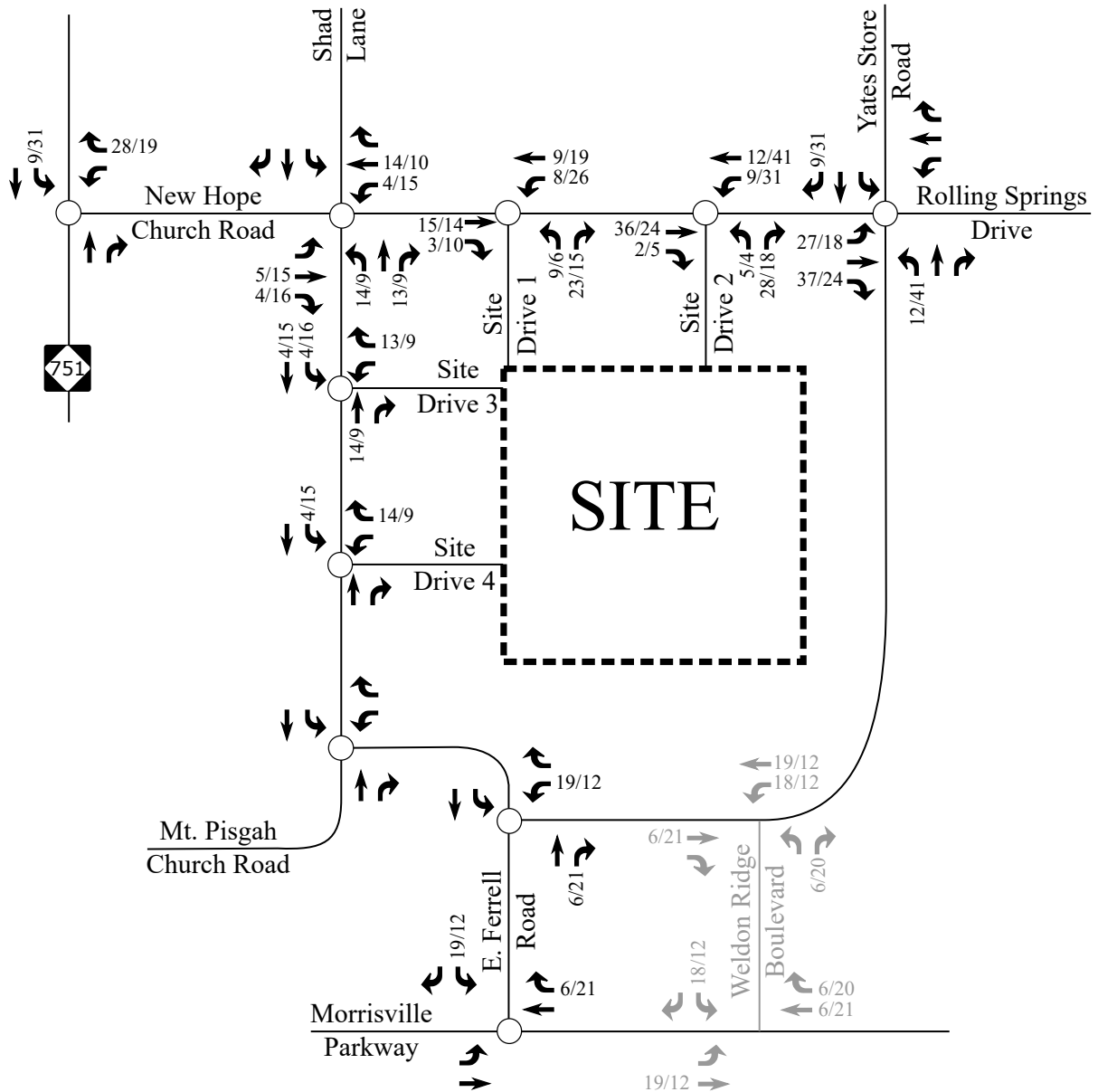
Scale: Not to Scale

Figure 8

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Hour Site Trips



**Mt. Pisgah Tract
(19-TAR-447)**
Cary, NC

Site Trip Assignment

Scale: Not to Scale

Figure 9

5. COMBINED (2024) TRAFFIC CONDITIONS

5.1. Combined (2024) Peak Hour Traffic Volumes

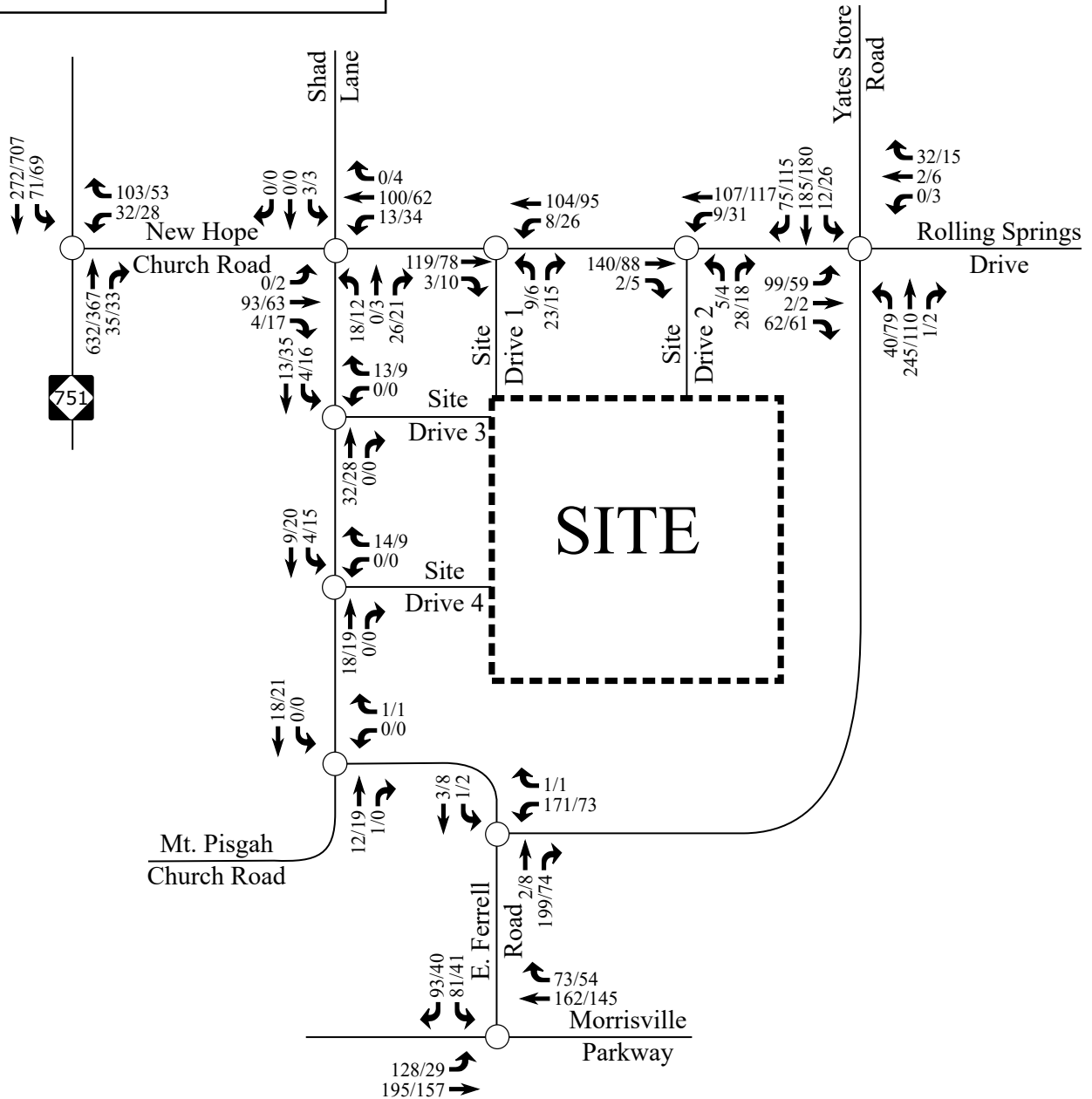
The background (2024) traffic volumes (Figure 7) were combined with the total site trips (Figure 9) to determine the combined (2024) peak hour traffic volumes upon build-out of the development. Refer to Figure 10 for the combined (2024) AM and PM peak hour traffic volumes.

5.2. Analysis of Combined (2024) Peak Hour Traffic

The combined (2024) peak hour conditions were analyzed according to the same methodology as described for background conditions. The results of the capacity analysis for each intersection are presented in Section 7 of this report. Improvements are considered to meet Town of Cary LDO requirements.

LEGEND

- Unsignalized Intersection
- X / Y → Weekday AM / PM Peak Hour Traffic



Mt. Pisgah Tract
(19-TAR-447)
Cary, NC

Combined (2024)
Peak Hour Traffic

Scale: Not to Scale

Figure 10

6. TRAFFIC ANALYSIS PROCEDURE

Study intersections were analyzed using the methodology outlined in the Highway Capacity Manual (HCM), 6th Edition published by the Transportation Research Board. Capacity and level of service are the design criteria for this traffic study. A computer software package, Synchro (Version 10.3), was used to complete the analyses for most of the study area intersections. Please note that the unsignalized capacity analysis does not provide an overall level of service for an intersection; only delay for an approach with a conflicting movement.

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 Level “A” representing free flow, to Level “F” where breakdown conditions are evident. Refer to Table 3 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by the HCM includes “initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay”. An average control delay of 50 seconds at a signalized intersection results in LOS “D” operation at the intersection.

Table 3: Highway Capacity Manual – Levels-of-Service and Delay

UNSIGNALIZED INTERSECTION		SIGNALIZED INTERSECTION	
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE 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

6.1. Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the Town’s LDO and NCDOT Congestion Management Guidelines.

7. CAPACITY ANALYSIS

7.1. Morrisville Parkway and E Ferrell Road

The unsignalized intersection of Morrisville Parkway and E Ferrell Road was analyzed under existing (2019) conditions, background (2024) conditions, and combined (2024) conditions with the lanes and traffic control shown in Table 4. Refer to Table 4 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix D.

Table 4: Analysis Summary of Morrisville Parkway and E Ferrell Road

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Existing (2019) Conditions	EB WB SB	1 LT-TH 1 TH-RT 1 LT-RT	A ¹ (8) -- A ² (9)	N/A	A ¹ (8) -- A ² (10)	N/A
Background (2024) Conditions	EB WB SB	1 LT-TH 1 TH-RT 1 LT-RT	A ¹ (8) -- C ² (15)	N/A	A ¹ (8) -- B ² (11)	N/A
Combined (2024) Conditions	EB WB SB	1 LT-TH 1 TH-RT 1 LT-RT	A ¹ (8) -- C ² (17)	N/A	A ¹ (8) -- B ² (11)	N/A

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

Capacity analysis indicates that the major-street left-turn movement and minor-street approach at the intersection of Morrisville Parkway and E Ferrell Road currently operate at LOS A during the weekday AM and PM peak hours. Under background (2024) and combined (2024) conditions, the major-street left-turn movement is expected to continue to operate at LOS A and the minor-street approach is expected to operate at LOS C or better during the weekday AM and PM peak hours.

7.2. E Ferrell Road and Yates Store Road

The unsignalized intersection of E Ferrell Road and Yates Store Road was analyzed under existing (2019) conditions, background (2024) conditions, and combined (2024) conditions with the lanes and traffic control shown in Table 5. Refer to Table 5 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix E.

Table 5: Analysis Summary of E Ferrell Road and Yates Store Road

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Existing (2019) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ² (9) -- A ¹ (7)	N/A	A ² (9) -- A ¹ (7)	N/A
Background (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	B ² (10) -- A ¹ (8)	N/A	A ² (9) -- A ¹ (7)	N/A
Combined (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	B ² (10) -- A ¹ (8)	N/A	A ² (9) -- A ¹ (7)	N/A

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

Capacity analysis indicates that the major-street left-turn movement and minor-street approach at the intersection of E Ferrell Road and Yates Store Road currently operate at LOS A during the weekday AM and PM peak hours. Under background (2024) and combined (2024) conditions, the major-street left-turn movement is expected to continue to operate at LOS A and the minor-street approach is expected to operate at LOS B or better during the weekday AM and PM peak hours.

7.3. Mt. Pisgah Church Road and Earnest Jones Road

The unsignalized intersection of Mt. Pisgah Church Road and Earnest Jones Road was analyzed under existing (2019) conditions, background (2024) conditions, and combined (2024) conditions with the lanes and traffic control shown in Table 6. Refer to Table 6 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix F.

Table 6: Analysis Summary of Mt. Pisgah Church Road and Earnest Jones Road

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Existing (2019) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ² (9) -- A ¹ (7)	N/A	A ² (9) -- A ¹ (7)	N/A
Background (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ² (9) -- A ¹ (7)	N/A	A ² (9) -- A ¹ (7)	N/A
Combined (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ² (9) -- A ¹ (7)	N/A	A ² (9) -- A ¹ (7)	N/A

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

Capacity analysis of existing (2019), background (2024), and combined (2024) traffic conditions indicates that the major-street left-turn movement and minor-street approach at the intersection of Mt. Pisgah Church Road and Earnest Jones Road are expected to operate at LOS A during the weekday AM and PM peak hours.

7.4. Yates Store Road and New Hope Church Road / Rolling Springs Drive

The unsignalized intersection of Yates Store Road and New Hope Church Road / Rolling Springs Drive was analyzed under existing (2019) conditions, background (2024) conditions, and combined (2024) conditions with the lanes and traffic control shown in Table 7. Refer to Table 7 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix G.

Table 7: Analysis Summary of Yates Store Road and New Hope Church Road / Rolling Springs Drive

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Existing (2019) Conditions	EB WB NB SB	1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	B ² (11) A ² (9) A ¹ (7) A ¹ (8)	N/A	B ² (11) B ² (10) A ¹ (8) A ¹ (7)	N/A
Background (2024) Conditions	EB WB NB SB	1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	B ² (15) B ² (11) A ¹ (8) A ¹ (8)	N/A	B ² (12) B ² (11) A ¹ (8) A ¹ (8)	N/A
Combined (2024) Conditions	EB WB NB SB	1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT	C ² (15) B ² (11) A ¹ (8) A ¹ (8)	N/A	B ² (13) B ² (12) A ¹ (8) A ¹ (8)	N/A

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

Capacity analysis of existing (2019) and background (2024) conditions indicates that the major-street left-turn movements at the intersection of Yates Store Road and New Hope Church Road / Rolling Springs Drive are expected to operate at LOS A and the minor-street approaches are expected to operate at LOS B or better during the weekday AM and PM peak hours. Under combined (2024) conditions, the major-street left-turn movements are expected to continue to operate at LOS A and the minor-street approaches are expected to operate at LOS C or better during the weekday AM and PM peak hours.

7.5. New Hope Church Road and Mt. Pisgah Church Road / Shad Lane

The unsignalized intersection of New Hope Church Road and Mt. Pisgah Church Road / Shad Lane was analyzed under existing (2019) conditions, background (2024) conditions, and combined (2024) conditions with the lanes and traffic control shown in Table 8. Refer to Table 8 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix H.

Table 8: Analysis Summary of New Hope Church Road and Mt. Pisgah Church Road / Shad Lane

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Existing (2019) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A ¹ (7) A ¹ (7) A ² (9) A ² (9)	N/A	A ¹ (7) A ¹ (7) A ² (9) A ² (9)	N/A
Background (2024) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A ¹ (7) A ¹ (7) A ² (10) A ² (10)	N/A	A ¹ (7) A ¹ (7) A ² (9) A ² (10)	N/A
Combined (2024) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A ¹ (8) A ¹ (8) A ² (10) B ² (10)	N/A	A ¹ (7) A ¹ (8) A ² (10) A ² (10)	N/A

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

Capacity analysis of existing (2019) and background (2024) conditions indicates that the major-street left-turn movements and minor-street approaches at the intersection of New Hope Church Road and Mt. Pisgah Church Road / Shad Lane will operate at LOS A during the weekday AM and PM peak hours. Under combined (2024) conditions, the major-street left-turn movements are expected to continue to operate at LOS A and the minor-street approaches are expected to operate at LOS B or better during the weekday AM and PM peak hours.

7.6. NC 751 and New Hope Church Road

The unsignalized intersection of NC 751 and New Hope Church Road was analyzed under existing (2019) conditions, background (2024) conditions, and combined (2024) conditions with the lanes and traffic control shown in Table 9. Refer to Table 9 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix I.

Table 9: Analysis Summary of NC 751 and New Hope Church Road

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Existing (2019) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT, 1 TH	C ² (17) -- A ¹ (9)	N/A	C ² (20) -- A ¹ (8)	N/A
Background (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT, 1 TH	C ² (23) -- A ¹ (10)	N/A	C ² (22) -- A ¹ (8)	N/A
Combined (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT, 1 TH	C ² (25) -- A ¹ (10)	N/A	C ² (22) -- A ¹ (9)	N/A

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

Capacity analysis of existing (2019), background (2024), and combined (2024) traffic conditions at the intersection of NC 751 and New Hope Church Road indicates that the major-street left-turn movement is expected to operate at LOS A and the minor-street approach is expected to operate at LOS C during the weekday AM and PM peak hours.

7.7. New Hope Church Road and Site Drive 1

The proposed intersection of New Hope Church Road and Site Drive 1 was analyzed under combined (2024) conditions with the lanes and traffic control shown in Table 10. Refer to Table 10 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix J.

Table 10: Analysis Summary of New Hope Church Road and Site Drive 1

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Combined (2024) Conditions	EB WB NB	1 TH-RT 1 LT, 1 TH 1 LT-RT	-- A ¹ (8) A ² (9)	N/A	-- A ¹ (8) A ² (9)	N/A

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Improvements and/or revised lane configurations by developer shown in **BOLD** type.

Capacity analysis of combined (2024) conditions indicates that the major-street left-turn movement and minor-street approach at the intersection of New Hope Church Road and Site Drive 1 are expected to operate at LOS A during the weekday AM and PM peak hours.

Turn lanes were considered at this intersection under combined (2024) conditions based on the methodology outlined in the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the findings from the turn lane warrant analysis, a westbound left-turn lane with a minimum of 50 feet of storage and appropriate taper and deceleration is recommended at this intersection. Due to the low volume of eastbound right-turning traffic expected, a right-turn lane is not recommended.

7.8. New Hope Church Road and Site Drive 2

The proposed intersection of New Hope Church Road and Site Drive 2 was analyzed under combined (2024) conditions with the lanes and traffic control shown in Table 11. Refer to Table 11 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix K.

Table 11: Analysis Summary of New Hope Church Road and Site Drive 2

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Combined (2024) Conditions	EB WB NB	1 TH-RT 1 LT, 1 TH 1 LT-RT	-- A ¹ (8) A ² (9)	N/A	-- A ¹ (8) A ² (9)	N/A

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Improvements and/or revised lane configurations by developer shown in **BOLD** type.

Capacity analysis of combined (2024) conditions indicates that the major-street left-turn movement and minor-street approach at the intersection of New Hope Church Road and Site Drive 2 are expected to operate at LOS A during the weekday AM and PM peak hours.

Turn lanes were considered at this intersection under combined (2024) conditions based on the methodology outlined in the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the findings from the turn lane warrant analysis, a westbound left-turn lane with a minimum of 50 feet of storage and appropriate taper and deceleration is recommended at this intersection. Due to the low volume of eastbound right-turning traffic expected, a right-turn lane is not recommended.

7.9. Mt. Pisgah Church Road and Site Drive 3

The proposed intersection of Mt. Pisgah Church Road and Site Drive 3 was analyzed under combined (2024) conditions with the lanes and traffic control shown in Table 12. Refer to Table 12 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix L.

Table 12: Analysis Summary of Mt. Pisgah Church Road and Site Drive 3

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Combined (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ² (9) -- A ¹ (7)	N/A	A ² (9) -- A ¹ (7)	N/A

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Improvements and/or revised lane configurations by developer shown in **BOLD** type.

Capacity analysis of combined (2024) conditions indicates that the major-street left-turn movement and minor-street approach at the intersection of Mt. Pisgah Church Road and Site Drive 3 are expected to operate at LOS A during the weekday AM and PM peak hours.

Turn lanes were considered at this intersection under combined (2024) conditions based on the methodology outlined in the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the findings from the turn lane warrant analysis, the intersection does not meet the criteria to warrant any turn lanes.

7.10. Mt. Pisgah Church Road and Site Drive 4

The proposed intersection of Mt. Pisgah Church Road and Site Drive 4 was analyzed under combined (2024) conditions with the lanes and traffic control shown in Table 13. Refer to Table 13 for a summary of the capacity analysis results. Copies of the Synchro analysis output reports are provided in Appendix M.

Table 13: Analysis Summary of Mt. Pisgah Church Road and Site Drive 4

ANALYSIS SCENARIO	A P P R O A C H	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (sec)	Approach	Overall (sec)
Combined (2024) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A ² (9) -- A ¹ (7)	N/A	A ² (9) -- A ¹ (7)	N/A

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Improvements and/or revised lane configurations by developer shown in **BOLD** type.

Capacity analysis of combined (2024) conditions indicates that the major-street left-turn movement and minor-street approach at the intersection of Mt. Pisgah Church Road and Site Drive 4 are expected to operate at LOS A during the weekday AM and PM peak hours.

Turn lanes were considered at this intersection under combined (2024) conditions based on the methodology outlined in the NCDOT *Policy on Street and Driveway Access to North Carolina Highways* (Driveway Manual). Based on the findings from the turn lane warrant analysis, the intersection does not meet the criteria to warrant any turn lanes.

8. CONCLUSIONS

This report summarizes the findings of the Traffic Analysis Report (TAR) conducted for the proposed residential development located in the southeast quadrant at the intersection of New Hope Church Road and Mt. Pisgah Church Road in Cary, North Carolina. A build-out year of 2024 was assumed for analysis purposes per LDO guidelines. The proposed development is expected to consist of 165 single-family detached homes, according to the TAR application. Access to the site will two (2) full access driveways along Mt. Pisgah Church Road and two (2) full access driveways along New Hope Church Road.

Trips generated by the following adjacent developments were considered in the study as a component of the background (2021) conditions:

- 17-REZ-13 Weldon Ridge PDD
- 14-SB-005 Montvale Subdivision

Trip Generation

It is estimated that the proposed development will generate 1,650 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 122 trips (30 entering and 92 exiting) will occur during the weekday AM peak hour and 164 (103 entering and 61 exiting) will occur during the weekday PM peak hour.

Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the Town's LDO and NCDOT Congestion Management Guidelines. Refer to section 6.1 of this report for a detailed description of any adjustments to these guidelines made throughout the analysis.

Intersection Capacity Analysis Summary

All the study area intersections (including the proposed site driveways) are expected to operate at acceptable levels-of-service under existing and future year conditions.

9. RECOMMENDATIONS

Based on the findings of this study, specific geometric and traffic control improvements have been identified at study intersections. The improvements are summarized below and are illustrated in Figure 11.

Recommended Improvements by Developer

The following improvements are recommended based on the Town's LDO requirements:

Required Frontage Improvements per Cary Community Plan's Planned Roadway Widths Map at the time of Development Plan

- New Hope Church Road
 - Widen one-half section of New Hope Church Road along the site frontage to this roadway's ultimate section (2-lane thoroughfare). Applicant will be required to dedicate a minimum of one-half of 60-foot right-of-way and construct a minimum of one-half of the 37-foot road section along the site frontage. Refer to Appendix N for a copy of the associated Frontage Roadway Improvement Standard Detail Drawing.
- Mt. Pisgah Church Road
 - Widen one-half section of Mt. Pisgah Church Road along the site frontage to this roadway's ultimate section (local street). Applicant will be required to dedicate a minimum of one-half of 50-foot right-of-way and construct a minimum of one-half of the 27-foot road section along the site frontage. Refer to Appendix N for a copy of the associated Frontage Roadway Improvement Standard Detail Drawing.

New Hope Church Road and Site Drive 1

- Construct the northbound approach (Site Drive 1) with one ingress lane and one egress lane.
- Provide stop control for the northbound approach.
- Construct an exclusive westbound left-turn lane with a minimum of 50 feet of full width storage and appropriate deceleration and taper length.

New Hope Church Road and Site Drive 2

- Construct the northbound approach (Site Drive 2) with one ingress lane and one egress lane.
- Provide stop control for the northbound approach.
- Construct an exclusive westbound left-turn lane with a minimum of 50 feet of full width storage and appropriate deceleration and taper length.

Mt. Pisgah Church Road and Site Drive 3

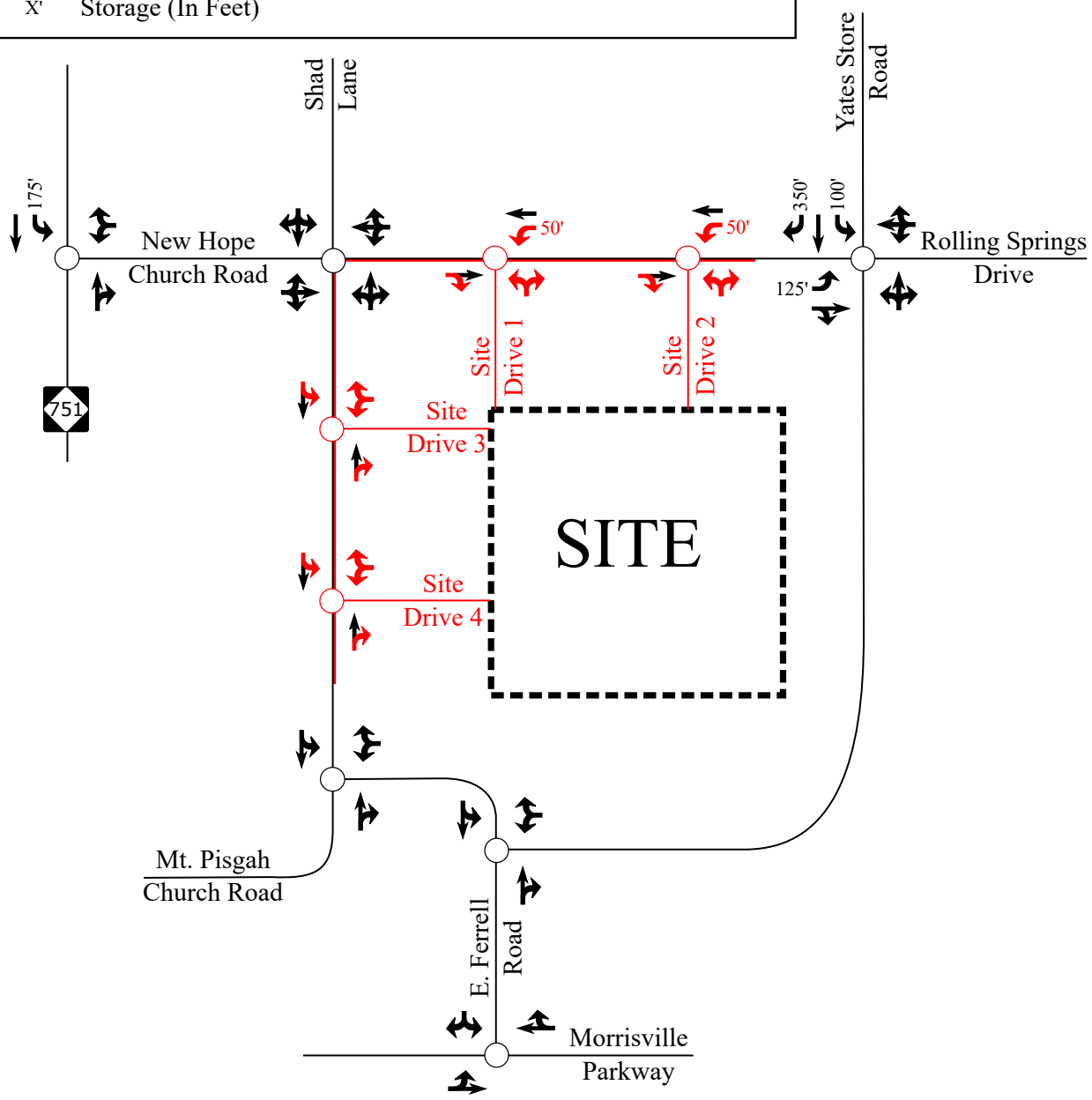
- Construct the westbound approach (Site Drive 3) with one ingress lane and one egress lane.
- Provide stop control for the westbound approach.

Mt. Pisgah Church Road and Site Drive 4

- Construct the westbound approach (Site Drive 4) with one ingress lane and one egress lane.
- Provide stop control for the westbound approach.

LEGEND

<div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="margin-right: 10px;">○</div> <div>Unsignalized Intersection</div> </div> <div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="margin-right: 10px;">➡</div> <div>Existing Lane</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;">x'</div> <div>Storage (In Feet)</div> </div>	<div style="display: flex; align-items: center; margin-bottom: 5px;"> <div style="margin-right: 10px; color: red;">➡</div> <div style="color: red;">Improvement by Developer</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 10px; color: red;">—</div> <div style="color: red;">CCP Required Frontage Improvement</div> </div>	
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 RAMEY KEMP & ASSOCIATES <small>TRANSPORTATION ENGINEERS</small>	<p>Mt. Pisgah Tract (19-TAR-447) Cary, NC</p>	<p>Recommended Lane Configurations</p>	
		<p>Scale: Not to Scale</p>	<p>Figure 11</p>



Charleston, SC - Charlotte, NC - Columbia, SC - Raleigh, NC - Richmond, VA - Winston-Salem, NC