TRAFFIC IMPACT ANALYSIS REPORT

Averette Farms Development

ROLESVILLE, NORTH CAROLINA

Prepared For:
Ammons Development Group
P.O. Box 1615
Wake Forest, North Carolina 27588

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

June 2007

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RKA Project # 07104

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AVERETTE FARMS DEVELOPMENT
ROLESVILLE, NORTH CAROLINA

1. INTRODUCTION

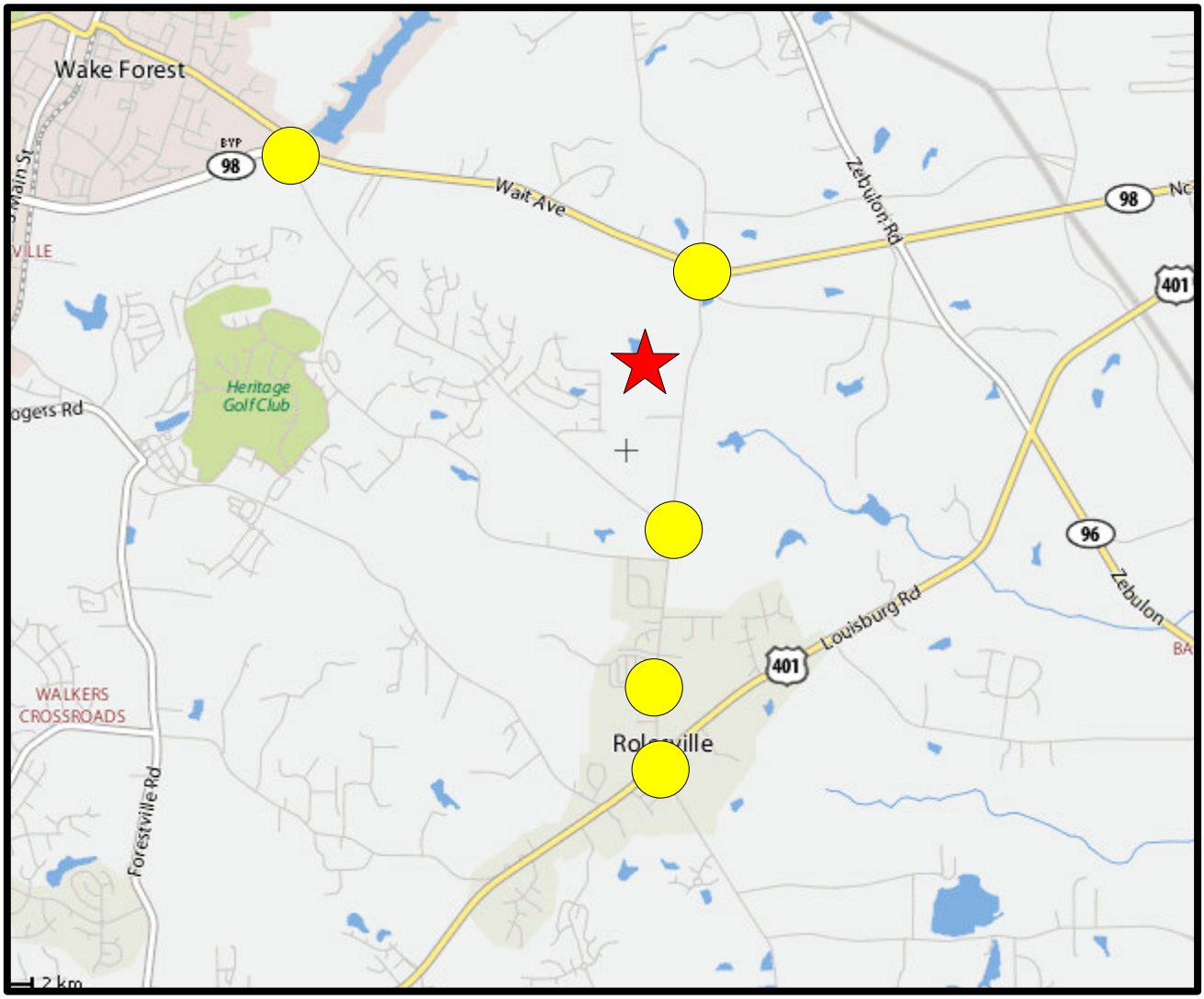
This report summarizes the findings of the Traffic Impact Analysis (TIA) that was conducted for the proposed Averette Farms development in Rolesville, North Carolina. The purpose of the study is to determine the impact to the surrounding roadway network caused by the additional traffic generated by the development. In order to accomplish this objective, the study analyzed existing (2007), background (2014) and combined (2014) traffic conditions during the AM and PM peak hours.

1.1 Site Location and Study Area

The proposed development is located along the west side of Averette Road, between its intersections with Jones Dairy Road (SR 2053) and NC 98 (Wait Avenue) and is approximately 1 ¼ miles west of US 401. Refer to Figure 1 for the site location map.

The study area for this project was determined based on discussions with the Town of Rolesville planning staff. The study intersections for the TIA are as follows:

1) Jones Dairy Road and NC 98 Bypass
2) Averette Road and NC 98 (Wait Avenue)
3) Averette Road and Jones Dairy Road
4) Averette Road and Granite Falls Boulevard
5) Young Street and US 401



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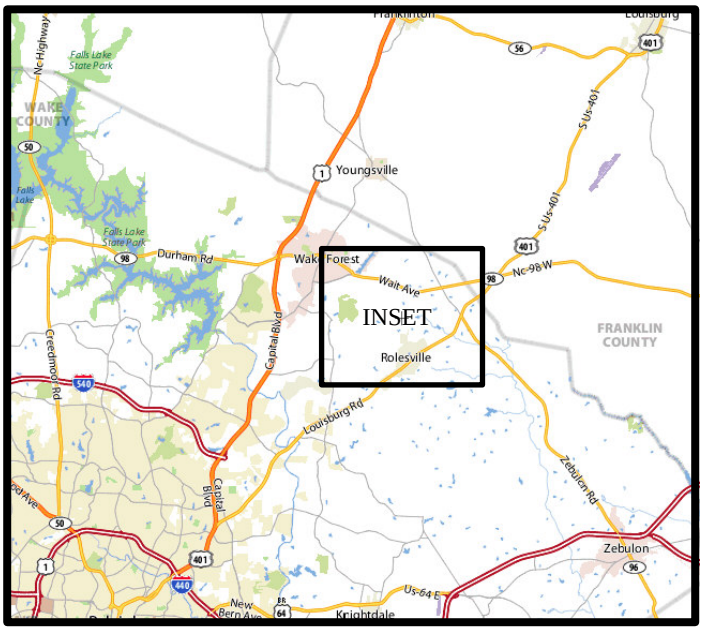

LOCATION MAP

LEGEND

- Off-site Study Intersections
- Site Location

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AVERETTE FARMS DEVELOPMENT
ROLESVILLE, NORTH CAROLINA

Site Location Map

Scale: Not to Scale | Figure 1

1.2 Proposed Land Use and Site Access

Based on the preliminary site plan, the proposed development is expected to consist of approximately 630 single-family homes, 141 townhomes and a neighborhood commercial area on approximately 11.6 acres. Access to the development is currently proposed via two (2) full-movement driveways along NC 98 (Wait Avenue), three (3) full-movement driveways along Averette Road, three (3) full-movement driveways along Jones Dairy Road, and two (2) internal driveway access points to proposed and existing neighborhood streets to the west of the development. The study assumes that the development will be fully built-out in 2014. Refer to Figure 2 for an illustration of the preliminary site plan.

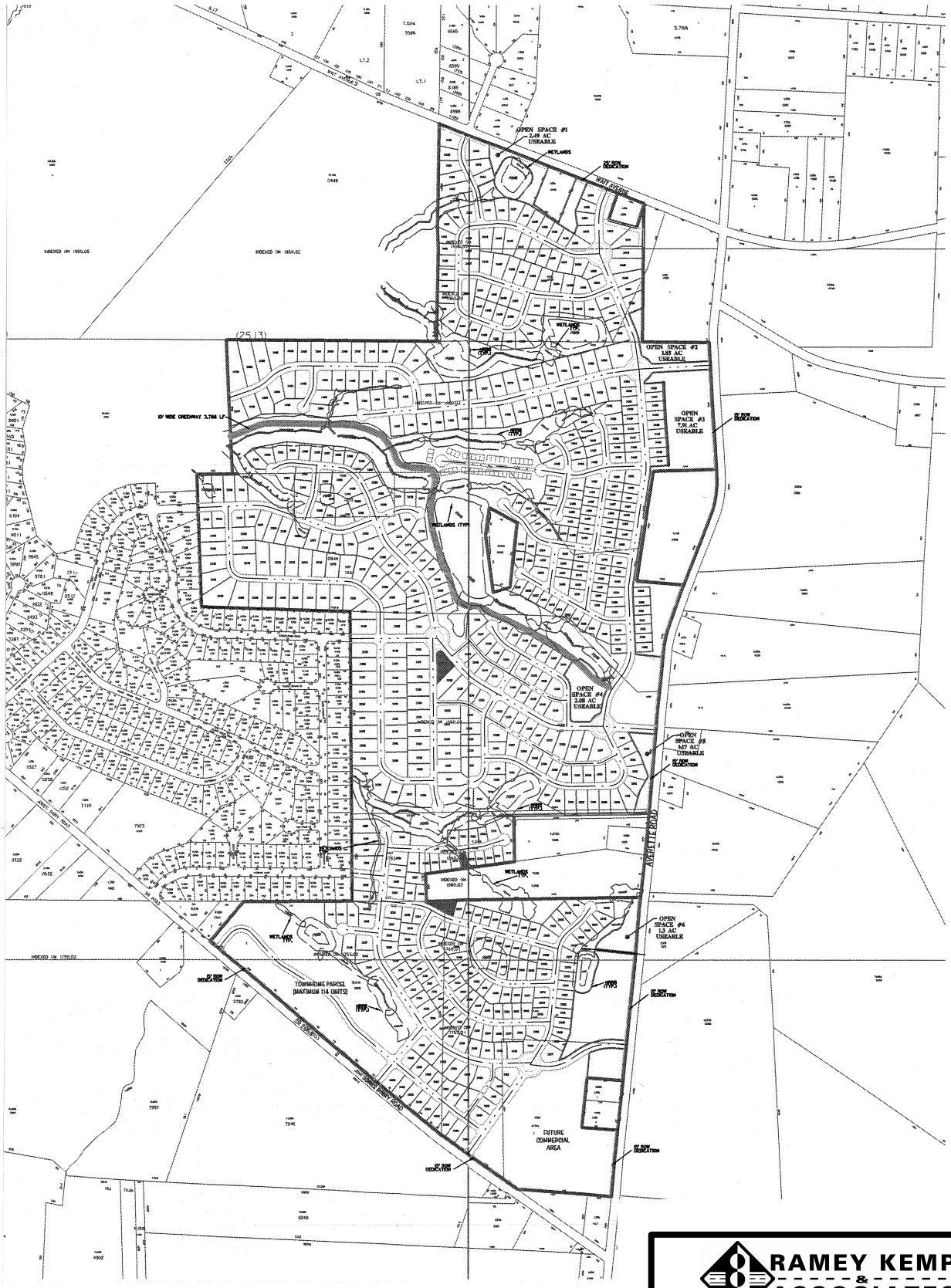
1.3 Existing and Proposed Adjacent Land Uses

Existing development within the vicinity of the proposed site primarily consists of residential housing and scattered small commercial establishments.

Based on discussions with the Town of Rolesville, there are five (5) adjacent developments that shall be included as part of the future traffic conditions. The Averette Ridge subdivision development is located along the south side of Jones Dairy Road in the vicinity of the proposed site. The Bowling Green and Austin Creek residential developments are located between NC 98 and Jones Dairy Road, west of the proposed development. The Gateway Commons Development is located southwest of the intersection of NC 98 bypass and Jones Dairy Road. The Stratford Development is located along the proposed Granite Falls Boulevard south of the proposed development. The adjacent developments are discussed in more detail in Section 4.2.

1.4 Existing and Proposed Roadways

The project study area for this TIA consists of US 401, NC 98 Bypass, Jones Dairy Road, NC 98 (Wait Avenue), Averette Road and Granite Falls Boulevard.



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AVERETTE FARMS DEVELOPMENT
ROLESVILLE, NORTH CAROLINA

Preliminary Site Plan

	Scale: Not to Scale	Figure 2

US 401 is a major north-south route that provides access from northern Wake County and Franklin County to key employment and shopping areas to the south. US 401 is primarily a two-lane facility in the vicinity of the site with a posted speed limit of 35 miles per hour (mph).

NC 98 Bypass is a major east-west route that runs along the southern side of the Town of Wake Forest. It is primarily a four-lane, divided facility in the vicinity of the study area with a posted speed limit that varies from 45 to 55 mph.

Jones Dairy Road is a two-lane facility that runs from NC 98 Bypass to the southeast to Averette Road. It has a posted speed limit of 45 mph.

Wait Avenue (NC 98) is a two-lane facility that connects the NC 98 Bypass to downtown Wake Forest. It has a posted speed limit varying from 45 to 55 mph along its length. Along the frontage of the site, the posted speed limit is 55 mph.

Averette Road is a two-lane facility that connects Wait Avenue (NC 98) to US 401. It has a two-lane cross-section in the vicinity of the study area with a posted speed limit that varies from 45 to 55 mph.

Granite Falls Boulevard is a two-lane road currently under construction between Rogers Road and West Young Street/Averette Road. Granite Falls Boulevard is being constructed as part of the Stratford Development and upon completion is expected to be a two-lane facility. Road construction is expected to be complete before the 2014 buildout date of the Averette Farms Development.

In conjunction with future developments planned in the area, the NC 98 Bypass/Jones Dairy Road intersection is expected to be modified in order to improve traffic flow. No plans are currently available for improvements at the intersection.

RKA collected data on existing lane configurations (number of traffic lanes on each intersection approach), traffic control, lane widths, vehicle storage capacities, sight distances, and other intersection data in conjunction with the traffic counts conducted at each of the study intersections. Refer to Figure 3 for an illustration of the existing lane configurations within the study area.

2. TRAFFIC ANALYSIS PROCEDURE

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.

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 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

3. EXISTING (2007) CONDITIONS

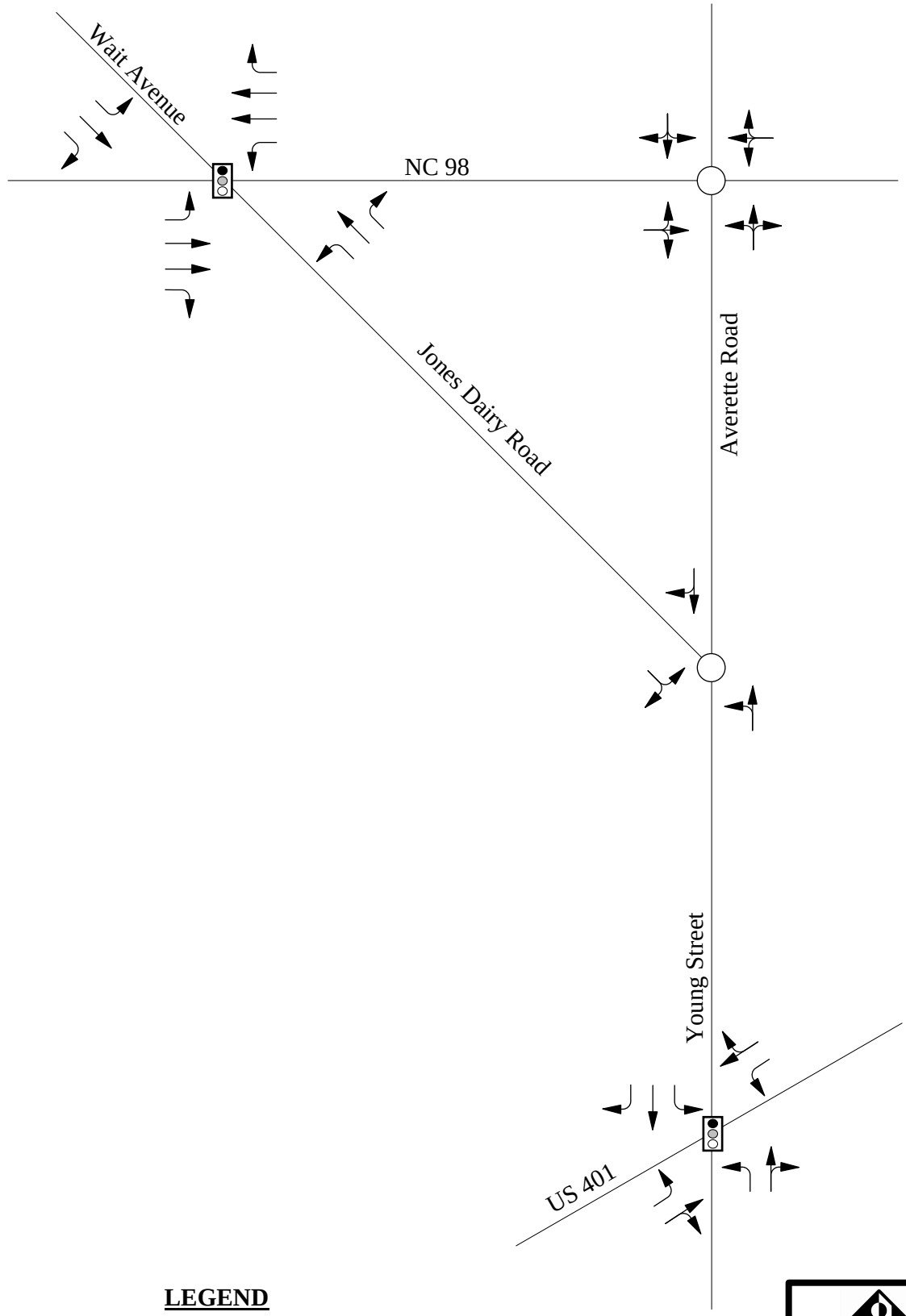
Existing lane configurations (number of traffic lanes on the intersection approach), lane widths, storage capacities, traffic signal data and other intersection and roadway information was collected through field reconnaissance by Ramey Kemp & Associates, Inc. (RKA).

3.1. Existing (2007) Peak Hour Traffic Volumes

Weekday turning movement counts were conducted in May 2007 during the AM (7:00 AM to 9:00 AM) and PM (4:30 PM to 6:30 PM) peak periods at the following intersections:

1) Averette Road and NC 98 (Wait Avenue)
2) Averette Road and Jones Dairy Road
3) Young Street/Averette Road and US 401

A copy of the raw traffic count data is located in Appendix A of this report. Existing count data for the NC 98 Bypass and Jones Dairy Road intersection was recently acquired as part of another project and is also provided in Appendix A. Refer to Figure 4 for the existing (2007) weekday AM and PM peak hour traffic volumes. Signal plans for the existing signalized intersections are provided in Appendix B.



LEGEND

- Unsignalized Intersection
- Signalized Intersection
- Existing Lane Configuration

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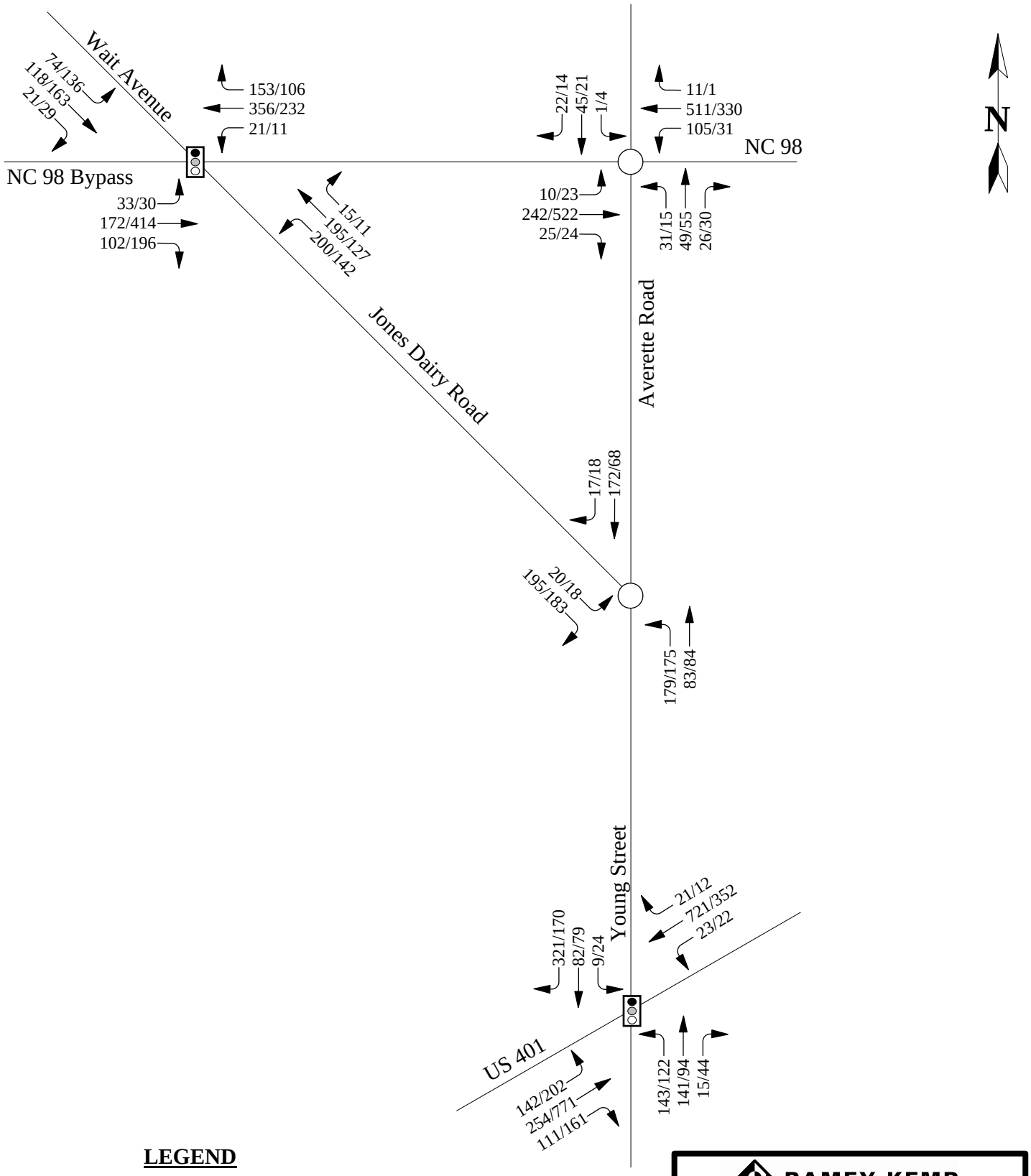
AVERETTE FARMS DEVELOPMENT
ROLESVILLE, NORTH CAROLINA

Existing Lane Configuration

Scale: Not to Scale | Figure 3



LEGEND

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

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ROLESVILLE, NORTH CAROLINA

Existing (2007) Peak Hour Traffic

Scale: Not to Scale | Figure 4

3.2. Analysis of Existing (2007) Peak Hour Traffic Volumes

In order to determine the current levels of service at the study intersections, the existing (2007) traffic volumes were analyzed under existing lane configurations and traffic control conditions. The results of the analyses are presented in Section 7 of this report. Refer to Appendix C for detailed capacity analysis results for existing peak hour conditions.

4. BACKGROUND (2014) TRAFFIC CONDITIONS

In order to account for the growth of traffic and future traffic conditions, traffic projections are needed. The background condition is that component of traffic due to growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed development is constructed.

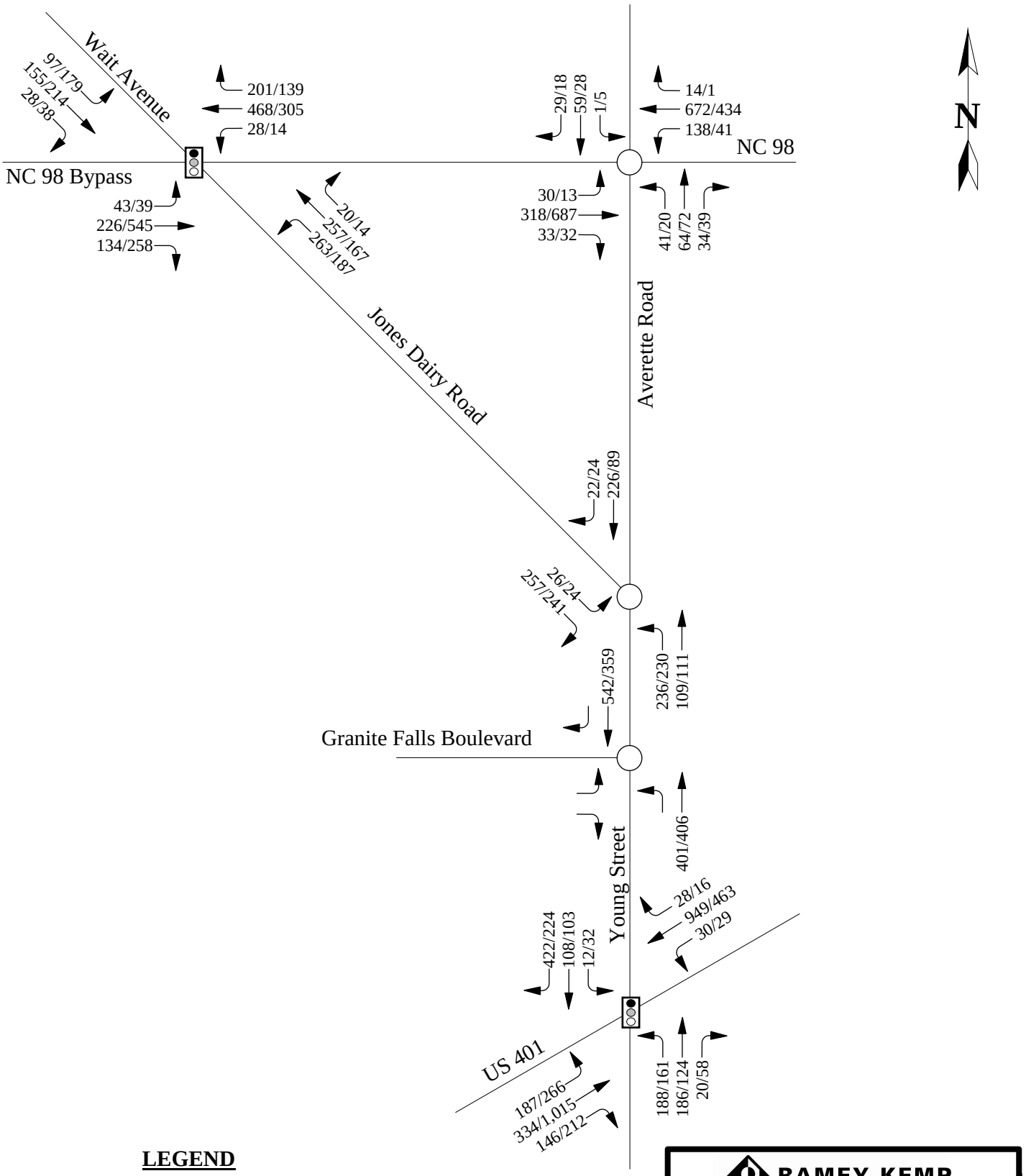
4.1 Projected Traffic

To account for the growth of traffic that is anticipated to occur regardless of the proposed development, the existing traffic volumes (Figure 4) were projected to the year 2014 by applying a compound annual growth rate of 4% to the traffic volumes at the study intersections. The annual growth rate was determined based on discussions with the Town of Rolesville. Refer to Figure 5 for an illustration of the 2014 projected peak hour traffic volumes.

4.2 Approved Adjacent Development Traffic

In addition to the growth rate applied to existing traffic, based on discussions with the Town of Rolesville, traffic from the following adjacent developments shall also be considered in the study:

1. Averette Ridge Residential Development
2. Austin Creek Residential Development
3. Bowling Green Residential Development
4. Gateway Commons Development
5. Stratford Development



LEGEND

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

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ROLESVILLE, NORTH CAROLINA

Projected 2014 Peak Hour Traffic

Scale: Not to Scale | Figure 5

The Averette Ridge residential development is proposed to consist of 149 single-family homes and is located along the south side of Jones Dairy Road, just west of the proposed development. The development is expected to be fully built-out in 2010.

The Austin Creek residential development is proposed to consist of approximately 700 single-family homes and is located between Wait Avenue (NC 98) and Jones Dairy Road, west of the proposed development. The development is expected to be fully built-out in 2012. It should be noted that a review of the TIA conducted for the Austin Creek development indicates that the construction of a separate right-turn lane along Jones Dairy Road at Averette Road and a separate left-turn lane along Averette Road at Jones Dairy Road is recommended as part of the development.

The Bowling Green residential development is proposed to consist of approximately 281 single-family homes and 67 townhomes and is located between Wait Avenue (NC 98) and Jones Dairy Road, west of the proposed development. The development is expected to be fully built-out in 2012.

The Gateway Commons development is a large commercial development located along the south side of the NC 98 Bypass, east of Jones Dairy Road. The development is proposed to be constructed in three phases with full build-out expected in 2013. It should be noted that, based on a review of the TIA conducted for the development, it is anticipated that an additional left-turn lane will be constructed along northbound Jones Dairy Road at the NC 98 Bypass, as well as an additional left-turn lane along the eastbound NC 98 Bypass.

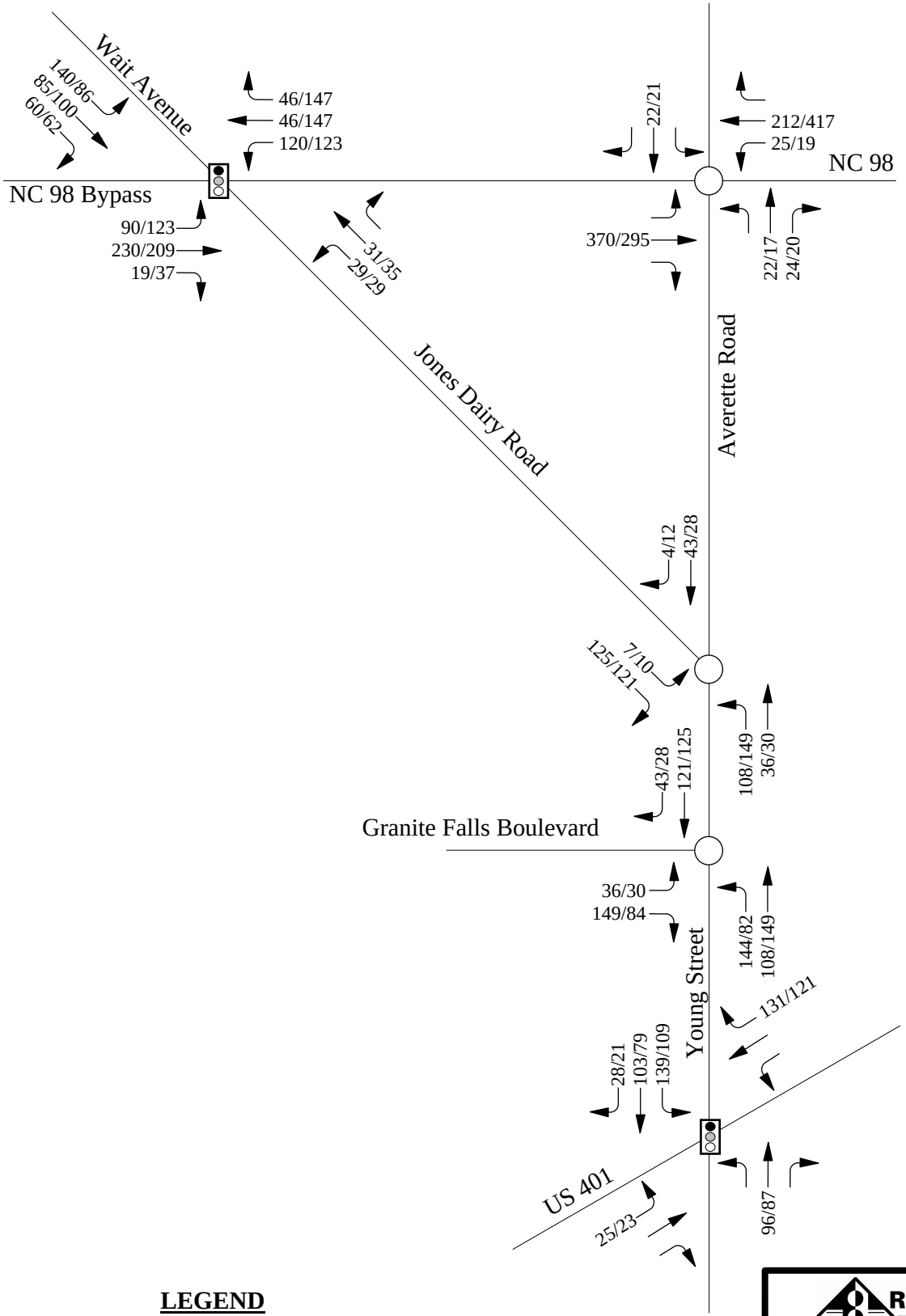
The Stratford development is a mixed-use development located along the proposed Granite Falls Development between Young Street and Rogers Road. The development is expected to be fully built-out in 2009. It should be noted that, based on a review of the TIA conducted for the development, it is anticipated that an additional left-turn lane will be constructed along northbound Young Street at Granite Falls Boulevard, and that the eastbound approach of Granite Falls Boulevard to Young Street will be constructed with separate left-turn and right-turn lanes.

For the purpose of the study, all of the adjacent developments are expected to be fully built-out by the subject development build-out year of 2014. Anticipated site traffic from all of the adjacent developments was assigned to study intersections based on the Traffic Impact Analyses conducted for each of the developments. Where adjacent development traffic was not specifically assigned to intersections included in this study, traffic was distributed based on area population and employment centers, retail establishments, and engineering judgment. Refer to Figure 6 for an illustration of the adjacent development site traffic and Appendix B for adjacent development data for all adjacent developments.

The total adjacent development traffic (Figure 6) was added to the projected (2014) traffic volumes (Figure 5) to obtain the background (2014) peak hour traffic volumes, as illustrated in Figure 7.

4.3. Analysis of Background (2014) Peak Hour Traffic Volumes

In order to determine the levels of service at the study intersections under background (2014) conditions, the background traffic volumes were analyzed using the lane configurations and traffic control conditions noted under the description for each intersection in Section 7. Some improvements are necessary under the background traffic conditions due to the high adjacent development traffic volumes and the additional background traffic growth expected. The results of the analyses are presented in Section 7 of this report. Refer to Appendix D for detailed capacity analysis results for background (2014) peak hour conditions.



LEGEND

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

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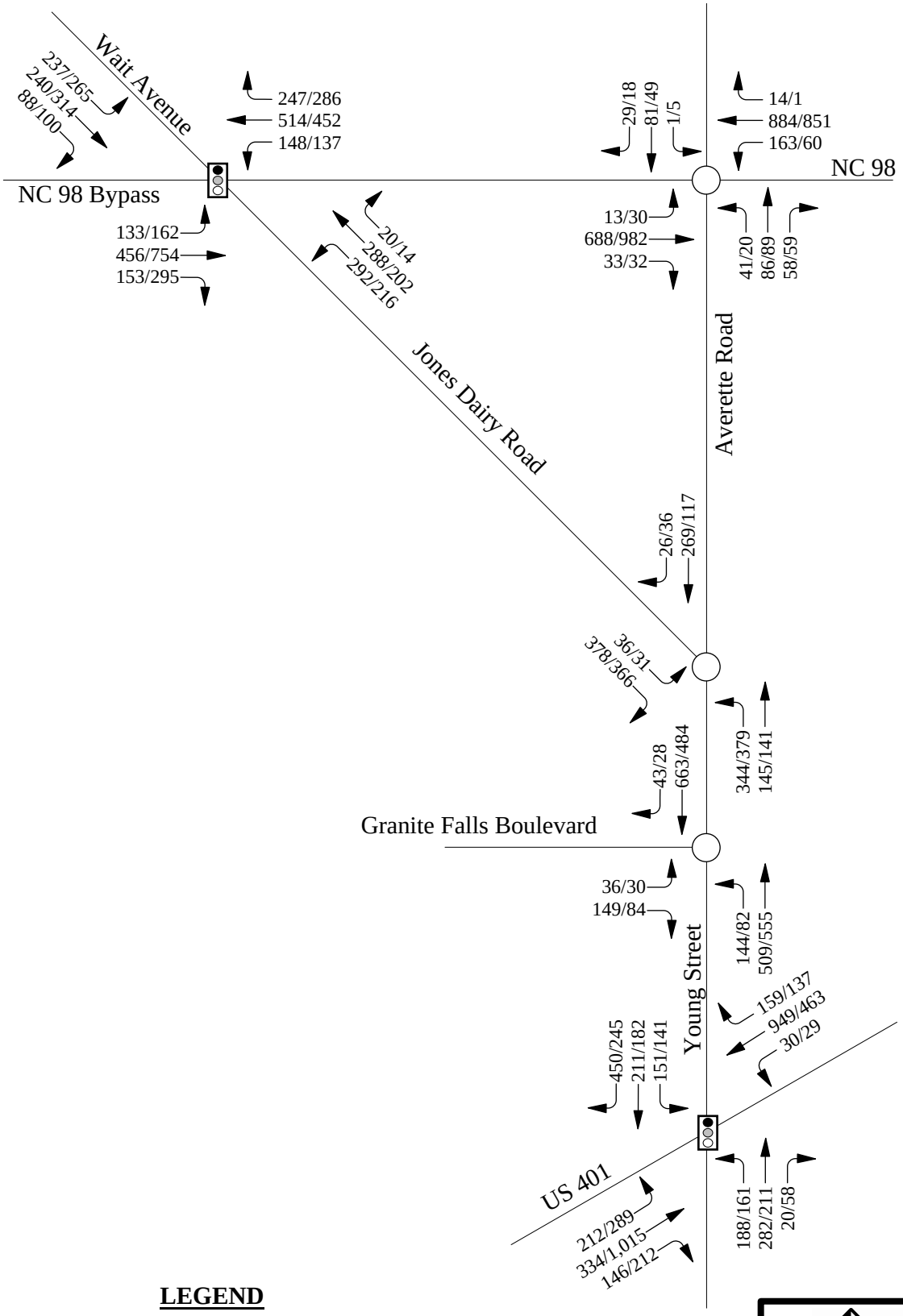
ROLESVILLE, NORTH CAROLINA

Adjacent Development Traffic

Scale: Not to Scale | Figure 6



LEGEND

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

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ROLESVILLE, NORTH CAROLINA

Background (2014) Peak Hour Traffic

Scale: Not to Scale | Figure 7

5. TRIP GENERATION

Average weekday daily, AM peak hour and PM peak hour site trips for the proposed development were calculated utilizing methodology contained within the Institute of Transportation Engineers (ITE) *Trip Generation* manual, 7th Edition. Based on the preliminary site plan, the proposed development is expected to consist of approximately 630 single-family homes, 141 townhomes and a neighborhood commercial area on approximately 11.6 acres. For the purpose of the study, it was assumed that approximately 10,000 square feet of commercial space could be developed per acre. Thus, for trip generation purposes, a total of 116,000 square feet of commercial space was utilized. The site is expected to be fully built out by 2014.

It is expected that some trips generated by the commercial and residential land uses will travel between each other without accessing external roadways outside the boundaries of the proposed development. These trips, called internal capture trips, reduce the number of trips that the site generates on the external roadway network. It was assumed for the study that ten percent of the neighborhood commercial trips will travel to/from the residential component of the proposed development. As a result, the internal trips are subtracted from the total trips generated by the proposed development. Refer to Table 2 for the trip generation for the proposed development.

A portion of the site trips will be pass-by trips. Pass-by trips are trips that are attracted from the traffic on the adjacent roadways and do not add to the existing traffic volumes. ITE pass-by rates were applied to retail trips along NC 133 and Mallory Creek Drive during the PM peak hour. Because retail development has access onto Averette Road and Jones Dairy Road, the calculation of pass-by rates was conducted separately for each road. However, in order to be conservative, pass-by trips were limited to 10% of background (2014) traffic volumes along the adjacent streets. Refer to Table 2 for a breakdown of pass-by trips for the development.

TABLE 2
Site Trip Generation

ITE Land Use (Code)	Size	Average Daily Traffic (vpd)	AM Peak Hour (vph)		PM Peak Hour (vph)	
			Entering	Exiting	Entering	Exiting
Single-Family Detached (210)	630 d.u	5,654	113	337	354	208
Residential Townhouse (230)	141 d.u.	860	12	56	54	26
Shopping Center (820)	116,000 s.f.	7,479	104	67	331	359
Subtotal		**13,993**	**229**	**460**	**739**	**593**
Internal Capture Reduction						
Single-Family Detached (210)		-565	0	0	-28	-28
Residential Townhouse (230)		-86	0	0	-4	-4
Shopping Center (820)		-748	0	0	-35	-34
Internal Capture Total	**10%**	**-1,399**	**0**	**0**	**-67**	**-66**
Pass-By Capture Reduction						
Shopping Center (820)	34%	211	0	0	106	105
Averette Road Portion of Pass-By	47%	99	0	0	50	49
10% of Existing Averette Road Traffic		19	0	0	9	10
Jones Dairy Road Portion of Pass-By	53%	112	0	0	56	56
10% of Existing Jones Dairy Road Traffic		39	0	0	20	19
Pass-By Capture Total		**-58**	**0**	**0**	**-29**	**-29**
Primary Trips		**12,536**	**229**	**460**	**643**	**498**

5.1 Trip Distribution and Assignment

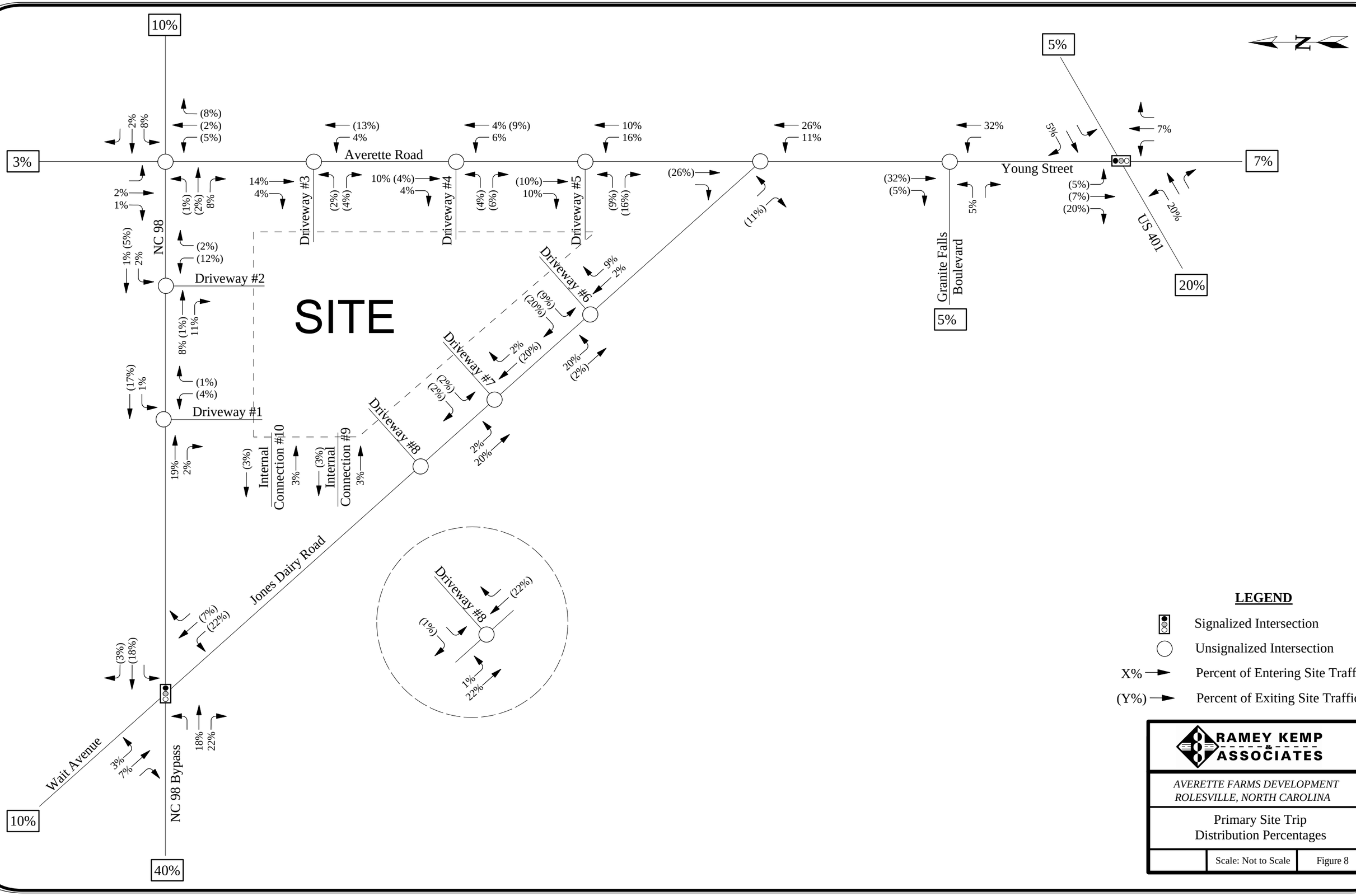
The primary trip distribution percentages used for the proposed development were determined based on existing development around the site, employment centers, existing traffic patterns and engineering judgment. The primary trip distribution percentages are illustrated in Figure 8 and are as follows:

- 40% to/from the west along NC 98
- 10% to/from the north along Wait Avenue
- 3% to/from the north along Averette Farms Road
- 10% to/from the east along NC 98
- 5% to/from the east along US 401
- 20% to/from the west along US 401
- 7% to/from the south along Young Street
- 10% to/from the west along Granite Falls Boulevard

Primary site trips presented in Table 2 were assigned to study intersections based on the distribution percentages shown in Figure 8. Refer to Figure 9 for the weekday AM and PM peak hour primary assignment volumes.

Pass-by site trip distribution percentages were determined based on existing traffic patterns and engineering judgment. Refer to Figure 10 for the pass-by trip distribution percentages. The pass-by site trips presented in Table 2 were assigned to the study intersections based on the pass-by distribution percentages shown in Figure 10. Refer to Figure 11 for an illustration of the total weekday PM peak hour pass-by site trips.

The primary site trips (Figure 9) and pass-by site trips (Figure 11) were combined to determine the total site trip assignment at each of the study intersections. Refer to Figure 12 for the total site trip assignment at the study intersections. The site trip assignments at the site driveways were primarily determined based on the location of the various land uses on the site and the anticipated direction of travel.



LEGEND

- Signalized Intersection
- Unsignalized Intersection
- X% → Percent of Entering Site Traffic
- (Y%) → Percent of Exiting Site Traffic

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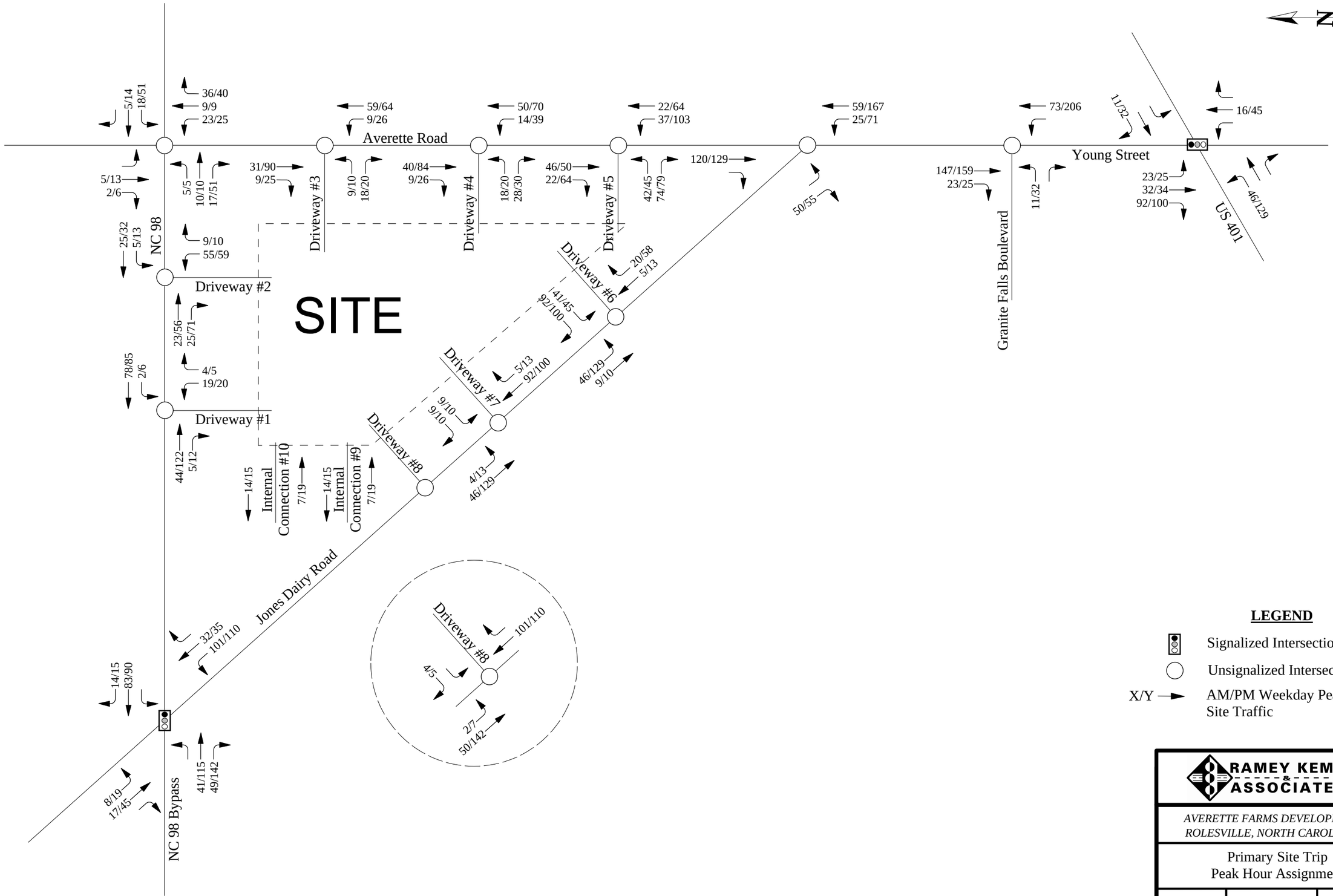
ROLESVILLE, NORTH CAROLINA

Primary Site Trip Distribution Percentages

Scale: Not to Scale | Figure 8



LEGEND

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

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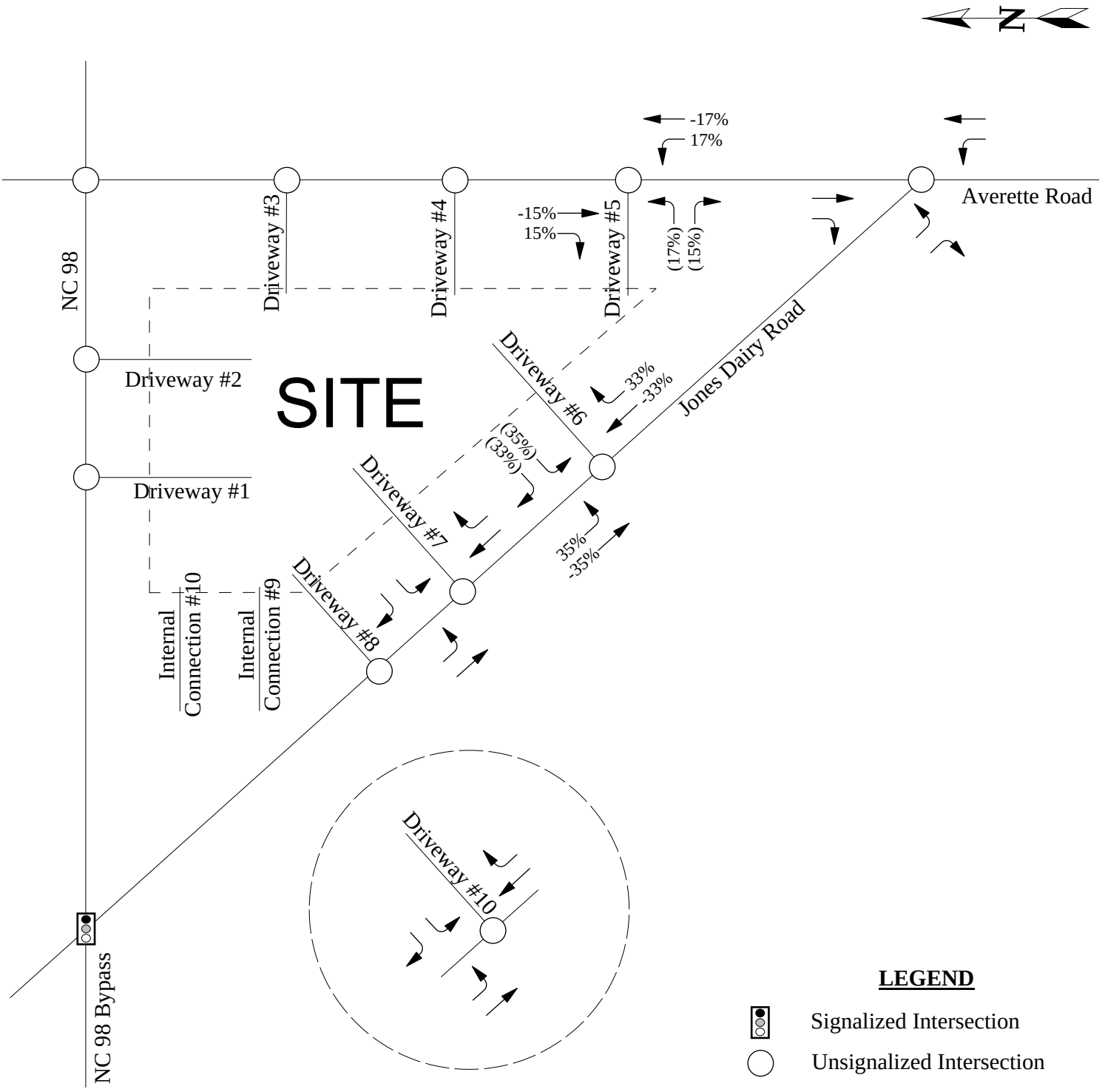
ROLESVILLE, NORTH CAROLINA

Primary Site Trip
Peak Hour Assignment

Scale: Not to Scale | Figure 9



LEGEND

- Signalized Intersection
- Unsignalized Intersection
- X% → Percent of Entering Site Traffic
- (Y%) → Percent of Exiting Site Traffic

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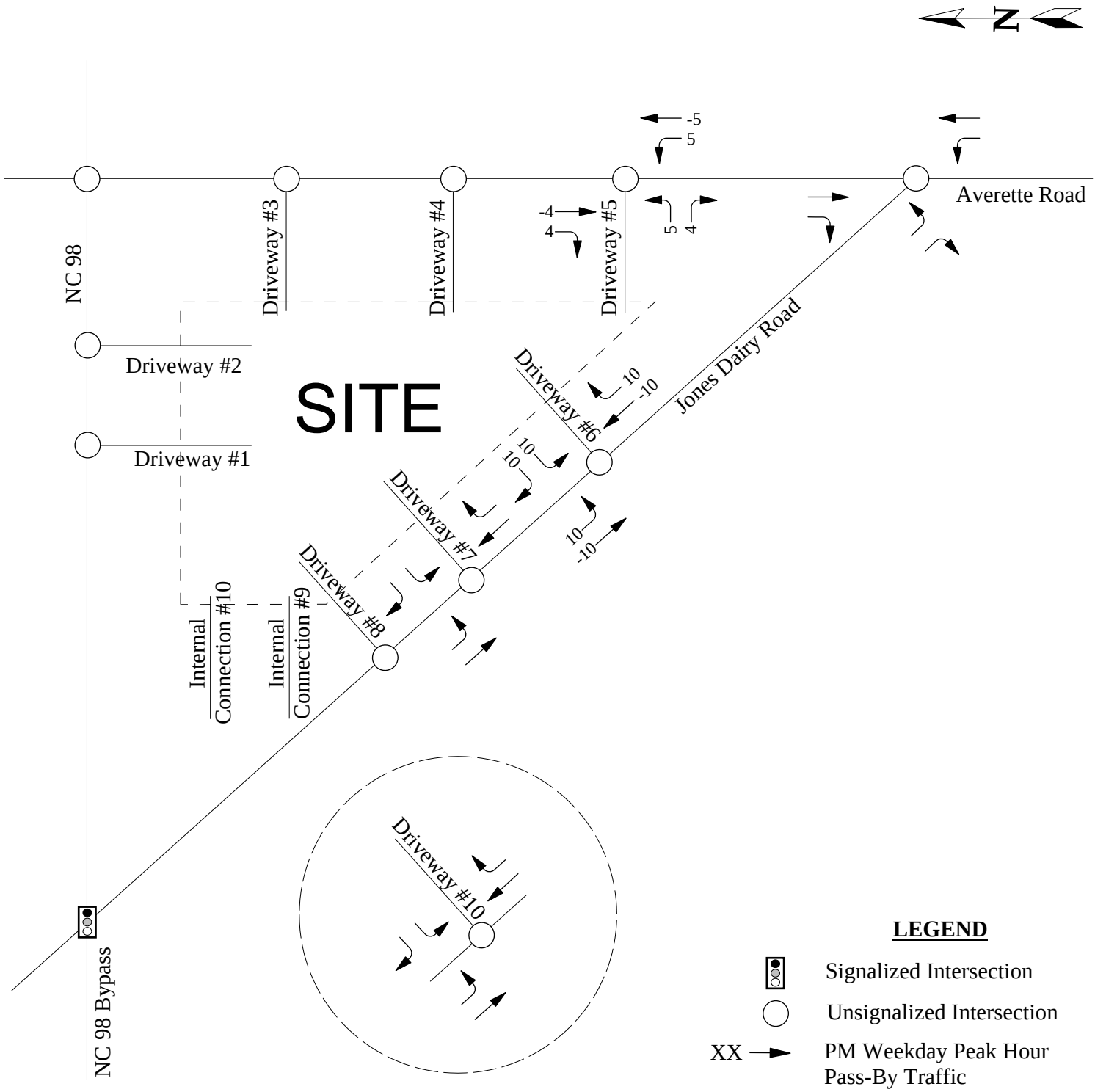
ROLESVILLE, NORTH CAROLINA

Pass-By Distribution Percentages

Scale: Not to Scale | Figure 10



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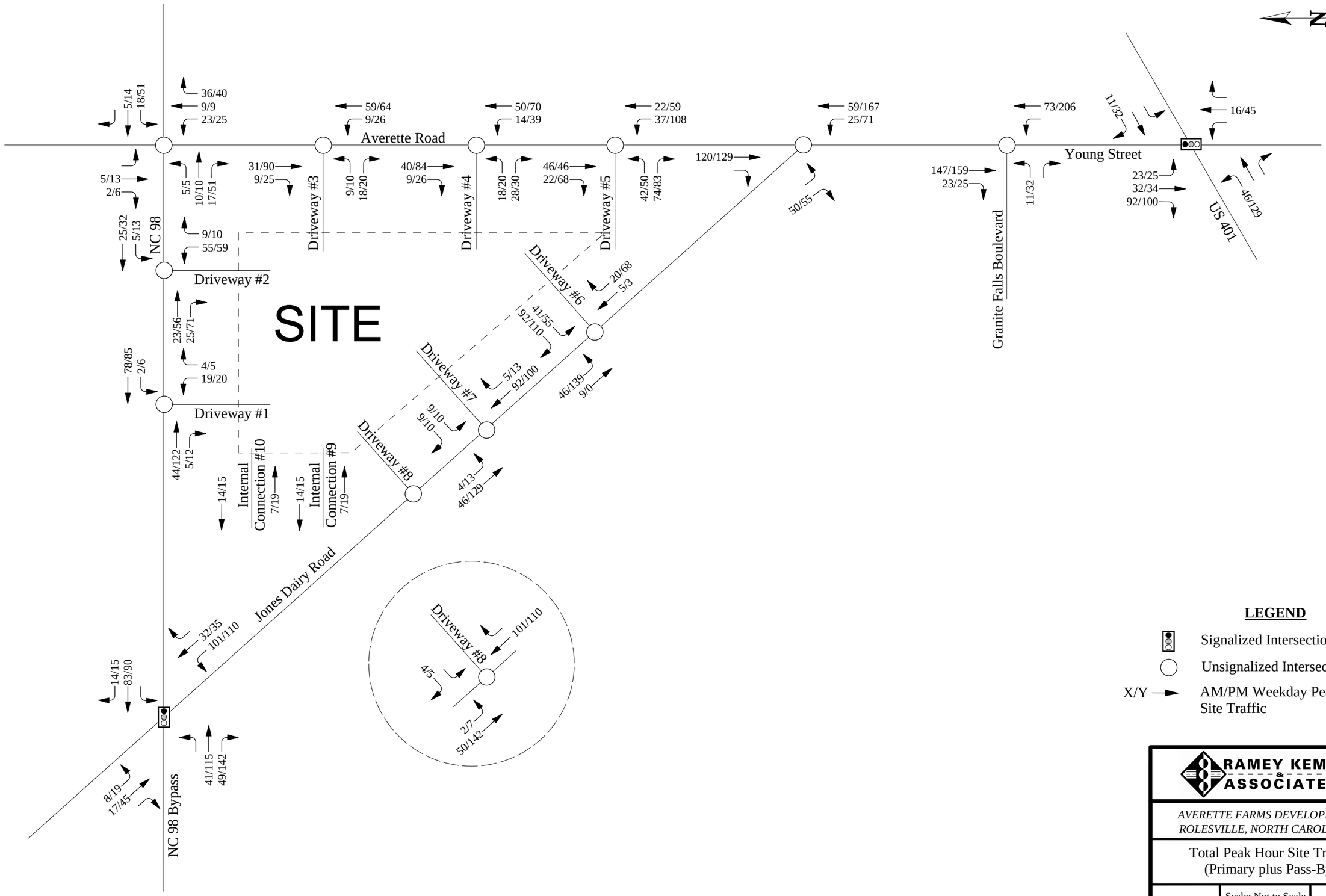
ROLESVILLE, NORTH CAROLINA

PM Peak Hour Pass-By Assignment

Scale: Not to Scale | Figure 11



LEGEND

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

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ROLESVILLE, NORTH CAROLINA

Total Peak Hour Site Traffic
(Primary plus Pass-By)

Scale: Not to Scale | Figure 12

6. COMBINED (2014) TRAFFIC CONDITIONS

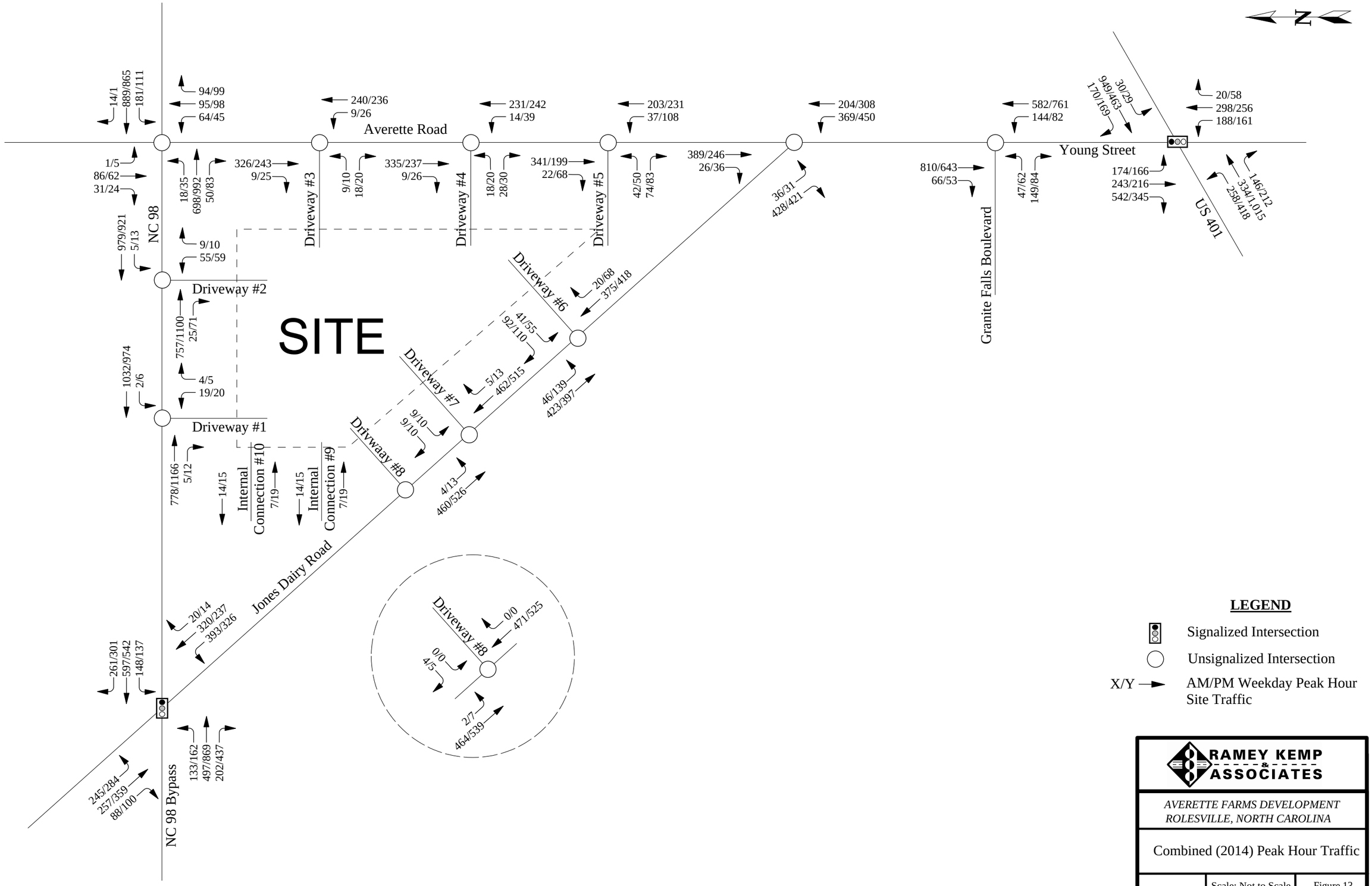
The total site traffic for the proposed development (Figure 12) was combined with the background (2014) traffic volumes (Figure 7) to determine the combined (2014) traffic conditions upon full build-out of the proposed development. Refer to Figure 13 for an illustration of the combined (2014) traffic conditions at the study intersections.

6.1. Analysis of Combined (2014) Peak Hour Traffic Volumes

Based on the results of this report, traffic impacts due to the proposed development are expected to necessitate roadway geometry and traffic control improvements in order to meet acceptable level of service requirements. Those improvements are discussed in more detail in Section 7 of this report.

The combined (2014) traffic conditions were analyzed to determine impacts in the study area due to the construction of the proposed development. The study intersections were analyzed using the same methodology as noted for existing and background traffic conditions, with the geometric configurations and traffic control under background conditions plus any improvements required under combined conditions.

The results of these analyses are presented in Section 7 of this report. Refer to Appendix E for detailed capacity analysis results for combined (2014) peak hour conditions.



LEGEND

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

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ROLESVILLE, NORTH CAROLINA

Combined (2014) Peak Hour Traffic

Scale: Not to Scale | Figure 13

7. CAPACITY ANALYSIS

7.1. NC 98 Bypass and Jones Dairy Road

The intersection of NC 98 Bypass and Jones Dairy Road was analyzed under existing, conditions with the lane configurations shown in Figure 3. As noted previously, a review of the TIA conducted for the proposed Gateway Commons development indicates that it is likely that an additional left-turn lane will be constructed along the eastbound and northbound approaches of the intersection, thus the improved lane configuration was used for both background and combined traffic condition analyses. Refer to Table 3 for a summary of the intersection LOS analysis.

TABLE 3
Analysis Summary of NC 98 Bypass and Jones Dairy Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Existing (2007) Traffic Conditions (Signalized)	EB WB NB SB	1 LT, 2 TH, 1 RT 1 LT, 2 TH, 1 RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	A A A A	**A**	A A B A	**A**
Background (2014) Traffic Conditions without Improvements (Signalized)	EB WB NB SB	**2 LT**, 2 TH, 1 RT 1 LT, 2 TH, 1 RT **2 LT**, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	C C C C	**C**	C B D C	**C**
Combined (2014) Traffic Conditions without Improvements (Signalized)	EB WB NB SB	**2 LT**, 2 TH, 1 RT 1 LT, 2 TH, 1 RT **2 LT**, 1 TH, 1 RT 1 LT, 1 TH, 1 RT	C C D C	**C**	C C D C	**C**

*Improvements denoted in **BOLD**

Based on the existing traffic conditions, the intersection currently operates at an overall LOS 'A' during the AM and PM peak hours, with all approaches operating at LOS 'B' or better.

Under both background (2014) and combined (2014) conditions, the intersection is expected to operate at an overall LOS 'C' during the AM and PM peak hours, with all approaches operating at LOS 'D' or better. It should be noted that the analyses include the

improvements noted as part of the adjacent Gateway Commons development.

7.2. NC 98 (Wait Avenue) and Averette Road

The intersection of NC 98 (Wait Avenue) and Averette Road was analyzed under existing, background (2014) and combined (2014) traffic conditions with the lane configurations shown in Figure 3. Refer to Table 4 for a summary of the intersection LOS analysis.

TABLE 4
Analysis Summary of NC 98 (Wait Avenue) and Averette Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Existing (2007) Traffic Conditions (Unsignalized)	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A[1] A[1] F[2] D[2]	**N/A**	A[1] A[1] D[2] C[2]	**N/A**
Background (2014) Traffic Conditions (Unsignalized)	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A[1] A[1] F[2] F[2]	**N/A**	A[1] A[1] F[2] F[2]	**N/A**
Combined (2014) Traffic Conditions (Unsignalized)	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A[1] A[1] F[2] F[2]	**N/A**	A[1] A[1] F[2] F[2]	**N/A**

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

Under existing conditions, the eastbound and westbound approaches of NC 98 (Wait Avenue) operate at LOS ‘A’ during both the AM and PM peak hours. The northbound approach of Averette Road operates at LOS ‘F’ during the AM peak hour and LOS ‘D’ during the PM peak hour. The southbound approach of Averette Road operates at LOS ‘D’ during the AM peak hour and LOS ‘C’ during the PM peak hour.

Both approaches of NC 98 (Wait Avenue) are expected to continue to operate at LOS ‘A’ during the AM and PM peak hours based on background (2014) and combined (2014) traffic

conditions. Both approaches of Averette Road are expected to operate at LOS 'F' during the AM and PM peak hours.

It is typical for a stop-controlled minor street approach at a thoroughfare to operate at a poor LOS during the peak hours. The addition of turn lanes would generally not improve the overall operation or reduce the delays experienced by the minor-street traffic. It is recommended that the intersection volumes be monitored in the future to determine the feasibility of installing a traffic signal.

7.3. Averette Road and Jones Dairy Road

The intersection of Averette Road and Jones Dairy Road was analyzed under existing, traffic conditions with the lane configurations shown in Figure 3. Refer to Table 5 for a summary of the intersection LOS analysis.

TABLE 5
Analysis Summary of Averette Road and Jones Dairy Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Existing (2007) Traffic Conditions (Signalized)	NB SB EB	1 LT-TH 1 TH-RT 1 LT-RT	A[1] - B[2]	**N/A**	A[1] - B[2]	**N/A**
Background (2014) Traffic Conditions (Signalized)	NB SB EB	**1 LT**, 1 TH 1 TH-RT 1 LT, **1 RT**	A[1] - C[2]	**N/A**	A[1] - B[2]	**N/A**
Combined (2014) Traffic Conditions (Signalized)	NB SB EB	**1 LT**, 1 TH 1 TH-RT 1 LT, **1 RT**	B[1] - D[2]	**N/A**	A[1] - C[2]	**N/A**

*Improvements denoted in **BOLD**
1. Level of service for left turn movement on major approach.
2. Level of service for minor approach.

Under existing conditions, all approaches operate at LOS B or better during both the AM and PM peak hours.

As indicated previously, the review of the TIA conducted for an adjacent development indicates that the construction of a separate right-turn lane along eastbound Jones Dairy Road and a separate left-turn lane along northbound Averette Road is recommended. Since the anticipated build-out for the development is 2012, the analyses for the subject development, based on the background (2014) and combined (2014) traffic conditions, assume that these improvements are in place.

Under both background (2014) and combined (2014) traffic conditions, each of the intersection approaches is expected to operate at LOS 'D' or better during both the AM and PM peak hours.

7.4. Young Street and US 401

The intersection of Young Street and US 401 was analyzed under existing, background (2014) and combined (2014) traffic conditions with the lane configurations shown in Figure 3. Refer to Table 6 for a summary of the intersection LOS analysis.

Under existing conditions, the intersection operates at an overall LOS 'C' or better during both the AM and PM peak hours. All intersection approaches operate at LOS 'D' or better during both the AM and PM peak hours.

Under the background (2014) conditions, the intersection is expected to operate at an overall LOS 'F' in the AM peak hour and LOS 'E' in the PM peak hour. The northbound intersection approach is expected to operate at LOS 'E' during both the AM and PM peak hours. The southbound intersection approach is expected to operate at LOS 'E' in the AM peak hour and LOS 'D' in the PM peak hour. The eastbound intersection approach is expected to operate at LOS 'D' in the AM peak hour and LOS 'E' in the PM peak hour. The westbound intersection approach is expected to operate at LOS 'F' in the AM peak hour and LOS 'C' in the PM peak hour.

TABLE 6
Analysis Summary of Young Street and US 401

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Existing (2007) Traffic Conditions (Signalized)	NB SB EB WB	1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	D C A C	**C**	C C B B	**B**
Background (2014) Traffic Conditions (Signalized)	NB SB EB WB	1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	E E D F	**F**	E D E C	**E**
Combined (2014) Traffic Conditions (Signalized)	NB SB EB WB	1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	E F E F	**F**	D D F E	**F**

Under the combined (2014) conditions, the intersection is expected to operate at an overall LOS 'F' during both the AM and PM peak hours. The northbound intersection approach is expected to operate at LOS 'E' in the AM peak hour and LOS 'D' in the PM peak hour. The southbound intersection approach is expected to operate at LOS 'F' in the AM peak hour and LOS 'D' in the PM peak hour. The eastbound intersection approach is expected to operate at LOS 'E' in the AM peak hour and LOS 'F' in the PM peak hour. The westbound intersection approach is expected to operate at LOS 'F' in the AM peak hour and LOS 'E' in the PM peak hour.

Despite excessive delays projected at this intersection, no improvements are recommended due to right-of-way constraints. According to the 2002 Rolesville Transportation Plan, an extension of Jones Dairy Road is planned that will intersect US 401. When this roadway link is constructed, it is likely that a significant amount of traffic will divert from Young Street to the Jones Diary Road extension in order to access US 401. Also included in the transportation plan is the proposed US 401 Bypass, which, once constructed, will

significantly reduce the traffic along US 401. It is expected that both of these projects will result in lower traffic demand and ultimately improve traffic operations at the intersection of US 401 and Young Street.

7.5. Averette Road and Granite Falls Boulevard

The intersection of Averette Road and Granite Falls Boulevard was analyzed under background (2014) and combined (2014) traffic conditions with the lane configurations recommended in the Stratford Development TIA. Refer to Table 7 for a summary of the intersection LOS analysis.

Under background (2014) conditions, all intersection approaches are expected to operate at LOS 'D' or better during both the AM and PM peak hours.

Under combined (2014) conditions, the eastbound approach is expected to operate at LOS 'F' during both the AM and PM peak hours. The northbound approach is expected to operate at LOS 'B' or better during both the AM and PM peak hours.

TABLE 7
Analysis Summary of Averette Road and Granite Falls Boulevard

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Background (2014) Traffic Conditions (Unsignalized)	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	D[2] B[1] -	**N/A**	C[2] A[1] -	**N/A**
Combined (2014) Traffic Conditions (Unsignalized)	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	F[2] B[1] -	**N/A**	F[2] A[1] -	**N/A**

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

It is typical for a stop-controlled minor-street approach to operate at LOS 'F' during the peak

hours. Typically, only signalization would provide an acceptable LOS however, it is not expected that the volumes at the intersection would satisfy the warrant criteria.

7.6. NC 98 and Driveway #1

The intersection of NC 98 and Driveway #1 was analyzed under combined (2014) conditions with an exclusive westbound left-turn lane and separate left-turn and right-turn lanes on the northbound approach. This lane configuration is shown in Figure 14. Refer to Table 8 for a summary of the intersection LOS analysis.

TABLE 8
Analysis Summary of NC 98 and Driveway #1

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
NC 98 (Wait Avenue) and Site Drive #1 (Unsignalized)	EB WB NB	1 TH-RT 1 LT,1 TH 1 TH, 1 RT	- A[1] F[2]	**N/A**	- A[1] F[2]	**N/A**

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

Under combined (2014) conditions, the westbound approach is expected to operate at LOS 'A' during both the AM and PM peak hours. The northbound approach is expected to operate at LOS 'F' during both the AM and PM peak hours.

It is typical for a stop-controlled minor street approach at a thoroughfare to operate at a poor LOS during the peak hours. Typically, only signalization would provide an acceptable LOS however, it is not expected that the volumes at the intersection would satisfy the warrant criteria. In addition, maintaining the traffic flow along a key arterial such as NC 98 is important, particularly during the AM and PM peak hours.

7.7. NC 98 and Driveway #2

The intersection of NC 98 and Driveway #2 was analyzed under combined (2014) conditions with an exclusive westbound left-turn lane, an exclusive eastbound right-turn lane, and separate left-turn and right-turn lanes on the northbound approach. This lane configuration is shown in Figure 14. Refer to Table 9 for a summary of the intersection LOS analysis.

TABLE 9
Analysis Summary of NC 98 and Driveway #2

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
NC 98 (Wait Avenue) and Site Drive #2 (Unsignalized)	EB WB NB	1 TH, 1 RT 1 LT, 1 TH 1 TH, 1 RT	- A[1] F[2]	**N/A**	- A[1] F[2]	**N/A**

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

Under combined (2014) conditions, the westbound approach is expected to operate at LOS 'A' during both the AM and PM peak hours. The northbound approach is expected to operate at LOS 'F' during both the AM and PM peak hours.

It is typical for a stop-controlled minor street approach at a thoroughfare to operate at a poor LOS during the peak hours. Typically, only signalization would provide an acceptable LOS however, it is not expected that the volumes at the intersection would satisfy the warrant criteria. In addition, maintaining the traffic flow along a key arterial such as NC 98 is important, particularly during the AM and PM peak hours.

7.8. Averette Road and Driveway #3

The intersection of Averette Road and Driveway #3 was analyzed under combined (2014) conditions with an exclusive northbound left-turn lane and a shared left-turn/right-turn lane on the eastbound approach. This lane configuration is shown in Figure 14. Refer to Table 10 for a summary of the intersection LOS analysis.

TABLE 10

Analysis Summary of Averette Road and Driveway #3

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Averette Road and Site Drive #3 (Unsignalized)	EB NB SB	1 LT-RT 1 LT, 1 TH 1 TH-RT	B[2] A[1] -	**N/A**	B[2] A[1] -	**N/A**

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

Under combined (2014) conditions, all intersection approaches are expected to operate at LOS B or better during both the AM and PM peak hours.

7.9. Averette Road and Driveway #4

The intersection of Averette Road and Driveway #4 was analyzed under combined (2014) conditions with an exclusive northbound left-turn lane and separate left-turn and right-turn lanes on the eastbound approach. This lane configuration is shown in Figure 14. Refer to Table 11 for a summary of the intersection LOS analysis.

TABLE 11
Analysis Summary of Averette Road and Driveway #4

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Averette Road and Site Drive #4 (Unsignalized)	EB NB SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	B[2] A[1] -	**N/A**	B[2] A[1] -	**N/A**

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

Under combined (2014) conditions, all intersection approaches are expected to operate at

LOS B or better during both the AM and PM peak hours.

7.10. Averette Road and Driveway #5

The intersection of Averette Road and Driveway #5 was analyzed under combined (2014) conditions with an exclusive northbound left-turn lane, an exclusive southbound right-turn lane, and separate left-turn and right-turn lanes on the eastbound approach. This lane configuration is shown in Figure 14. Refer to Table 12 for a summary of the intersection LOS analysis.

TABLE 12
Analysis Summary of Averette Road and Driveway #5

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Averette Road and Site Drive #5 (Unsignalized)	EB NB SB	1 LT,1 RT 1 LT, 1 TH 1 TH, 1 RT	B[2] A[1] -	N/A	B[2] A[1] -	N/A

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

Under combined (2014) conditions, all intersection approaches are expected to operate at LOS B or better during both the AM and PM peak hours.

7.11. Jones Dairy Road and Driveway #6

The intersection of Jones Dairy Road and Driveway #6 was analyzed under combined (2014) conditions with an exclusive northbound left-turn lane, an exclusive southbound right-turn lane and separate left-turn and right-turn lanes on the eastbound approach. This lane configuration is shown in Figure 14. Refer to Table 13 for a summary of the intersection LOS analysis.

Under combined (2014) conditions, all intersection approaches are expected to operate at

LOS C or better during both the AM and PM peak hours.

TABLE 13
Analysis Summary of Averette Road and Driveway #6

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Jones Dairy Road and Site Drive #6 (Unsignalized)	SB NB WB	1 LT, 1 TH 1 TH, 1 RT 1 LT, 1 RT	A[1] - B[2]	**N/A**	A[1] - C[2]	**N/A**

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

7.12. Jones Dairy Road and Driveway #7

The intersection of Jones Dairy Road and Driveway #7 was analyzed under combined (2014) conditions with an exclusive northbound left-turn lane and a shared left-turn/right-turn lane on the eastbound approach. This lane configuration is shown in Figure 14. Refer to Table 14 for a summary of the intersection LOS analysis.

TABLE 14
Analysis Summary of Averette Road and Driveway #7

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Jones Dairy Road and Site Drive #7 (Unsignalized)	SB NB WB	1 LT, 1 TH 1 TH-RT 1 LT-RT	A[1] - C[2]	**N/A**	A[1] - C[2]	**N/A**

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

Under combined (2014) conditions, all intersection approaches are expected to operate at LOS C or better during both the AM and PM peak hours.

7.13. Jones Dairy Road at Driveway #8

The intersection of Jones Dairy Road and Driveway #8 was analyzed under combined (2014) conditions with an exclusive northbound left-turn lane and a shared left-turn/right-turn lane on the eastbound approach. This lane configuration is shown in Figure 14. Refer to Table 15 for a summary of the intersection LOS analysis.

TABLE 15
Analysis Summary of Jones Dairy Road at Driveway #8

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall	Approach	Overall
Jones Dairy Road and Site Drive #7 (Unsignalized)	SB NB WB	1 LT-TH 1 TH-RT 1 LT-RT	A[1] - B[2]	**N/A**	A[1] - B[2]	**N/A**

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

Under combined (2014) conditions, all intersection approaches are expected to operate at LOS 'B' or better during both the AM and PM peak hours.

8. CONCLUSIONS

This study determines the potential impacts to the surrounding transportation system caused by the additional traffic generated by the proposed Averette Farms development in Rolesville, North Carolina. Access to the development is currently proposed via two (2) full-movement driveways along NC 98 (Wait Avenue), three (3) full-movement driveways along Averette Road, three (3) full-movement driveways along Jones Dairy Road and two (2) internal driveway access points to proposed and existing neighborhood streets to the west of the development.

Based on discussions with the Town of Rolesville the following adjacent developments were considered in the study:

1. Averette Ridge Subdivision

2. Austin Creek Residential Development
3. Bowling Green Residential Development
4. Gateway Commons Development
5. Stratford Development

Based on the preliminary site plan, the proposed Averette Farms development is expected to consist of approximately 630 single-family homes, 141 townhomes and a neighborhood commercial area on approximately 11.6 acres. The site is expected to be fully built out by 2014.

Under combined (2014) conditions, the proposed site is expected to generate approximately 689 new trips (229 entering and 460 exiting) during the AM peak hour and 1141 new trips (643 entering and 498 exiting) during the PM peak hour.

As a result of the traffic generated by the proposed development, improvements to off-site intersections will be required to maintain an acceptable LOS. Although most intersections are expected to operate at an acceptable LOS when recommended improvements are constructed, the intersection of US 401 at Young Street is expected to continue to experience excessive intersection delays. The construction of the Jones Dairy Road extension and the US 401 Bypass (shown in the 2002 Transportation Plan) are expected to alleviate traffic demand at this intersection and ultimately improve intersection operations.

The transportation plan also shows widening occurring on both NC 98 and Jones Dairy Road in the future. NC 98 is shown widened to a 4-lane divided section from Wait Avenue to NC 96, and Jones Diary Road is shown widened to a 5-lane section from NC 98 to Averette Road. It is expected that the Developer will be required to construct the necessary widening for the ultimate roadway half-section along the property frontage.

12. RECOMMENDATIONS

Based on the findings of this study, specific geometric and traffic control improvements have been identified and are recommended as part of the proposed development. The specific recommendations include the following (refer to Figure 14 for an illustration of improvements):

Intersection of NC 98 and Jones Diary Road

- Construct additional northbound left-turn lane to provide dual left-turn lanes. [Improvement proposed as part of Gateway Commons development.]
- Construct additional eastbound left-turn lane to provide dual left-turn lanes. [Improvement proposed as part of Gateway Commons development.]

Intersection of Averette Road and Jones Dairy Road

- Construct northbound left-turn lane and provide 200 feet of full-width storage with appropriate taper. [Improvement proposed as part of Austin Creek/Bowling Green developments.]
- Construct eastbound right-turn lane and provide 50 feet of full-width storage with appropriate taper. [Improvement proposed as part of Austin Creek/Bowling Green developments.]

NC 98 at Driveway #1

- Construct northbound approach with separate left and right turn lanes.
- Construct an exclusive westbound left-turn lane with 50 feet of full-width storage with appropriate taper.

NC 98 at Driveway #2

- Construct northbound approach with separate left and right turn lanes.
- Construct an exclusive westbound left-turn lane with 50 feet of full-width storage with appropriate taper.
- Construct an exclusive eastbound right-turn lane with 50 feet of full-width storage with appropriate taper.

Averette Road at Driveway #3

- Construct eastbound approach with a shared left-turn/right-turn lane.
- Construct an exclusive northbound left-turn lane with 50 feet of full-width storage with appropriate taper.

Averette Road at Driveway #4

- Construct eastbound approach with separate left and right turn lanes.
- Construct an exclusive northbound left-turn lane with 50 feet of full-width storage with appropriate taper.

Averette Road at Driveway #5

- Construct eastbound approach with separate left and right turn lanes.
- Construct an exclusive northbound left-turn lane with 100 feet of full-width storage with appropriate taper.
- Construct an exclusive southbound right-turn lane with 50 feet of full-width storage with appropriate taper.

Jones Dairy Road at Driveway #6

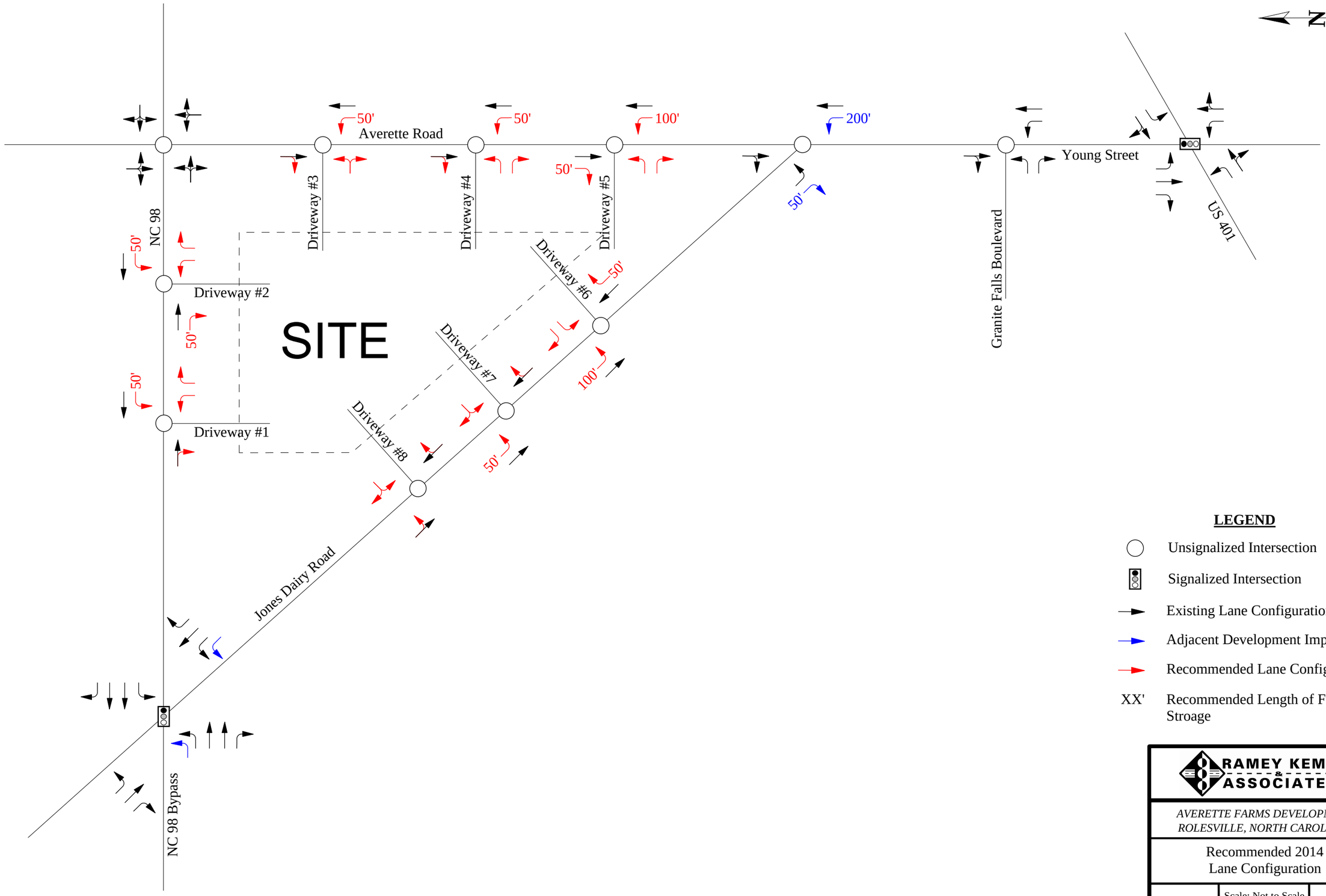
- Construct southbound approach with separate left and right turn lanes.
- Construct an exclusive eastbound left-turn lane with 100 feet of full-width storage with appropriate taper.
- Construct an exclusive westbound right-turn lane with 50 feet of full-width storage with appropriate taper.

Jones Dairy Road at Driveway #7

- Construct southbound approach with a shared left-turn/right-turn lane.
- Construct an exclusive eastbound left-turn lane with 50 feet of full-width storage with appropriate taper.

Jones Dairy Road at Driveway #8

- Construct westbound approach with a shared left-turn/right-turn lane.



LEGEND

- Unsignalized Intersection
- Signalized Intersection
- Existing Lane Configuration
- Adjacent Development Improvement
- Recommended Lane Configuration
- XX' Recommended Length of Full-Width Stroage

RAMEY KEMP & ASSOCIATES

AVERETTE FARMS DEVELOPMENT
ROLESVILLE, NORTH CAROLINA

Recommended 2014
Lane Configuration

Scale: Not to Scale | Figure 14