



Smithfield Road Mixed Use  
**Traffic Impact Analysis**  
**Knightdale, North Carolina**

# TRAFFIC IMPACT ANALYSIS

FOR

## Smithfield Road Mixed Use

LOCATED

IN

## KNIGHTDALE, NC

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RKA Project No. 20254

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**TRAFFIC IMPACT ANALYSIS  
SMITHFIELD ROAD MIXED USE  
KNIGHTDALE, NORTH CAROLINA**

**EXECUTIVE SUMMARY**

**1. Development Overview**

A Traffic Impact Analysis (TIA) was conducted for the proposed Smithfield Road Mixed-Use development in accordance with the Knightdale (Town) Unified Development Ordinance (UDO) and North Carolina Department of Transportation (NCDOT) capacity analysis guidelines. located along Smithfield Road and Mailman Road in Knightdale, North Carolina. The proposed development is expected to be 97 single-family homes, 416 apartments, and 16,600 s.f. of retail and estimated to be built out in 2026. Site access will be provided via one (1) full movement intersection along Smithfield Road and one (1) full movement intersection along Mailman Road. The development will also be providing a connection to the development north of this site which is served by driveway connections to Fayetteville Street.

**2. Existing Traffic Conditions**

The study area for the TIA was determined through coordination with the Town and NCDOT and consists of the following existing intersections:

- Smithfield Road and Mailman Road
- Smithfield Road and Eastbound US Highway 64 Bypass
- Smithfield Road and Westbound US Highway 64 Bypass
- Smithfield Road and 1<sup>st</sup> Avenue
- Smithfield Road and Old Ferrell Road
- Mailman Road and Fayetteville Street
- Mailman Road and Robertson Street

Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersection listed below, in July of 2020 by RKA during a typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods:

- Smithfield Road and Mailman Road

- Smithfield Road and Eastbound US Highway 64 Bypass
- Smithfield Road and Westbound US Highway 64 Bypass
- Smithfield Road and 1<sup>st</sup> Avenue
- Smithfield Road and Old Ferrell Road
- Mailman Road and Fayetteville Street
- Mailman Road and Robertson Street

Counts performed in 2016 were available for the US Highway 64 Bypass ramps. Per coordination with the NCDOT and Town staff at the TIA scoping meeting, 2016 traffic counts at the US Highway 64 Bypass ramps were grown to 2020 using a 3% annual growth rate and then compared to the newly performed counts to determine an adjustment factor for the remaining intersections. This adjustment factor was calculated to be 24% for all weekday AM peak hour counts and 14% for all weekday PM peak hour counts. This adjustment factor was applied at all study intersections to account for the reduced traffic volumes on the area road network during the COVID-19 Pandemic when traffic data collection was completed. Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate.

### **3. Site Trip Generation**

The proposed development is assumed to consist of 97 single-family detached housing units, 416 multifamily housing (low-rise) units and 16,600 s.f. of shopping center. 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 E-1 provides a summary of the trip generation potential for the site.

**Table E-1: Site Trip Generation**

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)		Weekday PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single-Family Detached Housing (210)	97 DU	1,010	19	55	62	37
Multifamily Housing (LowRise) (220)	416 DU	3,110	43	142	132	78
Shopping Center (820)	16,600 s.f.	1,770	99	61	69	75
<b>Total Trips</b>		<b>5,890</b>	<b>161</b>	<b>258</b>	<b>263</b>	<b>190</b>
<i>Internal Capture (1% AM and 7% PM)</i>			-2	-3	-18	-13
<b>Total External Trips</b>			<b>159</b>	<b>255</b>	<b>245</b>	<b>177</b>
<i>Pass-By Trips (0% AM, 34% PM)</i>			---	---	-23	-23
<b>Total Primary Trips</b>			<b>159</b>	<b>255</b>	<b>222</b>	<b>154</b>

**4. Future Traffic Conditions**

Through coordination with the Town and NCDOT, it was determined that an annual growth rate of 3% would be used to generate projected (2026) weekday AM and PM peak hour traffic volumes. The following adjacent developments were identified to be considered under future conditions:

- Glenmore Subdivision

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- Existing (2020) Traffic Conditions
- No-Build (2026) Traffic Conditions
- Build (2026) Traffic Conditions
- Future (2035) Traffic Conditions
- Future (2045) Traffic Conditions (US 64 Bypass interchange only)

**5. Capacity Analysis Summary**

The analysis considered weekday AM and PM peak hour traffic for existing (2020), no-build (2026), build (2026), future (2035), and future (2045) conditions. Refer to Table E-2 and Table E-3 on the following pages for the capacity analysis summary performed at each study intersection.

**Table E-2: Capacity Analysis Summary**

Intersection	Approach	Existing (2020) Conditions		No-Build (2026) Conditions		Build (2026) Conditions		Future (2035) Conditions	
		AM	PM	AM	PM	AM	PM	AM	PM
Smithfield Road and US Highway 64 Bypass EB Ramps	EB	D	F	D	F	D	F	E	F
	NB	A	A	B	B	B	B	E	B
	SB	B	D	B	D	B	D	C	D
	<b>Overall</b>	B (15.7)	F (85.1)	B (19.5)	F (154.9)	B (19.5)	F (165.4)	D (53.9)	F (336.1)
Smithfield Road and US Highway 64 Bypass WB Ramps	WB	D	D	D	D	D	D	D	D
	NB	B	C	C	C	D	C	F	E
	SB	C	D	C	D	C	F	C	F
	<b>Overall</b>	C (21.1)	C (32.5)	C (30.5)	D (39.0)	D (35.4)	D (50.8)	F (129.4)	F (106.9)
Smithfield Road and Mailman Road	WB	B <sup>2</sup>	C <sup>2</sup>	C <sup>2</sup>	E <sup>2</sup>	D <sup>2</sup>	F <sup>2</sup>	C	D
	NB	--	--	--	--	--	--	B	B
	SB	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	B	D
	<b>Overall</b>	N/A	N/A	N/A	N/A	N/A	N/A	B (13.7)	C (33.5)
Smithfield Road and Old Ferrell Road	EB	B <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>	C <sup>2</sup>	B <sup>2</sup>	C <sup>2</sup>	C <sup>2</sup>	E <sup>2</sup>
	NB	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>
	SB	--	--	--	--	--	--	--	--
Smithfield Road And 1 <sup>st</sup> Avenue	EB	B	D	C	E	C	E	E	F
	WB	A	V	B	B	B	B	B	C
	NB	B	C	C	E	C	F	E	F
	SB	C	F	C	F	C	F	E	F
	<b>Overall</b>	B (16.5)	E (62.7)	C (23.6)	F (167.0)	C (26.4)	F (197.2)	E (60.8)	F (351.4)
Mailman Road and Robertson Street	EB	--	--	--	--	--	--	--	--
	WB	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>
	NB	A <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>	B <sup>2</sup>
Mailman Road and Fayetteville Street	EB	A <sup>2</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>2</sup>	A <sup>2</sup>
	NB	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>
	SB	--	--	--	--	--	--	--	--
Smithfield Road and Site Drive 1	WB	N/A				C <sup>2</sup>	F <sup>2</sup>	D <sup>2</sup>	F <sup>2</sup>
	NB					--	--	--	--
	SB					A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	B <sup>1</sup>
Mailman Road and Site Drive 2	EB	N/A				A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>
	WB					--	--	--	--
	SB					A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>	A <sup>1</sup>

1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.
3. All-way stop-control, approach level of service.

**Table E-3: Capacity Analysis Summary (2045)**

Intersection	Node	Approach	Future (2035) Conditions	
			AM	PM
Smithfield Road and US Highway 64 Bypass EB Ramps	1	WB	A	A
		NB	E	D
		<b>Overall</b>	B (10.2)	B (18.0)
	11	D (53.9)	F (336.1)	C
		SB	D	C
		<b>Overall</b>	B (18.5)	C (25.6)
Smithfield Road and US Highway 64 Bypass WB Ramps	2	WB	A	A
		SB	C	C
		<b>Overall</b>	A (8.3)	A (9.8)
	22	EB	C	C
		NB	C	D
		<b>Overall</b>	C (28.9)	D (36.7)
	222	EB	A	A
		SB	B	B
		<b>Overall</b>	A (8.1)	A (6.9)

1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.
3. All-way stop-control, approach level of service.



## **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 the Smithfield Road Mixed Use Development**

#### Smithfield Road and Mailman Road

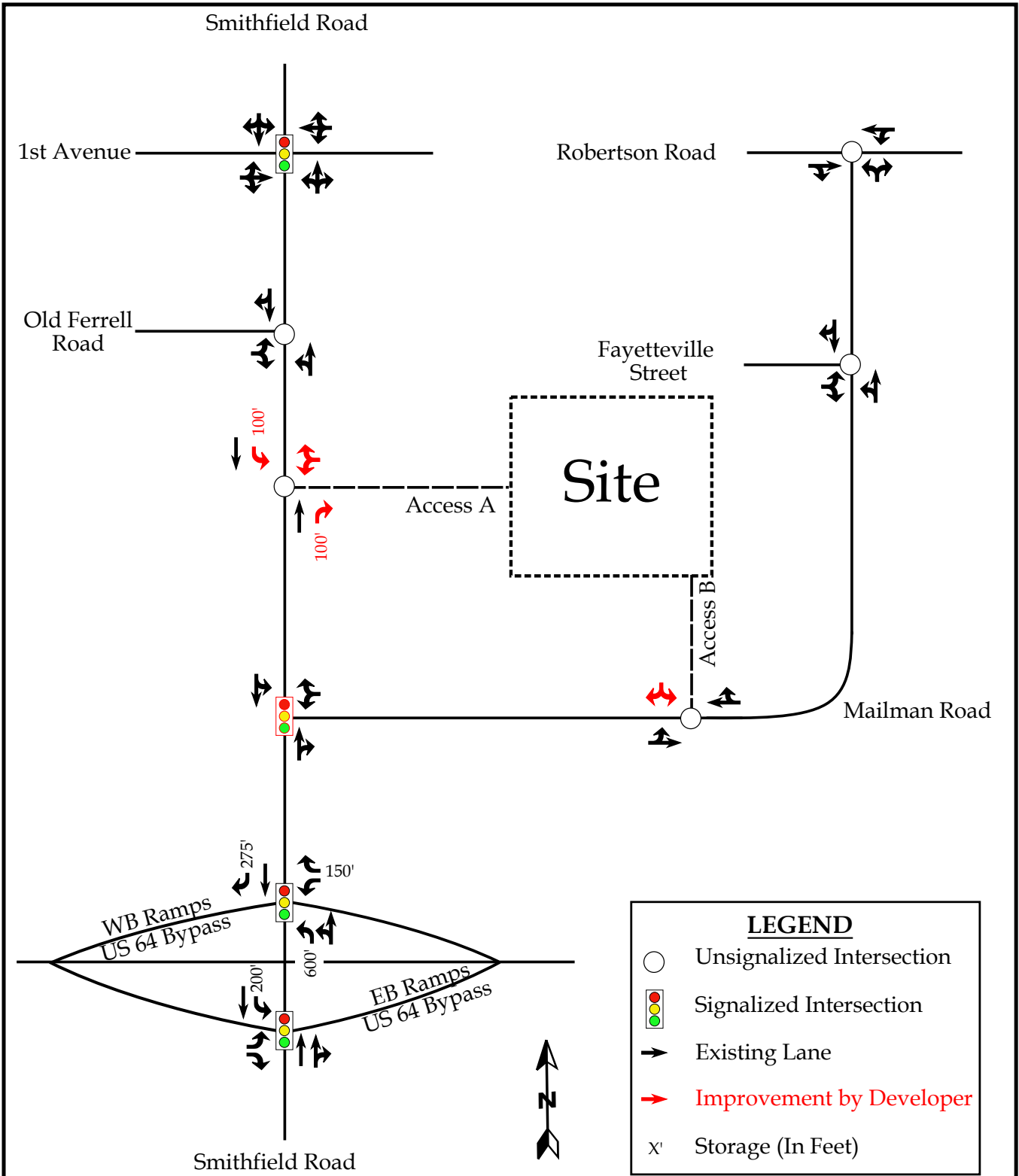
- Monitor for signalization and install once warranted and approved by NCDOT.

#### Smithfield Road and Access 1

- Construct Access 1 with one ingress lane and one egress lane (one shared left-right).
- Construct a northbound right turn lane with 100 feet of storage and appropriate taper.
- Construct a southbound left turn lane with 100 feet of storage and appropriate taper.

#### Mailman Road and Access 2

- Construct Access 2 with one ingress lane and one egress lane (one shared left-right).



**LEGEND**

- Unsignalized Intersection
- ⬆️⬆️⬆️ Signalized Intersection
- ➡ Existing Lane
- ➡ Improvement by Developer
- x' Storage (In Feet)



Smithfield Road Mixed Use  
Development  
Knightdale, NC

Recommended Lane  
Configuration

Scale: Not to Scale Figure E-1

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Moving forward.

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**TRAFFIC IMPACT ANALYSIS**  
**SMITHFIELD ROAD MIXED USE**  
**KNIGHTDALE, NORTH CAROLINA**

**1. INTRODUCTION**

The contents of this report present the findings of the Traffic Impact Analysis (TIA) conducted for the proposed Smithfield Road Mixed-Use development to be located along Smithfield Road and Mailman Road in Knightdale, North Carolina. 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, anticipated to be completed in 2026, is expected to consist of the following uses:

- 97 Single-Family Homes
- 416 Apartments
- 16,600 square foot (s.f.) retail space

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- Existing (2020) Traffic Conditions
- No-Build (2026) Traffic Conditions
- Build (2026) Traffic Conditions
- Future (2035) Traffic Conditions
- Future (2045) Traffic Conditions (US 64 Bypass interchange only)

**1.1. Site Location and Study Area**

The development is proposed to be located along Smithfield Road and Mailman Road in Knightdale, North Carolina. Refer to Figure 1 for the site location map. The study area for the TIA was determined through coordination with the North Carolina Department of Transportation (NCDOT) and the Town of Knightdale (Town) and consists of the following existing intersections:

- Smithfield Road and Mailman Road
- Smithfield Road and Eastbound US Highway 64 Bypass
- Smithfield Road and Westbound US Highway 64 Bypass
- Smithfield Road and 1<sup>st</sup> Avenue
- Smithfield Road and Old Ferrell Road
- Mailman Road and Fayetteville Street
- Mailman Road and Robertson Street

Refer to Appendix A for the approved scoping documentation.

### **1.2. Proposed Land Use and Site Access**

The site is expected to be located along Smithfield Road and Mailman Road. The proposed development, anticipated to be completed in 2025, is assumed to consist of the following uses:

- 97 Single-Family Homes
- 416 Apartments
- 16,600 square foot (s.f.) retail space

The proposed development is expected to consist of approximately 103 acres of mixed-use development expected to be built-out in 2025. Site access will be provided via one (1) full movement intersection along Smithfield Road and one (1) full movement intersection along Mailman Road. The development will also be providing a connection to the development north of this site which is served by driveway connections to Fayetteville Street. Refer to Figure 2 for a copy of the preliminary site plan.

### **1.3. Adjacent Land Uses**

The proposed development is located in an area consisting primarily of farms, undeveloped land, and residential development. The development will be north of the US Highway 64 bypass.

### **1.4. Existing Roadways**

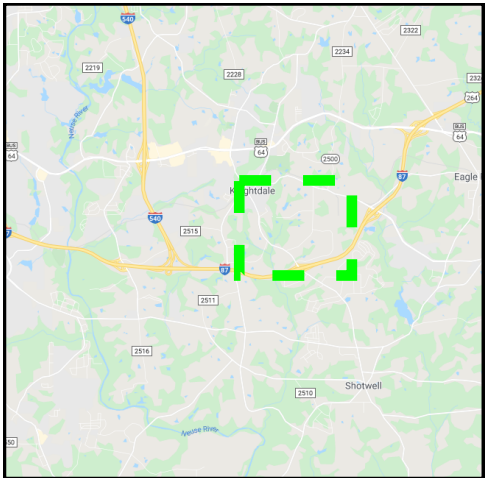
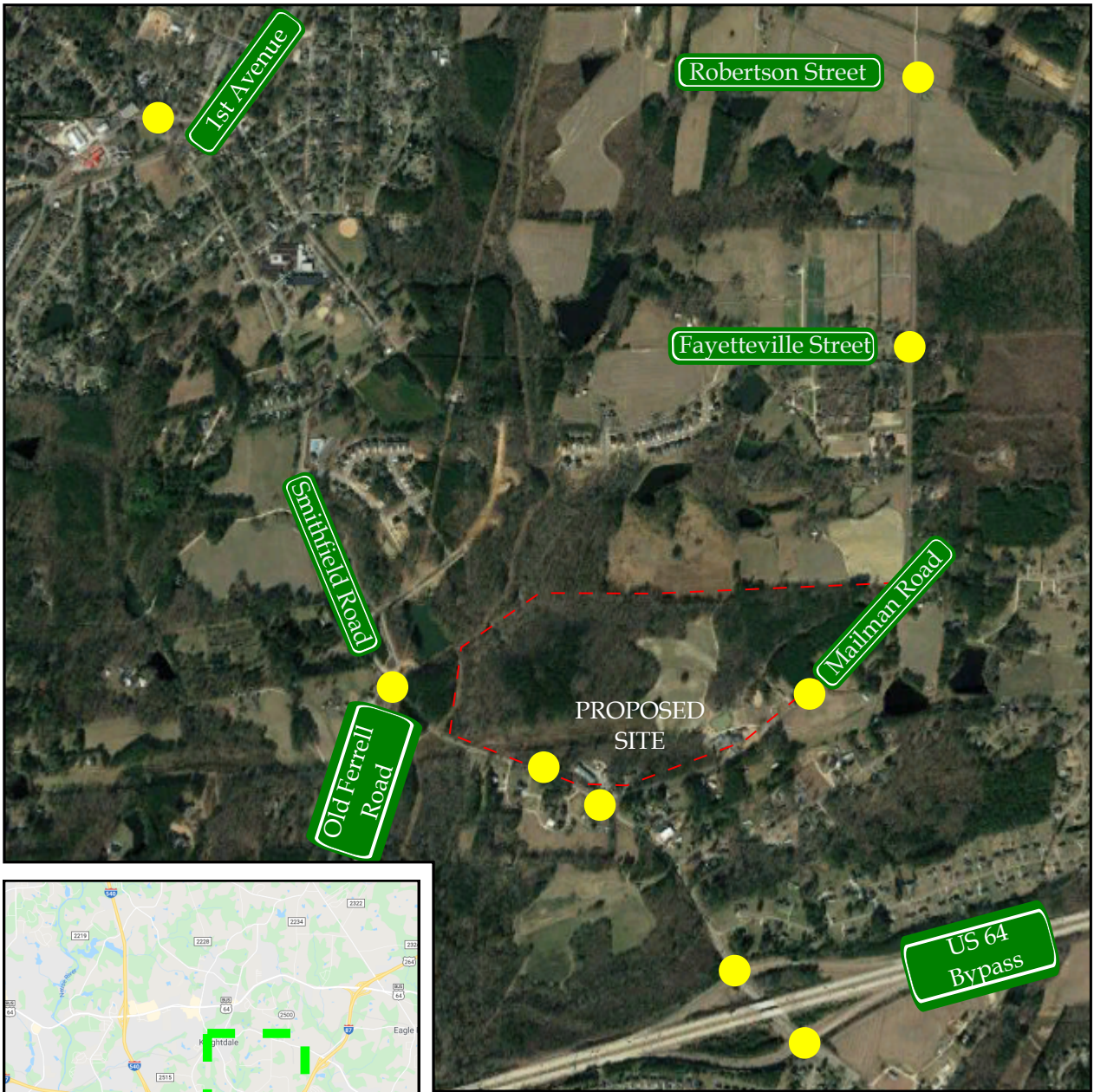
Existing lane configurations (number of traffic lanes on each intersection approach), lane widths, storage capacities, and other intersection and roadway information within the study area are shown in Figure 3. Table 1 provides a summary of this information, as well.



**Table 1: Existing Roadway Inventory**

<b>Road Name</b>	<b>Route Number</b>	<b>Typical Cross Section</b>	<b>Speed Limit</b>	<b>Maintained By</b>	<b>AADT (vpd)</b>
US Highway 64 Bypass	I-87/US 64/US 264	6-lane median divided	70 mph	NCDOT	71,000 (2019)
Smithfield Road	SR 2233	2-lane undivided	45 mph	NCDOT	8,100 (2017)
Mailman Road	SR 2513	2-lane undivided	45 mph	NCDOT	600 (2015)
1 <sup>st</sup> Avenue	SR 2049	2-lane undivided	25 mph	NCDOT	9,100 (2019)
Robertson Road	SR 2500	2-lane undivided	35 mph	NCDOT	2,600 (2018)
Fayetteville Street	SR 2513	2-lane undivided	45 mph	NCDOT	1,000 (2015)
Old Ferrell Road	SR 2512	2-lane undivided	35 mph	NCDOT	760 (2015)

\* Includes on and off ramp AADT



**LEGEND**

- - - Proposed Site Location
- Study Intersection
- - - Study Area



Moving forward.

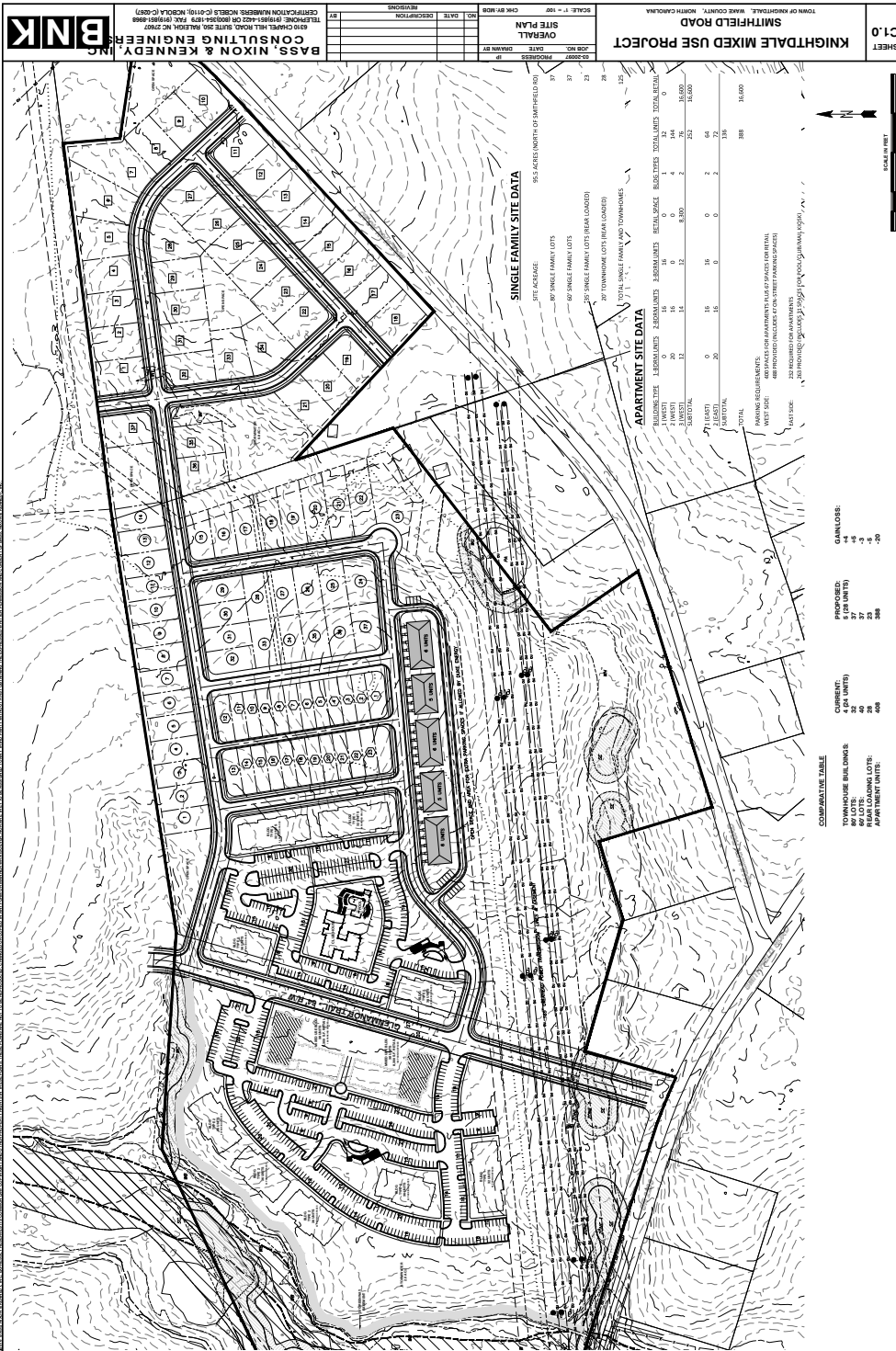
RKA

RAMEY KEMP ASSOCIATES

Smithfield Road Mixed Use  
Development  
Knightdale, NC

Site Location Map

Scale: Not to Scale    Figure 1



SMITHFIELD ROAD  
KNIGHTDALE MIXED USE PROJECT  
SHEET C1.0

BASS, NIXON & KENNEDY  
CONSULTING ENGINEERS  
BANK

APARTMENT SITE DATA

UNITS	1-BED	2-BED	3-BED	4-BED	5-BED	TOTAL
PLANNING	0	18	16	0	0	34
REQUIREMENTS	0	18	16	0	0	34
TOTAL	0	18	16	0	0	34

SINGLE FAMILY SITE DATA

UNITS	1-BED	2-BED	3-BED	4-BED	5-BED	TOTAL
PLANNING	0	18	16	0	0	34
REQUIREMENTS	0	18	16	0	0	34
TOTAL	0	18	16	0	0	34

COMPARATIVE TABLE

TYPE	UNITS	AREA (SQ FT)
TOWNHOUSE BUILDINGS	0	0
APARTMENTS	34	10,000
SINGLE FAMILY HOMES	0	0
TOTAL	34	10,000

SMITHFIELD ROAD  
KNIGHTDALE MIXED USE PROJECT  
SHEET C1.0

BASS, NIXON & KENNEDY  
CONSULTING ENGINEERS  
BANK

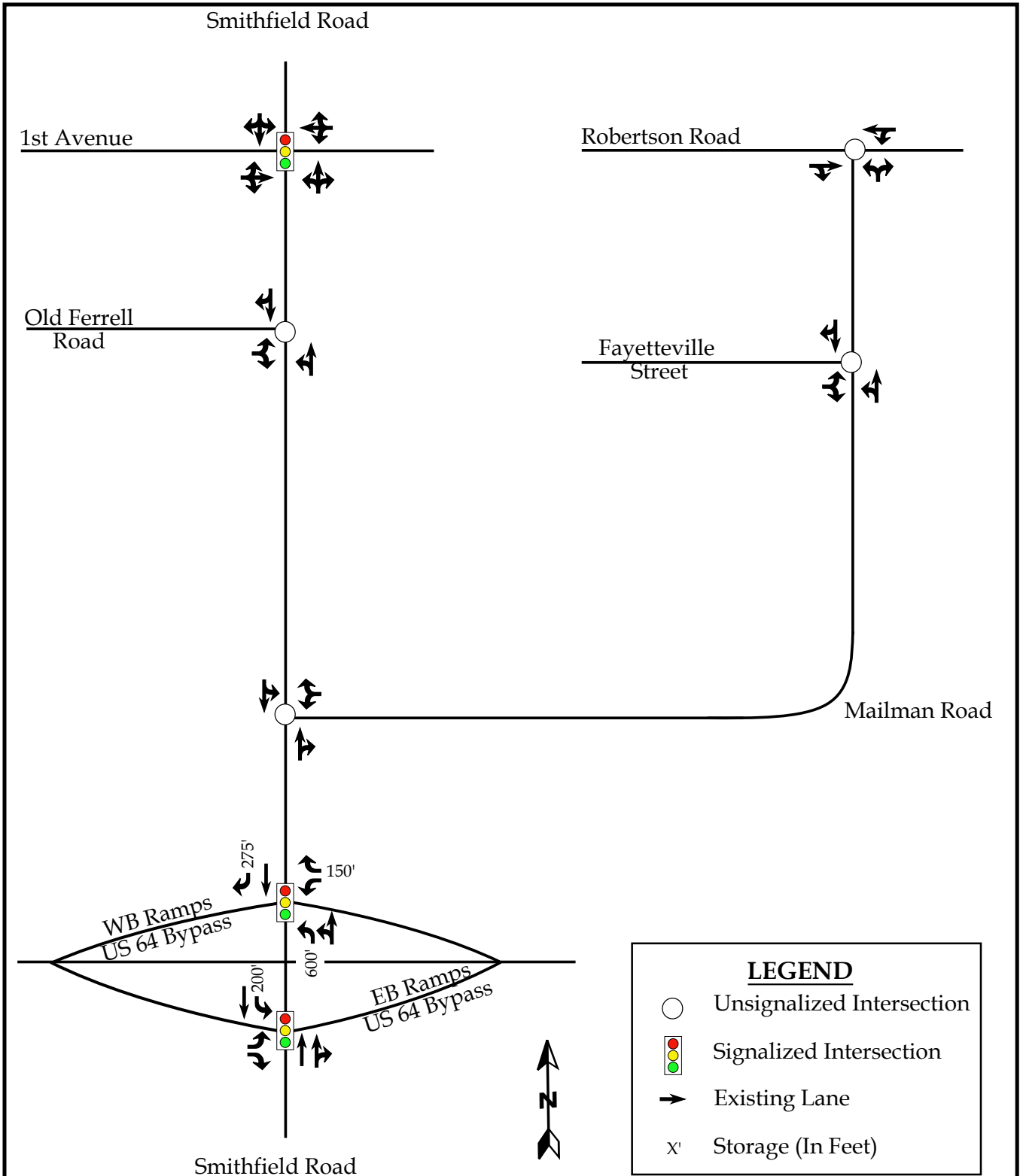


# Smithfield Road Mixed Use Development

Knightdale, NC

## Preliminary Site Plan

Scale: Not to Scale Figure 2



Smithfield Road Mixed Use  
 Development  
 Knightdale, NC

Existing  
 Lane Configurations

Scale: Not to Scale    Figure 3

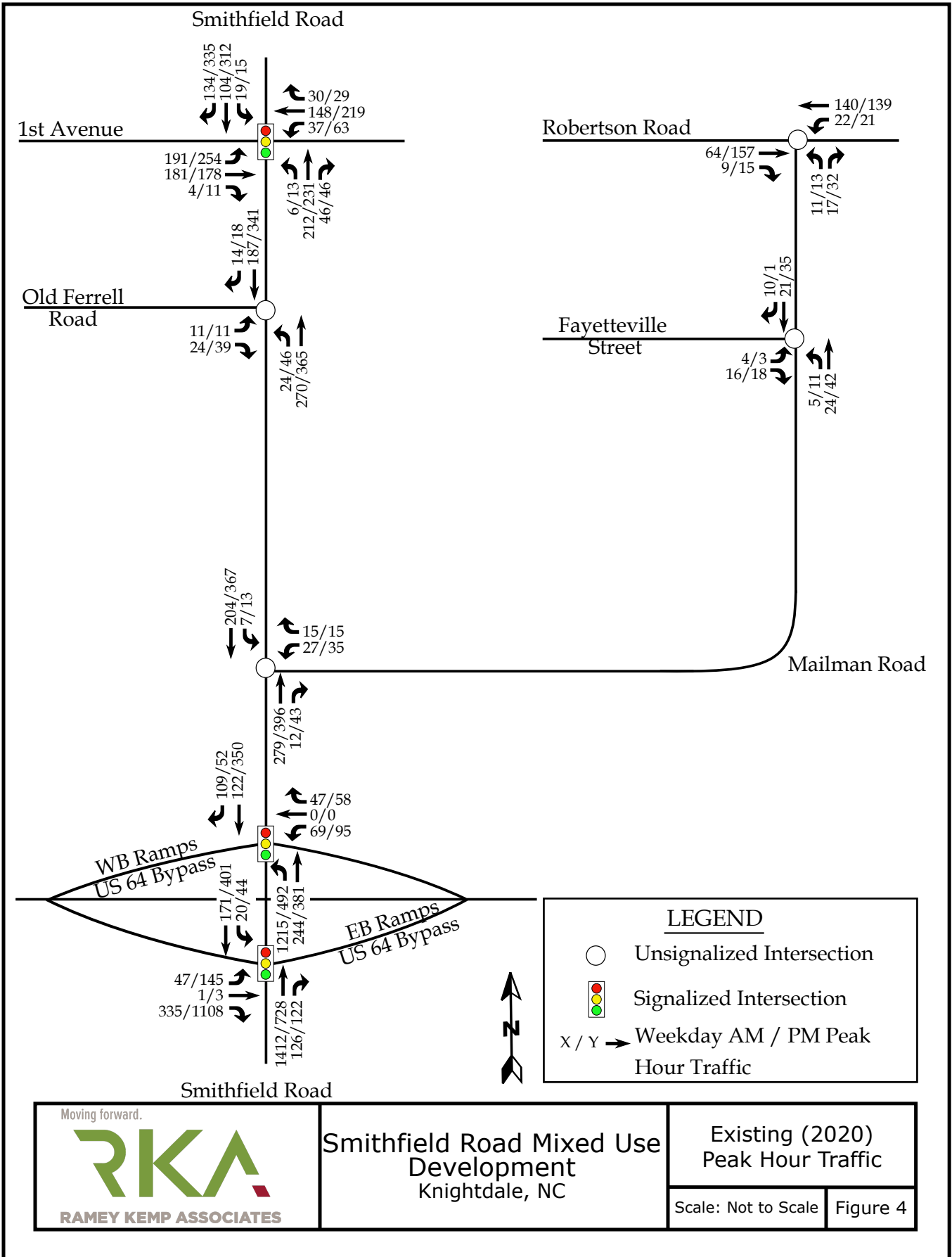
## **2. EXISTING (2020) PEAK HOUR CONDITIONS**

### **2.1. Existing (2020) Peak Hour Traffic**

Peak hour turning movement counts were conducted by Ramey Kemp & Associates, Inc. at all of the study intersections during weekday AM (7:00 to 9:00) and PM (4:00 to 6:00) peak hours in July 2020. Counts performed in 2016 were available for the US Highway 64 Bypass ramps. Per coordination with the NCDOT and Town staff at the TIA scoping meeting, 2016 traffic counts at the US Highway 64 Bypass ramps were grown to 2020 using a 3% annual growth rate and then compared to the newly performed counts to determine an adjustment factor for the remaining intersections. This adjustment factor was calculated to be 24% for all weekday AM peak hour counts and 14% for all weekday PM peak hour counts. This adjustment factor was applied at all study intersections to account for the reduced traffic volumes on the area road network during the COVID-19 Pandemic when traffic data collection was completed. Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate. Refer to Figure 4 for existing (2020) weekday AM and PM peak hour traffic volumes. A copy of the count data is located in Appendix B of this report.

### **2.2. Analysis of Existing (2020) Peak Hour Traffic**

The existing (2020) weekday AM and PM peak hour traffic volumes were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. Signal information was obtained from NCDOT and is included in Appendix C. The results of the analysis are presented in Section 8 of this report.



**3. NO-BUILD (2026) PEAK HOUR CONDITIONS**

In order to account for growth of traffic and subsequent traffic conditions at a future year, no-build traffic projections are needed. No-build 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. No-build traffic is comprised of existing traffic growth within the study area and additional traffic created as a result of adjacent approved developments.

**3.1. Ambient Traffic Growth**

Through coordination with the Town and NCDOT, it was determined that an annual growth rate of 3% would be used to generate projected (2026) weekday AM and PM peak hour traffic volumes. Refer to Figure 5 for projected (2026) peak hour traffic.

**3.2. Adjacent Development Traffic**

Through coordination with the Town and NCDOT, the following adjacent development was identified to be included as an approved adjacent development in this study:

- Glenmore Subdivision

Table 2 provides a summary of the adjacent developments. Additional adjacent development information can be found in Appendix D.

**Table 2: Adjacent Development Information**

<b>Development Name</b>	<b>Location</b>	<b>Land Use / Intensity</b>	<b>TIA Performed</b>
Glenmore Subdivision	Along Smithfield Road, south of Broadway Street	326 Single-Family Detached Housing	N/A <i>Trips generated and applied to roadway network</i>

The Glenmore Subdivision is expected to be developed along Smithfield Road, south of Broadway Street. No TIA has been conducted for this development, therefore trips were generated and applied to the roadway network. This development is expected to consist of

326 single-family detached houses. Refer to Figure 6 for an illustration of the adjacent development site trips.

### 3.3. Future Roadway Improvements

Based on coordination with the NCDOT and the Town, it was determined that three future projects were to be included under no-build (2026), build (2026) and future (2035) traffic conditions. These improvements include a potential round-a-bout at the intersection of Smithfield Road and Mailman Road as well as future road closure of Fayetteville Road to the west of the study area (Y-4805F). Y-4805 is a funded project, this will be included under all analysis scenarios. The Y-4805F project, expected to be completed in 2022, is not expected to affect lineage at any study intersections but will affect traffic volumes. As such, diverted traffic volumes are provided under these conditions based on data provided by NCDOT. This included the comparison of the no-build and build volumes under the NCDOT analysis. The difference in volumes were taken as the diverted trips. The potential round-a-bout at the intersection of Smithfield Road and Mailman Road is not associated with a funded project, therefore analysis was provided with and without this improvement. Refer to Figure 7 for an Illustration of the Y-4805F peak hour traffic adjustments.

Per Coordination with NCDOT and the Town, the I-6007 project was also considered in this analysis. I-6007 is expected to provide interchange improvements and consist of converting the US Highway 64 and Smithfield Road interchange to a diverging diamond interchange design. As this project is currently slated for right-of-way acquisition in 2028 and construction beyond the current STIP horizon year, it was only considered in a 2045 analysis. The traffic volumes for this 2045 analysis were determined according to the traffic forecast for the project and the design was determined through review of the current conceptual sketch. As the I-6007 project is only expected to provide interchange improvements, no additional intersections were included in this analysis.

The STIP Y-4805F future realignment plans and I-6007 information can be found in Appendix E.

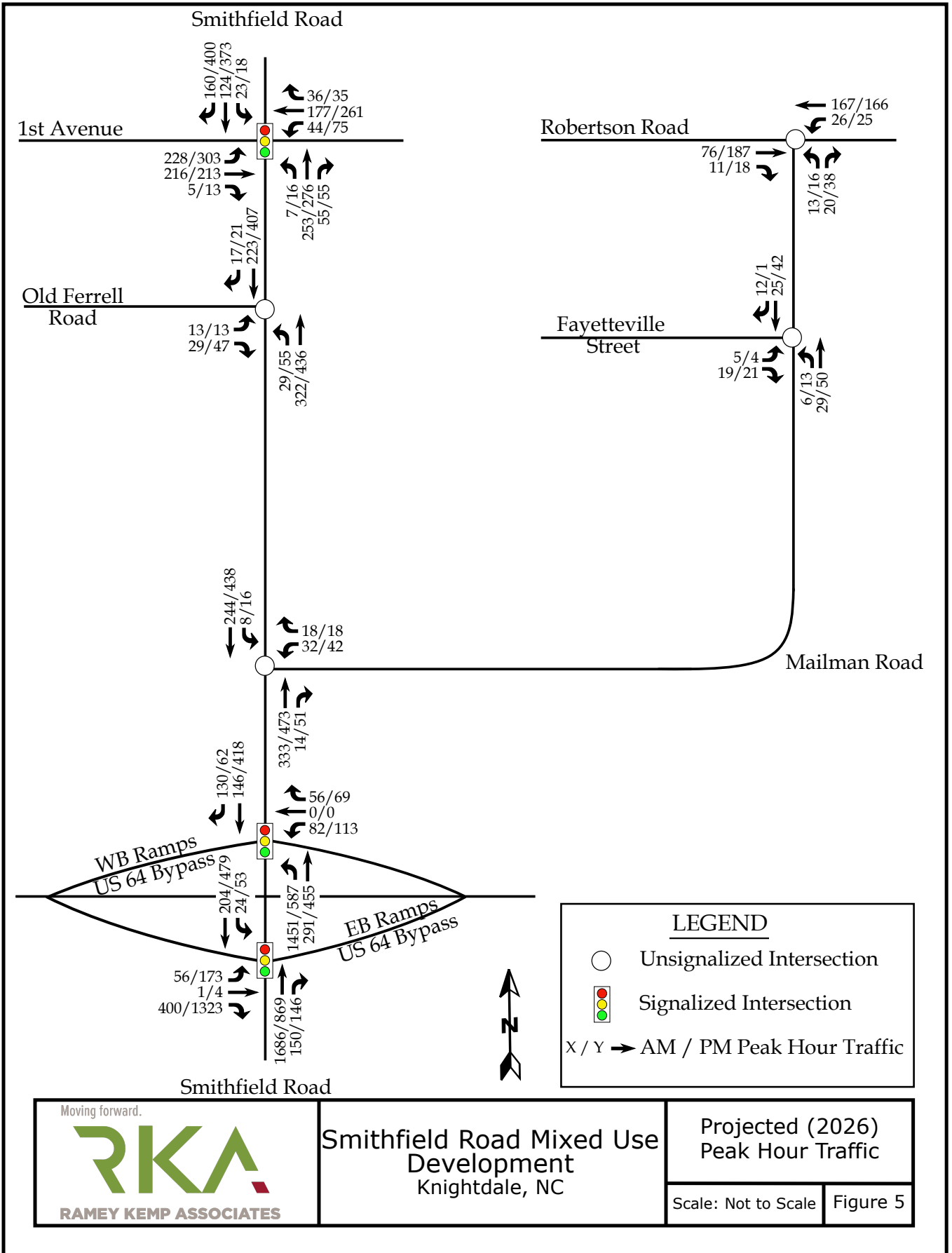


### **3.4. No-Build (2026) Peak Hour Traffic Volumes**

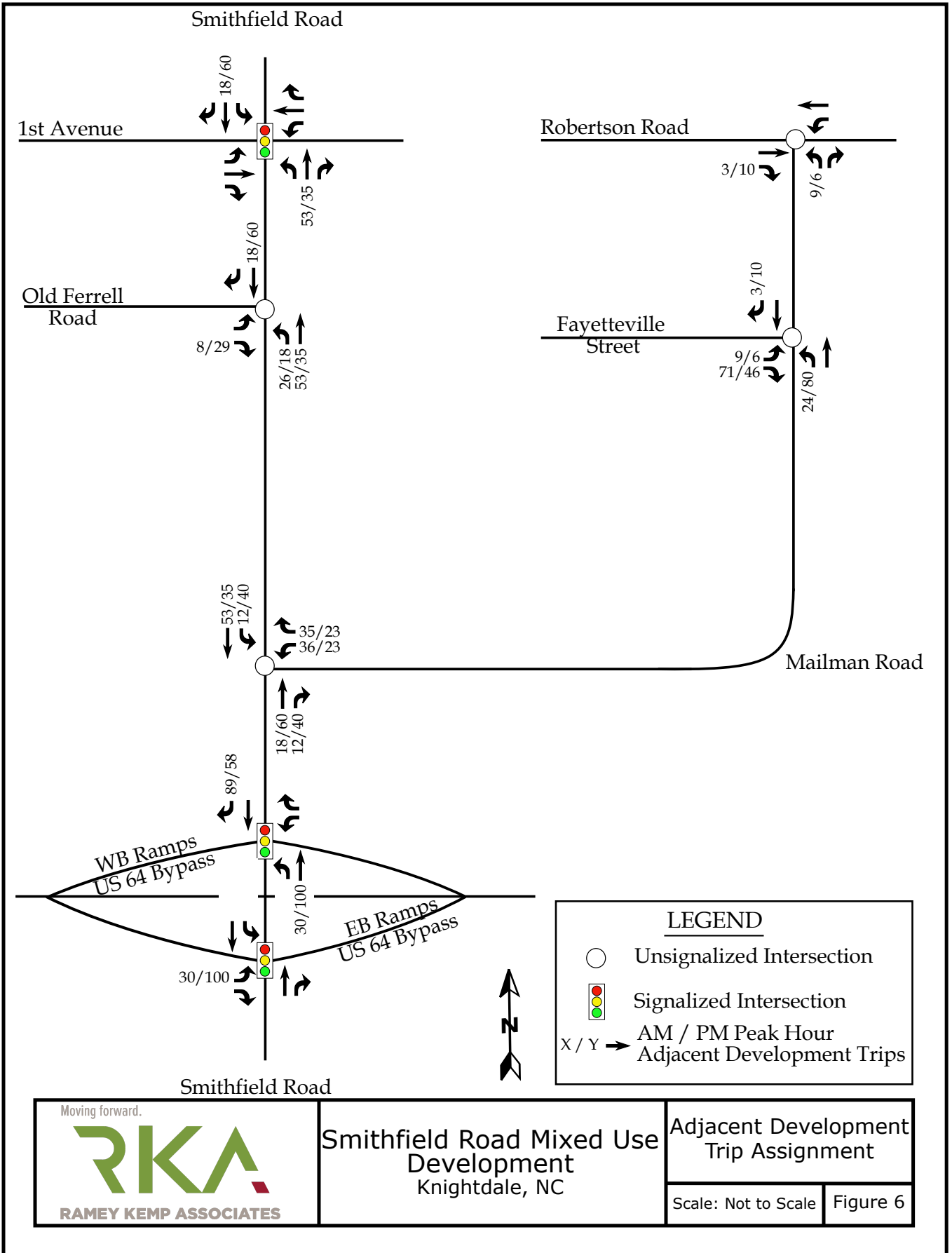
The no-build (2026) traffic volumes were determined by projecting the existing (2020) peak hour traffic to the year 2026 and adding the adjacent development trips and Y-4805F peak hour traffic adjustments. Refer to Figure 8 for an illustration of the no-build (2026) peak hour traffic volumes at the study intersections.

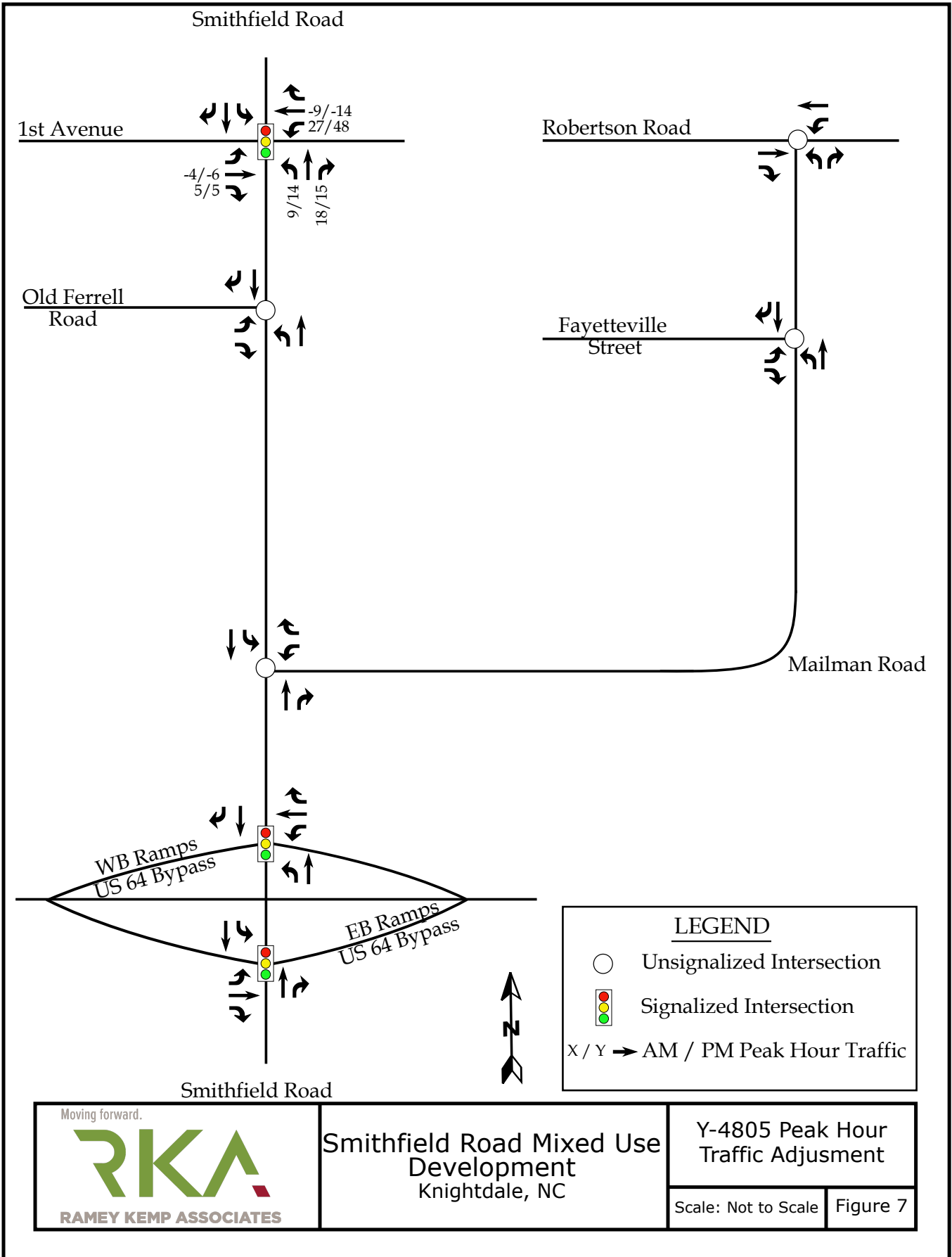
### **3.5. Analysis of No-Build (2026) Peak Hour Traffic Conditions**

The no-build (2026) AM and PM peak hour traffic volumes at the study intersections were analyzed with future geometric roadway conditions and traffic control. The analysis results are presented in Section 8 of this report.

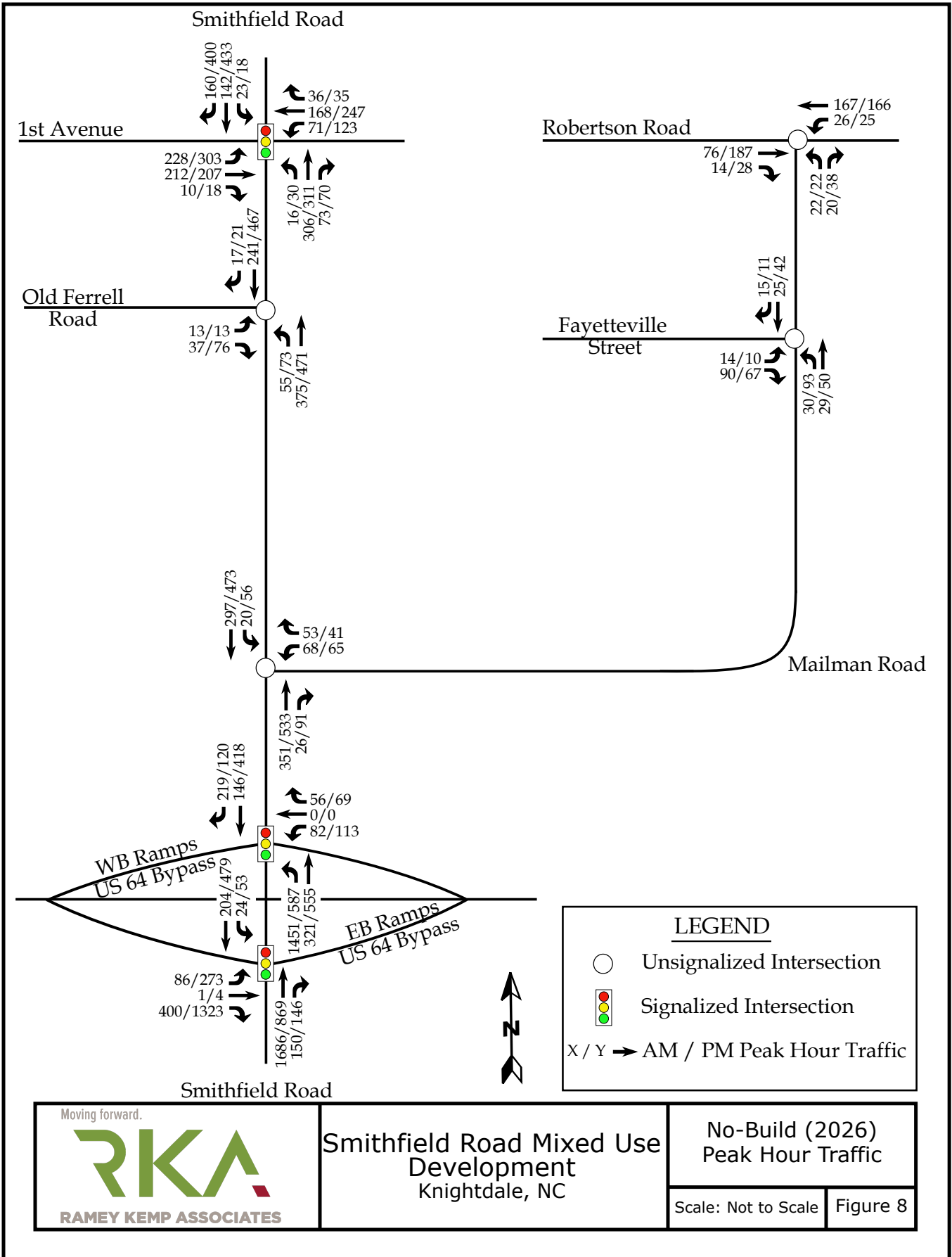


6  
12  
8





6  
12  
8



Moving forward.

**4. SITE TRIP GENERATION AND DISTRIBUTION**

**4.1. Trip Generation**

The proposed development is assumed to consist of 97 single-family detached housing units, 416 multifamily housing (low-rise) units and 16,600 s.f. of shopping center. 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 3 provides a summary of the trip generation potential for the site.

**Table 3: Trip Generation Summary**

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)		Weekday PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single-Family Detached Housing (210)	97 DU	1,010	19	55	62	37
Multifamily Housing (LowRise) (220)	416 DU	3,110	43	142	132	78
Shopping Center (820)	16,600 s.f.	1,770	99	61	69	75
Total Trips		5,890	161	258	263	190
<i>Internal Capture (1% AM and 7% PM)</i>			-2	-3	-18	-13
<b>Total External Trips</b>			<b>159</b>	<b>255</b>	<b>245</b>	<b>177</b>
<i>Pass-By Trips (0% AM, 34% PM)</i>			---	---	-23	-23
<b>Total Primary Trips</b>			<b>159</b>	<b>255</b>	<b>222</b>	<b>154</b>

It is estimated that the proposed development will generate approximately 5,890 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 413 trips (158 entering and 255 exiting) will occur during the weekday AM peak hour and 399 (236 entering and 163 exiting) will occur during the weekday PM peak hour.

Internal capture of trips between the residential and retail uses was considered in this study. Internal capture is the consideration for trips that will be made within the site between different land uses, so the vehicle technically never leaves the internal site but can still be considered as a trip to that specific land use. Internal capture typically only considers trips between residential, office, and retail/restaurant land uses. The internal capture reductions are expected to account for approximately 5 (2 entering and 3 exiting) trips during the weekday AM peak hour and 31 (18 entering and 13 exiting) trips during the weekday PM peak hour.

Pass-by trips were also taken into consideration in this study. Pass-by trips are made by the traffic already using the adjacent roadway, entering the site as an intermediate stop on their way to another destination. Pass-by percentages are applied to site trips after adjustments for internal capture. Pass-by trips are expected to account for approximately 46 trips (23 entering and 23 exiting) during the weekday PM peak hour. It should be noted that the pass-by trips were balanced, as it is likely that these trips would enter and exit in the same hour.

The total primary site trips are the calculated site trips after the reduction for internal capture and pass-by trips. Primary site trips are expected to generate approximately 414 trips (159 entering and 255 exiting) during the weekday AM peak hour and 376 trips (222 entering and 154 exiting) during the weekday PM peak hour.

#### **4.2. Site Trip Distribution and Assignment**

Trip distribution percentages used in assigning site traffic for this development were estimated based on a combination of existing traffic patterns, population centers adjacent to the study area, and engineering judgment.

It is estimated that the residential site trips will be regionally distributed as follows:

- 50% to/from the west via US 64 Bypass
- 30% to/from the north via Smithfield Road
- 15% to/from the west via Old Ferrell Road
- 5% to/from the north via Robertson Road

It is estimated that the primary commercial site trips will be regionally distributed as follows:

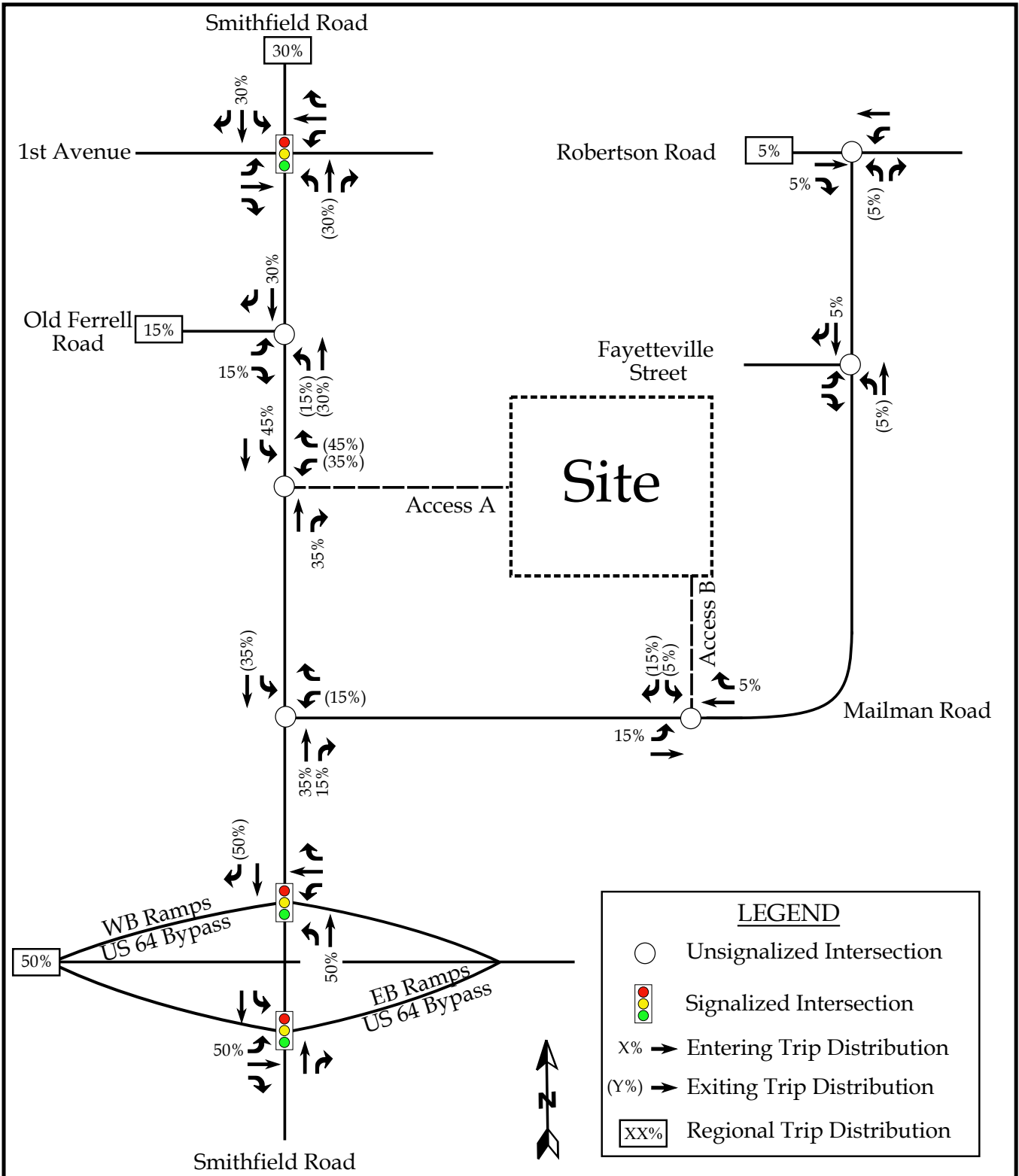
- 30% to/from the west via US 64 Bypass
- 15% to/from the east via US 64 Bypass
- 20% to/from the north via Smithfield Road
- 20% to/from the south via Smithfield Road
- 10% to/from the west via Old Ferrell Road
- 5% to/from the north via Old Ferrell Road

The residential site trip distribution is shown in Figure 9A, the commercial site trip distribution is shown in Figure 9B. Refer to Figure 10A for the residential site trip assignment, Figure 10B for the commercial site trip assignment.

The pass-by site trips were distributed based on existing traffic patterns with consideration given to the proposed driveway access and site layout. Refer to Figure 11 for the pass-by site trip distribution. Pass-by site trips are shown in Figure 12.

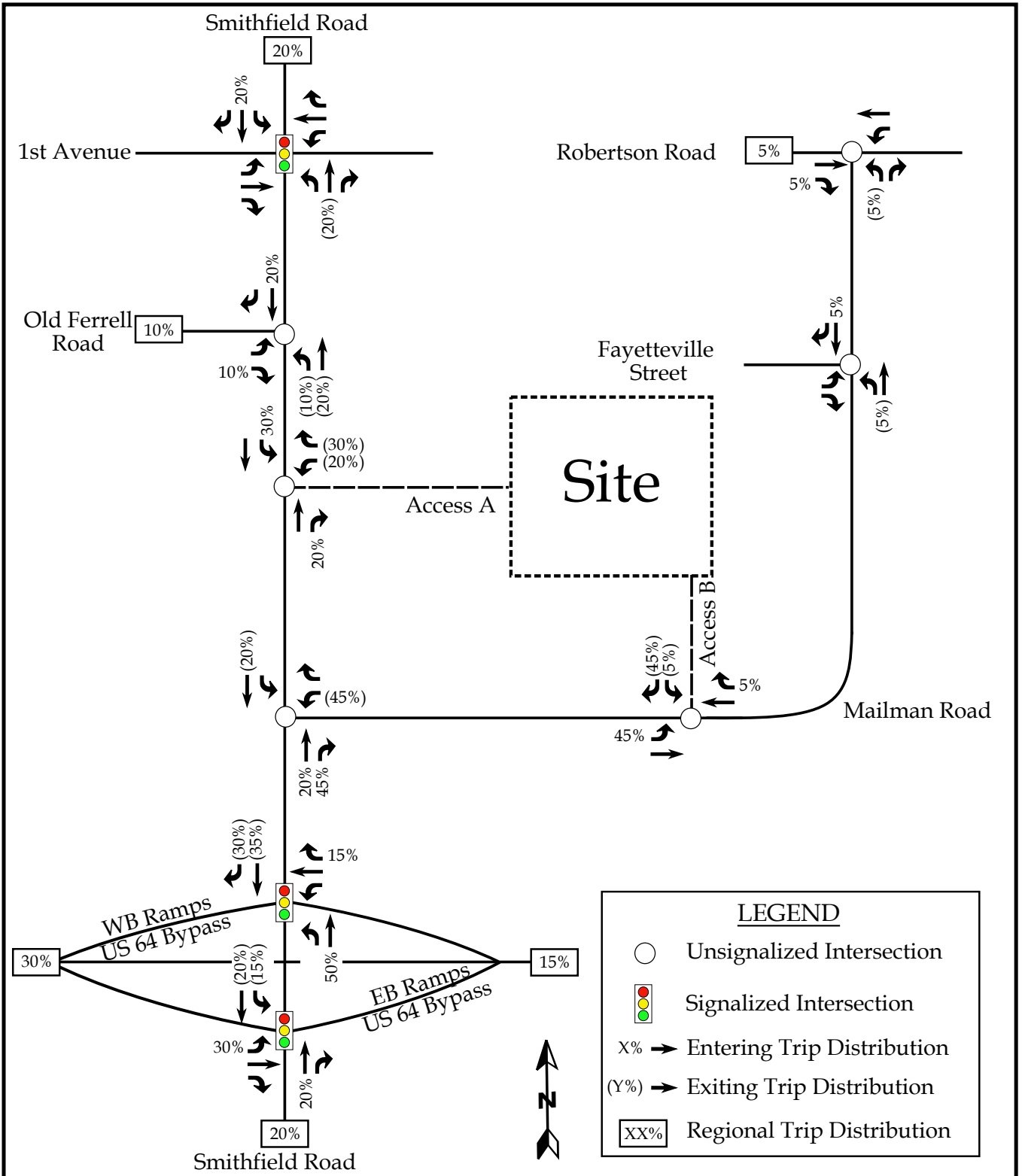
The total site trips were determined by adding the primary site trips and the pass-by site trips. Refer to Figure 13 for the total peak hour site trips at the study intersections.





Smithfield Road Mixed Use Development  
Knightdale, NC

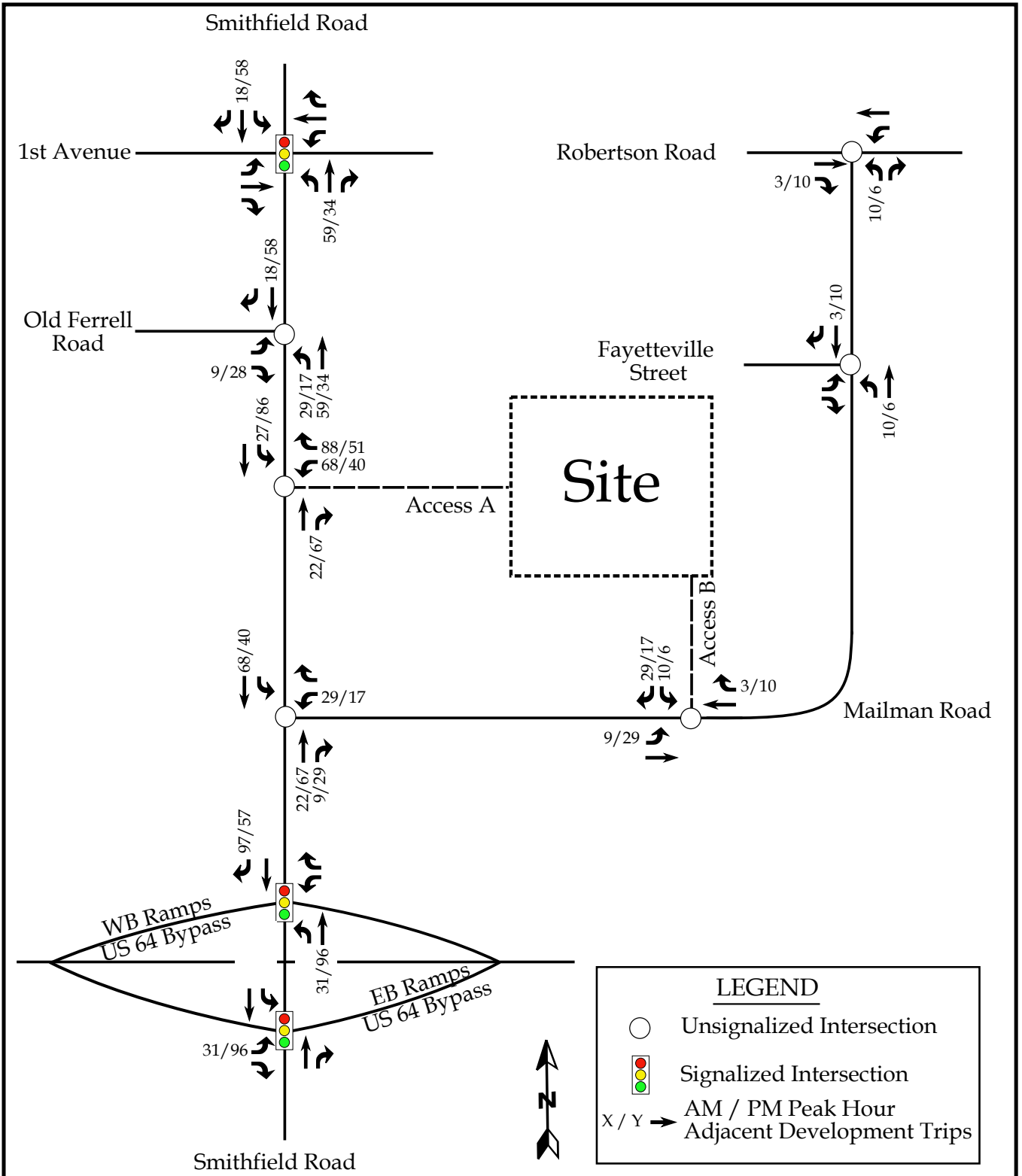
Residential Site Trip Distribution  
Scale: Not to Scale | Figure 9A



Smithfield Road Mixed Use Development  
Knightdale, NC

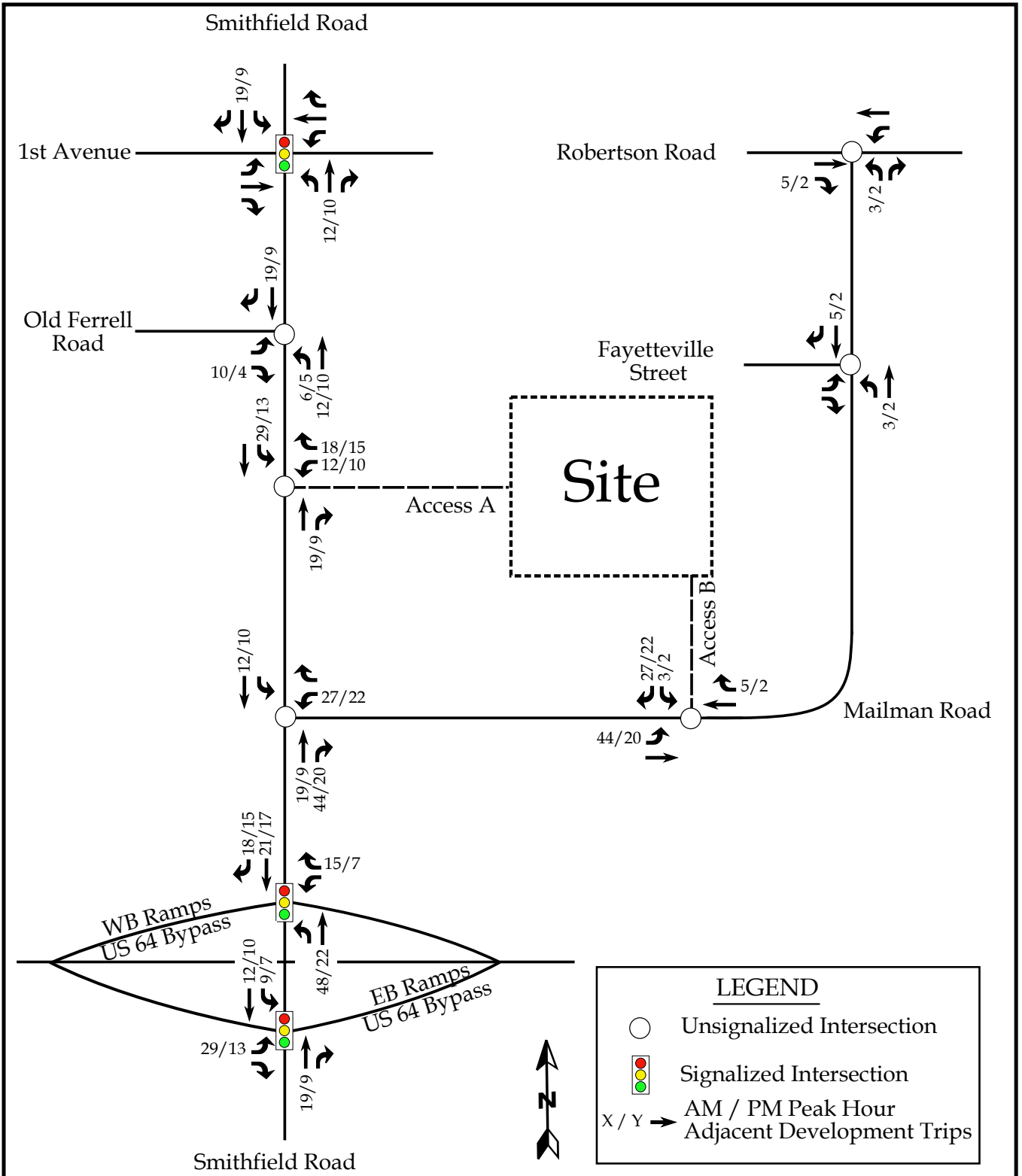
Commercial Site Trip Distribution

Scale: Not to Scale | Figure 9B



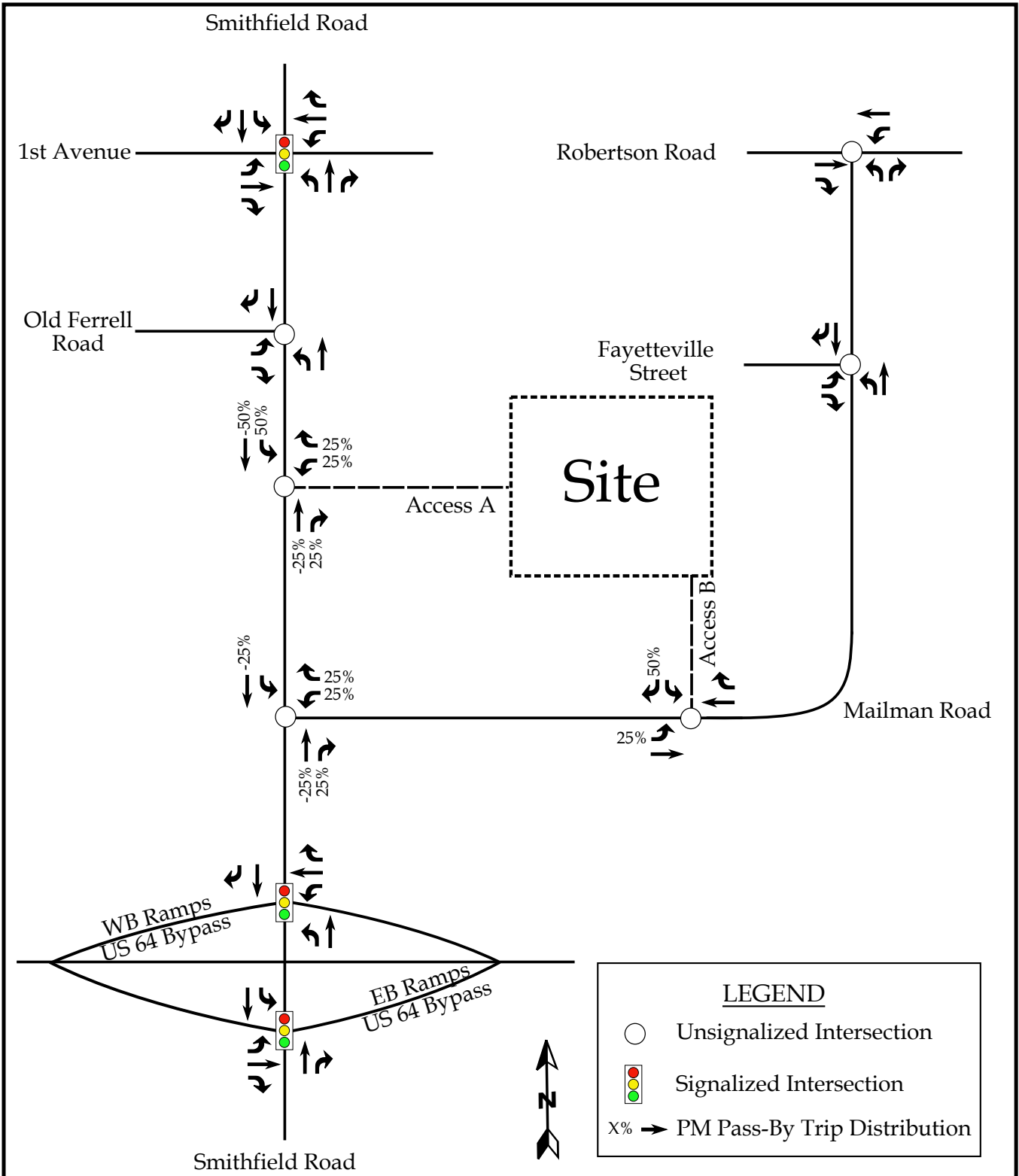
Smithfield Road Mixed Use Development  
Knightdale, NC

Proposed Site Residential Trip Assignment  
Scale: Not to Scale Figure 10A



Smithfield Road Mixed Use Development  
Knightdale, NC

Proposed Site Commercial Trip Assignment  
Scale: Not to Scale | Figure 10B



LEGEND

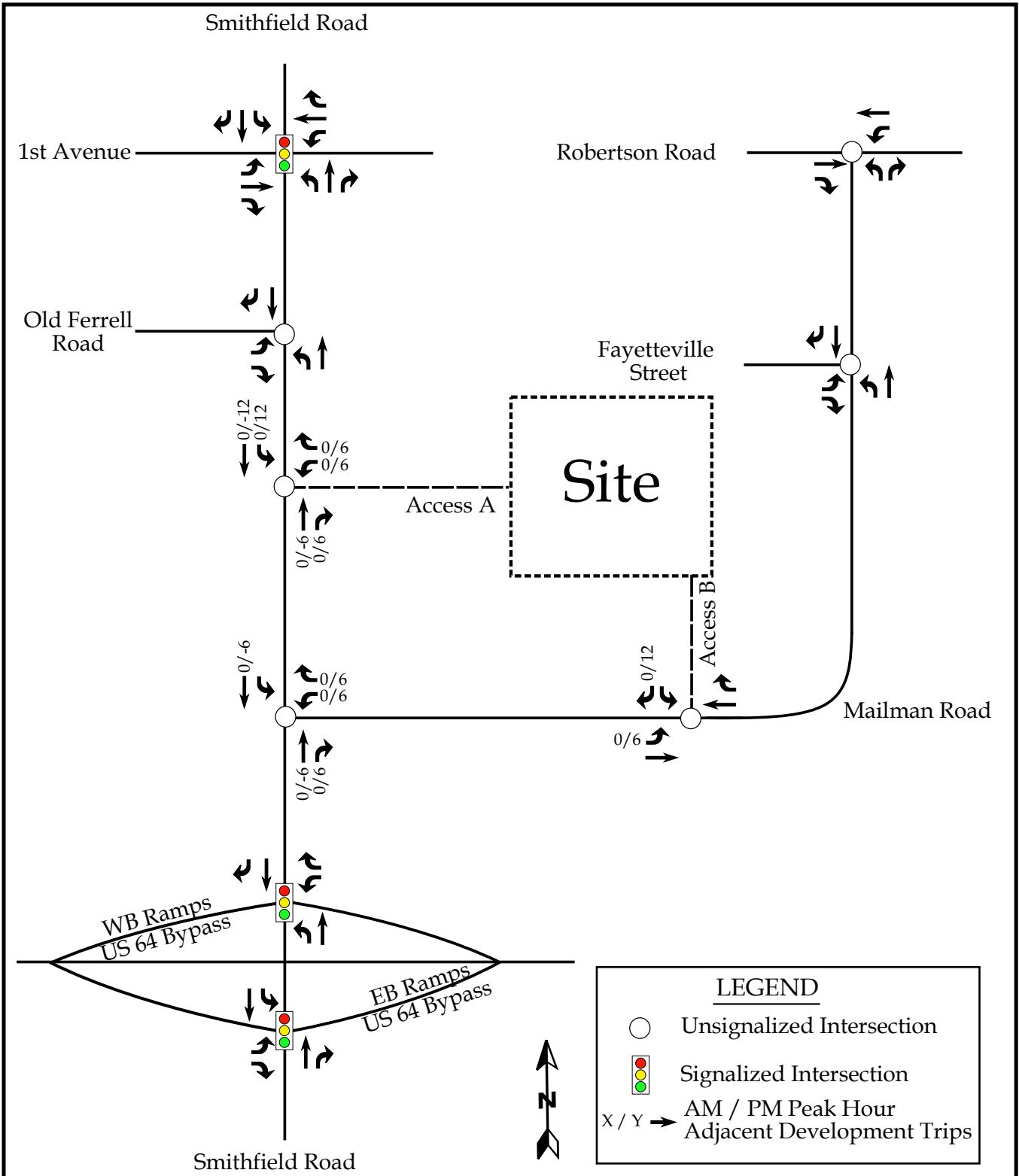
- Unsignalized Intersection
- ⬆️⬆️⬆️ Signalized Intersection
- X% → PM Pass-By Trip Distribution



Smithfield Road Mixed Use  
Development  
Knightdale, NC

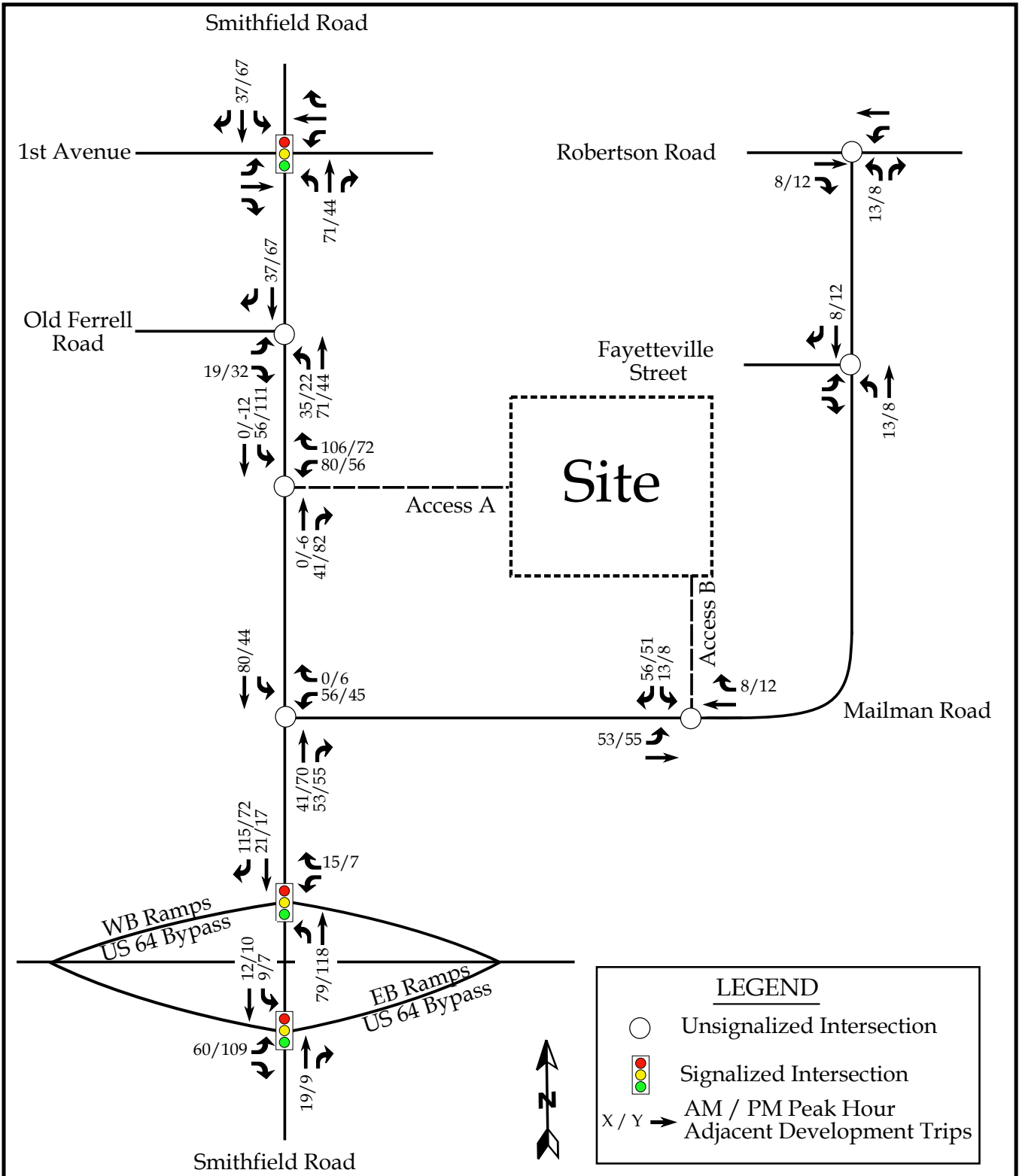
Pass-By  
Site Trip Distribution

Scale: Not to Scale | Figure 11



Smithfield Road Mixed Use Development  
 Knightdale, NC

Pass-By Site Trip Assignment  
 Scale: Not to Scale | Figure 12



**Smithfield Road Mixed Use Development**  
Knightdale, NC

<b>Total Site Trip Assignment</b>	
Scale: Not to Scale	Figure 13

## **5. BUILD (2026) TRAFFIC CONDITIONS**

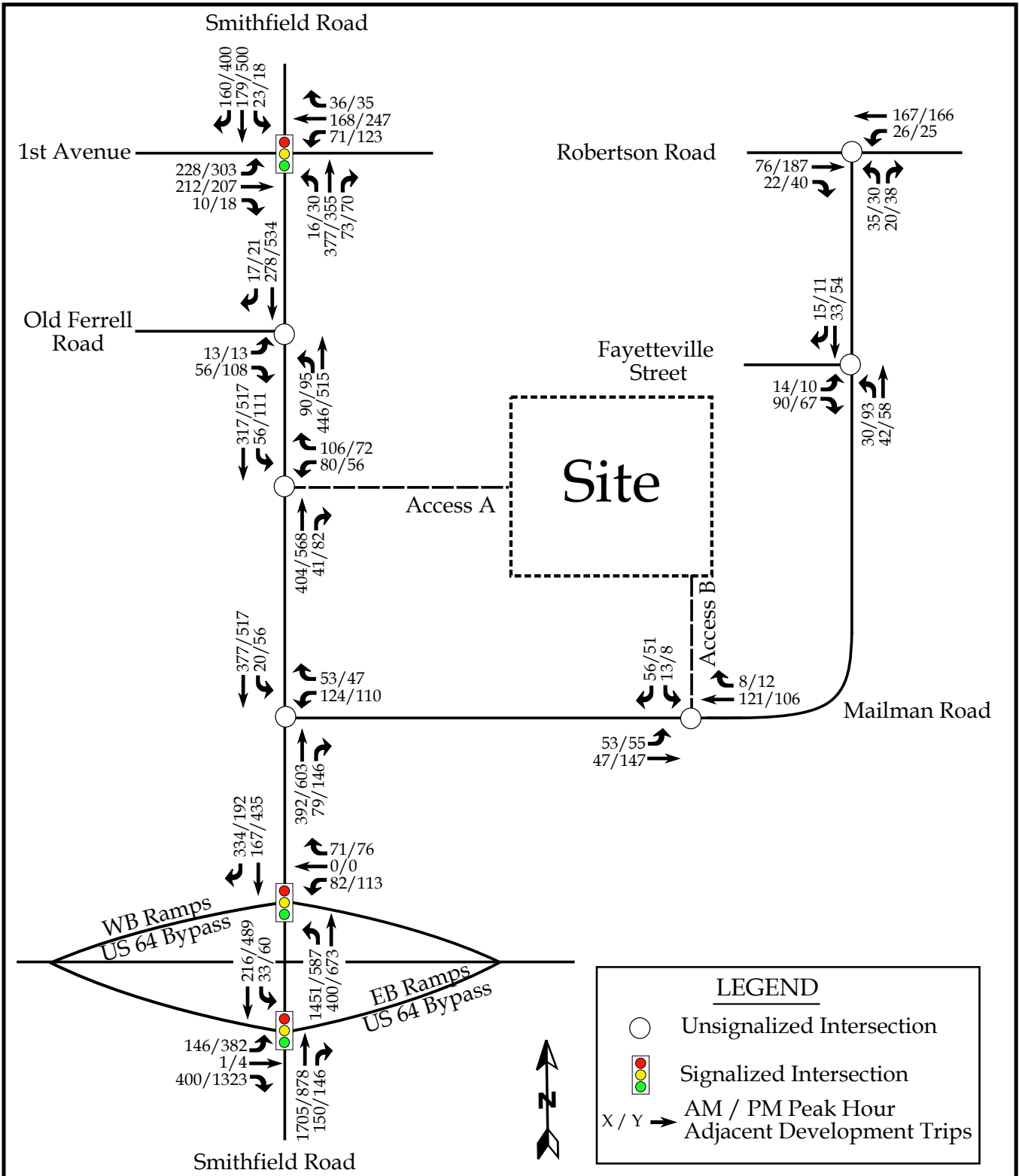
### **5.1. Build (2026) Peak Hour Traffic Volumes**

To estimate traffic conditions with the site fully built-out, the total site trips were added to the no-build (2026) traffic volumes to determine the build (2026) traffic volumes. Refer to Figure 14 for an illustration of the build (2026) peak hour traffic volumes with the proposed site fully developed.

### **5.2. Analysis of Build (2026) Peak Hour Traffic**

Study intersections were analyzed with the build (2026) traffic volumes using the same methodology previously discussed for existing and no-build traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The results of the capacity analysis for each intersection are presented in Section 8 of this report.





Smithfield Road Mixed Use Development  
 Knightdale, NC

Build (2026)  
 Peak Hour Traffic

Scale: Not to Scale | Figure 14

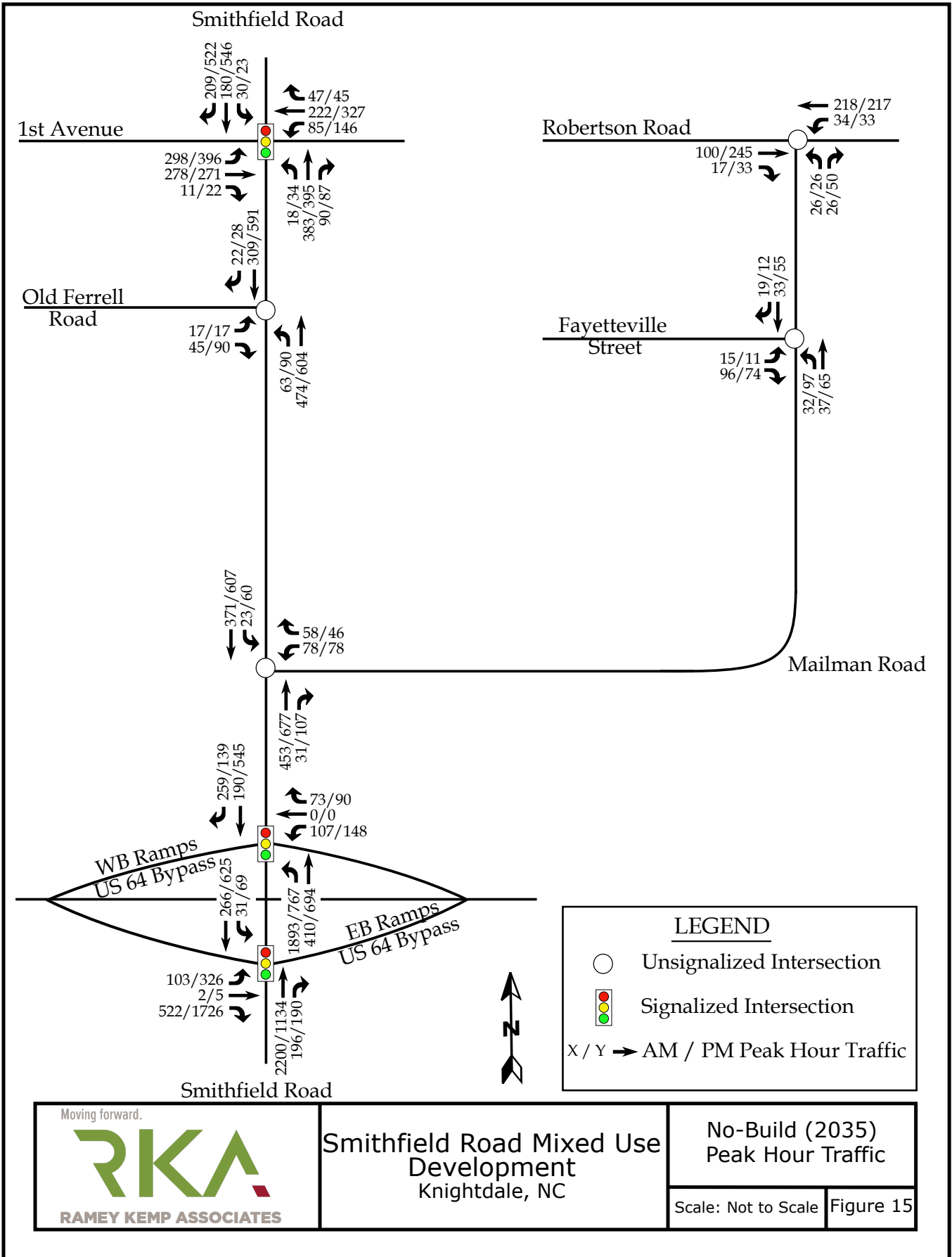
## **6. BUILD (2035) TRAFFIC CONDITIONS**

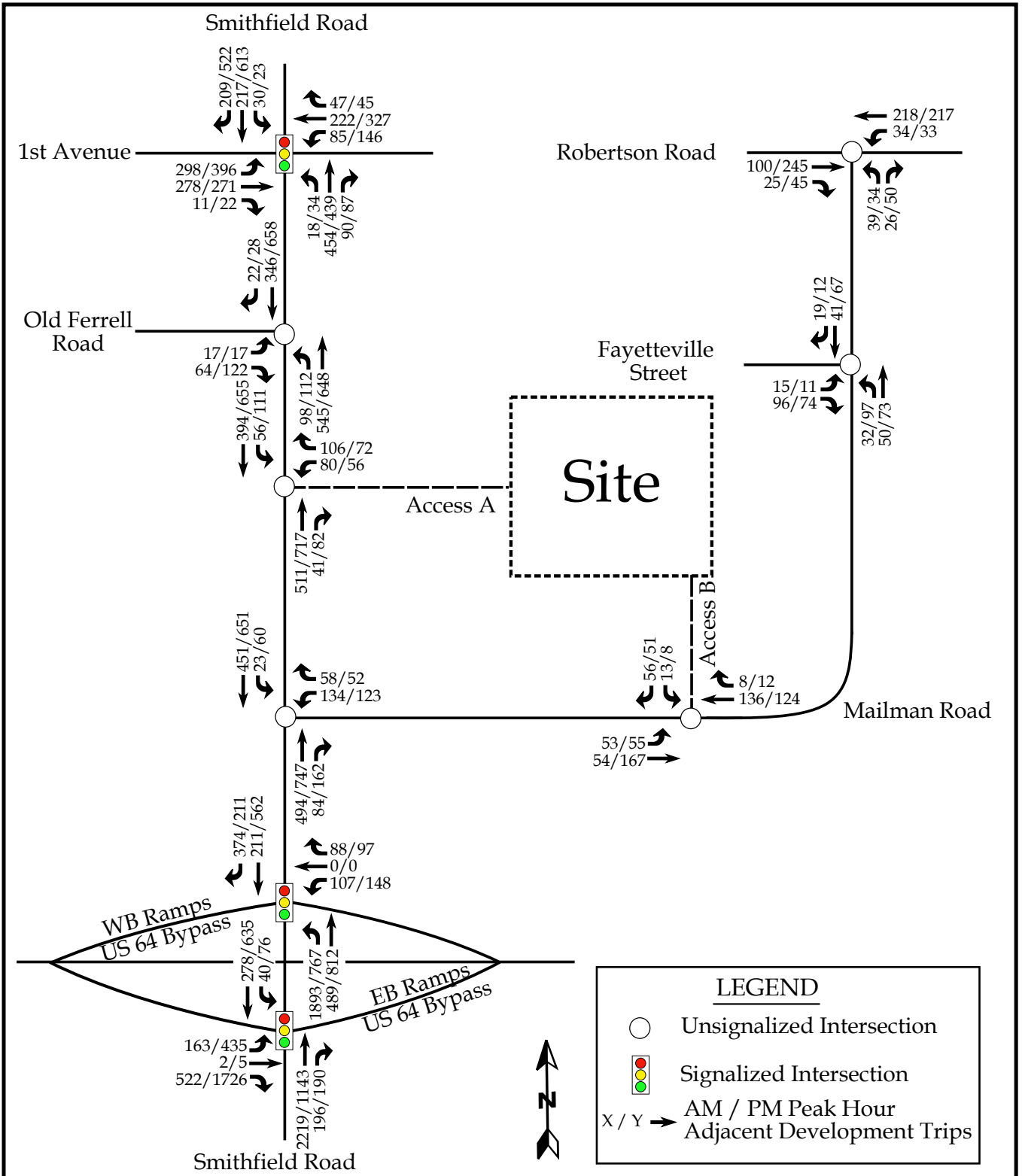
### **6.1. Build (2035) Peak Hour Traffic Volumes**

To estimate traffic conditions with the site fully built-out, existing volumes were grown to 2035. All other assumptions are the same as the 2026 scenarios. Refer to Figure 15 for an illustration of the No-Build (2035) peak hour traffic. The total site trips were added to the no-build (2035) traffic volumes to determine the build (2035) traffic volumes. Refer to Figure 16 for an illustration of the build (2035) peak hour traffic volumes with the proposed site fully developed.

### **6.2. Analysis of Build (2035) Peak Hour Traffic**

Study intersections were analyzed with the build (2035) traffic volumes using the same methodology previously discussed for existing and no-build traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The results of the capacity analysis for each intersection are presented in Section 8 of this report.





Smithfield Road Mixed Use Development  
Knightdale, NC

Future (2035)  
Peak Hour Traffic

Scale: Not to Scale | Figure 16

**7. TRAFFIC ANALYSIS PROCEDURE**

Study intersections were analyzed using the methodology outlined in the *Highway Capacity Manual* (HCM), 6<sup>th</sup> 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 4 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 4: 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

**7.1. Adjustments to Analysis Guidelines**

Capacity analysis at all study intersections was completed according to the NCDOT Congestions Management Guidelines.

**8. CAPACITY ANALYSIS**

**8.1. Smithfield Road [NB-SB] and US Highway 64 Bypass Eastbound Ramps [EB]**

The existing unsignalized intersection of Smithfield and US Highway 64 Bypass Eastbound Ramps was analyzed under existing (2020), no-build (2026), build (2026), future (2035), and future (2045) traffic conditions with lane configurations and traffic control shown in Table 5. Refer to Table 5 for a summary of the analysis results. Refer to Appendix F for the Synchro capacity analysis reports.

**Table 5: Analysis Summary of Smithfield Road and US Highway 64 Bypass Eastbound Ramps**

ANALYSIS SCENARIO	Node	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
				Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	1	EB NB SB	1 LT-TH, 1 RT 1 TH, 1 TH-RT 1 LT, 1 TH	D A B	B (15.7)	F A D	F (85.1)
No-Build (2026) Conditions	1	EB NB SB	1 LT-TH, 1 RT 1 TH, 1 TH-RT 1 LT, 1 TH	D B B	B (19.5)	F B D	F (154.9)
Build (2026) Conditions	1	EB NB SB	1 LT-TH, 1 RT 1 TH, 1 TH-RT 1 LT, 1 TH	D B B	C (22.8)	F B D	F (165.4)
Future (2035) Conditions	1	EB NB SB	1 LT-TH, 1 RT 1 TH, 1 TH-RT 1 LT, 1 TH	E E C	D (53.9)	F B D	F (336.1)
Future (2045) Conditions	1	WB NB	2 TH 1 LT	A E	B (10.2)	A D	B (18.0)
	11	WB SB	2 TH 1 TH	B D	B (18.5)	C C	C (25.6)

Capacity analysis of existing (2020), no-build (2026), and build (2026) traffic conditions indicates overall intersection is expected to function at an overall LOS F during PM peak hour under all conditions.

With the addition of the site traffic no significant increase in delay is expected during either the AM or PM peak hour. The proposed development is expected to account for approximately 4% of the build (2026) traffic at this intersection during the weekday AM and PM peak hours.

The interchange of US Highway 64 Bypass and Smithfield Road is expected to be converted to a diverging diamond interchange (DDI) upon the completion of TIP I-6007. Under the future (2045) conditions the intersection is expected to operate at a LOS C or better during all scenarios. Furthermore, it should be noted that if any improvements were implemented at this intersection, upon the completion of I-6007 these improvements would be removed.

Due to the low impacts to delay at this intersection by the proposed development, low percentage of traffic expected to be added to this intersection, and future improvements are planned to be constructed at this intersection, improvements are not recommended at this intersection by the proposed development. Although the current timeline for construction of this project is not known, the schedule prior to the pandemic had been with construction expected in 2026.

### 8.2. Smithfield Road [NB-SB] and US Highway 64 Bypass Westbound Ramps [WB]

The existing unsignalized intersection of Smithfield Road and US Highway 64 Bypass Westbound Ramps was analyzed under existing (2020), no-build (2026), build (2026), future (2035), and future (2045) traffic conditions with existing lane configurations and traffic control. Refer to Table 6 for a summary of the analysis results. Refer to Appendix G for the Synchro capacity analysis reports.

**Table 6: Analysis Summary of Smithfield Road and US Highway 64 Bypass Westbound Ramps**

ANALYSIS SCENARIO	NODE	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
				Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	2	WB NB SB	1 LT-TH, 1 RT 1 LT, 1 LT-TH 1 TH, 1 RT	D B C	C (21.1)	D C D	C (32.5)
No-Build (2026) Conditions	2	WB NB SB	1 LT-TH, 1 RT 1 LT, 1 LT-TH 1 TH, 1 RT	D C C	C (30.5)	D C D	D (39.0)
Build (2026) Conditions	2	WB NB SB	1 LT-TH, 1 RT 1 LT, 1 LT-TH 1 TH, 1 RT	D D C	D (35.4)	D C F	D (50.8)
Future (2035) Conditions	2	WB NB SB	1 LT-TH, 1 RT 1 LT, 1 LT-TH 1 TH, 1 RT	D F C	F (129.4)	D E F	F (106.9)
Future (2045) Conditions	2	WB SB	1 TH 1 RT	A C	A (8.3)	A C	A (9.8)
	22	EB NB	1 TH 1 TH	C C	C (28.9)	C D	D (36.7)
	222	EB SB	1 TH 1 LT	A B	A (8.1)	A B	A (6.9)

Capacity analysis of existing (2020) traffic conditions indicates the overall intersection is expected to operate at an overall LOS D or better during the existing (2020), no-build (2026), and build (2026) conditions. Under no-build (2026) traffic conditions, the southbound approach is expected to operate at LOS C during the AM peak hour and a LOS D during the



PM peak hour. Under build (2026) traffic conditions, the southbound approach is expected to operate at LOS F during the PM peak hour.

The interchange of US Highway 64 Bypass and Smithfield Road is expected to be converted to a diverging diamond interchange (DDI) upon the completion of TIP I-6007. Under the Build (2040) conditions the intersection is expected to operate at a LOS C or better during all scenarios. Furthermore, it should be noted that if any improvements were implemented at this intersection, upon the completion of I-6007 these improvements would be removed.

Due to the low impacts to delay at this intersection by the proposed development, low percentage of traffic expected to be added to this intersection, and future improvements are planned to be constructed at this intersection, improvements are not recommended at this intersection by the proposed development. Although the current timeline for construction of this project is not known, the schedule prior to the pandemic had been with construction expected in 2026.

### 8.3. Smithfield Road [NB-SB] and Mailman Road [WB]

The existing unsignalized intersection of Smithfield Road and Mailman Road was analyzed under existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions with the lane configurations and traffic control shown in Table 7. Refer to Table 7 for a summary of the analysis results. Refer to Appendix H for the Synchro capacity analysis reports.

**Table 7: Analysis Summary of Smithfield Road and Mailman Road**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	B <sup>2</sup> -- A <sup>1</sup>	N/A	C <sup>2</sup> -- A <sup>1</sup>	N/A
No-Build (2026) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	C <sup>2</sup> -- A <sup>1</sup>	N/A	E <sup>2</sup> -- A <sup>1</sup>	N/A
No-Build (2026) Conditions - Roundabout	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A <sup>3</sup> A <sup>3</sup> A <sup>3</sup>	A (7.1)	A <sup>3</sup> B <sup>3</sup> B <sup>3</sup>	B (11.8)
Build (2026) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	D <sup>2</sup> -- A <sup>1</sup>	N/A	F <sup>2</sup> -- A <sup>1</sup>	N/A
Build (2026) Conditions - Roundabout	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A <sup>3</sup> A <sup>3</sup> A <sup>3</sup>	A (8.8)	B <sup>3</sup> C <sup>3</sup> B <sup>3</sup>	C (16.0)
Build (2026) Conditions with Signalization	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	B B B	B (12.0)	C B B	B (14.7)
Future (2035) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	C B B	B (13.7)	D B D	C (33.5)

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

Capacity analysis of existing (2020) traffic conditions indicates the minor-street movement and major-street left-turn movement currently operates at LOS C or better. Under no-build (2026) traffic conditions, the minor-street is expected to operate at a LOS E or better. Under

build (2026) traffic conditions, the minor-street is expected to operate at an LOS D during the weekday AM peak hour and LOS F during the weekday PM peak hour.

The installation of a roundabout was considered at the intersection of Smithfield Road and Mailman Road based on coordination with the Town. The roundabout is expected to operate at a LOS B or better under no-build (2026) conditions. Under build (2026) conditions the roundabout is expected to operate at an overall LOS C or better. However, a flow scale analysis was performed on the roundabout and it was determined that the roundabout would reach capacity in approximately 2 years during the PM peak hour. Additionally, due to the size of the roundabout the businesses and homes around the intersection would be impacted by the construction of the roundabout. Due to these reasons, a roundabout is not recommended.

Although it is not uncommon for a minor-street approach to operate at a poor level of service with a high volume of through traffic on the main-line approach, a signal was considered at this intersection under build (2026) conditions. With signalization, the intersection is expected to operate at an overall LOS B during the weekday AM and PM peak hours under build (2026) conditions. The intersection is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours under future (2035) conditions. Peak hour signal warrants were also reviewed under build (2026) conditions following the methodology contained in the Manual on Uniform Traffic Control Devices (MUTCD). The intersection is expected to meet warrants under the weekday AM and PM peak hours. Due to this, signalization is recommended by the proposed development.

**8.4. Smithfield Road [NB-SB] and Old Ferrell Road [EB]**

The existing unsignalized intersection of Smithfield Road and Mailman Road was analyzed under existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions with the lane configurations and traffic control shown in Table 8. Refer to Table 8 for a summary of the analysis results. Refer to Appendix I for the Synchro capacity analysis reports.

**Table 8: Analysis Summary of Smithfield Road and Old Ferrell Road**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH- RT	B <sup>2</sup> A <sup>1</sup> --	N/A	B <sup>2</sup> A <sup>1</sup> --	N/A
No-Build (2026) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH- RT	B <sup>2</sup> A <sup>1</sup> --	N/A	C <sup>2</sup> A <sup>1</sup> --	N/A
Build (2026) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH- RT	B <sup>2</sup> A <sup>1</sup> --	N/A	C <sup>2</sup> A <sup>1</sup> --	N/A
Future (2035) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH- RT	C <sup>2</sup> A <sup>1</sup> --	N/A	E <sup>2</sup> A <sup>1</sup> --	N/A

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

Capacity analysis of existing (2020) traffic conditions indicates the minor-street movement and major-street left-turn movement currently operates at LOS B or better. Under no-build (2026) traffic conditions, the minor-street is expected to operate at a LOS C or better. No significant increase in delay or queue lengths are expected with completion of the proposed development. Due to the negligible impacts caused by the proposed development and the acceptable operations expected, no improvements are recommended by the proposed development.

Moving forward.

**8.5. Smithfield Road [NB-SB] and 1<sup>st</sup> Avenue [EB-WB]**

The existing signalized intersection of Smithfield Road / 1<sup>st</sup> Avenue was analyzed under existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions with existing lane configurations and traffic control. Refer to Table 9 for a summary of the analysis results. Refer to Appendix J for the Synchro capacity analysis reports.

**Table 9: Analysis Summary Smithfield Road and 1<sup>st</sup> Avenue**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	EB	1 LT-TH-RT	B	B (16.5)	D	E (62.7)
	WB	1 LT-TH-RT	A			
	NB	1 LT-TH-RT	B			
	SB	1 LT-TH-RT	C			
No-Build (2026) Conditions	EB	1 LT-TH-RT	C	C (23.6)	E	F (167.0)
	WB	1 LT-TH-RT	B			
	NB	1 LT-TH-RT	C			
	SB	1 LT-TH-RT	C			
Build (2026) Conditions	EB	1 LT-TH-RT	C	C (26.4)	E	F (197.2)
	WB	1 LT-TH-RT	B			
	NB	1 LT-TH-RT	C			
	SB	1 LT-TH-RT	C			
Future (2035) Conditions	EB	1 LT-TH-RT	E	E (60.8)	F	F (351.4)
	WB	1 LT-TH-RT	B			
	NB	1 LT-TH-RT	E			
	SB	1 LT-TH-RT	E			

Capacity analysis of existing (2020) traffic conditions indicates the intersection of Smithfield Road and 1<sup>st</sup> Avenue is expected to operate at LOS E or better during the weekday AM and PM peak hours. The intersection is expected to operate at LOS F during all future weekday PM peak hours after closure of the Fayetteville Street grade separation (Y-4805F).

The proposed development is expected to account for approximately 7% of the weekday AM and PM peak hour traffic at this intersection under build (2026) conditions. This analysis also considered the rerouting of traffic associated with the Y-4805F project which is planned to

close the railroad crossing for Fayetteville Street, just north of this intersection. It should be noted that while the Y-4805F adjustments have been implemented during all future analysis, no improvements have been identified. There is a potential that as the project progresses that improvements will be identified and the delay at the intersection will be improved.

**8.6. Mailman Road [NB] and Robertson Street [EB]/Knightdale Eagle Rock Road [WB]**

The proposed intersection of Mailman Road and Robertson Street/ Knightdale Eagle Rock Road was analyzed under build (2026) and future (2035) traffic conditions with the lane configurations and traffic control shown in Table 10. Refer to Table 10 for a summary of the analysis results. Refer to Appendix K for the Synchro capacity analysis reports.

**Table 10: Analysis Summary of Mailman Road and Robertson Street/ Knightdale Eagle Rock Road**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	EB	1 TH-RT	--	N/A	--	N/A
	WB	1 LT-TH	A <sup>1</sup>			
	NB	1 LT-RT	A <sup>2</sup>			
No-Build (2026) Conditions	EB	1 TH-RT	--	N/A	--	N/A
	WB	1 LT-TH	A <sup>1</sup>			
	NB	1 LT-RT	B <sup>2</sup>			
Build (2026) Conditions	EB	1 TH-RT	--	N/A	--	N/A
	WB	1 LT-TH	A <sup>1</sup>			
	NB	1 LT-RT	B <sup>2</sup>			
Future (2035) Conditions	EB	1 TH-RT	--	N/A	--	N/A
	WB	1 LT-TH	A <sup>1</sup>			
	NB	1 LT-RT	B <sup>2</sup>			

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

Capacity analysis of existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions indicates the minor-street approach and major-street left-turns are expected to operate at LOS B or better during the weekday AM and PM peak hours. No significant queuing issues are expected.

**8.7. Mailman Road [NB-SB] and Fayetteville Street [EB]**

The proposed unsignalized intersection of Mailman Road and Fayetteville was analyzed under build (2026) and future (2035) traffic conditions with lane configurations and traffic control shown in Table 11. Refer to Table 11 for a summary of the analysis results. Refer to Appendix L for the Synchro capacity analysis reports.

**Table 11: Analysis Summary of Mailman Road and Fayetteville**

**Street**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	A <sup>2</sup> A <sup>1</sup> --	N/A	A <sup>2</sup> A <sup>1</sup> --	N/A
No-Build (2026) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	A <sup>2</sup> A <sup>1</sup> --	N/A	A <sup>2</sup> A <sup>1</sup> --	N/A
Build (2026) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	A <sup>2</sup> A <sup>1</sup> --	N/A	A <sup>2</sup> A <sup>1</sup> --	N/A
Future (2035) Conditions	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	A <sup>2</sup> A <sup>1</sup> --	N/A	A <sup>2</sup> A <sup>1</sup> --	N/A

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

Capacity analysis of existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions indicates the minor-street approach and major-street left-turns are expected to operate at LOS A or better during the weekday AM and PM peak hours. No significant queuing issues are expected.



**8.8. Smithfield Road [NB-SB] and Site Drive 1 [EB]**

The unsignalized intersection of Smithfield Road and Site Drive 1 was analyzed under build (2026) and future (2035) traffic conditions with lane configurations and traffic control shown in Table 12. Refer to Table 12 for a summary of the analysis results. Refer to Appendix M for the Synchro capacity analysis reports.

**Table 12: Analysis Summary of Smithfield Road and Site Drive**

**1**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Build (2026) Conditions	WB NB SB	<b>1 LT-RT</b> 1 TH, <b>1 RT</b> 1 LT, <b>1 TH</b>	C <sup>2</sup> -- A <sup>1</sup>	N/A	F <sup>2</sup> -- A <sup>1</sup>	N/A
Future (2035) Conditions	WB NB SB	<b>1 LT-RT</b> 1 TH, <b>1 RT</b> 1 LT, <b>1 TH</b>	D <sup>2</sup> -- A <sup>1</sup>	N/A	F <sup>2</sup> -- B <sup>1</sup>	N/A

Improvements to lane configurations are shown in bold.

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

Capacity analysis of build (2026) and future (2035) traffic conditions indicates the minor-street approach at the intersection of Smithfield Road and Site Drive 1 is expected to operate at LOS B or better during the weekday AM and PM peak hours.

Turn lanes were considered at the site driveway according to the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. A left-turn lane is recommended at the southbound approach while a right-turn lane is recommended at the northbound approach.

Moving forward.

**8.9. Mailman Road [EB-WB] and Site Drive 2 [NB]**

The unsignalized intersection of Mailman Road and Site Drive 2 was analyzed under build (2026) and future (2035) traffic conditions with lane configurations and traffic control shown in Table 13. Refer to Table 13 for a summary of the analysis results. Refer to Appendix N for the Synchro capacity analysis reports.

**Table 13: Analysis Summary of Mailman Road and Site Drive 2**

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Build (2026) Conditions	EB	1 LT-TH	A <sup>1</sup>	N/A	A <sup>1</sup>	N/A
	WB	1 TH-RT	--		--	
	SB	<b>1 LT-RT</b>	A <sup>2</sup>		A <sup>2</sup>	
Future (2035) Conditions	EB	1 LT-TH	A <sup>1</sup>	N/A	A <sup>1</sup>	N/A
	WB	1 TH-RT	--		--	
	SB	<b>1 LT-RT</b>	A <sup>2</sup>		A <sup>2</sup>	

Improvements to lane configurations are shown in bold.

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

Capacity analysis of build (2026) and future (2035) traffic conditions indicates the minor-street approach at the intersection of Mailman Road and Site Drive 2 is expected to operate at LOS A during the weekday AM and PM peak hours.

Turn lanes were considered at the site driveway according to the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. Due to the low volume of traffic expected on Mailman Road under build (2026) conditions, turn-lanes are not expected to be triggered at the site driveway along Mailman Road.

## 9. CONCLUSIONS

This Traffic Impact Analysis was conducted to determine the potential traffic impacts of the proposed Smithfield Road Mixed-Use development to be located along Smithfield Road and Mailman Road in Knightdale, North Carolina. The proposed development is expected to be a mixed-use development and be built out in 2026. Site access to the parcel is proposed via one full movement driveway along Smithfield Road and one full access driveway along Mailman Road.

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- Existing (2020) Traffic Conditions
- No-Build (2026) Traffic Conditions
- Build (2026) Traffic Conditions
- Future (2035) Traffic Conditions
- Future (2045) Traffic Conditions (US 64 Bypass interchange only)

### Trip Generation

It is estimated that the proposed development will generate approximately 436 primary trips (167 entering and 269 exiting) during the weekday AM peak hour and 551 primary trips (312 entering and 239 exiting) during the weekday PM peak hour.

### Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to NCDOT Congestion Management Guidelines. Refer to section 7.1 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 with the exception of the intersections listed below. A summary of the study area intersections that are expected to need improvements are as follows:

### Smithfield Road and Eastbound US Highway 64 Bypass

Capacity analysis of existing (2020), no-build (2026), and build (2026) traffic conditions indicates overall intersection is expected to function at an overall LOS F during PM peak hour under all conditions. With the addition of the site traffic no significant increase in delay is expected during either the AM or PM peak hour. The proposed development is expected to account for approximately 4% of the build (2026) traffic at this intersection during the weekday AM and PM peak hours. The interchange of US Highway 64 Bypass and Smithfield Road is expected to be converted to a diverging diamond interchange (DDI) upon the completion of TIP I-6007. Under the future (2045) conditions the intersection is expected to operate at a LOS C or better during all scenarios. Furthermore, it should be noted that if any improvements were implemented at this intersection, upon the completion of I-6007 these improvements would be removed. Due to the low impacts to delay at this intersection by the proposed development, low percentage of traffic expected to be added to this intersection, and future improvements are planned to be constructed at this intersection, improvements are not recommended at this intersection by the proposed development. Although the current timeline for construction of this project is not known, the schedule prior to the pandemic had been with construction expected in 2026.

### Smithfield Road and Westbound US Highway 64 Bypass

Capacity analysis of existing (2020) traffic conditions indicates the overall intersection is expected to operate at an overall LOS D or better during the existing (2020), no-build (2026), and build (2026) conditions. Under no-build (2026) traffic conditions, the southbound approach is expected to operate at LOS C during the AM peak hour and a LOS D during the PM peak hour. Under build (2026) traffic conditions, the southbound approach is expected to operate at LOS F during the PM peak hour. The interchange of US Highway 64 Bypass and Smithfield Road is expected to be converted to a diverging diamond interchange (DDI) upon the completion of TIP I-6007. Under the Build (2040) conditions the intersection is expected to operate at a LOS C or better during all scenarios. Furthermore, it should be noted that if any improvements were implemented at this intersection, upon the completion of I-6007 these improvements would be removed. Due to the low impacts to delay at this intersection by the proposed development, low percentage of traffic expected to be added to this intersection, and future improvements are

planned to be constructed at this intersection, improvements are not recommended at this intersection by the proposed development. Although the current timeline for construction of this project is not known, the schedule prior to the pandemic had been with construction expected in 2026.

### Smithfield Road and Mailman Road

Capacity analysis of existing (2020) traffic conditions indicates the minor-street movement and major-street left-turn movement currently operates at LOS C or better. Under no-build (2026) traffic conditions, the minor-street is expected to operate at a LOS E or better. Under build (2026) traffic conditions, the minor-street is expected to operate at an LOS D during the weekday AM peak hour and LOS F during the weekday PM peak hour. The installation of a roundabout was considered at the intersection of Smithfield Road and Mailman Road based on coordination with the Town. The roundabout is expected to operate at a LOS B or better under no-build (2026) conditions. Under build (2026) conditions the roundabout is expected to operate at an overall LOS C or better. However, a flow scale analysis was performed on the roundabout and it was determined that the roundabout would reach capacity in approximately 2 years during the PM peak hour. Additionally, due to the size of the roundabout the businesses and homes around the intersection would be impacted by the construction of the roundabout. Due to these reasons, a roundabout is not recommended. Although it is not uncommon for a minor-street approach to operate at a poor level of service with a high volume of through traffic on the main-line approach, a signal was considered at this intersection under build (2026) conditions. With signalization, the intersection is expected to operate at an overall LOS B during the weekday AM and PM peak hours under build (2026) conditions. The intersection is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours under future (2035) conditions. Peak hour signal warrants were also reviewed under build (2026) conditions following the methodology contained in the Manual on Uniform Traffic Control Devices (MUTCD). The intersection is expected to meet warrants under the weekday AM and PM peak hours. Due to this, signalization is recommended by the proposed development.

### Smithfield Road and Old Ferrell Road

Capacity analysis of existing (2020) traffic conditions indicates the minor-street movement and major-street left-turn movement currently operates at LOS B or better. Under no-build (2026) traffic conditions, the minor-street is expected to operate at a LOS C or better. No significant increase in delay or queue lengths are expected with completion of the proposed development. Due to the negligible impacts caused by the proposed development and the acceptable operations expected, no improvements are recommended by the proposed development.

### Smithfield Road and 1<sup>st</sup> Avenue

Capacity analysis of existing (2020) traffic conditions indicates the intersection of Smithfield Road and 1<sup>st</sup> Avenue is expected to operate at LOS E or better during the weekday AM and PM peak hours. The intersection is expected to operate at LOS F during all future weekday PM peak hours after closure of the Fayetteville Street grade separation (Y-4805F). The proposed development is expected to account for approximately 7% of the weekday AM and PM peak hour traffic at this intersection under build (2026) conditions. This analysis also considered the rerouting of traffic associated with the Y-4805F project which is planned to close the railroad crossing for Fayetteville Street, just north of this intersection. It should be noted that while the Y-4805F adjustments have been implemented during all future analysis, no improvements have been identified. There is a potential that as the project progresses that improvements will be identified and the delay at the intersection will be improved.

### Mailman Road and Robertson Street

Capacity analysis of existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions indicates the minor-street approach and major-street left-turns are expected to operate at LOS B or better during the weekday AM and PM peak hours. No significant queuing issues are expected.

### Mailman Road and Fayetteville Street

Capacity analysis of existing (2020), no-build (2026), build (2026), and future (2035) traffic conditions indicates the minor-street approach and major-street left-turns are expected to operate at LOS A or better during the weekday AM and PM peak hours. No significant queuing issues are expected.

### Smithfield Road and Site Drive 1

Capacity analysis of build (2026) and future (2035) traffic conditions indicates the minor-street approach at the intersection of Smithfield Road and Site Drive 1 is expected to operate at LOS B or better during the weekday AM and PM peak hours. Turn lanes were considered at the site driveway according to the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. A left-turn lane is recommended at the southbound approach while a right-turn lane is recommended at the northbound approach.

### Mailman Road and Site Drive 2

Capacity analysis of build (2026) and future (2035) traffic conditions indicates the minor-street approach at the intersection of Mailman Road and Site Drive 2 is expected to operate at LOS A during the weekday AM and PM peak hours. Turn lanes were considered at the site driveway according to the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. Due to the low volume of traffic expected on Mailman Road under build (2026) conditions, turn-lanes are not expected to be triggered at the site driveway along Mailman Road.

## 10. RECOMMENDATIONS

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 14 for an illustration of the recommended lane configuration for the proposed development.

### Recommended Improvements by Developer

#### Smithfield Road and Mailman Road

- Monitor for signalization and install once warranted and approved by NCDOT.

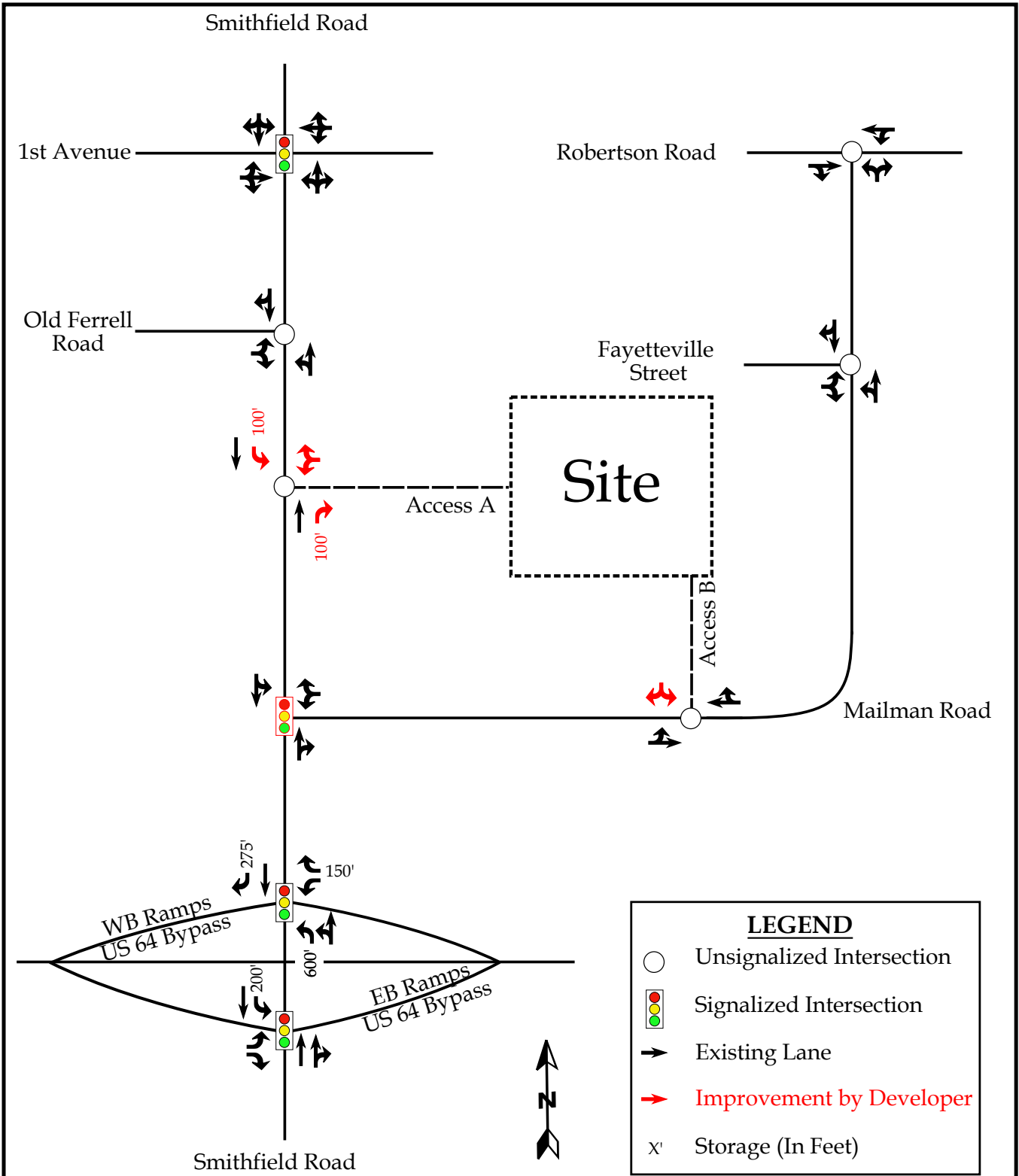
#### Smithfield Road and Access 1

- Construct Access 1 with one ingress lane and one egress lane (one shared left-right).
- Construct a northbound right turn lane with 100 feet of storage and appropriate taper.
- Construct a southbound left turn lane with 100 feet of storage and appropriate taper.

#### Mailman Road and Access 2

- Construct Access 2 with one ingress lane and one egress lane (one shared left-right).





Smithfield Road Mixed Use  
Development  
Knightdale, NC

Recommended Lane  
Configuration

Scale: Not to Scale | Figure 17

