FINAL Swansboro Starbucks Traffic Impact Analysis

Swansboro, North Carolina

September 28, 2022

Prepared for:

Vaquero Swansboro Partners, LP
29009 Wingate Street, Suite 200
Fort Worth, TX 76107

Prepared by:

Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606

Sign-off Sheet

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Prepared by Pierre Tong

(signature)

Pierre Tong, PE

Reviewed by

(signature)

Jeff Weller, PE

Approved by Christa Greene

(signature)

Christa Greene, PE

9/28/22

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Executive Summary

The proposed Starbucks is included as an outparcel for the existing Walmart development located on the south side of NC 24 (West Corbett Avenue) and west of SR 1511 (Hammocks Beach Road) in Swansboro, NC. The proposed development will consist of a 2,223 square-foot coffee shop with a drive-thru and is expected to be complete in 2023.

The proposed development is expected to generate 1,186 trips per average weekday. In the AM and PM peak hours, the development is expected to generate 95 new AM peak hour trips (48 entering and 47 exiting) and 39 new PM peak hour trips (19 entering and 20 exiting). These peak hour trips would result in an approximate increase of 1.5% to the existing trips along the NC 24 corridor during the peak hours.

Access to the site is envisioned to be provided by connecting to the internal network established as part of the original Walmart development.

The purpose of this report is to evaluate the proposed development in terms of traffic conditions, evaluate the ability of the adjacent roadways to accommodate the additional traffic volumes, and recommend transportation improvements needed to mitigate congestion that may result from the additional site traffic. This report presents trip generation, trip distribution, traffic analysis, and recommendations for transportation improvements needed to meet anticipated traffic demands. This report examines the following scenarios for the AM and PM peak hours:

- 2022 Existing
- 2024 Off-season Background
- 2024 Seasonal Background
- 2024 Off-season Build
- 2024 Seasonal Build

Capacity analysis for the AM and PM peak hours in each scenario were performed for the following intersections:

- NC 24 (West Corbett Avenue) at SR 1509 (Queens Creek Road) / Swansboro Middle School Egress
- NC 24 (West Corbett Avenue) at SR 1445 (Norris Road) / Walmart Driveway 1
- NC 24 (West Corbett Avenue) at Walmart Driveway 2
- NC 24 (West Corbett Avenue) at SR 1511 (Hammocks Beach Road)

With the addition of traffic generated by the proposed development, there are no discernable differences in operations between the Background and Build scenarios for either seasonal or off-season analyses. Due to the minimal traffic impact, the existing infrastructure is able to accommodate the proposed development. Access to the internal road network should meet the design requirements in the Town of Swansboro Unified Development Ordinance.

Table ES-1 shows a summary of the capacity analysis results included in this Traffic Impact Analysis (TIA).

Table ES-1: Level of Service Summary Table

Level of Service (Delay, sec/veh)	2022 Existing		2024 No Build		2024 No Build - Seasonal Traffic		2024 Build		2024 Build - Seasonal Traffic	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
NC 24 & Queens Creek Road/Swansboro Middle School	C (30.2)	D (37.8)	C (33.9)	D (44.3)	D (38.3)	D (53.0)	C (34.5)	D (43.4)	D (39.4)	D (52.8)
NC 24 & Norris Road/Walmart Driveway 1	B (10.7)	B (19.9)	B (11.0)	B (18.9)	B (12.2)	C (23.7)	B (14.2)	C (21.6)	B (15.6)	C (25.3)
NC 24 & Walmart Driveway 2	B (11.0)	B (12.0)	B (11.3)	B (12.5)	B (11.5)	B (12.7)	B (11.5)	B (12.6)	B (11.7)	B (12.9)
NC 24 & Hammocks Beach Road	A (8.2)	B (10.6)	A (8.7)	B (10.2)	A (9.5)	B (12.4)	A (8.6)	B (10.5)	A (9.6)	B (12.2)

1.0 INTRODUCTION

The purpose of this report is to evaluate the transportation impacts of the proposed Starbucks outparcel development to the existing Walmart located on the south side of NC 24 (West Corbett Avenue) and west of SR 1511 (Hammocks Beach Road) in Swansboro, NC. The subject parcel is zoned B-1 – Highway Business which has the purpose of providing proper grouping of roadside business uses. This Traffic Impact Analysis (TIA) satisfies the Town of Swansboro Unified Development Ordinance (UDO) requirement of a traffic impact study for a special use permit (SUP) associated with sites expected to generate greater than 200 trips per day. The project location is shown below in Figure 1.

This report evaluates the feasibility of the adjacent transportation system to accommodate the total Build traffic demands of the proposed 2,223 square-foot coffee shop with drive-thru. The proposed development is expected to be complete during 2023 and, per the requirement in the Swansboro UDO that future year scenario analyses occur for Build year +1, the resulting future year analyses will be for 2024. Additionally, the UDO requires analyses for seasonal scenarios to determine the impacts on the adjacent transportation system during peak summer months.

Trip generation, trip distribution, and traffic analysis for the following AM and PM peak hour scenarios are included in this study:

- 2022 Existing
- 2024 Off-season Background
- 2024 Seasonal Background
- 2024 Off-season Build
- 2024 Seasonal Build

Figure 2 shows the conceptual site plan prepared by Franz Architects. An electronic copy of the site plan is provided in the appendix.

Figure 1: Site Location

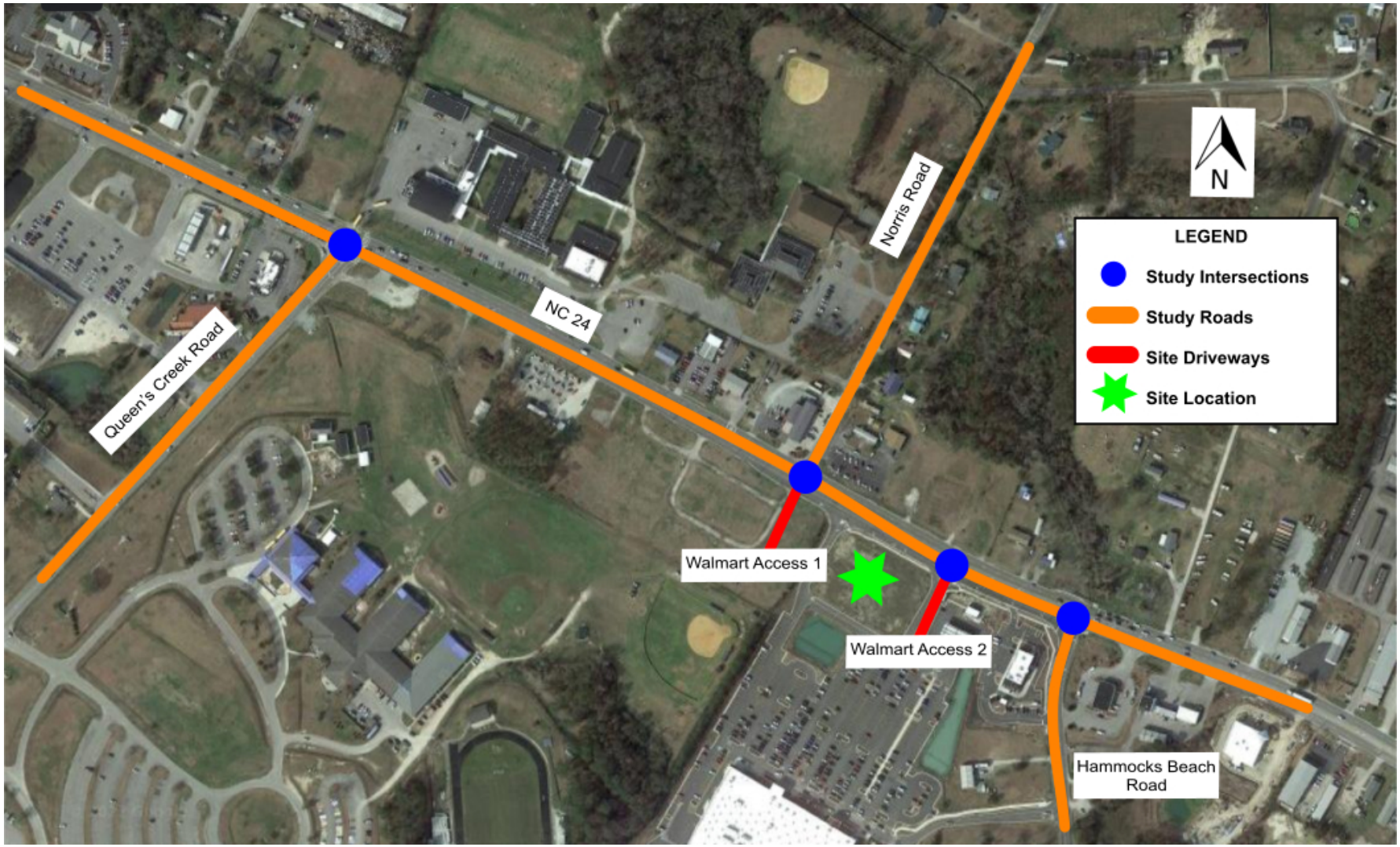
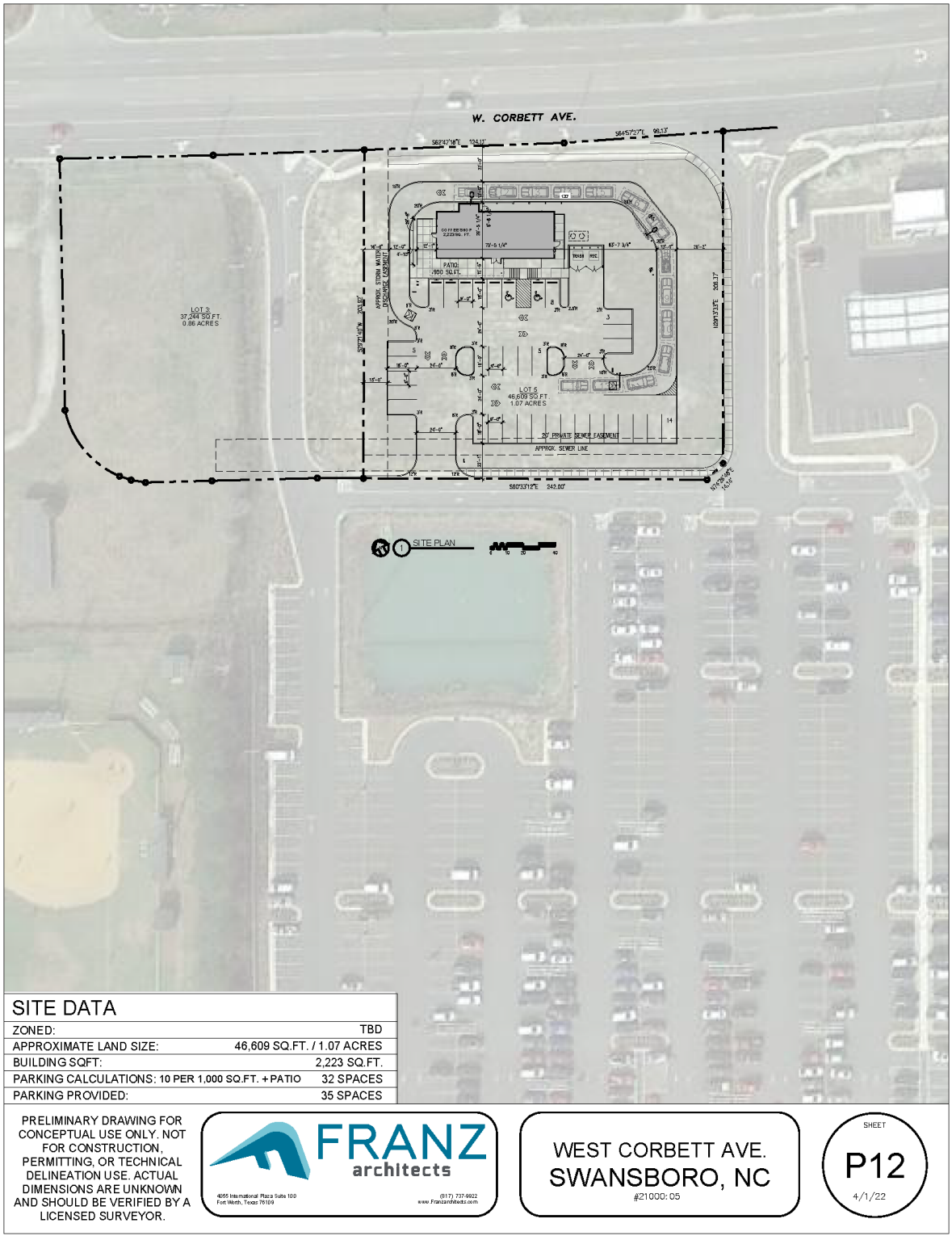


Figure 2: Site Plan



2.0 INVENTORY OF TRAFFIC CONDITIONS

2.1 STUDY AREA

Stantec coordinated with the Town of Swansboro to determine the appropriate study area and assumptions. The following intersections were agreed upon to be analyzed to determine the impacts associated with this development.

- NC 24 (West Corbett Avenue) at SR 1509 (Queens Creek Road) / Swansboro Middle School Egress
- NC 24 (West Corbett Avenue) at SR 1445 (Norris Road) / Walmart Driveway 1
- NC 24 (West Corbett Avenue) at Walmart Driveway 2
- NC 24 (West Corbett Avenue) at SR 1511 (Hammocks Beach Road)

2.2 PROPOSED ACCESS

Access to the site is envisioned to be provided by connecting to the established internal network of the Walmart development. The existing Walmart site connects to the adjacent public roadway network via Walmart Driveway 1 (located at the signalized intersection of West Corbett Avenue and Norris Road), Walmart Driveway 2 (a right-in / right-out driveway connecting to West Corbett Avenue) and Walmart Driveway 3 (a stop-controlled driveway connecting to Hammocks Beach Road).

2.3 EXISTING CONDITIONS

Table 1 provides a detailed description of the existing study area roadway network. All functional classification and average annual daily traffic (AADT) information were obtained from the North Carolina Department of Transportation (NCDOT).

Table 1: Existing Conditions

Road Name	Road Number	Primary Cross-Section	Functional Classification[1]	2020 AADT[2] (vpd)	Speed Limit (mph)	Bicycle/ Pedestrian Facilities	Maintenance Agency
West Corbett Avenue	NC 24	Four-Lane w/TWLTL	Principal Arterial	29,500	35	Limited Sidewalks	NCDOT
Queens Creek Road	SR 1509	Two-Lane w/TWLTL	Major Collector	11,000	45	None	NCDOT
Norris Road	SR 4445	Two-Lane Undivided	Local Road	-	45	None	NCDOT
Hammocks Beach Road	SR 1511	Two-Lane Undivided	Local Road	3,400	35	None	NCDOT

*TWLTL = Continuous Two-Way Left-Turn Lane

The existing lane configuration and traffic control for the study area intersections are illustrated in Figure 3.

2.4 FUTURE HIGHWAY IMPROVEMENTS

The NCDOT proposes to convert the NC 24 corridor from traditional intersections to reduced conflict intersections (RCIs) via State Transportation Improvement Program (STIP) Project R-5885. The project to convert the 3.0-mile corridor which extends beyond the study area of this analysis is currently slated to begin in FY 2027; construction is listed as Post Year and is therefore unfunded and uncommitted. The Draft 2024-2033 STIP further delays the proposed schedule and both ROW acquisition and construction are listed as Post Year. Due to the project delays and uncommitted status, it was determined that inclusion of any planned or proposed improvements associated with this project was unnecessary for the scope of this traffic study.

No approved developments were identified for the study area.

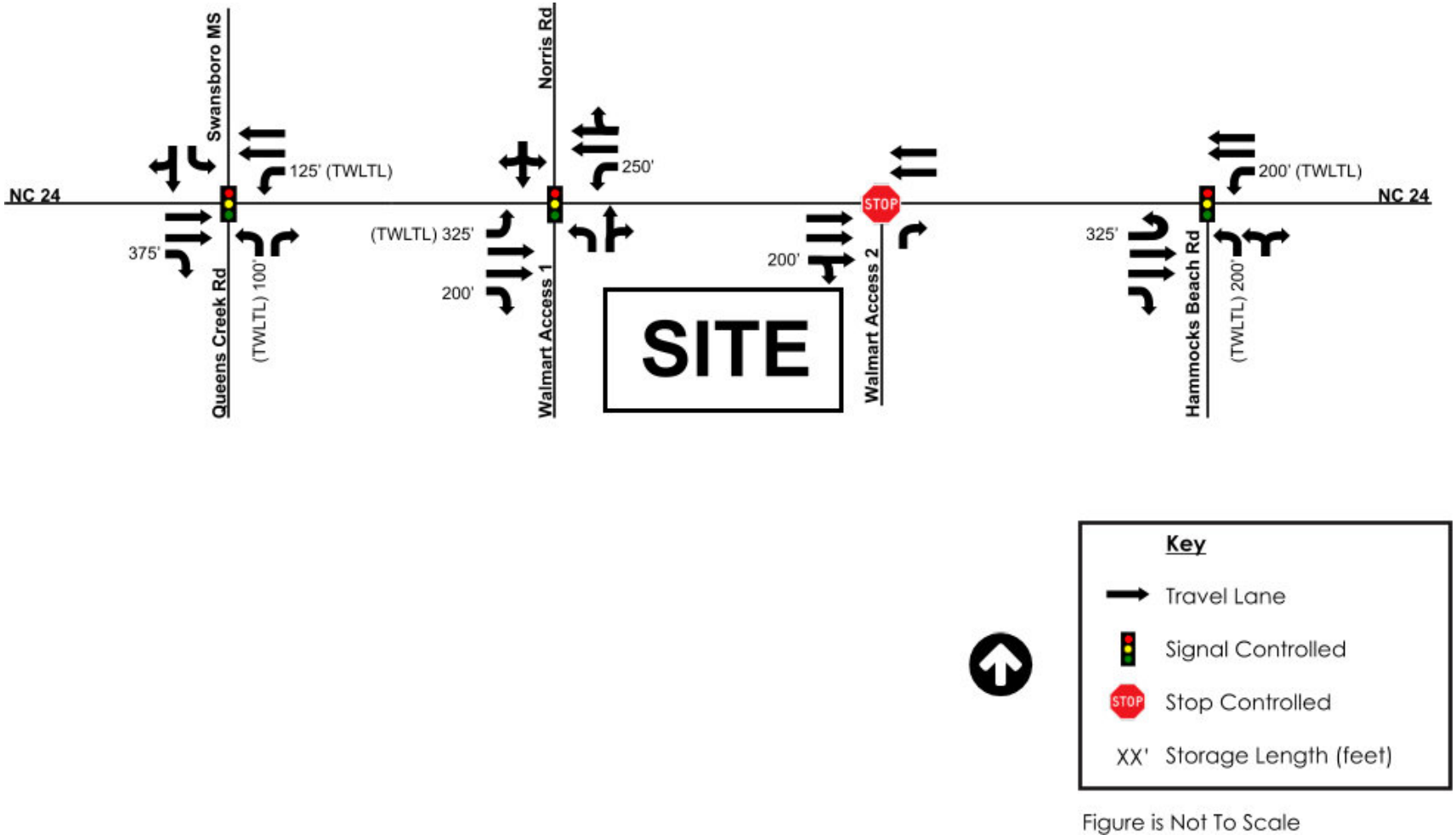
2.5 SAFETY ANALYSIS/REPORT

Crash data was obtained at the signalized study area intersections for the period of January 1, 2017 – December 31, 2021, via the Total Crash Frequency By Intersection[3] map publishing by the NCDOT Traffic Safety Unit. A total of 145 crashes were reported at these intersections and as expected, more than half (84 out of 145) are rear-end or sideswipe crashes which are often associated with congested conditions. There were a number of injury crashes during the analysis period with roughly 25% (36 out of 145) being classified as such. For reference, Table 2 below, provides definitions for each type of injury crashes. The majority of these injury crashes (29) were Type C, while the remaining 7 were classified as Type B injury crashes. No Fatalities or Type A injury crashes were reported. Additionally, a signal was installed at the intersection of NC 24 with Norris Road and incorporated a realignment of Walmart Driveway 1 during the 5-year period. It is assumed that this new signal was part of the Walmart development; however, it is expected that this signalization had a positive impact on the pattern and severity of crashes, although it is still in the evaluation period.

Table 2: Injury Classification

K	Fatality (Killed)
A	Incapacitating injury
B	Non-incapacitating injury
C	Reported injury, not evident

Figure 3: 2022 Existing Lanes and Traffic Control



3.0 TRIP GENERATION AND DISTRIBUTION

3.1 TRIP GENERATION

Table 3 below shows the number of anticipated trips that will be generated by the proposed development. These values are calculated using the 11th Edition of the Institute of Transportation Engineers Trip Generation Manual[4]. While no pass-by reductions are included in the current version of the Trip Generation Manual for this land use code, pass-by reduction rates were requested and approved as part of the scoping process for this study.

Table 3: Trip Generation

Trip Generation													
Land Use	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Coffee/Donut Shop with Drive-Through Window	937	2.223	1000 GFA	1186	593	593	191	97	94	87	43	44
				1186	593	593	191	97	94	87	43	44
Pass-Bys	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
							AM Pass-Bys: 50%			**PM Pass-Bys: 55%**		
Coffee/Donut Shop with Drive-Through Window	937	2.223	1000 GFA				96	49	47	48	24	24
Adjusted Trip Generation	**ITE LUC**	**Size**		**Daily**			**AM Peak**			**PM Peak**		
				Total	**Enter**	**Exit**	**Total**	**Enter**	**Exit**	**Total**	**Enter**	**Exit**
Coffee/Donut Shop with Drive-Through Window	937	2.223	1000 GFA	1186	593	593	95	48	47	39	19	20
Total Trips Generated				1186	593	593	95	48	47	39	19	20

3.2 SITE TRIP DISTRIBUTION

To accurately determine the effect of the proposed development on the surrounding roadway network, an estimate of the expected distribution of traffic entering and exiting the site is needed. The following percentages were used in both the AM and PM peak hours:

- 50% to/from the west on NC 24
- 40% to/from the east on NC 24
- 10% to/from the south on Queen's Creek Road

These percentages were developed using a combination of existing traffic volume counts, historic average annual daily traffic (AADT) recordings provided by NCDOT, and engineering judgment.

Figure 4 shows the distribution described above as well as the turning movement percentages at each intersection and Figure 5 shows the expected pass-by distribution. Figure 6 shows the actual trips that are expected to be generated through the study area intersections and Figure 7 shows the net pass-by trips that are expected to travel through the study area intersections.

Figure 4: Site Trip Distribution

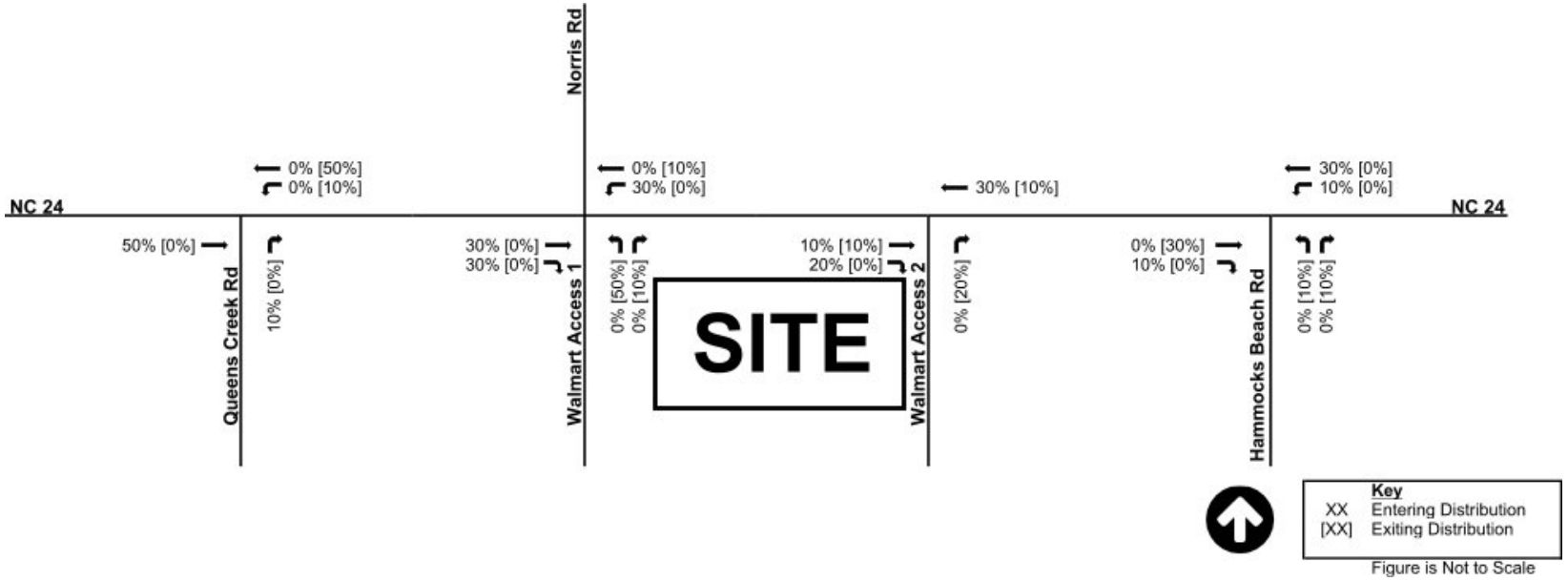


Figure 5: Pass-By Trip Distribution

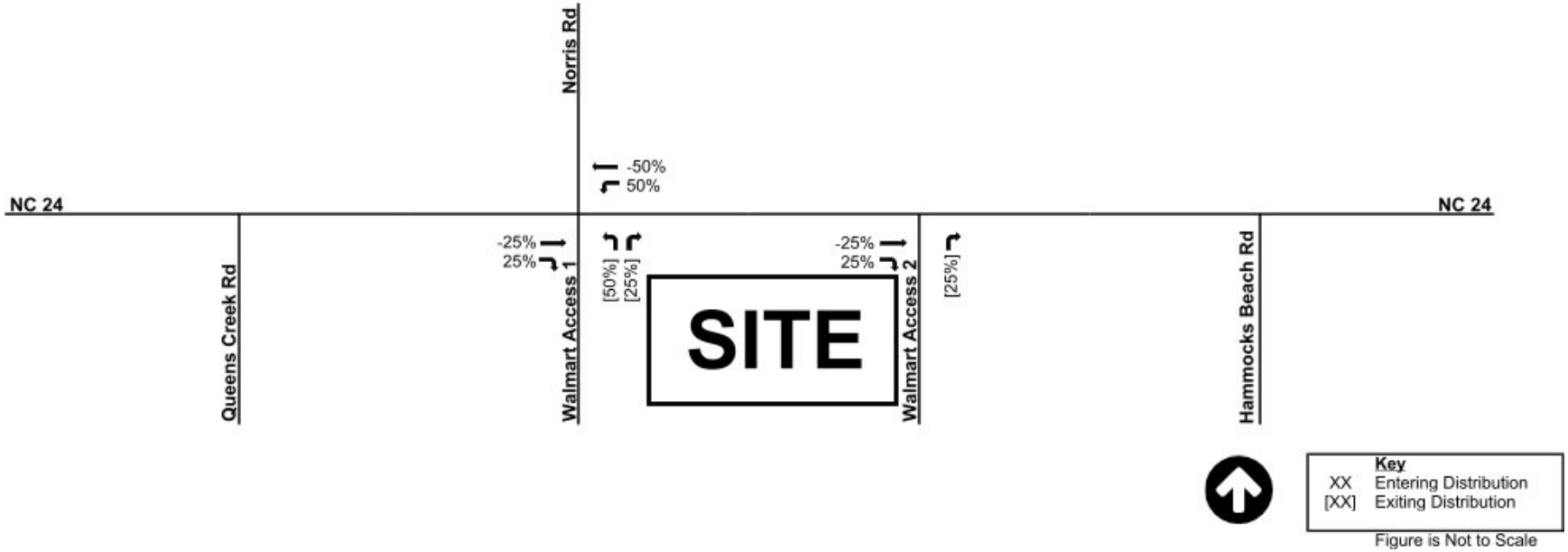


Figure 6: Site Trip Assignment

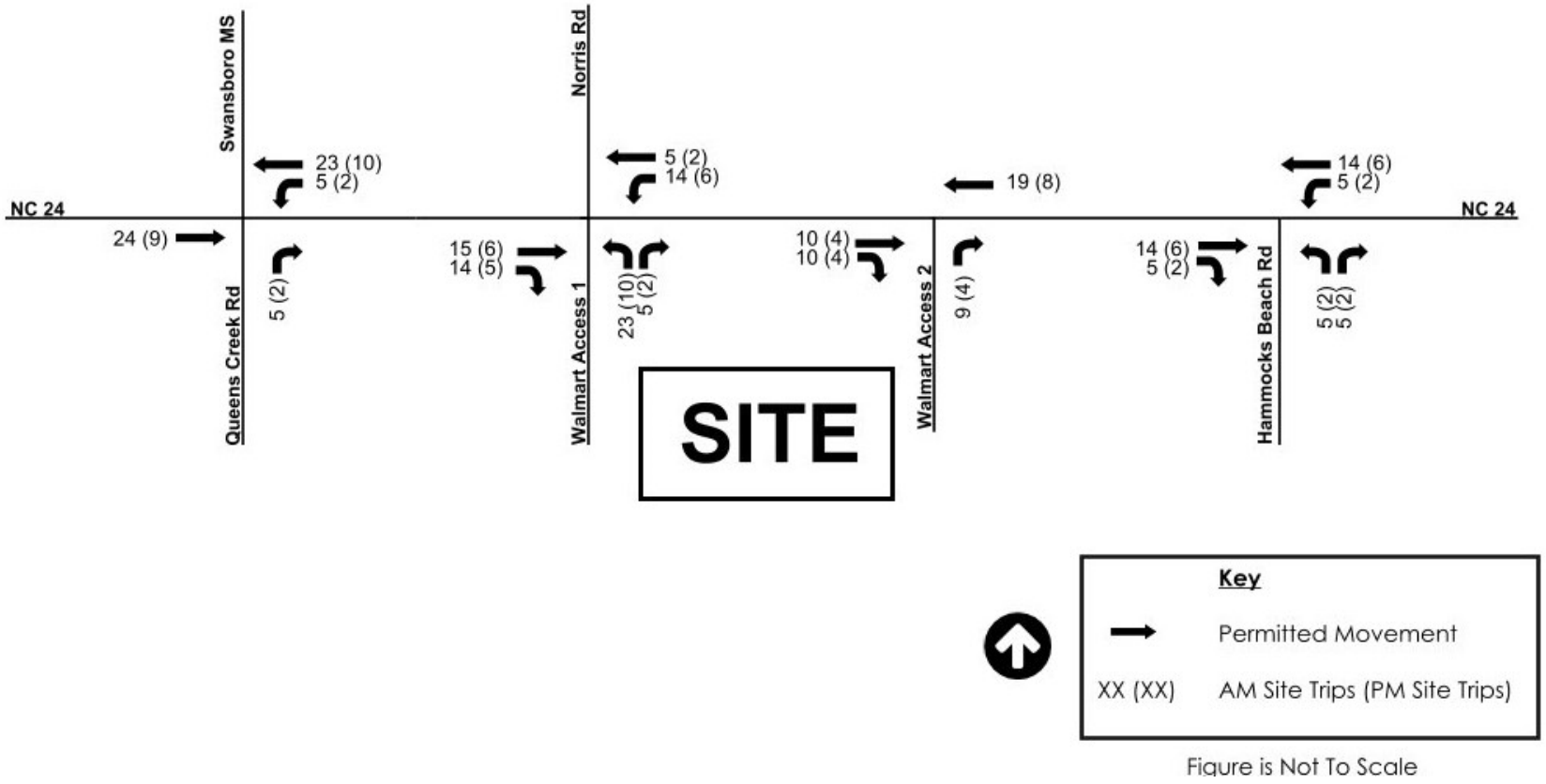
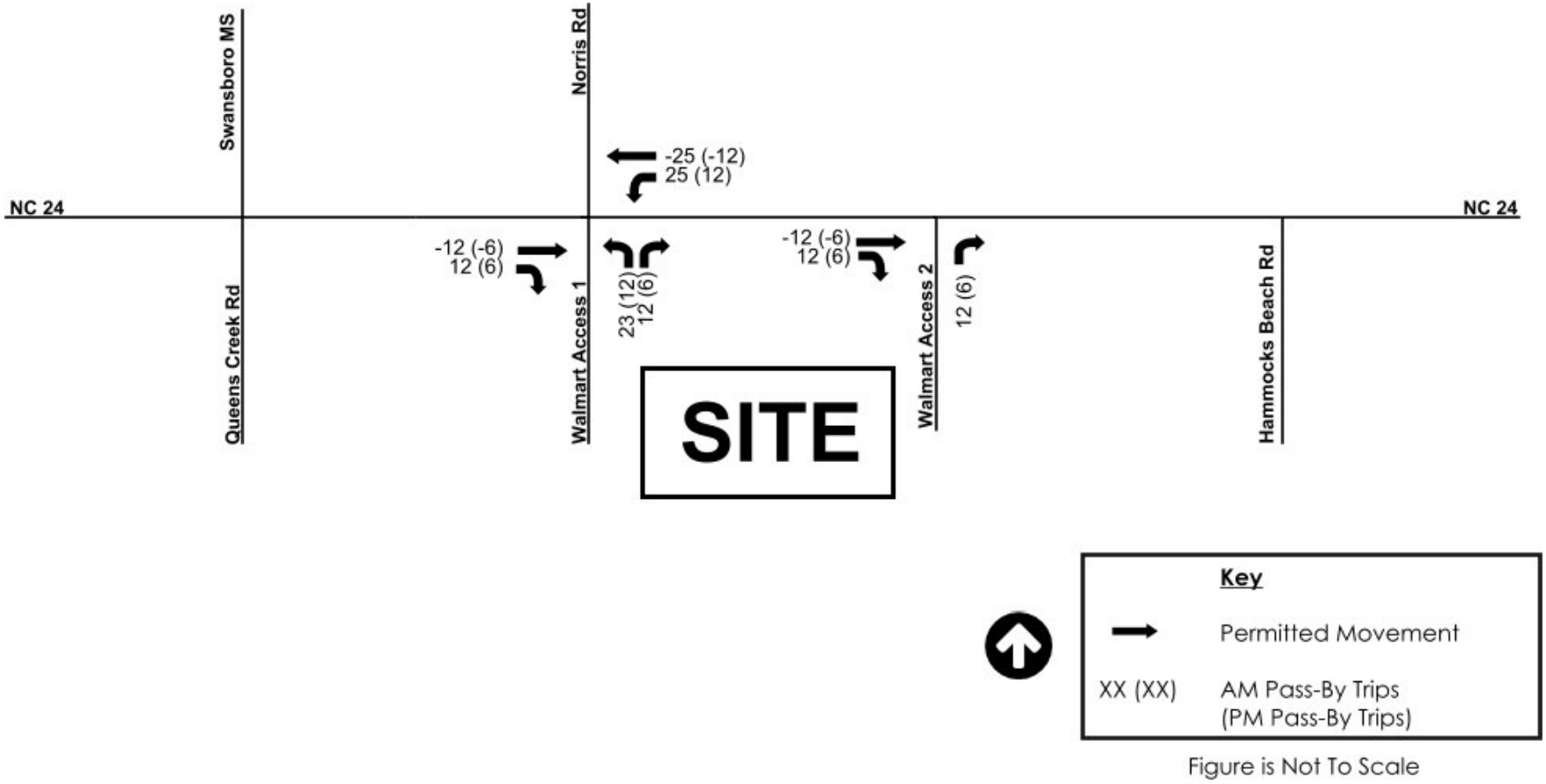


Figure 7: Pass-By Trip Assignment



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4.0 TRAFFIC VOLUMES

4.1 DATA COLLECTION

AM (7:00 – 9:45 AM) and PM (4:00 – 6:00 PM) turning movement counts were collected for a previous study on April 7th, 2022, at the following intersections:

- NC 24 (West Corbett Avenue) at SR 1509 (Queen's Creek Road)
- NC 24 (West Corbett Avenue) at SR 4445 (Norris Road) / Walmart Driveway 1
- NC 24 (West Corbett Avenue) at Walmart Driveway 2
- NC 24 (West Corbett Avenue) at SR 1511 (Hammocks Beach Road)

Raw count data for these locations are included in the appendix. Traffic volumes were balanced between study intersections. The Existing (2022) traffic volumes are shown in Figure 8.

4.2 BACKGROUND TRAFFIC VOLUMES

As stipulated in the Swansboro UDO, the count data was grown by three percent (3%) per year to estimate traffic growth from 2022 to 2024. The historical growth traffic volumes were added to the existing volumes to determine the 2024 Off-season Background traffic volumes. The 2024 Off-season Background traffic volumes are shown in Figure 9.

To account for the increase in traffic during the summer, the 2024 Seasonal Background traffic volumes were further increased by seven percent (7%). The 2024 Seasonal Background traffic volumes are shown in Figure 10.

4.3 BUILD TRAFFIC VOLUMES

The 2024 Off-season Build traffic volumes include the 2024 Off-season Background traffic and the proposed development traffic discussed in Section 3.0. The 2024 Off-season Build traffic volumes are shown in Figure 11 and the 2024 Seasonal Build traffic volumes are shown in Figure 12.

Figure 8: 2022 Existing Traffic Volumes

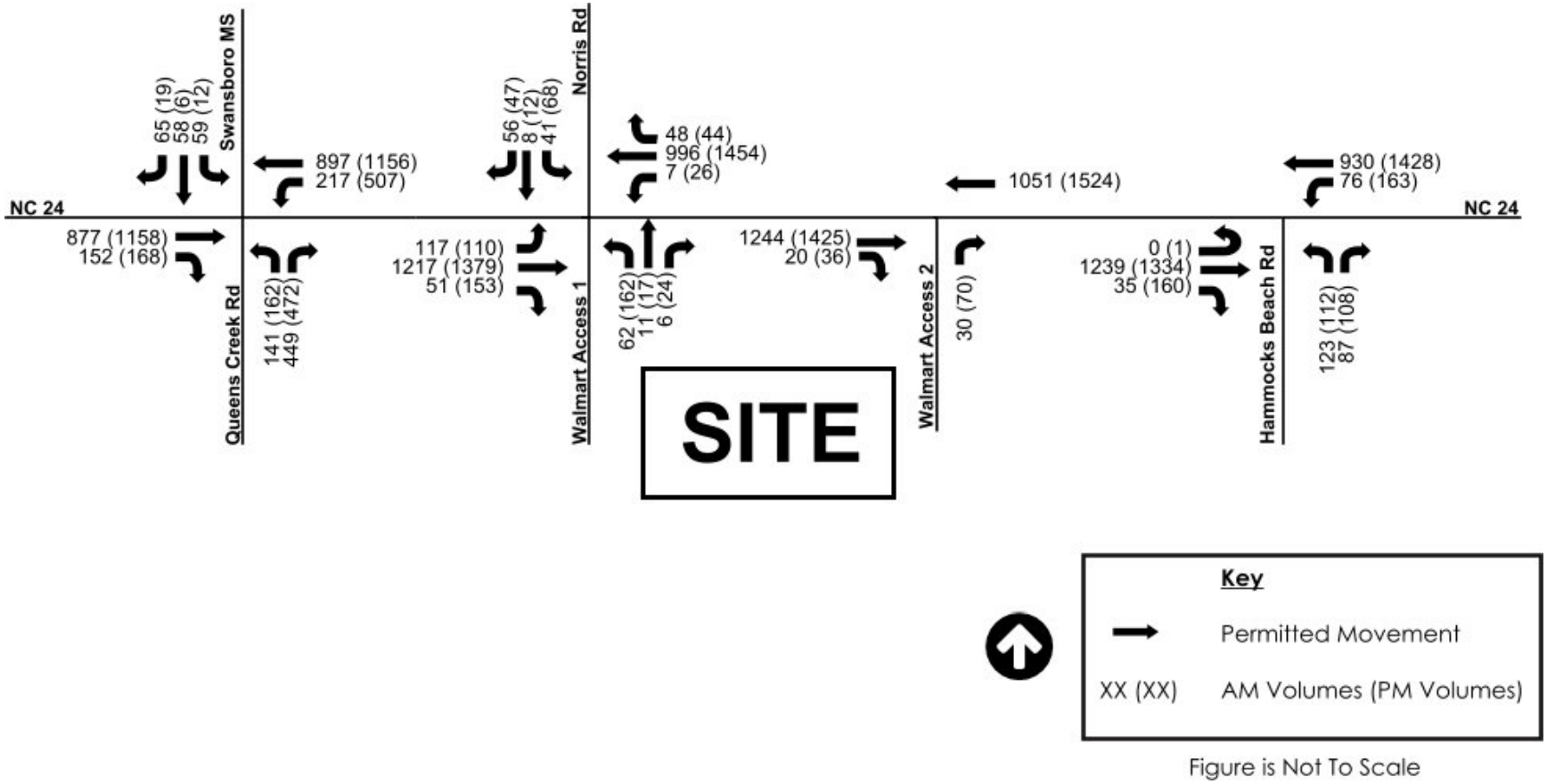

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Figure 9: 2024 No-Build Traffic Volumes

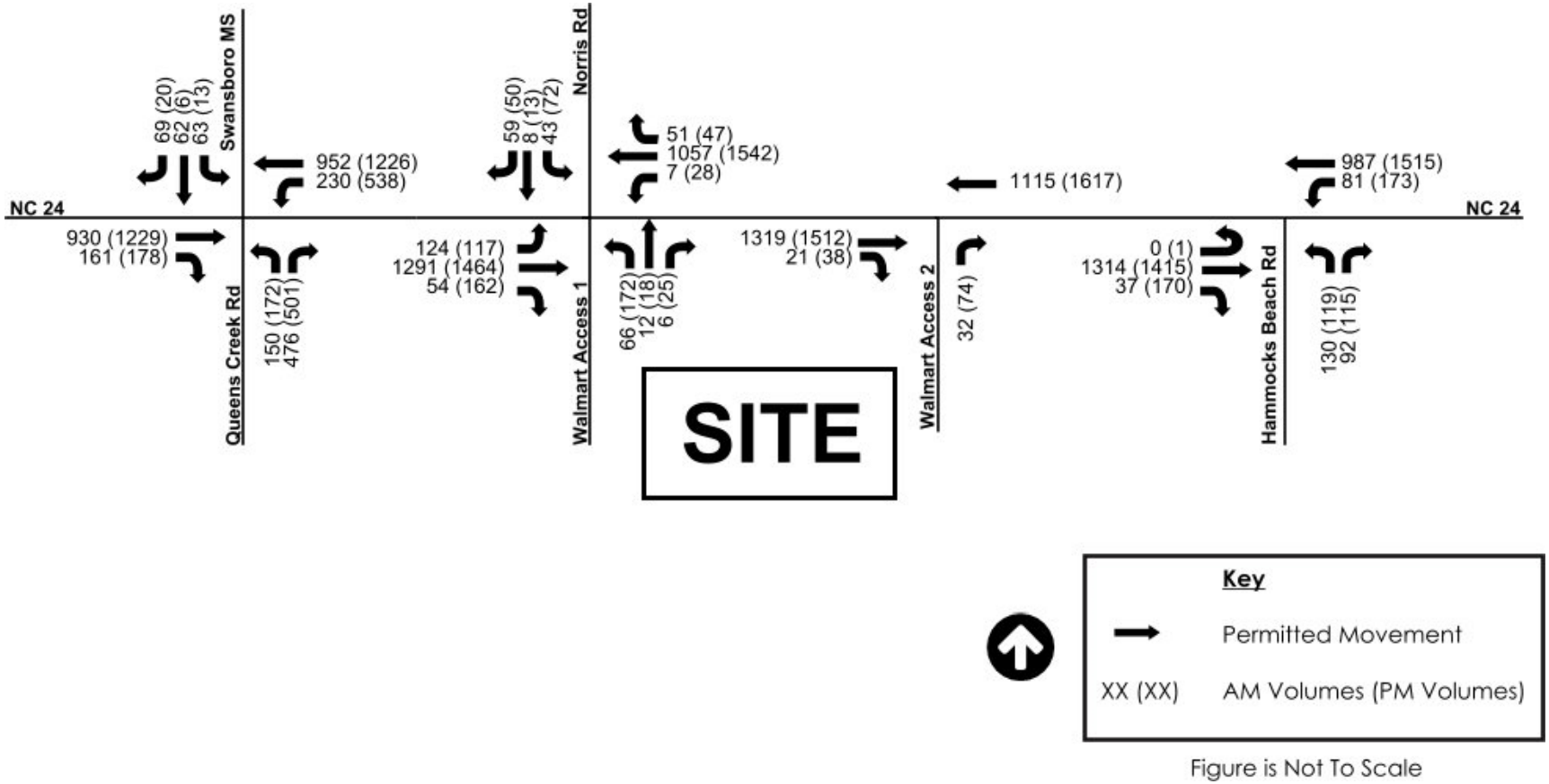

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Figure 10: 2024 No-Build Seasonal Traffic Volumes

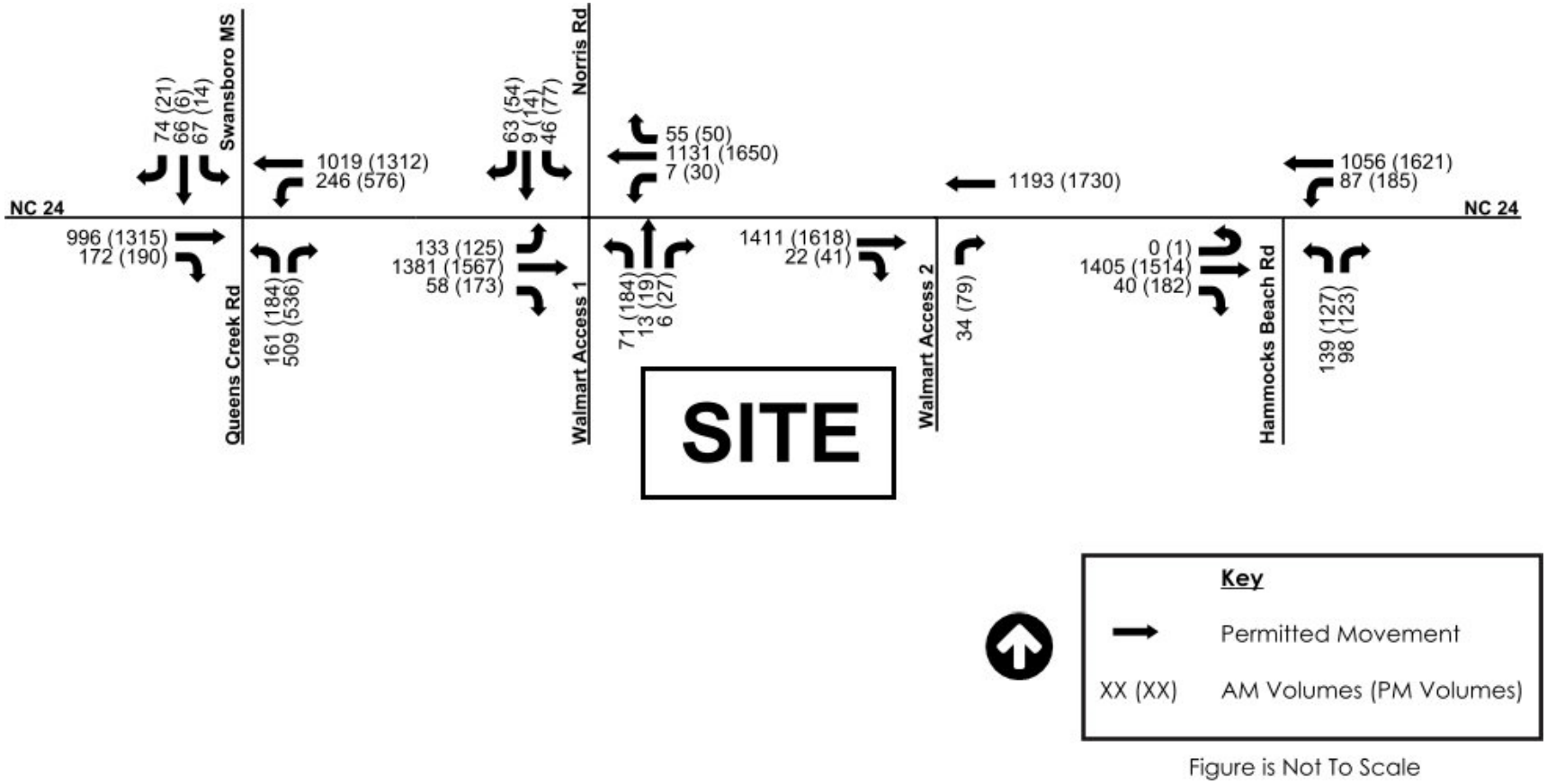

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Figure 11: 2024 Build Traffic Volumes

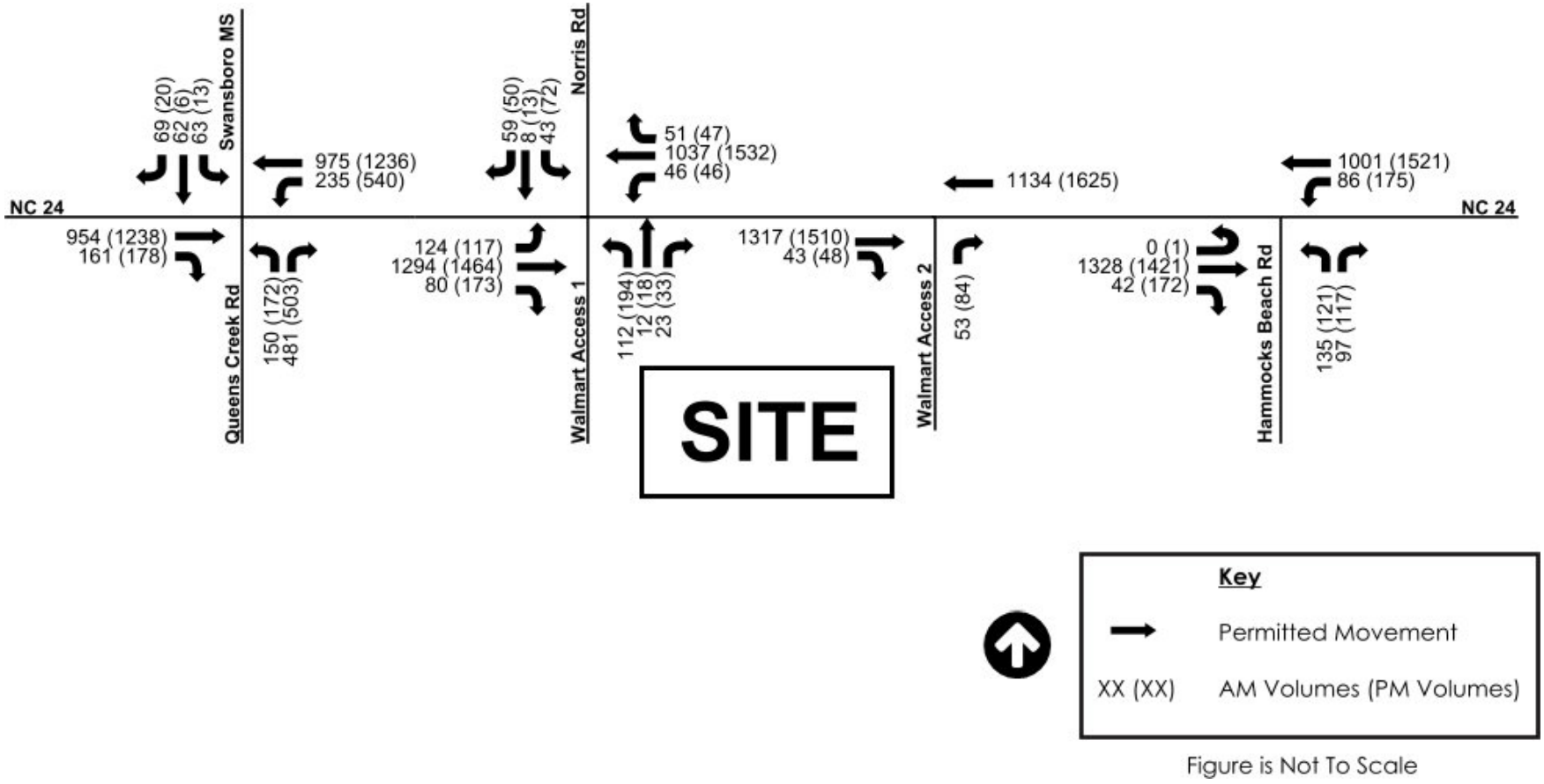

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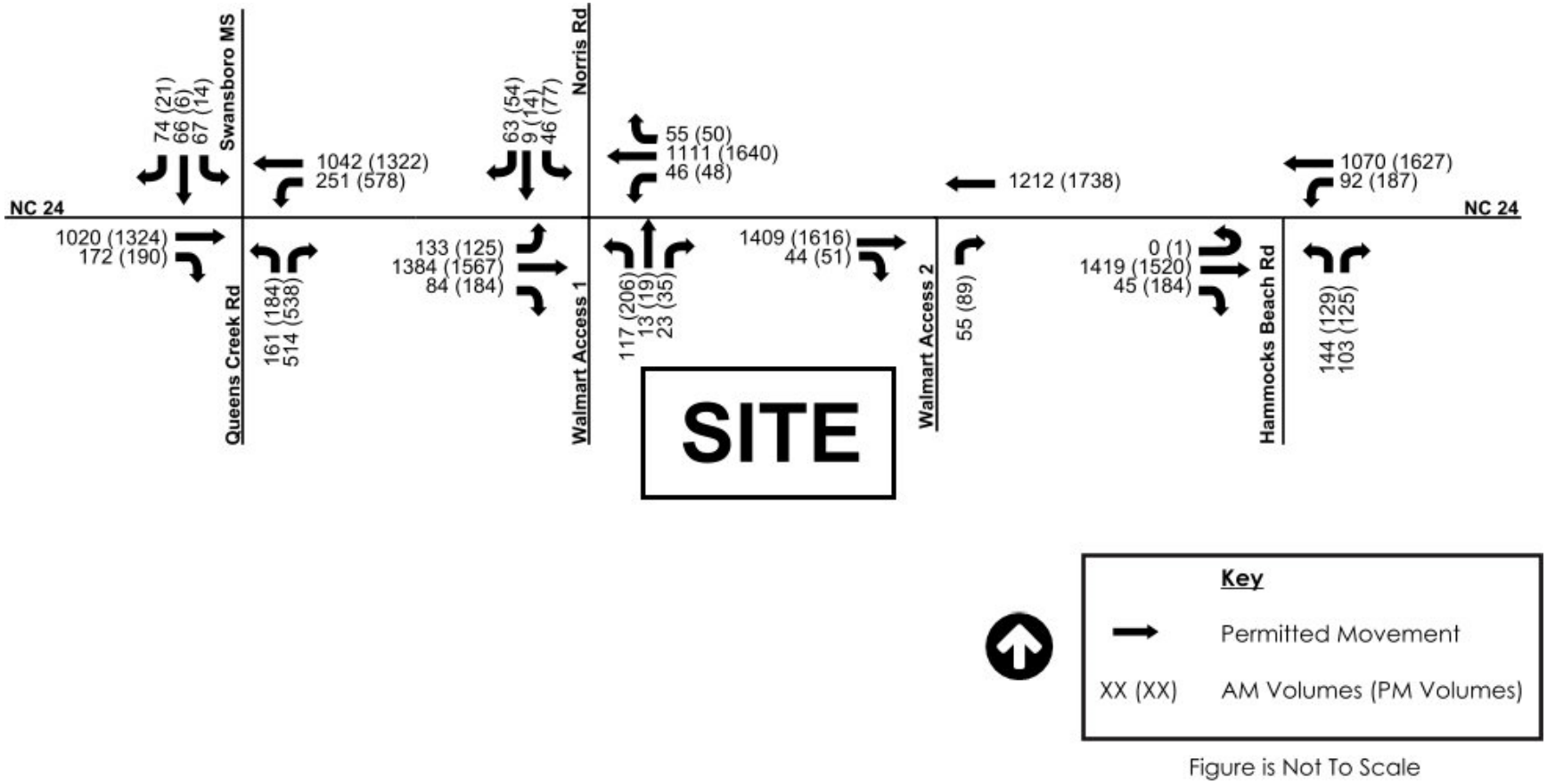
Figure 12: 2024 Build Seasonal Traffic Volumes



5.0 TRAFFIC ANALYSIS

Capacity analyses were performed for the roadway network in the study area. The traffic analysis program Synchro Version 11 was used to analyze all signalized and stop-controlled intersections according to methods put forth by the Transportation Research Board's Highway Capacity Manual[5] (HCM). The HCM defines capacity as the "maximum rate or flow at which persons or vehicles can be reasonably expected to traverse a point or uniform section of a line or roadway during a specified period under prevailing roadway, traffic, and control conditions, usually expressed as vehicles per lane per hour."

Level of service (LOS) is a term used to describe different traffic conditions and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists or passengers." LOS varies from Level A, representing free flow, to Level F where traffic breakdown conditions are evident. At an unsignalized intersection, the primary traffic on the main roadway is virtually uninterrupted. Therefore, the overall delay for the intersection is usually less than what is calculated for the minor street movements. The overall intersection delay and the delay for the intersections' minor movement(s) are reported in the summary tables of this report. LOS D is acceptable for signalized intersections in suburban areas during peak periods. For unsignalized intersections, it is common for some of the minor street movements or approaches to be operating at LOS F during peak hour conditions and that is not necessarily indicative of an area that requires improvements.

Capacity analyses were completed following *NCDOT Capacity Analysis Guidelines*[6] as well as the *Draft NCDOT Capacity Analysis Guidelines Best Practices*[7]. Table 4 presents the criteria of each LOS as indicated in the HCM.

Table 4: Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (seconds / vehicle)	Unsignalized Intersection Control Delay (seconds / vehicle)
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

Capacity analyses were performed for the following conditions:

- 2022 Existing
- 2024 Off-season Background
- 2024 Off-season Build
- 2024 Seasonal Background
- 2024 Seasonal Build

Peak hour factors for all analysis scenarios were set to 0.9. Dallas permitted & protected (D.P.+P.) left turn/u-turn phasing was used in all future year scenarios where already used in the existing signal phasing. Additionally, corridor signal timings were optimized for all analysis scenarios. All Synchro files and detailed printouts can be found in the appendix. A summary of the results of the analyses is provided in the following sub-sections.

5.1 2022 EXISTING

In the base year of 2022 under the existing geometric conditions, all study intersections operate at an acceptable level of service. In the PM peak hour, the northbound left and southbound through-right movement at the NC 24 & Queen's Creek Road intersection operates at LOS F, as well as the northbound left movement at the NC 24 & Norris Road intersection, and the northbound approach at the NC 24 & Hammocks Beach Road intersection. Synchro level of service, delay, and queuing results for the 2022 Existing analysis scenario are listed in Table 5.

Table 5: 2022 Existing Level of Service and Delay

Intersection		Approach	Lane Group	Delay (sec. / veh.)		Level of Service (LOS)		95th % Queue (feet)	
				AM	PM	AM	PM	AM	PM
	NC 24 & Queens Creek Road/Swansboro Middle School	Overall		30.2	37.8	C	D		
		EB	T	34.7	52.2	C	D	421	843
			R	12.7	17	B	B	88	135
		WB	L	21.9	66.9	C	E	151	780
			T	5	6	A	A	88	236
		NB	L	64.3	89.1	E	F	181	265
			R	52.6	35.7	D	D	455	471
		SB	L	57	77	E	E	95	38
			TR	85.4	85.3	F	F	212	65
	NC 24 & Norris Road/Walmart Driveway 1	Overall		10.7	19.9	B	B		
		EB	L	6.2	29.1	A	C	19	67
			T	4.4	8.1	A	A	164	262
			R	3.5	5.8	A	A	12	36
		WB	L	4.1	7.6	A	A	4	13
			TR	10.3	19.3	B	B	277	845
		NB	L	55	91.2	E	F	93	265
			TR	42.6	52.9	D	D	34	76
		SB	LTR	63.8	65.5	E	E	142	200
STOP	NC 24 & Walmart Driveway 2	NB	R	11	12	B	B	5	13
	NC 24 & Hammocks Beach Road	Overall		8.2	10.6	A	B		
		EB	U	0.8	1.5	A	A	0	0
			T	3.2	4.8	A	A	27	109
			R	0.4	1.1	A	A	0	14
		WB	L	6.6	21.7	A	C	24	82
			T	3.9	5.2	A	A	141	312
		NB	LR	58.6	80.4	E	F	129	173

5.2 2024 OFF-SEASON BACKGROUND

In the 2024 Off-season Background scenario, all of the study intersections operate at an overall acceptable level of service. There are a few movements that operate at LOS F. The northbound left and southbound left movements at the NC 24 & Queen's Creek Road intersection operates at LOS F in the PM peak hour and the southbound through-right movement operates at LOS F in both peak hours.

Synchro level of service, delay, and queuing results for the 2024 Off-season Background analysis scenario are listed in Table 6.

Table 6: 2024 Off-season Background Level of Service and Delay

Intersection	Approach	Lane Group	Delay (sec. / veh.)		Level of Service (LOS)		95th % Queue (feet)	
			AM	PM	AM	PM	AM	PM
NC 24 & Queens Creek Road/Swansboro Middle School	Overall		33.9	44.3	C	D		
	EB	T	35.5	62.4	D	E	455	1005
		R	12	15.4	B	B	91	133
	WB	L	27.7	72	C	E	196	906
		T	5.2	7.5	A	A	96	471
	NB	L	64.1	104.5	E	F	189	316
		R	68.8	45.4	E	D	534	678
	SB	L	58	88.3	E	F	100	45
		TR	95.1	99.8	F	F	232	74
NC 24 & Norris Road/Walmart Driveway 1	Overall		11	18.9	B	B		
	EB	L	7.9	23.8	A	C	18	70
		T	4.3	11.2	A	B	179	368
		R	3.5	5.1	A	A	12	57
	WB	L	4.4	6.8	A	A	4	7
		TR	11.3	19.1	B	B	296	307
	NB	L	55.2	71	E	E	96	225
		TR	42.1	32	D	C	35	54
	SB	LTR	63.6	43.2	E	D	148	141
NC 24 & Walmart Driveway 2	NB	R	11.3	12.5	B	B	5	13
NC 24 & Hammocks Beach Road	Overall		8.7	10.2	A	B		
	EB	U	0.8	1.2	A	A	0	0
		T	4	7.2	A	A	30	44
		R	0.4	1.5	A	A	0	2
	WB	L	8.8	30.8	A	C	26	113
		T	4.2	6.1	A	A	157	227
	NB	LR	58.4	46.2	E	D	134	114

5.3 2024 SEASONAL BACKGROUND

In the 2024 Seasonal Background scenario, all of the study intersections operate at an acceptable overall level of service. There are a few movements that operate at LOS F. The northbound left and southbound left movements at the NC 24 & Queen's Creek Road intersection operates at LOS F in the PM peak hour and the southbound through-right movement operates at LOS F in both peak hours. The northbound left movement at the NC 24 & Norris Road intersection operates at LOS F in the PM peak hour.

Synchro level of service, delay, and queuing results for the 2024 Seasonal Background analysis scenario are listed in Table 7.

Table 7: 2024 Seasonal Background Level of Service and Delay

Intersection	Approach	Lane Group	Delay (sec. / veh.)		Level of Service (LOS)		95th % Queue (feet)	
			AM	PM	AM	PM	AM	PM
NC 24 & Queens Creek Road/Swansboro Middle School	Overall		38.3	53	D	D		
	EB	T	41.5	77.7	D	E	559	1254
		R	13.5	19.6	B	B	109	176
	WB	L	35.2	77	D	E	229	1159
		T	6.4	6.8	A	A	115	238
	NB	L	69.9	141.3	E	F	216	476
		R	74.4	56.1	E	E	582	909
	SB	L	62.6	113.3	E	F	111	57
		TR	104.9	133	F	F	265	88
NC 24 & Norris Road/Walmart Driveway 1	Overall		12.2	23.7	B	C		
	EB	L	10.9	41.8	B	D	16	120
		T	4.8	16.7	A	B	227	602
		R	3.8	10.9	A	B	12	116
	WB	L	4.6	8.8	A	A	4	9
		TR	12.3	21.7	B	C	337	440
	NB	L	61.7	80.3	E	F	109	277
		TR	45.5	37.7	D	D	38	65
	SB	LTR	69.7	49.3	E	D	167	177
NC 24 & Walmart Driveway 2	NB	R	11.5	12.7	B	B	5	15
NC 24 & Hammocks Beach Road	Overall		9.5	12.4	A	B		
	EB	U	0.8	1	A	A	0	0
		T	4.2	9	A	A	32	55
		R	0.3	1.7	A	A	1	6
	WB	L	12.4	40.8	B	D	30	156
		T	4.5	6.7	A	A	184	299
	NB	LR	63.9	56.5	E	E	152	143

5.4 2024 OFF-SEASON BUILD

This analysis scenario evaluates traffic operations under the increased traffic demands associated with the proposed Starbucks.

In the 2024 Off-season Build scenario, all of the study intersections still operate at an overall acceptable level of service. There are a few movements that operate at LOS F. The northbound left and southbound left movements at the NC 24 & Queen's Creek Road intersection operates at LOS F in the PM peak hour and the southbound through-right movement operates at LOS F in both peak hours.

Capacity analysis results for the 2024 Off-season Build analysis scenario are listed in Table 8.

Table 8: 2024 Off-Season Build Level of Service and Delay

Intersection	Approach	Lane Group	Delay (sec. / veh.)		Level of Service (LOS)		95th % Queue (feet)	
			AM	PM	AM	PM	AM	PM
NC 24 & Queens Creek Road/Swansboro Middle School	Overall		34.5	43.4	C	D		
	EB	T	35.7	67.7	D	E	465	1005
		R	11.7	15.9	B	B	89	131
	WB	L	29.9	55.9	C	E	238	866
		T	5.2	7.1	A	A	90	315
	NB	L	64.1	104.5	E	F	189	316
		R	70.7	44.2	E	D	555	689
	SB	L	59.3	88.5	E	F	101	45
		TR	101.9	100.5	F	F	242	74
NC 24 & Norris Road/Walmart Driveway 1	Overall		14.2	21.6	B	C		
	EB	L	7.7	19.9	A	B	20	44
		T	7.4	14.9	A	B	217	480
		R	5.6	10.7	A	B	20	99
	WB	L	5.5	9.5	A	A	18	12
		TR	13.1	20.9	B	C	286	322
	NB	L	68.6	75.9	E	E	150	252
		TR	42	31.6	D	C	55	60
	SB	LTR	58.3	40.7	E	D	144	139
NC 24 & Walmart Driveway 2	NB	R	11.5	12.6	B	B	8	15
NC 24 & Hammocks Beach Road	Overall		8.6	10.5	A	B		
	EB	U	1.2	0.8	A	A	0	0
		T	3.6	8.3	A	A	55	136
		R	0.1	1.4	A	A	1	7
	WB	L	6.6	25.9	A	C	28	117
		T	4.4	6	A	A	164	229
	NB	LR	58.5	47.4	E	D	139	115

5.5 2024 SEASONAL BUILD

This analysis scenario evaluates traffic operations under the increased traffic demands associated with the proposed Starbucks during the summer months.

In the 2024 Seasonal Build scenario, all of the study intersections still operate at an overall acceptable level of service. There are a few movements that operate at LOS F. The northbound left and southbound left movements at the NC 24 & Queen's Creek Road intersection operates at LOS F in the PM peak hour and the southbound through-right movement operates at LOS F in both peak hours. The northbound left movement at the NC 24 & Norris Road intersection operates at LOS F in both peak hours.

Capacity analysis results for the 2024 Seasonal Build analysis scenario are listed in Table 9.

Table 9: 2024 Seasonal Build Level of Service and Delay

Intersection	Approach	Lane Group	Delay (sec. / veh.)		Level of Service (LOS)		95th % Queue (feet)	
			AM	PM	AM	PM	AM	PM
NC 24 & Queens Creek Road/Swansboro Middle School	Overall		39.4	52.8	D	D		
	EB	T	45.1	79	D	E	643	1268
		R	14.9	19.6	B	B	118	176
	WB	L	38.4	76.3	D	E	263	1121
		T	6.7	5.1	A	A	117	243
	NB	L	75.9	141.3	E	F	231	476
		R	69.2	56.3	E	E	437	916
	SB	L	66.9	113.3	E	F	118	57
		TR	109.9	133	F	F	278	88
NC 24 & Norris Road/Walmart Driveway 1	Overall		15.6	25.3	B	C		
	EB	L	10.8	38.7	B	D	19	76
		T	7.3	18.1	A	B	252	530
		R	5.6	11.7	A	B	20	103
	WB	L	7.6	14.3	A	B	21	15
		TR	14	22.6	B	C	347	424
	NB	L	83.3	89.7	F	F	179	312
		TR	48.7	37.4	D	D	63	73
	SB	LTR	67.5	47.3	E	D	172	175
NC 24 & Walmart Driveway 2	NB	R	11.7	12.9	B	B	8	15
NC 24 & Hammocks Beach Road	Overall		9.6	12.2	A	B		
	EB	U	1	1.2	A	A	0	0
		T	3.1	8.2	A	A	52	60
		R	0.2	1.9	A	A	0	4
	WB	L	13.8	42.1	B	D	32	161
		T	4.6	6.6	A	A	198	302
	NB	LR	69.2	57.5	E	E	169	145

6.0 RECOMMENDATIONS

With the addition of traffic generated by the proposed development (approximately 1.5% increase in the peak hours), there are no discernable differences in operations between the Background and Build scenarios for either seasonal or off-season analyses. All of the study intersections operate at an acceptable level of service in all of the Off-season and Seasonal scenarios. Therefore, no improvements are recommended to be constructed as part of the Swansboro Starbucks Development. Access to the internal road network should meet the design requirements in the UDO.

7.0 REFERENCES

[1] ***NCDOT Functional Classification Map***,
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[4] ***Trip Generation (11th Edition)***, Institute of Transportation Engineers (ITE), September 2021.

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[7] ***Draft NCDOT Capacity Analysis Guidelines: Best Practices.*** North Carolina Department of Transportation (NCDOT), March 2022, https://connect.ncdot.gov/resources/safety/Congestion%20Mngmt%20and%20Signing/Best%20Practices%20-%20Capacity%20Analysis%20Guidelines.pdf

8.0 APPENDIX

- Scoping Correspondence
- Site Plan
- Raw Traffic Count Data
- Traffic Volume Calculations
- Synchro Files
- Synchro & SimTraffic Reports