# Traffic Impact Analysis Porter's Neck Wilmington , North Carolina



# TRAFFIC IMPACT ANALYSIS

FOR

# **PORTER'S NECK**

#### LOCATED

#### IN

# NEW HANOVER COUNTY, NORTH CAROLINA

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OCTOBER 2019



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RKA Project No. 19282

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# TRAFFIC IMPACT ANALYSIS PORTER'S NECK DEVELOPMENT NEW HANOVER COUNTY, NORTH CAROLINA

# 1. INTRODUCTION

The contents of this report present the findings of the Traffic Impact Analysis (TIA) conducted for the proposed Porter's Neck Development to be located south of Futch Creek Road and east of Porter's Neck Road in New Hanover County, 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 2023, is assumed to consist of 58 single family homes and 348 low rise multi family housing units. Access is provided via one full-movement driveway each on Market Street (SR 2845) and Shiraz Way.

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

- Existing (2019) Traffic Conditions
- Background (2023) Traffic Conditions
- Combined (2023) Traffic Conditions
- Combined (2023) w/ Improvements Traffic Conditions

# 1.1. Site Location and Study Area

The development is proposed to be located south of Futch Creek Road and east of Porter's Neck Development in New Hanover County, North Carolina. Refer to Figure 1 for the site location map.

The study area for the TIA was determined through coordination with the Wilmington Urban Area Metropolitan Planning Organization (WMPO) and North Carolina Department of



Transportation (NCDOT). The approved scoping document can be found in Appendix A. The approved study area consists of the following intersections:

- Porter's Neck Rd. and Edgewater Club Rd./Shiraz Way
- Market Street (US 17) and Porter's Neck Road
- Futch Creek Rd./Market St. (SR 1400) and Market St. (SR 2845)
- US 17 and U-turn location (North of SR 1400 Market St.)
- US 17 and Market Street (SR 1400)
- Shiraz Way and Site Drive 1 (Proposed)
- Market Street (SR 2845) and Site Drive 2 (Proposed)

# 1.2. Proposed Land Use and Site Access

The proposed development, anticipated to be completed in 2023, is assumed to consist of 58 single family homes and 348 low rise multi family housing units.

Site access is proposed via one full-movement driveway on both Market Street (SR 2845) and Shiraz Way. 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 office and residential development. The Waterstone Development is located on Edgewater Club Road which is south of the Porter's Neck Development. Retail development is located along US 17.

# 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 was collected through field reconnaissance by Ramey Kemp & Associates, Inc. (RKA). Table 1 provides a summary of the field data collected. Refer to Figure 3 for an illustration of the existing lane configurations within the study area.



Road Name	Route Number	Typical Cross Section	Speed Limit	Maintained By	2017 AADT (vpd)
Porter's Neck Road	SR 1402 SR1491	Two-lane undivided	45 mph	Local	14,000
Edgewater Club Road	SR 1402	Two-lane undivided	45 mph	Local	5,200
Shiraz Way	SR 2932	Two-lane undivided	25 mph	Local	2,140*
Market Street	SR 2845	Two-lane median- divided	35 mph (assumed)	NCDOT	660*
Futch Creek Road	SR 1400	Two-lane undivided	35 mph (assumed) Local		2,200
US 17	US 17 N/A median- divided		55 mph	NCDOT	43,000

Table 1:	Existing	Roadway	Inventory
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\* ADT based on the traffic counts from 2018 and assuming the weekday PM peak hour volume is 10% of the average daily traffic.









# 2. EXISTING (2019) PEAK HOUR CONDITIONS

# 2.1. Existing (2019) Peak Hour Traffic

Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersections listed below, in September 2019 by RKA during a typical weekday AM (7:00 AM - 9:00 AM) and PM (4:00 PM - 6:00 PM) peak periods:

- Porter's Neck Rd. and Edgewater Club Rd./Shiraz Way
- Market Street and Porter's Neck Road
- Futch Creek Rd./Market St. (SR 1400) and Market St. (SR 2845)
- US 17 and U-turn location (North of SR 1400 Market St.)
- US 17 and Market Street (SR 1400)
- Shiraz Way and Site Drive 1 (Proposed)
- Market Street (SR 2845) and Site Drive 2 (Proposed)

Traffic volumes were balanced between study intersections, where appropriate. The methodology for balancing existing traffic has been approved by the NCDOT and WMPO. Refer to Figure 4 for existing (2019) 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 (2019) Peak Hour Traffic

The existing (2019) 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 City of Wilmington (City) and is included in Appendix C. The results of the analysis are presented in Section 7 of this report.





# **3.** BACKGROUND (2023) PEAK HOUR CONDITIONS

In order to account for growth of traffic and subsequent traffic conditions at a future year, background traffic projections are needed. Background traffic is the component of traffic due to the growth of the community and surrounding area that is anticipated to occur regardless of whether or not the proposed development is constructed. Background traffic 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 WMPO and NCDOT, it was determined that an annual growth rate of 1% would be used to generate projected (2023) weekday AM and PM peak hour traffic volumes. Refer to Figure 5 for projected (2023) peak hour traffic.

# 3.2. Adjacent Development Traffic

Through coordination with the WMPO and NCDOT, it was determined that the Waterstone Development would be considered as approved adjacent development in this study. Refer to Figure 6 for adjacent development (2023) peak hour traffic. Adjacent development information can be found in Appendix D.

# 3.3. Future Roadway Improvements

Based on coordination with the WMPO and NCDOT, it was determined there were no future roadway improvements to consider with this study. The Military Cutoff Extension project is expected to reduce traffic volumes along US 17; however this project was not considered in this study.

# 3.4. Background (2023) Peak Hour Traffic Volumes

The background (2023) traffic volumes were determined by projecting the existing (2019) peak hour traffic to the year 2023 and adding the adjacent development trips. Refer to Figure 7 for an illustration of the background (2023) peak hour traffic volumes at the study intersections.



# 3.5. Analysis of Background (2023) Peak Hour Traffic Conditions

The background (2023) 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 7 of this report.









# 4. SITE TRIP GENERATION AND DISTRIBUTION

# 4.1. Trip Generation

The proposed development is assumed to consist of 58 single family homes and 348 low rise multi family housing units. 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*, 10<sup>th</sup> Edition. Table 2 provides a summary of the trip generation potential for the site.

Land Use	Intensity	Daily Traffic	AM Pea Trips	k Hour (vph)	PM Peak Hour Trips (vph)	
(TTE Code)		(vpd)	Enter	Exit	Enter	Exit
Single-Family Detached Housing (210)	58 units	630	12	34	38	22
Multifamily Housing (Low-Rise) (220)	348 units	2,590	36	120	113	66
Total Trips		3,220	48	154	151	88

**Table 2: Trip Generation Summary** 

It is estimated that the proposed development will generate approximately 3,220 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 202 trips (48 entering and 154 exiting) will occur in the AM peak hour and 239 trips (151 entering and 88 exiting) during the 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. The following distributions have been approved by the NCDOT and WMPO:

- 20% to/from the west via NC 140
- 20% to/from the north via US 17
- 5% to/from the south via Edgewater Club Road (SR 1402)
- 55% to/from the south via US 17

The site trip distribution is shown in Figure 8. Refer to Figure 9 for the site trip assignment.







# 5. COMBINED (2023) TRAFFIC CONDITIONS

# 5.1. Combined (2023) Peak Hour Traffic Volumes

To estimate traffic conditions with the site fully built-out, the total site trips were added to the background (2023) traffic volumes to determine the combined (2023) traffic volumes. Refer to Figure 10 for an illustration of the combined (2023) peak hour traffic volumes with the proposed site fully developed.

# 5.2. Analysis of Combined (2023) Peak Hour Traffic

Study intersections were analyzed with the combined (2023) traffic volumes using the same methodology previously discussed for existing and background 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 7 of this report.





#### 6. TRAFFIC ANALYSIS PROCEDURE

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

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions." Level of service (LOS) is a term used to represent different driving conditions and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers." Level of service varies from Level "A" representing free flow, to Level "F" where breakdown conditions are evident. Refer to Table 3 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by the HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay". An average control delay of 50 seconds at a signalized intersection results in LOS "D" operation at the intersection.

UNSIGN	ALIZED INTERSECTION	SIGNALIZED INTERSECTION				
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)			
А	0-10	А	0-10			
В	10-15	В	10-20			
С	15-25	С	20-35			
D	25-35	D	35-55			
Е	35-50	E	55-80			
F	>50	F	>80			

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



# 6.1 Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the NCDOT Congestions Management Guidelines, with the exception of the following items:

Congestion Management Guidelines indicate the applicant shall identify mitigation improvements at study area intersections if at least one of the following conditions exist when comparing the background and combined conditions:

- The total average delay of the intersection or an individual approach increases by at least 25%, while maintaining the same level of service.
- The level of service degrades by at least one level.
- The level of service is F.

This TIA does not mitigate every instance of necessary improvement based on the above items, specifically if the level of service degrades by at least one level. For intersections that are expected to degrade one level of service, but operate with delay that is close to the next level of service under background traffic conditions and the proposed development is not expected to increase an individual approach delay by 25%, improvements were not recommended.

Analysis of the intersection of US 17 and Market Street was completed with and without rightturn-on-red (RTOR) at the intersection. Since all turns from Market Street are right, the analysis with RTOR is considered to be the most accurate.



# 7. CAPACITY ANALYSIS

# 7.1. Porter's Neck Road and Edgewater Club Road / Shiraz Way

The existing roundabout at Porter's Neck Road and Edgewater Club Road/Shiraz Way was analyzed under existing (2019), background (2023), and combined (2023) traffic conditions with existing lane configurations and traffic control. Refer to Table 4 for a summary of the analysis results. Refer to Appendix E for the Synchro capacity analysis reports and Appendix M for the SimTraffic queuing reports.

ANALVSIS	LANE GROUP		eak Hour	Weekday PM Peak Hour							
SCENARIO		Queue 95 <sup>th</sup> / Max (ft)	Lane LOS	Delay (sec)	Approach (sec)	Overall (sec)	Queue 95 <sup>th</sup> / Max (ft)	Lane LOS	Delay (sec)	Approach (sec)	Overall (sec)
	EBL/T/R	70* / 66	А	7	A (7)		70* / 72	А	7	A (7)	
Existing	WBL/T/R	30* / 30	А	7	A (7)	А	38* / 37	А	7	A (7)	A
(2019) Conditions	NBL/T/R	65* / 35	А	8	A (8)	(8)	33* / 34	А	7	A (7)	(7)
	SBL/T/R	35* / 71	А	9	A (9)		15* / 15	А	6	A (6)	
	EBL/T/R	83* / 83	А	8	A (8)	A (9)	98* / 99	А	8	A (8)	A (8)
Background	WBL/T/R	35* / 35	А	9	A (9)		30*/31	А	7	A (7)	
(2023) Conditions	NBL/T/R	93* / 94	А	10	A (10)		45* / 46	А	8	A (8)	
	SBL/T/R	45* / 45	В	11	B (11)		18* / 18	А	6	A (6)	
	EBL/T/R	88* / 90	А	8	A (8)		123* / 124	А	9	A (9)	A
Combined	WBL/T/R	35* / 36	А	9	A (9)	А	48* / 47	А	9	A (9)	
(2023) Conditions	NBL/T/R	108* / 110	В	10	B (10)	(10)	50* / 52	А	9	A (9)	(9)
	SBL/T/R	78* / 78	В	13	B (13)		27* / 28	А	8	A (7)	

# Table 4: Analysis Summary of Porter's Neck Rd and Edgewater Club Rd/Shiraz Way

\* A vehicle length of 25 feet was used to determine the 95<sup>th</sup> percentile queue in feet.

Capacity analysis of existing (2019), background (2023), and combined (2023) traffic conditions indicates the intersection of Porter's Neck Road and Edgewater Club Road/Shiraz Way is expected to operate at a LOS A during both the weekday AM and PM peak hour.



# 7.2. Market Street (US 17) and Porter's Neck Road

The existing signalized intersection Market Street (US 17) and Porter's Neck Road was analyzed under existing (2019), background (2023), and combined (2023) traffic conditions with existing lane configurations and traffic control. Refer to Table 5 for a summary of the analysis results. Refer to Appendix F for the Synchro capacity analysis reports and Appendix M for the SimTraffic queuing reports.

ANAI VSIS	LANE	Weekday AM Peak Hour						Weekday PM Peak Hour				
SCENARIO	GROUP	Queue 95 <sup>th</sup> / Max (ft)	Lane LOS	Delay (sec)	Approach (sec)	Overall (sec)	Queue 95 <sup>th</sup> / Max (ft)	Lane LOS	Delay (sec)	Approach (sec)	Overall (sec)	
	EBL	74 / 146	D	51	Б		135 / 201	Е	57	Б		
	EBT	105 / 139	F	81	(60)		170 / 193	Е	80	(61)		
	EBR	84 / 121	Е	55	(00)		133 / 169	D	49	(01)		
	WBL	347 / 328	Е	67	F		#352 / 308	F	80	F		
Existing	WBT	131 / 322	F	82	(66)		169 / 323	F	81	(75)		
(2019)	WBR	299 / 200	Е	59	(00)	D	266 / 200	E	59	(73)	D	
Conditions	NBL	102 / 175	Е	75	C	(41)	136 / 353	Е	73	C	(44)	
conditions	NBT	559 / 398	D	35	(31)		705 / 456	D	35	(34)		
	NBR	133 / 177	А	7	(31)		101 / 151	Α	6	(54)		
	SBL	115 / 276	Е	64	C		157 / 409	Е	76	D (35)		
	SBT	694 / 428	С	32	(32)		616 / 594	С	32			
	SBR	39 / 90	Α	4	(52)		51 / 132	Α	5	(55)		
	EBL	76 / 150	D	49	E (58)		141 / 207	Е	57	E (61)	-	
	EBT	108 / 135	F	80			177 / 199	Е	80			
	EBR	86 / 122	D	55			139 / 177	D	49	(01)		
	WBL	389 / 370	Е	66	F		#409 / 552	F	88	F		
Background	WBT	136 / 407	F	82	(67)	(67)		173 / 471	F	81	(81)	_
(2023)	WBR	344 / 200	Е	64			D	295 / 200	E	62	(01)	D
Conditions	NBL	105 / 244	Е	75	C (33)	C (33)	(43)	140 / 380	Е	73	Л	(47)
contantions	NBT	604 / 425	D	39				752 / 496	D	38	(35)	
	NBR	150 / 200	Α	8	(55)		126 / 175	A	7	(55)	-	
	SBL	122 / 376	Е	64	П		#187 / 423	F	82	Л		
	SBT	#765 / 490	D	36	(36)		656 / 983	C	34	(38)		
	SBR	41 / 80	А	4	(30)		53 / 141	A	6	(33)		
	EBL	76 / 144	D	47	E		141 / 190	E	57	E		
	EBT	108 / 128	F	80	(57)		177 / 199	E	80	(61)		
	EBR	86 / 130	D	55	(07)		139 / 166	D	49	(01)		
	WBL	441 / 378	Е	67	E		#459 / 365	F	104	F		
Combined	WBT	136 / 458	F	82	(67)		173 / 437	F	81	(91)		
(2023)	WBR	344 / 200	E	64	(**)	D	295 / 200	E	62	()	D	
Conditions	NBL	105 / 238	Е	75	С	(45)	140 / 425	E	73	С	(49)	
	NBT	608 / 426	D	41	(35)		765 / 783	D	38	(35)		
	NBR	160 / 202	А	8	(30)	4	159 / 193	A	8	()	4	
	SBL	122 / 380	Е	64	D		#187 / 412	F	82	D		
	SBT	#813 / 544	D	39	(38)		664 / 558	C	34	(38)		
	SBR	41 / 130	Α	4	(30)		53 / 135	A	6	(20)		

# Table 5: Analysis Summary of Market Street (US 17) and Porter's Neck Road



Capacity analysis of existing (2019), background (2023), and combined (2023) traffic conditions indicates the intersection of Market Street (US 17) and Porter's Neck Road is expected to operate at an overall LOS D during the weekday AM and PM peak hours. The proposed development is not expected to increase the approach delay by 25% at any approach.

The intersection is expected to exceed capacity at the eastbound and westbound approaches under all traffic conditions. This is because they are minor street approaches at a major thoroughfare that is the first signal after an interchange. The Military Cutoff Road Extension project will provide an alternative route to vehicles traveling to/from Wilmington and Hampstead which will alleviate some through traffic along US 17. This project is currently under construction and is expected to provide an opportunity to allow more green time for the eastbound and westbound approaches. It is anticipated that this intersection will operate with less delay after the completion of the Military Cutoff Road Extension project.



# 7.3. Futch Creek Road/Market Street (SR 1400) and Market Street (SR 2845)

The existing unsignalized intersection of Futch Creek Road / Market Street (SR 1400) and Market Street (SR 2845) was analyzed under existing (2019), background (2023), and combined (2023) 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 and Appendix M for the SimTraffic queuing reports.

# Table 6: Analysis Summary of Futch Creek Road / Market Street (SR 1400) and Market Street (SR 2845)

		Weekday AM Peak Hour						Weekday PM Peak Hour				
ANALYSIS SCENARIO	LANE GROUP	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	
Existing	EBL/R	3* / 50	В	11	B (11)	N/A	3* / 39	Α	10	A (10)	N/A	
(2019)	NBL/T	0*/3	$A^1$	81	N/A		0*/3	A <sup>1</sup>	<b>8</b> <sup>1</sup>	N/A		
Conditions	SBT/R	/			N/A		/			N/A		
Background	EBL/R	5* / 62	В	11	B (11)		3* / 33	В	10	B (10)		
(2023)	NBL/T	0* /	$A^1$	81	N/A	N/A	0*/8	A <sup>1</sup>	81	N/A	N/A	
Conditions	SBT/R	/			N/A		/			N/A		
Combined	EBL/R	20* / 87	В	12	B (12)		10* / 59	В	11	B (11)		
(2023)	NBL/T	0*/5	$A^1$	81	N/A	N/A	0*/8	A <sup>1</sup>	81	N/A	N/A	
Conditions	SBT/R	/			N/A		/			N/A		

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

\* Due to limitations with the HCM 6th TWSC reporting, a vehicle length of 25 feet was used to determine the 95<sup>th</sup> percentile queue in feet.

Capacity analysis of existing (2019), background (2023), and combined (2023) traffic conditions indicates the major street left-turn movement and minor street approach are expected to operate at LOS B or better during the weekday AM peak hour and the weekday PM peak hour.



# 7.4. US 17 and U-turn Location (North of SR 1400 Market Street)

The existing signalized intersection of US 17 and the U-turn location was analyzed under existing (2019), background (2023), and combined (2023) traffic conditions with existing lane configurations and traffic control. Refer to Table 7 for a summary of the analysis results. Refer to Appendix H for the Synchro capacity analysis reports and Appendix M for the SimTraffic queuing reports.

			Weekd	ay AM P	eak Hour			Weekda	ekday PM Peak Hour					
ANALYSIS SCENARIO	LANE GROUP	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)			
Existing	NBU	169 / 249	D	38	D (38)	C(22)	95 / 155	С	32	C (32)	A (9)			
Conditions	SBT	#743 / 447	В	20	B (20)	C (22)	321 / 173	А	8	A (8)	$\Lambda(\mathcal{I})$			
Background (2023)	NBU	176 / 247	D	38	D (38)	C (26)	98 / 171	С	32	C (32)	B (10)			
Conditions	SBT	#791 / 571	С	25	C (24)	0 (20)	356 / 185	А	8	A (8)	Б (10)			
Combined (2023)	NBU	213 / 290	D	40	D (40)	C (33)	112 / 188	С	32	C (32)	B (13)			
Conditions	SBT	#797 / 751	С	32	C (32)		400 / 222	В	11	B (11)				

# Table 7: Analysis Summary of US 17 and U-turn Location (North of SR 1400 Market Street)

Capacity analysis of existing (2019), background (2023), and combined (2023) traffic conditions indicates the intersection of US 17 and U-turn location is expected to operate at LOS C during the weekday AM peak hour and LOS B or better during the weekday PM peak hour. Adequate storage is available with the existing U-turn lane to accommodate future queues



# 7.5. US 17 and Market Street (SR 1400)

The signalized intersection of US 17 and Market Street (SR 1400) was analyzed under existing (2019), background (2023), and combined (2023) conditions with existing lane configurations and traffic control. Refer to Table 8 for a summary of the analysis results. Refer to Appendix I for the Synchro analysis reports and Appendix M for the SimTraffic queuing reports.

			Weekd	ay AM P	eak Hour			Weekda	y PM Pe	eak Hour	
ANALYSIS SCENARIO	LANE GROUP	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)
	EBL	50 / 130	В	16	B (16)		64 / 246	С	27	C (27)	
Existing (2019)	WBR	#255 / 291	D	40	D (40)	$\mathbf{B}$	169 / 189	D	38	D (38)	C (33)
Conditions	NBT NBR	271 / 86 53 / 68	B A	13 8	B (13)	(18)	#793 / 85 57 / 73	C A	35 6	C (32)	
Background	EBT	51 / 123	В	16	B (16)	B (20)	66 / 299	С	29	C (29)	C (31)
	WBR	#269 / 326	D	42	5     B (16)       2     D (42)       5     B (14)		#178 / 197	D	50	D (50)	
Conditions	NBT NBR	300 / 164 54 / 95	B A	15 8			#855 / 185 60 / 95	C A	32 5	C (30)	
Background	EBT	51 / 101	В	16	B (16)	B (17)	66 / 94	С	30	C (30)	C (25)
(2023) Conditions	WBR	#238 / 218	D	36	D (36)		150 / 196	D	42	D (42)	
Field Conditions	NBT NBR	300 / 171 23 / 95	B A	14 2	B (13)		#855 / 184 33 / 95	C A	25 2	C (24)	
0 1 1	EBT	56 / 154	В	16	B (16)		89 / 116	С	29	C (29)	D (39)
(2023)	WBR	#348 / 531	Е	58	E (58)	С	#250 / 217	Е	58	E (58)	
Conditions	NBT NBR	300 / 175 60 / 95	B A	17 9	B (16)	(25)	#855 / 182 75 / 95	D A	40 6	D (37)	
Combined	EBT	56 / 102	В	16	B (16)		89 / 130	С	30	C (30)	
(2023) Conditions –	WBR	#319 / 272	D	46	D (46)	С	#213 / 228	D	48	D (48)	С
Field Conditions	NBT NBR	300 / 170 25 / 95	B A	16 2	B (14)	(22)	#855 / 182 39 / 95	C A	33 3	C (31)	(32)

Table 8: Analysis Summary of US 17 and Market Street (SR 1400)

Capacity analysis of existing (2019), background (2023), and combined (2023) traffic conditions indicates the intersection is expected to operate at an overall LOS D or better during the weekday AM and PM peak hours. The development is expected to increase queues on Market Street by approximately 80 feet in the AM peak hour. The analysis scenario shown in green in Table 8 represents Field Conditions which includes consideration of right-turn-on-red which is currently allowed at the intersection. Since all turns on the westbound approach are right turns, this analysis should more accurately represent field conditions.



# 7.6. US 17 and Stephen's Church Road / NB U-Turn

The existing signalized intersection of US 17 and Stephen's Church Road / NB U-Turn was analyzed under existing (2019), background (2023), and combined (2023) 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 and Appendix M for the SimTraffic queuing reports.

ANALYSIS SCENARIO	LANE	Weekday AM Peak Hour Weekday PM Peak							eak Hour		
	GROUP	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)
Existing (2019) Conditions	EBR	70 / 113	D	38	D (38)		46 / 61	С	30	C (30)	
	WBT	47 / 86	С	33	C (33)	B (12)	72 / 94	С	32	C (32)	B
	SBT SBR	705 / 177 m1 / 10	B A	12 2	B (12)	(13)	490 / 202 m1 / 46	B A	11 3	B (11)	(12)
D 1 1	EBR	73 / 101	D	38	D (38)	В	47 / 62	С	29	C (29)	B (12)
Background (2023)	WBT	47 / 220	С	33	C (33)		74 / 1234	С	32	C (32)	
Conditions	SBT SBR	m703 / 176 m1 / 22	B A	13 2	B (13)	(14)	510 / 201 m1 / 64	B A	11 3	B (11)	
Combined (2023) Conditions	EBR	73 / 100	D	38	D (38)		47 / 90	С	29	C (29)	
	WBT	47 / 281	С	33	C (33)	В	74 / 1258	С	32	C (32)	В
	SBT SBR	m689 / 156 m1 / 20	B A	12 2	B (12)	(13)	510 / 160 m1 / 14	A A	10 2	A (10)	(11)

Table 9: Analysis Summary of US 17 and Stephen's Church Road / NB U-Turn

Capacity analysis of existing (2019), background (2023), and combined (2023) traffic conditions indicates the intersection is expected to operate at an overall LOS B during both the weekday AM and PM peak hour.



# 7.7. Shiraz Way and Site Drive 1

The proposed unsignalized intersection of Shiraz Way and Site Drive 1 was analyzed under combined (2023) traffic conditions with existing lane configurations and traffic control. Refer to Table 10 for a summary of the analysis results. Refer to Appendix K for the Synchro capacity analysis reports and Appendix M for the SimTraffic queuing reports.

ANALYSIS SCENARIO			Weekd	ay AM P	eak Hour			Weekda	y PM Pe	eak Hour	
	LANE GROUP	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)
Combined	EBL/R	10* / 60	$\mathbf{B}^1$	101	B (10)		5* / 56	$A^1$	<b>9</b> <sup>1</sup>	A (9)	
(2023) Conditions	NBL/T	3* / 35	А	8	N/A	N/A	5* / 45	А	8	N/A	N/A
	SBT/R	/			N/A		/			N/A	

Table 10: Analysis Summary of Shiraz Way and Site Drive 1

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

\* Due to limitations with the HCM 2010 TWSC reporting, a vehicle length of 25 feet was used to determine the 95<sup>th</sup> percentile queue in feet.

Capacity analysis of combined (2023) traffic conditions indicates the minor-street approach and major-street left-turn movement at the intersection of Shiraz Way and Site Drive 1 are expected to operate at LOS B or better during the weekday AM and PM peak hours.

Shiraz Way is not expected to have an AADT of 4,000 vpd by the year 2023, which is the typical threshold for considering designated turn lanes at unsignalized intersections; therefore, no designated turn lanes are recommended at the proposed site drive.



# 7.8. Market Street (SR 2845) and Site Drive 2

The proposed unsignalized intersection of Market Street (SR 2845) and Site Drive 2 was analyzed under combined (2023) 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 and Appendix M for the SimTraffic queuing reports.

ANALYSIS SCENARIO	LANE		Weekd	ay AM P	eak Hour			Weekda	y PM Pe	PM Peak Hour				
	GROUP	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)	Queue 95 <sup>th</sup> / Max (ft.)	Lane LOS	Delay (sec)	Approach LOS (sec)	Overall LOS (sec)			
Combined	WBT/R	8* / 58	$A^1$	9 <sup>1</sup>	A (9)		5* / 50	$A^1$	<b>9</b> <sup>1</sup>	A (9)				
(2023) Conditions	NBT/R	/			N/A	N/A	/			N/A	N/A			
	SBL/T	3* /	А	7	N/A		5* / 22	А	7	N/A				

 Table 11: Analysis Summary of Market Street (SR 2845) and Site Drive 2

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

Capacity analysis of combined (2023) traffic conditions indicates the major-street left-turn movement at the intersection of Market Street (SR 2845) and Site Drive 2 is expected to operate at LOS A during both weekday AM and PM peak hours.

Market Street (SR 2845) is not expected to have an AADT of 4,000 vpd by the year 2023, which is the typical threshold for considering designated turn lanes at unsignalized intersections; therefore, no designated turn lanes are recommended at the proposed site drive.



# 8. CONCLUSIONS

This Traffic Impact Analysis was conducted to determine the potential traffic impacts of the proposed Porter's Neck Development, to be located south of Futch Creek Road and east of Porter's Neck Road in Wilmington, North Carolina. The proposed development is expected to include single family homes and multi-family units and be built out in 2023. Site access is proposed via one full-movement driveway on both Market Street (SR 2845) and Shiraz Way.

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

- Existing (2019) Traffic Conditions
- Background (2023) Traffic Conditions
- Combined (2023) Traffic Conditions
- Combined (2023) w/ Improvements Traffic Conditions

# Trip Generation

Based on data from the existing facility, it is anticipated that the proposed development will generate 202 trips (48 entering and 154 exiting) will during the weekday AM peak hour and 239 trips (151 entering and 88 exiting) during the weekday PM peak hour.

# Capacity Analysis Summary

Overall, the development is not expected to have a significant impact at study intersections. Congestion occurs during peak hours at Porter's Neck Road/US 17 and at Market Street (SR 1400)/US 17. These two roads (Porter's Neck Road and Market Street) are the only two connections to US 17 for the Porter's Neck area. With completion of the Waterstone development and the proposed development, nearly all land in the Porter's Neck area will be development, which minimizes the potential for future traffic increases in this area beyond these developments.

The Military Cutoff Extension project is under construction and is expected to alleviate some traffic along US 17 through the study area. This should improve intersection operations along US 17, including the Porter's Neck Road / US 17 intersection. Changes to traffic patterns as a



result of this new roadway were not considered in this traffic study, which provides a conservative analysis for the study area.

# Porter's Neck Road and Edgewater Club Road/Shiraz Way

The roundabout is expected to operate at an acceptable level of service in the future with full build out of the development. The development is not expected to cause a significant increase in delays or queues along the approaches of the roundabout.

#### Market Street (US 17) and Porter's Neck Road

The intersection is expected to operate at LOS D under background conditions and combined conditions with build out of the development. Site trips are expected to increase intersection delay by approximately 2 seconds in the peak hours. Queues on the westbound approach of Porter's Neck Road are expected to increase by approximately 2-3 vehicles during the heaviest peak hour period. Operations at this intersection should improve with completion of the Military Cutoff Road Extension project.

# US 17 and U-turn Location (North of SR 1400 Market Street)

The signalized u-turn location is expected to operate at LOS C or better under future conditions with the development. The northbound u-turn queues are expected to increase by approximately 2-3 vehicles during the AM peak hour; however, adequate storage is available to accommodate future queues.

# US 17 and Market Street (SR 1400)

The intersection is expected to operate at an overall LOS D or better under each analysis scenario. The proposed development is expected to increase queues along Market Street (SR 1400) by approximately 80 feet during the heaviest peak hour.

Other study intersections are expected to operate at acceptable levels of service during the weekday AM and PM peak hours under each analysis scenario.



# 9. **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 11 for an illustration of the recommended lane configuration for the proposed development.

### **Recommended Improvements by Developer**

Shiraz Way and Site Drive 1

- Provide site access via full-movement intersection with one ingress lane and one egress lane.
- Provide stop control for Site Drive 1.

#### Market Street (SR 2845) and Site Drive 2

- Provide site access via full-movement intersection with one ingress lane and one egress lane.
- Provide stop control for Site Drive 2.







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