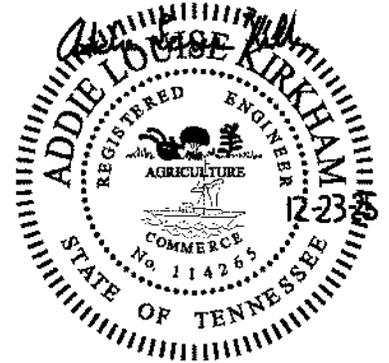




BUTTERMILK ROAD SUBDIVISION TRAFFIC IMPACT STUDY

BUTTERMILK ROAD
KNOX COUNTY, TN

CCI PROJECT NO. 01904-0003.000



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TABLE OF CONTENTS

SECTION 1	EXECUTIVE SUMMARY	1
SECTION 2	INTRODUCTION & PURPOSE OF STUDY	2
SECTION 3	EXISTING CONDITIONS	4
SECTION 4	BACKGROUND CONDITIONS	8
SECTION 5	FUTURE CONDITIONS	10
SECTION 6	EVALUATIONS	15
SECTION 7	CONCLUSIONS & RECOMMENDATIONS	18
SECTION 8	APPENDIX	19



FIGURES

FIGURE 1	LOCATION MAP	2
FIGURE 2	CONCEPTUAL SITE PLAN	3
FIGURE 3	EXISTING SITE CONDITIONS	4
FIGURE 4	2025 EXISTING TRAFFIC VOLUMES	6
FIGURE 5	2028 BACKGROUND TRAFFIC VOLUMES	9
FIGURE 6	TRIP DISTRIBUTION PATTERNS	12
FIGURE 7	TRIP ASSIGNMENT	13
FIGURE 8	2028 COMBINED TRAFFIC VOLUMES	14
FIGURE 9	SIGHT DISTANCE ASSESSMENT	17

TABLES

TABLE 1	ANNUAL AVERAGE DAILY TRAFFIC COUNT SUMMARY	5
TABLE 2	TRIP GENERATION SUMMARY	10
TABLE 3	CAPACITY ANALYSIS SUMMARY	15

APPENDICES

APPENDIX A	TRAFFIC DATA
APPENDIX B	TRIP GENERATION
APPENDIX C	CAPACITY ANALYSES
APPENDIX D	TURN LANE WARRANT EVALUATIONS



1 EXECUTIVE SUMMARY

This report provides a summary of a traffic impact study that was performed for a proposed residential development to be located along Buttermilk Road within the Hardin Valley community of Knox County, TN. The project site is located on the south side of Buttermilk Road between Graybeal Road and Marietta Church Road. The conceptual plan for this project, Buttermilk Road Subdivision, proposes a total of 95 Single-Family lots.

The conceptual plan shows two site access locations, one site access onto Buttermilk Road, approximately 600 feet east of Graybeal Road, and the second site access onto Hickory Meadows Drive with access to Buttermilk Road. The Hickory Meadows Subdivision has approximately 62 single-family lots completed and the remaining 40 single-family lots currently under construction.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed residential development upon roadways in the vicinity of the site. Of particular interest in this study are the proposed development access mentioned above as well as the unsignalized intersection of Buttermilk Road and Hickory Meadows Drive. Appropriate intersection evaluations were conducted at these locations in order to determine the anticipated impacts and to establish recommended measures to mitigate these impacts. These evaluations included trip generation, trip distribution, capacity analyses, turn lane warrant analyses and sight distance assessments.

The primary conclusion of this study is that traffic generated from the proposed residential development will not have major negative impacts on the study intersections. All study intersections and proposed site accesses were found to operate at a LOS "A" and have little to no impact on current delay.

The following list is a summary of the improvements that are recommended to be implemented with the construction of this project:

1. Install STOP sign at unsignalized Site Access at Buttermilk Road.
2. Maintain tree foliage and vegetation within the right-of-way looking both directions in order to provide the required minimum intersection sight distance.



2 INTRODUCTION & PURPOSE OF STUDY

This report provides a summary of a traffic impact study that was performed for a proposed residential development to be located along Buttermilk Road within the community of Hardin Valley in Knox County, TN. The project site is located on the south side of Buttermilk Road between Graybeal Road and Marietta Church Road. FIGURE 1 is a location map identifying the major roadways in the vicinity of the site.



**FIGURE 1
LOCATION MAP**

The conceptual plan for this project, Buttermilk Road Subdivision, proposes a residential development with 95 Single-Family lots. The project is to have two site access locations, one site access onto Buttermilk Road, approximately 600 feet east of Graybeal Road, and the second site access onto Hickory Meadows Drive with access to Buttermilk Road. FIGURE 2 is a Conceptual Site Plan which details the proposed site configuration.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed residential development upon roadways in the vicinity of the site. Of particular interest in this study are the proposed development accesses mentioned above. Appropriate intersection evaluations were conducted at these locations to determine the anticipated impacts and to establish recommended measures to mitigate these impacts. These evaluations included trip generation, trip distribution, capacity analyses, turn lane warrant analyses and sight distance assessments.

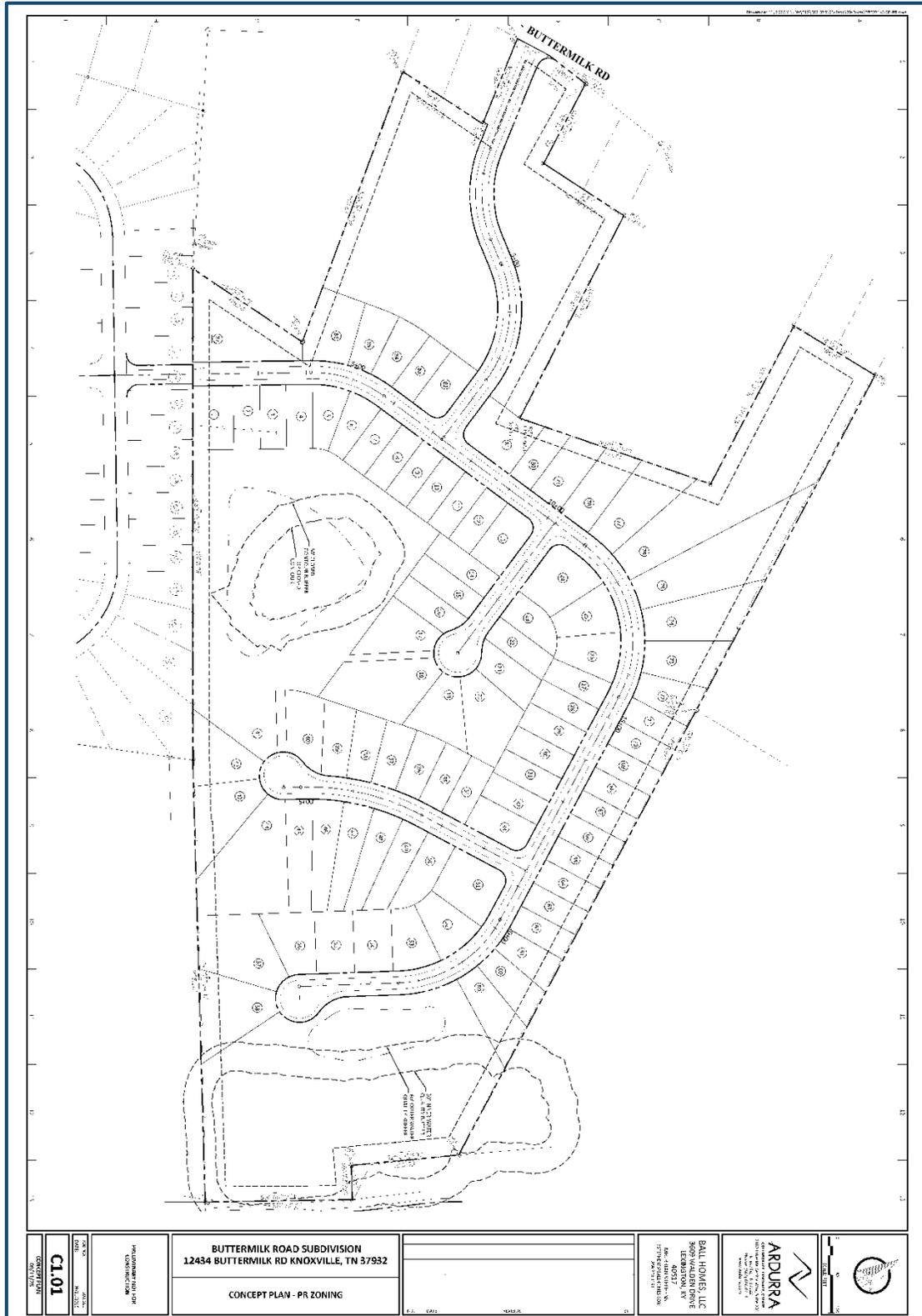


FIGURE 2
CONCEPTUAL SITE PLAN



3 EXISTING CONDITIONS

EXISTING ROADWAY CONDITIONS

According to the Knoxville-Knox County Major Road Plan Buttermilk Road is an Minor Collector between Hickory Creek Road and Marietta Church Road that provides east-west access for the Hardin Valley community in Knox County. Buttermilk Road carries traffic to and from both residential and agricultural areas. In the vicinity of the proposed development, the roadway consists of two 10-foot through travel lanes in each direction. No shoulder or sidewalks exists on either side of the roadway. The speed limit on Buttermilk Road is posted as 30 mph. The 2024 ADT on Buttermilk Road was 800 vpd.

Hickory Meadows Drive is a considered a local street per Knoxville-Knox County Planning consisting of 12-foot lanes and currently carries traffic to an existing residential development that is still under construction.

EXISTING SITE CONDITIONS

The total site acreage for this project consists of approximately 33 acres located south of Buttermilk Road. Knoxville is located to the east and Lenior City is located to the south-west of the proposed site. The site is primarily bordered by general agricultural and residential land uses.





FIGURE 3
EXISTING SITE CONDITIONS

EXISTING TRAFFIC DATA

Existing traffic data was gathered for this study. Annual average daily traffic data (AADT) collected by TDOT and the Knoxville Regional Transportation Planning Organization (TPO) on roadways in the area of the proposed development were utilized. Three count stations, one located on Marietta Church Road south of Hardin Valley Road, one located on Buttermilk Road east of Everett Road, and one located on Buttermilk Road west of Everett Road, were felt to have relevance for this study. The most currently available data from these count stations is contained in TABLE 1.

In addition to the available AADT data, intersection turning movement traffic counts were performed to determine the current AM and PM peak hour operating volumes at the intersection of Buttermilk Road at Hickory Meadows Drive. The traffic count was conducted during December 2025. It should be noted that at the time the traffic count was conducted, the Hickory Meadows subdivision was still under construction and only partially occupied. Therefore, the intersection of Buttermilk Road and Hickory Meadows Drive did not include all the trips that would result from full build-out conditions. The 2025 peak hour volumes from the existing traffic data are shown in FIGURE 4, and the raw data traffic count summary sheets are contained in APPENDIX A.

TABLE 1			
ANNUAL AVERAGE DAILY TRAFFIC COUNT SUMMARY			
COUNT YEAR	TDOT COUNT STATION 47000556 BUTTERMILK ROAD WEST OF EVERETT ROAD	KNOX TPO COUNT STATION 093M276 BUTTERMILK ROAD EAST OF EVERETT ROAD	KNOX TPO COUNT STATION 093M275 MARIETTA CHURCH ROAD SOUTH OF HARDIN VALLEY ROAD
2024	800	-	-
2023	826	510	2,350
2022	726	530	-
2021	920	-	1,990
2020	818	-	1,470
2019	707	490	2,050
2018	861	-	-
2017	1,000	520	1,670
2016	990	-	-
2015		530	1,440
2014		-	-
2013		450	1,320
2012		-	-
2011		380	1,100

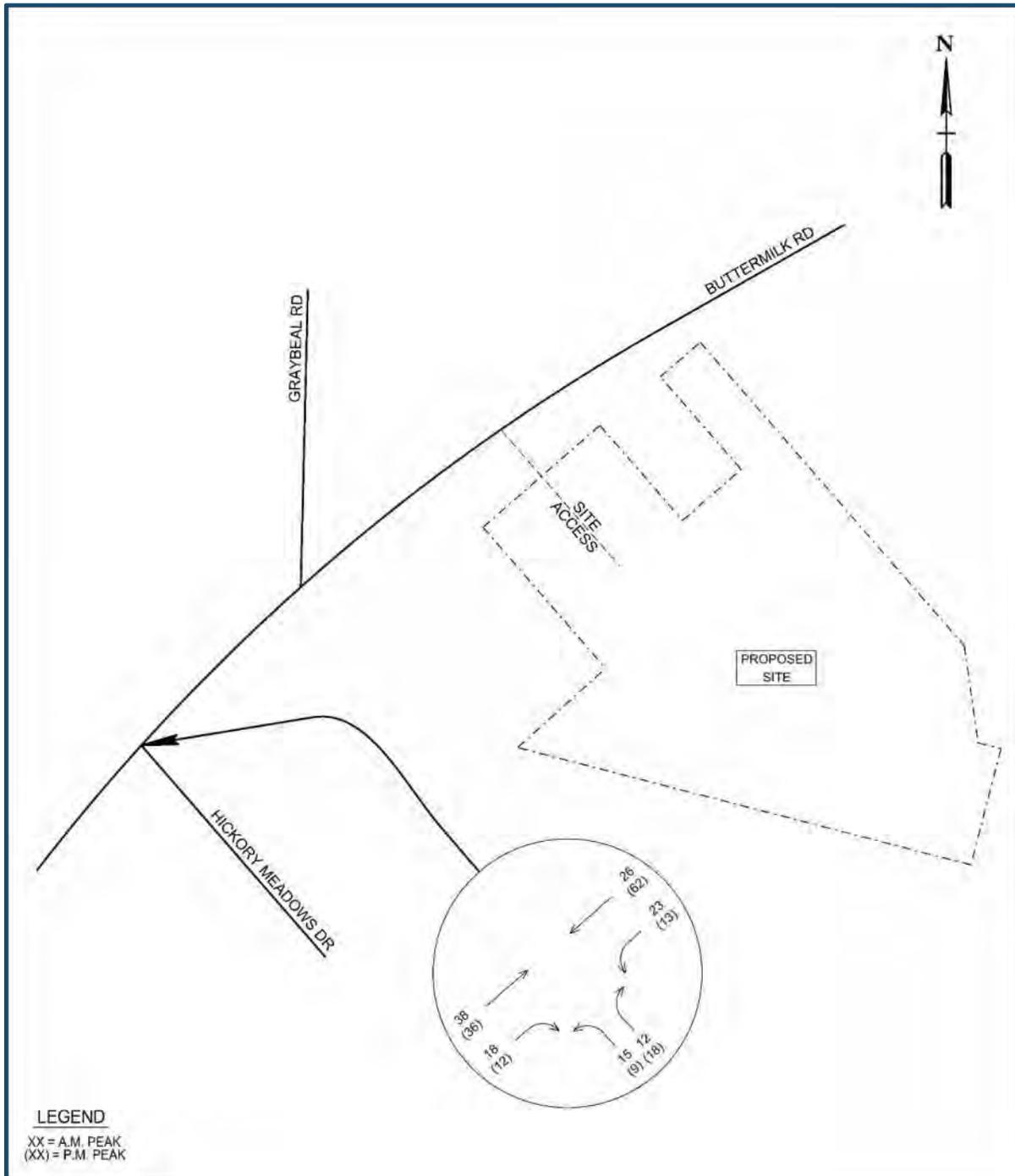


FIGURE 4
2025 EXISTING TRAFFIC VOLUMES



EXISTING CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses employing the methods of the Highway Capacity Manual (7th Edition) were conducted for the existing study intersection. The analyses were performed with the 2025 existing traffic volumes and existing intersection traffic control and lane configurations. The intersection of Buttermilk Road at Hickory Meadows Drive was found to operate at a Level-of-Service (LOS) “A” during both the AM and PM peak hours with approach delays of 9.1 seconds and 8.9 seconds, respectively.

The EVALUATIONS section of this report may be referenced for tabular summaries and discussion of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C.



4 BACKGROUND CONDITIONS

BACKGROUND TRAFFIC GROWTH

To determine traffic volumes resulting solely from background traffic growth to year 2028, it was necessary to establish an annual growth rate for existing traffic. The ADT values previously discussed, as well as knowledge of the area, were used to determine an approximate annual growth rate. Based on the available data, a background annual growth rate of 5.0% was assumed. Existing volumes from the intersection of Buttermilk Road and Hickory Meadows Drive were grown by 5.0% every year from the year 2025, when the counts were conducted, to the year 2028.

Anticipating the full build out of the Hickory Meadows subdivision, trip generation was conducted for the remainder of unoccupied lots. A field visit was conducted in December 2025 and concluded that a total of 40 lots were unoccupied. The trips generated from the unoccupied lots were then combined with the background data that had been grown from the year 2025 to the year 2028. More detailed trip generation information is contained in APPENDIX B.

A trip distribution of 60% entering/exiting from Marietta Church Road and 40% entering/exiting from Everett Road was assumed for the remainder of the unoccupied lots.

The background traffic volumes shown on FIGURE 5 represents the full build out of the Hickory Meadows Subdivision and the Year 2028 background growth conditions without traffic related to the proposed development.

BACKGROUND CAPACITY ANALYSES / LEVELS-OF-SERVICE

Appropriate capacity analyses as described in the Existing Conditions section of this report were conducted utilizing the Year 2028 background volumes shown in FIGURE 5. Under Year 2028 background conditions, without traffic related to the development, the intersection of Buttermilk Road at Hickory Meadows Drive was still found to operate at a Level-of-Service (LOS) "A" during both the AM and PM peak hours with approach delays of 9.4 seconds and 9.3 seconds, respectively.

The EVALUATIONS section of this report may be referenced for tabular summaries and discussion of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C.

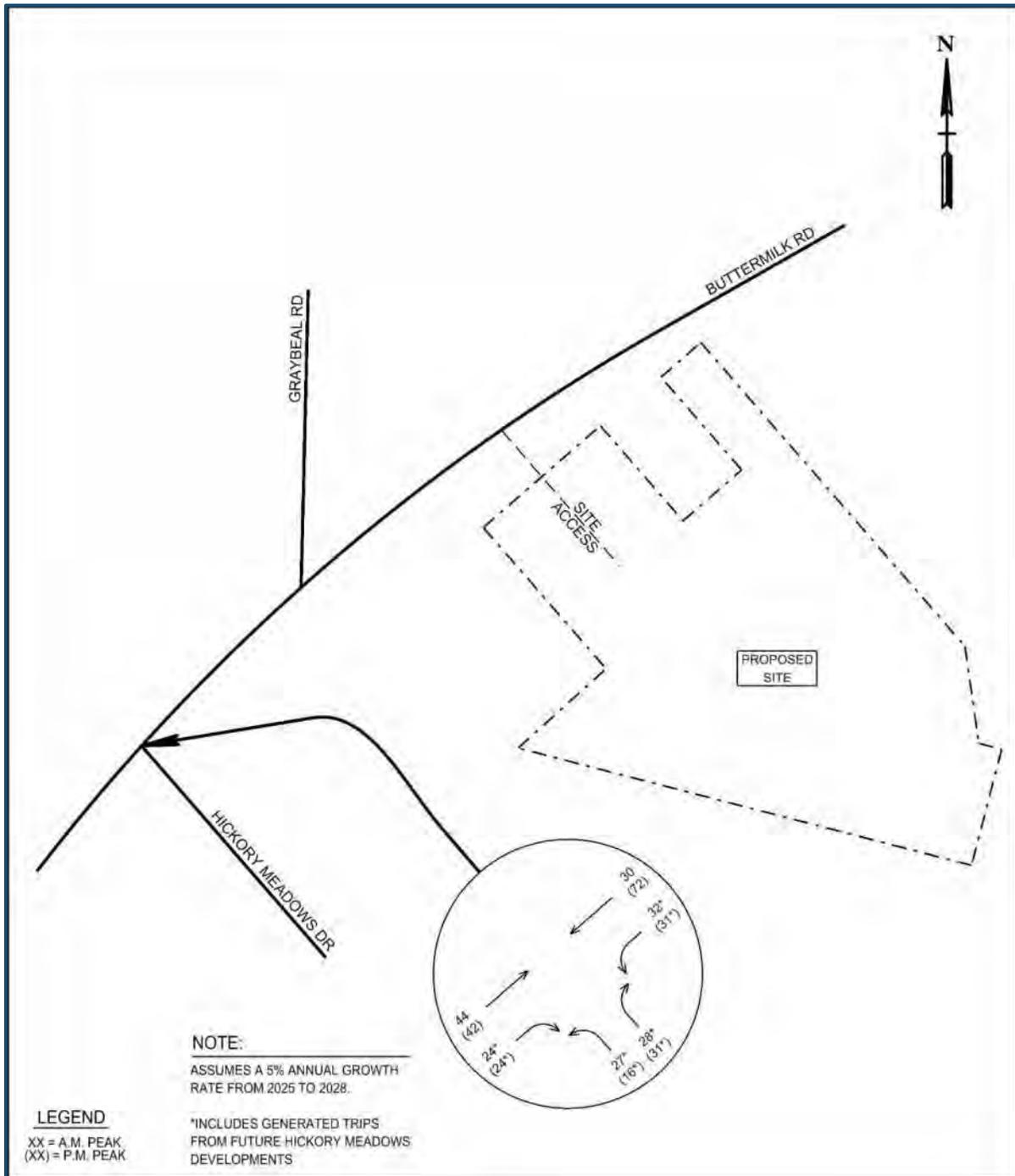


FIGURE 5
2028 BACKGROUND TRAFFIC VOLUMES



5 FUTURE CONDITIONS

TRIP GENERATION

In order to estimate the expected traffic volumes to be generated by the proposed development, the procedures recommended by the Institute of Transportation Engineers were utilized. Trip generation rates developed by the Institute of Transportation Engineers (Trip Generation, 11th Edition) were utilized to generate the estimated trips for the proposed development. The generated traffic volumes were determined based on the data for the weekday, AM peak hour and PM peak hour. Fitted curves were used for the trip generation calculations. Based on standard practices, if the “R-squared” value is 0.75 or greater the fitted curve equation is used for trip generation, otherwise the average rate is used. TABLE 2 provides a summary of the expected newly generated traffic for the development. More detailed information is contained in APPENDIX B.

TABLE 2 TRIP GENERATION SUMMARY					
LAND USE	ITE CODE	SIZE	WEEKDAY (TRIPS/DAY)	AM PEAK HOUR (TRIPS/HR)	PM PEAK HOUR (TRIPS/HR)
Single-Family Detached	210	95 D.U.			
Entering Trips			482	18	60
Exiting Trips			<u>481</u>	<u>53</u>	<u>35</u>
Total			963	71	95

TRIP DISTRIBUTION AND ASSIGNMENT

FIGURE 6 provides a summary of the trip distribution patterns assumed for this study. These patterns were based on the existing traffic patterns derived from the traffic counts and knowledge of the area. FIGURE 7 provides a summary of the anticipated trips associated with the proposed development as assigned to the study intersection utilizing the trip generation data from TABLE 2 and the distribution patterns shown on FIGURE 6.

With the proposed subdivision being connected to the Hickory Meadows subdivision, it was assumed that 10% of trips associated with the Hickory Meadows subdivision would enter and exit at the proposed site access once completed. These combined year volumes reflect the existing traffic, the background traffic growth, volume redistribution, and the newly generated traffic from the proposed residential development. FIGURE 8 represents the 2028 combined traffic data with anticipated trips from the proposed development. The volumes shown in FIGURE 8 are the combined volumes used in the analysis of the future conditions.



FUTURE CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses as described in the Existing Conditions section of this report were conducted for 2028, full build-out conditions utilizing the Year 2028 combined volumes shown in FIGURE 8.

Under 2028 combined conditions, the intersection of Buttermilk Road and the proposed site access was found to operate at a LOS “A” during both the AM and PM peaks with approach delays of 9.3 seconds and 9.7 seconds, respectively. The intersection of Buttermilk Road and Hickory Meadows Drive was found to operate at a LOS “A” during both the AM and PM peaks with an approach delay of 9.5 seconds.

The EVALUATIONS section of this report may be referenced for tabular summaries and discussion of these analyses, while more detailed summaries are presented on the computer printouts contained in APPENDIX C.

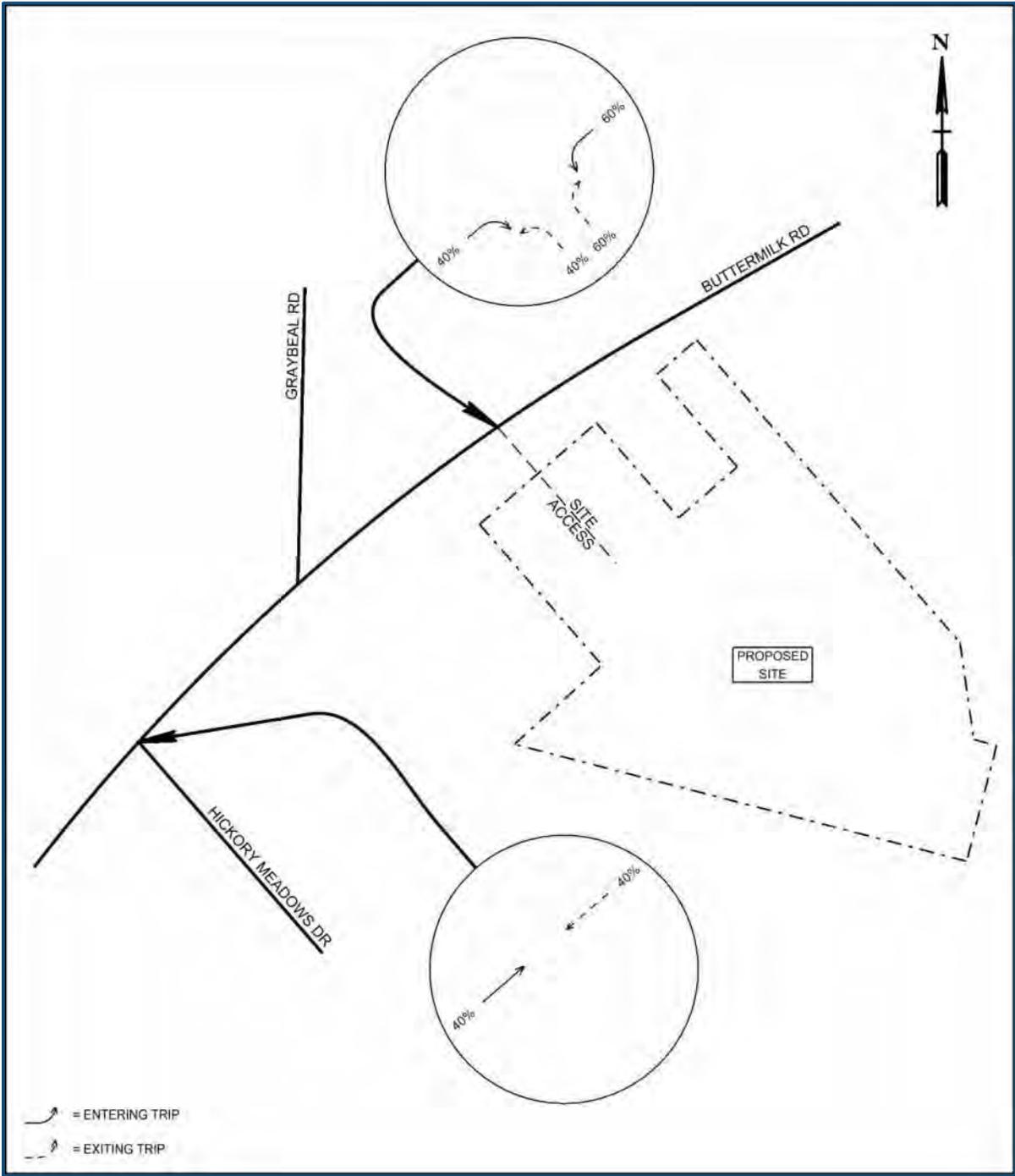


FIGURE 6
TRIP DISTRIBUTION PATTERNS

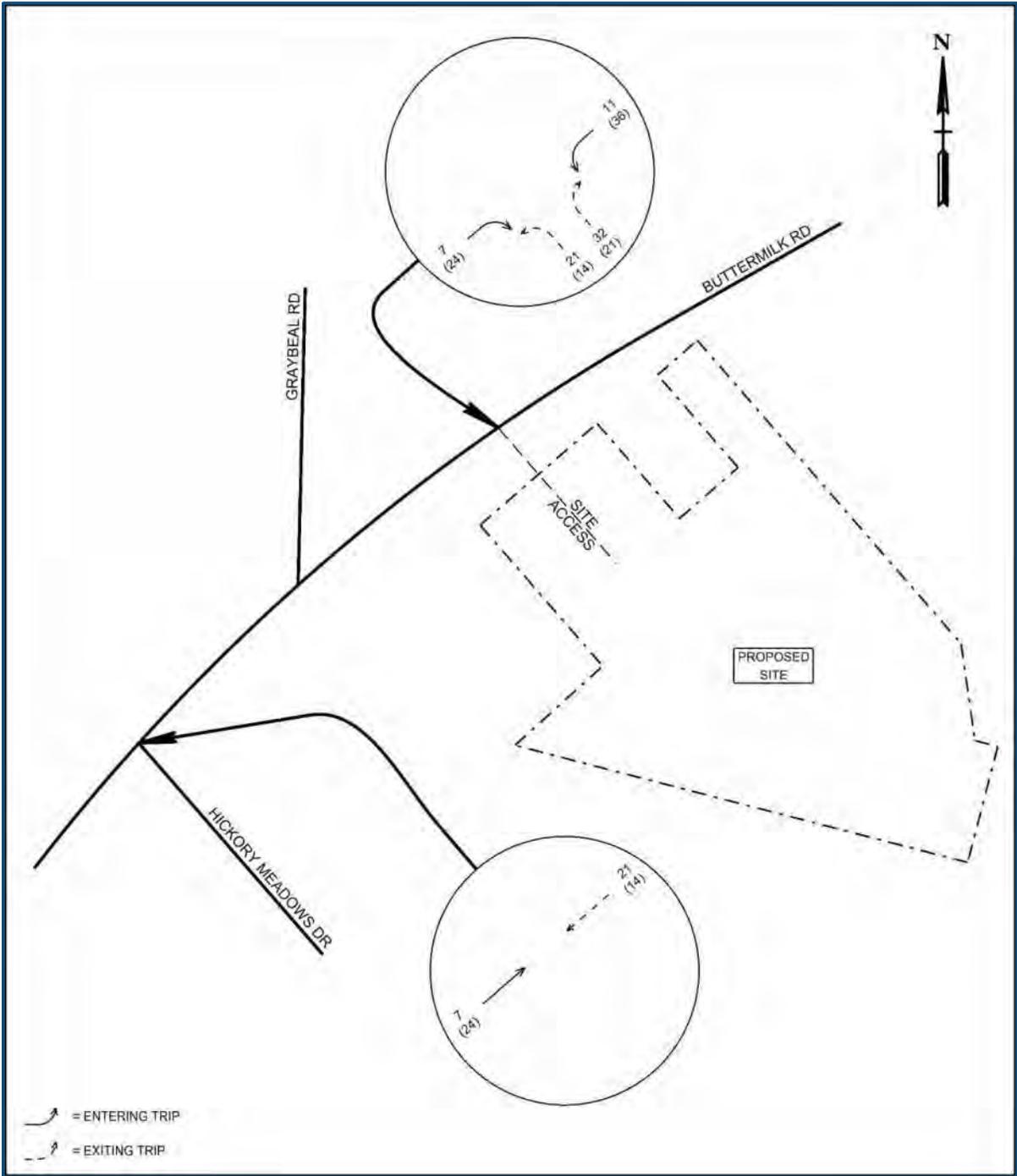


FIGURE 7
TRIP ASSIGNMENT

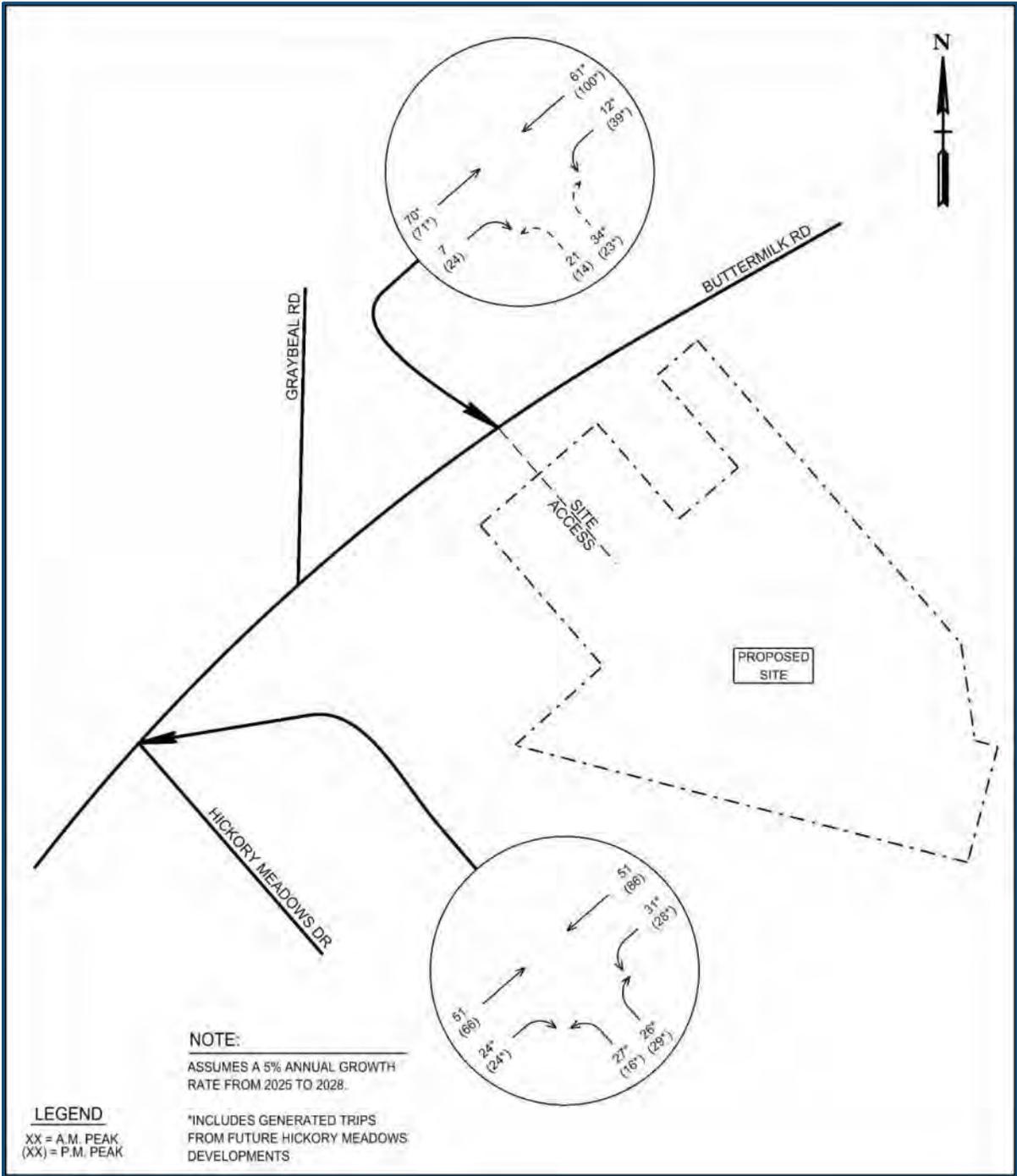


FIGURE 8
2028 COMBINED TRAFFIC VOLUMES



6 EVALUATIONS

INTERSECTION CAPACITY ANALYSES

TABLE 3
CAPACITY ANALYSIS SUMMARY

INTERSECTION	TIME PERIOD	YEAR 2025 EXISTING (LOS/DELAY)	YEAR 2028 BACKGROUND (LOS/DELAY)	YEAR 2028 COMBINED (LOS/DELAY)
Buttermilk Road at Hickory Meadows Drive (SIDE STREET STOP) ¹	A.M.	A 9.1	A 9.4	A 9.5
	P.M.	A 8.9	A 9.3	A 9.5
Buttermilk Road at Site Access (SIDE STREET STOP) ¹	A.M.	-	-	A 9.3
	P.M.	-	-	A 9.7

¹SIDE STREET STOP CONTROL – Level-of-Service and Average Vehicular Delay (seconds) for side street approach utilizing HCM methodology.

The results summarized in TABLE 3 indicate that a LOS “A” can be anticipated at all study intersections under the evaluated conditions, even combined conditions. The anticipated delay for the intersection of Buttermilk Road and Hickory Meadows Drive will be approximately 9.5 seconds during both the AM and PM Peak hour. The anticipated delay for the intersection of Buttermilk Road and the proposed site access will be approximately 9.3 seconds during the AM peak hour and 9.5 seconds during the PM peak hour.



TURN LANE ASSESSMENT

The proposed site accesses were evaluated for left and right-turn lane warrants utilizing the Knox County Department of Engineering and Public Works “Access Control and Driveway Design Policy” turn lane volume thresholds for the existing and proposed intersections. Combined conditions were evaluated as part of the assessment with the following results:

- Build-out Traffic
 - Buttermilk Road at Hickory Meadows Drive
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – PM Peak: Not Met / PM Peak: Not Met
 - Buttermilk Road at Proposed Site Access
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – PM Peak: Not Met / PM Peak: Not Met

Knox County recommends that turn lanes be installed when turn lane warrants are met during either the AM or PM peak hours at existing and proposed intersections. As indicated above, neither of the intersections warranted a left turn lane or right turn lane. The turn lane warrant analyses worksheets are in APPENDIX D.

SIGHT DISTANCE ASSESSMENT

Intersection sight distance was reviewed for the proposed site access at Buttermilk Road. As stated previously, the posted speed limit within the project vicinity of 30 mph was utilized to determine the necessary sight distance for turning vehicles. Based on the Knox County Subdivision Regulations, the minimum sight distance at the intersection (in both directions along the major street) shall be ten (10) times the posted speed limit or 300 feet at the proposed site access to Buttermilk Road.

Intersection sight distance was assessed via field measurements at the proposed site access to Buttermilk Road in December 2025. The measurements were taken looking left and right from a point 15 feet from the edge of the major road and measured with a driver eye height of 3.5 feet and an object height of 3.5 feet above the driving surface of the major road.

The sight distance was found to be greater than 300 feet for both right and left-turning vehicles. It should be noted that sight distance could potentially be blocked by the foliage of an existing tree when looking left on Buttermilk Road. With proper foliage management, the required sight distance can be maintained. The sight distance observed from the field measurements can be seen in FIGURE 9.



Looking left along Buttermilk Road from the proposed site access.

Approx. sight distance: greater than 300 ft.



Looking right along Buttermilk Road from the proposed site access.

Approx. sight distance: greater than 300 ft.

**FIGURE 9
SIGHT DISTANCE ASSESSMENT**



7 CONCLUSIONS & RECOMMENDATIONS

The primary conclusion of this study is that traffic generated from the proposed residential development will not have major negative impacts on the study intersections. All study intersections and proposed site accesses were found to operate at a LOS “A” and have little to no impact on current delay.

The following list is a summary of the improvements that are recommended to be implemented with the construction of this project:

1. Install STOP sign at unsignalized Site Access at Buttermilk Road.
2. Maintain tree foliage and vegetation within the right-of-way looking both directions in order to provide the required minimum intersection sight distance.



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- APPENDIX A | TRAFFIC DATA**
 - APPENDIX B | TRIP GENERATION**
 - APPENDIX C | CAPACITY ANALYSES**
 - APPENDIX D | TURN LANE WARRANT EVALUATIONS**



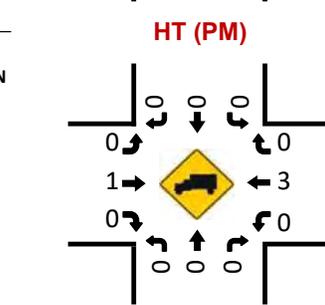
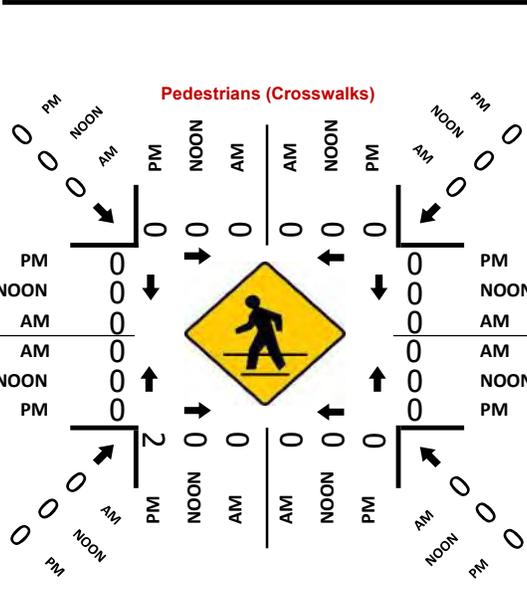
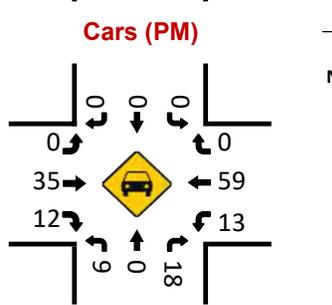
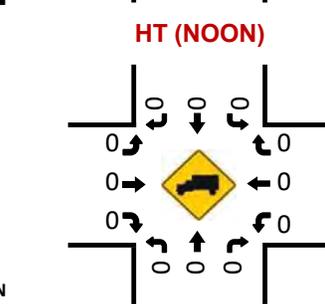
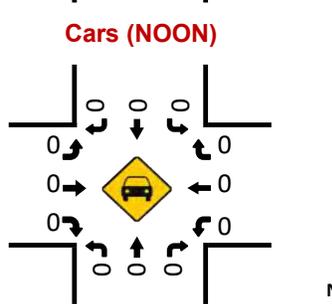
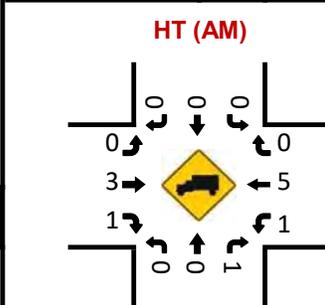
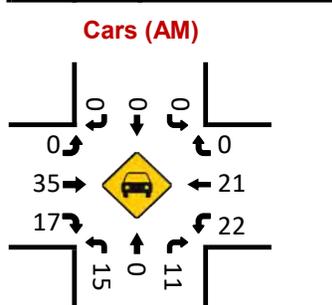
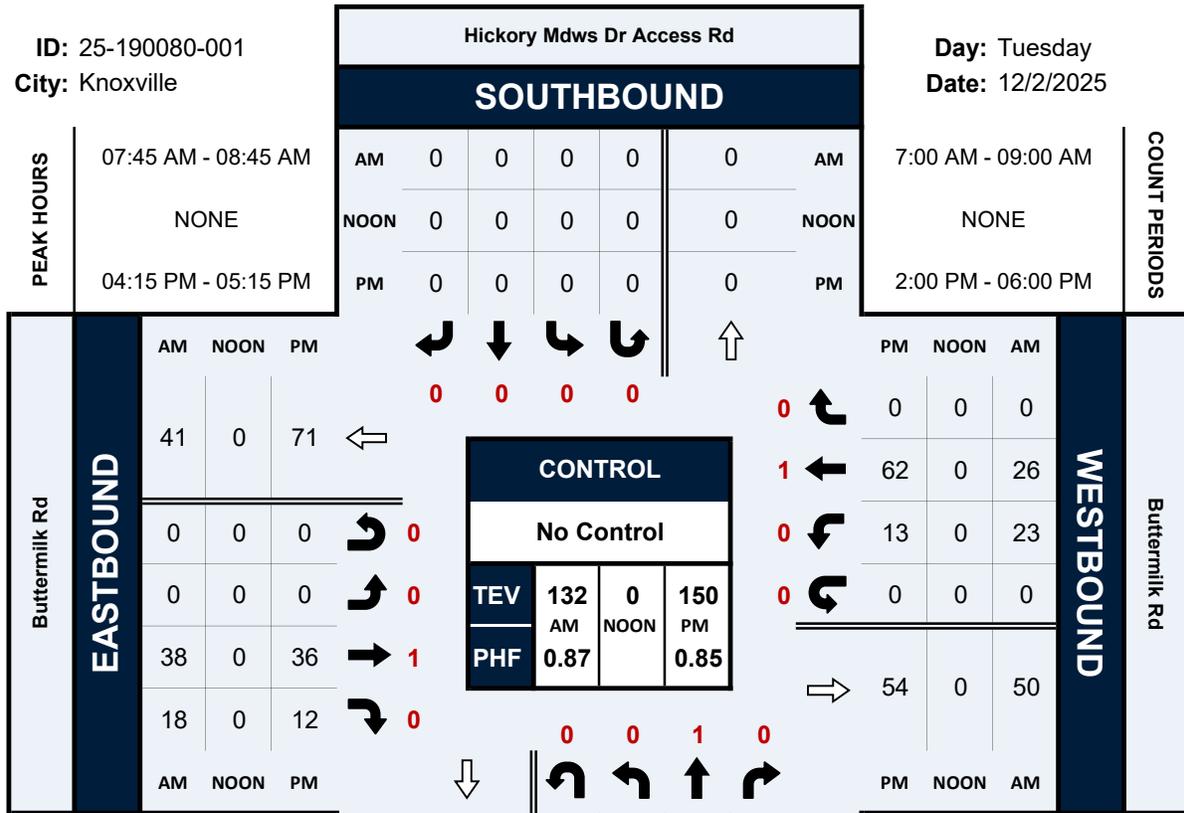
APPENDIX A | TRAFFIC DATA

Hickory Mdws Dr Access Rd & Buttermilk Rd

Peak Hour Turning Movement Count

ID: 25-190080-001
City: Knoxville

Day: Tuesday
Date: 12/2/2025



Project ID: 25-190080-001

Location: Hickory Mdws Dr Access Rd & Buttermilk Rd
 City: Knoxville

Day: Tuesday
 Date: 12/2/2025

Groups Printed - Cars, PU, Vans - Heavy Trucks

Start Time	Hickory Mdws Dr Access Rd Northbound						Hickory Mdws Dr Access Rd Southbound						Buttermilk Rd Eastbound						Buttermilk Rd Westbound						Int. Total
	Left	Thru	Rgt	Utum	Peds	App. Total	Left	Thru	Rgt	Utum	Peds	App. Total	Left	Thru	Rgt	Utum	Peds	App. Total	Left	Thru	Rgt	Utum	Peds	App. Total	
7:00 AM	5	0	6	0	0	11	0	0	0	0	0	0	0	11	2	0	0	13	1	5	0	0	0	6	
7:15 AM	5	0	5	0	0	10	0	0	0	0	0	0	0	7	3	0	0	10	3	9	0	0	0	12	
7:30 AM	5	0	6	0	0	11	0	0	0	0	0	0	0	8	2	0	0	10	2	5	0	0	6	7	
7:45 AM	2	0	2	0	0	4	0	0	0	0	0	0	0	14	3	0	0	17	10	7	0	0	0	17	
Total	17	0	19	0	0	36	0	0	0	0	0	0	0	40	10	0	0	50	16	26	0	0	6	42	
8:00 AM	4	0	2	0	0	6	0	0	0	0	0	0	0	7	9	0	0	16	4	6	0	0	0	10	
8:15 AM	4	0	7	0	0	11	0	0	0	0	0	0	0	9	5	0	0	14	4	5	0	0	0	9	
8:30 AM	5	0	1	0	0	6	0	0	0	0	0	0	0	8	1	0	0	9	5	8	0	0	0	13	
8:45 AM	3	0	3	0	0	6	0	0	0	0	0	0	0	4	1	0	0	5	4	0	0	0	0	4	
Total	16	0	13	0	0	29	0	0	0	0	0	0	0	28	16	0	0	44	17	19	0	0	0	36	
BREAK																									
2:00 PM	1	0	3	0	0	4	0	0	0	0	0	0	0	7	2	0	0	9	3	4	0	0	0	7	
2:15 PM	1	0	9	0	0	10	0	0	0	0	0	0	0	6	4	0	0	10	3	4	0	0	0	7	
2:30 PM	1	0	3	0	0	4	0	0	0	0	0	0	0	13	2	0	0	15	2	4	0	0	0	6	
2:45 PM	0	0	3	0	0	3	0	0	0	0	0	0	0	2	0	0	0	2	0	1	0	0	0	1	
Total	3	0	18	0	0	21	0	0	0	0	0	0	0	28	8	0	0	36	8	13	0	0	0	21	
3:00 PM	2	0	0	1	0	3	0	0	0	0	0	0	0	4	3	0	0	7	9	8	0	0	0	17	
3:15 PM	1	0	1	0	0	2	0	0	0	0	0	0	0	3	4	0	5	7	3	5	0	0	0	8	
3:30 PM	5	0	3	0	0	8	0	0	0	0	0	0	0	7	4	0	0	11	3	4	0	0	0	7	
3:45 PM	3	0	2	0	0	5	0	0	0	0	0	0	0	8	2	0	0	10	2	10	0	0	5	12	
Total	11	0	6	1	0	18	0	0	0	0	0	0	0	22	13	0	5	35	17	27	0	0	5	44	
4:00 PM	5	0	5	0	0	10	0	0	0	0	0	0	0	7	3	0	0	10	2	17	0	0	0	19	
4:15 PM	3	0	6	0	0	9	0	0	0	0	0	0	0	8	3	0	0	11	2	12	0	0	0	14	
4:30 PM	0	0	6	0	1	6	0	0	0	0	0	0	0	7	3	0	0	10	2	18	0	0	0	20	
4:45 PM	3	0	2	0	1	5	0	0	0	0	0	0	0	9	4	0	0	13	4	14	0	0	0	18	
Total	11	0	19	0	2	30	0	0	0	0	0	0	0	31	13	0	0	44	10	61	0	0	0	71	
5:00 PM	3	0	4	0	0	7	0	0	0	0	0	0	0	12	2	0	0	14	5	18	0	0	0	23	
5:15 PM	1	0	8	0	0	9	0	0	0	0	0	0	0	6	2	0	0	8	3	12	0	0	0	15	
5:30 PM	1	0	3	0	0	4	0	0	0	0	0	0	0	11	2	0	0	13	2	8	0	0	0	10	
5:45 PM	2	0	2	0	0	4	0	0	0	0	0	0	0	10	1	0	0	11	6	6	0	0	0	12	
Total	7	0	17	0	0	24	0	0	0	0	0	0	0	39	7	0	0	46	16	44	0	0	0	60	
Grand Total	65	0	92	1	2	158	0	0	0	0	0	0	0	188	67	0	5	255	84	190	0	0	11	274	
Apprch %	41.1	0.0	58.2	0.6	1.3		0.0	0.0	0.0	0.0	0.0		0.0	73.7	26.3	0.0	2.0		30.7	69.3	0.0	0.0	4.0		
Total %	9.5	0.0	13.4	0.1	0.3	23.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.4	9.8	0.0	0.7	37.1	12.2	27.7	0.0	0.0	1.6	39.9	
Cars, PU, Vans	64	0	87	1		152	0	0	0	0	0	0	0	176	65	0		241	77	176	0	0		253	
% Cars, PU, Vans	98.5	0.0	94.6	100.0		96.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	93.6	97.0	0.0		94.5	91.7	92.6	0.0	0.0		92.3	
Heavy trucks	1	0	5	0		6	0	0	0	0	0	0	0	12	2	0		14	7	14	0	0		21	
%Heavy trucks	1.5	0.0	5.4	0.0		3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	3.0	0.0		5.5	8.3	7.4	0.0	0.0		7.7	

Project ID: 25-190080-001

Location: Hickory Mdws Dr Access Rd & Buttermilk Rd

City: Knoxville

PEAK HOURS

Day: Tuesday

Date: 12/2/2025

AM

Start Time	Hickory Mdws Dr Access Rd Northbound					Hickory Mdws Dr Access Rd Southbound					Buttermilk Rd Eastbound					Buttermilk Rd Westbound					Int. Total
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	
Peak Hour Analysis from 07:00 AM - 09:00 AM																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
7:45 AM	2	0	2	0	4	0	0	0	0	0	0	14	3	0	17	10	7	0	0	17	38
8:00 AM	4	0	2	0	6	0	0	0	0	0	0	7	9	0	16	4	6	0	0	10	32
8:15 AM	4	0	7	0	11	0	0	0	0	0	0	9	5	0	14	4	5	0	0	9	34
8:30 AM	5	0	1	0	6	0	0	0	0	0	0	8	1	0	9	5	8	0	0	13	28
Total Volume	15	0	12	0	27	0	0	0	0	0	0	38	18	0	56	23	26	0	0	49	132
% App. Total	55.6	0.0	44.4	0.0	100	0.0	0.0	0.0	0.0	0	0.0	67.9	32.1	0.0	100	46.9	53.1	0.0	0.0	100	
PHF	0.614										0.824					0.721					0.868
Cars, PU, Vans	15	0	11	0	26	0	0	0	0	0	0	35	17	0	52	22	21	0	0	43	121
% Cars, PU, Vans	100.0	0.0	91.7	0.0	96.3	0.0	0.0	0.0	0.0	0.0	0.0	92.1	94.4	0.0	92.9	95.7	80.8	0.0	0.0	87.8	91.7
Heavy trucks	0	0	1	0	1	0	0	0	0	0	0	3	1	0	4	1	5	0	0	6	11
%Heavy trucks	0.0	0.0	8.3	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	7.9	5.6	0.0	7.1	4.3	19.2	0.0	0.0	12.2	8.3

PM

Start Time	Hickory Mdws Dr Access Rd Northbound					Hickory Mdws Dr Access Rd Southbound					Buttermilk Rd Eastbound					Buttermilk Rd Westbound					Int. Total
	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	Left	Thru	Rgt	Uturn	App. Total	
Peak Hour Analysis from 02:00 PM - 06:00 PM																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
4:15 PM	3	0	6	0	9	0	0	0	0	0	0	8	3	0	11	2	12	0	0	14	34
4:30 PM	0	0	6	0	6	0	0	0	0	0	0	7	3	0	10	2	18	0	0	20	36
4:45 PM	3	0	2	0	5	0	0	0	0	0	0	9	4	0	13	4	14	0	0	18	36
5:00 PM	3	0	4	0	7	0	0	0	0	0	0	12	2	0	14	5	18	0	0	23	44
Total Volume	9	0	18	0	27	0	0	0	0	0	0	36	12	0	48	13	62	0	0	75	150
% App. Total	33.3	0.0	66.7	0.0	100	0.0	0.0	0.0	0.0	0	0.0	75.0	25.0	0.0	100	17.3	82.7	0.0	0.0	100	
PHF	0.750										0.857					0.815					0.852
Cars, PU, Vans	9	0	18	0	27	0	0	0	0	0	0	35	12	0	47	13	59	0	0	72	146
% Cars, PU, Vans	100.0	0.0	100.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0	97.2	100.0	0.0	97.9	100.0	95.2	0.0	0.0	96.0	97.3
Heavy trucks	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	4
%Heavy trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	0.0	2.1	0.0	4.8	0.0	0.0	4.0	2.7



APPENDIX B | TRIP GENERATION

Land Use: 210

Single-Family Detached Housing

Description

A single-family detached housing site includes any single-family detached home on an individual lot. A typical site surveyed is a suburban subdivision.

Specialized Land Use

Data have been submitted for several single-family detached housing developments with homes that are commonly referred to as patio homes. A patio home is a detached housing unit that is located on a small lot with little (or no) front or back yard. In some subdivisions, communal maintenance of outside grounds is provided for the patio homes. The three patio home sites total 299 dwelling units with overall weighted average trip generation rates of 5.35 vehicle trips per dwelling unit for weekday, 0.26 for the AM adjacent street peak hour, and 0.47 for the PM adjacent street peak hour. These patio home rates based on a small sample of sites are lower than those for single-family detached housing (Land Use 210), lower than those for single-family attached housing (Land Use 251), and higher than those for senior adult housing -- single-family (Land Use 251). Further analysis of this housing type will be conducted in a future edition of *Trip Generation Manual*.

Additional Data

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (<https://www.ite.org/technical-resources/topics/trip-and-parking-generation/>).

For 30 of the study sites, data on the number of residents and number of household vehicles are available. The overall averages for the 30 sites are 3.6 residents per dwelling unit and 1.5 vehicles per dwelling unit.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Arizona, California, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Minnesota, Montana, New Jersey, North Carolina, Ohio, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, Virginia, and West Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 869, 903, 925, 936, 1005, 1007, 1008, 1010, 1033, 1066, 1077, 1078, 1079

Single-Family Detached Housing (210)

Entering: 8
Exiting: 24
Total: 32

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

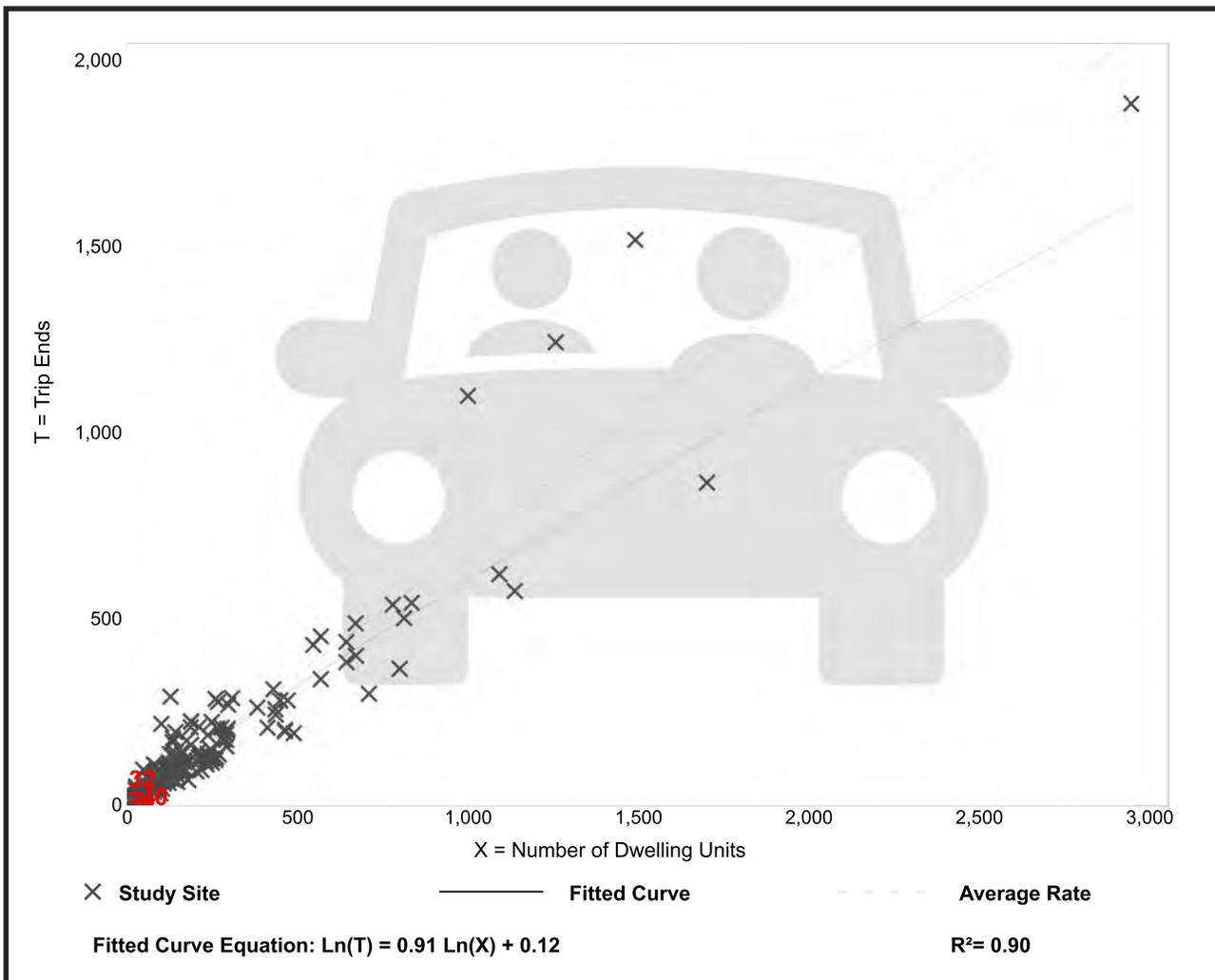
Setting/Location: General Urban/Suburban

Number of Studies: 192
 Avg. Num. of Dwelling Units: 226
 Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Entering: 26
Exiting: 16
Total: 42

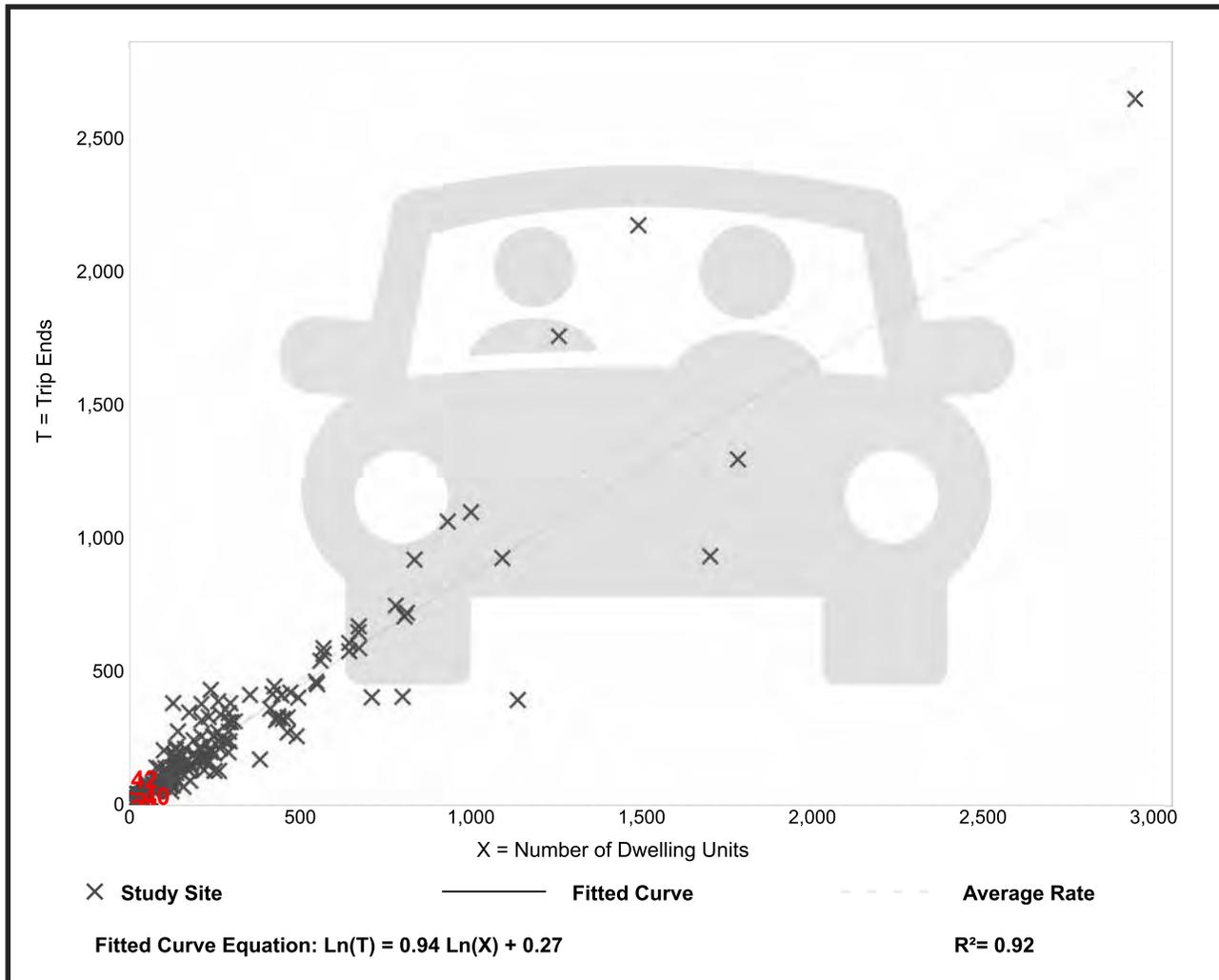
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 208
 Avg. Num. of Dwelling Units: 248
 Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



Single-Family Detached Housing (210)

Entering: 482
Exiting: 481
Total: 963

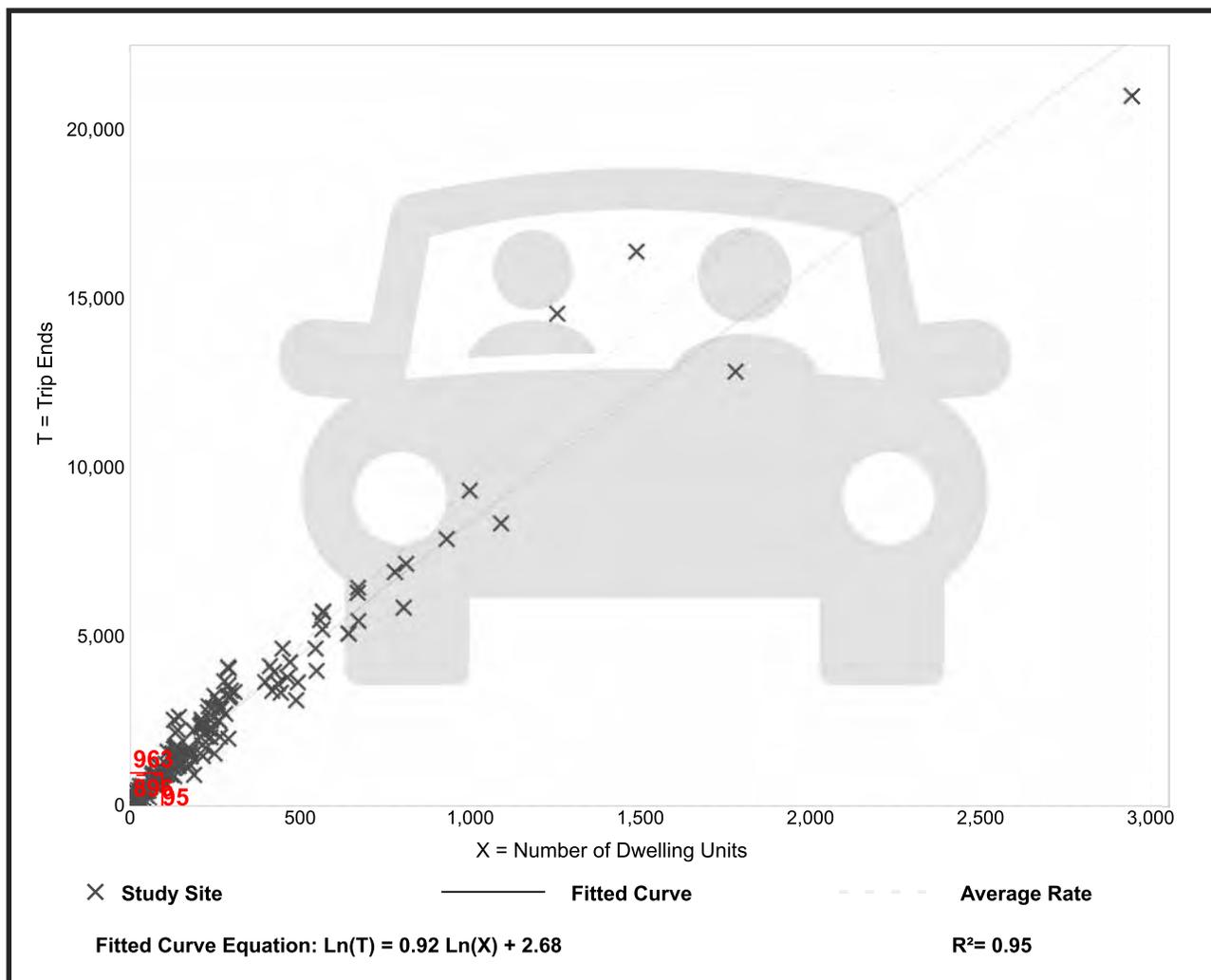
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 174
Avg. Num. of Dwelling Units: 246
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.43	4.45 - 22.61	2.13

Data Plot and Equation



Single-Family Detached Housing (210)

Entering: 18
Exiting: 53
Total: 71

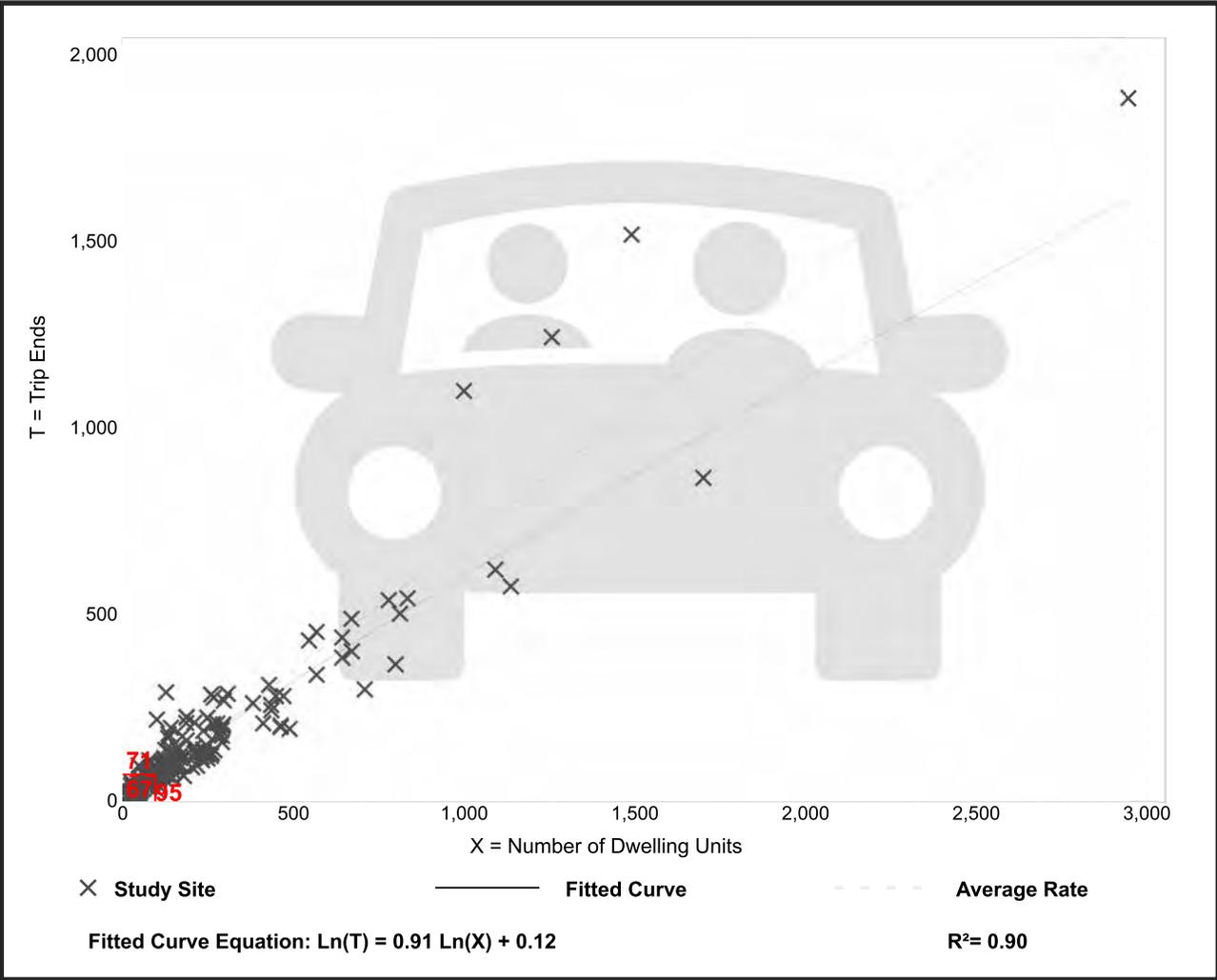
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban
 Number of Studies: 192
 Avg. Num. of Dwelling Units: 226
 Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



Single-Family Detached Housing (210)

Entering: 60
Exiting: 35
Total: 95

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

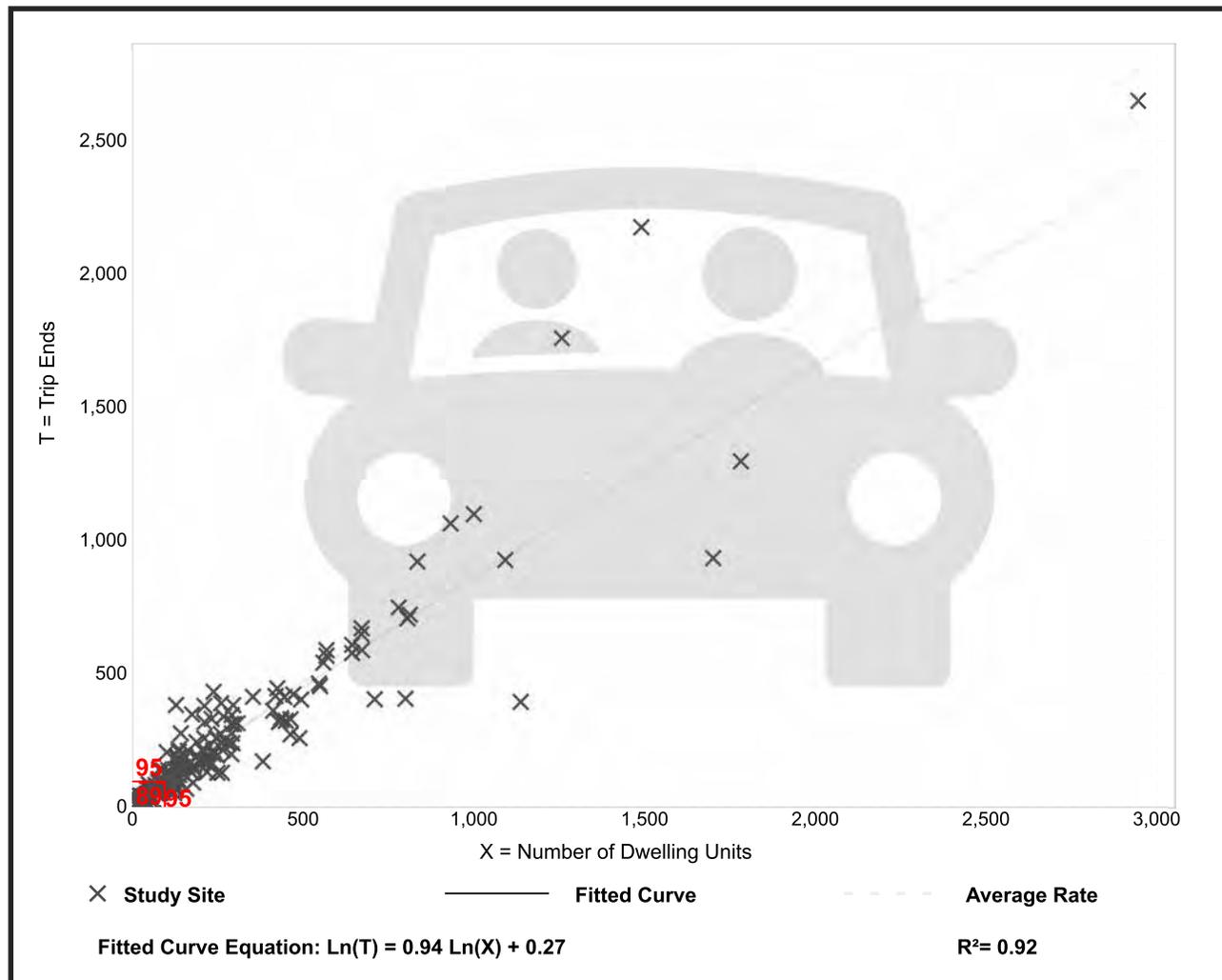
Setting/Location: General Urban/Suburban

Number of Studies: 208
Avg. Num. of Dwelling Units: 248
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



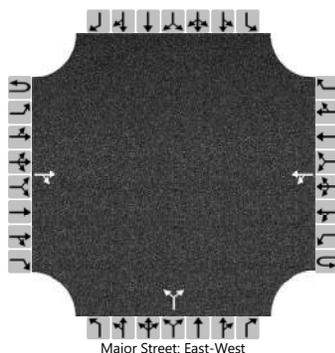


APPENDIX C | CAPACITY ANALYSES

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	MEM			Intersection	Buttermilk Rd at Hickory Meadows Dr		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/11/2025			East/West Street	Buttermilk Road		
Analysis Year	2025			North/South Street	Hickory Meadows Drive		
Time Analyzed	AM Peak - 2025 Existing			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			38	18		23	26			15		12				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

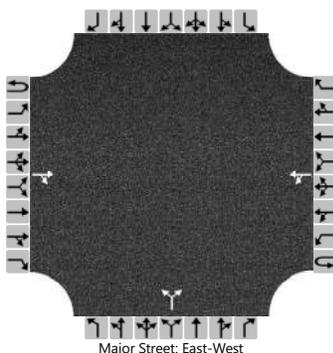
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)					26						31					
Capacity, c (veh/h)					1532						908					
v/c Ratio					0.02						0.03					
95% Queue Length, Q ₉₅ (veh)					0.1						0.1					
95% Queue Length, Q ₉₅ (ft)					2.6						2.6					
Control Delay (s/veh)					7.4	0.1					9.1					
Level of Service (LOS)					A	A					A					
Approach Delay (s/veh)					3.5				9.1							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	MEM			Intersection	Buttermilk Rd at Hickory Meadows Dr		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/11/2025			East/West Street	Buttermilk Road		
Analysis Year	2025			North/South Street	Hickory Meadows Drive		
Time Analyzed	PM Peak - 2025 Existing			Peak Hour Factor	0.85		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			36	12		13	62			9		18				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

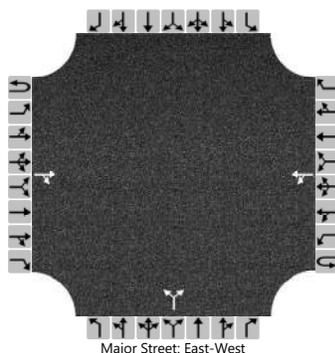
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)					15						32					
Capacity, c (veh/h)					1542						945					
v/c Ratio					0.01						0.03					
95% Queue Length, Q ₉₅ (veh)					0.0						0.1					
95% Queue Length, Q ₉₅ (ft)					0.0						2.6					
Control Delay (s/veh)					7.4	0.1					8.9					
Level of Service (LOS)					A	A					A					
Approach Delay (s/veh)					1.3				8.9							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	MEM			Intersection	Buttermilk Rd at Hickory Meadows Dr		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/11/2025			East/West Street	Buttermilk Road		
Analysis Year	2028			North/South Street	Hickory Meadows Drive		
Time Analyzed	AM Peak - 2028 Background			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			44	24		32	30			27		28				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

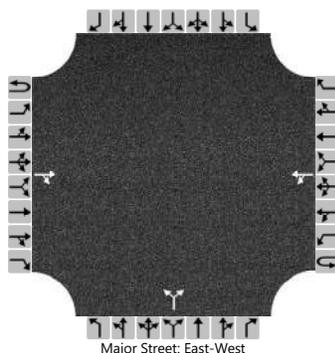
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						37						63				
Capacity, c (veh/h)						1514						887				
v/c Ratio						0.02						0.07				
95% Queue Length, Q ₉₅ (veh)						0.1						0.2				
95% Queue Length, Q ₉₅ (ft)						2.6						5.1				
Control Delay (s/veh)						7.4	0.2					9.4				
Level of Service (LOS)						A	A					A				
Approach Delay (s/veh)					3.9				9.4							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	MEM			Intersection	Buttermilk Rd at Hickory Meadows Dr		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/11/2025			East/West Street	Buttermilk Road		
Analysis Year	2025			North/South Street	Hickory Meadows Drive		
Time Analyzed	PM Peak - 2028 Background			Peak Hour Factor	0.85		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Priority																
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			42	24		31	72			16		31				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1					7.1		6.2			
Critical Headway (sec)						4.13					6.43		6.23			
Base Follow-Up Headway (sec)						2.2					3.5		3.3			
Follow-Up Headway (sec)						2.23					3.53		3.33			

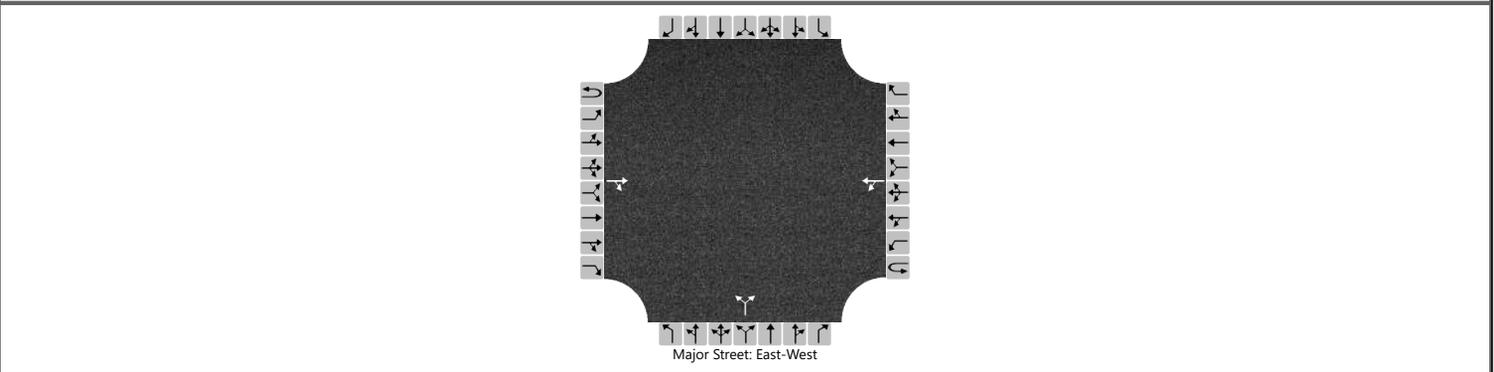
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)					36						55					
Capacity, c (veh/h)					1515						895					
v/c Ratio					0.02						0.06					
95% Queue Length, Q ₉₅ (veh)					0.1						0.2					
95% Queue Length, Q ₉₅ (ft)					2.6						5.1					
Control Delay (s/veh)					7.4	0.2					9.3					
Level of Service (LOS)					A	A					A					
Approach Delay (s/veh)					2.4				9.3							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	KNB			Intersection	Buttermilk Rd at Hickory Meadows Dr		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/22/2025			East/West Street	Buttermilk Road		
Analysis Year	2028			North/South Street	Hickory Meadows Drive		
Time Analyzed	AM Peak - 2028 Combined			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT				LR						
Volume (veh/h)			51	24		31	51			27		26				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

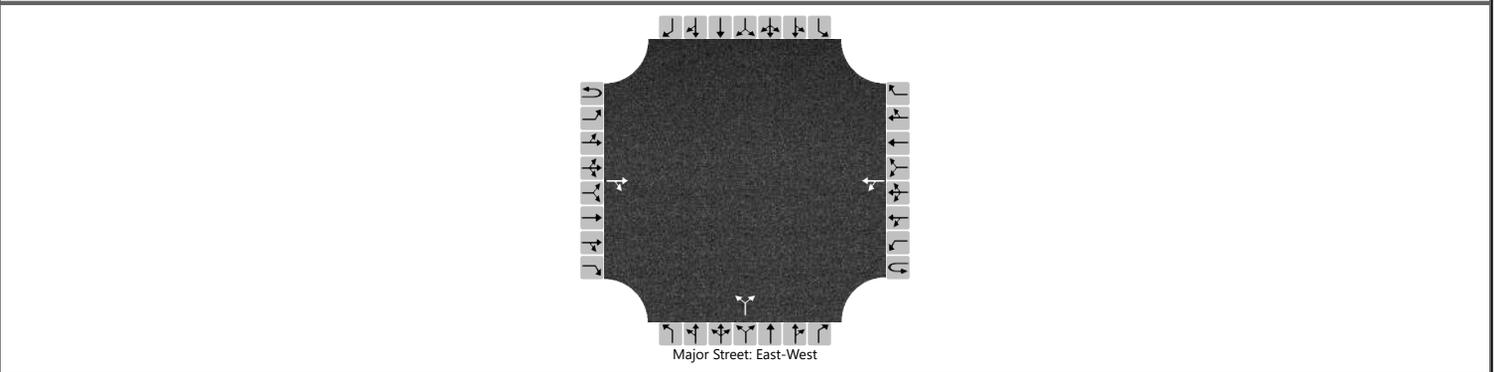
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						36					61					
Capacity, c (veh/h)						1504					860					
v/c Ratio						0.02					0.07					
95% Queue Length, Q ₉₅ (veh)						0.1					0.2					
95% Queue Length, Q ₉₅ (ft)						2.6					5.1					
Control Delay (s/veh)						7.5	0.2				9.5					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)					2.9				9.5							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	KNB			Intersection	Buttermilk Rd at Hickory Meadows Dr		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/22/2025			East/West Street	Buttermilk Road		
Analysis Year	2028			North/South Street	Hickory Meadows Drive		
Time Analyzed	PM Peak - 2028 Combined			Peak Hour Factor	0.85		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT				LR						
Volume (veh/h)			66	24		28	86			16		29				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

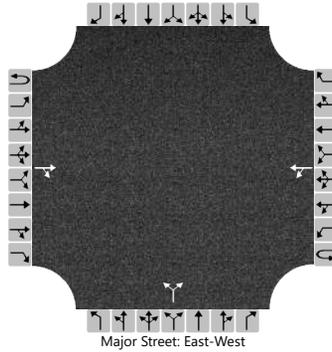
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						33					53					
Capacity, c (veh/h)						1479					855					
v/c Ratio						0.02					0.06					
95% Queue Length, Q ₉₅ (veh)						0.1					0.2					
95% Queue Length, Q ₉₅ (ft)						2.6					5.1					
Control Delay (s/veh)						7.5	0.2				9.5					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)					2.0				9.5							
Approach LOS					A				A							

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	KNB			Intersection	Buttermilk Rd at Site Access		
Agency/Co.	Ardurra			Jurisdiction	Knox Co., TN		
Date Performed	12/22/2025			East/West Street	Buttermilk Road		
Analysis Year	2028			North/South Street	Site Access		
Time Analyzed	AM Peak - 2028 Combined			Peak Hour Factor	0.87		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT				LR						
Volume (veh/h)			70	7		12	61			21		34				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

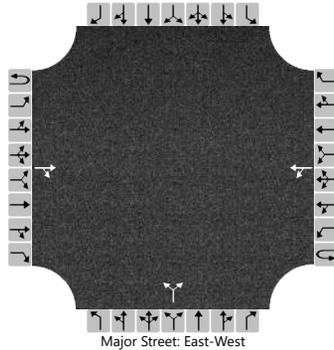
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						14					63					
Capacity, c (veh/h)						1501					897					
v/c Ratio						0.01					0.07					
95% Queue Length, Q ₉₅ (veh)						0.0					0.2					
95% Queue Length, Q ₉₅ (ft)						0.0					5.1					
Control Delay (s/veh)						7.4	0.1				9.3					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)						1.3				9.3						
Approach LOS						A				A						

HCS Two-Way Stop-Control Report

General Information				Site Information			
Analyst	KNB			Intersection	Buttermilk Rd at Site Access		
Agency/Co.	Ardurra			Jurisdiction	Knox Co, TN		
Date Performed	12/22/2025			East/West Street	Buttermilk Road		
Analysis Year	2028			North/South Street	Site Access		
Time Analyzed	PM Peak - 2028 Combined			Peak Hour Factor	0.85		
Intersection Orientation	East-West			Analysis Time Period (hrs)	0.25		
Project Description	Buttermilk Road Subdivision						

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement	1U	1	2	3	4U	4	5	6	7	8	9		10	11	12	
Priority																
Number of Lanes	0	0	1	0	0	0	1	0	0	1	0		0	0	0	
Configuration				TR		LT				LR						
Volume (veh/h)			71	24		39	100			14		23				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						46					44					
Capacity, c (veh/h)						1472					817					
v/c Ratio						0.03					0.05					
95% Queue Length, Q ₉₅ (veh)						0.1					0.2					
95% Queue Length, Q ₉₅ (ft)						2.6					5.1					
Control Delay (s/veh)						7.5	0.3				9.7					
Level of Service (LOS)						A	A				A					
Approach Delay (s/veh)					2.3				9.7							
Approach LOS					A				A							



APPENDIX D | TURN LANE WARRANT EVALUATIONS

TABLE 4A
KNOX COUNTY LEFT-TURN LANE VOLUME THRESHOLDS
FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 0 TO 35 MPH

Project No: 01904-0003
Project Name: Buttermilk Road Subdivision
Notes:

(If the left-turn volume exceeds the table value a left-turn lane is needed)

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149	300	235	185	145	120	100
150 - 199	245	200	160	130	110	90
200 - 249	205	170	140	115	100	80
250 - 299	175	150	125	105	90	70
300 - 349	155	135	110	95	80	65
350 - 399	135	120	100	85	70	60
400 - 449	120	105	90	75	65	55
450 - 499	105	90	80	70	60	50
500 - 549	95	80	70	65	55	50
550 - 599	85	70	65	60	50	45
600 - 649	75	65	60	55	45	40
650 - 699	70	60	55	50	40	35
700 - 749	65	55	50	45	35	30
750 or More	60	50	45	40	35	30

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149	100	80	70	60	55	50
150 - 199	90	75	65	55	50	45
200 - 249	80	72	60	55	50	45
250 - 299	70	65	55	50	45	40
300 - 349	65	60	50	50	45	40
350 - 399	60	55	50	45	40	40
400 - 449	55	50	45	45	40	35
450 - 499	50	45	45	40	35	35
500 - 549	50	45	40	40	35	35
550 - 599	45	40	40	35	35	35
600 - 649	40	35	35	35	35	30
650 - 699	35	35	35	30	30	30
700 - 749	30	30	30	30	30	30
750 or More	30	30	30	30	30	30

* Or through volume only if a right-turn lane exists

Intersection	Time Period	Opposing Volume	Through Volume	Left-Turn Volume	Warrant Threshold	Left-Turn Lane Warranted (Yes / No)
Hickory Meadow Drive	2028 AM	75	51	31	300	No
Hickory Meadow Drive	2028 PM	90	86	28	300	No
Site Access	2028 AM	77	61	12	300	No
Site Access	2028 PM	95	100	39	300	No

TABLE 4B KNOX COUNTY RIGHT-TURN LANE VOLUME THRESHOLDS FOR 2-LANE ROADWAYS WITH A PREVAILING SPEED OF 0 TO 35 MPH	Project No: 01904-0003 Project Name: Buttermilk Road Subdivision Notes:
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RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	< 100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25						
25 - 49						
50 - 99						
100 - 149						
150 - 199						
200 - 249						
250 - 299						Yes
300 - 349					Yes	Yes
350 - 399				Yes	Yes	Yes
400 - 449			Yes	Yes	Yes	Yes
450 - 499			Yes	Yes	Yes	Yes
500 - 549		Yes	Yes	Yes	Yes	Yes
550 - 599		Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
Fewer Than 25						
25 - 49						Yes
50 - 99					Yes	Yes
100 - 149				Yes	Yes	Yes
150 - 199			Yes	Yes	Yes	Yes
200 - 249		Yes	Yes	Yes	Yes	Yes
250 - 299	Yes	Yes	Yes	Yes	Yes	Yes
300 - 349	Yes	Yes	Yes	Yes	Yes	Yes
350 - 399	Yes	Yes	Yes	Yes	Yes	Yes
400 - 449	Yes	Yes	Yes	Yes	Yes	Yes
450 - 499	Yes	Yes	Yes	Yes	Yes	Yes
500 - 549	Yes	Yes	Yes	Yes	Yes	Yes
550 - 599	Yes	Yes	Yes	Yes	Yes	Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

* Or through volume only if a left-turn lane exists

Intersection	Time Period	Through Volume	Right-Turn Volume	Right-Turn Lane Warranted (Yes / No)
Hickory Meadow Drive	2028 AM	51	24	No
Hickory Meadow Drive	2028 PM	66	24	No
Site Access	2028 AM	70	7	No
Site Access	2028 PM	71	24	No