



THE PRESERVE AT LOVES CREEK TRAFFIC IMPACT STUDY

LOVES CREEK ROAD
KNOXVILLE, TN

ARDURRA PROJECT NO. 01975-0000.000



PREPARED FOR:
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1 EXECUTIVE SUMMARY

This report provides a summary of a traffic impact study that was performed for a proposed multi-family development to be located along Loves Creek Road within the Alice Bell community of Knox County, TN. The project site is located West of Loves Creek Road between Buffat Mill Road and McIntyre Road. The conceptual plan for this project proposes a total of 84 Apartment units.

The conceptual plan shows two driveway locations onto Loves Creek Road. The first driveway is shown to be located 280' south of Buffat Mill Road.

The purpose of this study was the evaluation of the traffic operational and safety impacts of the proposed multi-family development upon roadways in the vicinity of the site. Of particular interest in this study are the proposed development access locations onto Loves Creek Road as mentioned above, and the adjacent intersection of Loves Creek Road and Buffat Mill Road. 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, sight distance assessments, and crash history analysis.

The primary conclusion of this study is that traffic generated from the proposed residential development will have minor impacts on the study intersections. The results indicate that an acceptable LOS "D" or better can be anticipated at all study intersections under combined conditions. Due to the limited sight distance when looking left onto Loves Creek Road from Buffat Mill Road, it is recommended that the current side-street stop control be converted to All-Way Stop control and advanced signage be added prior to the proposed All-Way Stop.

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 the unsignalized intersection of each of the proposed driveways.
2. Remove or trim any vegetation within the right-of-way that interferes with sight distance.
3. Convert the intersection of Loves Creek Road at Buffat Mill Road from side-street stop control to All-Way stop control.
4. Install a MUTCD 30" x 30" (W3-1) sign with a MUTCD 24" x 16" (W16-15P) plaque 400' in advance of the proposed all-way stop at Loves Creek Road and Buffat Mill Road, approximately just south of the Cross Points Church driveway.



2 INTRODUCTION & PURPOSE OF STUDY

This report provides a summary of a traffic impact study that was performed for a proposed multi-family development to be located along Loves Creek Road within the community of Alice Bell in Knox County, TN. The project site is located West of Loves Creek Road and between Buffat Mill Road and McIntyre 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 proposes a multi-family development with 84 apartments. The project is to have two driveway locations, onto Loves Creek Road, with the first driveway approximately 280 feet south of Buffat Mill 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 multi-family development upon roadways in the vicinity of the site. Of particular interest in this study is the proposed development access locations onto Loves Creek Road mentioned above, and the adjacent intersection of Loves Creek Road and Buffat Mill Road. 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, a sight distance assessment, and crash history analysis.

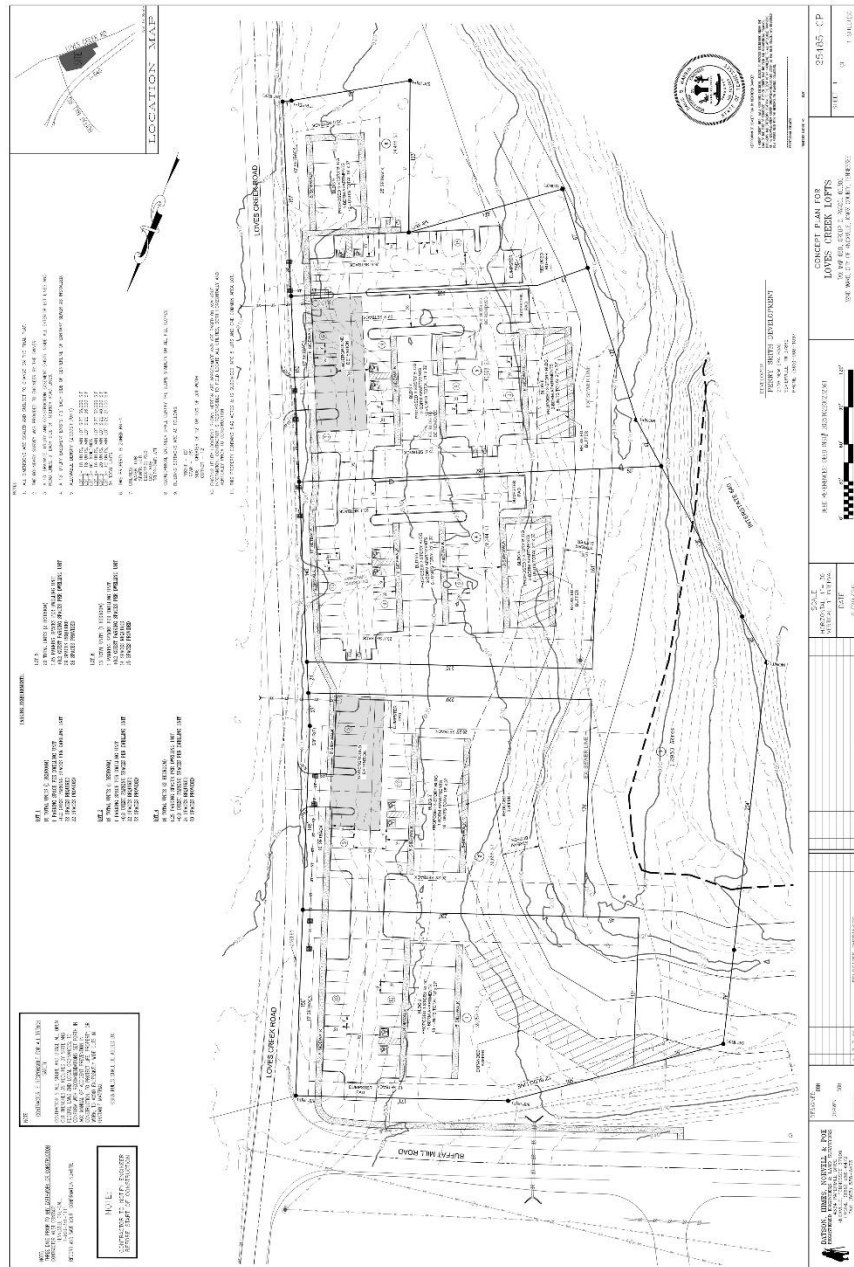


FIGURE 2
CONCEPTUAL SITE PLAN



3 EXISTING CONDITIONS

EXISTING ROADWAY CONDITIONS

Loves Creek Road is classified as a Major Collector Road between Millertown Pike and Rutledge Pike. According to the Knoxville-Knox County Major Road Plan, Loves Creek Road provides north-south access for the Alice Bell community in the City of Knoxville. Loves Creek Road carries traffic to and from commercial, residential, and agricultural areas. In the vicinity of the proposed development, the roadway consists of two 11-foot through travel lanes. Shoulders and sidewalks are not present along either side of the road. The speed limit on Loves Creek Road is posted as 30 mph. Access to the Loves Creek Greenway is located southeast of the proposed development and runs through Spring Place Park and the Loves Creek Playground.

Buffat Mill Road is classified as a Major Collector according to the Knoxville-Knox County Major Road Plan and provides east-west access for the Alice Bell community in the City of Knoxville. Buffat Mill Road carries traffic to and from both residential and agricultural areas. In the vicinity of the proposed development, the roadway consists of two 12-foot through travel lanes. No sidewalks exist on either side of the roadway. Shoulders exist on both sides of Buffat Mill Road and vary from 9 to 13 feet wide. The speed limit on Buffat Mill Road is posted as 30 mph.

Additionally, transit can be accessed nearby via a Knoxville Area Transit (KAT) bus stop. The nearest KAT bus stop is located in the nearby Walmart parking lot, just off Kinzel Way. Walking distance from the KAT bus stop is approximately 0.65 miles to the first driveway of the proposed development and 0.8 miles to the second driveway of the proposed development. Presently, there are no sidewalks or crosswalks to help pedestrians walk to the bus stop; however, sidewalks are shown to be included with the proposed development.



EXISTING SITE CONDITIONS

The total site acreage for this project consists of approximately 6.12 acres located west of Loves Creek Road. The site is primarily bordered by residential, commercial, and public park 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 on roadways in the area of the proposed development were utilized. One count station located on Loves Creek Road north of Buffat Mill Road was 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 Loves Creek Road and Buffat Mill Road. The traffic count was conducted during May 2026. The 2026 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 47000388 LOVES CREEK ROAD NORTH OF BUFFAT MILL ROAD
2025	4,963
2024	4,861
2023	5,314
2022	5,514
2021	5,056
2020	4,451
2019	5,023
2018	5,226
2017	5,209
2016	5,073
2015	4,304
2014	4,261
2013	4,278
2012	4,368

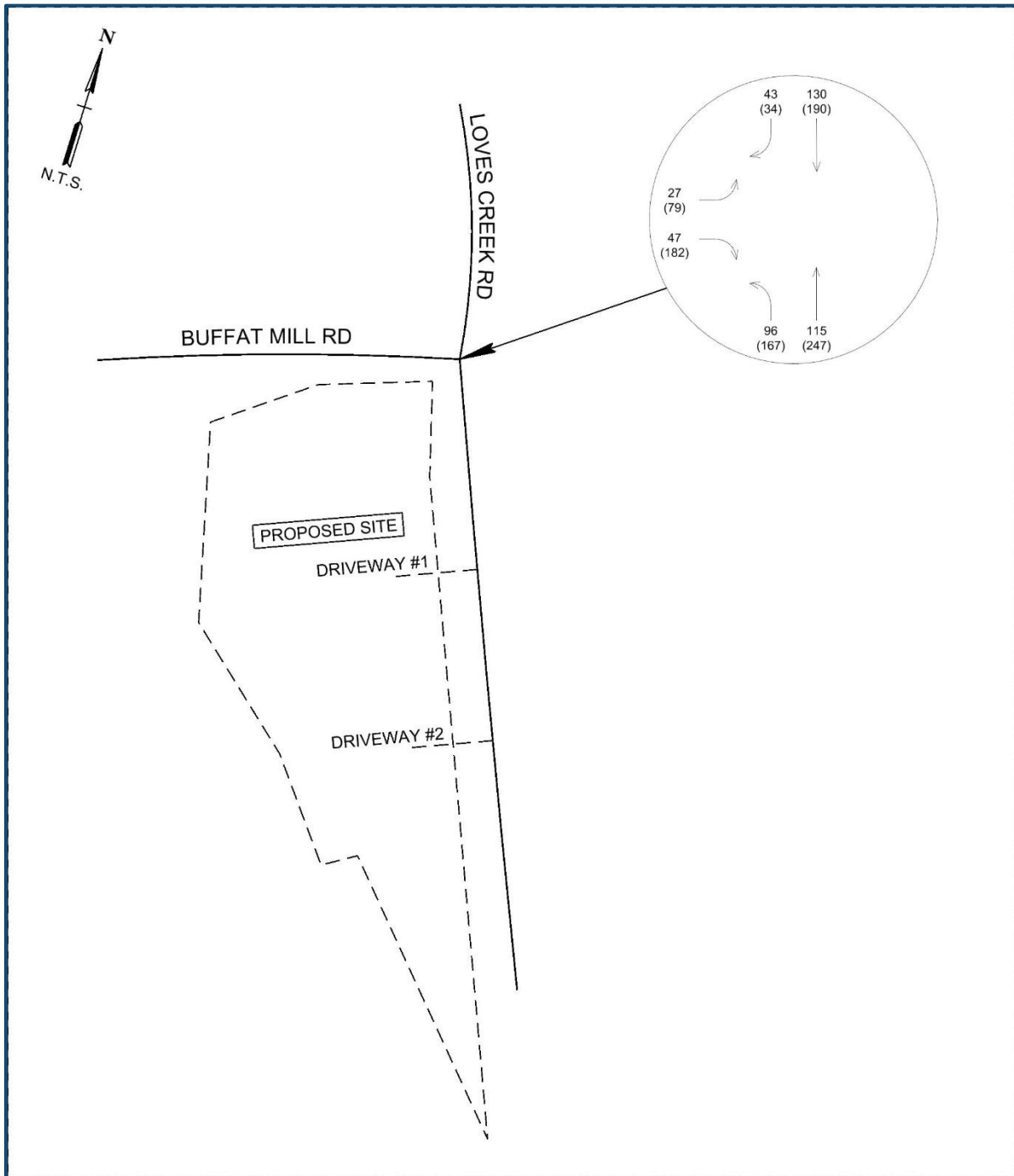


FIGURE 4
2026 EXISTING TRAFFIC VOLUMES



EXISTING CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses employing the methods of the Highway Capacity Manual (6th Edition) were conducted for the existing study intersection. The analyses were performed with the 2026 existing traffic volumes and existing intersection traffic control and lane configurations. The intersection of Loves Creek Road was found to operate at a Level-of-Service (LOS) “B” during the AM peak hour and a LOS “D” in the PM peak hour with an approach delay of 12.1 seconds and 25.9 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

The year 2029 was established as the study horizon. To determine traffic volumes resulting solely from background traffic growth to year 2029, 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 3.0% was assumed. Existing volumes from each of the intersections were grown by 3.0% every year from the year 2026, when the counts were conducted, to the year 2029.

The background traffic volumes shown on FIGURE 5 represent the full build out of the proposed residential development and the Year 2029 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 2029 background volumes shown in FIGURE 5. Under Year 2029 background conditions, without traffic related to the development, the intersection of Loves Creek Road at Buffat Mill Road was found to operate at a Level-of-Service (LOS) "B" during the AM peak hour and at a LOS "E" in the PM peak hour with approach delays of 12.8 seconds and 37.7 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.

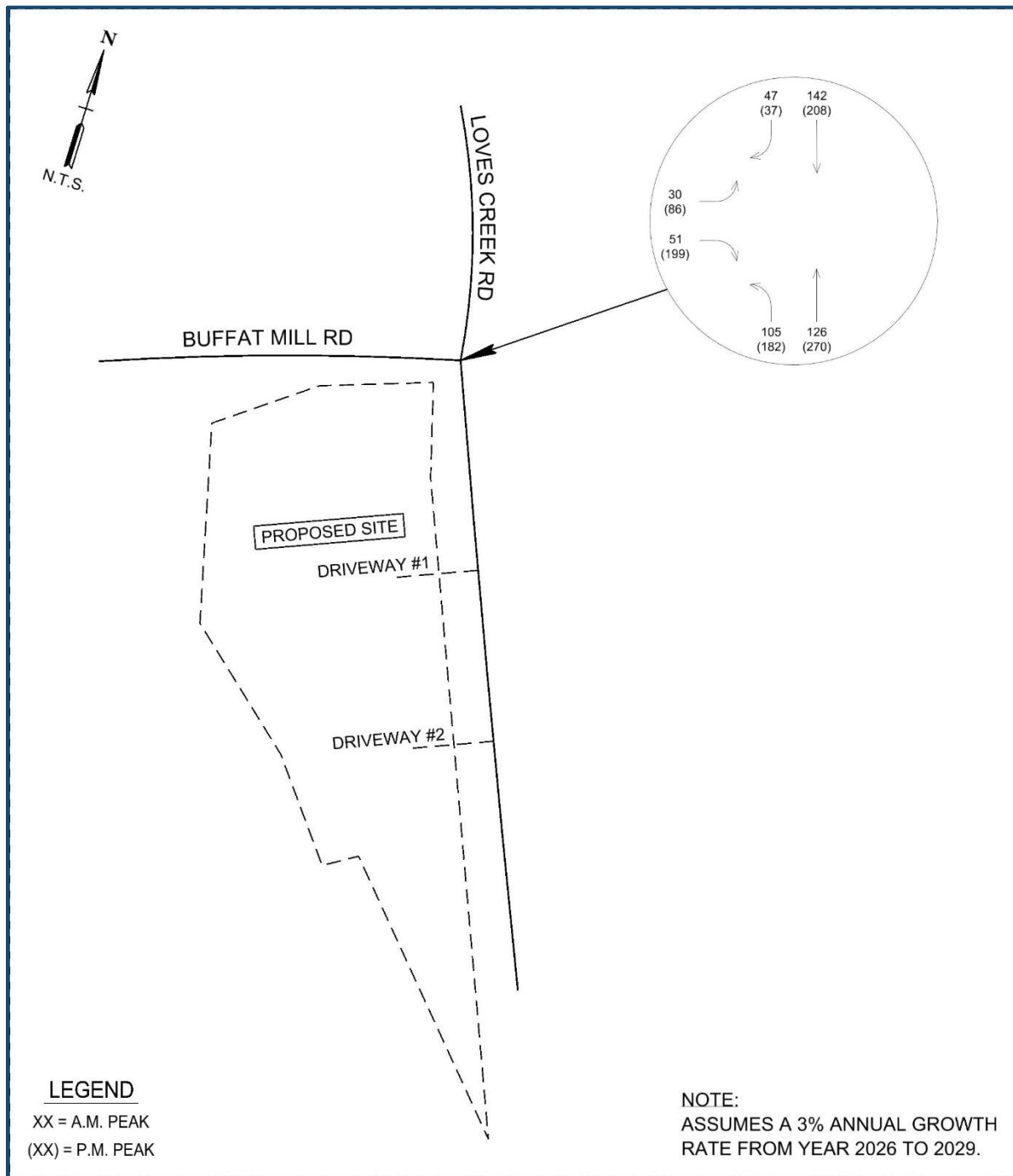


FIGURE 5
2029 BACKGROUND TRAFFIC VOLUMES



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, 12th 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)
Multifamily Housing (Low-Rise)	220	84 D.U.			
Entering Trips			261	10	30
Exiting Trips			<u>261</u>	<u>32</u>	<u>18</u>
Total			522	42	48

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.



FUTURE CAPACITY ANALYSES / LEVELS-OF-SERVICE

Capacity analyses as described in the Existing Conditions section of this report were conducted for 2029, full build-out conditions utilizing the Year 2029 combined volumes shown in FIGURE 8.

Under 2029 combined conditions, the intersection of Loves Creek Road at Buffat Mill Road was found to operate at a LOS “B” during the AM peak hour and a LOS “E” in the PM peak hour with an approach delay of 13.3 seconds and 44.6 seconds, respectively. The proposed driveways along Loves Creek Road are anticipated to operate at a LOS “B” during the AM peak hour and at a LOS “C” during the PM peak hour. The delay for the proposed driveways is 11.1 seconds in the AM Peak hour and 16.2 seconds to 16.3 seconds in the PM Peak hour.

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.

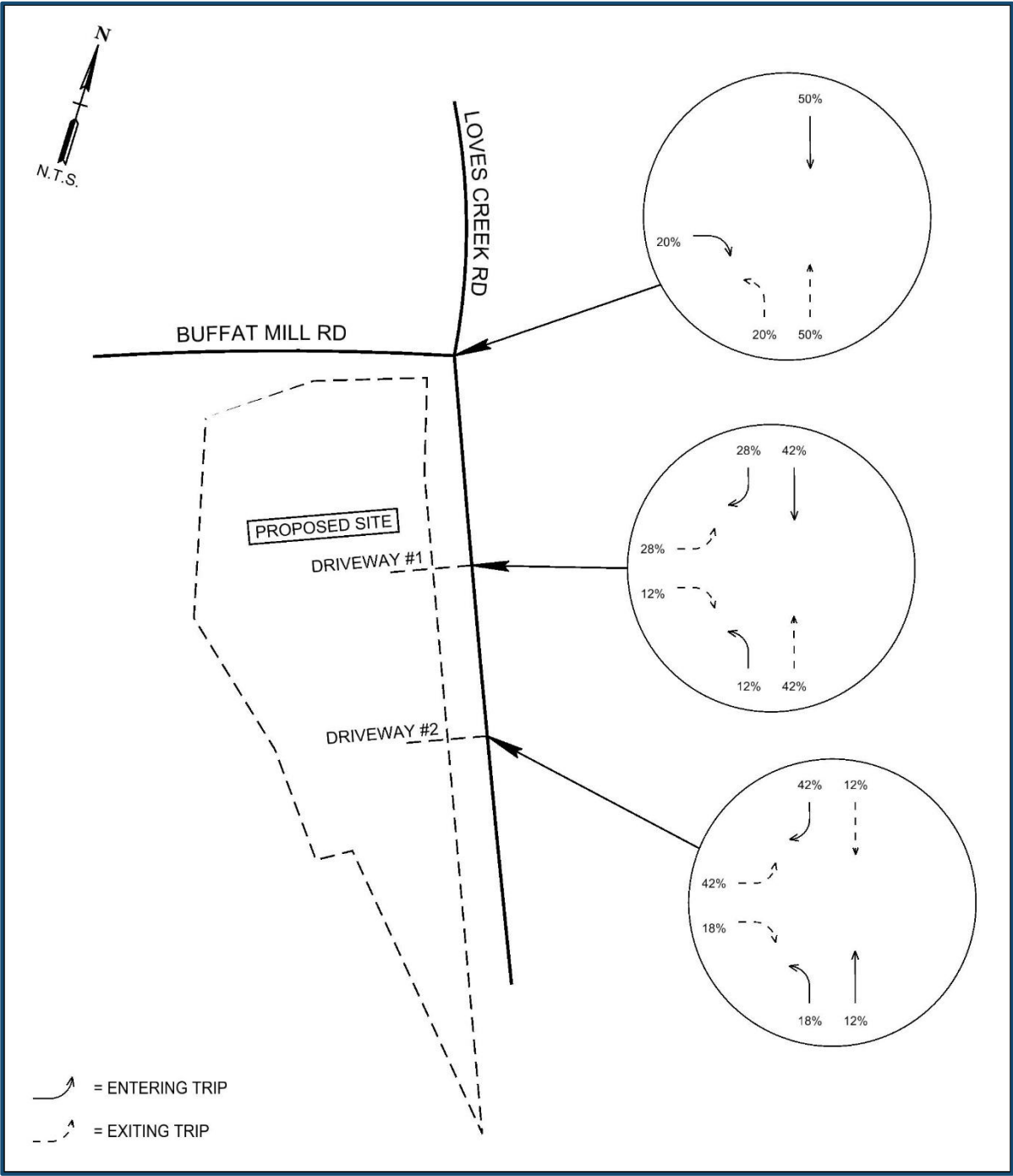


FIGURE 6
TRIP DISTRIBUTION PATTERNS

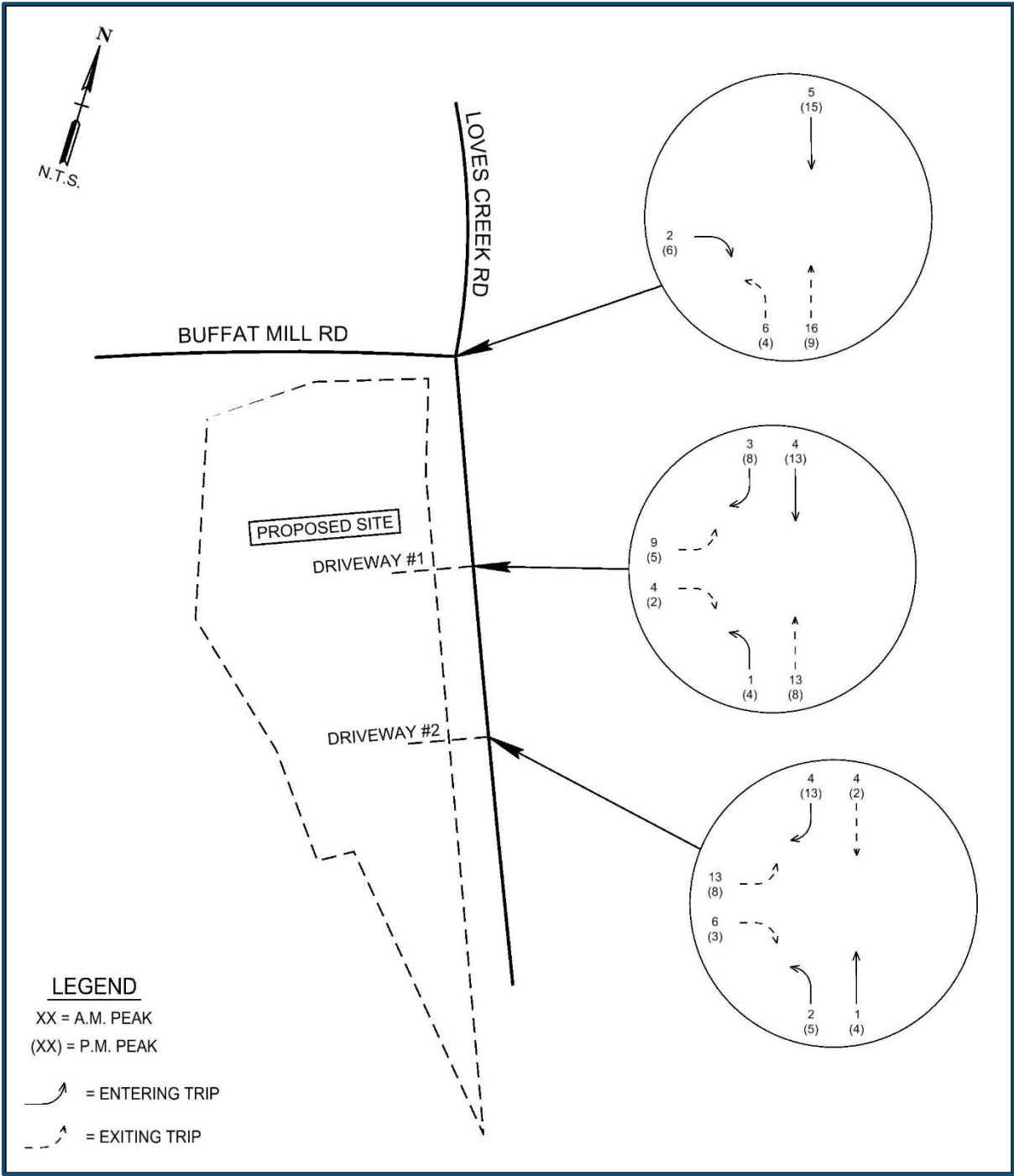


FIGURE 7
TRIP ASSIGNMENT

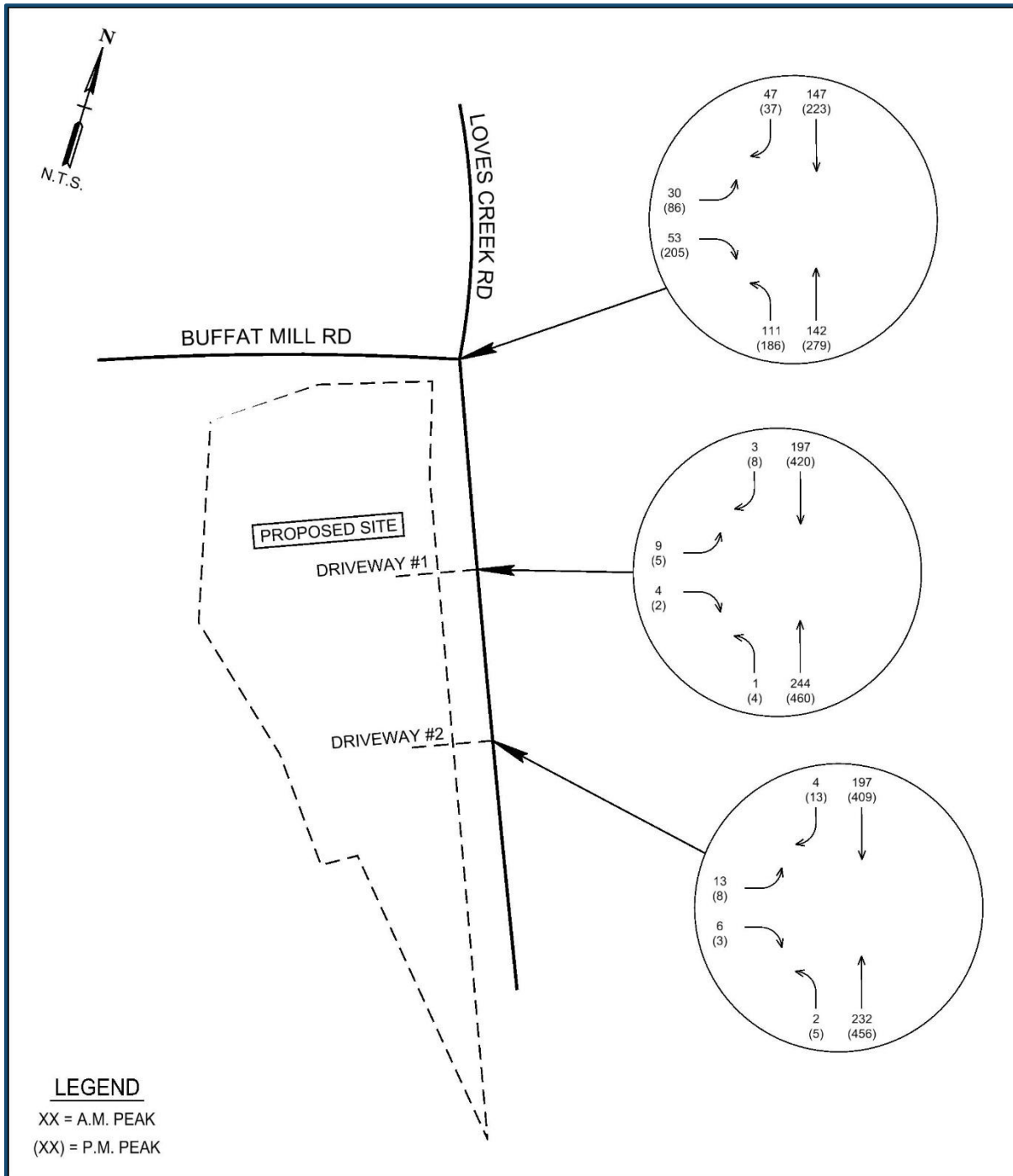


FIGURE 8
2029 COMBINED TRAFFIC VOLUMES



6 EVALUATIONS

INTERSECTION CAPACITY ANALYSES

TABLE 3
CAPACITY ANALYSIS SUMMARY

INTERSECTION	TIME PERIOD	YEAR 2026 EXISTING (LOS/DELAY)	YEAR 2029 BACKGROUND (LOS/DELAY)	YEAR 2029 COMBINED (LOS/DELAY)
Loves Creek Road at Buffat Mill Road (SIDE STREET STOP) ¹	A.M. P.M.	B 12.1 D 25.9	B 12.8 E 37.7	B 13.3 E 44.6
Loves Creek Road at Buffat Mill Road (ALL-WAY STOP) ²	A.M. P.M.	- -	- -	A 10.7 D 27.2
Loves Creek Road at Proposed Driveway #1 (SIDE STREET STOP) ¹	A.M. P.M.	- -	- -	B 11.1 C 16.2
Loves Creek Road at Proposed Driveway #2 (SIDE STREET STOP) ¹	A.M. P.M.	- -	- -	B 11.1 C 16.3

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

²ALL-WAY STOP CONTROL – Level-of-Service and Average Vehicular Delay (seconds) for full intersection utilizing HCM methodology.



The results summarized in TABLE 3 indicate that a LOS “E” or better can be anticipated at each of study intersections under the evaluated conditions. Under the 2029 combined conditions and utilizing existing geometry, the intersection of Loves Creek Road at Buffat Mill Road is anticipated to operate at a LOS “B” during the AM Peak hour and at a LOS “E” in the PM Peak hour, with an approximate delay of 13.3 seconds and 44.6 seconds, respectively. Both proposed driveways along Loves Creek Road are anticipated to operate at a LOS “B” in the AM Peak hour and at a LOS “C” in the PM Peak hour. The approximate delay for the proposed driveways are 11.1 seconds in the AM Peak hour and range from 16.2 to 16.3 seconds in the PM Peak hour.

Due to limited sight distance at the intersection of Loves Creek Road and Buffat Mill Road, All-Way stop control was evaluated. As shown, the All-Way stop control is anticipated to operate at LOS “A” in the AM peak hour and at a LOS “D” in the PM peak hour, with an approximate delay of 10.7 seconds and 27.2 seconds, respectively. Compared to the existing side-street stop control, the All-Way stop condition at the intersection of Loves Creek Road and Buffat Mill Road provides a better LOS during the proposed 2029 combined conditions. Therefore, it is recommended the existing side-street stop control at the intersection of Loves Creek Road and Buffat Mill Road should be converted to an All-Way Stop.



TURN LANE ASSESSMENT

Each of the proposed driveways and the adjacent existing intersection were evaluated for left and right-turn lane warrants utilizing Knox County's Access Control and Driveway Design Policy Handbook 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
 - Loves Creek Road at Buffat Mill Road
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: **Met**
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Loves Creek Road at Proposed Driveway #1
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Loves Creek Road at Proposed Driveway #2
 - Left Turn Warrant – AM Peak: Not Met / PM Peak: Not Met
 - Right Turn Warrant – AM 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, the intersection evaluated does not warrant a right turn lane and only warrants a left turn lane during the PM peak hour. Due to the existing geometry, intersection constraints, and the recommendation to convert the intersection to an All-Way Stop, neither a right turn lane or left turn lane is recommended. The turn lane warrant analyses worksheets are in APPENDIX D.

CRASH ANALYSIS

Utilizing the publicly available data from the Knoxville Regional TPO Crash map, the crash history at the intersection of Loves Creek Road and Buffat Mill Road was evaluated. From the Knoxville Regional TPO Crash Map, 12 crashes over the past 5 years have been identified to have occurred at or near the intersection of Loves Creek Road and Buffat Mill Road. Of the 12 crashes the following crash types were identified as follows: 7 were classified as angle, 3 were classified as head-on, 1 was classified as no collision with vehicle, and 1 was unspecified. Of the identified crashes the severity was classified as follows: 4 were suspected minor injury, 3 were property damage only, 3 were possible injury, 1 was suspected serious injury, and 1 was fatal.



SIGHT DISTANCE ASSESSMENT

Intersection sight distance was reviewed for the existing intersection of Loves Creek Road at Buffat Mill Road, as well as the proposed driveways, along Loves Creek Road. As stated previously, the posted speed limit along Loves Creek Road is 30 mph within the vicinity of the project. The posted speed limit was utilized to determine the necessary sight distance for turning vehicles. Based on the AASHTO Sight Distance requirements, the minimum sight distance for a right turning vehicle is 290 feet, while the minimum sight distance for a left turning vehicle is 335 feet.

Intersection sight distance was assessed via field measurements at both intersections in June 2026. 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 at the intersection of Loves Creek Road at Buffat Mill Road was found to be adequate when looking right, but inadequate looking left. Due to the existing blind curve and vertical curve prior to the intersection of Loves Creek Road, sight distance looking left is limited and does not meet the required sight distance of 290'. However, looking at the intersection of Loves Creek Road at Buffat Mill Road, sight distance looking right was determined to be greater than the required sight distance of 335'.

The sight distance at the proposed intersection of Loves Creek Road and driveway #1 was found to be adequate when looking in both directions. At the intersection, sight distance looking left was measured to be greater than the 290', while the intersection sight distance looking right was measured to be greater than 335'.

At the proposed intersection of Loves Creek Road and driveway #2 sight distance was found to be adequate when looking right, but inadequate looking left. Due to the proposed development's existing topography, sight distance was measured to be less than 290' when looking left. However, when looking right, sight distance was measured to be greater than 335'. It should be noted that the required sight distance can be achieved and maintained with proper grading of the proposed site and trimming of nearby vegetation within the right-of-way.

Additionally, the sight distance between driveways was observed. Sight distance was found to meet the required sight distance when looking right and left. The sight distance observed from the field measurements can be seen in FIGURES 9, 10, & 11.



Looking left along Loves Creek Road from Buffat Mill Road.

Approx. sight distance: Less than 290 ft.



Looking right along Loves Creek Road from Buffat Mill Road.

Approx. sight distance: Greater than 335 ft

FIGURE 9
SIGHT DISTANCE ASSESSMENT



Looking left along Loves Creek Road from the approximate location of proposed driveway #1.
Approx. sight distance: greater than 290 ft.



Looking right along Loves Creek Road from the approximate location of proposed driveway #1.
Approx. sight distance: greater than 335 ft.

FIGURE 10
SIGHT DISTANCE ASSESSMENT



Looking left along Loves Creek Road from the approximate location of proposed driveway #2.
Approx. sight distance: Less than 290 ft.



Looking right along Loves Creek Road from the approximate location of Proposed driveway #2.
Approx. sight distance: greater than 335 ft.

FIGURE 11
SIGHT DISTANCE ASSESSMENT



7 CONCLUSIONS & RECOMMENDATIONS

The primary conclusion of this study is that traffic generated from the proposed residential development will have minor impacts on the study intersections. The results indicate that an acceptable LOS “D” or better can be anticipated at all study intersections under combined conditions. Due to the limited sight distance when looking left onto Loves Creek Road from Buffat Mill Road, it is recommended that the current side-street stop control be converted to All-Way Stop control and advanced signage be added prior to the proposed All-Way Stop.

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 the unsignalized intersection of each of the proposed driveways.
2. Remove or trim any vegetation within the right-of-way that interferes with sight distance.
3. Convert the intersection of Loves Creek Road at Buffat Mill Road from side-street stop control to All-Way stop control.
4. Install a MUTCD 30” x 30” (W3-1) sign with a MUTCD 24” x 16” (W16-15P) plaque 400’ in advance of the proposed all-way stop at Loves Creek Road and Buffat Mill Road, approximately just south of the Cross Points Church driveway.



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APPENDIX B | TRIP GENERATION
APPENDIX C | CAPACITY ANALYSES
APPENDIX D | TURN LANE WARRANT EVALUATIONS



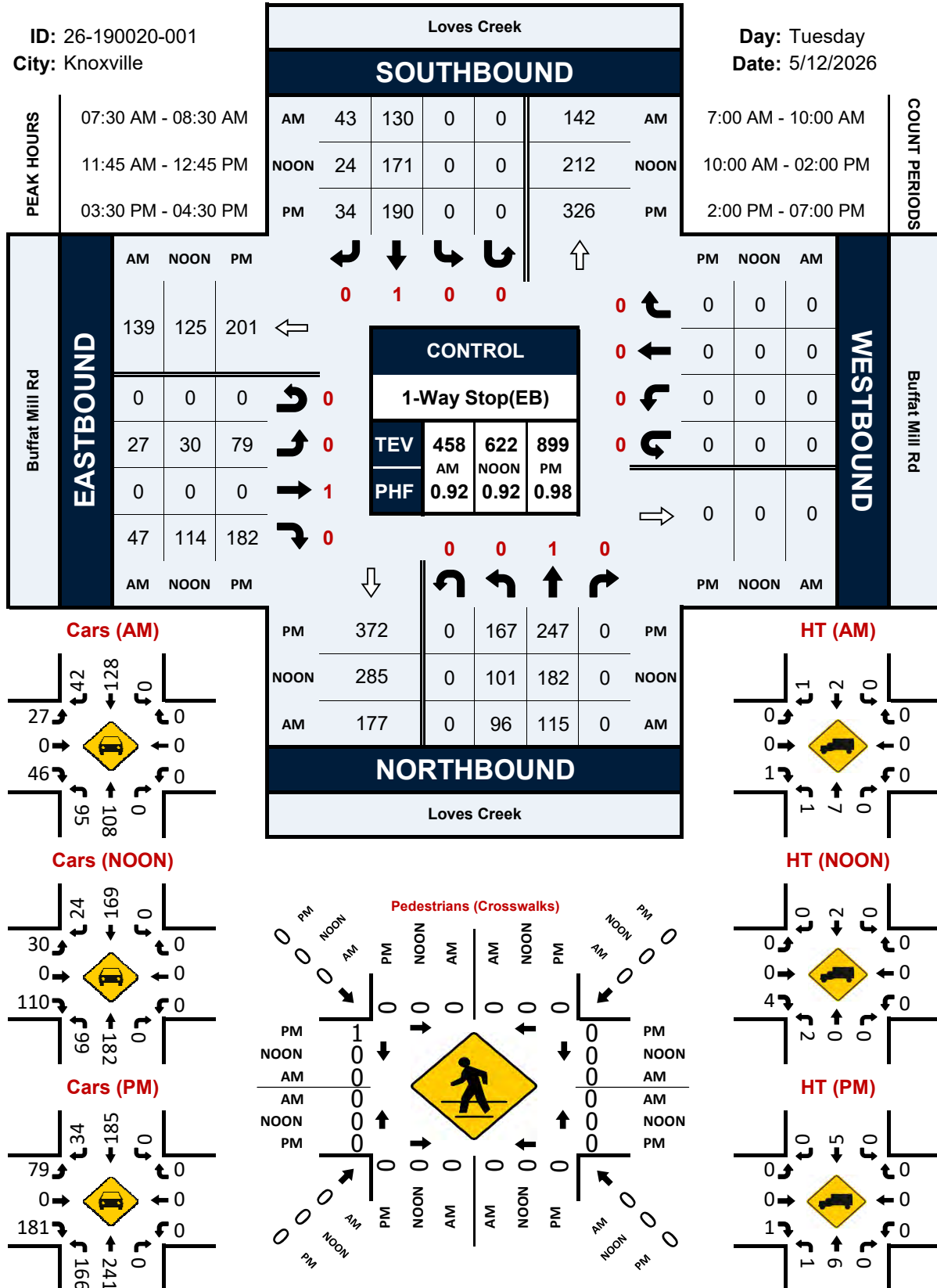
APPENDIX A | TRAFFIC DATA

Loves Creek & Buffat Mill Rd

Peak Hour Turning Movement Count

ID: 26-190020-001
City: Knoxville

Day: Tuesday
Date: 5/12/2026



National Data & Surveying Services

Intersection Turning Movement Count

Location: Loves Creek & Buffat Mill Rd
City: Knoxville
Control: 1-Way Stop(EB)

Project ID: 26-190020-001
Date: 5/12/2026

Data - Total

NS/EW Streets:	Loves Creek				Loves Creek				Buffat Mill Rd				Buffat Mill Rd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	1 NT	0 NR	0 NU	0 SL	1 ST	0 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
7:00 AM	22	20	0	0	0	19	6	0	0	0	11	0	0	0	0	0	78
7:15 AM	17	25	0	0	0	32	18	0	5	0	14	0	0	0	0	0	111
7:30 AM	25	40	0	0	0	26	13	0	11	0	9	0	0	0	0	0	124
7:45 AM	26	23	0	0	0	25	15	0	9	0	11	0	0	0	0	0	109
8:00 AM	23	24	0	0	0	42	6	0	4	0	15	0	0	0	0	0	114
8:15 AM	22	28	0	0	0	37	9	0	3	0	12	0	0	0	0	0	111
8:30 AM	20	20	0	0	0	15	5	0	5	0	11	0	0	0	0	0	76
8:45 AM	20	31	0	0	0	27	3	0	2	0	20	0	0	0	0	0	103
9:00 AM	17	27	0	0	0	16	3	0	7	0	8	0	0	0	0	0	78
9:15 AM	13	25	0	0	0	22	7	0	5	0	23	0	0	0	0	0	95
9:30 AM	18	23	0	0	0	27	4	0	6	0	15	0	0	0	0	0	93
9:45 AM	32	31	0	0	0	25	4	0	2	0	14	0	0	0	0	0	108
TOTAL VOLUMES :	255	317	0	0	0	313	93	0	59	0	163	0	0	0	0	0	1200
APPROACH %'s :	44.58%	55.42%	0.00%	0.00%	0.00%	77.09%	22.91%	0.00%	26.58%	0.00%	73.42%	0.00%	0	0	0	0	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	96	115	0	0	0	130	43	0	27	0	47	0	0	0	0	0	458
PEAK HR FACTOR :	0.923	0.719	0.000	0.000	0.000	0.774	0.717	0.000	0.614	0.000	0.783	0.000	0.000	0.000	0.000	0.000	0.923
	0.812				0.901				0.925								
NOON	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	1 NT	0 NR	0 NU	0 SL	1 ST	0 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
10:00 AM	25	31	0	0	0	15	5	0	4	0	22	0	0	0	0	0	102
10:15 AM	29	36	0	0	0	19	5	0	5	0	14	0	0	0	0	0	108
10:30 AM	21	26	0	0	0	36	6	0	3	0	12	0	0	0	0	0	104
10:45 AM	27	31	0	0	0	28	7	0	2	0	19	0	0	0	0	0	114
11:00 AM	24	36	0	0	0	25	3	0	8	0	17	0	0	0	0	0	113
11:15 AM	27	34	0	0	0	40	5	0	3	0	20	0	0	0	0	0	129
11:30 AM	20	42	0	1	0	34	2	0	6	0	16	0	0	0	0	0	121
11:45 AM	24	47	0	0	0	38	5	0	5	0	43	0	0	0	0	0	162
12:00 PM	27	45	0	0	0	36	5	0	12	0	20	0	0	0	0	0	145
12:15 PM	26	53	0	0	0	55	7	0	4	0	24	0	0	0	0	0	169
12:30 PM	24	37	0	0	0	42	7	0	9	0	27	0	0	0	0	0	146
12:45 PM	18	34	0	0	0	27	10	0	9	0	31	0	0	0	0	0	129
1:00 PM	36	42	0	0	0	32	5	0	3	0	18	0	0	0	0	0	136
1:15 PM	21	24	0	0	0	45	8	0	7	0	31	0	0	0	0	0	136
1:30 PM	29	50	0	0	0	27	6	0	3	0	21	0	0	0	0	0	136
1:45 PM	16	42	0	0	0	42	5	0	8	0	20	0	0	0	0	0	133
TOTAL VOLUMES :	394	610	0	1	0	541	91	0	91	0	355	0	0	0	0	0	2083
APPROACH %'s :	39.20%	60.70%	0.00%	0.10%	0.00%	85.60%	14.40%	0.00%	20.40%	0.00%	79.60%	0.00%	0	0	0	0	
PEAK HR :	11:45 AM - 12:45 PM																TOTAL
PEAK HR VOL :	101	182	0	0	0	171	24	0	30	0	114	0	0	0	0	0	622
PEAK HR FACTOR :	0.935	0.858	0.000	0.000	0.000	0.777	0.857	0.000	0.625	0.000	0.663	0.000	0.000	0.000	0.000	0.000	0.920
	0.896				0.786				0.750								
PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				TOTAL
	0 NL	1 NT	0 NR	0 NU	0 SL	1 ST	0 SR	0 SU	0 EL	1 ET	0 ER	0 EU	0 WL	0 WT	0 WR	0 WU	
2:00 PM	26	34	0	0	0	37	7	0	9	0	30	0	0	0	0	0	143
2:15 PM	21	31	0	0	0	40	14	0	7	0	33	0	0	0	0	0	146
2:30 PM	21	32	0	0	0	44	8	0	8	0	29	0	0	0	0	0	142
2:45 PM	21	45	0	0	0	46	9	0	8	0	30	0	0	0	0	0	159
3:00 PM	35	48	0	0	0	45	13	0	19	0	43	0	0	0	0	0	207
3:15 PM	34	45	0	0	0	38	9	0	18	0	24	0	0	0	0	0	168
3:30 PM	42	57	0	0	0	59	11	0	18	0	35	0	0	0	0	0	222
3:45 PM	45	62	0	0	0	46	9	0	11	0	54	0	0	0	0	0	227
4:00 PM	44	59	0	0	0	36	10	0	25	0	46	0	0	0	0	0	220
4:15 PM	36	69	0	0	0	49	4	0	25	0	47	0	0	0	0	0	230
4:30 PM	33	53	0	0	0	43	17	0	22	0	47	0	0	0	0	0	215
4:45 PM	19	49	0	0	0	32	7	0	37	0	49	0	0	0	0	0	193
5:00 PM	38	54	0	0	0	37	11	0	35	0	48	0	0	0	0	0	223
5:15 PM	26	60	0	0	0	51	9	0	47	0	52	0	0	0	0	0	245
5:30 PM	21	56	0	0	0	52	8	0	35	0	48	0	0	0	0	0	220
5:45 PM	29	51	0	0	0	47	7	0	15	0	38	0	0	0	0	0	187
6:00 PM	19	30	0	0	0	53	6	0	7	0	30	0	0	0	0	0	145
6:15 PM	26	46	0	0	0	37	9	0	5	0	35	0	0	0	0	0	158
6:30 PM	31	49	0	0	0	42	7	0	6	0	41	1	0	0	0	0	177
6:45 PM	27	29	0	0	0	29	6	0	7	0	30	0	0	0	0	0	128
TOTAL VOLUMES :	594	959	0	0	0	867	181	0	364	0	789	1	0	0	0	0	3755
APPROACH %'s :	38.25%	61.75%	0.00%	0.00%	0.00%	82.73%	17.27%	0.00%	31.54%	0.00%	68.37%	0.09%	0	0	0	0	
PEAK HR :	03:30 PM - 04:30 PM																TOTAL
PEAK HR VOL :	167	247	0	0	0	190	34	0	79	0	182	0	0	0	0	0	899
PEAK HR FACTOR :	0.928	0.895	0.000	0.000	0.000	0.805	0.773	0.000	0.790	0.000	0.843	0.000	0.000	0.000	0.000	0.000	0.977
	0.967				0.800				0.906								



APPENDIX B | TRIP GENERATION

Land Use: 220

Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing is a residential building with two or three floors (levels) of residences. Various configurations fit this description, including the following:

- Walk-up apartment or multiplex—access to the individual dwelling units is typically internal to the structure and provided through a shared entry, stairway, and hallway.
- Mansion apartment with several dwelling units within what appears from the outside to be a single-family dwelling unit.
- Stacked townhouse designed to match the external appearance of a townhouse, but which has dwelling units that share both floors and walls and with access through a central entry and stairway.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there was an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Arizona, British Columbia (CAN), California, Delaware, Florida, Illinois, Maine, Massachusetts, Minnesota, New Jersey, New York, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Utah, and Washington.

Source Numbers

357, 390, 412, 525, 530, 579, 583, 638, 864, 866, 896, 901, 903, 904, 936, 939, 944, 946, 947, 948, 963, 964, 966, 967, 1012, 1013, 1014, 1036, 1047, 1056, 1071, 1076, 1219, 1236, 1265, 1267

Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

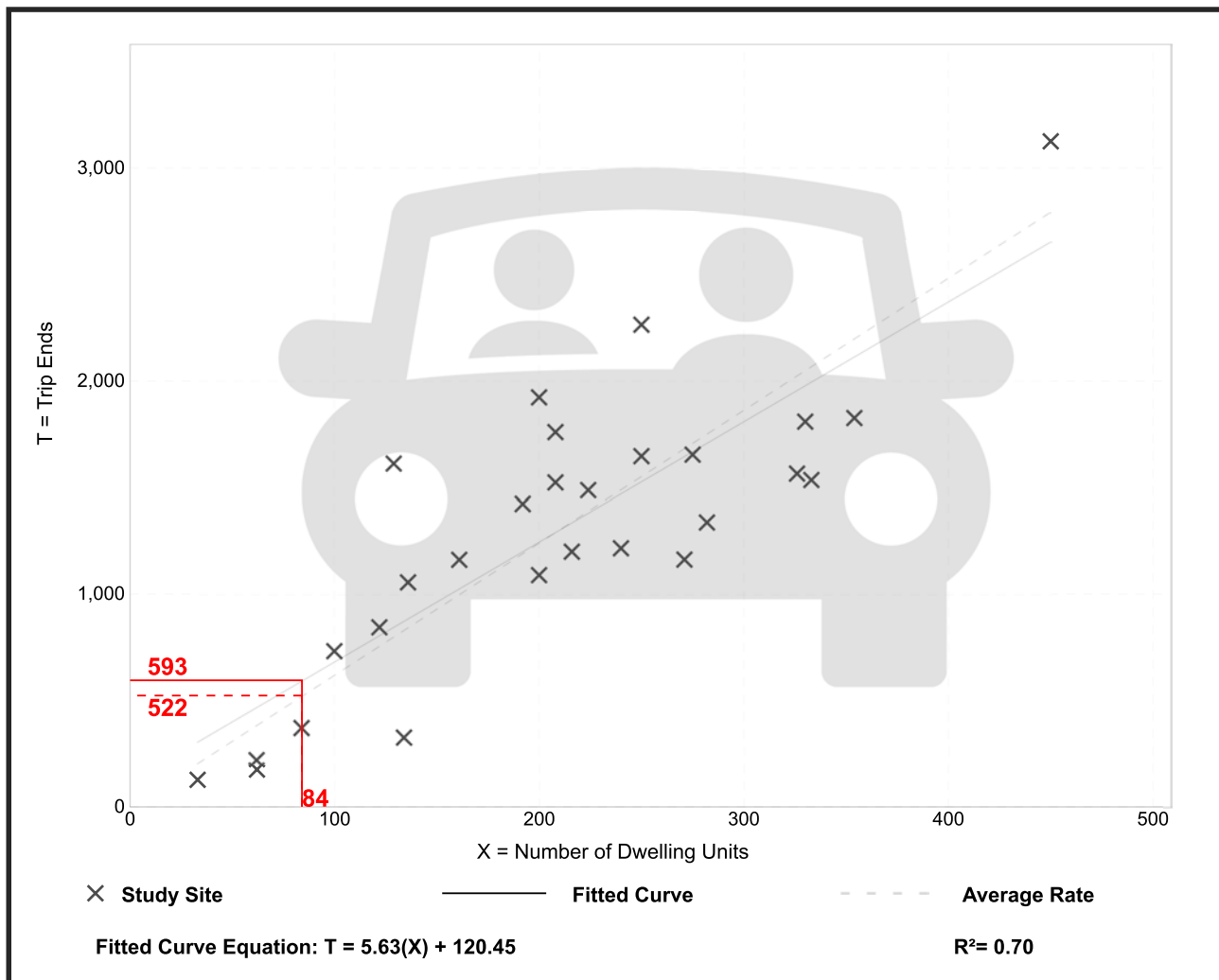
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 28
Avg. Num. of Dwelling Units: 208
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.21	2.46 - 12.50	1.87

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

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: 51

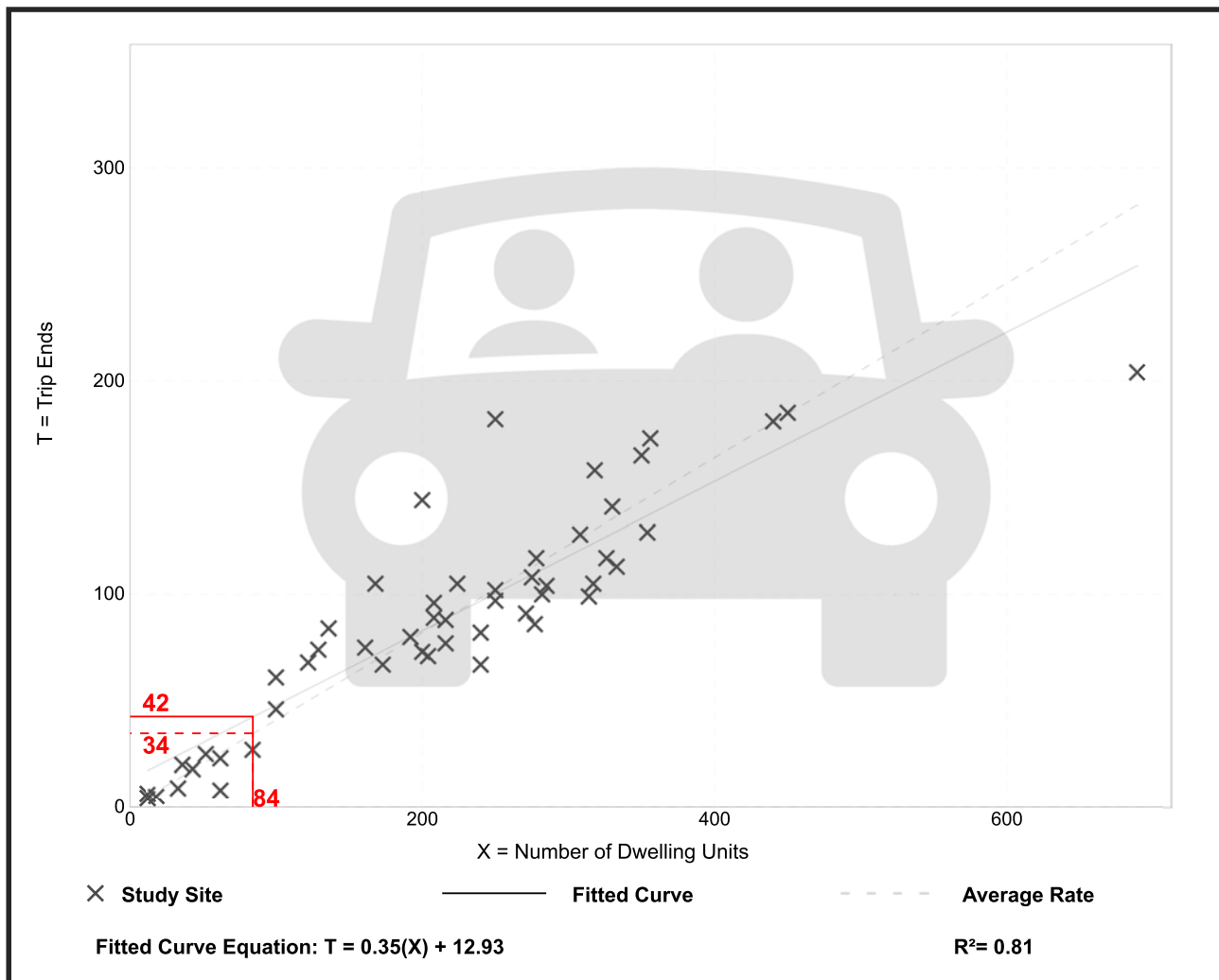
Avg. Num. of Dwelling Units: 219

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.41	0.13 - 0.73	0.10

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

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: 61

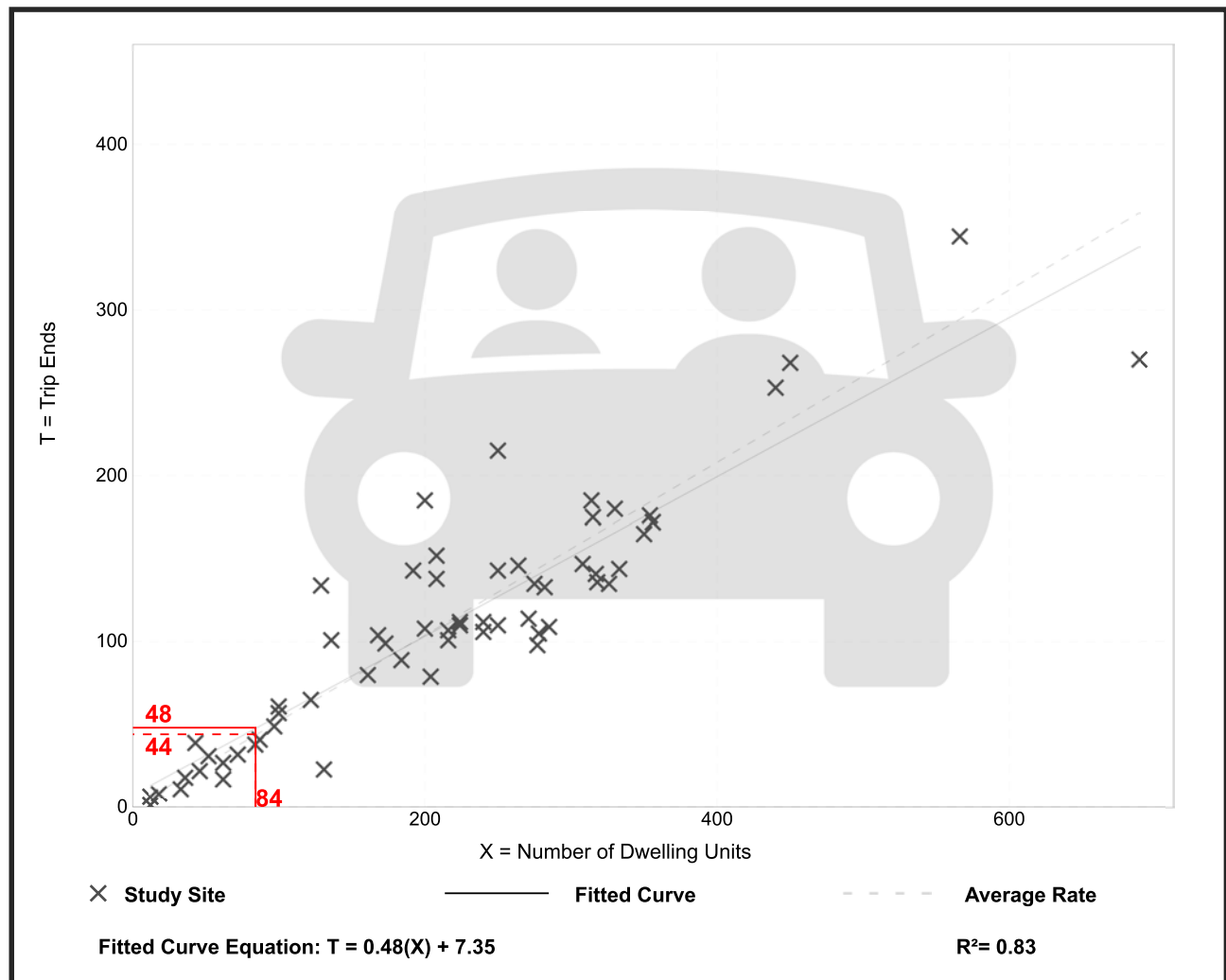
Avg. Num. of Dwelling Units: 215

Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.52	0.08 - 1.04	0.13

Data Plot and Equation



Project: The Preserve at Loves Creek

Date Conducted: 7/13/26

Multifamily Housing (Low-Rise) (220)

84 Apartment Units

Average Daily Traffic

$$T = 6.21(X)$$

$$T = 6.21(84)$$

$$T = 522$$

Peak Hour of Adjacent Street Traffic

One Hour Between 7 and 9 a.m.

$$T = 0.35(X) + 12.93$$

$$T = 0.35(84) + 12.93$$

$$T = 42$$

Peak Hour of Adjacent Street Traffic

One Hour Between 4 and 6 p.m.

$$T = 0.48(X) + 7.35$$

$$T = 0.48(84) + 7.35$$

$$T = 48$$

Time Period	Total Trips	Percent		Number	
		Enter	Exit	Enter	Exit
Weekday (24 hours)	522	50%	50%	261	261
AM Peak Hour	42	24%	76%	10	32
PM Peak Hour	48	62%	38%	30	18



APPENDIX C | CAPACITY ANALYSES

Intersection						
Int Delay, s/veh	3.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	27	47	96	115	130	43
Future Vol, veh/h	27	47	96	115	130	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	78	92	72	77	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	44	60	104	160	169	60

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	567	199	229	0	-	0
Stage 1	199	-	-	-	-	-
Stage 2	368	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	485	842	1339	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	700	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	444	842	1339	-	-	-
Mov Cap-2 Maneuver	444	-	-	-	-	-
Stage 1	764	-	-	-	-	-
Stage 2	700	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.1	3.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1339	-	610	-	-
HCM Lane V/C Ratio	0.078	-	0.171	-	-
HCM Ctrl Dly (s/v)	7.9	0	12.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0.3	-	0.6	-	-

Intersection						
Int Delay, s/veh	9.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	79	182	167	247	190	34
Future Vol, veh/h	79	182	167	247	190	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	84	93	90	81	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	100	217	180	274	235	44
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	891	257	279	0	-	0
Stage 1	257	-	-	-	-	-
Stage 2	634	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	313	782	1284	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	261	782	1284	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	656	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	25.9	3.3		0		
HCM LOS	D					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1284	-	480	-	-	
HCM Lane V/C Ratio	0.14	-	0.66	-	-	
HCM Ctrl Dly (s/v)	8.3	0	25.9	-	-	
HCM Lane LOS	A	A	D	-	-	
HCM 95th %tile Q (veh)	0.5	-	4.7	-	-	

Intersection						
Int Delay, s/veh	3.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	51	105	126	142	47
Future Vol, veh/h	30	51	105	126	142	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	78	92	72	77	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	65	114	175	184	65

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	620	217	249
Stage 1	217	-	-
Stage 2	403	-	-
Critical Hdwy	6.42	6.22	4.12
Critical Hdwy Stg 1	5.42	-	-
Critical Hdwy Stg 2	5.42	-	-
Follow-up Hdwy	3.518	3.318	2.218
Pot Cap-1 Maneuver	452	823	1317
Stage 1	819	-	-
Stage 2	675	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	409	823	1317
Mov Cap-2 Maneuver	409	-	-
Stage 1	740	-	-
Stage 2	675	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.8	3.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1317	-	574	-	-
HCM Lane V/C Ratio	0.087	-	0.2	-	-
HCM Ctrl Dly (s/v)	8	0	12.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0.3	-	0.7	-	-

Intersection						
Int Delay, s/veh	12.8					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	199	182	270	208	37
Future Vol, veh/h	86	199	182	270	208	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	84	93	90	81	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	237	196	300	257	48

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	973	281	305	0	-	0
Stage 1	281	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	280	758	1256	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	497	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	228	758	1256	-	-	-
Mov Cap-2 Maneuver	228	-	-	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	497	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	37.7	3.3	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1256	-	438	-	-
HCM Lane V/C Ratio	0.156	-	0.789	-	-
HCM Ctrl Dly (s/v)	8.4	0	37.7	-	-
HCM Lane LOS	A	A	E	-	-
HCM 95th %tile Q (veh)	0.6	-	7	-	-

Intersection						
Int Delay, s/veh	3.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	53	111	142	147	47
Future Vol, veh/h	30	53	111	142	147	47
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	78	92	72	77	72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	68	121	197	191	65

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	663	224	256	0	-	0
Stage 1	224	-	-	-	-	-
Stage 2	439	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	426	815	1309	-	-	-
Stage 1	813	-	-	-	-	-
Stage 2	650	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	382	815	1309	-	-	-
Mov Cap-2 Maneuver	382	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	650	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	13.3	3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1309	-	552	-	-
HCM Lane V/C Ratio	0.092	-	0.212	-	-
HCM Ctrl Dly (s/v)	8	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0.3	-	0.8	-	-

HCM 6th TWSC
2: Loves Creek Road & Driveway #1

The Preserve at Loves Creek
2029 Combined AM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	9	4	1	244	197	3
Future Vol, veh/h	9	4	1	244	197	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	10	4	1	265	214	3

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	483	216	217	0	-	0
Stage 1	216	-	-	-	-	-
Stage 2	267	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	542	824	1353	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	541	824	1353	-	-	-
Mov Cap-2 Maneuver	541	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	778	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.1	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1353	-	605	-	-
HCM Lane V/C Ratio	0.001	-	0.023	-	-
HCM Ctrl Dly (s/v)	7.7	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0	-	0.1	-	-

HCM 6th TWSC
3: Loves Creek Road & Driveway #2

The Preserve at Loves Creek
2029 Combined AM

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	6	2	232	197	4
Future Vol, veh/h	13	6	2	232	197	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-15	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	14	7	2	252	214	4

Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	472	216	218	0	-	0
Stage 1	216	-	-	-	-	-
Stage 2	256	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	551	824	1352	-	-	-
Stage 1	820	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	550	824	1352	-	-	-
Mov Cap-2 Maneuver	550	-	-	-	-	-
Stage 1	818	-	-	-	-	-
Stage 2	787	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.1	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1352	-	615	-	-
HCM Lane V/C Ratio	0.002	-	0.034	-	-
HCM Ctrl Dly (s/v)	7.7	0	11.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q (veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	14.7					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	205	186	279	223	37
Future Vol, veh/h	86	205	186	279	223	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	79	84	93	90	81	77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	244	200	310	275	48
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1009	299	323	0	-	0
Stage 1	299	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	266	741	1237	-	-	-
Stage 1	752	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	214	741	1237	-	-	-
Mov Cap-2 Maneuver	214	-	-	-	-	-
Stage 1	605	-	-	-	-	-
Stage 2	487	-	-	-	-	-
Approach	EB	NB		SB		
HCM Ctrl Dly, s/v	44.6	3.3		0		
HCM LOS	E					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1237	-	421	-	-	
HCM Lane V/C Ratio	0.162	-	0.838	-	-	
HCM Ctrl Dly (s/v)	8.5	0	44.6	-	-	
HCM Lane LOS	A	A	E	-	-	
HCM 95th %tile Q (veh)	0.6	-	8	-	-	

HCM 6th TWSC
2: Loves Creek Road & Driveway #1

The Preserve at Loves Creek
2029 Combined PM

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	5	2	4	460	420	8
Future Vol, veh/h	5	2	4	460	420	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	5	2	4	500	457	9

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	970	462	466	0	-	0
Stage 1	462	-	-	-	-	-
Stage 2	508	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	281	600	1095	-	-	-
Stage 1	634	-	-	-	-	-
Stage 2	604	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	280	600	1095	-	-	-
Mov Cap-2 Maneuver	280	-	-	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	604	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	16.2	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1095	-	330	-	-
HCM Lane V/C Ratio	0.004	-	0.023	-	-
HCM Ctrl Dly (s/v)	8.3	0	16.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q (veh)	0	-	0.1	-	-

HCM 6th TWSC
3: Loves Creek Road & Driveway #2

The Preserve at Loves Creek
2029 Combined PM

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	3	5	456	409	13
Future Vol, veh/h	8	3	5	456	409	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	-15	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	3	5	496	445	14

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	958	452	459	0	-	0
Stage 1	452	-	-	-	-	-
Stage 2	506	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	285	608	1102	-	-	-
Stage 1	641	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	283	608	1102	-	-	-
Mov Cap-2 Maneuver	283	-	-	-	-	-
Stage 1	637	-	-	-	-	-
Stage 2	606	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	16.3	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1102	-	331	-	-
HCM Lane V/C Ratio	0.005	-	0.036	-	-
HCM Ctrl Dly (s/v)	8.3	0	16.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q (veh)	0	-	0.1	-	-

HCM 6th AWSC
1: Loves Creek Road & Buffat Mill Road

The Preserve at Loves Creek
2029 Combined AM (All-Way Stop)

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	53	111	142	147	47
Future Vol, veh/h	30	53	111	142	147	47
Peak Hour Factor	0.61	0.78	0.92	0.72	0.77	0.72
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	68	121	197	191	65
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	8.9	10.7	9.5
HCM LOS	A	B	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	44%	36%	0%
Vol Thru, %	56%	0%	76%
Vol Right, %	0%	64%	24%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	253	83	194
LT Vol	111	30	0
Through Vol	142	0	147
RT Vol	0	53	47
Lane Flow Rate	318	117	256
Geometry Grp	1	1	1
Degree of Util (X)	0.405	0.159	0.315
Departure Headway (Hd)	4.587	4.893	4.432
Convergence, Y/N	Yes	Yes	Yes
Cap	785	731	810
Service Time	2.62	2.939	2.466
HCM Lane V/C Ratio	0.405	0.16	0.316
HCM Control Delay, s/veh	10.7	8.9	9.5
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2	0.6	1.4

HCM 6th AWSC
1: Loves Creek Road & Buffat Mill Road

The Preserve at Loves Creek
2029 Combined PM (All-Way Stop)

Intersection	
Intersection Delay, s/veh	20.6
Intersection LOS	C

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	205	186	279	223	37
Future Vol, veh/h	86	205	186	279	223	37
Peak Hour Factor	0.79	0.84	0.93	0.90	0.81	0.77
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	109	244	200	310	275	48
Number of Lanes	1	0	0	1	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay, s/veh	16.2	27.2	14.9
HCM LOS	C	D	B

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	40%	30%	0%
Vol Thru, %	60%	0%	86%
Vol Right, %	0%	70%	14%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	465	291	260
LT Vol	186	86	0
Through Vol	279	0	223
RT Vol	0	205	37
Lane Flow Rate	510	353	323
Geometry Grp	1	1	1
Degree of Util (X)	0.797	0.566	0.516
Departure Headway (Hd)	5.623	5.774	5.746
Convergence, Y/N	Yes	Yes	Yes
Cap	643	621	624
Service Time	3.686	3.847	3.82
HCM Lane V/C Ratio	0.793	0.568	0.518
HCM Control Delay, s/veh	27.2	16.2	14.9
HCM Lane LOS	D	C	B
HCM 95th-tile Q	7.9	3.5	3



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: 01975-0000
Project Name: The Preserve at Loves Creek TIS
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)
Loves Creek at Buffat Mill	2029 AM	194	142	111	245	No
Loves Creek at Buffat Mill	2029 PM	260	279	186	105	Yes
Loves Creek at Driveway #1	2029 AM	200	244	1	140	No
Loves Creek at Driveway #1	2029 PM	428	460	4	45	No
Loves Creek at Driveway #2	2029 AM	201	232	2	140	No
Loves Creek at Driveway #2	2029 PM	222	456	5	60	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: 01975-0000 Project Name: The Preserve at Loves Creek TIS 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

		Through	Right-Turn	Right-Turn Lane
Intersection	Time Period	Volume	Volume	Warranted (Yes / No)
Loves Creek at Buffat Mill	2029 AM	147	47	No
Loves Creek at Buffat Mill	2029 PM	223	37	No
Loves Creek at Driveway #1	2029 AM	197	3	No
Loves Creek at Driveway #1	2029 PM	420	8	No
Loves Creek at Driveway #1	2029 AM	197	4	No
Loves Creek at Driveway #1	2029 PM	409	13	No