TRAFFIC IMPACT STUDY

FOR

RIDGE ROAD TRACT DEVELOPMENT

HALL COUNTY, GA

Prepared By:

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EXECUTIVE SUMMARY

The proposed residential development at Ridge Road Tract is located in the southwest corner of the intersection of SR 347/Friendship Road and Hog Mountain Road/Ridge Road in Hall County, Georgia. This development will include 144 townhomes, which will be accessed via one Site Driveway on Ridge Road. The proposed driveway will align with the Emergency Driveway of Ridgeview Estates, a mixed-use development located on the east side on Ridge Road. The full build-out of the development is anticipated to be completed by 2028. This study analyzed the peak hour traffic operations and capacity analysis for the study intersection to determine if recommendations to the existing roadway network should be made to accommodate the new traffic and determine the intersection control for the proposed driveway.

This study analyzed the impacts the additional development's generated trips are expected to have on the surrounding roadway network and study intersections. The study intersections are listed below:

1. SR 347/Friendship Road at Hog Mountain Road/Ridge Road
2. Ridge Road at Site Driveway/Ridgeview Emergency Driveway

The ITE *Trip Generation Manual*, was referenced to estimate the trips generated by the residential development. The expected trips were added to the future traffic volumes to analyze the delay and level of service at the study intersections in build condition and compared with the existing and no-build conditions.

Under existing conditions, the southbound approach on the intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is operating unacceptably at LOS F during both peak hours. The intersection is also operating at an overall unacceptable level of service during the AM peak hour but operates acceptably in the PM peak hour. It is expected to continue operating at same levels of service as existing year in the future no-build conditions with future background traffic and trips generated from the adjacent development of Ridgeview Estates.

In the build scenario, with future year traffic volumes and added traffic from the Ridge Road Tract development, the Site Driveway on Ridge Road is expected to operated acceptably, as minor-street stop controlled with left and right turn lanes provided along Ridge Road to access the development. The existing intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is expected to operate at the same levels of service, in the build condition as in the existing and no-build conditions, with slightly higher delays. The southbound approach is expected to operate unacceptably at LOS F during both peak hours and the intersection is expected to continue operating at an overall unacceptable level of service during the AM peak.

The recommended driveway configuration and control type for the development are listed below:

<u>Ridge Road at Site Driveway/Ridgeview Emergency Driveway</u>

- Driveway should be minor-street stop-controlled.
- Provide a northbound left turn lane on Ridge Road, per GDOT minimum standards.
- Provide a southbound right turn lane on Ridge Road, per GDOT minimum standards.

The southbound approach at the intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is operating at LOS F in all scenarios. Therefore, additional operational analysis was conducted to evaluate the impact of providing overlapping right turn phase for the southbound right turn corresponding with the eastbound left turn. It is expected that this modification will reduce southbound delays by 1,305 seconds (91%) during the AM peak hour, and will have it operating with a 122-second delay and LOS F. For the PM peak hour, the southbound delay reduces by 93.1 seconds (77%), resulting in a 27.4-second delay with LOS C. The intersection is expected to operate more efficiently, with a delay reduction of 244.8 seconds (an 85% improvement) during AM peak hours and a 13.2-second decrease (a 38% reduction) during PM peak hours.

INTRODUCTION

Southeastern Engineering, Inc. conducted a traffic impact study for Ridge Road Tract residential development in Hall County, Georgia. The development will be built on an undeveloped site located in the southwest corner of the intersection of SR 347/Friendship Road at Hog Mountain Road/Ridge Road. The development will include 144 townhome units and will be accessed via on site driveway along Ridge Road. The full build-out of the development is planned for 2028. A location map of the area near the site is shown in **Figure 1**.

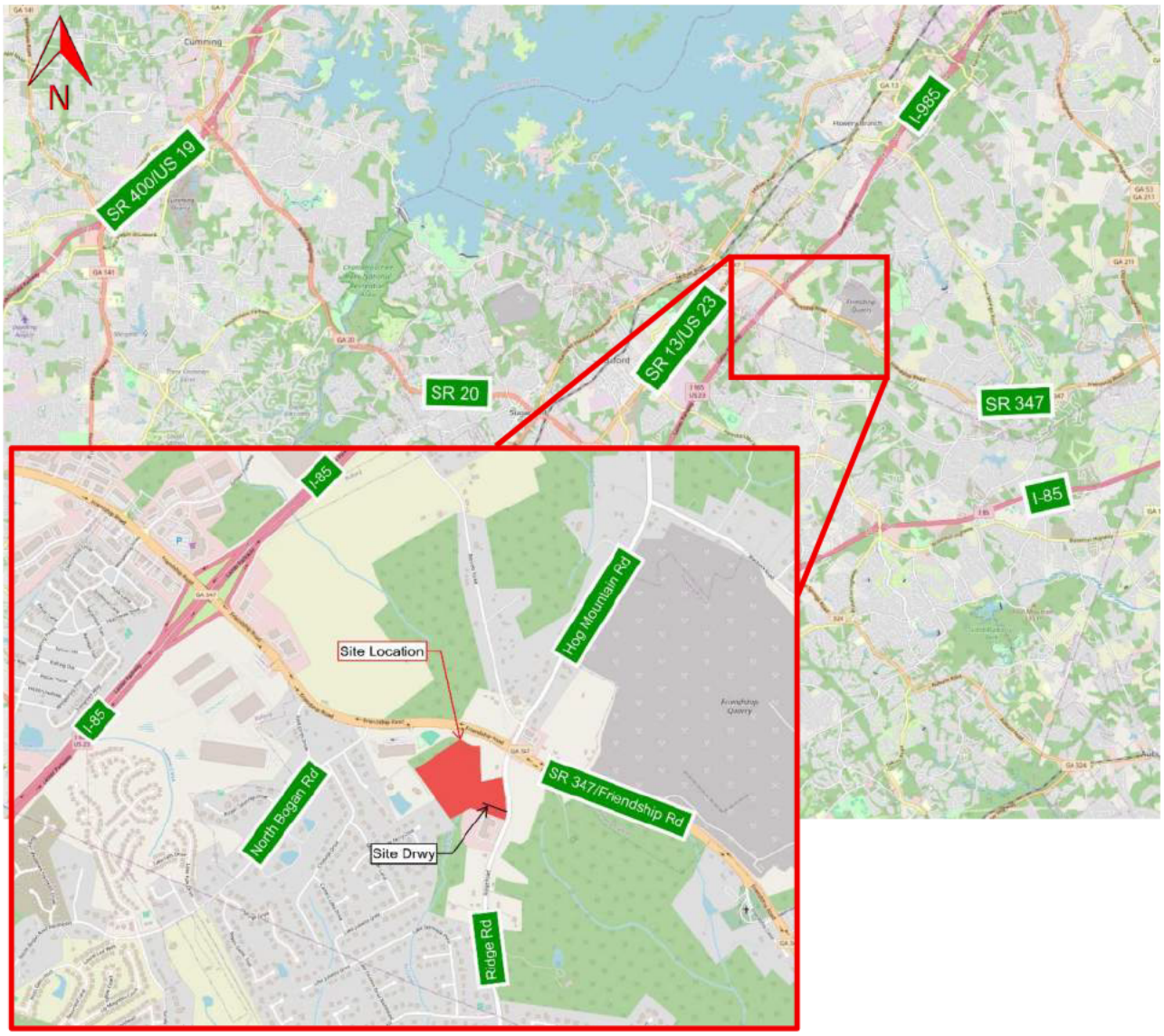


Figure 1: Location Map

This study will identify the potential impacts of the proposed development traffic on the surrounding roadway network. The study includes the existing and future peak hour traffic operations and capacity analysis for the surrounding roadway network and development driveways. As necessary, operational improvements will be identified and analyzed to mitigate the traffic impacts caused by the development. Based on the results of the analysis for the study intersections, recommendations will be made for intersection geometry and control methods.

PROJECT DESCRIPTION

The proposed residential development of Ridge Road Tract will be located in the southwest corner of the intersection of SR 347/Friendship Road and Hog Mountain Road/Ridge Road in Hall County, Georgia. The development includes 144 townhomes that will be accessed via one Site Driveway, Street A on the site plan, on Ridge Road. The proposed Site Driveway will align with the Emergency Driveway of Ridgeview Estates, a mixed-use development located on the east side of Ridge Road. Per the site plan, the development driveway is currently proposed to be controlled as a minor street stop control and will have a right turn lane provided along Ridge Road to access it. The full build-out of the development is planned for 2028. The site plans for both developments are attached in **Appendix A**.

Study Network

The traffic study analyzes traffic operations for the study intersections in the vicinity of the development. Capacity analysis and level of service evaluations of the study intersections were conducted for the existing, no-build and build scenarios. The intersections studied in this report are listed below, and **Figure 2** provides an aerial view of the study area, including the intersections analyzed.

1. SR 347/Friendship Road at Hog Mountain Road/Ridge Road – Traffic Signal
2. Ridge Road at Site Driveway/Ridgeview Emergency Driveway – Minor-Street Stop-Control



Figure 2: Aerial of Study Area

Roadway Conditions

The roadway network adjacent to the development was examined for the existing roadway characteristics.

SR 347/Friendship Road

SR 347/Friendship is a six-lane divided roadway. It is classified as a minor arterial with a posted speed limit of 45 mph. It connects to I-985 to the east and to Spout Springs Road to the west. Curb, gutter, and sidewalks are present along the entire roadway in the study area.

Hog Mountain Road

Hog Mountain Road is a two-lane undivided roadway. It is classified as a major collector with a posted speed limit of 45 mph. It connects to Spout Springs Road to the north and SR 347/Friendship Road to the south. Curb, gutter, and sidewalks are present along the roadway for the first 650 ft to the north of SR 347/Friendship Road.

Ridge Road

Ridge Road is a two-lane undivided roadway. It is classified as a major collector with a posted speed limit of 45 mph. It connects to SR 347/Friendship Road to the north and Thompson Mill Road to the south. Curb, gutter, and sidewalks are present along the roadway for the first 650 ft to the north of SR 347/Friendship Road.

EXISTING TRAFFIC CONDITIONS

The traffic impact study analyzes the current traffic operations of the study network. Capacity analysis and level of service evaluations of the study intersections were conducted for the existing and future conditions with and without the proposed development to determine the impacts of the development traffic on the network.

Existing Traffic Volumes

The traffic volumes used in the traffic impact study for the adjacent Ridgeview Development were collected on Thursday, February 15, 2024, and were utilized to analyze the impact of the proposed Ridge Road Tract development. Detailed traffic counts are attached in **Appendix B**. The existing AM and PM peak hour turning movement volumes for the study area are shown in **Figure 3.** For operational analysis, the peak hours were identified as 7:15-8:15 AM for the AM peak hour and 5:00-6:00 PM for the PM peak hour.

Level of Service Methodology

Intersection capacity analyses were performed using the methodology outlined in the *Highway Capacity Manual, 7th Edition* (HCM). This methodology is the industry standard for the evaluation of intersection capacity and delay. To facilitate the analysis, computer software Synchro 12. This software conforms to the methodology of the HCM.

An analysis of peak hour traffic conditions was performed to determine the level of service (LOS) at the study intersections. LOS for an intersection is based on vehicular delay at the intersection and is a typical measure of effectiveness used to evaluate intersection operations. The HCM provides ranges of delay for each LOS definition, spanning from very minimal delays (LOS A) to high delays (LOS F). LOS F is considered unacceptable for most drivers.

For unsignalized intersections, where a stop sign controls side streets or minor streets, the criterion for evaluating traffic operations is the LOS for the controlled turning movements at the intersection. Methodology from the HCM to determine the delay and LOS for these turning movements is based on input data including intersection geometry, lane configuration, and turning movement volumes.

For the signalized intersections, LOS is based on input data including intersection geometry, lane configuration, turning movement volumes, traffic signal timing.

Table 1 below indicates the relationship between delay and LOS for unsignalized and signalized intersections.

Table 1: Level of Service Standards		
Level of Service	Control Delay Per Vehicle (sec)	
	Unsignalized Intersection	Signalized Intersection
A	≤10	≤10
B	>10 and ≤15	>10 and ≤20
C	>15 and ≤25	>20 and ≤35
D	>25 and ≤35	>35 and ≤55
E	>35 and ≤50	>55 and ≤80
F	>50	>80

Existing Conditions Levels of Service

The existing geometric configuration and intersection controls were used to analyze the intersection for the existing conditions operational analysis. The signal timing for the intersection was obtained from GDOT's Automated Traffic Signal Performance Measures (ATSPM). The intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is the only existing intersection the other intersection does not exist in the year 2024. Based on the operational analysis, the southbound approach of Hog Mountain Road is operating unacceptably at LOS F during both peak hours. The intersection operates at an overall unacceptable level of service in the AM peak hour but operates acceptably in the PM peak hour. The results of the existing intersection operational analysis are summarized in **Table 2** and detailed Synchro reports are attached in **Appendix C**.

Table 2: Level of Service and Delay for Existing Year (2024)				
Intersection	Control	Approach	Delay (LOS)	
			AM	PM
SR 374/Friendship Road at Ridge Road/Hog Mountain Road	Signalized	EB	12.9 (B)	12.7 (B)
		WB	25.9 (C)	26.9 (C)
		NB	26.1 (C)	24.5 (C)
		SB	**1227.1 (F)**	**111.8 (F)**
		Overall	**250.2 (F)**	30.8 (C)

FUTURE CONDITIONS – WITHOUT THE PROPOSED DEVELOPMENT (NO-BUILD)

The impact of the proposed development on the roadway network was analyzed and evaluated in the future year (2028) without the proposed development (No-Build) to compare the future conditions with the proposed fully constructed development (Build).

Growth Rate

The growth rate for the study area was calculated using different sources, including the annual volume statistics from GDOT's Traffic Analysis & Data Application (TADA), employment and population projections for the county from Regional Economic Models, Inc. (REMI), population projections for the county from the Governor's Office of Planning and Budget (OPB), and county census data from the US Census Bureau. Data and calculations from the sources are attached in **Appendix D**.

TADA traffic volume data between March 2020 and July 2022 has been excluded from the growth rate calculations due to potential COVID-19 impacts. As a result, the latest count data available before 2020 was used to calculate the 5-year growth rate. The growth rate calculated using the GDOT's Historical traffic data is summarized in **Table 3**.

Table 3: GDOT Historical Growth Rate				
Station ID	**Location**	**5-Year**	**10-Year**	**15-Year**
139-0487	SR 347/Friendship Road west of Bogan Road	5.4%	7.2%	6.2%
139-7382	Ridge Road south of SR 347/Friendship Road	5.9%	3.3%	4.4%
139-7380	Bogan Road south of SR 347/Friendship Road	0.0%	0.9%	5.4%
135-7359	Ridge Road south of Thompson Mill Road	0.0%	3.2%	-
5-,10- and 15-Year Average		3.77%	2.8%	3.6%
Average Growth Rate		3.9%		

Population and employment projections from REMI were utilized in determining growth rates for the county. This data was used to calculate the growth rate for completion year 2028. **Table 4** summarizes the growth rate calculated using REMI's projections.

Table 4: Growth Rate Based on Regional Economic Models, Inc's Projections	
Projection Type	**2024-2028**
Employment Projection	**0.6%**
Population Projection	**1.0%**

The population projection data for the county was obtained from the Georgia Governor's OPB. This data was used to calculate the growth rate for completion year 2028. Growth rate calculated using projections from OPB are summarized in **Table 5**.

Table 5: Georgia Governor's Office of Planning and Budget Annual Population Estimates		
Year	**Hall County Population**	**Growth Rate**
2024	220,128	
2028	231,217	**1.2%**

Census data from the U.S. Census Bureau was used to calculate a growth rate for the county. Growth rate calculated using the U.S. Census Bureau data is shown **Table 6**.

Table 6: U.S. Census Bureau Annual Estimates of the Resident Population			
Geographic Area	**2010 Census**	**2020 Census**	**2010 to 2020 Growth Rate**
Hall County	179,684	203,136	1.2%

A weighted growth rate was established for the study area using engineering judgment. Since the census data, model population, and employment figures are countywide, they were assigned a lower weight. In contrast, GDOT's TADA Historical Data, which reflects the growth recorded in the area, was given a higher weight compared to the other sources. **Table 7** Shows the growth rate values for each source and weight factor. A growth rate of 2.8% was calculated for the study area based on the weighted average of growth rates from different sources.

Table 7: Weighted Growth Rate Calculation		
Data Source	**Weight Factor**	**Growth Rate**
GDOT's TADA Historical Data	0.6	3.9%
REMI's Employment Projection	0.1	0.6%
REMI's Population Projection	0.1	1.0%
Georgia Governor's OPB Population Projections	0.1	1.2%
U.S. Census Bureau	0.1	1.2%
Average		**2.8%**

Adjacent Projects

The adjacent development of Ridgeview Estates is proposed to be built in the southeast corner of the intersection of SR 347/Friendship Road and Hog Mountain Road/Ridge Road, across from the proposed development. The Ridgeview Estates will be a mixed-use development with four driveways to access the site, with one being an Emergency Driveway, which is proposed to be aligned with the proposed development driveway. From the development's traffic impoact study it had an expected completion year of 2025, so trips generated from this development were included in the future no-build and build analysis of this study. The site plan, trip generation, and distribution for this development are attached in **Appendix A**.

Future No-Build Traffic Volumes

The future background volumes for 2028 were calculated by applying the annual exponential growth rate over four (4) years to the existing 2024 background volumes and adding the trips generated from Ridgeview Estates development. Future 2028 background volumes are shown in **Figure 3**.

Future No-Build Conditions Level of Service

The future no-build intersection operational analysis was conducted for the study network, with existing geometric configuration and intersection control. Similar to the existing conditions the southbound approach at the intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is expected to operate at LOS F during both peak hours and during the AM peak hour the intersection is operating at an overall LOS F as well. The results of the intersection operational analysis are summarized in **Table 8**, and detailed Synchro reports are attached in **Appendix C**.

Table 8: Level of Service and Delay for No-Build Year (2028)				
Intersection	**Control**	**Approach**	**Delay (LOS)**	
			AM	**PM**
SR 374/Friendship Road at Ridge Road/Hog Mountain Road	Signalized	EB	14.9 (B)	14.2 (B)
		WB	28.9 (C)	30.1 (C)
		NB	31.6 (C)	27.6 (C)
		SB	**1417.4 (F)**	**132.7 (F)**
		Overall	**288.2 (F)**	35.6 (D)

PROPOSED DEVELOPMENT

The proposed development will be built in the southwest corner of the intersection of SR 347/Friendship Road and Hog Mountain Road/Ridge Road in Hall County, Georgia. The development will include 144 townhomes that will be accessed via one Site Driveway on Ridge Road. The proposed Site Driveway will align with the Emergency Driveway of Ridgeview Estates, a mixed-use development located across on Ridge Road. Per the site plan, the development driveway is currently proposed to be controlled as a minor street stop control and will have a right turn lane provided along Ridge Road to access it. The full build-out of the development is planned for 2028.

Trip Generation

The number of trips expected to be generated from the proposed development were estimated based on the method defined in the ITE *Trip Generation Manual, 11th Edition*. Due to the nature of land use of the development, no pass-by trip reductions are anticipated for the trips generated from the development. The trip generation for the proposed development is summarized in **Table 9**, and the trip generation reports are attached in **Appendix E**.

Table 9: Proposed Site Trip Generation

Land Use (ITE Code)	Unit of Measure	Daily Traffic			AM Peak Hour			PM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Single-Family Attached Housing (215)	144	523	524	1047	17	52	69	49	33	82

Trip Distribution and Assignment

The trips expected to be generated from the proposed development were distributed on the roadway network in the study area. The proposed distribution is based on historical counts and observed traffic patterns in the area. Trips generated by the development assigned to the study network are shown in **Figure 3**.

Auxiliary Lane Analysis

The need for auxiliary lanes on Ridge Road at the development driveway was evaluated based on the guidelines from GDOT's *Regulations for Driveway and Encroachment Control* manual. Auxiliary lanes are recommended on approaches to intersections when the daily turning traffic volumes meet or exceed volume thresholds defined in the GDOT manual.

Based on the GDOT manual, a left-turn lane is recommended at an intersection if the threshold values as shown in **Table 10** are met or exceeded.

Table 10: Left-Turn Lane Requirements

Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	ADT		ADT	
	< 6,000	≥ 6,000	< 10,000	≥ 10,000
35 MPH or Less	300 LTV a day	200 LTV a day	400 LTV a day	300 LTV a day
40 to 50 MPH	250 LTV a day	175 LTV a day	325 LTV a day	250 LTV a day
≥ 55 MPH	200 LTV a day	150 LTV a day	250 LTV a day	200 LTV a day

Based on the GDOT manual, a right-turn lane is recommended at an intersection if the threshold values as shown in **Table 11** are met or exceeded.

Table 11: Right-Turn Lane Requirements				
Posted Speed	2 Lane Routes		More than 2 Lanes on Main Road	
	ADT		ADT	
	< 6,000	≥6,000	<10,000	≥10,000
35 MPH or Less	200 RTV a day	100 RTV a day	200 RTV a day	100 RTV a day
40 to 50 MPH	150 RTV a day	75 RTV a day	150 RTV a day	75 RTV a day
55 to 60 MPH	100 RTV a day	50 RTV a day	100 RTV a day	50 RTV a day
≥65 MPH	Always	Always	Always	Always

Ridge Road is a two-lane roadway with a speed limit of 45 mph. Based on GDOT's TADA station #139-7282, Ridge Road has an average daily traffic (ADT) of approximately 9,393 vehicles per day (vpd) exceeding 6,000 vpd. Therefore, the threshold for a left-turn lane is set at 175 LTV per day and the threshold for a right-turn lane is set at 75 RTV per day. Based on the expected daily trip distribution, auxiliary lanes are warranted on Ridge Road into the Site Driveway. The results for the auxiliary lane analysis are shown in **Table 12**. The build analysis for Site Driveway intersection was carried out with a left and right turn lanes modeled along Ridge Road.

Table 12: Results for Auxiliary Lane Analysis				
Intersection	Turning Movement Thresholds (vpd)		Expected Turning Volumes (vpd)	
	LTV	RTV	LTV	RTV
Ridge Road at Site Driveway	175	75	284 (Yes)	239 (Yes)

FUTURE CONDITIONS- WITH THE PROPOSED DEVELOPMENT (BUILD)

To assess the traffic impact of the development, the site-generated trips were added to the future background traffic (2028), and the combined volumes were analyzed.

Future Build Traffic Volumes

The future build analysis was conducted to determine any impacts to the study intersections resulting from the traffic generated by the full build-out of the development. The site-generated trips assigned to the adjacent roadway network were added to the background traffic volumes and are presented in **Figure 3**.

Future Build Level of Service

The level of service criteria discussed in the prior sections was applied to the study intersections to determine the impacts of 2028 background traffic volumes plus total site-generated volumes and the addition of the proposed Site Driveway. The future build operational analysis was conducted to determine any impacts to the study intersections resulting from traffic generated after the full build-out of the proposed development.

The future build intersection operational analysis was conducted for the study network, with existing geometric configuration and intersection controls with the addition of the Ridge Road Tract development traffic and new Site Driveway. For the intersection of SR 374/Friendship Road at Ridge Road/Hog Mountain Road, similarly to the existing and no-build conditions the southbound approach is expected to operate at LOS F during both peak hours and during the AM peak hour the intersection is expected to operate at an overall LOS F. The Site Driveway, the one access for the proposed development, on Ridge Road is expected to operated acceptably, with minor-street stop-control and

left and right turn lanes along Ridge Road. The Ridgeview Estates Emergency Driveway is intended solely for emergency access, so no peak-hour or daily traffic volumes have been assigned to it. The results of the intersection capacity analysis are summarized in **Table 13**, and detailed Synchro reports are attached in **Appendix C**.

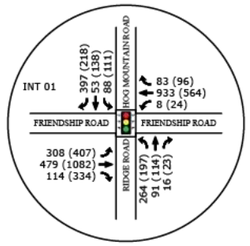
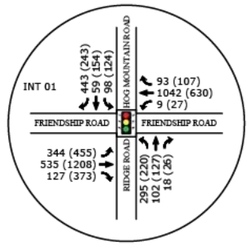
Table 13: Level of Service and Delay for Build Year (2028)				
Intersection	Control	Approach	Delay (LOS)	
			AM	PM
SR 374/Friendship Road at Ridge Road/Hog Mountain Road	Signalized	EB	15.8 (B)	14.7 (B)
		WB	30.2 (C)	30.7 (C)
		NB	33.7 (C)	27.9 (C)
		SB	**1427.0 (F)**	**120.5 (F)**
		Overall	**288.2 (F)**	34.3 (C)
Ridge Road at Site Driveway/Ridgeview Emergency Driveway	Minor-Street Stop-Control	EB	14.4 (B)	17.9 (C)
		WB	0.0 (A)	0.0 (A)

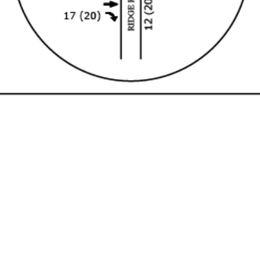
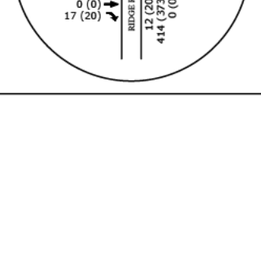
Level of Service Comparison

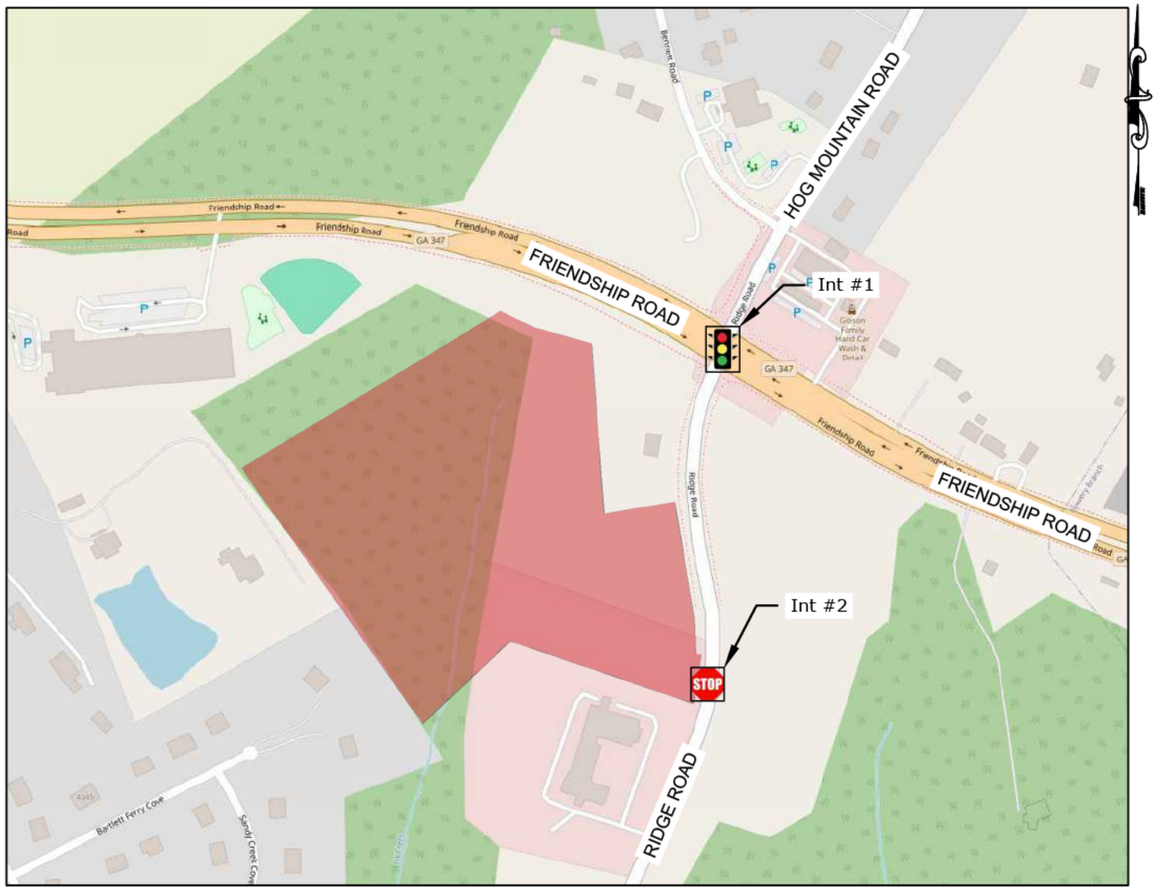
The results of the intersection capacity analysis for the existing, no-build and build conditions are compared in **Table 14**. The development traffic has minimal impact on the adjacent roadway network in the build year (2028). The addition of the development traffic does not result in a decreased level of service for any of the intersections approaches or overall intersection operations.

Table 14: Level of Service Comparison								
Intersection	Control	Approach	Existing		No-Build		Build	
			Delay (LOS)		Delay (LOS)		Delay (LOS)	
			AM	PM	AM	PM	AM	PM
SR 374/Friendship Road at Ridge Road/Hog Mountain Road	Signalized	EB	12.9 (B)	12.7 (B)	14.9 (B)	14.2 (B)	15.8 (B)	14.7 (B)
		WB	25.9 (C)	26.9 (C)	28.9 (C)	30.1 (C)	30.2 (C)	30.7 (C)
		NB	26.1 (C)	24.5 (C)	31.6 (C)	27.6 (C)	33.7 (C)	27.9 (C)
		SB	**1227.1 (F)**	**111.8 (F)**	**1417.4 (F)**	**132.7 (F)**	**1427.0 (F)**	**120.5 (F)**
		Overall	**250.2 (F)**	30.8 (C)	**288.2 (F)**	35.6 (D)	**288.2 (F)**	34.3 (C)
Ridge Road at Site Driveway/Ridgeview Emergency Driveway	Minor-Street Stop-Control	EB					14.4 (B)	17.9 (C)
		WB					0.0 (A)	0.0 (A)

JURISDICTION	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
HALL COUNTY	1423-25-128		

EXISTING 2025	NO BUILD 2028
	

SITE GENERATED	BUILD 2028
	



LEGEND

00 AM DHV

(00) (PM) DHV

FIGURE 3

SOUTHEASTERN ENGINEERING, INC.

2470 Sandy Plains Road
Marietta, Georgia 30066
tel: 770-971-5956
www.seengineering.com

PEAK HOUR VOLUMES

REVISION DATES		

DATE:

RIDGE ROAD TRACT

DRAWING NAME: I:\1423 LJA Engineering, Inc\1423-25-128 Ridge Road - Buford GA\Traffic\DWG\Figures.dwg
PLOT DATE - TIME: Aug. 14, 2025 - 4:09 PM
PRINTED BY: HAEMO KU

Additional Analysis

The intersection of SR 374/Friendship Road at Ridge Road/Hog Mountain Road is operating at unacceptable level of service during the AM peak hour and the southbound approach of Hog Mountain Road is operating at LOS F during both peak hours. It is expected to continue operating at same levels of service in the future no-build and build conditions. The development has minimal impact on the intersection operations.

Additional analysis was performed to determine the impact of providing and overlapping right turn phase for the southbound right turn corresponding with the eastbound left turn. The results of the intersection operations with the overlap are summarized in **Table 15**, and detailed Synchro reports are attached in **Appendix C**. The modification is expected to reduce the southbound delay by 1305.0 seconds (91%) during the AM peak hour and by 93.1 seconds (77%) during the PM peak hour. Similarly, the intersection is expected to operate acceptably during the AM peak with delay reduced by 244.8 seconds (85%) and the delay also improves during the PM peak reducing the delay by 13.2 seconds (38%).

Table 15: Level of Service and Delay for Build and Build with Improvements

Intersection	Control	Approach	Build		Build with Improvement	
			Delay (LOS)		Delay (LOS)	
			AM	PM	AM	PM
SR 374/Friendship Road at Ridge Road/Hog Mountain Road	Signalized	EB	15.8 (B)	14.7 (B)	15.8 (B)	14.7 (B)
		WB	30.2 (C)	30.7 (C)	30.2 (C)	30.7 (C)
		NB	33.7 (C)	27.9 (C)	33.7 (C)	27.9 (C)
		SB	**1427.0 (F)**	**120.5 (F)**	**122.0 (F)**	27.4 (C)
		Overall	**288.2 (F)**	34.3 (C)	43.4 (D)	21.1 (C)

CONCLUSION AND RECOMMENDATIONS

The proposed Ridge Road Tract will be built along the west side of Ridge Road to the south of SR 347/Friendship Road in Hall County, Georgia. The development will include 144 townhomes with a new Site Driveway along Ridge Road. The proposed Site Driveway will align with the Emergency Driveway for Ridgeview Estates, a mixed-use development on the east side of Ridge Road. The full build-out of the development is planned for 2028. This study analyzed the peak hour traffic operations and capacity analysis for the study intersections to determine if recommendations to the existing roadway network should be made to accommodate the new traffic and determine the intersection control for the Site Driveway.

Under existing conditions, the southbound approach on the intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is operating unacceptably at LOS F during both peak hours. The intersection is also operating at an overall unacceptable level of service during the AM peak hour but operates acceptably in the PM peak hour. It is expected to continue operating at same levels of service as existing year in the future no-build conditions with future background traffic and trips generated from the adjacent development of Ridgeview Estates.

In the build scenario, with future year traffic volumes and added traffic from the Ridge Road Tract development, the Site Driveway on Ridge Road is expected to operated acceptably, as minor-street stop controlled with left and right turn lanes provided along Ridge Road to access the development. The existing intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is expected to operate at the same levels of service, in the build condition as in the existing and no-build conditions, with slightly higher delays. The southbound approach is expected to operate unacceptably at LOS F during both peak hours and the intersection is expected to continue operating at an overall unacceptable level of service during the AM peak.

The recommended driveway configuration and control type for the development are listed below:

<u>Ridge Road at Site Driveway/Ridgeview Emergency Driveway</u>

- Driveway should be minor-street stop-controlled.
- Provide a northbound left turn lane on Ridge Road, per GDOT minimum standards.
- Provide a southbound right turn lane on Ridge Road, per GDOT minimum standards.

The southbound approach at the intersection of SR 347/Friendship Road at Ridge Road/Hog Mountain Road is operating at LOS F in all scenarios. Therefore, additional operational analysis was conducted to evaluate the impact of providing overlapping right turn phase for the southbound right turn corresponding with the eastbound left turn. It is expected that this modification will reduce southbound delays by 1,305 seconds (91%) during the AM peak hour, and will have it operating with a 122-second delay and LOS F. For the PM peak hour, the southbound delay reduces by 93.1 seconds (77%), resulting in a 27.4-second delay with LOS C. The intersection is expected to operate more efficiently, with a delay reduction of 244.8 seconds (an 85% improvement) during AM peak hours and a 13.2-second decrease (a 38% reduction) during PM peak hours.

APPENDICES

- **Appendix A**
  - Site Plan
- **Appendix B**
  - Background Traffic Data
- **Appendix C**
  - Synchro Reports
- **Appendix D**
  - Growth Rate Data
- **Appendix E**
  - Trip Generation Report

Appendix A
Site Plan

R-MF SITE DATA - HALL COUNTY

GROSS ACREAGE:	20.85 ACRES
EXISTING ZONING:	AR-III (HALL COUNTY)
PROPOSED ZONING:	R-MF (HALL COUNTY)
PROPOSED USES:	ATTACHED RESIDENTIAL TOWNHOMES
OVERLAY:	GATEWAY CORRIDOR OVERLAY
TOTAL UNITS:	144 (22' WIDE, REAR ENTRY)
GROSS DENSITY:	6.90 U/A

SETBACKS:

FRONT:	40 FT. MIN.
SIDE:	10 FT. MIN.
REAR:	20 FT. MIN.
MAX HEIGHT:	75 FT. MAX.

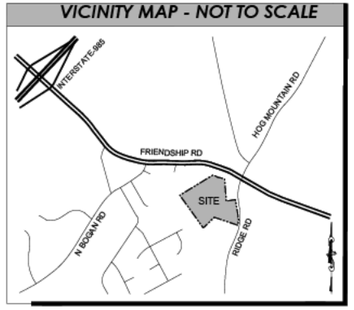
OPEN SPACE REQUIREMENTS:

30% OF THE GROSS LOT AREA	REQUIRED: 6.255 ACRES PROVIDED: +/- 40%

PARKING REQUIREMENTS:
2 SPACES PER DWELLING UNIT PLUS 1 GUEST SPACE PER 4 DWELLING UNITS
144 UNITS X 2.25 = **324 SPACES REQUIRED**

PROPOSED UNITS:	144
PROVIDED GARAGE SPACES:	288
PROVIDED DRIVEWAY SPACES:	288
PROVIDED GUEST SPACES:	43 ON-STREET SPACES
TOTAL SPACES PROVIDED:	619 SPACES

VICINITY MAP - NOT TO SCALE



SITE LEGEND

25	25' STATE STREAM BUFFER
50	50' STREAM BUFFER
75	75' IMPERVIOUS SETBACK
CT	COURTYARD OR COMMUNITY GREEN
LP	LINEAR PARK
MK	MAIL KIOSK
PF	PLAY FIELD
PG	PLAYGROUND
CH	CLUBHOUSE
SWE	EXISTING STORMWATER MANAGEMENT
SWM	PROPOSED STORMWATER MANAGEMENT
W	WETLAND (POTENTIALLY ISOLATED)

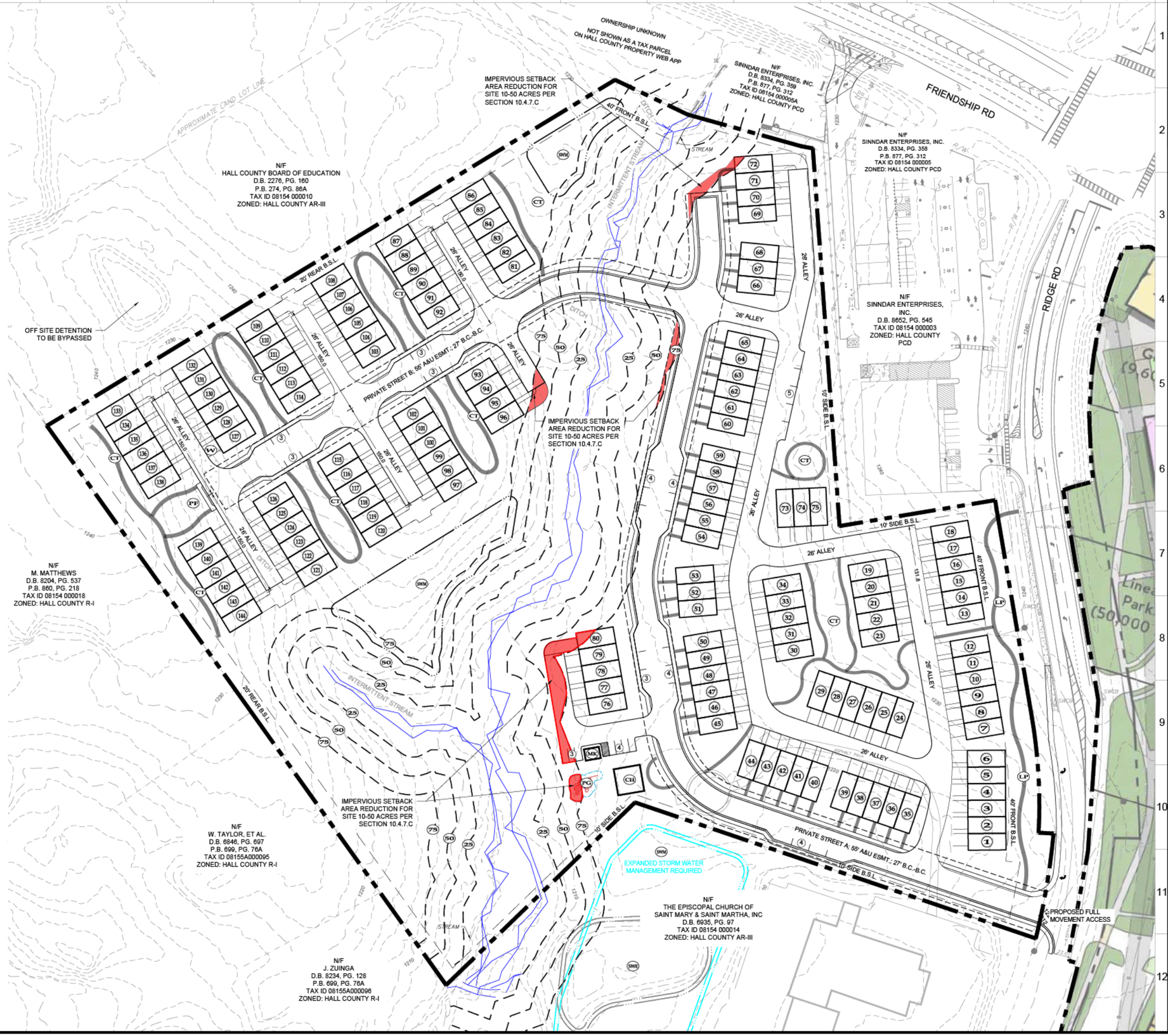
PROPERTY ADDRESS:
RIDGE ROAD
BUFORD, GA 30519

PROPERTY OWNERS:
PID 08154 000016 - BSIDE OAKWOOD LLC

STORMWATER NOTE:
STORMWATER WILL BE PROVIDED ON SITE AS WELL AS DIRECTED TO AN OFF-SITE EXISTING POND TO BE EXPANDED FOR MASTER DETENTION

PLAN NOTE:
THIS PLAN IS CONCEPTUAL IN NATURE AND IS NOT INTENDED FOR CONSTRUCTION OR DEVELOPMENT.

VARIANCE:
1.) ALLOW GUEST PARKING TO BE PROVIDED ON-STREET. (SEC. 8.1.2.A.2)



NO.	DATE	DESCRIPTION	BY	CHK.	APV.

NOT RELEASED FOR CONSTRUCTION

LJA
299 S. MAIN STREET
ALPHARETTA, GA 30009
770-225-4730

LASETER DEVELOPMENT GROUP
24 HR CONTACT: EMILY WYCHE
PHONE: 678.313.3312
EWYCHE@LASETERDEVELOPMENT.COM

SITE CONCEPT PLAN FOR RIDGE ROAD TRACT

NORTH

SCALE: 1"= 60'
0 60

PROJECT NUMBER
GA6864-2501

SHEET TITLE
CONCEPT PLAN

SHEET NUMBER
7.26.25

File Location: s:\sel\projects\ga6864-2501 - ridge road - buford, ga\02 design\cad\drawings\01 concept\concept 7.26.25.dp

Appendix A
Adjacent Development

Note: Red dashed line indicates potential future development with future development to the east property.

Pipe easement (30')

Linear park space along Ridge Road connecting retail village to residential community and trail network

Hotel, 110 rms, 5 story

Central plaza framed by retail/restaurant space and upper-level residential

Multi-family residential, 251 un, 3/4 split and 4 story

Gated emergency access only

Left and right (decel) turn lanes to be provided at access points along Ridge Road, per engineer

Residential amenity area connecting to trail system

Creek buffer with mulch trails connecting neighborhoods to shared green spaces and amenities

Single-family residential neighborhood with detached and attached product integrated with a series of park spaces

Cluster mailbox unit, 103 mailboxes, 5 sp (minimum per code)

Single-family lots, 50' width minimum, 8,000 sf minimum

Residential 50' ROW with 3' landscape strip minimum, 5' sidewalk, and 20' driveway from back of sidewalk

Front-loaded townhomes

Common access driveway or easement, 30', 150' maximum length

Rear-loaded (stacked) townhomes fronting green space with pedestrian connection to trail system

Cluster mailbox unit, 183 mailboxes, 8 sp (minimum per code)

Impervious setback area reduction for site >50 acres - 50' undisturbed buffer not altered (typical)

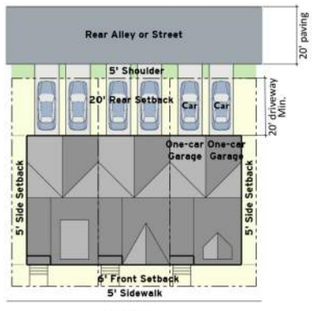
Front-load and rear-load townhome products with 20' driveways (typical)

Stormwater management - detention ponds - #4, #5, #6, #7

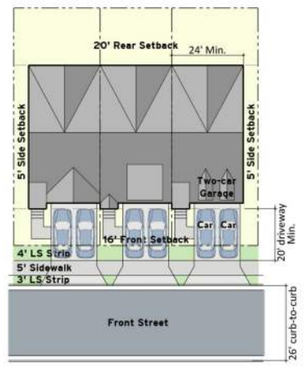
Secondary fire safety access from adjacent community (future development)

Lot Diagrams (scale 1"=25')

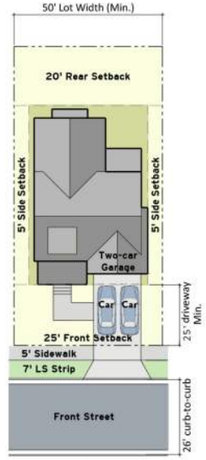
Car size shown as typical 18' x 6'



Rear Loaded Townhomes



Front Loaded Townhomes



Front Loaded Lots

Development Summary

Current Zoning	**ARIII and S-S**	
Proposed Zoning	**PCD and GCOD**	
Existing Site Acreage	**74.38 ac**	
Land Uses		**Parking Provided**
Comm./Retail/Rest.*	**39,000 sf**	**273 sp (7/1000)**
Hotel	**110 rms**	**55 sp (1/2 rms)**
Multi-family	**251 un**	**377 sp (1.5/un)**
Parking Total*		**705 sp**
Parking Provided		**671 sp**
Townhomes	**209 un**	
Front-loaded	*115 un*	*460 sp (4/un)*
Rear-loaded (stacked)	*94 un*	*229 sp (2.4/un)*
Single-family Detached	**65 lots**	**130 sp (2/un)**
Residential Density	**525 un**	**7.05 un/ac**
Single-family Density	**274 un**	**3.68 un/ac**
Open Space	**28.3 ac (1,234,020 sf) - 38.0%**	
Conservation Area	*1,027,890 sf*	
Passive Area	*102,480 sf*	
Active Area	*92,150 sf - 7.5%*	
Impervious Setback and Stream Buffer		
Existing	*18.37 ac (800,068 sf) - 24.7%*	
Non-impacted	*17.51 ac (762,975 sf) - 23.5%*	

**NOTE: With future development on adjacent property, commercial/retail/restaurant may increase with additional parking. Comm./retail/restaurant not to exceed 65,000 sf.*

NORTH

0 37.5 75 150 300 750

26 FEBRUARY 2025

NELSON

RIDGE ROAD
HALL COUNTY | GEORGIA
ZP 15

III. Methodology

A. BASE ASSUMPTIONS

Intersection capacity analysis was conducted using Synchro v11.0. Trip generation was calculated using the 11th edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. Right-turn and left-turn lanes were examined using Hall County Access Regulations on Ridge Road.

B. BACKGROUND GROWTH

The average annual background growth rate is calculated using historical AADT volumes. Calculations show that the background growth in the study area is 9.12% per year. These calculations can be found in the Appendix. Existing volumes were increased by 9% to estimate background growth for Full Build 2025 conditions.

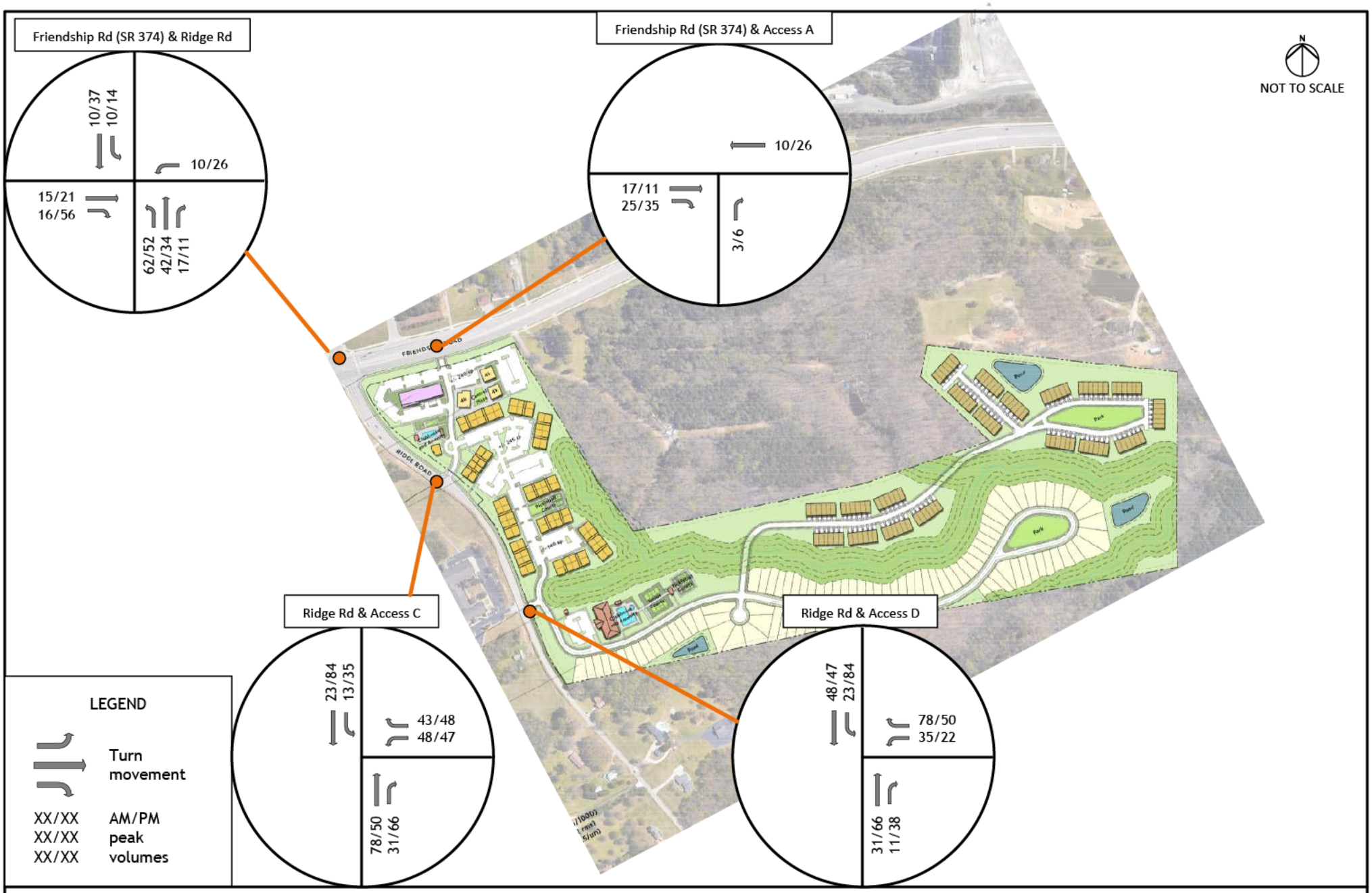
C. TRIP GENERATION

The new site plan shows 16,000 SF of retail space, a 110-room hotel, 481 units of multi-family and townhome units, and 74 single-family homes. The *ITE Trip Generation Manual, 11th Edition* was used to estimate the projected trips by this development. Table 3.1 contains the summary of the land uses and sizes used for trip generation estimates.

Table 3.1 - ITE Trip Generation

Average Weekday Driveway Volumes					AM Peak Hour		PM Peak Hour	
Land Use	**ITE Code**	**Size**		**Daily Trips**	**Enter**	**Exit**	**Enter**	**Exit**
Single-Family Detached Housing	210	74	Dwelling Units	765	14	43	47	28
Multifamily Housing (Low-Rise)	220	481	Dwelling Units	3242	41	131	154	91
Hotel	310	110	Rooms	879	27	21	28	26
Strip Retail Plaza (<40k)	822	16	Th.Sq.Ft. GFA	871	23	15	55	54
Unadjusted Peak Hour Trips				**5757**	**105**	**210**	**284**	**199**
Internal Capture Reduction - from NCHRP No 684								
Internal Capture Reduction		*Retail*			*-3*	*-1*	*-7*	*-17*
		Residential			*-1*	*-2*	*-14*	*-9*
		Hotel			*0*	*-1*	*-6*	*-1*
Total New Peak Hour Trips to Adjacent Network					**101**	**206**	**257**	**172**

This retail/service development generates "internal capture" trips summarized in the table above. Internal capture trip reduction is a method to estimate interaction between different uses within the same development. While each land use in a development generates vehicle trips, some people will visit more than one land use within the development. This phenomenon of multiple land uses adjacent to each other ultimately results in fewer vehicle trips to the external road network, and less impact, than free-standing retail, office, or residential areas.



Site Trips

Figure 6

Ridgeview Estates - Hall County

Date: 16 August 2024

TRAFFIC IMPACT GROUP, LLC

Appendix B
Background Traffic Data

Prepared by National Data & Surveying Services

Ridge Rd & Holiday Rd/Friendship Rd/SR 347

Peak Hour Turning Movement Count

ID: 24-180045-001
City: Buford

Day: Thursday
Date: 02/15/2024

PEAK HOURS

AM: 07:15 AM - 08:15 AM
NOON: NONE
PM: 05:00 PM - 06:00 PM

COUNT PERIODS

AM: 7:00 AM - 09:00 AM
NOON: NONE
PM: 4:00 PM - 06:00 PM

CONTROL: Signalized

	AM	NOON	PM
TEV	2834	0	3308
PHF	0.92		0.95

SOUTHBOUND (Ridge Rd)

AM	397	53	88	0	475	AM
NOON	0	0	0	0	0	NOON
PM	218	138	111	0	616	PM
	1	1	1	0		

EASTBOUND (Holiday Rd/Friendship Rd/SR 347)

AM	NOON	PM		
1601	0	980		
7	0	1	0	
301	0	406	1	
479	0	1082	3	
114	0	334	1	
AM	NOON	PM		

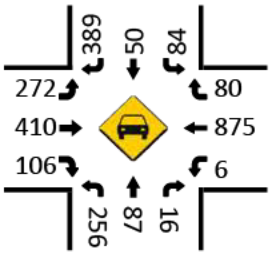
WESTBOUND (Holiday Rd/Friendship Rd/SR 347)

PM	NOON	AM		
96	0	83	1	
564	0	933	3	
23	0	6	1	
1	0	2	0	
1217	0	585		
PM	NOON	AM		

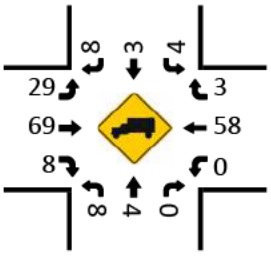
NORTHBOUND (Ridge Rd)

	0	1	1	1		
PM	495	0	197	114	23	PM
NOON	0	0	0	0	0	NOON
AM	173	0	264	91	16	AM

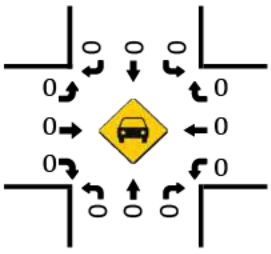
Cars (AM)



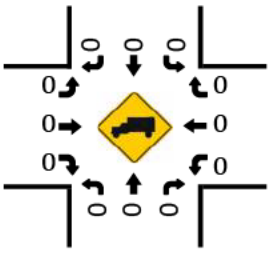
HT (AM)



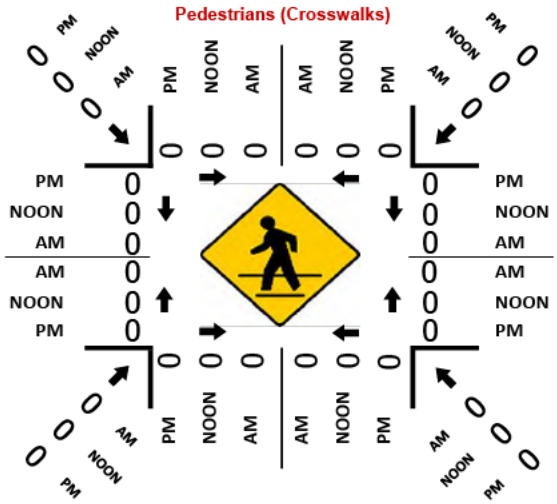
Cars (NOON)



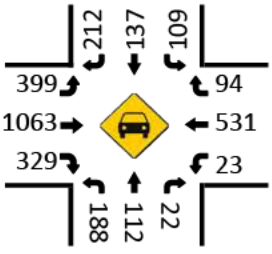
HT (NOON)



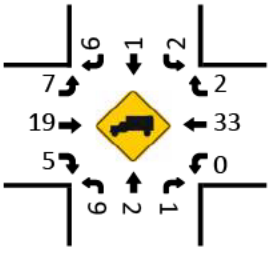
Pedestrians (Crosswalks)



Cars (PM)

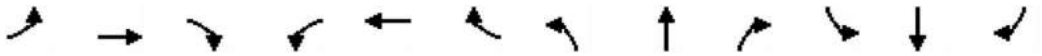


HT (PM)



Appendix C
Synchro Reports

Existing - 2024



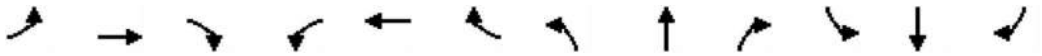
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	308	479	114	8	933	83	264	91	16	88	53	397
Future Volume (veh/h)	308	479	114	8	933	83	264	91	16	88	53	397
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1693	1796	1870	1811	1841	1856	1841	1870	1826	1811	1870
Adj Flow Rate, veh/h	335	521	124	9	1014	90	287	99	17	96	58	432
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	14	7	2	6	4	3	4	2	5	6	2
Cap, veh/h	428	2396	790	303	1292	408	436	308	265	293	108	95
Arrive On Green	0.18	0.52	0.52	0.26	0.26	0.26	0.18	0.17	0.17	0.07	0.06	0.06
Sat Flow, veh/h	1682	4621	1522	785	4944	1560	1767	1841	1585	1739	1811	1585
Grp Volume(v), veh/h	335	521	124	9	1014	90	287	99	17	96	58	432
Grp Sat Flow(s),veh/h/ln	1682	1540	1522	785	1648	1560	1767	1841	1585	1739	1811	1585
Q Serve(g_s), s	9.8	4.5	3.1	0.6	14.0	3.3	10.5	3.5	0.7	3.7	2.3	4.4
Cycle Q Clear(g_c), s	9.8	4.5	3.1	0.6	14.0	3.3	10.5	3.5	0.7	3.7	2.3	4.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	428	2396	790	303	1292	408	436	308	265	293	108	95
V/C Ratio(X)	0.78	0.22	0.16	0.03	0.78	0.22	0.66	0.32	0.06	0.33	0.54	4.56
Avail Cap(c_a), veh/h	910	6223	2050	728	3969	1252	581	601	518	622	591	518
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.0	9.6	9.3	20.3	25.2	21.3	24.0	26.9	25.8	29.5	33.6	34.6
Incr Delay (d2), s/veh	3.2	0.0	0.1	0.0	1.1	0.3	1.7	0.6	0.1	0.6	4.1	1618.3
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.4	1.2	0.9	0.1	5.0	1.1	4.1	1.5	0.2	1.5	1.1	44.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	19.1	9.6	9.4	20.3	26.3	21.6	25.7	27.5	25.9	30.1	37.6	1652.9
LnGrp LOS	B	A	A	C	C	C	C	C	C	C	D	F
Approach Vol, veh/h		980			1113			403			586	
Approach Delay, s/veh		12.9			25.9			26.1			1227.1	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	18.9	25.2	11.1	18.3		44.1	19.0	10.4				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	34.0	59.0	19.0	24.0		99.0	19.0	24.0				
Max Q Clear Time (g_c+I1), s	11.8	16.0	5.7	5.5		6.5	12.5	4.3				
Green Ext Time (p_c), s	1.1	3.2	0.2	0.2		1.2	0.5	0.1				

Intersection Summary												
HCM 7th Control Delay, s/veh			250.2									
HCM 7th LOS			F									

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	407	1082	334	24	564	96	197	114	23	111	138	218
Future Volume (veh/h)	407	1082	334	24	564	96	197	114	23	111	138	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1811	1870	1826	1870	1841	1870	1870	1856
Adj Flow Rate, veh/h	428	1139	352	25	594	101	207	120	24	117	145	229
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	6	2	5	2	4	2	2	3
Cap, veh/h	563	2513	780	168	849	272	370	300	250	377	199	167
Arrive On Green	0.23	0.49	0.49	0.17	0.17	0.17	0.13	0.16	0.16	0.08	0.11	0.11
Sat Flow, veh/h	1781	5106	1585	353	4944	1585	1739	1870	1560	1781	1870	1572
Grp Volume(v), veh/h	428	1139	352	25	594	101	207	120	24	117	145	229
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	353	1648	1585	1739	1870	1560	1781	1870	1572
Q Serve(g_s), s	12.1	9.8	9.7	4.2	7.6	3.8	6.9	3.9	0.9	3.8	5.0	7.1
Cycle Q Clear(g_c), s	12.1	9.8	9.7	4.2	7.6	3.8	6.9	3.9	0.9	3.8	5.0	7.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	563	2513	780	168	849	272	370	300	250	377	199	167
V/C Ratio(X)	0.76	0.45	0.45	0.15	0.70	0.37	0.56	0.40	0.10	0.31	0.73	1.37
Avail Cap(c_a), veh/h	1052	8664	2689	496	5446	1746	500	807	673	606	807	679
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	15.4	11.2	11.1	24.8	26.2	24.6	22.3	25.3	24.1	23.8	29.1	30.0
Incr Delay (d2), s/veh	2.1	0.1	0.4	0.4	1.1	0.8	1.3	0.9	0.2	0.5	5.1	175.5
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	2.9	2.8	0.3	2.8	1.3	2.6	1.6	0.3	1.5	2.3	10.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	17.5	11.3	11.5	25.2	27.3	25.5	23.6	26.2	24.2	24.3	34.2	205.5
LnGrp LOS	B	B	B	C	C	C	C	C	C	C	C	F
Approach Vol, veh/h		1919			720			351			491	
Approach Delay, s/veh		12.7			26.9			24.5			111.8	
Approach LOS		B			C			C			F	

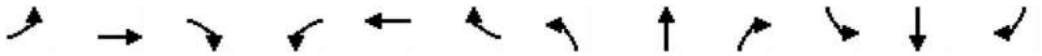
Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	21.5	17.5	11.3	16.8		39.1	15.0	13.1
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	34.0	74.0	14.0	29.0		114.0	14.0	29.0
Max Q Clear Time (g_c+I1), s	14.1	9.6	5.8	5.9		11.8	8.9	7.0
Green Ext Time (p_c), s	1.5	1.9	0.2	0.3		2.7	0.3	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	30.8
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

No-Build - 2028



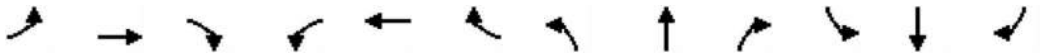
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	344	535	127	9	1042	93	295	102	18	98	59	443
Future Volume (veh/h)	344	535	127	9	1042	93	295	102	18	98	59	443
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1693	1796	1870	1811	1841	1856	1841	1870	1826	1811	1870
Adj Flow Rate, veh/h	374	582	138	10	1133	101	321	111	20	107	64	482
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	14	7	2	6	4	3	4	2	5	6	2
Cap, veh/h	425	2482	818	291	1390	439	442	319	274	291	108	95
Arrive On Green	0.18	0.54	0.54	0.28	0.28	0.28	0.19	0.17	0.17	0.08	0.06	0.06
Sat Flow, veh/h	1682	4621	1522	732	4944	1560	1767	1841	1585	1739	1811	1585
Grp Volume(v), veh/h	374	582	138	10	1133	101	321	111	20	107	64	482
Grp Sat Flow(s),veh/h/ln	1682	1540	1522	732	1648	1560	1767	1841	1585	1739	1811	1585
Q Serve(g_s), s	12.3	5.6	3.9	0.8	18.0	4.2	13.6	4.5	0.9	4.8	2.9	5.0
Cycle Q Clear(g_c), s	12.3	5.6	3.9	0.8	18.0	4.2	13.6	4.5	0.9	4.8	2.9	5.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	425	2482	818	291	1390	439	442	319	274	291	108	95
V/C Ratio(X)	0.88	0.23	0.17	0.03	0.82	0.23	0.73	0.35	0.07	0.37	0.59	5.10
Avail Cap(c_a), veh/h	794	5432	1790	599	3464	1093	506	525	452	551	516	452
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.8	10.3	9.9	22.1	28.2	23.3	27.4	30.6	29.2	33.5	38.6	39.6
Incr Delay (d2), s/veh	6.0	0.0	0.1	0.0	1.2	0.3	4.5	0.7	0.1	0.8	5.1	1867.2
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.7	1.6	1.1	0.1	6.7	1.5	5.8	1.9	0.3	2.0	1.4	50.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	23.8	10.4	10.0	22.1	29.4	23.5	31.9	31.3	29.3	34.3	43.7	1906.8
LnGrp LOS	C	B	B	C	C	C	C	C	C	C	D	F
Approach Vol, veh/h		1094			1244			452			653	
Approach Delay, s/veh		14.9			28.9			31.6			1417.4	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	21.6	29.7	12.4	20.6		51.2	22.0	11.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	34.0	59.0	19.0	24.0		99.0	19.0	24.0				
Max Q Clear Time (g_c+I1), s	14.3	20.0	6.8	6.5		7.6	15.6	4.9				
Green Ext Time (p_c), s	1.3	3.7	0.2	0.2		1.4	0.4	0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	288.2
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1208	373	27	630	107	220	127	26	124	154	243
Future Volume (veh/h)	455	1208	373	27	630	107	220	127	26	124	154	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1811	1870	1826	1870	1841	1870	1870	1856
Adj Flow Rate, veh/h	479	1272	393	28	663	113	232	134	27	131	162	256
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	6	2	5	2	4	2	2	3
Cap, veh/h	575	2600	807	149	904	290	369	314	262	376	209	176
Arrive On Green	0.25	0.51	0.51	0.18	0.18	0.18	0.14	0.17	0.17	0.09	0.11	0.11
Sat Flow, veh/h	1781	5106	1585	298	4944	1585	1739	1870	1560	1781	1870	1572
Grp Volume(v), veh/h	479	1272	393	28	663	113	232	134	27	131	162	256
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	298	1648	1585	1739	1870	1560	1781	1870	1572
Q Serve(g_s), s	15.2	12.4	12.3	6.4	9.6	4.8	8.7	4.9	1.1	4.8	6.4	8.5
Cycle Q Clear(g_c), s	15.2	12.4	12.3	6.4	9.6	4.8	8.7	4.9	1.1	4.8	6.4	8.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	575	2600	807	149	904	290	369	314	262	376	209	176
V/C Ratio(X)	0.83	0.49	0.49	0.19	0.73	0.39	0.63	0.43	0.10	0.35	0.78	1.46
Avail Cap(c_a), veh/h	929	7648	2374	385	4807	1541	440	713	594	549	713	599
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.9	12.2	12.2	28.0	29.4	27.4	24.6	28.4	26.8	26.4	32.9	33.8
Incr Delay (d2), s/veh	3.6	0.1	0.5	0.6	1.2	0.9	2.1	0.9	0.2	0.6	6.0	212.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	3.9	3.7	0.4	3.6	1.7	3.5	2.1	0.4	1.9	3.1	13.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	20.5	12.4	12.6	28.6	30.5	28.2	26.7	29.3	27.0	27.0	38.9	246.2
LnGrp LOS	C	B	B	C	C	C	C	C	C	C	D	F
Approach Vol, veh/h		2144			804			393			549	
Approach Delay, s/veh		14.2			30.1			27.6			132.7	
Approach LOS		B			C			C			F	

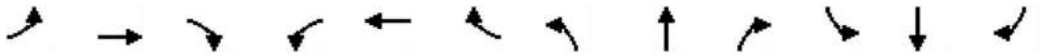
Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	24.8	19.9	12.6	18.8		44.8	16.9	14.5				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	34.0	74.0	14.0	29.0		114.0	14.0	29.0				
Max Q Clear Time (g_c+I1), s	17.2	11.6	6.8	6.9		14.4	10.7	8.4				
Green Ext Time (p_c), s	1.6	2.3	0.2	0.3		3.1	0.2	0.1				

Intersection Summary	
HCM 7th Control Delay, s/veh	35.6
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.

Build - 2028



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	344	535	131	9	1042	93	320	111	19	98	60	443
Future Volume (veh/h)	344	535	131	9	1042	93	320	111	19	98	60	443
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1693	1796	1870	1811	1841	1856	1841	1870	1826	1811	1870
Adj Flow Rate, veh/h	374	582	142	10	1133	101	348	121	21	107	65	482
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	14	7	2	6	4	3	4	2	5	6	2
Cap, veh/h	423	2466	812	286	1380	436	459	340	293	286	107	94
Arrive On Green	0.19	0.53	0.53	0.28	0.28	0.28	0.20	0.18	0.18	0.08	0.06	0.06
Sat Flow, veh/h	1682	4621	1522	730	4944	1560	1767	1841	1585	1739	1811	1585
Grp Volume(v), veh/h	374	582	142	10	1133	101	348	121	21	107	65	482
Grp Sat Flow(s),veh/h/ln	1682	1540	1522	730	1648	1560	1767	1841	1585	1739	1811	1585
Q Serve(g_s), s	13.0	5.9	4.2	0.9	18.7	4.4	15.4	5.0	1.0	5.0	3.1	5.2
Cycle Q Clear(g_c), s	13.0	5.9	4.2	0.9	18.7	4.4	15.4	5.0	1.0	5.0	3.1	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	423	2466	812	286	1380	436	459	340	293	286	107	94
V/C Ratio(X)	0.88	0.24	0.17	0.03	0.82	0.23	0.76	0.36	0.07	0.37	0.61	5.13
Avail Cap(c_a), veh/h	764	5232	1724	575	3337	1053	487	505	435	532	497	435
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	10.9	10.5	23.0	29.5	24.3	28.2	31.1	29.5	34.8	40.1	41.1
Incr Delay (d2), s/veh	6.3	0.0	0.1	0.0	1.3	0.3	6.4	0.6	0.1	0.8	5.4	1881.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	1.7	1.2	0.1	7.0	1.5	6.8	2.2	0.4	2.0	1.5	51.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.3	10.9	10.6	23.1	30.7	24.6	34.6	31.7	29.6	35.6	45.5	1922.2
LnGrp LOS	C	B	B	C	C	C	C	C	C	D	D	F
Approach Vol, veh/h		1098			1244			490			654	
Approach Delay, s/veh		15.8			30.2			33.7			1427.0	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	22.2	30.4	12.6	22.1		52.7	23.6	11.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	34.0	59.0	19.0	24.0		99.0	19.0	24.0
Max Q Clear Time (g_c+I1), s	15.0	20.7	7.0	7.0		7.9	17.4	5.1
Green Ext Time (p_c), s	1.3	3.7	0.2	0.2		1.4	0.2	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	288.2
HCM 7th LOS	F

Notes

User approved pedestrian interval to be less than phase max green.

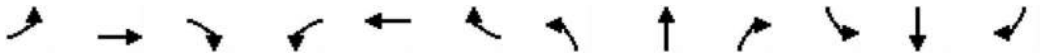
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	0	17	0	0	0	12	414	0	0	193	5
Future Vol, veh/h	35	0	17	0	0	0	12	414	0	0	193	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	235	-	-	-	-	225
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	3	3	3	6	6	6
Mvmt Flow	38	0	18	0	0	0	13	450	0	0	210	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	686	686	210	686	691	450	215	0	0	450	0	0
Stage 1	210	210	-	476	476	-	-	-	-	-	-	-
Stage 2	476	476	-	210	215	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.13	-	-	4.16	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.227	-	-	2.254	-	-
Pot Cap-1 Maneuver	362	370	830	362	368	609	1349	-	-	1090	-	-
Stage 1	792	729	-	570	557	-	-	-	-	-	-	-
Stage 2	570	557	-	792	725	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	358	367	830	350	364	609	1349	-	-	1090	-	-
Mov Cap-2 Maneuver	358	367	-	350	364	-	-	-	-	-	-	-
Stage 1	792	729	-	564	551	-	-	-	-	-	-	-
Stage 2	564	551	-	775	725	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	14.38	0	0.22	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1349	-	-	440	-	1090	-	-
HCM Lane V/C Ratio	0.01	-	-	0.128	-	-	-	-
HCM Ctrl Dly (s/v)	7.7	-	-	14.4	0	0	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1208	393	28	630	107	228	131	27	124	162	243
Future Volume (veh/h)	455	1208	393	28	630	107	228	131	27	124	162	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1811	1870	1826	1870	1841	1870	1870	1856
Adj Flow Rate, veh/h	479	1272	414	29	663	113	240	138	28	131	171	256
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	6	2	5	2	4	2	2	3
Cap, veh/h	572	2588	803	146	901	289	370	327	273	379	217	183
Arrive On Green	0.25	0.51	0.51	0.18	0.18	0.18	0.14	0.18	0.18	0.09	0.12	0.12
Sat Flow, veh/h	1781	5106	1585	292	4944	1585	1739	1870	1560	1781	1870	1572
Grp Volume(v), veh/h	479	1272	414	29	663	113	240	138	28	131	171	256
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	292	1648	1585	1739	1870	1560	1781	1870	1572
Q Serve(g_s), s	15.5	12.7	13.5	7.0	9.8	4.9	9.1	5.1	1.2	4.9	6.9	9.0
Cycle Q Clear(g_c), s	15.5	12.7	13.5	7.0	9.8	4.9	9.1	5.1	1.2	4.9	6.9	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	572	2588	803	146	901	289	370	327	273	379	217	183
V/C Ratio(X)	0.84	0.49	0.52	0.20	0.74	0.39	0.65	0.42	0.10	0.35	0.79	1.40
Avail Cap(c_a), veh/h	913	7507	2330	372	4718	1513	432	699	583	548	699	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	12.6	12.8	28.8	29.9	27.9	24.6	28.5	26.9	26.6	33.3	34.3
Incr Delay (d2), s/veh	3.9	0.1	0.5	0.7	1.2	0.9	2.7	0.9	0.2	0.5	6.2	188.0
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	4.0	4.1	0.5	3.7	1.8	3.7	2.2	0.4	2.0	3.3	12.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.2	12.7	13.3	29.4	31.1	28.8	27.2	29.4	27.0	27.2	39.6	222.2
LnGrp LOS	C	B	B	C	C	C	C	C	C	C	D	F
Approach Vol, veh/h		2165			805			406			558	
Approach Delay, s/veh		14.7			30.7			27.9			120.5	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	25.2	20.1	12.7	19.6		45.3	17.2	15.0
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	34.0	74.0	14.0	29.0		114.0	14.0	29.0
Max Q Clear Time (g_c+I1), s	17.5	11.8	6.9	7.1		14.7	11.1	8.9
Green Ext Time (p_c), s	1.6	2.3	0.2	0.3		3.0	0.2	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	34.3
HCM 7th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Intersection	
Int Delay, s/veh	0.8

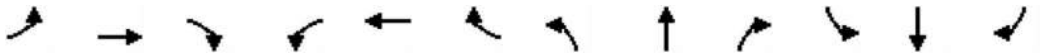
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	0	20	0	0	0	20	373	0	0	553	29
Future Vol, veh/h	13	0	20	0	0	0	20	373	0	0	553	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	235	-	-	-	-	225
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	4	2	2	2	2
Mvmt Flow	14	0	22	0	0	0	22	405	0	0	601	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1050	1050	601	1050	1082	405	633	0	0	405	0	0
Stage 1	601	601	-	449	449	-	-	-	-	-	-	-
Stage 2	449	449	-	601	633	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	205	227	500	205	218	645	950	-	-	1153	-	-
Stage 1	487	489	-	589	572	-	-	-	-	-	-	-
Stage 2	589	572	-	487	474	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	200	222	500	192	213	645	950	-	-	1153	-	-
Mov Cap-2 Maneuver	200	222	-	192	213	-	-	-	-	-	-	-
Stage 1	487	489	-	576	559	-	-	-	-	-	-	-
Stage 2	576	559	-	466	474	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	17.9	0	0.45	0
HCM LOS	C	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	950	-	-	315	-	1153	-	-
HCM Lane V/C Ratio	0.023	-	-	0.114	-	-	-	-
HCM Ctrl Dly (s/v)	8.9	-	-	17.9	0	0	-	-
HCM Lane LOS	A	-	-	C	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	-	0	-	-

Build w/Improvements - 2028



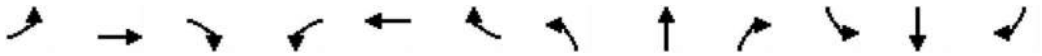
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	344	535	131	9	1042	93	320	111	19	98	60	443
Future Volume (veh/h)	344	535	131	9	1042	93	320	111	19	98	60	443
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1767	1693	1796	1870	1811	1841	1856	1841	1870	1826	1811	1870
Adj Flow Rate, veh/h	374	582	142	10	1133	101	348	121	21	107	65	482
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	9	14	7	2	6	4	3	4	2	5	6	2
Cap, veh/h	423	2466	812	286	1380	436	459	340	293	286	107	389
Arrive On Green	0.19	0.53	0.53	0.28	0.28	0.28	0.20	0.18	0.18	0.08	0.06	0.06
Sat Flow, veh/h	1682	4621	1522	730	4944	1560	1767	1841	1585	1739	1811	1585
Grp Volume(v), veh/h	374	582	142	10	1133	101	348	121	21	107	65	482
Grp Sat Flow(s),veh/h/ln	1682	1540	1522	730	1648	1560	1767	1841	1585	1739	1811	1585
Q Serve(g_s), s	13.0	5.9	4.2	0.9	18.7	4.4	15.4	5.0	1.0	5.0	3.1	5.2
Cycle Q Clear(g_c), s	13.0	5.9	4.2	0.9	18.7	4.4	15.4	5.0	1.0	5.0	3.1	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	423	2466	812	286	1380	436	459	340	293	286	107	389
V/C Ratio(X)	0.88	0.24	0.17	0.03	0.82	0.23	0.76	0.36	0.07	0.37	0.61	1.24
Avail Cap(c_a), veh/h	764	5232	1724	575	3337	1053	487	505	435	532	497	730
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	10.9	10.5	23.0	29.5	24.3	28.2	31.1	29.5	34.8	40.1	33.0
Incr Delay (d2), s/veh	6.3	0.0	0.1	0.0	1.3	0.3	6.4	0.6	0.1	0.8	5.4	118.4
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	1.7	1.2	0.1	7.0	1.5	6.8	2.2	0.4	2.0	1.5	20.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	25.3	10.9	10.6	23.1	30.7	24.6	34.6	31.7	29.6	35.6	45.5	151.4
LnGrp LOS	C	B	B	C	C	C	C	C	C	D	D	F
Approach Vol, veh/h		1098			1244			490			654	
Approach Delay, s/veh		15.8			30.2			33.7			122.0	
Approach LOS		B			C			C			F	

Timer - Assigned Phs	1	2	3	4		6	7	8
Phs Duration (G+Y+Rc), s	22.2	30.4	12.6	22.1		52.7	23.6	11.2
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0
Max Green Setting (Gmax), s	34.0	59.0	19.0	24.0		99.0	19.0	24.0
Max Q Clear Time (g_c+I1), s	15.0	20.7	7.0	7.0		7.9	17.4	5.1
Green Ext Time (p_c), s	1.3	3.7	0.2	0.2		1.4	0.2	0.1

Intersection Summary	
HCM 7th Control Delay, s/veh	43.4
HCM 7th LOS	D

Notes

User approved pedestrian interval to be less than phase max green.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	455	1208	393	28	630	107	228	131	27	124	162	243
Future Volume (veh/h)	455	1208	393	28	630	107	228	131	27	124	162	243
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Lane Width Adj.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1811	1870	1826	1870	1841	1870	1870	1856
Adj Flow Rate, veh/h	479	1272	414	29	663	113	240	138	28	131	171	256
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	6	2	5	2	4	2	2	3
Cap, veh/h	572	2588	803	146	901	289	370	327	273	379	217	571
Arrive On Green	0.25	0.51	0.51	0.18	0.18	0.18	0.14	0.18	0.18	0.09	0.12	0.12
Sat Flow, veh/h	1781	5106	1585	292	4944	1585	1739	1870	1560	1781	1870	1572
Grp Volume(v), veh/h	479	1272	414	29	663	113	240	138	28	131	171	256
Grp Sat Flow(s),veh/h/ln	1781	1702	1585	292	1648	1585	1739	1870	1560	1781	1870	1572
Q Serve(g_s), s	15.5	12.7	13.5	7.0	9.8	4.9	9.1	5.1	1.2	4.9	6.9	9.0
Cycle Q Clear(g_c), s	15.5	12.7	13.5	7.0	9.8	4.9	9.1	5.1	1.2	4.9	6.9	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	572	2588	803	146	901	289	370	327	273	379	217	571
V/C Ratio(X)	0.84	0.49	0.52	0.20	0.74	0.39	0.65	0.42	0.10	0.35	0.79	0.45
Avail Cap(c_a), veh/h	913	7507	2330	372	4718	1513	432	699	583	548	699	977
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	12.6	12.8	28.8	29.9	27.9	24.6	28.5	26.9	26.6	33.3	18.8
Incr Delay (d2), s/veh	3.9	0.1	0.5	0.7	1.2	0.9	2.7	0.9	0.2	0.5	6.2	0.6
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	4.0	4.1	0.5	3.7	1.8	3.7	2.2	0.4	2.0	3.3	3.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d), s/veh	21.2	12.7	13.3	29.4	31.1	28.8	27.2	29.4	27.0	27.2	39.6	19.3
LnGrp LOS	C	B	B	C	C	C	C	C	C	C	D	B
Approach Vol, veh/h		2165			805			406			558	
Approach Delay, s/veh		14.7			30.7			27.9			27.4	
Approach LOS		B			C			C			C	

Timer - Assigned Phs	1	2	3	4		6	7	8				
Phs Duration (G+Y+Rc), s	25.2	20.1	12.7	19.6		45.3	17.2	15.0				
Change Period (Y+Rc), s	6.0	6.0	6.0	6.0		6.0	6.0	6.0				
Max Green Setting (Gmax), s	34.0	74.0	14.0	29.0		114.0	14.0	29.0				
Max Q Clear Time (g_c+I1), s	17.5	11.8	6.9	7.1		14.7	11.1	8.9				
Green Ext Time (p_c), s	1.6	2.3	0.2	0.3		3.0	0.2	0.1				

Intersection Summary												
HCM 7th Control Delay, s/veh			21.1									
HCM 7th LOS			C									

Notes

User approved pedestrian interval to be less than phase max green.

Appendix D
Growth Rate Data

Growth Rate Based on U.S Census Bureau			
Geographic Area	2010 Census	2020 Census	2010-2020 Population % Change
Hall County	179,684	203,136	1.2%
Average			1.2%

GDOT Historical Growth Rate																			
Location	Station ID	2025	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	5 year	10 year	15 year
SR 347/Friendship Road west of Bogan Road	139-0487	-	-	26925	-	26025	-	21825	-	-	-	15450	-	13825	-	13125	5.4%	7.2%	6.2%
Ridge Road south of SR 347/Friendship Road	139-7382	8825	-	-	7425	-	-	-	7050	-	-	5850	-	-	-	4800	5.9%	3.3%	4.4%
Bogan Road south of SR 347/Friendship Road	139-7380	5900	-	5900	-	-	-	5600	-	-	4000	-	-	-	2975	-	0.0%	0.9%	5.4%
Ridge Road south of Thompson Mill Road	135-7359	0	-	-	9950	-	-	-	9950	-	-	-	7750	-	-	-	0.0%	3.2%	-
5 & 10 - Year Average																	2.8%	3.6%	5.3%
Weighted Average																		3.9%	

Due to COVID-19, the growth rate calculations did not consider data from March 2020 to July 2022. Instead, the latest count data available before 2020 was used to calculate the 5-year growth rate.

Growth Rate Based on Georgia Governor's Office of Planning and Budget Annual Population Projections		
Year	County Population	Growth Rate
2024	220128	
2028	231217	1.2%

Growth Rate Based on Regional Economic Models, Inc. Employment Projections		
Year	County Population	Growth Rate
2024	132387	
2028	135565	0.6%

Growth Rate Based on Regional Economic Models, Inc. Population Projections		
Year	County Population	Growth Rate
2024	217169	
2028	226297	1.0%

Appendix E
Trip Generation Reports

Single-Family Attached Housing
(215)

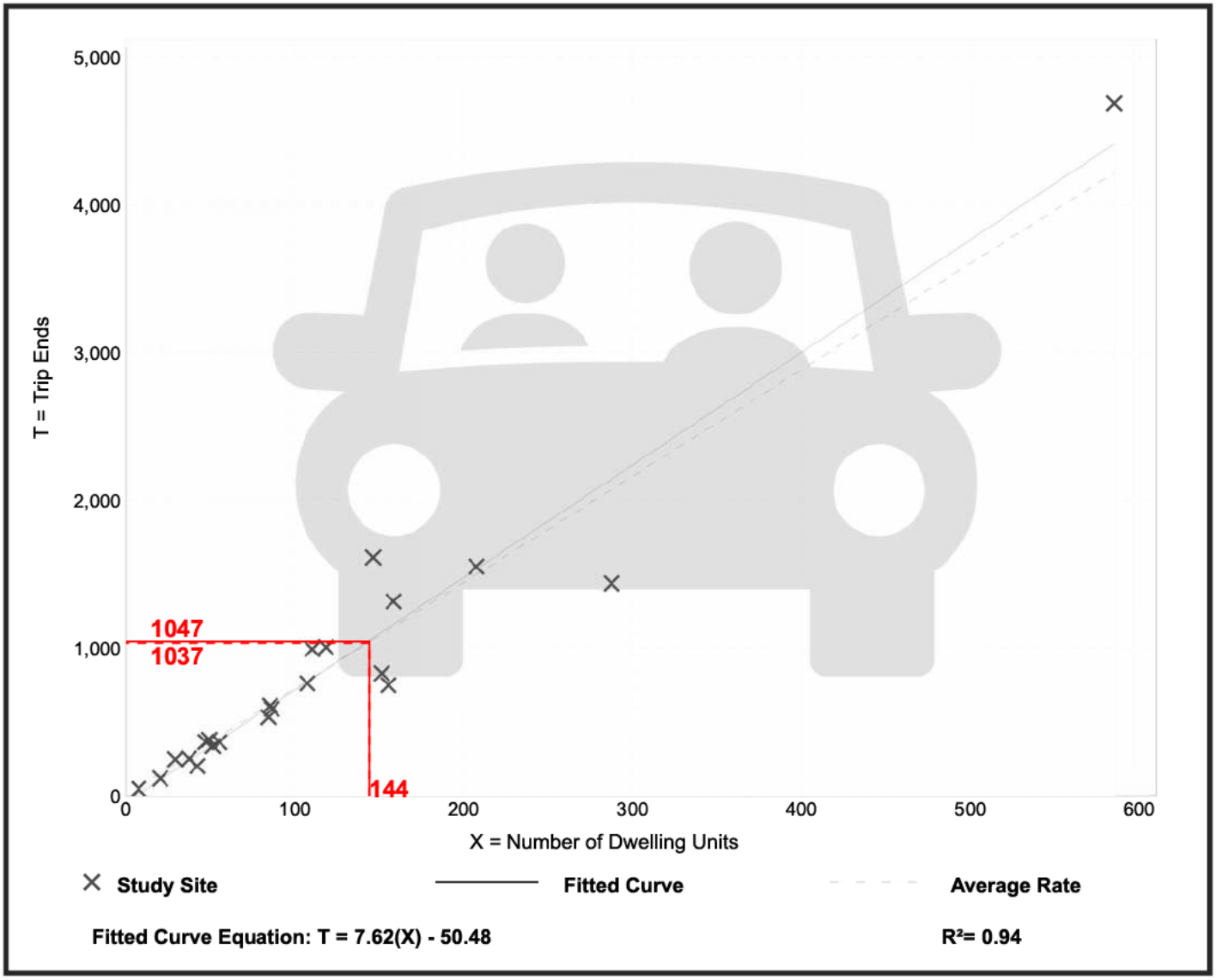
Vehicle Trip Ends vs: **Dwelling Units**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 22
Avg. Num. of Dwelling Units: 120
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.20	4.70 - 10.97	1.61

Data Plot and Equation



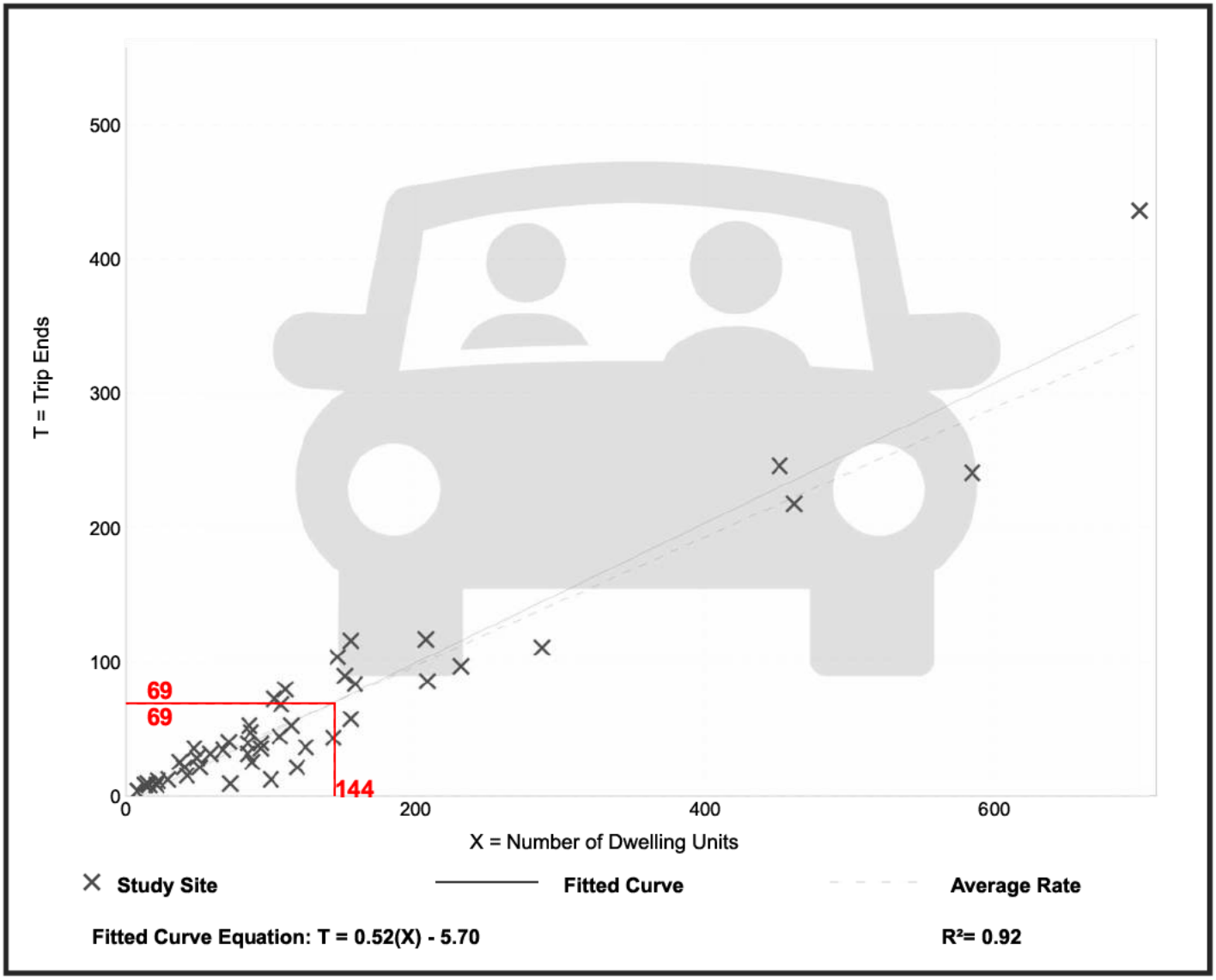
Single-Family Attached Housing
(215)

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:	46
Avg. Num. of Dwelling Units:	135
Directional Distribution:	25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



Single-Family Attached Housing
(215)

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:	51
Avg. Num. of Dwelling Units:	136
Directional Distribution:	59% entering, 41% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation

