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Building Relationships Through Performance

Developments of Regional Impact (DRI) The Outlet Shoppes At Atlanta Woodstock, GA DRI # 2194 July, 2011



Civil, Survey & Transportation



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Executive Summary

This report presents a systematic approach, by LAI Engineering (LAI), to analyze the anticipated traffic impacts for a proposed 50 acre commercial development (The Outlet Shoppes of Atlanta). The Outlet Shoppes of Atlanta is proposed to be located within the City of Woodstock in Cherokee County, Georgia. The applicant (Horizon Group Properties Inc.) is applying for approval under Georgia Regional Transportation Authorities (GRTA's) non-expedited review process. Because the project will exceed 300,000 square feet of commercial development, The Outlet Shoppes of Atlanta requires a Development of Regional Impact (DRI) study and is subject to GRTA and Atlanta Regional Commission (ARC) review.

Proposed Development Conditions

The Outlet Shoppes of Atlanta is expected to consist of factory outlet retail shops, restaurants and other retail with a total gross area of 433,000 square feet. The Outlet Shoppes of Atlanta development is scheduled to be completed by the year 2016.

As part of the DRI process, 2011 existing traffic conditions, future background condition for 2016 and future condition with full build out for the year 2016 were analyzed using SYNCHRO 7.0 software. Each scenario was analyzed using PM and Saturday peak hour traffic data for the 2016 build-out year. The projected traffic was calculated using a 2% background traffic growth rate agreed upon by GRTA during the methodology review process.

Existing Traffic Analysis

Based on intersection analysis under the 2010 existing conditions, there were **no** intersections below the standard level of service D.

No-Build Conditions

The No-Build conditions were analyzed using the factors described in the Analysis of Anticipated Traffic Impact paragraph below for the 2016 build-out year. A growth rate of 2% was used for projecting existing traffic data to the year 2016.

Build Conditions

The Build conditions were analyzed using the factors described in the Analysis of Anticipated Traffic Impact paragraph below, plus the site generated traffic associated with The Outlet Shoppes of Atlanta development for the 2016 build-out year.

Analysis of the Anticipated Traffic Impacts

The results of the detailed intersection analysis for the 2016 No-Build conditions include background traffic growth of 2% per year and include new interchange at Ridgewalk Parkway and I-575.

The 2016 Build conditions include the 2016 No-Build conditions plus the site generated traffic associated with the Outlet Shops of Atlanta. In the build condition apart from including the new interchange of I-575 and Ridgewalk Parkway, re-aligned Woodstock Parkway and all the proposed driveways to the proposed development were analyzed.

All the intersections along study network perform at acceptable levels of service in existing, future background as well as in the future condition with the proposed Outlet Shops of Atlanta. No other intersection improvements are not suggested other than the project improvements the developer is performing to improve the connectivity of the area. The improvements that the developer is proposing are listed below:

- Align the proposed Main Site access with N. Rope Mill Road with the signal at the intersection in place
- Realign Woodstock Parkway more towards east to intersect Ridgewalk Parkway east of the proposed development. The proposed intersection will be signalized.
- A roundabout at the intersection of Woodstock Parkway and Rope Mill Road / Site Driveway

Segment Analysis

As part of the DRI process, a detailed segment analysis for all major corridors in the study network had to be completed. Woodstock Parkway, Ridgewalk Parkway and Canton Highway were the three major segments analyzed. The analysis was completed for the build-out year (2016) for both No-Build and Build scenarios. The results of the detailed segment analysis reveal that Woodstock Parkway, Ridgewalk Parkway and Canton Highway will all operate at acceptable levels of service during all analyzed scenarios, per the outlined technical guidelines in GRTA's Letter of Understanding.

**Outlet Shops of Atlanta
Development of Regional Impacts
(DRI) # 2194**

Anticipated Traffic Impact Study Results
June, 2011

PROJECT SUMMARY

Name and Number of DRI	Outlet Shops of Atlanta, DRI # 2194
Jurisdiction	City of Woodstock
Local Development Approval Sought	Land Development Permit
Location	728 Woodstock Parkway, Woodstock, GA 30189
Uses and Intensities of Use	433,000 square feet proposed retail
Project Phasing and Build-Out	Phase I – 2013 – 400,000 SF, Phase II – 2016 - 33,000 SF
Site Trip Generation (Average Daily Traffic / AM / PM / SAT Peak Hour Traffic)	(17,613/999/824/1,989)

1.0 Project Description

1.1 Introduction

This report presents a systematic approach to the analysis of the anticipated traffic impacts for Outlet Shops of Atlanta, a proposed 50 acre commercial development. The Outlet Shoppes of Atlanta(DRI #2194), is located in the City of Woodstock, Cherokee County, Georgia. More specifically, the proposed development is located east of I-575, south of the intersection of Ridgewalk Parkway and Woodstock Parkway and bisected by existing Woodstock Parkway. See **Figure 1** and **Figure 2** for Aerial Site View and the Aerial Site Plan.

The proposed development will reside on a 50 acre site and consist of retail and outlet space with a total area of 433,000 square feet. The site is currently zoned for Light Industrial (LI), which allows commercial uses. The proposed zoning will remain LI (Light Industrial) and commercial. The project is scheduled to be completed in 2016. See **Table 1** for proposed land use intensities.

Table 1: Proposed Land Uses	
Land Use	Description
823- Factory Outlet Center	395,000 SF
932- Sit Down Restaurant	12,000 SF
934 – Fast Food Restaurant	16,000 SF
912- Bank	4,000 SF
881- Pharmacy	6,000 SF
Grand Total	433,000 SF

1.1.1 Site Plan Review

The proposed development utilizes a racetrack type design for the outlet shops, which is the industry standard. Outparcels will only have internal access. These internal connections will provide access for all retail and outlet shops elements of the proposed development. See **Figure 3** for the Site Plan.

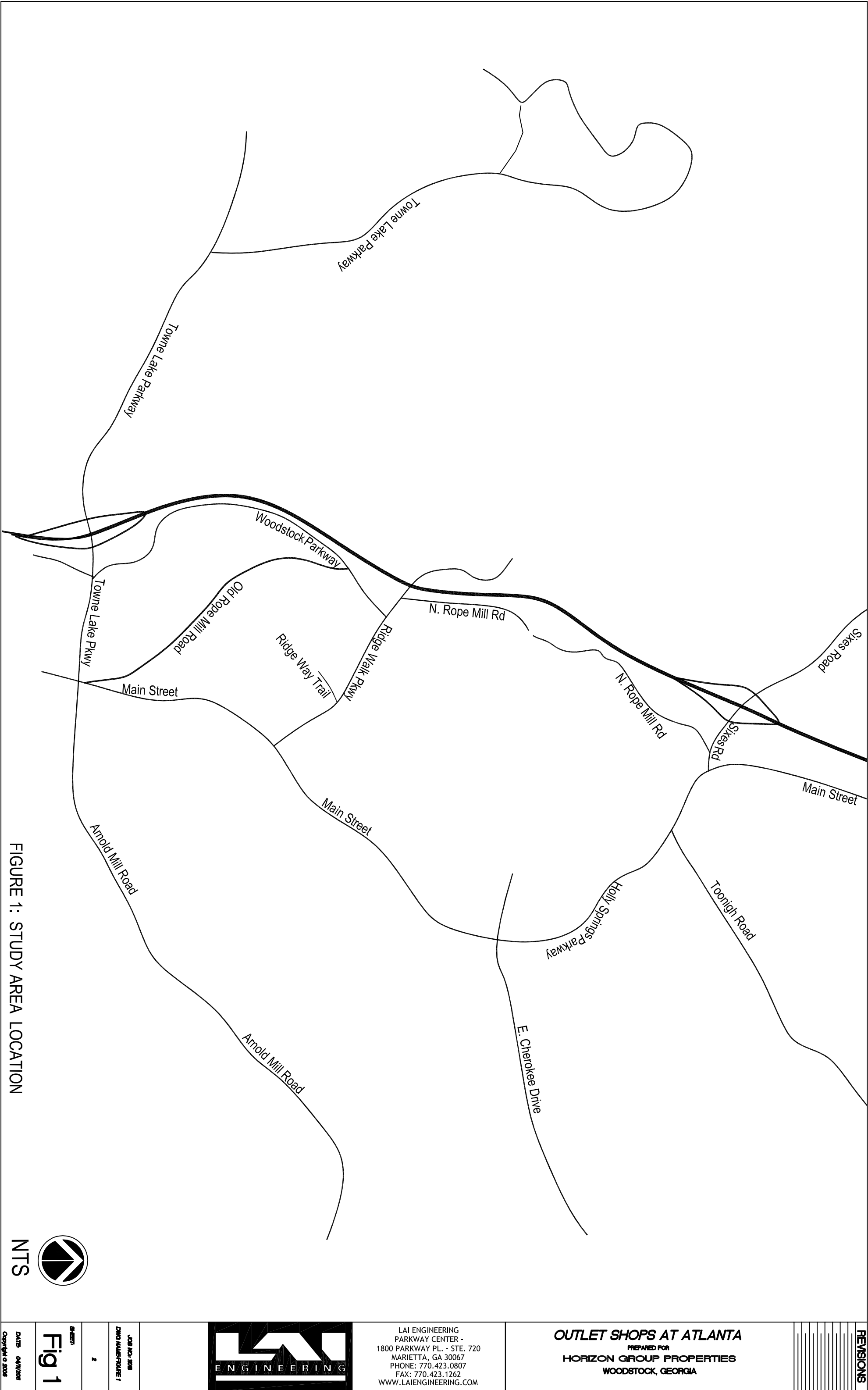


FIGURE 1: STUDY AREA LOCATION

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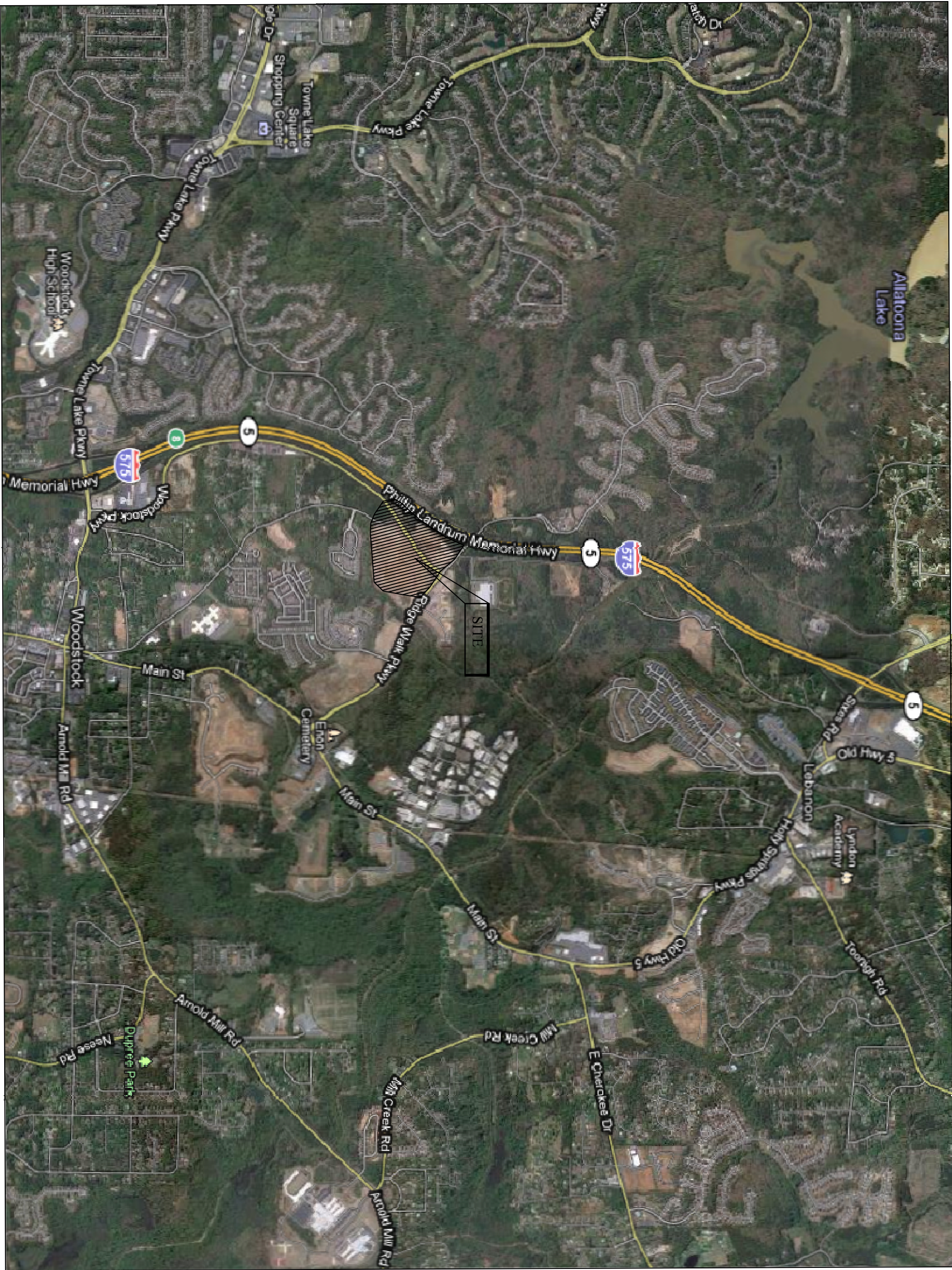


FIGURE 2: AERIAL LOCATION OF THE PROJECT



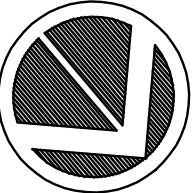
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OUTLET SHOPS AT ATLANTA
PREPARED FOR
HORIZON GROUP PROPERTIES, INC
WOODSTOCK, GEORGIA

REVISIONS

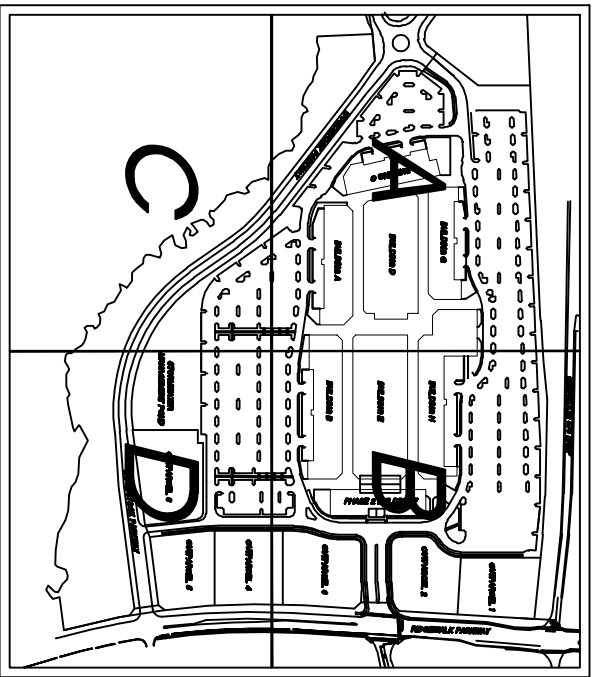
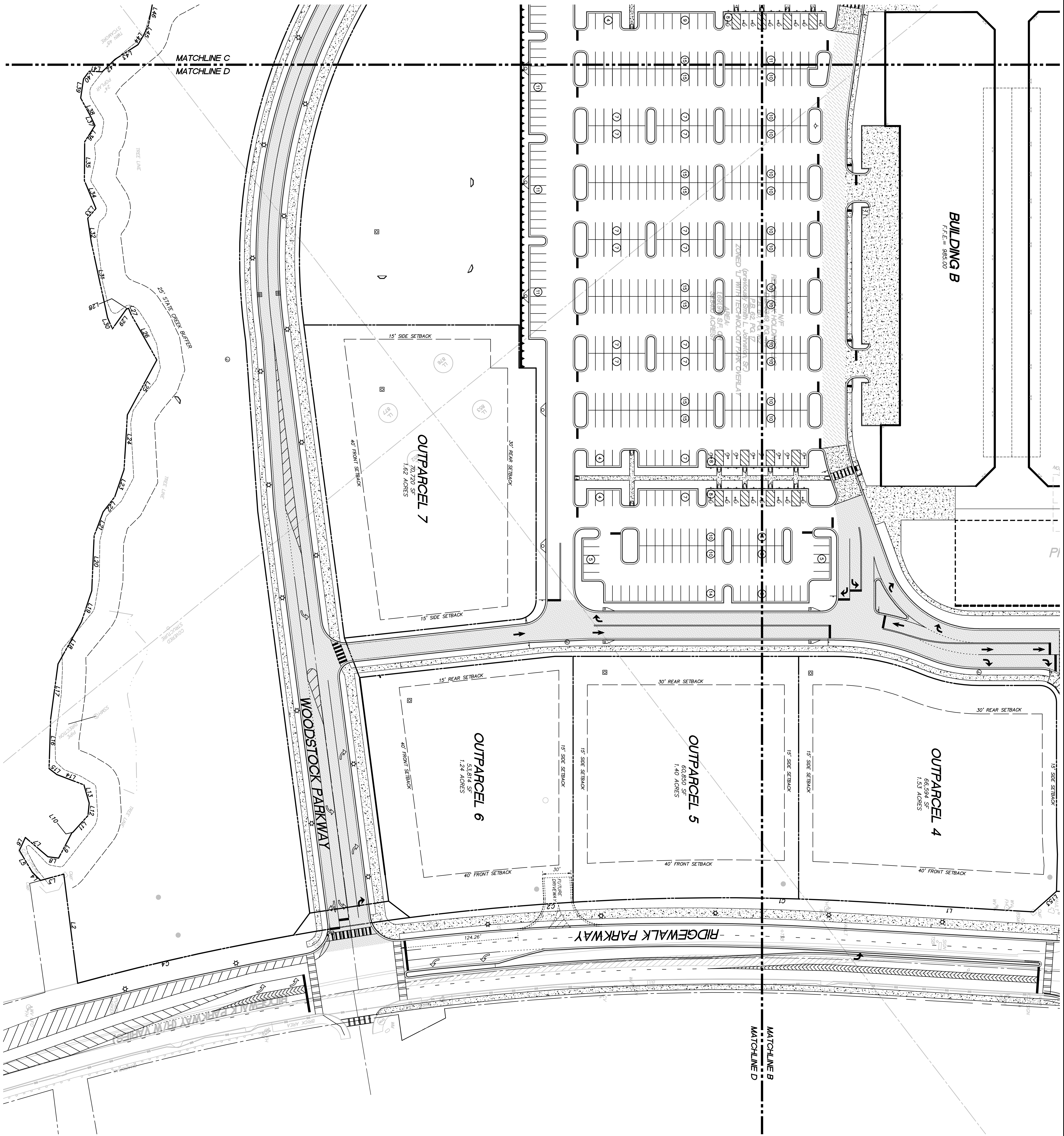


SITE LEGEND

- PROPERTY LINE
- ESSENTIAL LINE
- SETBACK LINE
- GRASSY LOT
- CONCRETE SIDEWALK (SEE DETAIL)
- 24" CONCRETE CURB AND GUTTER (SEE DETAIL)
- STOP BAR (PARKING WARNING)
- TRAFFIC FLOW ARROW (PARKING WARNING)
- "YIELD" (PARKING WARNING)
- DIRECTIONAL ARROWS (PARKING WARNING)
- "ONE WAY" DIRECTIONAL ARROW (PARKING WARNING)
- "STOP" SIGN (61-1)
- 4" W/ HANDICAP STALL AND DESIGNATED VAN STALL
- WHEEL STOP
- A.O.A. STD HANDICAP RAMP
- GROUP OF FOUR GUARD POSTS
- RETAINING WALL (LENGTH AT SYMBOL) BY OTHERS
- HEAVY DUTY PAVING
- PARKING SPACE COUNT 8x18
- SPRING SENSITIVE GRATE
- PRECAST CATCH BASIN
- SITE LIGHTING FIXTURES
- FUTURE/PROPOSED SIGNAL

SITE NOTES

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PLANS AND FEDERAL, STATE AND LOCAL CODES.
- REFERENCE ARCHITECTURAL PLANS FOR BUILDING DIMENSIONS, TRUCK TRAILER DIMENSIONS, AND TRUCK TRAILER CLEARANCES.
- ALL DIMENSIONS AND SPACING ARE TO THE FACE OF CURB, UNLESS OTHERWISE NOTED. ALL DIMENSIONS SHOWN TO BUILDINGS ARE TO OUTSIDE FACE OF BUILDING.
- CONCRETE TRUCK DOCKS ARE BY THE BUILDING CONTRACTOR.
- ALL HANDICAP ACCESSIBLE PARKING SPACES AND STRIPING SHALL BE IN ACCORDANCE WITH THE AMERICAN WITH DISABILITY ACT (ADA).
- ALL TRAFFIC SIGNS SHALL CONFORM TO THE UNIFORM TRAFFIC CONTROL MANUAL AND THE STATE OF GEORGIA DEPARTMENT OF TRANSPORTATION, AND BE APPROVED BY THE ENGINEER AND BE ERECTED OR BETTER THAN EXISTING CONDITIONS.
- ALL STRIPED OR CURBED PAVEMENT SHALL BE 4" UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ANY DAMAGE TO ANY EXISTING IMPROVEMENTS OUTSIDE OF SITE SUCH AS UTILITIES, ETC. APPROVED BY THE ENGINEER AND BE ERECTED OR BETTER THAN EXISTING CONDITIONS.
- SITE LIGHTING SHALL BE INCLUDED IN THE GENERAL CONTRACTOR'S RESPONSIBILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, INSTALLATION, AND MAINTENANCE OF ALL LIGHTING FIXTURES WITH LUMENS SHALL BE INSTALLED BY THE GENERAL CONTRACTOR AND BE ERECTED OR BETTER THAN EXISTING CONDITIONS.
- ALL CURB AND GUTTER SHALL BE REMOVED BEFORE CONSTRUCTION BEGINS.
- SITE CONTRACTOR SHALL SUPPLY AS-BUILT PLANS INDICATING ALL CHANGES AND DEVIATIONS.
- ANY DEVIATION FROM THESE PLANS MAY CAUSE THE WORK TO BE UNACCEPTABLE.
- ANY UNANTICIPATED CONDITIONS ENCOUNTERED DURING THE CONSTRUCTION PROCESS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.
- ALL CONCRETE SHALL BE 3000 PSI 28 DAY COMPRESSIVE STRENGTH.
- PROJECT SIGNAGE SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR.
- ALL CURB AND GUTTER WITHIN THE DEVELOPMENT SHALL BE 24" IT SHALL BE 30" WITHIN THE R.O.W. UNLESS NOTED OTHERWISE.
- PARKING LOT STRIPING SHALL BE INCLUDED IN PARKING CONTRACTOR'S SCOPE OF WORK. STRIPING WILL BE ACCORDING TO OWNER'S TO HAVE TWO (2) COATS OF PAINT (MAY).
- LIGHT POLE BASES SHALL BE PAINTED TRAFFIC YELLOW PER SITE WORK SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR AVOIDANCE OF ALL WETLANDS AREAS AS ILLUSTRATED IN THE WETLANDS DELINEATION PACKAGE.
- THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY AND ALL NECESSARY PERMITS AND APPROVALS FOR THE PROJECT PRIOR TO THE TIME OF PLAN ISSUANCE.
- THE SITE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL WORK AND MATERIALS TO WITHIN 5' OF THE BUILDING. THIS INCLUDES SIDEWALKS, DRIVEWAYS, AND DRIVEWAY PAVES TO BE LEFT TO THE UTILITY CONTRACTORS.



KEY MAP

1.1.2 Site Access

The proposed site will have two full access driveways one at the intersection of N. Rope Mill Road and Ridgewalk Parkway, and at the intersection of realigned Woodstock Parkway and Rope Mill Road. A third access which will be a right-in-left-in access will be located along the newly realigned Woodstock Parkway close to the intersection of Woodstock Parkway and Ridgewalk Parkway. Another possible entrance to the site will be a right-in-right-out access from Ridgewalk Parkway.

Driveway-1(Main Entrance) – Driveway 1 (Main Entrance) will be standard commercial driveway with four (4) 12 ft lanes and 50 ft. radius at its intersection with Ridgewalk Parkway. Driveway 1 is located south of proposed Interstate 575 ramps with Ridgewalk Parkway. This driveway will be constructed as a full movement drive. This intersection will be a signalized intersection.

Driveway-2(Right-In-Left-In -Only) – The proposed driveway will be standard commercial driveway with one (1) 12 ft lane and 50 ft. radius at its intersection with the relocated Woodstock Parkway just west of its intersection with Ridgewalk Parkway.

Driveway-3 (Full movement) – Driveway 3 is proposed as three (3) lane commercial driveway, approximately 12 ft lanes and 50 ft. radius. It will be located along realigned Woodstock Parkway at its intersection with Rope Mill Road. A roundabout is suggested at this intersection. Roundabout analysis for this driveway is also included in the appendix portion of this report.

Possible Driveway -4 (Right-In-Right-Out) - A possible right-in-right-out is being planned along Ridgewalk Parkway for the Outparcel number 6 (please refer site plan). This right-in-right-out entrance is a possible condition and will not require additional roadway improvements and hence it is not shown in the capacity analysis section of the report.

1.2 Bicycle and Pedestrian Facilities

The proposed development is designed to be a highly pedestrian friendly shopping center. This pedestrian friendly environment will be created through the use of wide sidewalks, allowing for walkers and bikers, and strategically placed aesthetic plantings. Additionally, Woodstock Parkway and Ridgewalk Parkway will each have a sidewalk on one side and a ten foot multiuse trail on the other side to connect to the City trail network. A sidewalk will also be installed to connect to the existing sidewalk on Rope Mill Road.

1.3 Transit Facilities

Currently there are no transit agencies that service the proposed development area. Information obtained from the City of Woodstock and Cherokee County indicated that there are no current plans for any future transit elements in this area.

GRTA has an Xpress commuter service route originating from the Woodstock Community. Route 490 AND Route 491 provides four commuter coaches from Canton and Woodstock to Midtown and Downtown Atlanta, Monday-Friday.

Source: www.XpressGA.com

2.0 Traffic Analyses – Methodology and Assumptions

2.1 Existing Facilities

The area roadways in the vicinity of the proposed development offer drivers a wide range of travel paths with functional classifications including Urban Local Streets, Urban Minor Streets, Urban Collector Streets and Urban Principal streets. There are three basic functional classifications of roadways: arterial, collector and local roads. All streets and highways are grouped into one of these classifications depending on the character of traffic (i.e., local or long distance) and the degree of property access they allow. See **Table 2** for a list of existing roadways in the study network and description as defined by the Georgia Department of Transportation (GDOT).

Table 2: Existing Roadway Facilities				
Roadway Name	Orientation	GDOT Classification	Speed Limit	Number of Lanes
Ridgewalk Pkwy	East-West	Urban Local Street	45 mph	One lane in each direction
Woodstock Pkwy	North-South	Urban Local Street	35 mph	One lane in each direction
Rope Mill Rd	North-South	Urban Local Street	35 mph	One lane in each direction
Canton Hwy	North-South	Urban Minor Arterial	45 mph	One lane in each direction
Towne Lake Pkwy	East-West	Urban Minor Arterial	35 mph	One lane in each direction
East Cherokee Dr	East-West	Urban Minor Arterial	45 mph	One lane in each direction

2.2 Growth Rate

Historical traffic volumes were analyzed utilizing volume data gathered from the Georgia Department of Transportation. Volume data from 6 previous years was assembled to help determine a background traffic growth rate on the roadways within the study network. Based on recent travel trends in traffic along the area roadways, as well as the population growth rates of Cherokee County Census, a growth rate of 2.0% per year was used to calculate all future traffic. This 2% growth rate was approved by GRTA during the methodology review process and is documented in GRTA's Letter of Understanding dated April 18, 2011.

2.2.1 Traffic Data Collection

Vehicle turning movement counts were collected by Reliable Traffic Data Services, LLC and LAI Engineering for weekday PM (4:00 pm – 6:00 pm) peak periods. Peak hour counts were also collected for a typical Saturday Peak period (11:00 pm – 1:00 pm). Counts were performed on Wednesday May 11, 2011 and Saturday May 14, 2011. See **Appendix C** for Peak Hour Traffic Counts.

2.3 Detailed Intersection Analysis

Level of service (LOS) is used to describe the operating characteristics of a road segment or intersection in relation to its capacity. LOS is defined as a quantitative measure that describes operational conditions and motorist perceptions within a traffic stream. The Highway Capacity Manual defines six levels of service, LOS A through LOS F, with A being the best and F being the worst. Level of service analyses were conducted at all intersections within the study network using SYNCHRO, Version 7.

Levels of service for signalized intersections are reported for individual movements as well as for the intersection as a whole. One or more movements at an intersection may experience a low level of service, while the intersection as a whole may operate acceptably.

Levels of service for un-signalized intersections, with stop control on the minor street only are reported for the minor (side) street left turn movements and for the side street approaches. Low levels of service for side street approaches are not uncommon, as vehicles may experience delay in turning onto major roadways.

If an intersection or roadway segment (corridor) was found to be below the acceptable level of service, as established by the city standards, it was improved to an acceptable level of service before the analysis could be considered complete. See section 6.4 for Corridor Segment Study.

3.0 Study Network

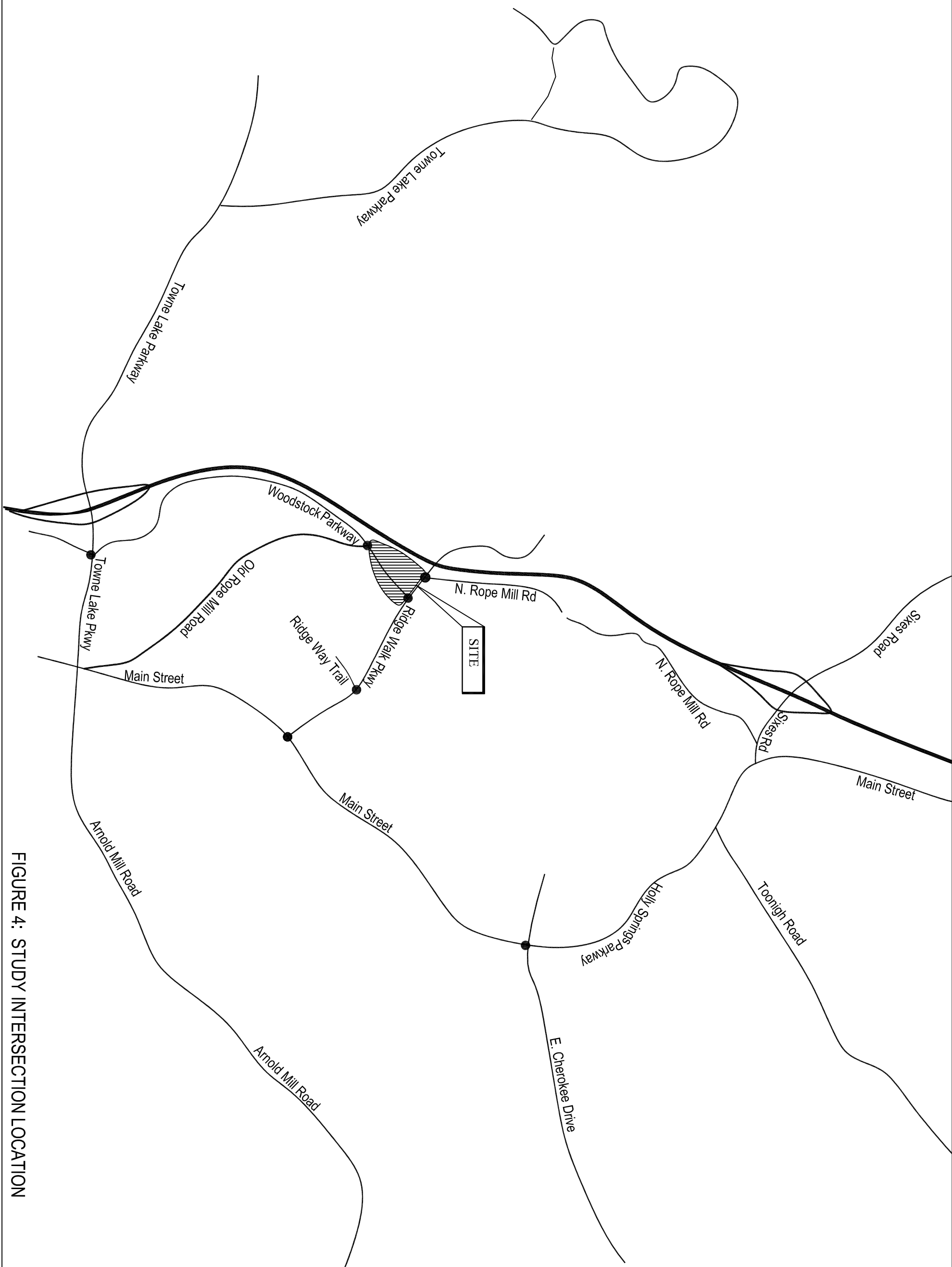
3.1 Study Intersections

As stated earlier, there are three (3) functional classifications of roadways: arterial, collector and local roads. All streets and highways are grouped into one of these classifications, depending on the character of traffic (i.e., local or long distance) and the degree of land access they allow. See **Table 2** for a list of area roadways included in the study network and the functional classification of each. Functional classifications were determined using the GDOT website.

The study network was determined by evaluating the amount of traffic that the proposed development will add to each roadway segment in the area. According to GRTA's requirements, a roadway segment carries a "significant" amount of traffic if the project contributes 7% or more trips to the two-way daily service volumes of the roadway at the appropriate level of service standard. Upon agreement with GRTA, a standard LOS D was used for determining the study network area. See **Figure 4** for Study Network Intersections. See **Appendix A** for GRTA's 7% study network determination table.

The traffic generated by the proposed project was then assigned to the area roadways using a trip distribution process (historical travel trends, residential densities and engineering judgment) to determine the site-generated traffic volumes on each roadway segment. The boundaries of the study network extend to the most distant intersections where at least 7% of the service volumes on the segment are attributed to the project traffic. The following intersections were found to have site generated volumes in keeping with the 7% rule and have been included in the traffic study:

- I-575 NB ramps at Ridgewalk Parkway (Proposed)
- I-575 SB ramps at Ridgewalk Parkway (Proposed)
- Main Street at Ridgewalk Parkway
- Woodstock Parkway at Towne Lake Parkway
- Old Highway 5 at E. Cherokee Drive
- Ridgewalk Parkway at Rope Mill Road / Main Entrance
- Ridgewalk Parkway at Re-aligned Woodstock Parkway
- Re-aligned Woodstock Pkwy/ Driveway 2
- Re-aligned Woodstock Parkway at Driveway 3/ Rope Mill Road



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3.2 Trip Generation

Trip generation estimates were based on the rates and equations published in the 8th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. The ITE *Trip Generation Manual* contains traffic volume count data collected at similar facilities nationwide. The proposed development will consist of 433,000 square feet of retail space.

Pass-by reductions were taken for the retail land uses based on ITE's Trip Generation Handbook, October 1998. Pass-by trip reduction was not applied to the development. This was because there is 0% pass-by traffic to the outlet store, and all the retail outparcels do not have a direct access from the external roads. However, a 20% retail to retail mixed use reduction was applied to the entire development. Mixed use worksheets are included in the appendix. See **Table 3** for gross site trips.

TABLE 3: TRIP GENERATION								
Code - Land Use	Description	Average Weekday Trips (ADT)	A.M.		P.M.		Sat	
			Enter	Exit	Enter	Exit	Enter	Exit
823- Factory Outlet Center	395,000 SF	10,503	194	71	427	478	762	735
932- Sit down Restaurant	12,000 SF	1,526	72	66	80	51	151	89
934- Fast Food Restaurant w/ Drive - Through	8,000 SF	3,969	217	208	144	133	242	232
912- Bank	4,000 SF	986	28	22	91	91	76	73
881- Pharmacy	6,000 SF	529	9	7	25	26	24	24
933- Fast Food Restaurant w/o Drive - Through	8,000 SF	5,728	211	140	107	102	214	223
Gross Trips		23,241	731	514	874	881	1,469	1,376
- Mixed Use Reduction		-5,628	--	--	-225	-225	-320	-320
Net Trips	433,000 SF	17,613	547	452	649	656	1,149	1,056

4.0 Trip Distribution

The trip distribution is the percentage of the traffic generated by the site that uses each segment of the surrounding roadway network. A trip distribution is estimated for the land use for the site. The site generated traffic distributions were based on knowledge of the roadway system in conjunction with engineering judgment and historical travel trends within the defined study network. Historical travel trend data gathered from average daily traffic (ADT) was taken from the GDOT web-site and utilized 2009 annual traffic data and 2011 traffic data collected by LAI Engineering to develop the distributions. The distributions were discussed and agreed upon in the methodology process with GRTA. See **Figure 5** for trip distribution percentages.

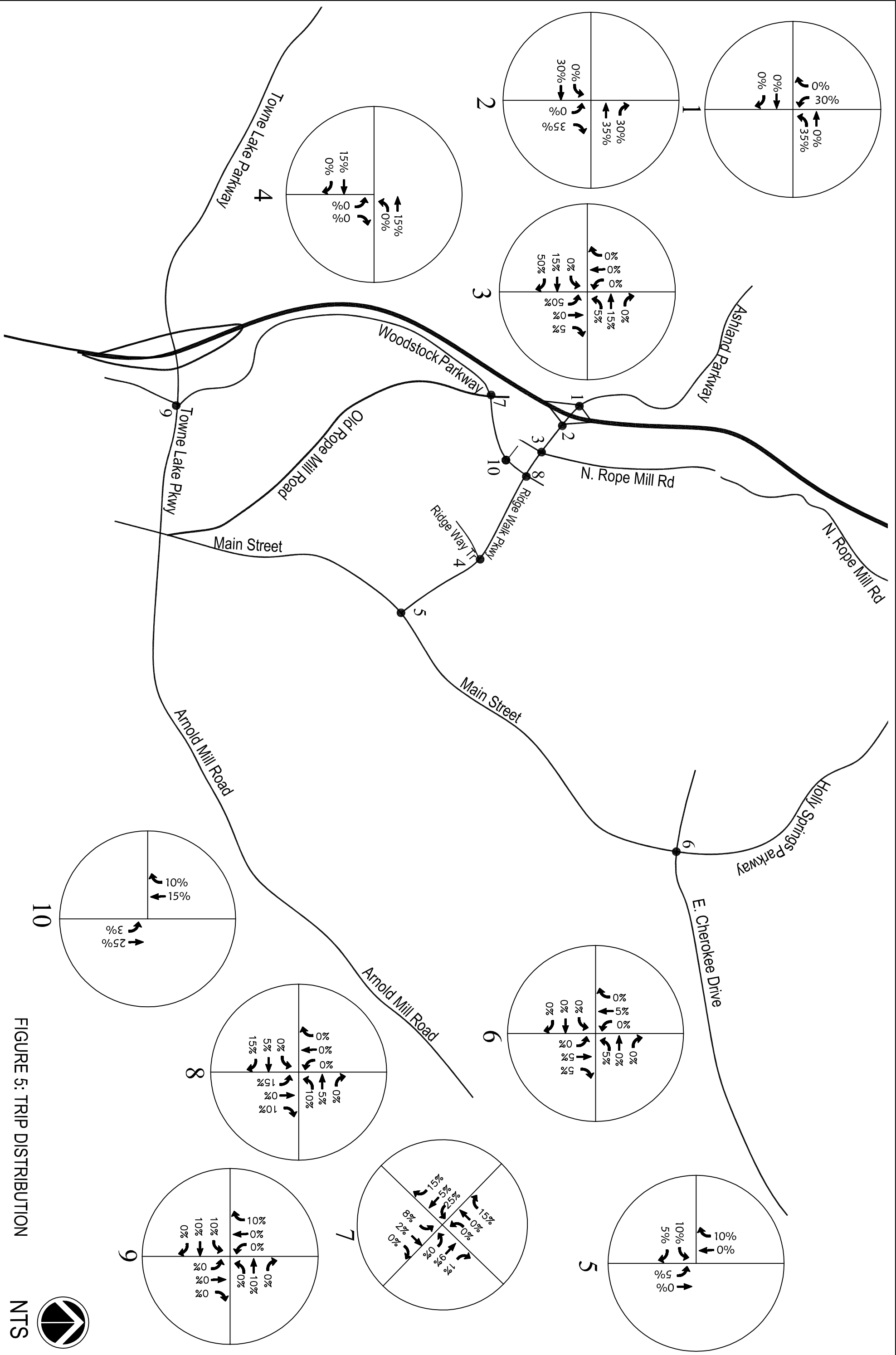


FIGURE 5: TRIP DISTRIBUTION

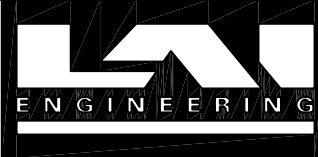
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Fig 5

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JOB NO. 1018
DWG NAME: TRIP DISTRIBUTION



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PREPARED FOR
HORIZON GROUP PROPERTIES, INC
WOODSTOCK, GEORGIA

REVISIONS

DRAWN BY: JLM
DATE: 06/14/2011
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5.0 Level of Service Standards

The City of Woodstock does not currently have a standard level of service. For the purpose of this DRI analysis and as per the previously mentioned GRTA technical guidelines, a standard LOS D was utilized for all analyses.

The levels of service of the key intersections analyzed as part of this study were determined with the use of the SYNCHRO 7.0 which is based on the methodology in the current edition Highway Capacity Manual. Level of service (LOS) is an indication of the operations of an intersection and is designated by the letters A through F. A level of service A represents good traffic flow with little or no delay to motorists, and a level of service F represents very poor traffic flow and extreme delays to motorists.

The capacity analyses performed were based on the existing traffic volumes counted, the lane configurations, type of control, truck traffic characteristics and various other parameters of traffic operations at each of these intersections. Once the analysis has been done, a level of service of each intersection is determined.

For unsignalized intersections, the level of service is based on reserve capacity and average delay per vehicle. Table 1 illustrates the criteria for determining level of service for unsignalized control, based on information in the Highway Capacity Manual. An overall level of service of LOS D or better is considered adequate, for rural conditions similar to this proposed study area.

TABLE 4: LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS		
Reserve Capacity(PCPH)	Level of Service	Expected Delay to Minor Street Traffic
≥ 500	A	Little or no delay
300 – 399	B	Short traffic delays
200 – 299	C	Average traffic delays
100 – 199	D	Long traffic delays
0 – 99	E	Very long traffic delays
*	F	*
* When demand volume exceeds the capacity of the lane, extreme delays will be encountered with queuing which may cause severe congestion affecting other traffic movements in the intersection. This condition may warrant intersection improvements.		

For signalized intersections, the level of service is based on stopped delay per vehicle and volume to capacity ratio of the approaches to the intersection. Table 2 contains information obtained from the Highway Capacity Manual, which illustrates the criteria for determining level of service for signalized control.

TABLE 5 : LEVEL OF SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS	
Level of Service	Stopped Delay per Vehicle
A	≤ 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	> 60.0

6.0 Traffic Analysis

6.1 Existing Traffic Conditions – 2011

Existing traffic was analyzed at recommended intersections which were identified by GRTA during the methodology process and then confirmed by GRTA's Letter of Understanding. Any intersection that was found to be below the standard LOS D had to be improved in the analysis models before any future traffic analysis could be completed. This would insure that the area intersections would operate, and will continue to operate at an acceptable level of service.

The recommended improvements for those intersections which did not meet the standard level of service (LOS) D were made and all future traffic analysis includes those recommended improvements. The existing analysis was performed using SYNCHRO 7.0 and the results are shown in Table 6. See **Table 6** for Existing Intersection Levels of Service.

Table 6: Existing 2011 Intersection Levels of Service (Delay, sec)						
Intersection	Traffic Control	Approach	PM Peak		Sat Peak	
			LOS	Delay	LOS	Delay
Towne Lake Pkwy @ Woodstock Pkwy	Signalized		B	18.1	A	8.0
Ridgewalk Pkwy @ Main St	Signalized		B	17.3	B	14.1
Woodstock Pkwy @ Rope Mill Rd	Unsignalized	North	A	0.0	A	0.0
		South	A	0.8	A	0.2
		West	C	15.6	B	14.3
Ridgewalk Pkwy @ Woodstock Pkwy	Signalized		B	14.7	B	12.6
Old Highway 5 @ E. Cherokee Dr	Signalized		D	37.7	C	20.7
Ridgewalk Pkwy @ Rope Mill Rd	Unsignalized	East	A	0.4	A	0.2
		West	A	0.0	A	0.0
		South	B	14.0	B	11.0
Ridgewalk Parkway at Ridgeway Trail	Unsignalized	East	A	0.0	A	0.0
		West	A	2.7	A	1.5
		North	C	20.1	C	16.0

*** NOTE:** It is important to note that it is not uncommon to have an un-signalized intersection to have an approach (usually a side street) to have an unacceptable LOS. This does not mean that the intersection as a whole is not operating at an acceptable level of service.

All the intersections perform at level of service of D or better in the existing condition during both PM and Saturday peak periods. Hence, intersection improvements are not recommended for existing condition.

See **Figure 6** for 2011 Existing Lane Geometry and **Figure 7** for 2011 Existing Turning Movement Counts. Based on intersection analysis for 2011 existing conditions, there were no intersections below the standard LOS D.

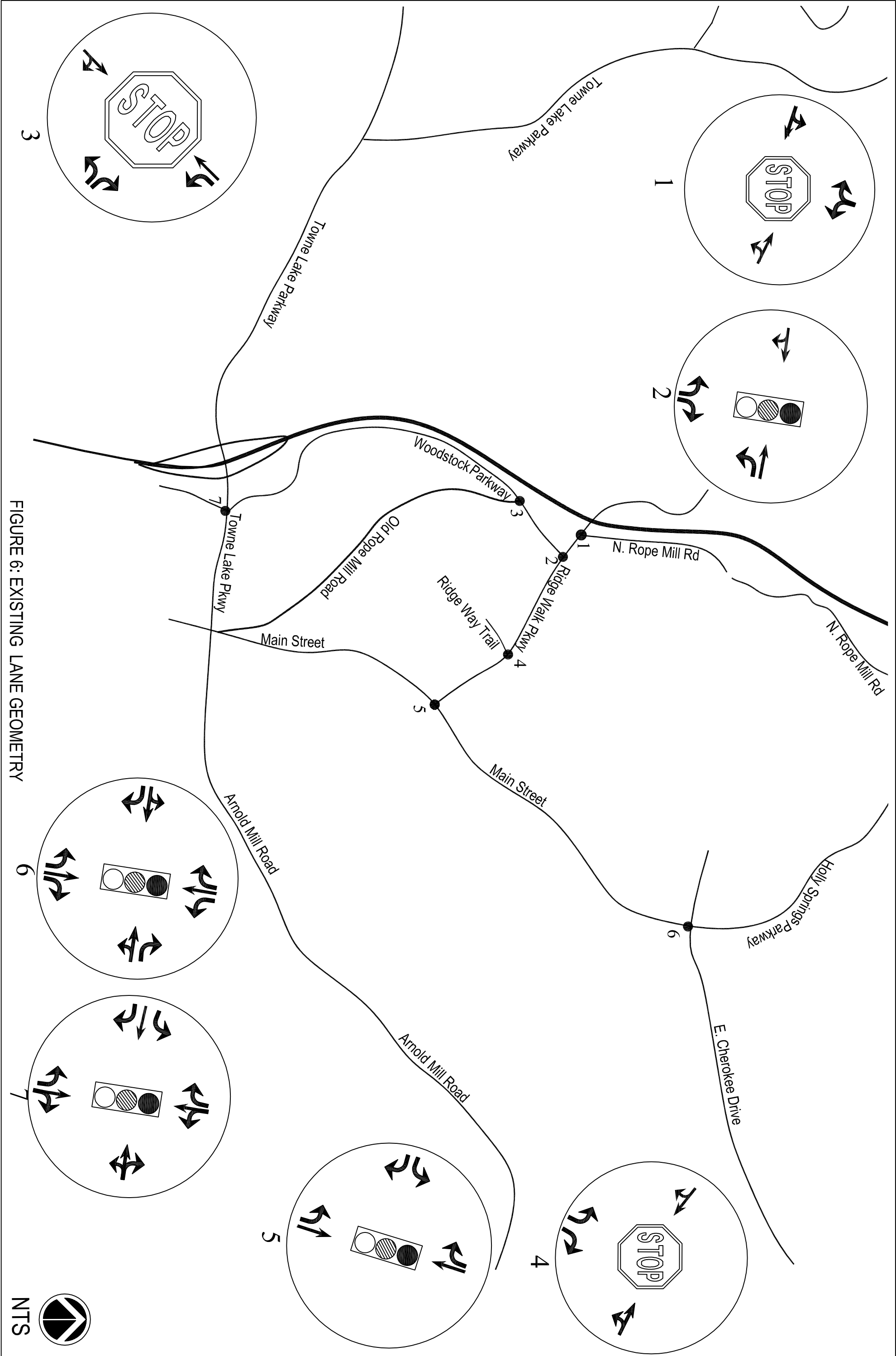
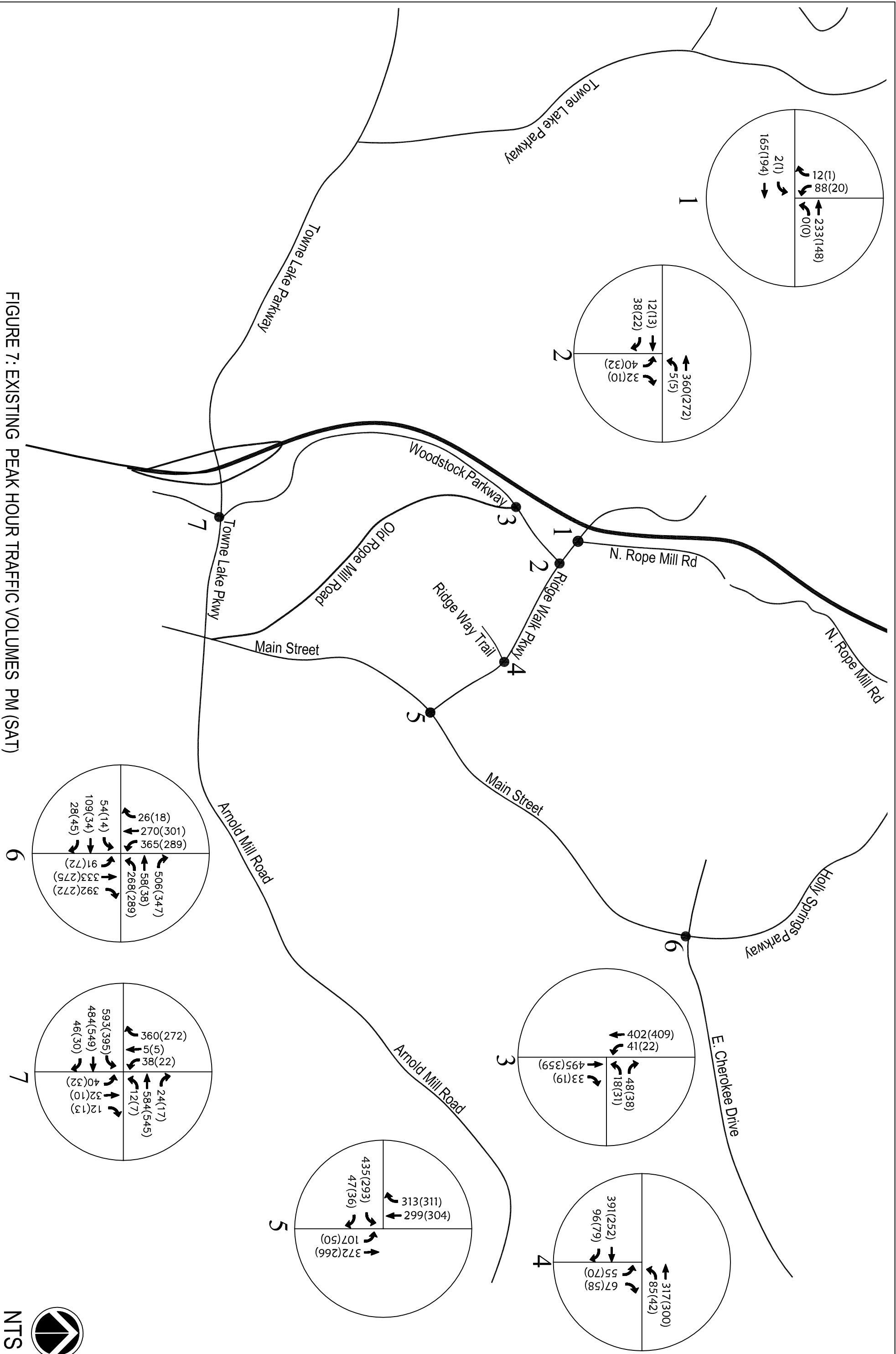


FIGURE 6: EXISTING LANE GEOMETRY





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6.2 Future Background Traffic Conditions – 2016

The Outlet Shoppes of Atlanta development is currently scheduled to be built out by the end of 2016. The future condition is based on the projected build-out year traffic conditions along with the proposed full access interchange at Rope Mill Road and Interstate I-575 (GDOT project # 0006043).

The projected design year traffic conditions consist of the following key elements:

- Potential increase in through traffic based on historical growth trends. (2%)
- Any planned and programmed transportation system improvements which would impact the configuration and capacity of the study area roadway network by 2016.
 - (I-575 interchange GDOT project # 0006043 and City of Woodstock Project Ridgewalk Parkway Improvement)
 - Realignment of N. Rope Mill Road with Woodstock Road along Ridgewalk Parkway east of the new interchange with I-575.
 - Widening of Ridgewalk Parkway to four lane highway.

This DRI Transportation Analysis applied a conservative two percent (2.0%) annual growth factor in through traffic for the study area network and took into consideration traffic generated by the approved background developments. The background developments considered in this study were based on the following:

- Economics Development Map of The City of Woodstock, office of Deputy Mayor for Planning and Economics Development; and
- Development activity information provided by the Office of Planning, GDOT.

No-build traffic was analyzed at the same intersections as the existing conditions. However, there are various proposed projects in the area that would affect the study intersections; these changes were included in the no-build conditions analysis. A growth rate of 2% was used to project existing traffic from the year 2011 to 2016.

GDOT and Cherokee County Project - CH-AR -225: I-575 at Ridgewalk Parkway interchange project is currently in design stage and will be let for build in the next one year. The project is anticipated to be completed by 2013 before the opening of Outlet Shops of Atlanta. Hence, the new intersections with I-575 will be evaluated in both no-build and build conditions. Traffic data used for the design of the project for these intersections will be obtained from GDOT for evaluating no build and build conditions.

The no build analysis was performed using SYNCHRO 7.0 and the results are shown in Table 7.

See **Table 7** for No Build Intersection Levels of Service. **Figures 8 & 9** show no-build lane geometry and traffic volumes.

Table 7: No Build 2016 Intersection Levels of Service (Delay, sec)

Intersection	Traffic Control	Approach	PM Peak		Sat Peak	
			LOS	Delay	LOS	Delay
Towne Lake Pkwy @ Woodstock Pkwy	Signalized		D	40.1	B	17.7
Ridgewalk Pkwy @ Main St	Signalized		B	19.1	B	15.2
Woodstock Pkwy @ Rope Mill Rd	Unsignalized	North	A	0.0	A	0.0
		South	A	0.8	A	0.4
		West	C	17.7	C	16.0
Ridgewalk Pkwy @ Woodstock Pkwy/ Rope Mill Rd	Signalized		C	21.2	B	17.8
Old Highway 5 @ E. Cherokee Dr	Signalized		D	45.7	C	25.7
Ridgewalk Pkwy @ Ridgeway Trail	Unsignalized	East	A	0.0	A	0.0
		West	A	3.1	A	1.7
		North	D	33.1	F	60.3
Ridgewalk Parkway @ I-575 SB Ramps	Signalized		B	13.5	B	15.1
Ridgewalk Parkway @ I-575 NB Ramps	Signalized		A	9.4	A	6.8

* **NOTE:** It is important to note that it is not uncommon to have an un-signalized intersection to have an approach (usually a side street) to have an unacceptable LOS. This does not mean that the intersection as a whole is not operating at an acceptable level of service.

All the intersections are expected to perform at level of service of D or better in the background no build year condition during both PM and Saturday peak periods. Hence, intersection improvements are not recommended for background no build year condition.

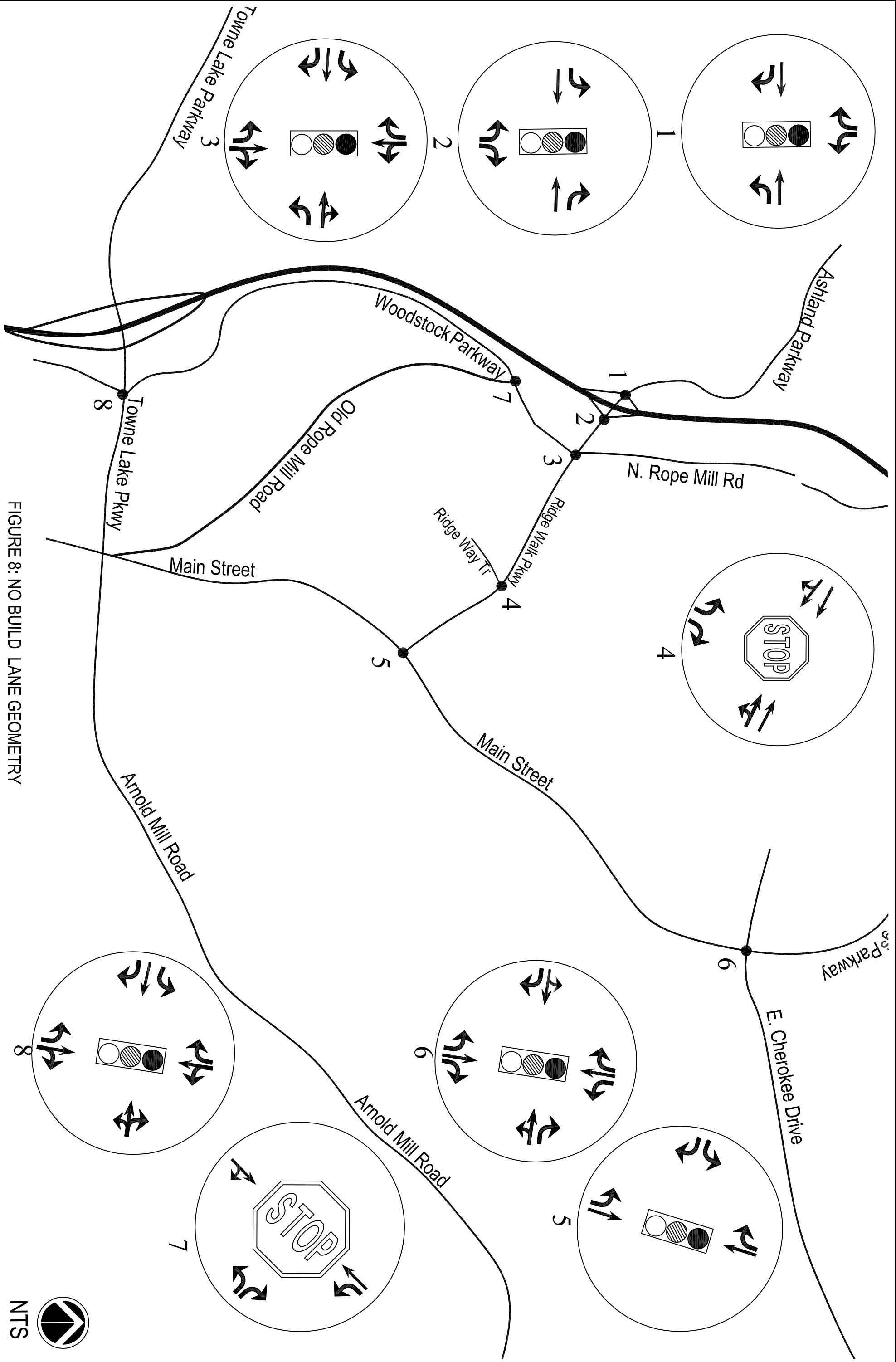
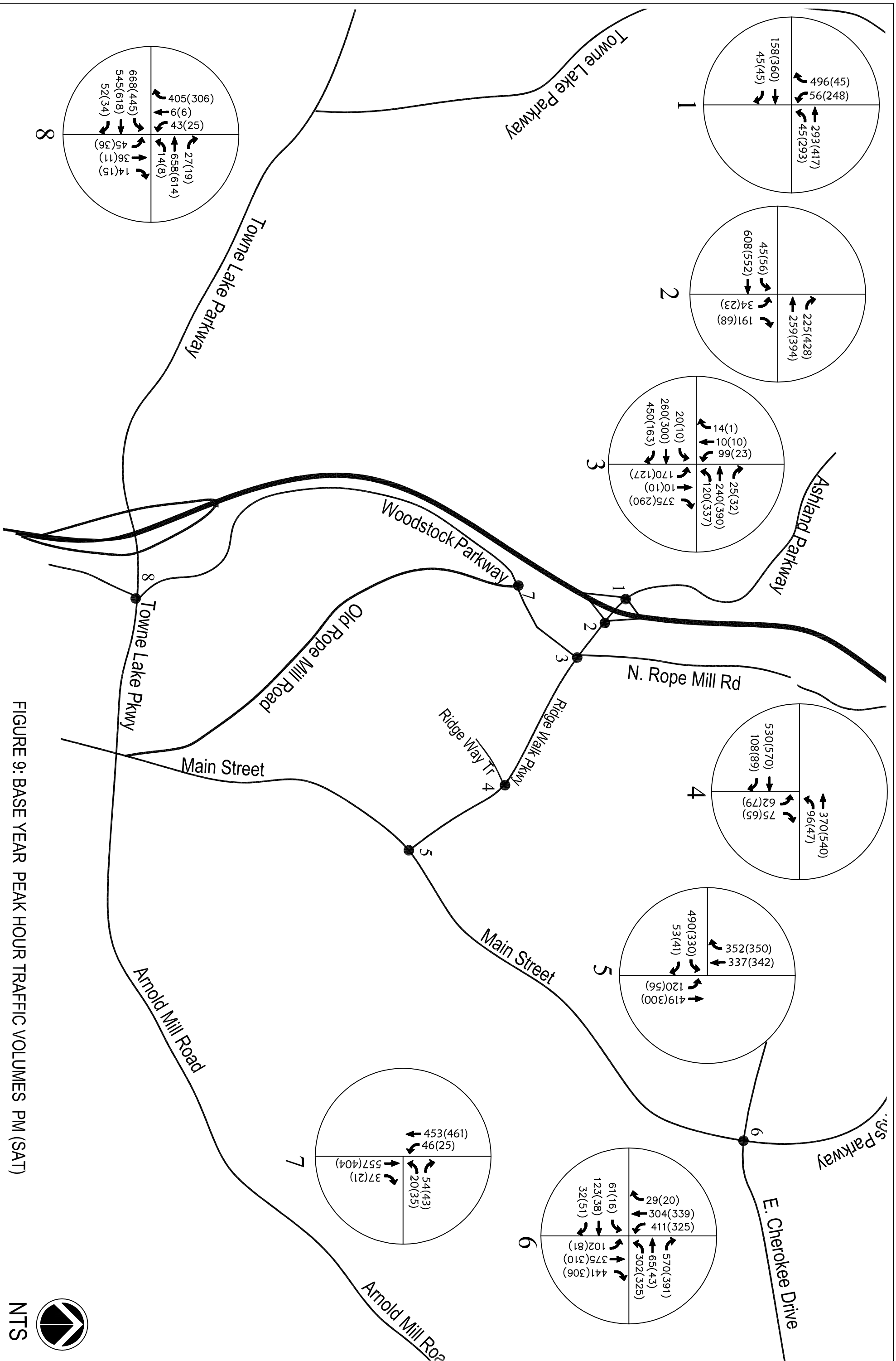


FIGURE 8: NO BUILD LANE GEOMETRY

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6.3 Future Condition with Ridgewalk Parkway / I-575 Interchange 2016 Build Traffic

The Outlet Shoppes of Atlanta development is currently scheduled to be built out by the end of 2016. The future condition is based on the projected build-out year traffic conditions along with the proposed full access interchange at Rope Mill Road and Interstate I-575 (GDOT project # 0006043). Apart from the interchange project, LAI Engineering in coordination with City of Woodstock are planning on realigning Woodstock Parkway to a new location to accommodate the proposed The Outlet Shoppes of Atlanta development.

Following are the changes that will be reflected in the future year condition (2016):

- Interchange along Ridgewalk Parkway @ I-575
- Main Entrance to the The Outlet Shoppes of Atlanta development along Ridgewalk Parkway aligning with N. Rope Mill Road.
- Woodstock Parkway realigned to accommodate the proposed development and a new intersection of Ridgewalk Parkway and Woodstock Parkway east of its current intersection
- Ridgewalk Parkway widened to two lanes on each direction as per the planned project PR -780-6(57)

Site generated trips anticipated to be produced by the proposed development were distributed along the proposed new roadway network to arrive at the anticipated number of trips at each study intersection in the future condition. Site generated trips to the site as well as anticipated future year trips (2016) are shown in **Figures 10 & 11**. The build analysis was performed using SYNCHRO 7.0 and the results are shown in **Table 8**. **Figures 12** shows build lane geometry.

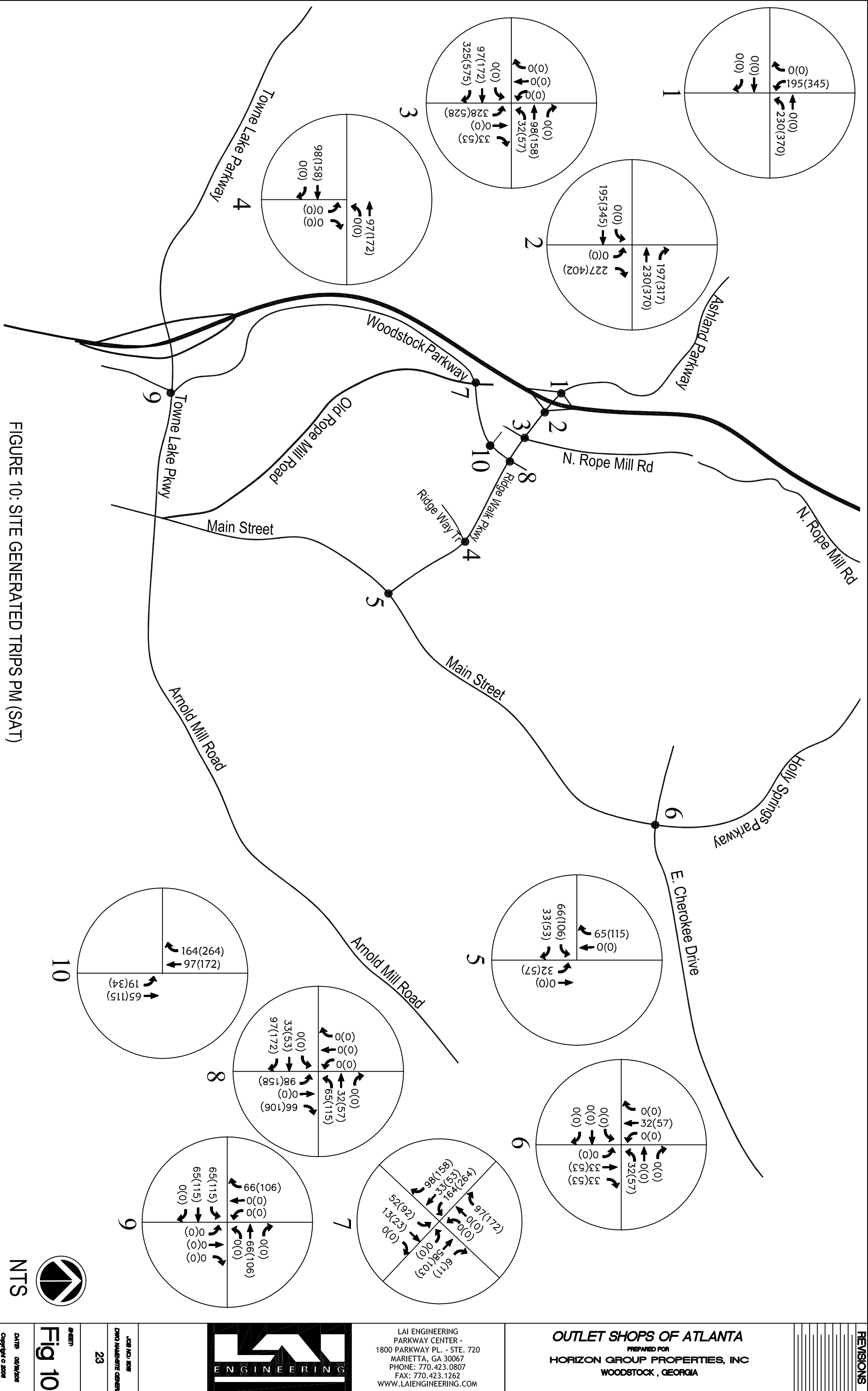


FIGURE 10: SITE GENERATED TRIPS PM (SAT)



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Fig 10

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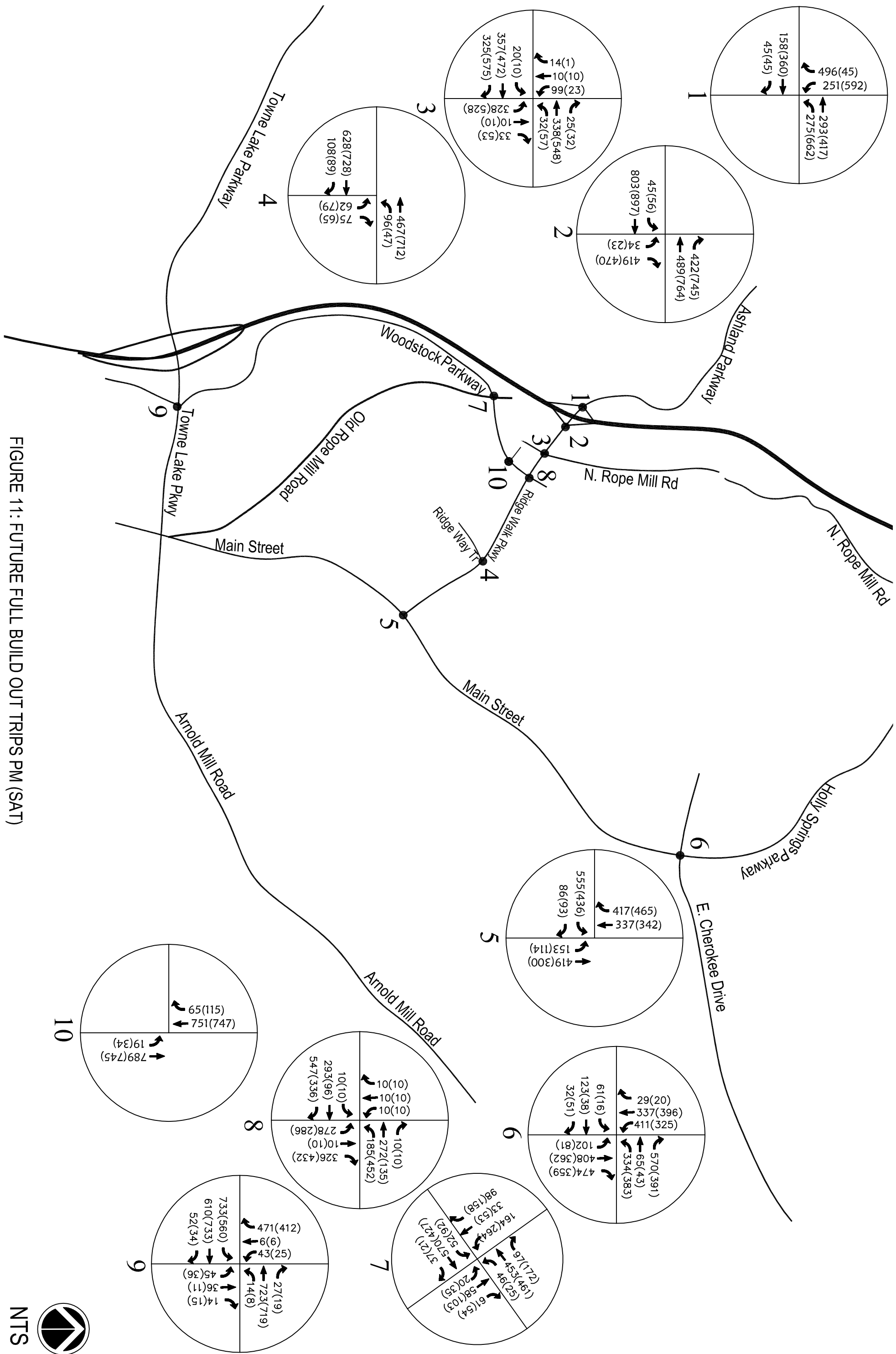


Table 8: Build 2016 Intersection Levels of Service (Delay, sec)						
Intersection	Traffic Control	Approach	PM Peak		Sat Peak	
			LOS	Delay	LOS	Delay
Towne Lake Pkwy @ Woodstock Pkwy	Signalized		D	52.1	D	36.2
Ridgewalk Pkwy @ Main St	Signalized		C	21.4	B	18.5
Woodstock Pkwy @ Rope Mill Rd / Driveway 1	Roundabout	North	B	12.0	D	27.0
		South	B	11.0	B	14.0
		East	B	11.0	C	21.0
		West	C	22.0	C	19.0
Ridgewalk Pkwy @ Woodstock Pkwy	Signalized		B	18.9	B	20.0
Ridgewalk Parkway @ Main Entrance/ N. Rope Mill Road	Signalized		B	15.8	C	29.7
Old Highway 5 @ E. Cherokee Dr	Signalized		D	55.0	C	33.4
Ridgewalk Pkwy @ Ridge Trail	Unsignalized	East	A	0.0	A	0.0
		West	A	3.2	A	2.0
		North	F	54.4	F	202.7
Ridgewalk Parkway @ I-575 SB Ramps	Signalized		B	10.5	E	74.5
Ridgewalk Parkway @ I-575 NB Ramps	Signalized		B	17.2	C	25.5
Woodstock Parkway @ Driveway 2	Unsignalized					
		North	A	0.2	B	0.5

* **NOTE:** It is important to note that it is not uncommon to have an un-signalized intersection to have an approach (usually a side street) to have an unacceptable LOS. This does not mean that the intersection as a whole is not operating at an acceptable level of service.

All the intersections are expected to perform at level of service of D or better in the future build year condition during both PM and Saturday peak periods. Except for the intersection of Ridgewalk Parkway and Ridge Trail, where the side street performs at a level of service F in the both peak hours. This kind of performance is not uncommon for side street traffic during peak hours in unsignalized conditions. A signal warrant analysis has been performed for this intersection and the results of the analysis are listed out in the sections that follow. Intersection improvements are not recommended for the future build year condition for all the other intersections.

7.0 Corridor Segment Study

Corridor analyses were performed along segments of Ridgewalk Parkway, Canton Highway and Woodstock Parkway. SYNCHRO 7.0 was utilized to calculate the existing, no-build and build corridor levels of service. A detailed segment analysis was completed based on those links within the study network, as defined by GRTA's Technical Analysis Guidelines. **Table 9** illustrates the results.

Table 9: Corridor Levels of Service				
	PM Peak Hour (LOS)		SAT Peak Hour (LOS)	
Ridgewalk Parkway				
Scenario	EB	WB	EB	WB
2011 Existing	B	A	B	A
2016 No-Build	C	B	D	B
2016 Build	D	C	E	D
Canton Hwy.				
Scenario	NB	SB	NB	SB
2011 Existing	B	A	B	A
2016 No-Build	B	A	B	A
2016 Build	C	B	B	A
Woodstock Parkway				
Scenario	NB	SB	NB	SB
2011 Existing	A	B	A	B
2016 No-Build	A	C	A	B
2016 Build	B	C	D	B

The results of the detailed segment analysis reveal that Ridgewalk Parkway, Canton Hwy and Woodstock Parkway will operate at acceptable levels of service during all analyzed scenarios per the outlined technical guidelines in GRTA's Letter of Understanding.

8.0 Identification of Planned Projects

The ARC's Transportation Improvement Program, Regional Transportation Improvement Program, State Transportation Improvement Program and GDOT's Construction Work Program were researched to determine the sponsors, funding source and projected improvements to be made to all roadways and intersections within the study network. See below for identified programmed projects. See **Appendix B** for the detailed information for ARC and GDOT

- CH-AR -225: I-575 at Ridgewalk Parkway – New Interchange
- PR-780-6(57) Widening of Ridgewalk Parkway to a four lane highway.
- AR – 917: I -575 from I-75 North to SR 5 business in Cherokee County
- CH- 208: Towne Lake Parkway signal interconnection and coordination at 13 locations within 0.5 miles of I- 575 Interchange
- AR-930: Northwest Corridor (I-75 and I-575) managed lanes at Akers Mill Road to Hickory Grove Road on I-75 and from I-75 to Sixes Road on I-575
- AR -625 Park and Ride facilities for Xpress bus service at Milly Lane in Southern Cherokee County
- CH- 190: Sixes Road from I-575 to Old SR 5 (Holy Springs Parkway) widening
- CH-AR- 259: Pedestrian Improvements along Main Street from Towne Lake Parkway to Serenade Lane
- CH- 167: Arnold Mill Road extension/connector from Main Street South of Ridgewalk Parkway to Arnold Mill road at Neese Road
- CH-168: Arnold Mill Road extension/connector from Main Street to Arnold Mill Road

9.0 Compliance with Comprehensive Plan Analysis

The site is currently zoned as “LI” (Light Industrial) and will require no additional rezoning. The Cherokee County Future Land Use Map identifies the site as “RAC” (Regional Activity Center). See **Figure 13** for the Cherokee County Current Zoning Map.

10.0 Conclusions

The proposed Outlet Shops at Atlanta development will consist of 433,000 SF of retail development on 50 acres of land along Ridgewalk parkway at I-575 in City of Woodstock, Georgia. The development will be built in two (2) phases and will be completed by the year 2016. However, for the purpose of the traffic study the development is assumed to be built in one phase with a full build out year of 2016.

The construction of the development will start before the build out of the interchange ramps for I-575 from Ridgewalk Parkway. The realignment of Woodstock Parkway to meet Ridgewalk Parkway east of the development will be performed simultaneously with the construction of the project. The developer is working with City of Woodstock for the coordination of that project.

The proposed development will consist of Outlet shops with the peak operating hours during late evening and during weekends. Peak congestion hours along Ridgewalk Parkway and I-575 ramps will be avoided due to the type of development. The development has sufficient access points from Ridgewalk Parkway as well as from Woodstock Parkway to distribute the traffic without causing congestion at one point. The development will have sidewalk on one side and 10' multi-use trail on the other along Ridgewalk Parkway and Woodstock Parkway as well as within the development for safe pedestrian access. Crosswalks will be provided at all the intersections and driveways in to the development.

10.1 Existing Traffic Analysis

Based on intersection analysis under the 2011 existing conditions, there were **no** intersections below the standard LOS D.

10.2 Future Background Conditions

A background growth of 2% was applied to the intersections. Future planned project of I-575 ramps with Ridgewalk Parkway were also included in the future background condition. Based on intersection analysis under the 2011 future background conditions, there were **no** intersections below the standard LOS D.

10.3 Future Build Conditions

Site generated traffic from the proposed The Outlet Shoppes of Atlanta were added to the future background traffic to arrive at the future condition traffic volume. Proposed driveways and re-alignment of Woodstock Parkway were considered in the analysis. Based on intersection analysis under the 2011 future conditions, most of the intersections perform at acceptable levels of service. The intersection of Ridgewalk Parkway and Ridge Trail performs at lower level of service; the side street performs at level of service F in both peak hour conditions. A signal

warrant analysis was performed for the intersection and the intersection warrants a traffic signal when the development is completely built and occupied.

10.4 Recommended Improvements

Intersection geometry improvements are not recommended for the proposed development. The developer in coordination with City of Woodstock is planning the following improvements to Ridgewalk Parkway and Woodstock Parkway.

- Ridgewalk Parkway along the frontage of the site
- Woodstock Parkway realignment
- Roundabout at the intersection of Woodstock Parkway and Rope Mill Road
- Possible signal at the intersection of Ridgewalk Parkway at Ridgeway Trail

10.5 Segment Analysis

As part of the DRI process, a detailed segment analysis for all major corridors in the study network had to be completed. Woodstock Parkway, Ridgewalk Parkway and Canton Highway were the three major segments analyzed. The analysis was completed for the existing year (2011) for both No-Build and Build scenarios (2016). The results of the detailed segment analysis reveal that Woodstock Parkway, Ridgewalk Parkway and Canton Highway will all operate at acceptable levels of service during all analyzed scenarios, per the outlined technical guidelines in GRTA's Letter of Understanding.

11.0 Signal Warrant Analysis – Ridge Walk Parkway at Ridge Trail

A traffic signal warrant investigation must be conducted to determine whether the installation of a traffic control signal is justified at a particular location. The Manual on Uniform Traffic Control Devices (MUTCD) explains the methodology for conducting an investigation. Traffic volumes in exclusive right turn lanes were excluded from the traffic signal warrant analyses. The MUTCD describes eight warrants that may be considered and three of them are applicable to our investigations.

Warrant 1 – Eight-Hour Vehicular Volume

The Minimum Vehicular Volume, Condition A, is intended for application where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

The Interruption of Continuous Traffic, Condition B, is intended for application where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Warrant 1 is met if the requirements for Condition A or Condition B are fulfilled for any eight hours of an average day or if a Combination of Warrants, 80% of Condition A and 80% of Condition B, is fulfilled for any eight hours of an average day.

Warrant 2 – Four-Hour Vehicular Volume

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. Warrant 2 is met if the requirements are met for any four hours of an average day.

Warrant 3 – Peak Hour

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. This signal warrant shall be applied only in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

LAI prepared an analysis of the traffic signal warrants found in the MUTCD for intersection of Ridgewalk Parkway and Ridge Trail for the future condition with the proposed The Outlet Shoppes of Atlanta development in place in the year 2016. The signal warrant analysis was performed using the 2000 version of PC-Warrants. This software compares traffic volumes and accident experience at an intersection with the traffic signal warrants found in the MUTCD.

LAI utilized the 24 hour ADT count data on Ridgewalk Parkway and Ridge Trail to project future background traffic volumes to 2016 using a growth rate of 3%. Trip Generation from the proposed development for the study intersection between 10:00 AM and 10:00 PM on a typical weekday were then added to the future background traffic. This trip generation is based on predicted hourly variations for shopping center traffic from the Institute of Transportation Engineers 6th Edition Trip Generation Manual. A signal warrant analysis was performed for the study intersection for the year 2016.

Appendix G shows the background traffic, the total hourly projections, and a printout of the results. **Table 10** summarizes the results of the traffic signal warrants analysis conducted.

Table 10: Signal Warrant Analysis			
Warrant	Criteria	Condition	Result
<u>1</u>			Satisfied
1A	Minimum Vehicular Volume	3 hrs – 8 hrs needed	Not Satisfied
1B	Interruption of Continuous Traffic	12 hrs- 8 hrs needed	Satisfied
1A & B	Combination Warrants	2 hrs – 8 hrs needed	Not Satisfied
<u>2</u>	4-Hour Vehicular Volume	15 hrs – 4 hrs needed	Satisfied
<u>3</u>	Peak Hour	Not Evaluated	
<u>4</u>	Pedestrian Volumes	Not Evaluated	
<u>5</u>	School Crossing	Not Evaluated	
<u>6</u>	Coordinated Signal System	Not Evaluated	
<u>7</u>	Crash Experience	Not Satisfied	
<u>8</u>	Roadway Network	Not Evaluated	

Using the future condition traffic volumes signal warrant analysis was performed at the study intersection. 100% right turn reductions were applied to the Ridgeway Trail. The results of the analysis are included in the Appendix. The analysis revealed the study intersection satisfies Warrants 1B and satisfies Warrant 2 (See **Appendix G**) for the future year 2016 with the proposed The Outlet Shoppes of Atlantadevelopment. Warrants 3, 4, 5, 6 and 8 were not evaluated, as they were not applicable to this study.

A traffic signal is warranted at the intersection in the future condition with the proposed The Outlet Shoppes of Atlantadevelopment. A stop and go traffic signal is warranted at the intersection when the development is complete and fully occupied.

12.0 Non Expedited Criteria

Regional Mobility and Location

1. Quality Character, Convenience, and Flexibility of transportation options

The increasing density of Cherokee County and City of Woodstock and the proximity of the proposed development to the City of Atlanta make this area a good location for proposing future transit facility and other alternative mode programs. There is current GRTA Express commuter service route originating from the Woodstock Community. Route 490 AND Route 491 provides four commuter coaches from Canton and Woodstock to Midtown and Downtown Atlanta, Monday-Friday. However, there is no transit facility that serves Ridgewalk Parkway in the study area. With the construction of the new interchange ramp, this location would be a good place to extend the transit service.

2. Vehicle Miles Traveled

The proposed DRI will mainly provide much needed retail shopping in close proximity to residential developments in Cobb, Cherokee and North Fulton Counties. The next nearest outlet shops for Cobb and Cherokee County are in Dalton, Georgia which is 50 miles further north and for North Fulton County they are in Dahlonega which is 25 miles north of North Fulton. This outlet shopping center would be the closest to Outlet Shops to City of Atlanta and north metro area thereby providing the potential for reducing vehicle miles traveled.

3. Relationship between Location of Proposed DRI and Regional Mobility

The proposed DRI will improve connections to the local area by providing access to adjacent developments in the future through new roadway connections.

4. Relationship between Proposed DRI and Existing or Planned Transit Facilities

The proposed development has some existing transit facilities in close proximity. However, there are no transit or shuttles services routes on Ridgewalk Parkway or Woodstock Parkway. Increasing density of Cherokee County makes it a good candidate for future transit facility planning.

5. Transportation Management Area Designation

The proposed project location comes under Cherokee County Comprehensive Plan which encourages alternative modes of transportation.

6. Offsite Trip Reduction and Trip Reduction Techniques

A 24% mixed-use reduction was applied to the development. A detailed discussion of mixed use reductions is provided in the trip generation portion of the report.

8. Relationships between Proposed DRI and Existing Development

The proposed DRI is located in an area where adequate public facilities will be available to serve the proposed development. Cherokee County Water and Sewer Authority will provide water and wastewater facilities for the development. Regarding transportation, the traffic study has identified transportation improvements required in the surrounding roadway network, which will allow traffic in the area to operate at the LOS standard. The construction of new I-575 ramps at Ridgewalk Parkway will relieve all the traffic coming from the surrounding areas.

Appendix

Appendix: A Study Network Determination

Appendix: B ARC Programmed Projects

Appendix: C Traffic Data Sheets

Appendix: D SYNCHRO 7.0 Capacity Analysis

Appendix: E Corridor Study Analysis

Appendix: F Full Size Site Plan

Appendix: G Signal Warrant Analysis – Ridgewalk Parkway at Ridgeway Trail

Appendix: A
Study Network Determination

Appendix: B
ARC Programmed Projects

Appendix: C
Traffic Data Sheets

Appendix: D
SYNCHRO 7 Capacity Analysis

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Corridor Study Analysis

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Full Size Site Plan

Appendix: G

Signal Warrant Analysis – Ridgewalk Parkway at Ridge Trail