

**Traffic Impact Study for  
Loganville Highway Tract  
DRI 2465**

A Mixed-Use Development on  
Loganville Highway (SR 20) at  
Oak Grove & Hope Hollow Roads  
&at Champion Way  
Southeast of Grayson in  
Gwinnett County, Georgia

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## Executive Summary

The proposed Loganville Highway Tract mixed-use development located on Loganville Highway (SR 20) southeast of Grayson in unincorporated Gwinnett County, Georgia will consist of approximately 642 single-family homes, 66 townhomes, and 52 villas with 569,616,000 square feet of retail/service/office land use building space. The site consists of five (5) separate parcels on both sides of SR 20. Vehicular access will be provided via the SR 20 existing signalized intersections at Oak Grove Road, Hope Hollow Road, and Champion Way from twelve (12) side-street site driveways, directly onto SR 20 via eight (8) right-turn in/out only driveways, and onto Ozora Road at Moon Road. The internal roadway network will allow access to all parking areas and buildings within each parcel. Sidewalks and trails will provide non-motorized access to all areas within each parcel and to adjacent parcels when developed, where feasible.

The development is expected to generate approximately 27,600 daily vehicular trips when completed in 2020. Upon completion, during a typical weekday morning peak volume hour approximately 393 entering and 562 exiting new vehicular trips are expected. During the evening peak hour, approximately 951 entering and 820 exiting new external vehicular trips are expected. During the evening peak hour, approximately 382 additional vehicular trips are estimated to begin and end within the development, or be replaced by non-vehicular travel, and 398 additional vehicular pass-by or diverted trips will consist of vehicles already on the adjacent roadway, not new vehicular trips outside the development area. The Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9<sup>th</sup> Ed and *Trip Generation Handbook*, 3<sup>rd</sup> Ed methodology, data, rates, and equations were used to calculate the new trips.

The directional distribution of the new trips was based on vehicular intersection turning movement counts and 24-hour bidirectional vehicular counts on adjacent roadways collected on Tuesday, January 13, 2015 (while Gwinnett County schools were in session), the existing external roadway network, area demographics, the internal roadways, area familiarity, and use of engineering judgment. Approximately 57% of the new trips are expected to originate and terminate to the northwest and 25% to the southeast of the development primarily using SR 20, with approximately 13% (primarily commercial generated) trips on Ozora Road to the northeast and 5% of the trips to the southwest on existing streets.

The existing vehicular peak hour counts were increased by one (1) percent compounded annually for five (5) years to estimate background traffic growth from other developments outside the area. The new trips expected to be generated by the development were added to the background volumes to estimate future traffic conditions in 2020 with and without the development trips. Intersection capacity analyses were conducted to determine existing and expected peak-hour average vehicle delay and Levels of Service (LOS) at each of the twelve (12) existing intersections and at the additional seventeen (17) new site accesses using *Synchro 9* (a nationally recognized analysis software) and Transportation Research Board (TRB) *2010 Highway Capacity Manual* methodology.

With the existing lane configurations and traffic control, all of the existing study intersections operate at adequate LOS and are expected to operate adequately in 2020, with or without the project traffic, with minimal changes. At the intersection of SR 20 at Ozora/Cooper Road during the PM peak hour, the average vehicle delay of approximately 64 seconds ("E" LOS) may occur when the project is completely built and. Changing the Ozora Road left turn phasing to protected/permitted would provide LOS "D". Also, conversion of the southeast bound SR 20 right-turn lane to a shared through and right-turn lane would also provide LOS "D" for the projected 2020 weekday PM peak traffic volume hour. With assumed SR 20 right-turn deceleration lanes at all access points (with right-turn raised channelizing islands), shared through and turning lanes, and stop sign or yield control at all of the new site access intersections, adequate overall signalized intersection and non-signalized approaches LOS is expected when the development is completed. However, it is recommended that separate dedicated turning lanes on new site approaches to the existing signalized and at the new side-street access intersections be constructed to provide safer movements and less vehicular delay caused by turning vehicles waiting for gaps in the traffic flow.

There were no currently funded future transportation improvement projects within the study area were identified likely to be constructed by 2020.

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## **1.0 Introduction**

The proposed Loganville Highway Tract mixed-use development will be located on Loganville Highway (SR 20) southeast of Grayson in unincorporated Gwinnett County, Georgia. The development, when completed in 2020, is planned to consist of approximately 642 single-family homes, 66 townhomes, and 52 villas with 569,616,000 square feet of retail/service/office land use building space.

The development site consists of five (5) separate parcels on both sides of SR 20 with vehicular access locations on Oak Grove Road, Hope Hollow Road, and Champion Way on the southwest side, directly onto SR 20 at the existing signalized intersections with these three (3) side-streets and via eight (8) restricted movement right turn in and right turn out only driveways, and onto Ozora Road at the existing intersection with Moon Road in the northern area of the development. Twelve (12) site driveways on Oak Grove Road, Hope Hollow Road, and Champion Way will provide vehicular access between the retail/commercial land use parcels and SR 20 and to the adjacent and nearby existing residential areas. Within each parcel, the internal roadway network will allow access to all parking areas and buildings. Within the northeastern parcel, internal roadways will provide vehicular access between the retail/commercial uses and the residential uses within the parcel and access to both SR 20 (at the existing Oak Grove Road signalized intersection) and to Ozora Road (at Moon Road.) Sidewalks and trails within the development will provide non-motorized access to all areas and to adjacent parcels, when developed, where feasible.

This study analyzed the proposed site access intersections expected operations:

- Collection of existing traffic data;
- Determination of the number of trips expected to be generated by the new development;
- Directional distribution and assignment of the new trips;
- Capacity analyses of the study intersections with the new trips; and
- Report of analyses results.

In the following sections, the analysis of traffic operations is described for existing conditions, and future conditions with the additional traffic. Finally, conclusions are presented. The overall site plan and individual site plans for each tract are included in the review package. A vicinity location map is included in the appendix.

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## **2.0 Existing Traffic Conditions**

SR 20 (Loganville Highway-Grayson Highway north of Cooper/Ozora Road) is a four-lane raised median divided roadway with curbs and gutters on both sides and a posted 45 mph speed limit. SR 20 provides access through Grayson to Lawrenceville and beyond, north of Atlanta to northwestern Georgia, and through Loganville to the south and southeast of Atlanta. Major intersections are signalized. The adjacent land uses in the project area are primarily residential, institutional, agricultural/vacant, and commercial at intersections.

Ozora Road is a two-lane local roadway with a 45 mph speed limit adjacent to the northern border of part of the site. Cooper Road continues to the southwest at the SR 20 signalized intersection. Ozora Road provides access to SR 81 to the east and nearby residential areas. Major intersections are signalized with dedicated left-turn lanes. The adjacent land uses in the project area are primarily residential, institutional, agricultural/vacant, and commercial at a few intersections.

Oak Grove Road and Hope Hollow Road are two-lane local roadways with 35 mph speed limits providing SR 20 access to and from residential and institutional land uses. Hope Hollow Road intersects with Oak Grove Road and continues to intersect with Cooper Road to the northwest (and continuing as Moon Road to SR 20). Oak Grove Road continues to the southeast, providing access to US 78. The intersections at SR 20 are signalized with left-turn lanes and right-turn raised channelizing islands.

Champion Way is a four-lane raised median divided local roadway providing access between SR 20 and the Grayson High School parking areas. The intersection at SR 20 is signalized with dedicated left- and right-turn lanes and raised right-turn channelizing islands. The signal is used in a stop and go operation only when needed and remains in flash for most of the day. Although an approximately 500-foot long eastbound SR 20 right-turn deceleration and storage lane with a dedicated receiving lane for free right turns into Champion Way has been provided, during approximately 15-25 minutes of the morning peak area, vehicular congestion was observed. This seems primarily due to inappropriate lane changes and merges on SR 20 and on Champion Way.

Moon Road at Ozora Road is a local un-paved dead-end residential street.

A figure showing the existing intersection lane configurations and controls is included in the appendix.

### **2.1 EXISTING VOLUMES**

Weekday vehicular counts were collected on Tuesday, January 13, 2015, when the Gwinnett County public schools were in session, during the peak volume hours of 6:45 to 7:45 AM and 4:30 to 5:30 PM at the study intersections as listed in Table 4-1. SR 20 24-hour bidirectional vehicular counts collected on the same day between the Oak Grove Road and Hope Hollow Road identified the highest volume four (4) consecutive 15-minute periods between 6-9 AM and 4-7 PM. The turning movement counts from the videos collected at all the study intersections were then counted for these specific hours. On January 13, 2015 there were 20,545 vehicles counted on SR 20, 6.5% were trucks, buses, or RVs and 1.5% were combination trucks. During peak hours, less than 2% were heavy vehicles.

The existing peak morning and evening turning movement volumes at the study intersections and new site access driveways were increased by one percent (1%) compounded annually for five (5) years to account for other developments that are not in the immediate vicinity, but that will contribute traffic to the road network (background growth). Growth of this nature is generally determined by examining historic trends in the vicinity of the subject site and by applying those trends to the appropriate roadways; however the historical growth rate for the last six years based on Annual Average Daily Traffic (AADT) provided by the Georgia Department of Transportation (GDOT) at counting stations in the vicinity of the site indicated declining traffic volumes, therefore a 1% growth rate was agreed upon to provide a conservative analysis of future traffic conditions. The traffic counts and figures showing the existing and background intersection turning movement volumes are included in the Appendix.

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### **3.0 Project Traffic**

The number of vehicle trips expected to be generated by the proposed development was estimated by applying the methodology, rates, and equations developed by the Institute of Transportation Engineers (ITE) as published in the *Trip Generation Manual*, 9th Edition, 2012 for Distribution Centers.

#### **3.1 TRIP GENERATION**

The numbers of new trips expected to be generated has been determined for the full build-out of the project in 2020. The results of the trip generation are shown in Table 3-1.

**Table 3-1 Trip Generation**

<b>Land Use</b>	<b>Code</b>	<b>Intensity</b>	<b>Units</b>	<b>Daily</b>	<b>AM IN</b>	<b>AM OUT</b>	<b>PM IN</b>	<b>PM OUT</b>
Single Family Homes	210	642	DU	5,810	115	344	353	207
Townhomes (& Villas)	230	118	DU	744	10	49	46	23
Total Residential Trips		760	DU	6,554	125	393	399	230
Internally Captured Trips Reduction				N/A	-3	-4	-97	-94
<b>New External Residential Trips</b>				<b>6,554</b>	<b>122</b>	<b>389</b>	<b>305</b>	<b>133</b>
Shopping Center	820	569.616	KSF	21,042	275	176	942	980
Internally Captured				N/A	-4	-3	-94	-97
Pass-by Diverted Trips				N/A	N/A	N/A	-199	-199
<b>New External Retail/Service/Office Trips</b>				<b>21,042</b>	<b>271</b>	<b>173</b>	<b>646</b>	<b>687</b>
<b>New External Project Trips</b>				<b>27,596</b>	<b>400</b>	<b>569</b>	<b>951</b>	<b>820</b>

#### **3.2 DIRECTIONAL DISTRIBUTION AND TRIP ASSIGNMENT**

The geographic distribution of the remaining trips generated by the development was the existing and proposed roadway network and existing traffic patterns in the area, engineering judgment and the land uses and densities of use in the area.

The directional distribution of the new trips was based on vehicular intersection turning movement counts and 24-hour bidirectional vehicular counts on adjacent roadways collected on Tuesday, January 13, 2015 (while Gwinnett County schools were in session), the existing external roadway network, area demographics, the proposed internal roadways, area familiarity, and use of engineering judgment.

Approximately 50% of the new trips are expected to originate and terminate to the northwest and 30% to the southeast of the development primarily using SR 20, with approximately 15% (primarily commercial generated) trips on Ozora Road to the northeast and 5% of the trips to the southwest on existing streets.

Figures showing the retail and residential directional distribution and project trips assignment are included in the appendix.

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## **4.0 Existing & Future Traffic Conditions**

The existing counted and estimated future background peak hour vehicular turning movement volumes were used to determine the adequacy of existing and background study intersection operations.

### **4.1 CAPACITY ANALYSIS: EXISTING & FUTURE BACKGROUND CONDITIONS**

Using the methodologies described in the EXPLANATION OF LEVEL OF SERVICE Section, the results of the capacity analysis for existing and future 2020 traffic conditions are presented in the following table.

**Table 4-1 2015 & 2020 Background LOS**

Intersection		Control	Approach/ Movement	2015 LOS		2020 LOS	
#	Name			AM	PM	AM	PM
1	Oak Grove Road at SR 20	Signal	Overall	B	B	B	A
2	Hope Hollow Road at SR 20	Signal	Overall	A	A	A	A
3	Champion Way Road at SR 20	Signal	Overall	B	C	B	B
4	Moon Road at Ozora Road	Side Street Stop Sign	NB LT	A	A	A	A
			EB	B	B	B	B
5	Ozora & Cooper Roads at SR 20	Signal	Overall	C	C	C	C
6	Sosebee Farm Road at SR 20	Signal	Overall	B	B	B	C
7	Grayson Parkway at SR 20	Signal	Overall	A	B	A	B
8	Herring Road at SR 20	Signal	Overall	B	B	B	B
9	Hoke O'Kelly Mill Road at SR 20	Signal	Overall	B	A	B	A
10	Brand Road at SR 20	Signal	Overall	B	B	B	B
11	Camp Mitchell Road at Ozora Rd	Signal	Overall	B	B	B	B
12	Cooper Road at Rosebud Road	Signal	Overall	B	B	B	B

As can be seen in table above, all of the study intersections operate and are expected to operate in 2020 at adequate Levels of Service (LOS) during both peak periods with existing lane configurations and controls. The intersection capacity worksheets included in the Appendix

### **4.2 CAPACITY ANALYSIS: FUTURE WITH PROJECT CONDITIONS**

The estimated vehicular trips for the project were added to the future background traffic volumes to represent the traffic expected when the project built-out. The following table reports the expected LOS.

For the purpose of these analyses, SR 20 right-turn deceleration lanes at all access points (with right-turn raised channelizing islands), site access approach shared through and turning lanes, and stop sign or yield control were assumed. Overall signalized intersection and non-signalized site access approaches LOS is provided. All existing through movements on SR 20, Ozora Road, Oak Grove Road, Hope Hollow Road, and Champion Way were not affected by the stop and yield controlled exiting vehicles and all entering right and left turn movements are expected to operate adequately; therefore these are not reported in the following table. The intersection capacity worksheets included in the Appendix show this.

However, it is recommended that separate dedicated turning lanes on new site approaches to the existing signalized and at the new side-street access intersections be constructed to provide safer movement and less vehicular delay caused by turning vehicles waiting for gaps in traffic blocking other vehicles.

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**Table 4-2 2020 with Project LOS**

#	Intersection	Control	Approach/ Movement	LOS w/project	
	Name			AM	PM
1	Oak Grove Road at SR 20	Signal	Overall	B	B
2	Hope Hollow Road at SR 20	Signal	Overall	A	B
3	Champion Way Road at SR 20	Signal	Overall	B	B
4	Moon Road at Ozora Road	Side-Street Stop Sign	NB LT	A	B
			SB LT	A	A
			EB	B	B
			WB	D	E
5	Ozora & Cooper Roads at SR 20	Signal	Overall	D	E
6	Sosebee Farm Road at SR 20	Signal	Overall	B	C
7	Grayson Parkway at SR 20	Signal	Overall	C	D
8	Herring Road at SR 20	Signal	Overall	B	C
9	Hoke O'Kelly Mill Road at SR 20	Signal	Overall	B	A
10	Brand Road at SR 20	Signal	Overall	B	C
11	Camp Mitchell Road at Ozora Rd	Signal	Overall	B	B
12	Cooper Road at Rosebud Road	Signal	Overall	B	B
13	NE Tract 1 Retail Dr at SR 20	Side St Stop	Southbound	B	C
14	NE Tract A Residential at SR 20	Side St Stop	Southbound	B	C
15	NW Tract 2 Retail Dr at SR 20	Side St Stop	Northbound	B	C
16	Main Tract 2 Retail Dr at SR 20	Side St Stop	Northbound	B	C
17	NE Tract 2 Retail Dr at SR 20	Side St Stop	Northbound	B	C
18	Tract 3 Retail Dr at SR 20	Side St Stop	Northbound	B	C
19	Tract 4 Retail Dr at SR 20	Side St Stop	Northbound	B	C
20	Tract 5 Retail Dr at SR 20	Side St Stop	Northbound	B	C
21	N Tract 2 Retail at Oak Grove Rd	Side St Stop	Westbound	B	B
22	W Tract 2 Retail at Oak Grove Rd	Side St Stop	Westbound	A	B
23	S Tract 2 Retail at Oak Grove Rd	Side St Stop	Westbound	A	B
24	S Tract 3 at Hope Hollow Rd	Side St Stop	Eastbound	B	B
25	N Tracts 3&4 at Hope Hollow Rd	Side-Street Stop Sign	Eastbound	B	C
			Westbound	A	B
26	NE Tract 5 at Champion Way	Side St Stop	Westbound	A	A
27	N Tracts 4&5 at Champion Way	Side-Street Stop Sign	Eastbound	D	B
			Westbound	A	A
28	S Tracts 4&5 at Champion Way	Side-Street Stop Sign	Eastbound	D	B
			Westbound	A	A
29	SW Tract 5 at Champion Way	Side St Stop	Eastbound	C	A

As can be seen in table above, all of the study intersections operate and are expected to operate in 2020 at adequate Levels of Service (LOS) during both peak periods with existing lane configurations and controls, with the exception of the intersection of SR 20 at Ozora/Cooper Roads during the evening peak hour. Changing the Ozora Road left-turn phase to protected/permitted or conversion of the southeast bound right turn lane to a shared with through lane would provide adequate LOS, although other lane configuration changes may also provide adequate operations in 2020.



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## **Explanation of Level of Service**

Capacity analyses of the study intersections were completed using procedures in the Transportation Research Board's *Highway Capacity Manual (HCM)*. This is the usual methodology for the analysis of traffic conditions. The software program *Synchro 8* (a nationally recognized computer software package for analyzing capacities and Levels of Service) was used to perform the actual capacity analyses for the key intersections.

Operating conditions at intersections are evaluated in terms of Levels of Service (LOS). LOS A through D are generally considered adequate peak hour operations. LOS E and F are generally considered inadequate conditions.

Levels of Service for signalized intersections are reported in composite fashion, i.e., one LOS for the entire intersection, and are based on average control delay. Individual turning movements at a signalized intersection may experience inadequate LOS, particularly where those volumes are relatively low, while the intersection as a whole has an adequate LOS. This is because the major movements on the major roadway are given priority in assigning signal green time.

Traffic conditions at un-signalized intersections, with STOP sign control on the minor street only, are evaluated for the minor street approaches and for the left turns from the major street. This is because the major street traffic is assumed to have no delay since there is no control (no STOP sign). Inadequate Levels of Service for minor street approaches to un-signalized intersections are not uncommon, as the continuous flow traffic will always get the priority.

Levels of Service for all-way STOP controlled intersections are reported both for key intersection movements, and in composite fashion, i.e., one LOS for the entire intersection, and are based on average control delay.

The *Highway Capacity Manual* Level of Service criteria for signalized and un-signalized intersections are shown in the following table:

**Highway Capacity Manual Intersection Level of Service Criteria**

LOS	Control Delay (seconds per vehicle)	
	Signalized Intersection	Unsignalized Intersection
A	$\leq 10$	$\leq 10$
B	$>10$ and $\leq 20$	$>10$ and $\leq 15$
C	$>20$ and $\leq 35$	$>15$ and $\leq 25$
D	$>35$ and $\leq 55$	$>25$ and $\leq 35$
E	$>55$ and $\leq 80$	$>35$ and $\leq 50$
F	$> 80$	$> 50$

*Source: Highway Capacity Manual.*

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**APPENDIX**

Traffic Counts

Trip Generation

Capacity Analyses

Figures