

GA SR 25 Spur at Canal Road Transportation Impact Analysis



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TRAFFIC IMPACT STUDY GLOSSARY

Access Point = An intersection, driveway, or opening on a public street providing entry to a private development or property.

ADA= Americans with Disabilities Act

Adjacent Street Traffic= All traffic with direct access to a development site

Arterial= A signalized street that primarily serves through traffic and that secondarily provides access to abutting properties, with signal spacing of 2.0 miles or less.

At-Grade Intersection= The location at which two roadways cross and join at the same vertical elevation; access through the intersection may be controlled by traffic signals or stop/yield signs

Background Conditions= Conditions affecting the performance of the transportation network not directly related to the subject development over a designated time period, such as growth in existing traffic volumes, other planned, approved or current developments in the study area, and planned improvements to the transportation network

Capacity= The maximum sustainable flow rate at which vehicles or persons reasonably can be expected to traverse a point or uniform segment of roadway during a specified time period under given roadway, geometric, traffic, environmental, and control conditions, usually expressed as vehicles per hour.

Collector= A roadway with no control of access linking residential communities with the arterial system

Cycle= The time period required for one complete sequence of traffic signal indications

Delay= The additional time experienced by a roadway user, typically motorists as a result of constrained movements and deviation from ideal or free flow speeds

Generator= a land use that attracts vehicle, pedestrian, or other modes of traffic

Highway Capacity Manual= A publication of the National Academy of Sciences Transportation Research Board that provides a collection of the state-of-the-art techniques for estimating the capacity and determining the level of service for transportation facilities; first published in the 1950s and most recently published in 2000.

Internally Captured Trip= A trip originating and destined for different land uses within the same development but not traveling on a public street

Level of Service= A qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed, travel time, freedom to maneuver, traffic interruption, comfort and convenience.

Modal Split= The percentage of people using a particular means of transport, such as auto, transit, or walking, to make a trip

Multi-modal= A transportation facility for different types of users, modes, or vehicles.

Pass-by Trip= An intermediate stop on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street or roadway that offers direct access to the development.

Peak Hour= The one-hour period of greatest utilization of a transportation facility; weekdays normally have two peaks, one in the morning and one in the afternoon

Phase= A portion of a traffic signal cycle allocated to any traffic movement or combination of traffic movements

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Split-Phased Mode= A type of signal control where all movements from one side street at a time move concurrently

Trip/Trip End= A single or one-direction movement by any mode of travel with the origin or destination (exiting or entering) inside the study development.

INTRODUCTION

The intersection of GA SR 25 Spur at Canal Road is located in Brunswick Georgia as shown in Figure 1. GA SR 25 Spur (Golden Isles Veteran Memorial Parkway) is a major arterial that provides access from I-95 to the Golden Isles region. There are numerous commercial developments along GA SR 25 Spur, though access is not provided to these developments directly from GA SR 25 Spur to maintain the traffic flow on that major highway. Canal Road is a minor two lane arterial that connects local residential neighborhoods to SR 25 Spur and provides access to the Brunswick Golden Isles Airport.

The report is divided in three sections; first the existing conditions are evaluated and documented including the existing roadway network, existing traffic volumes, and existing intersection capacity and level of service. Secondly, Year 2015 conditions are analyzed including the regional growth in existing traffic volumes, traffic from other nearby planned, approved, or current development activity, and planned improvements to the transportation network. Lastly, the Year 2015 build conditions are evaluated including the total future traffic volumes, and future intersection capacity and Level of Service (LOS).

Figure 1 – Study Area (Not to Scale)



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Sources of data for this study include traffic counts collected by Vision Engineering and Planning, signal timing data provide by the Georgia Department of Transportation, and roadway and intersection conditions as inventoried in the field by Vision Engineering and Planning, LLC.

Analysis was conducted for the existing conditions. The Highway Capacity Manual 2010 (HCM) methodology was employed through Synchro version 7.0 for all capacity analysis.

EXISTING CONDITIONS

Existing Road Network

The intersection of GA SR 25 Spur at Canal Road is located south of Interstate 95 in Glynn County, Georgia. GA SR 25 Spur is the gateway into the Golden Isles region and as such carries a significant amount of traffic during the morning and evening peak hours.

The following is a description of some of the roads in the vicinity of the site:

- *GA SR 25 Spur*
GA SR 25 Spur is a principal arterial with a four lane cross section that provides direct access from I-95 to Brunswick and the Golden Isles Region. The orientation of the highway leads to a number of skewed intersections along the corridor including the intersection of GA SR 25 Spur at Canal Road. There are a number of commercial areas including Glynn Place Mall located along GA SR 25 Spur; however access is not directly provided to these developments from GA SR 25 Spur to maintain the traffic flow on this highway. The posted speed limit on GA SR 25 Spur is 50 mph.
- *Canal Road*
Canal Road is a two lane highway that will be the primary access point for the Canal Crossing development. Canal Road provides access to the Brunswick Golden Isles Airport to the east. There is currently a Raceway gas station located on the southern side of Canal Road directly south of GA SR 25 Spur. The posted speed limit on Canal Road is 35 mph.

Vision Engineering and Planning, LLC conducted field reconnaissance to obtain the existing lane usage and traffic controls at the intersections within the study area. Figure 2 presents the local roadway network of the study area and existing lane use and configurations.

Existing Traffic Volumes

Turning movement traffic counts were conducted at the intersection of GA SR 25 Spur at Canal Road during the month of May between 7:00 a.m. and 9:00 a.m., and 4 p.m. and 6 p.m. The results of the traffic counts are included in the Appendix B and summarized on Figure 3.

Existing Capacity Analysis

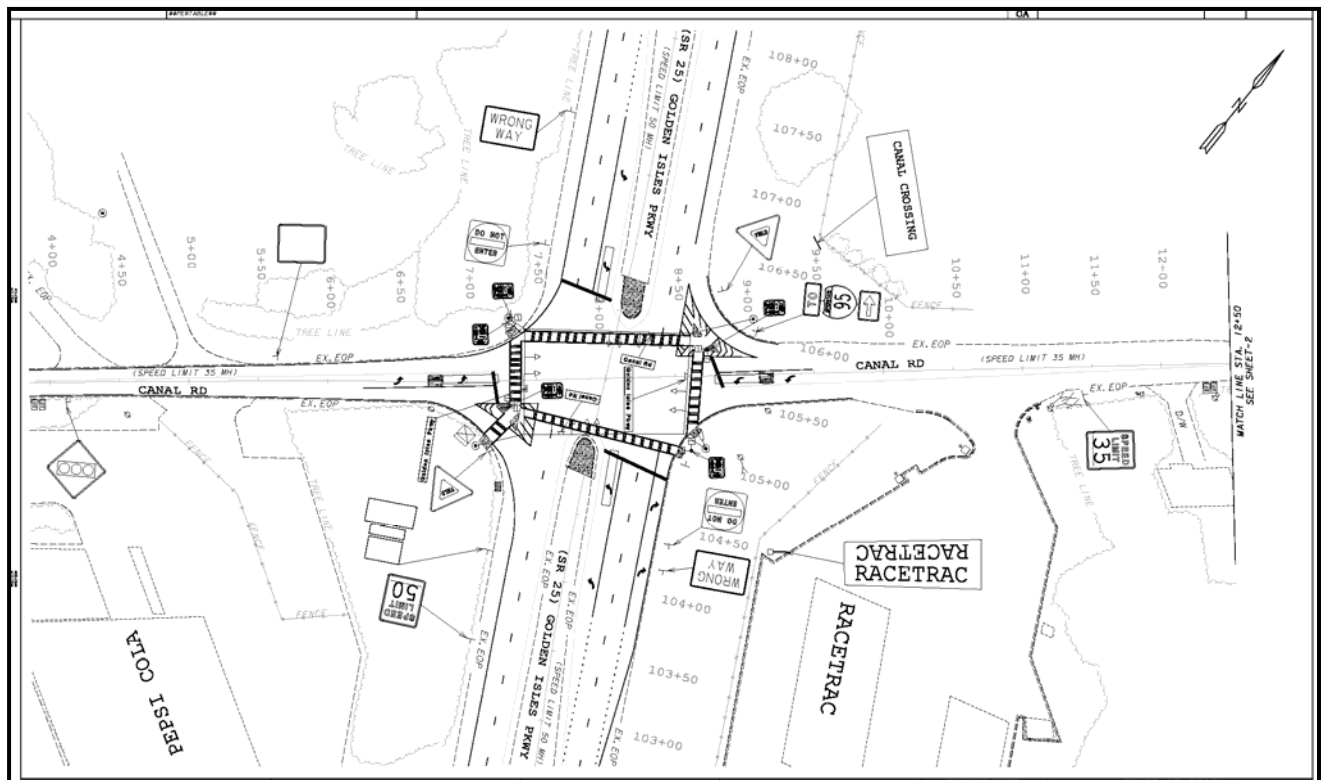
Capacity analyses were performed to determine the existing Level of Service (LOS) and volume-to-capacity (v/c) ratios for the a.m. and p.m. peak hours for the study intersection. A LOS grade is essentially a measure of the quality of service to the user through a letter grade based on the average delay experienced by motorists traveling through a particular intersection. Levels of

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service results range from LOS A being the best to LOS F being the worst. LOS D is typically used as the acceptable LOS threshold for many cities and counties. Sometimes LOS E and F are accepted in certain highly urbanized and constrained areas.

The volume-to-capacity ratio is an indicator and measure of the adequacy of the capacity of the intersection. This included the physical geometry design features and the signal operations. If the value of the v/c ratio is closer to zero, then this represent “under capacity” operations; if the value of the v/c ratio approaches 1 or the value is 1, then this implies that the intersection operates “near” or “at” capacity, respectively. If the v/c ratio is above 1, then the intersection is over its capacity or congested. The *Highway Capacity Manual 2000* (HCM) methodology, through Synchro, was used for all analyses. For unsignalized intersections, the LOS is reported for the minor street or left turn movement that experiences the highest delay at the intersection.

Figure 2 – Existing Lane Use and Traffic Controls



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Figure 3 – Existing Traffic Counts

AM Peak Hour



PM Peak Hour



The existing LOS capacity analyses were based on: (1) the existing lane use and traffic controls shown on Figure 2; (2) the peak hour traffic volumes at each study intersection on Figure 3; and (3) the *Highway Capacity Manual 2010* (HCM) methodologies (using Synchro 7 software). Copies of the LOS calculation worksheets are included in the Appendix B.

Table 1 summarizes the results of the capacity analyses.

Table 1 – Existing Levels of Service Results

Study Intersections	Summary of Results							
	Existing		Future Background				Future	
	AM	PM	AM	PM	AM	PM		
GA SR 25 Spur	C	C						
Canal Rd at Canal Crossing Main Entrance (proposed road)	NA	NA						
Canal Rd at West Entrance (proposed road)*	NA	NA						

Note: * The stop approach delay reported for LOS for this intersection

The analysis shows that the intersection of GA SR 25 Spur at Canal Road is currently operating at LOS C during the AM and PM peak hours.

Field Observations during Data Collection

The results of the existing capacity analysis correctly represent the existing observed operations. However, there are several traffic issues that were identified during field observations that cannot be reproduced in the analysis. These are discussed below.

Intersection Skew

During field observations, the left turning vehicles on Canal Road were observed to have difficulty with the sight distance related to opposing left turns and the skew of the intersection. A number of near-misses were observed as both of the left turn movements on Canal Road are currently permissive.

Raceway Driveway

The Raceway gas station driveway is currently located approximately 200 feet east of the GA SR 25 Spur. The short distance between the driveway and the intersection make it difficult for vehicles to turn left out of driveway and leads to aggressive and unsafe turning maneuvers.

FUTURE BACKGROUND CONDITIONS

The Year 2015 Background Conditions includes the following assumptions:

- Growth in existing traffic volumes over the study period due to regional growth,
- Other planned, approved or current developments in the study area,
- Planned improvements to the transportation network by the County and/or State in the study area

A. Growth in Existing Traffic Volumes

As the existing traffic counts were collected in 2014, one years growth (3%) in existing traffic volumes was assumed on GA SR 25 Spur to account for regional growth in the county.

B. Approved Developments

Based on information on planned, approved and current development activity in the study area provided by the Glynn County Department of Planning, the following developments were included for the Year 2015 background conditions analysis:

1. 200 unit apartment complex
2. 10K Square Foot convenience store

C. Transportation Network Improvements

GDOT is currently extending the existing left turn lanes on SR 25 Spur at Canal Road to 800'. These improvements are under construction.

D. Future Background Intersection Capacity and Level of Service

A capacity analysis was performed for the future background conditions with the results summarized in Table 2. Detailed HCM worksheets are included in Appendix C.

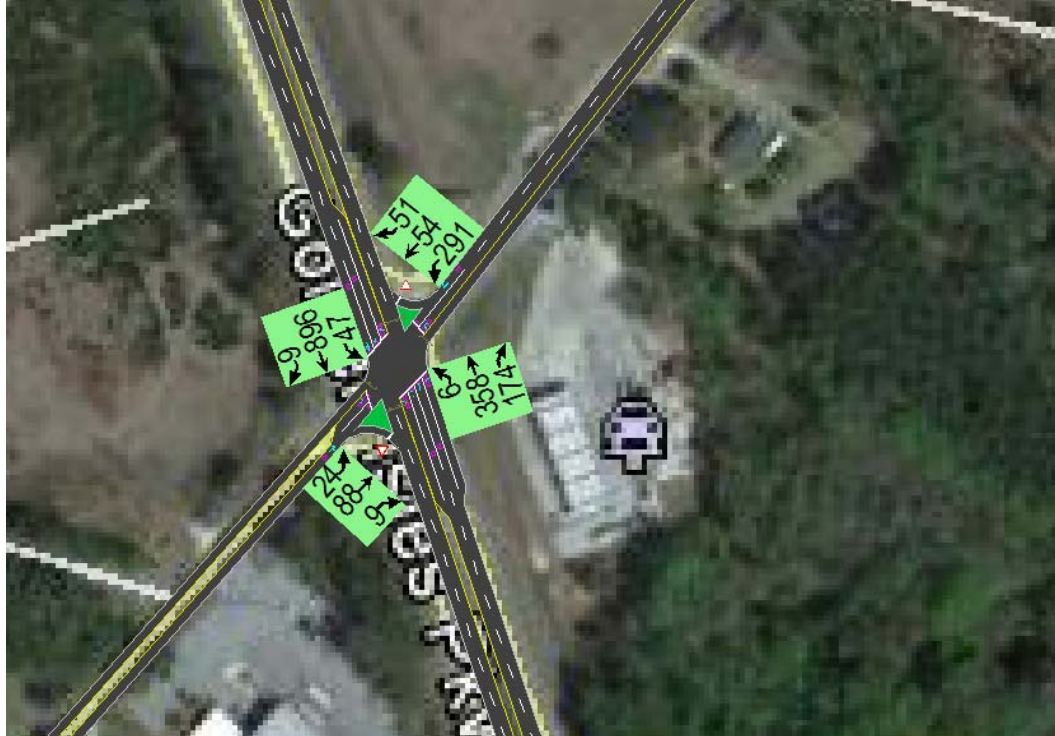
Table 2 – Background Levels of Service Results

Study Intersections	Summary of Results							
	Existing		Future Background				Future	
	AM	PM	AM	PM	AM	PM	AM	PM
GA SR 25 Spur	C	C	D	D				
Canal Rd at Canal Crossing Main Entrance (proposed road)	NA	NA	NA	NA				
Canal Rd at West Entrance (proposed road)*	NA	NA	NA	NA				

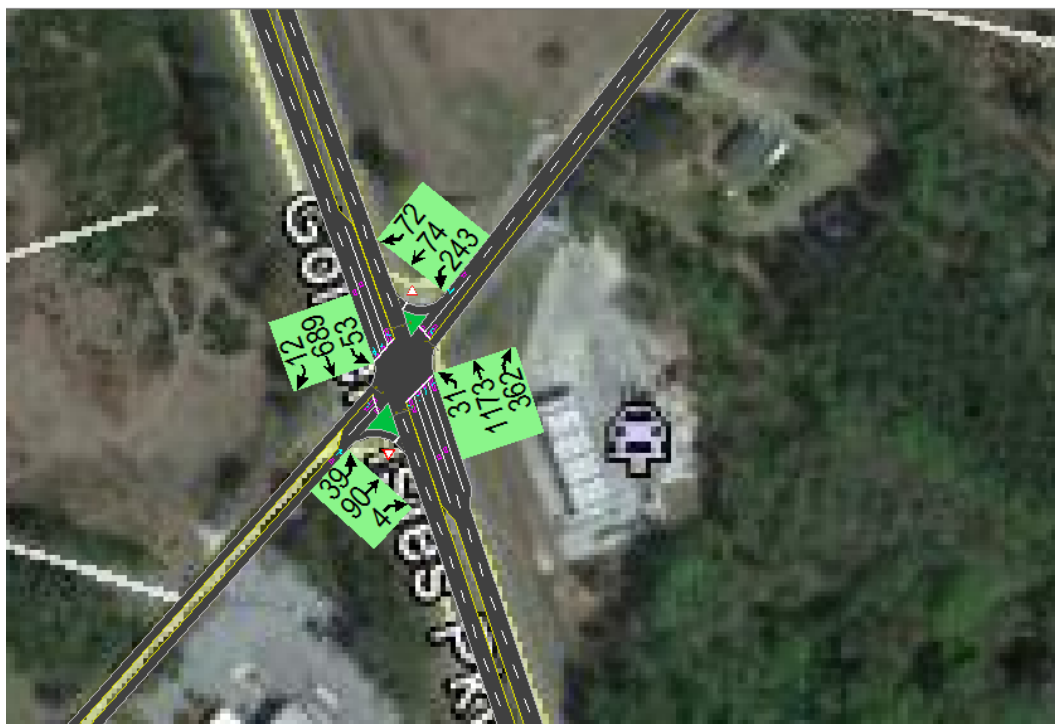
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The results of the future year 2015 background conditions capacity analysis indicate that the intersection of GA SR 25 Spur at Canal will operate at a LOS D during the AM and PM peak hours.

Figure 4 – Future Background Traffic Volumes
AM Peak Hour



PM Peak Hour



FUTURE BUILD CONDITIONS

The Canal Crossing development will be located on Canal Road east of GA SR 25 Spur. The development will include two access points, including a main access point that will be signalized on Canal Road. The Canal Crossing development will include 359,000 square feet of retail in the first phase and an additional 42,000 square feet of restaurant space at full build out.

A. Transportation Network Improvements

In support of the Canal Crossing development, the developer is planning to improve Canal Road to a three lane cross section including turning lanes at the new intersections into the sight development. The cross section includes two receiving lanes east of GA SR 25 Spur to accommodate a potential dual left turn lane on the southbound SR 25 Spur approach. There will also be a new traffic signal on Canal Road at the main entrance into the development.

B. Trip Generation and Distribution

Projecting the number of new vehicular trips generated by proposed development is the most critical aspect of assessing traffic impact. The objective of a trip generation analysis is to forecast the number of new trips that will begin or end at a proposed land use. A primary source for data on vehicular trip generation is the Institute of Transportation Engineers Trip Generation 9th Edition handbook. The handbook compiles data from numerous studies of vehicular trip rates at hundreds of specific types of land uses such as recreational, residential, commercial, office, institutional, and industrial throughout the country. The data is sorted by various time periods such as morning and evening peak hour, and plotted against independent variables for specific land uses such as square feet of commercial space, number of hotel rooms, number of dwelling units, etc. The data is presented in chart format with mean trip rates, standard deviations, and fitted curve linear regression equations, where enough data is available.

Several site-specific factors can reduce the number of new personal vehicular trips generated by a new development or land use. These include 1) the availability of alternative modes of transportation such as sidewalks, bicycle facilities, and public transportation, 2) the effect of pass-by traffic which includes personal vehicles already on the roadway network making an intermediate stop on the way from an origin to a primary trip destination without a route diversion, and 3) the effect of internally captured trips composed of traffic originating and destined for different land uses within the same development that do not travel on the public roadway network. An example of an internal trip would be a trip from an office building to a restaurant or from a hotel to an office building within the same development.

For this study, the ITE Trip Generation Manual, 9th Edition peak hour trip generation rates were

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determined based on current land uses. The average number of vehicular trip ends and percentage of entering and exiting volumes were calculated using the land uses for Specialty Retail Center and High-Turnover (Sit-Down) Restaurant for the build conditions, and Low Rise Apartment and Convenience Store for the background conditions.

Table 3 – Canal Crossing Trip Generation

	Land Use	ITE Code	Sq Ft or DU	Daily Trip Rate	Daily Trips	AM Trip Rate	AM Trips	Internal Cap	Transit/Ped	Pass By	Final AM	In	Out	PM Trip Rate	PM Trips	Internal Cap	Transit/Ped	Pass By	Final PM	In	Out
Background	Apartment	220	200	6.72	1344	0.51	102	0	0	0	102	20	82	0.62	124	0	0	0	124	81	43
	Convenience Market	852	10	737.77	7378	31.02	310	0	0	152	158	79	79	34.57	346	0	0	169	176	86	90
	Total				8722							260	100	161					300	167	133
Build	Speciality Retail Center	814	134.55	44.32	5963	6.84	920	0	0	276	644	309	335	5.02	675	0	0	203	473	265	208
	Speciality Retail Center	814	62.182	44.32	2756	6.84	425	0	0	128	298	143	155	5.02	312	0	0	94	219	122	96
	Speciality Retail Center	814	55	44.32	2438	6.84	376	0	0	113	263	126	137	5.02	276	0	0	83	193	108	85
	Speciality Retail Center	814	30	44.32	1330	6.84	205	0	0	62	144	69	75	5.02	151	0	0	45	105	59	46
	Speciality Retail Center	814	22	44.32	975	6.84	150	0	0	45	105	51	55	5.02	110	0	0	33	77	43	34
	Speciality Retail Center	814	30	44.32	1330	6.84	205	0	0	62	144	69	75	5.02	151	0	0	45	105	59	46
	Fast Food Restaurant	934	7.5	496.12	3721	53.11	398	0	0	199	199	102	98	34.64	260	0	0	130	130	68	62
	Speciality Retail Center	814	18	44.32	798	6.84	123	0	0	37	86	41	45	5.02	90	0	0	27	63	35	28
Total				18512							1797	869	929					1303	724	578	
Full Build	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	High Turnover Restaurant	932	3.5	127.15	445	11.52	40	0	0	17	23	12	11	10.92	38	0	0	16	22	13	8
	Total				5340							276	143	132					261	159	102

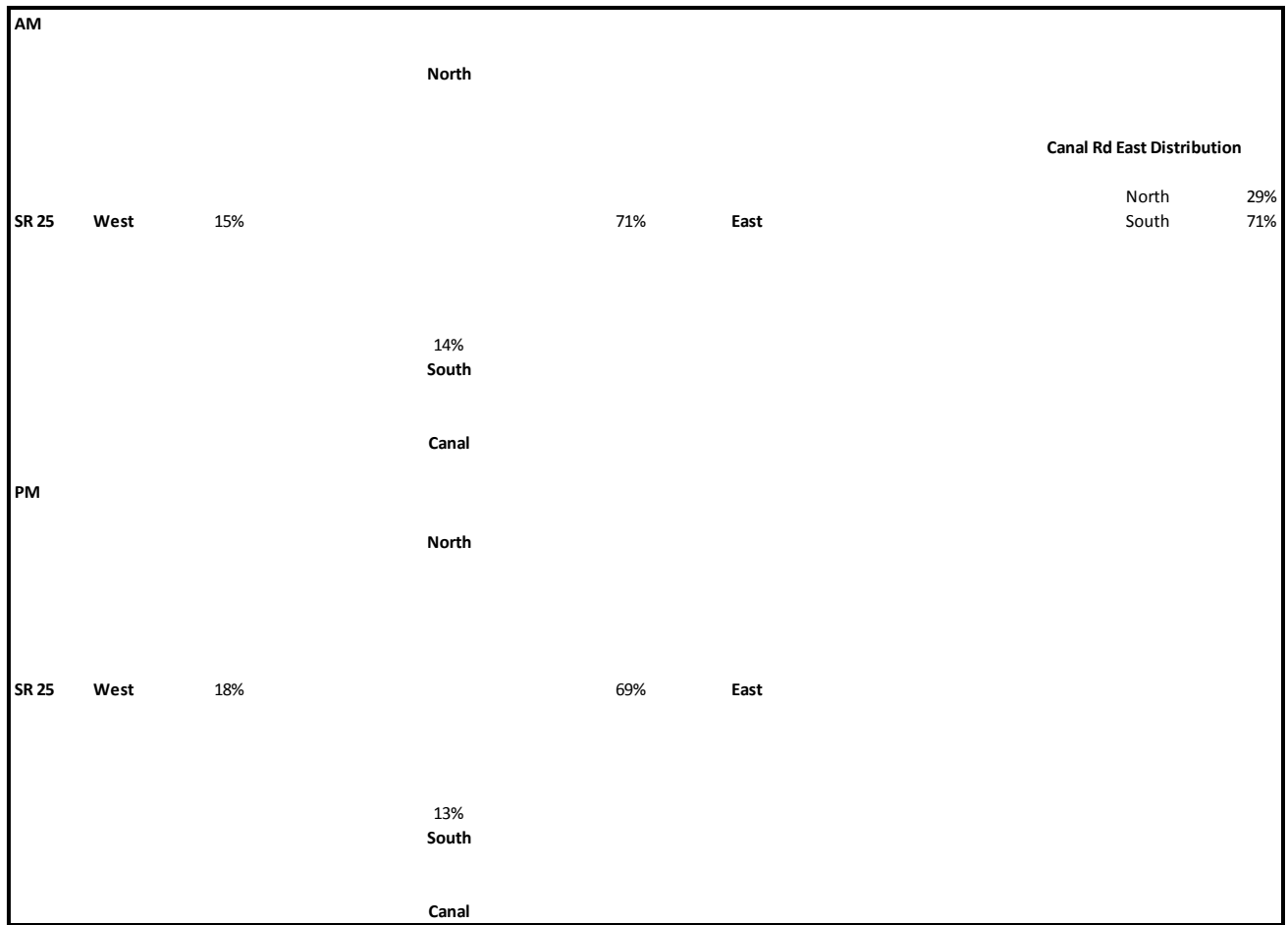
Information for pass-by and internal capture trip rates for mixed-use developments can also be found in the Trip Generation Handbook. In addition, if there are multiple land uses and specialty retail within the development which would also effectively reduce vehicular trips, pass-by and/or internal capture reductions were calculated for the subject developments. The projected trip generation is summarized in Table 3.

The proposed developments are projected to generate, after applicable trip reduction factors, a total of 32,574 new daily vehicular trips, of which 2333 will occur during the AM peak hour and 1864 will occur during the PM peak hour.

C. Distribution of Site Trips

The distribution of site trips is based on existing traffic patterns, land uses and access points to the proposed development and is summarized as shown in the following figure:

Figure 5 – Future Trip Distribution



It should be noted that the trips from the north will be able to access the development from Glyngo Parkway and it was assumed that 25% of the trips from the north direction would access the development via Glyngo Parkway. The build forecasts are shown in Appendix E.

D. Future Intersection Capacity and Level of Service

A capacity analysis was performed for the future conditions with the results summarized in Table 4. Detailed HCM worksheets are included in Appendix C. The results of the future year full build conditions capacity analysis indicate that the intersection of GA SR 25 Spur at Canal Road will operate at a LOS F during the AM and PM peak hours. The main site entrance at Canal Road would operate at LOS D during the AM peak hour and a LOS B during the PM peak hour. The west entrance into the sight would operate at a LOS F during the AM and PM peak hours based on the delay observed on the minor street approach.

Table 4 – Future Build Levels of Service Results

Study Intersections	Summary of Results							
	Existing		Future Background 2015		Future Build 2015			
	AM	PM	AM	PM	AM	PM		
GA SR 25 Spur	C	C	D	D	F	F		
Canal Rd at Canal Crossing Main Entrance (proposed road)	NA	NA	NA	NA	D	B		
Canal Rd at West Entrance (proposed road)*	NA	NA	NA	NA	F	F		

In addition, given the proposed development will include a Sam’s Club and Hobby Lobby, a Saturday peak hour analysis was completed for the study corridor. The daily weekday trip generation rate for Specialty Retail is 44.32 per 1000 square feet of space and 42.04 for Saturday. Given the similarities between the daily rates, and the lack of peak hour trip rate information for Saturday, the weekday PM peak hour trip generation rate was used for Saturday as well. The results of the Saturday analysis yielded similar (identical intersection delay at GA SR 25 Spur and Canal Road) results as the PM weekday peak hour, therefore the recommendations developed for the weekday peak hour analysis will also effectively mitigate the impacts on Saturday as well.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The capacity analyses contained in this report provided the following results:

- *Existing Conditions (2014)*
Under existing conditions the intersection GA SR 25 Spur at Canal Road operates at a LOS C during the AM and PM peak hours.
- *Future Background Conditions (2015)*
The results of the future background capacity analyses show that the intersection of GA SR 25 Spur at Canal Road would operate at a LOS D during the AM and PM peak hours.
- *Total Future Conditions (2015)*
The intersection of GA SR 25 Spur at Canal Road would operate at LOS F during the AM and PM peak hours without additional improvements. The intersection of the main site entrance at Canal Road would operate at a LOS D during the AM peak hour and a LOS B during the PM peak hour. The west entrance into the sight would operate at LOS F during the AM and PM peak hours.

Based on these results, vehicular traffic generated by the proposed Canal Crossing will require improvements to mitigate the projected failing LOS at the intersection of GA SR 25 Spur at Canal Road. Through discussions with the developer and the county, modifications to the Canal Road design concept have already been made to improve traffic flow on Canal Road and maintain a LOS D or better at the site entrances. The recommendations include conducting a future signal warrant assessment at the west entrance into the site development as a traffic signal would improve the LOS at this intersection to B or better during the AM, PM, and Saturday peak hours. It should be noted that the distance between the access points (300-500') are below the standard minimum of 800' typically recommended for signal coordination. This may require using one controller for multiple intersections to effectively maintain simultaneous green indications on Canal Road for all of the study intersections. The signal coordination could be achieved with either fiber optic or wireless communication depending on the existing infrastructure in the field. Additional improvements incorporated into the Canal Road design include right in-right out only turns into the Raceway driveway which would eliminate the conflicts between left turning vehicles and thru movements on Canal Road, and left turn lanes on the approaches of the main site entrance at Canal Road. A traffic signal is proposed at the main site entrance on Canal Road, and this signal is recommended to have a protected/permissive left turn phase on the SB Canal Road approach to accommodate the forecast left turn movement into the Canal Crossing development.

Recommendations

- Add a left turn lane on the westbound approach of Canal Road to form a dual left turn lane. This improvement would require modifying the left turn phasing on this approach from permitted left turn phasing to protected only left turn phasing. This was recommended on the previous Canal Road Study conducted by Vision Engineering and Planning and is shown on the current design concept by the developer of Canal Crossing.
- Add a thru lane on the eastbound approach of Canal Road at the intersection of GA SR 25 Spur. The current concept design indicates that there will be enough pavement width to simply restripe the eastbound approach of Canal Road on the design plans.
- Extend the northbound right turn lane on GA SR 25 Spur to a minimum of 500' to accommodate the heavy right turn movement projected on this approach. A SimTraffic traffic simulation model was developed and calibrated to evaluate the study area in detail, and these results indicate that right turning vehicles would be queued with the thru traffic on westbound GA SR 25 Spur, and hence unable to access the right turn lane unless it is extended. This would have the added benefit of reducing the overall queuing on westbound GA SR 25 Spur.
- Add a right turn overlap phase and signal head for the northbound GA SR 25 Spur approach at Canal Road to run concurrently with southbound Canal Road left turn.
- Install No Left Turn signs and to serve the west site entrance approach until a traffic signal is installed at this location.
- Improve the signage at SR 25 Spur and Glyngo Parkway to encourage southbound traffic to use this road to access Canal Crossing. Larger, GDOT standard signs are recommended.

Additional consideration should be given to impacts of the recommendations and improvements from this study on the overall traffic signal coordination on GA SR 25 Spur. While the 160 second cycle length was maintained at the intersection, the addition of protected left turn phasing on Canal Road would require the adjustment of the green splits at this intersection which would in turn have some impact on the existing signal system coordination on GA SR 25 Spur. It is recommended that additional traffic counts be collected at the coordinated intersections on GA SR 25 Spur and the green band be evaluated along the corridor for the AM and PM peak hour to determine if any adjustments to timing and/or offsets would be required as a result of the changes in traffic signal timing at the Canal Road intersection. A table indicating the recommended turn bay lengths at the study intersections is presented in Appendix D.