

Memorandum

To: *Loren Gordon, City Planner
City of Minnetonka*

From: *Anthony Heppelmann, PE*

Date: *April 5, 2017*

Re: *Shady Oak Redevelopment
WSB Project No. 1502-70*

Introduction

This traffic impact study addresses a proposed redevelopment of the property at 4312 Shady Oak Road with a 54 Unit apartment building. The project location is shown on Figure 1. The development would replace the existing retail building on this site. The proposed site layout is shown on Figure 2. The proposed development would have access to Oak Drive Lane via two proposed access points, one to a 32 space surface parking lot and one to proposed underground parking. The primary issue for this project is the potential queues and delays on Oak Drive Lane at Shady Oak Road and the potential impact on safety and the proposed access to the site.

Existing Conditions

Shady Oak Road was recently reconstructed as a four lane divided roadway. The reconstructed Shady Oak Road has a median at the north entrance of Oak Drive Lane onto Shady Oak Road so this access only allows right-turns in and right-turns out. The southerly access of Oak Drive Lane to Shady Oak Road is full access. WSB set a video traffic counter at the southerly Oak Drive Lane access to Shady Oak Road in March, 2017. The am and pm peak hour turning movement volumes recorded at this intersection are shown on Figure 3. The peak hour traffic volumes on Oak Drive Lane are relatively low in both the am and pm peak hours.

Hennepin County conducted peak hour counts on Shady Oak Road near this intersection in 2004 and in 2012. The peak hour volumes in 2012 were lower than in 2004. In 2004, there were 940 vehicles per hour (vph) in the am peak hour and 1260 vph in the pm peak hour. In 2012, there were 815 vph in the am peak hour and 1063 vph in the pm peak hour. The 2017 peak hour volumes based on the most recent counts taken by WSB are 1253 vph in the am peak hour and 1712 vph in the pm peak hour. The reason current traffic counts are much higher than in 2004 and 2012 is because TH 169 was closed north of Bren Road when these counts were taken and Shady Oak Road is being used as an alternative route. Peak hour volumes on Shady Oak Road can be expected to decrease once TH 169 is reopened to traffic. The traffic operations analysis is based on the higher peak hour counts from 2017.

Figure 1
Project Location

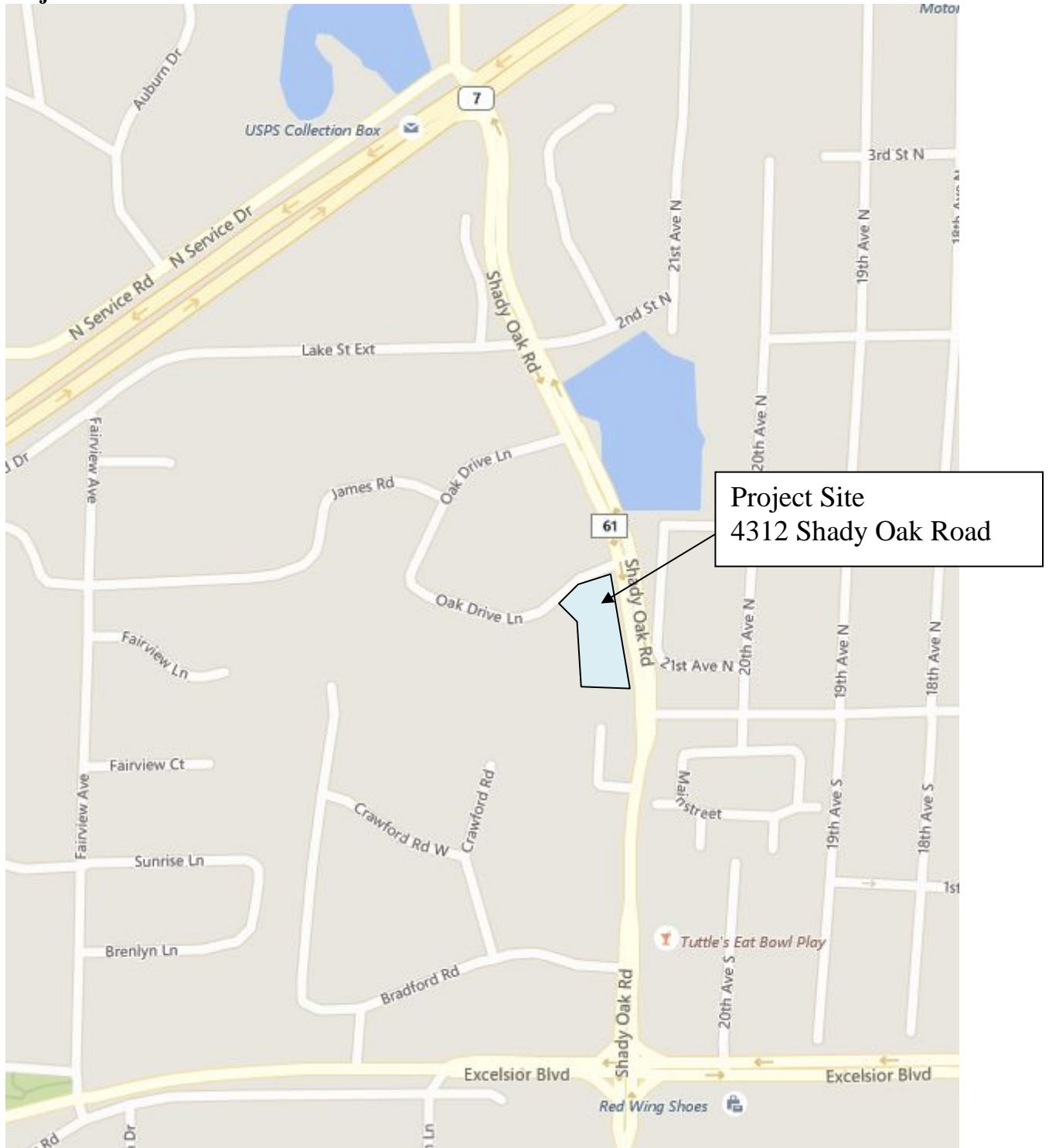


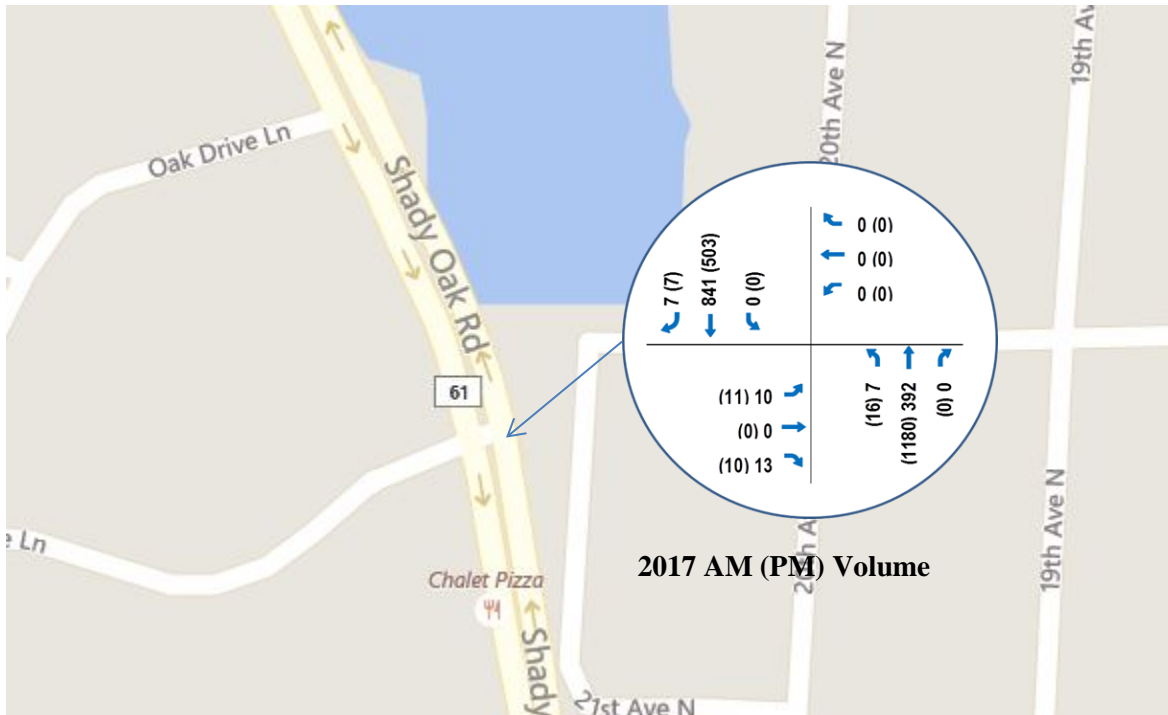
Figure 2
Proposed Site Plan



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WHITTEN ASSOCIATES, INC. SHADY OAK ROAD REDEVELOPMENT MINNETONKA, MN RON CLARK CONSTRUCTION

Figure 3
Existing (2017) Traffic Volumes



The southerly access of Oak Drive Lane is 24 feet wide and has one inbound and one outbound lane at Shady Oak Road. WSB conducted a traffic operations analysis for the Oak Drive Lane and Shady Oak Road intersection for the am and pm peak hours based on the traffic counts shown in Figure 3. The analysis was conducted using SimTraffic software which is a microsimulation model that models each vehicle through the intersection. The results of that analysis are shown in Table 1.

Table 1
Delay and Level of Service at Oak Drive Lane and Shady Oak Road—Existing Conditions

AM Peak Hour

Intersection		Appr	Total Delay by Movement			LOS by Movement			LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)		Appr	Average & Maximum Traffic Queueing (feet)								
Control	Location		L	T	R	L	T	R	Delay	LOS	Delay	LOS		Left-Turn			Through			Right-Turn		
														Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage
Thru-Stop	4: CSAH 61/Shady Oak Road & Oak Drive Lane	NB	7	1	0	A	A	A	1	A	3	A	NB	4	31	50						
		WB	0	0	0	A	A	A	0	A			WB									
		SB	0	4	4	A	A	A	4	A			SB									
		EB	15	0	5	C	A	A	9	A			EB	16	51							

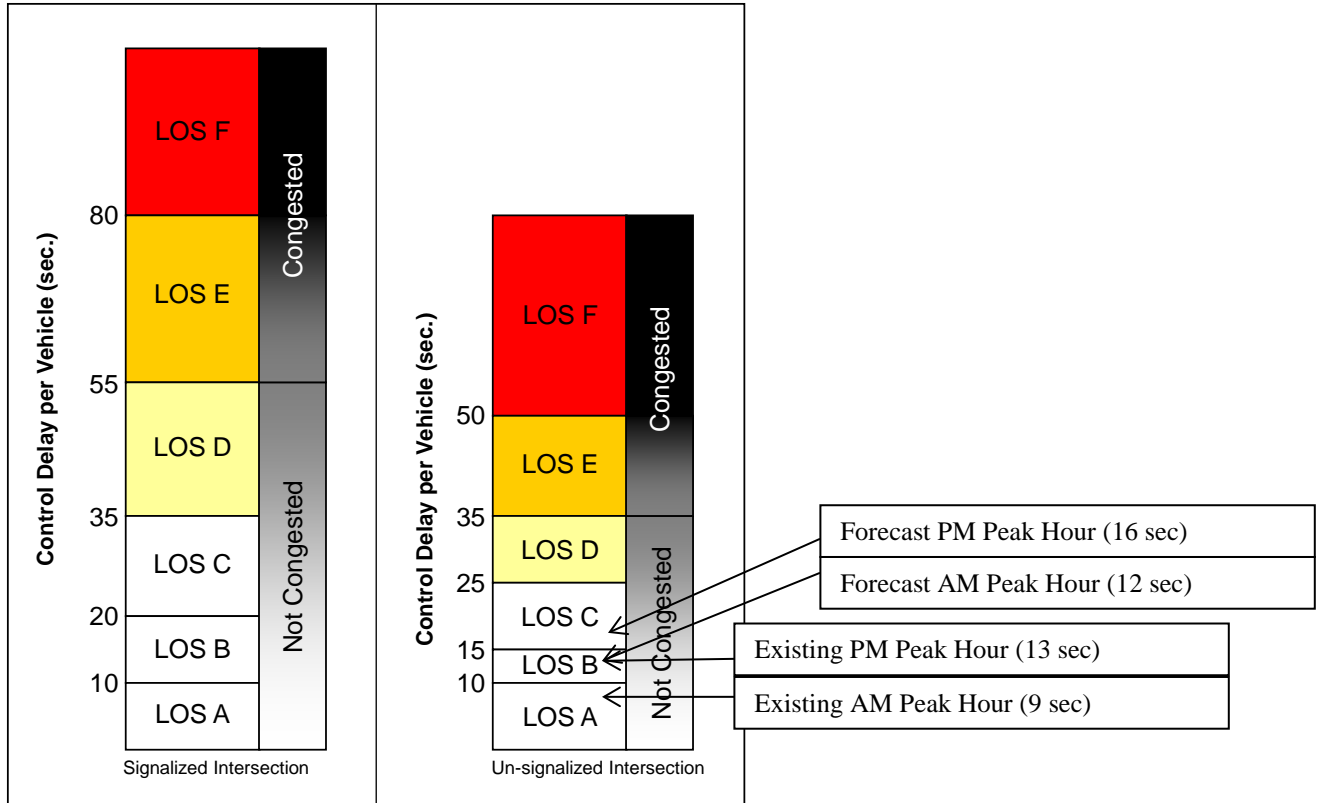
PM Peak Hour

Intersection		Appr	Total Delay by Movement			LOS by Movement			LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)		Appr	Average & Maximum Traffic Queueing (feet)								
Control	Location		L	T	R	L	T	R	Delay	LOS	Delay	LOS		Left-Turn			Through			Right-Turn		
														Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage
Thru-Stop	4: CSAH 61/Shady Oak Road & Oak Drive Lane	NB	5	2	0	A	A	A	2	A	3	A	NB	5	39	50						
		WB	0	0	0	A	A	A	0	A			WB									
		SB	0	4	3	A	A	A	4	A			SB									
		EB	19	0	6	C	A	A	13	B			EB	17	43							

Intersection operations are evaluated in terms of average seconds of delay per vehicle for the intersection, and for each approach and turning movement. The average number of seconds of delay is broken into six ranges assigned letter grades A through F defining each level of service (LOS) as shown in Figure 4. The ranges for unsignalized intersections are narrower than the ranges for signalized intersections. This is because many factors including the intangible factors of driver discomfort and frustration are considered. A one-minute delay at a red light is perceived as being more tolerable than one minute waiting for a gap in traffic at a stop sign, especially when there are vehicles queued behind. It is generally recognized that LOS D is the lowest acceptable LOS for urban intersections. Intersection capacity is also defined in terms of queue lengths of stopped vehicles. A 100-foot queue is approximately equal to four cars.

The analysis shows the eastbound approach operates at LOS “A” in the am peak hour and LOS “B” in the pm peak hour with an average delay of 9 seconds/vehicle in the am peak hour and 13 seconds/vehicle in the pm peak hour. The analysis indicates there is potential for there to be up to two vehicles waiting at this intersection during the peak hours. Review of the video logs for the intersection revealed that there was never more than one vehicle waiting on the eastbound approach of Oak Drive Lane during either the am or pm peak hours when the counts were taken.

Figure 4
Level of Service Definitions



SOURCE: Level of Service thresholds from the Highway Capacity Manual.
 K:\Traffic\Level of Service (LOS)\LOS Delay Graphic.ppt

Traffic Forecasts

The estimated trip generation for the site is shown in Table 2 below. The estimated trips are based on trip generation rates from the Institute of Transportation Engineers Trip Generation Manual 9th Edition. The site is expected to generate 30 trips in the am peak hour and 47 trips in the pm peak hour.

Table 2
Site Trip Generation

Description/ITE Code	Units	Expected Units (independent variable)	Calculated Daily Trips	AM Peak Trips - Total	AM In	AM Out	PM Peak Trips - Total	PM In	PM Out
Apartment 220 (adjacent street)	Dwelling Unit	54	451	30	6	24	47	31	16

In order to develop the traffic forecasts with the proposed development the above site generated trips were added to existing counts.

In this study, WSB did not reduce the forecasts by the trips generated by the current use. The table below shows the trip generation for two other potential scenarios for this site. The estimated trips are based on trip generation rates from the Institute of Transportation Engineers Trip Generation Manual 9th Edition. The first row in the table below shows the potential trip generation of the current use if the building were fully occupied. The existing building has almost 26,000 square feet and would generate more than 1000 trips per day and 95 pm peak hour trips if the building were fully occupied. The second row in the table below shows the potential trip generation if the site were redeveloped as a pharmacy similar to an approved plan on the southeast corner of Shady Oak Road and Excelsior Boulevard. This would be an approved use under the current zoning. In this scenario the site would generate over 1200 daily trips and 129 pm peak hour trips. This is more than twice the number of trips generated by the proposed 54 unit apartment building.

**Table 3
Alternative Trip Generation for the Site**

Description/ITE Code	Units	Units (independent variable)	Calculated Daily Trips	AM Peak Trips - Total	AM In	AM Out	PM Peak Trips - Total	PM In	PM Out
Alternate Scenario—Existing Retail	1000 KSF	25.7	1,097	25	15	9	95	46	50
Alternate Scenario--Pharmacy	1000 KSF	13.0	1,260	45	23	22	129	64	64

Site Trip Distribution

Almost all of the trips are expected to use Oak Drive Lane to access Shady Oak Road. Unless there are major delays at Shady Oak Road there is no reason that a vehicle would find it convenient to use Oak Drive Lane into the neighborhood. At Shady Oak Road about half will turn right and half will turn left which is the pattern of the existing traffic at this intersection. Figure 5 shows the trips that would be added to the Oak Drive Lane and Shady Oak Road intersection as a result of the proposed development.

Figure 6 shows the forecast traffic volumes with the proposed project.

Figure 5
Site Trips at Oak Drive Lane and Shady Oak Road

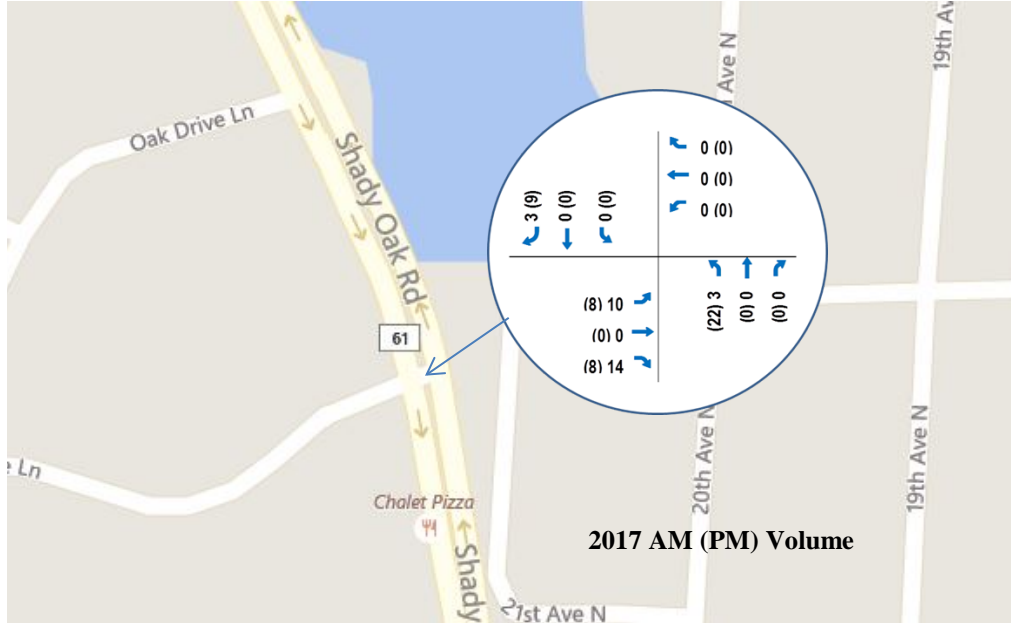
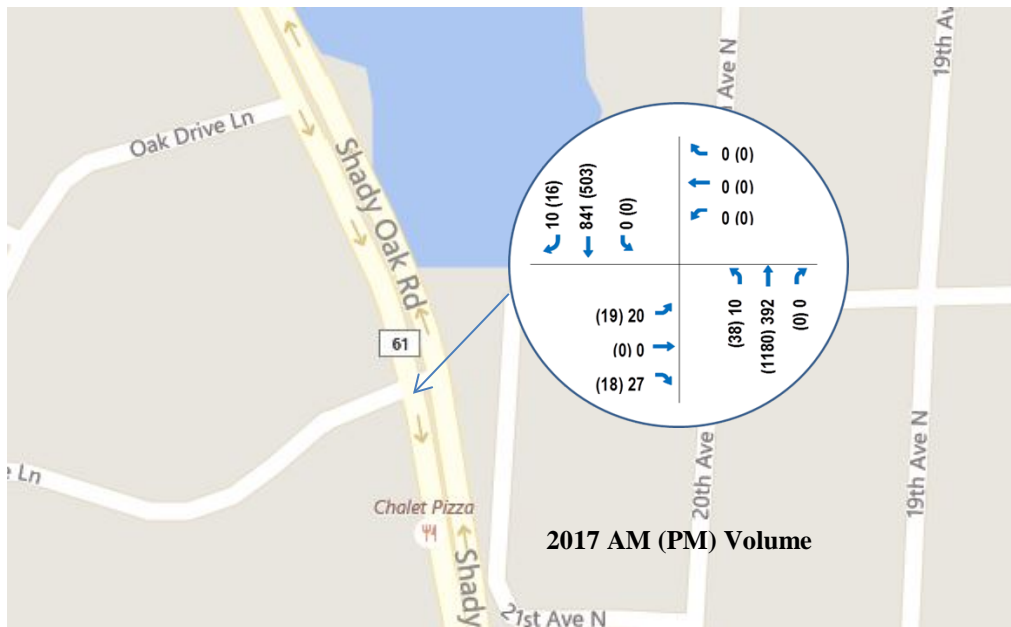


Figure 6
Forecast Volumes at Oak Drive Lane and Shady Oak Road with Development



Future Traffic Operations

WSB conducted traffic operations analysis of the forecast traffic volumes with the development to determine how delays, level of service and vehicle queues may change with the proposed project. Table 4 shows the results for one year after opening of the development. The analysis shows that the eastbound approach operates at LOS “A” in the am peak hour and LOS “C” in the pm peak hour with an average delay of 12 seconds/vehicle in the am peak hour and 16 seconds/vehicle in the pm peak hour. The increase in delay over the existing conditions is 3 seconds per vehicle on this approach. The analysis indicates that the potential queue length is still about two vehicles. However most of the time there would not be more than one vehicle waiting at the intersection.

**Table 4
Delay and Level of Service at Oak Drive Lane and Shady Oak Road With Development**

AM Peak Hour

Intersection		Appr	Total Delay by Movement			LOS by Movement			LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)		Appr	Average & Maximum Traffic Queueing (feet)								
Control	Location		L	T	R	L	T	R	Delay	LOS	Delay	LOS		Left-Turn			Through			Right-Turn		
														Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage
Thru-Stop	4: CSAH 61/Shady Oak Road & Oak Drive Lane	NB	7	1	0	A	A	A	1	A	3	A	NB	7	38	50						
		WB	0	0	0	A	A	A	0	A			WB									
		SB	0	4	5	A	A	A	4	A			SB									
		EB	19	0	7	C	A	A	12	B			EB	28	69							

PM Peak Hour

Intersection		Appr	Total Delay by Movement			LOS by Movement			LOS by Approach (Sec/Veh)		LOS by Intersection (Sec/Veh)		Appr	Average & Maximum Traffic Queueing (feet)								
Control	Location		L	T	R	L	T	R	Delay	LOS	Delay	LOS		Left-Turn			Through			Right-Turn		
														Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage	Ave Queue	Max Queue	Storage
Thru-Stop	4: CSAH 61/Shady Oak Road & Oak Drive Lane	NB	6	2	0	A	A	A	2	A	3	A	NB	13	43	50						
		WB	0	0	0	A	A	A	0	A			WB									
		SB	0	4	4	A	A	A	4	A			SB				4					
		EB	24	0	7	C	A	A	16	C			EB	25	62							

Conclusions and Recommendations

The following conclusions and recommendations were reached from the analysis that was conducted for this traffic study of the proposed 54 unit apartment at 4312 Shady Oak Road.

- The level of service for traffic on Oak Drive Lane approaching Shady Oak Road at the development site is LOS “A” in the am peak hour and LOS “B” in the pm peak hour with a maximum queue of two vehicles under existing conditions.
- The proposed site will generate 30 trip ends in the am peak hour and 47 trip ends in the pm peak hour with almost all of the traffic using the Oak Drive Lane and Shady Oak Road intersection. Very little if any traffic would use Oak Drive Lane to go west.
- With the development of the site, the level of service for traffic on Oak Drive Lane approaching Shady Oak Road at the development site is LOS “B” in the am peak hour and LOS “C” in the pm peak hour. The average increase in delay is 3 seconds/vehicle and the maximum queue length is still two vehicles.
- Based on the above WSB recommends that the access from the proposed development site be located at least 100 feet to the west of the intersection to allow traffic to exit the site without conflicts with traffic queued at the intersection. One access from the site to Oak Drive Lane is preferable to minimize vehicle conflicts.
- Separate right and left turn lanes on Oak Drive Lane at Shady Oak Road could slightly reduce delays but is not required to provide an acceptable level of service at this intersection.