Kimley»Horn

MEMORANDUM

Date: May 24, 2018

To: Brandon Anderson, P.E.
City Engineer – Apple Valley

From: Douglas Arnold, P.E.

Subject: Redevelopment Site – Cedar Avenue at 147th Street
Traffic Impact Study

Executive Summary

Launch Properties is proposing to redevelop an existing office building located on the southeast corner of Cedar Avenue and 147th Street in Apple Valley, MN. The existing building provides general office use. The redevelopment plan that is being considered includes one building with four land uses. The proposed land uses are as follows:

- 3,600 square foot restaurant
- 2,457 square foot restaurant
- 3,016 square-feet of dental office
- 1,817 square-feet of Coffee shop with a drive-thru

Access is proposed along 147th Street, with a right-in only driveway located 160 feet south of 147th Street and a full access driveway located 260 feet south of 147th Street. As part of the redevelopment, the property owner has offered to close the existing driveway access on 147th Street.

A traffic impact analysis was performed to quantify operating conditions for Existing Conditions (2017), Opening Year Conditions (2019), and Horizon Year Conditions (2030) at the Cedar Avenue/147th Street and Glazier Avenue/147th Street intersections. The analysis focused on level of service (LOS), vehicle delay, and queueing. Based on the analysis, the following improvements are recommended as part of Opening Year conditions to maintain acceptable intersection operations:

- The existing driveway connection of 147th Street should be abandoned.
- Restripe the northbound left-turn lane at 147th Street & Glazier Avenue to provide 190 feet of storage and a 50-foot taper.
- Restripe the westbound left-turn lane at Cedar Avenue & Glazier Avenue to provide 200 feet of storage and a 50-foot taper.

The City of Apple Valley is considering public improvements along 147th Street to improve operations and access management as a result of areawide growth. These improvements include constructing a roundabout at 147th Street & Glazier Avenue (North), limiting access at 147th Street & Glazier Avenue (South) to ¾ access, and constructing a raised median between Cedar Avenue and Glazier Avenue (South).

With these improvements in place, the intersections are anticipated to continue to operate at an acceptable LOS through the 2030 Horizon Year. With the elimination of the northbound left-turn movement at 147th Street & Glazier Avenue, the queueing for the northbound approach is anticipated to decrease, and as a result, consideration could be given to converting the northbound driveway of the proposed development to full access, once the public improvements are completed.

It is worth noting that the trip generation of the current development plan is anticipated to generally be 50% less traffic during the MD peak hour and 10% less trips during the PM peak hour as compared to the previous development plan with the 9,000-square foot fast-food restaurant.

Introduction

Launch Properties is proposing to redevelop a site located on the southeast corner of the intersection of Cedar Avenue (CSAH 23) and 147th Street in Apple Valley, Dakota County, Minnesota. The site is +/- 2 acres and is currently occupied by an office building with multiple tenants. The site is being considered for redevelopment to include a combination of restaurants and commercial retail space. The proposed land uses are as follows:

- 3,600 square foot restaurant
- 2,457 square foot restaurant
- 3,016 square foot dental office
- 1,817 square foot coffee shop with a drive-through window

As part of the development process, a traffic impact study has been requested by the City staff to quantify any impacts the proposed redevelopment will have on the adjacent intersections.

Existing Conditions

The proposed redevelopment site has frontage on three public roadways; Cedar Avenue, 147th Street and Glazier Avenue, with existing driveways along 147th Street and Glazier Avenue. The following provides more information on the adjacent roadways:

- Cedar Avenue is a north-south divided highway with three lanes in each direction. At its intersection with 147th Street, left turn lanes are provided on all four approaches and right turn lanes are provided on three of the four approaches (excluding EB). The speed limit is 45 miles per hour.
- 147th Street is an east-west undivided roadway with two lanes in each direction and a posted speed limit of 30 miles per hour. At its intersection with Cedar Avenue, there are dedicated left-turn lanes in each direction, as well as a dedicated westbound right-turn lane.
- Glazier Avenue is a two lane north-south undivided roadway adjacent to the proposed site on the east side. At its intersection with 147th Street, dedicated lanes are provided for left-turn and right-turn movements.

The Cedar Avenue/147th Street and the Glazier Avenue/147th Street intersections were included in the study area as study intersections. Existing lane geometry and intersection control is provided in Exhibit 1 in Appendix 1.

Peak period turning movement counts were collected at the study intersections on Tuesday, February 21, 2017. Exhibit 2 in Appendix 1 provides a summary of the AM, MD and PM peak hour traffic volumes.

Proposed Development

As previously stated, the proposed redevelopment is approximately 10,980 square-feet of mixed-use development. In the building, there is proposed to be two restaurants (6,057 square-feet total), a coffee shop with a drive-through window (1,817 square-feet) and a dental office (3,016 square-feet).

The redevelopment plan includes the closure of the current site full access driveway on 147th Street, with proposed access to the site provided by one right-in driveway and one full access driveway along Glazier Avenue spaced approximately 100 feet apart. The site is anticipated to be open for business within one year.

Site Trip Generation

Trip generation was calculated using the Institute of Transportation Engineers (ITE) *Trip Generation,* 10th Edition. For the fast-casual restaurant land uses, the MD peak hour trip generation was calculated as a ratio of the percent of daily traffic found in Appendix A of ITE's *Trip Generation* (14.8% for MD, 12.1% for PM). For the medical-dental office and the coffee shop land uses, the MD peak hour trip generation was assumed to be the same as the PM peak hour trip generation since MD information is not provided for those land uses. Table 1 provides the trip generation summary for the proposed redevelopment.

Table 1. Trip Generation

Land Use Description	ITE	Intensity / Units	AM Peak Hour			MD Peak Hour			PM Peak Hour		
			In	Out	Tot	In	Out	Tot	In	Out	Tot
Medical-Dental Office Building	720	3,016 Square Feet	6	2	8	2	8	10	2	8	10
Fast Casual Restaurant	930	6,057 Square Feet	9	4	13	58	47	105	47	39	86
Coffee Shop with Drive-Through Window	937	1,817 Square Feet	83	79	162	40	39	79	40	39	79
TOTAL EXTERNAL TRIPS			98	85	183	100	94	194	89	86	175

Trip Distribution and Assignment

The directional distribution was based on the current traffic patterns in the area, the location of the proposed site access, and the anticipated routes that will provide site users with the fastest and most convenient path to and from the site. The estimated trip distribution for the site-generated traffic is illustrated in Exhibit 3 in Appendix 1.

The site distribution is listed below: To/from the north on Cedar Avenue – 35%; To/from the south on Cedar Avenue – 30%; To/from the east on 147th Street – 10%; To/from the west on 147th Street – 15%; and To/from the south on Glazier Avenue – 10%.

In accordance with the estimated site trip generation and distribution, weekday AM, MD and PM peak hour site traffic volumes from the redevelopment were assigned to each of the study intersections and the proposed site driveways. The resulting trip assignment is presented in Exhibit 4A in Appendix 1. There are proposed public improvements along 147th Street that will affect the intersection of 147th Street at Glazier Avenue. The proposed improvements will eliminate the northbound left-turn onto 147th Street from Glazier Avenue. The trip assignment considering the public improvements is presented in Exhibit 4B in Appendix 1.

Intersection Capacity Analysis

A capacity analysis was performed at the study intersections to quantify existing operating conditions, as well as future conditions without and with traffic from the proposed redevelopment.

Level of service (LOS) analysis was conducted for the AM, MD and PM peak hours at both study intersections for Existing conditions, Opening Year conditions and Horizon Year conditions. LOS is a quantitative measure used by traffic engineers to describe the operations of an intersection. It ranges from A to F, with A being the best and F being the worst level of operation. LOS A conditions are characterized by minimal vehicle delay and free-flow conditions, while LOS F is characterized by long vehicle delay – usually when demand exceeds available roadway capacity. Although LOS E is defined as at-capacity, LOS D is generally the minimum acceptable level of operation at an intersection. Each study intersection was analyzed based on the Highway Capacity Manual using Synchro/SimTraffic software.

Existing (2017) Analysis

A capacity analysis was performed to quantify existing operating conditions during the AM and PM peak hours at the study intersections. The analysis was based on the existing lane geometry and signal timings provided by Dakota County. Synchro/SimTraffic was used to perform the capacity analysis.

Table 3, Table 4 and Table 5 provide a summary of the AM, MD and PM peak hour analysis, respectively. Based on the analysis, all intersections are currently operating at an acceptable LOS during the study time periods. The SimTraffic reports are attached in Appendix 2.

Table 3. Existing Capacity Analysis Summary (AM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	34.0	C	38.0	D	12.4	B	19.5	B
	WB	35.6	D	38.6	D	11.3	B		
	NB	51.0	D	20.6	C	6.0	A		
	SB	46.1	D	9.4	A	2.5	A		
147th Street & Glazier Avenue	EB			1.2	A	1.1	A	1.2	A
	WB	4.8	A	0.2	A				
	NB	8.7	A			2.7	A		
	SB								

Table 4. Existing Capacity Analysis Summary (MD Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	31.8	D	38.3	D	21.9	C	23.3	C
	WB	30.0	D	35.7	D	6.1	A		
	NB	51.9	E	23.5	C	5.7	A		
	SB	44.1	E	17.3	B	4.4	A		
147th Street & Glazier Avenue	EB			1.5	A	1.5	A	2.8	A
	WB	5.4	A	0.8	A				
	NB	14.3	B			3.2	A		
	SB								

Table 5. Existing Capacity Analysis Summary (PM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	41.4	D	51.7	D	41.0	D	30.0	C
	WB	41.4	D	39.9	D	7.8	A		
	NB	65.1	E	27.0	C	6.4	A		
	SB	58.4	E	27.5	C	8.9	A		
147th Street & Glazier Avenue	EB			1.6	A	1.7	A	3.3	A
	WB	8.9	A	1.0	A				
	NB	19.0	C			3.4	A		
	SB								

Opening Year Background (2019) Analysis

The future conditions analysis was based on an expected opening year of 2019. Opening Year Background capacity analysis was performed at the study intersections to provide a basis of operations in the 2019 Opening Year. Volumes used for the analysis are provided in Exhibit 5 in Appendix 1. Existing geometry and existing signal timings were used for this analysis.

Table 6, Table 7 and Table 8 provide a summary of the capacity analysis for AM, MD and PM peak hours, respectively. Based on the analysis, the intersection of Cedar Avenue & 147th Street is anticipated to operate at LOS B during the AM peak hour and LOS C during the MD peak hour and PM peak hour. The northbound left-turn movement at the intersection of 147th Street & Glazier Avenue is anticipated to operate at LOS A for the AM peak hour, LOS B for the MD peak hour and LOS C for the PM peak hour. SimTraffic reports are provided in Appendix 2.

Table 6. Opening Year Background Capacity Analysis Summary (AM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	49.0	D	51.8	D	14.5	B	19.7	B
	WB	47.9	D	51.8	D	9.8	A		
	NB	61.2	E	18.9	B	5.8	A		
	SB	55.1	E	7.7	A	1.9	A		
147th Street & Glazier Avenue	EB			1.3	A	1.2	A	1.2	A
	WB	5.7	A	0.2	A				
	NB	7.6	A			2.7	A		
	SB								

Table 7. Opening Year Background Capacity Analysis Summary (MD Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	44.8	D	48.8	D	30.9	C	26.1	C
	WB	42.4	D	47.0	D	6.6	A		
	NB	65.1	E	22.6	C	5.7	A		
	SB	60.2	E	16.3	B	3.6	A		
147th Street & Glazier Avenue	EB			1.6	A	1.5	A	2.8	A
	WB	5.5	A	0.7	A				
	NB	14.9	B			3.5	A		
	SB								

Table 8. Opening Year Background Capacity Analysis Summary (PM Peak Hour)

Intersection	Approach / Movement	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	47.8	D	62.6	D	55.0	D	32.7	C
	WB	56.0	E	51.1	D	8.0	A		
	NB	75.9	E	29.3	C	6.8	A		
	SB	67.2	E	27.2	C	9.4	B		
147th Street & Glazier Avenue	EB			1.7	A	1.8	A	3.8	A
	WB	9.3	A	1.1	A				
	NB	22.5	C			3.7	A		
	SB								

Opening Year Build (2019) Analysis

Opening Year Build capacity analysis was performed at the study intersections to determine the operations once project traffic is added to the surrounding roadway network. Volumes used for the analysis are provided in Exhibit 6 in Appendix 1. Existing signal timings were used for this analysis.

Table 8, Table 9 and Table 10 provide a summary of the capacity analysis for the AM, MD, and PM peak hours, respectively. Based on the analysis, the intersection of Cedar Avenue & 147th Street is anticipated to operate at LOS C during the AM an MD peak hours and LOS D during the PM peak hour. The northbound left-turn movement at the intersection of 147th Street & Glazier Avenue is anticipated to operate at LOS A for the AM peak hour, LOS C for the MD peak hour and LOS D for the PM peak hour. SimTraffic reports are provided in Appendix 2.

Table 8. Opening Year Build Capacity Analysis Summary (AM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	43.5	D	56.4	E	26.0	C	22.2	C
	WB	49.1	D	50.6	D	12.7	B		
	NB	67.3	E	21.3	C	7.5	A		
	SB	57.2	E	8.9	A	2.6	A		
147th Street & Glazier Avenue	EB			1.4	A	1.6	A	2.4	A
	WB	6.8	A	0.6	A				
	NB	10.0	A			3.1	A		
	SB								

Table 9. Opening Year Build Capacity Analysis Summary (MD Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	42.7	D	50.1	D	36.7	D	27.9	C
	WB	40.8	D	46.7	D	8.0	A		
	NB	63.5	E	26.4	C	7.4	A		
	SB	60.6	E	17.3	B	4.0	A		
147th Street & Glazier Avenue	EB			1.6	A	1.7	A	4.0	A
	WB	7.4	A	1.1	A				
	NB	16.9	C			4.2	A		
	SB								

Table 10. Opening Year Build Capacity Analysis Summary (PM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	50.0	D	63.1	E	50.9	D	36.5	D
	WB	61.9	E	46.4	D	8.6	A		
	NB	76.3	E	32.7	C	7.7	A		
	SB	71.9	E	32.6	B	13.0	B		
147th Street & Glazier Avenue	EB			1.7	A	2.2	A	6.0	A
	WB	9.9	A	1.6	A				
	NB	31.0	D			6.1	A		
	SB								

Opening Year Build with Public Improvements (2019) Analysis

To improve operations and access management along 147th Street as a result of areawide growth, the City of Apple Valley is considering public roadway improvements including the following: roundabout at the intersection of 147th Street & Glazier Avenue (North), restricting the intersection of 147th Street & Glazier Avenue (South) to ¾ access, and constructing a raised median between Cedar Avenue & Glazier Avenue (South). Opening Year Build with Public Improvements capacity analysis was performed at the study intersections to determine the operations once project traffic is added to the surrounding roadway network with the planned City improvements. Volumes used for the analysis are provided in Exhibit 7 in Appendix 1.

Table 11, Table 12 and Table 13 provide a summary of the capacity analysis for the AM, MD, and PM peak hours, respectively. Based on the analysis, the Glazier Avenue/147th Street intersection is anticipated to operate at LOS A during the peak hours, and all individual movements are anticipated to operate at LOS A. SimTraffic reports are provided in Appendix 2.

Table 11. Opening Year Build Capacity Analysis Summary (AM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
147th Street & Glazier Avenue	EB			1.4	A	1.5	A	1.4	A
	WB	5.0	A	0.5	A				
	NB					3.2	A		
	SB								

Table 12. Opening Year Build Capacity Analysis Summary (MD Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
147th Street & Glazier Avenue	EB			1.7	A	1.9	A	1.9	A
	WB	6.6	A	1.1	A				
	NB					4.0	A		
	SB								

Table 13. Opening Year Build Capacity Analysis Summary (PM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
147th Street & Glazier Avenue	EB			1.8	A	2.2	A	2.2	A
	WB	9.2	A	1.6	A				
	NB					4.2	A		
	SB								

Summary of Opening Year Conditions

Based on the analysis, the study intersections are anticipated to operate at an acceptable LOS for the three analysis time periods based on existing intersection control and geometry. The northbound left-turn movement at the intersection of 147th Street & Glazier Avenue is anticipated to operate at LOS D or better with the addition of site traffic. The intersections are anticipated to maintain acceptable LOS with the addition of the public improvements planned by the City of Apple Valley.

Horizon Year Background (2030) Analysis

Horizon Year Background capacity analysis was performed at the study intersections to provide a basis of operations in the 2030 horizon year. This analysis assumes that the public roadway improvements along 147th Street are in place. Volumes used for the analysis are provided in Exhibit 8 in Appendix 1. Existing signal timings were used for this analysis.

Table 14, Table 15 and Table 16 provide a summary of the capacity analysis for the AM, MD and PM peak hours, respectively. Based on the analysis, the Cedar Avenue/147th Street intersection is anticipated to operate at LOS C during the AM and MD peak hours, and LOS D during the PM peak hour. The Glazier Avenue/147th Street intersection is anticipated to operate at LOS A during the peak hours. SimTraffic reports are provided in Appendix 2.

Table 14. Horizon Background Capacity Analysis Summary (AM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	48.9	D	51.6	D	20.9	C	21.7	C
	WB	47.8	D	52.7	D	16.1	B		
	NB	56.6	E	21.9	C	7.2	A		
	SB	56.2	E	8.4	A	2.0	A		
147th Street & Glazier Avenue	EB			1.3	A	1.3	A	1.1	A
	WB	3.3	A	0.3	A				
	NB					3.2	A		
	SB								

Table 15. Horizon Background Capacity Analysis Summary (MD Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	43.2	D	48.2	D	35.9	D	28.0	C
	WB	41.8	D	47.1	D	9.0	A		
	NB	67.6	E	26.1	C	7.3	A		
	SB	58.0	E	18.6	B	4.8	A		
147th Street & Glazier Avenue	EB			1.7	A	1.7	A	1.8	A
	WB	5.4	A	0.8	A				
	NB					4.6	A		
	SB								

Table 16. Horizon Background Capacity Analysis Summary (PM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	50.2	D	59.8	E	52.7	D	48.9	D
	WB	61.2	E	50.4	D	11.3	B		
	NB	78.0	E	34.6	C	8.4	A		
	SB	72.6	E	56.2	E	33.2	C		
147th Street & Glazier Avenue	EB			1.8	A	1.9	A	2.0	A
	WB	8.9	A	1.3	A				
	NB					5.1	A		
	SB								

Horizon Year Build (2030) Analysis

Horizon Year Build with Public Improvements capacity analysis was performed at the study intersections to determine the operations once project traffic is added to the surrounding roadway network. This analysis assumes that the public roadway improvements along 147th Street are in place. Volumes used for the analysis are provided in Exhibit 9 in Appendix 1. Existing signal timings were used for this analysis.

Table 17, Table 18 and Table 19 provide a summary of the capacity analysis for the AM, MD, and PM peak hours, respectively. Based on the analysis, the Cedar Avenue/147th Street intersection is anticipated to continue to operate at LOS C during the AM and MD peak hours, and LOS E during the PM peak hour with the addition of project traffic. The Glazier Avenue/147th Street intersection is anticipated to operate at LOS A during the peak hours. SimTraffic reports are provided in Appendix 2.

Table 17. Horizon Year Build Capacity Analysis Summary (AM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	48.5	D	49.5	D	26.3	C	25.3	C
	WB	47.8	D	48.9	D	18.4	B		
	NB	65.8	E	26.7	C	9.5	A		
	SB	57.8	E	9.9	A	2.3	A		
147th Street & Glazier Avenue	EB			1.4	A	1.7	A	1.5	A
	WB	6.4	A	0.6	A				
	NB					3.3	A		
	SB								

Table 18. Horizon Year Build Capacity Analysis Summary (MD Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	43.1	D	48.0	D	37.7	D	29.4	C
	WB	46.2	D	47.6	D	8.7	A		
	NB	59.6	E	29.3	C	8.1	A		
	SB	57.7	E	19.1	B	4.8	A		
147th Street & Glazier Avenue	EB			1.7	A	1.9	A	2.1	A
	WB	7.2	A	1.2	A				
	NB					4.4	A		
	SB								

Table 19. Horizon Year Build Capacity Analysis Summary (PM Peak Hour)

Intersection	Approach	Left		Through		Right		Overall Intersection	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Cedar Avenue & 147th Street	EB	50.6	D	63.9	D	56.4	D	70.1	E
	WB	78.0	E	46.0	D	13.2	B		
	NB	75.7	E	38.7	D	10.2	B		
	SB	91.0	F	93.7	F	71.2	E		
147th Street & Glazier Avenue	EB			1.9	A	2.2	A	2.6	A
	WB	10.7	B	2.1	A				
	NB					4.8	A		
	SB								

Horizon Year Capacity Analysis Summary

Based on the capacity analysis, the intersections of Cedar Avenue & 147th Street and Glazier Avenue & 147th Street are anticipated to operate at an acceptable LOS. This analysis included the proposed City improvements along 147th Street.

Turn Lane Analysis

The traffic impact analysis also reviewed the anticipated queueing of vehicles for the westbound approach at the intersection of Cedar Avenue & 147th Street and the northbound left-turn movement at the intersection of 147th Street & Glazier Avenue during the AM, MD and PM peak hours. Below is a summary of the analysis.

147th Street & Glazier Avenue – Northbound Left-Turn

The existing turn lane is approximately 190 feet in length, including 140 feet of storage and a 50-foot taper. Table 20 provides a summary of the average queue length and 95th percentile queue length for the AM and PM peak hours.

Based on the SimTraffic analysis, the 95th percentile queue is not anticipated to exceed the existing provided storage for Background conditions. Once project traffic is introduced, the provided storage will need to be increased. It is recommended that the provided storage be increased from 140 feet to 190 feet to serve the forecasted demand during Opening Year Build conditions.

Table 20. Turn Lane Queue Summary

Analysis Year	AM Peak Hour		MD Peak Hour		PM Peak Hour	
	Average	95th	Average	95th	Average	95th
Opening Year Build 2019	40	65	65	120	115	190

Cedar Avenue & 147th Street – Westbound Left-Turn

The existing turn lane is approximately 230 feet in length, including 130 feet of storage and a 100-foot taper. Table 21 provides a summary of the average queue length and 95th percentile queue length for the AM, MD and PM peak hours. Based on the SimTraffic analysis, the 95th percentile queue is anticipated to exceed the existing provided storage for Horizon Year conditions for the westbound left-turn movement. It is recommended that the turn lane be extended to provide a total of 200 feet of storage. Because of the close proximity to Glazier Avenue, the existing 100-foot taper would likely need to be reduced to 50 feet.

Table 21. Turn Lane Queue Summary

Analysis Year	AM Peak Hour		MD Peak Hour		PM Peak Hour	
	Average	95th	Average	95th	Average	95th
Opening Year Build 2019	60	110	100	170	110	180
Horizon Build 2030	60	115	110	180	145	190

Conclusions and Recommendations

Launch Properties is proposing to redevelop an existing office building located on the southeast corner of Cedar Avenue and 147th Street in Apple Valley, MN. The existing building provides general office use. The redevelopment plan that is being considered includes one building with four land uses. The proposed land uses are as follows:

- 3,600 square foot restaurant
- 2,457 square foot restaurant
- 3,016 square-feet of dental office
- 1,817 square-feet of Coffee shop with a drive-thru

Access is proposed along 147th Street, with a right-in only driveway located 160 feet south of 147th Street and a full access driveway located 260 feet south of 147th Street. As part of the redevelopment, the property owner has offered to close the existing driveway access on 147th Street.

A traffic impact analysis was performed to quantify operating conditions for Existing Conditions (2017), Opening Year Conditions (2019), and Horizon Year Conditions (2030) at the Cedar Avenue/147th Street and Glazier Avenue/147th Street intersections. The analysis focused on level of service (LOS), vehicle delay, and queueing. Based on the analysis, the following improvements are recommended as part of Opening Year conditions to maintain acceptable intersection operations:

- The existing driveway connection of 147th Street should be abandoned.
- Restripe the northbound left-turn lane at 147th Street & Glazier Avenue to provide 190 feet of storage and a 50-foot taper.
- Restripe the westbound left-turn lane at Cedar Avenue & Glazier Avenue to provide 200 feet of storage and a 50-foot taper.

The City of Apple Valley is considering public improvements along 147th Street to improve operations and access management as a result of areawide growth. These improvements include constructing a roundabout at 147th Street & Glazier Avenue (North), limiting access at 147th Street & Glazier Avenue (South) to ¾ access, and constructing a raised median between Cedar Avenue and Glazier Avenue (South).

With these improvements in place, the intersections are anticipated to continue to operate at an acceptable LOS through the 2030 Horizon Year. With the elimination of the northbound left-turn movement at 147th Street & Glazier Avenue, the queueing for the northbound approach is anticipated to decrease, and as a result, consideration could be given to converting the northbound driveway of the proposed development to full access, once the public improvements are completed.

It is worth noting that the trip generation of the current development plan is anticipated to generally be 50% less traffic during the MD peak hour and 10% less trips during the PM peak hour as compared to the previous development plan with the 9,000-square foot fast-food restaurant.