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MEMORANDUM

TO: Rob Mattei
Director of Community Development

FROM: Chad Jorgenson, PE, PTOE (Lic. IA, MN, SD)

DATE: August 10, 2023

RE: Proposed Golf Course Road Multifamily Development Traffic Impact Assessment
SEH No. ITASC 172481 14.00

The following memorandum provides findings related to a traffic impact analysis for potential development of one and redevelopment of two parcels located near and along CSAH 23 (Golf Course Road) in the City of Grand Rapids, MN.

The parcels, shown in **Figure 1**, show a total of 342 units of multi-family housing. 132 units are proposed to be located north of SW 8th Street and 210 units are proposed to be located just east of 22nd Avenue on the south side of CSAH 23 (Golf Course Road).

Figure 1: Proposed Development

Impacts from the trips generated from the proposed development to the surrounding roadway network were evaluated and summarized in the following sections.

DATA COLLECTION AND EXISTING CONDITIONS

13-hour traffic counts along CSAH 23 (Golf Course Road) were obtained in May, 2023 when school was in session at the following intersections:

- CSAH 23 (Golf Course Road) and 22nd Avenue
- CSAH 23 (Golf Course Road) and the Grand Itasca Clinic and Hospital Access
- CSAH 23 (Golf Course Road) and Lakewood Avenue

Based on the existing counts, the AM peak hour was found to be 7:30 AM to 8:30 AM, the school dismissal peak hour was found to be from 2:45 PM to 3:45 PM and the PM peak hour was found to be from 4:00 PM to 5:00 PM.

Average Annual Daily Traffic (AADT) volume information was pulled from MnDOT's Traffic Mapping Application to determine existing daily roadway volumes along the surrounding roadways. From this application the roadways surrounding the proposed development had the following AADT volumes:

- CSAH 23 (Golf Course Road) west of 22nd Avenue: **5,217 vehicles per day in 2022**
- 22nd Avenue north of CSAH 23 (Golf Course Road): **465 vehicles per day in 2022**
- County Road 76 north of CSAH 23 (Golf Course Road): **4,050 vehicles per day in 2020**

The existing daily roadway capacity of a two-lane roadway is approximately 10,000 to 12,000 vehicles per day while a three-lane roadway can serve up to 18,000 vehicles per day. The existing roadway AADT volumes are well below the thresholds where traffic operations would begin to deteriorate.

TRIP GENERATION AND DISTRIBUTION

Trip generation estimates for the proposed development were calculated using the *Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition*. **Table 1** shows the trip generation estimates for the proposed development for the AM peak hour, school dismissal peak hour, and PM peak hour, and daily trips generated.

Table 1 – Trip Generation Estimates

Land Use	Number of Units	Daily Trips*	AM Peak Hour*			SD Peak Hour			PM Peak Hour*		
			Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit
Multifamily	132	599	49	11	38	24	7	17	51	31	20
Multifamily	125	568	46	11	35	23	7	16	49	30	19
Multifamily	85	386	31	7	24	16	5	11	33	20	13
Total	**342**	**1,553**	**126**	**29**	**97**	**63**	**19**	**44**	**133**	**81**	**52**

Trips from the proposed development sites were distributed through the adjacent roadway network based upon the collected intersection counts, and the parcels' relative location to surrounding development. Based upon this information it was assumed that 70% of the traffic travels to and from the east and 30% of the traffic to and from the west.

It is anticipated that a single access point will be provided to serve the two parcels located just east of 22nd Avenue on the south side of CSAH 23 (Golf Course Road). CSAH 23 (Golf Course Road) is designated as a major collector roadway and therefore access management best practices should be considered when evaluating new developments along the corridor. Limiting the amount of access onto CSAH 23 (Golf Course Road) will likely improve safety as well as lead to an increase in operational performance of the corridor.

OPERATIONAL ANALYSIS

Traffic operations analysis was conducted to determine the level of service (LOS), delay, and queuing information for the AM, SD and PM peak hour conditions.

LOS is a qualitative rating system used to describe the efficiency of traffic operations at an intersection. Six LOS are defined, designated by letters A through F. LOS A represents the best operating conditions (no congestion), and LOS F represents the worst operating conditions (severe congestion). For the purposes of this analysis, it was assumed that an intersection operating at LOS D or better, for all approaches and the overall intersection, represent acceptable operating conditions.

LOS for intersections is determined by the average control delay per vehicle. The range of control delay for each LOS is different for signalized and unsignalized intersections. The expectation is that a signalized intersection is designed to carry higher traffic volumes and will experience greater delays than an unsignalized intersection. Driver tolerance for delay is greater at a signal than at a stop sign; therefore, the LOS thresholds for each LOS category are lower for unsignalized intersections than for signalized intersections**. Table 2** shows the LOS thresholds for signalized and unsignalized intersections.

Table 2 – Level of Service Thresholds

Level of Service	Average Vehicle Delay (sec/veh)	
	Signalized Intersection	Unsignalized (Stop or Roundabout) Intersection
A	0 to 10	0 to 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

The following scenarios were analyzed as part of this analysis:

- 2023 Existing Conditions
- 2023 Conditions including proposed development traffic.

Intersections analyzed as part of this analysis include the following:

- CSAH 23 (Golf Course Road) and 22nd Avenue
- CSAH 23 (Golf Course Road) and Proposed site access point
- CSAH 23 (Golf Course Road) and the Grand Itasca Clinic and Hospital Access
- CSAH 23 (Golf Course Road) and Lakewood Avenue

2023 Existing Conditions

During all analyzed peak hours, all study intersections operate acceptably with all approaches operating at LOS C or better. During the AM peak hour and school dismissal peak hours, the southbound 22nd Avenue approach operates at LOS B and LOS C, respectively due to school pick up and drop off operations. **Table 3** shows the 2023 existing traffic operations at the study intersections during the AM, SD, and PM peak hours.

Table 3 – 2023 Existing Traffic Operations

Intersections:	Approach	AM PEAK HOUR		SD PEAK HOUR		PM PEAK HOUR	
		Approach (sec/LOS)	Intersection (sec/LOS)	Approach (sec/LOS)	Intersection (sec/LOS)	Approach (sec/LOS)	Intersection (sec/LOS)
CSAH 23 at 22nd Avenue (Minor Stop)	EB	0.9 / A	3.3 / A	0.8 / A	3.3 / A	0.4 / A	1.0 / A
	WB	0.9 / A		0.9 / A		0.9 / A	
	NB	0.0 / A		0.0 / A		0.0 / A	
	SB	12.2 / B		15.5 / C		8.0 / A	
CSAH 23 at Proposed Site Driveway (Minor Stop)	EB	0.8 / A	0.8 / A	0.7 / A	0.7 / A	0.5 / A	0.7 / A
	WB	0.9 / A		0.8 / A		0.8 / A	
	NB						
	SB						
CSAH 23 at Grand Itasca Hospital Access (Minor Stop)	EB	2.1 / A	1.7 / A	1.0 / A	1.4 / A	0.7 / A	1.6 / A
	WB	1.0 / A		0.7 / A		0.7 / A	
	NB						
	SB	9.4 / A		7.7 / A		7.7 / A	
CSAH 23 at Lakewood Ave (Minor Stop)	EB	4.6 / A	5.1 / A	4.8 / A	4.8 / A	4.2 / A	4.6 / A
	WB	5.6 / A		5.0 / A		5.2 / A	
	NB	3.8 / A		3.6 / A		3.5 / A	
	SB	3.6 / A		3.3 / A		3.6 / A	

2023 Existing Conditions with proposed development

Under the 2023 conditions with the addition of the proposed development, operations are comparable to the existing 2023 base conditions without the additional development. With additional through traffic traveling along CSAH 23 (Golf Course Road), delays for the minor street stop-controlled approaches increase slightly.

All intersection approaches operate at LOS C or better under all peak hours analyzed. **Table 4** shows the 2023 existing traffic operations with the proposed development at the study intersections during the AM, SD, and PM peak hours.

The proposed developments are expected to generate an estimated 1,553 vehicles per day with an estimated 1,100 vehicles (70%) expected to travel to the east along CSAH 23 (Golf Course Road). The additional 1,100 vehicles translates to a 20% increase in traffic volumes. The estimated additional daily traffic volumes bring the projected AADT along CSAH 23 (Golf Course Road) to 6,317 vehicles per day on the west end of the corridor and to 11,723 vehicles per day on the east end of the corridor, well within the carrying capacity of a three lane roadway.

As traffic volumes continue to grow along CSAH 23 (Golf Course Road), all minor street stop-controlled intersections along CSAH 23 (Golf Course Road) should be monitored for excessive delay and safety concerns. The southbound approach of 22nd Avenue to CSAH 23 (Golf Course Road) should be monitored as longer delays are currently present during school pick-up and drop off times. Improvements to be considered at this intersection include converting the north leg of the intersection to a right-in/right-out intersection and allow motorists to utilize the CSAH 76 roundabout to make a U-turn to travel east along CSAH 23 (Golf Course Road).

Table 4 – 2023 Existing Traffic Operations

Intersections:	Approach	AM PEAK HOUR		SD PEAK HOUR		PM PEAK HOUR	
		Approach (sec/LOS)	Intersection (sec/LOS)	Approach (sec/LOS)	Intersection (sec/LOS)	Approach (sec/LOS)	Intersection (sec/LOS)
CSAH 23 at 22nd Avenue (Minor Stop)	EB	1.1 / A	3.3 / A	0.9 / A	3.3 / A	0.5 / A	1.0 / A
	WB	1.0 / A		0.8 / A		0.9 / A	
	NB	0.0 / A		0.0 / A		0.0 / A	
	SB	21.6 / C		17.7 / C		9.9 / A	
CSAH 23 at Proposed Site Driveway (Minor Stop)	EB	1.0 / A	0.8 / A	0.8 / A	0.7 / A	0.5 / A	0.7 / A
	WB	1.2 / A		0.9 / A		1.2 / A	
	NB	7.0 / A		6 / A		4.6 / A	
	SB						
CSAH 23 at Grand Itasca Hospital Access (Minor Stop)	EB	2.4 / A	1.7 / A	1.0 / A	1.4 / A	0.6 / A	1.6 / A
	WB	1.1 / A		0.8 / A		0.7 / A	
	NB						
	SB	12.2 / B		9.1 / A		9.6 / A	
CSAH 23 at Lakewood Ave (Minor Stop)	EB	5.0 / A	5.1 / A	5.0 / A	4.8 / A	4.2 / A	4.6 / A
	WB	6.0 / A		5.3 / A		5.4 / A	
	NB	5.1 / A		4.1 / A		3.6 / A	
	SB	4.4 / A		3.5 / A		4.0 / A	

CONCLUSIONS AND RECOMMENDATIONS

The proposed development including redevelopment of three parcels into total of 342 units of multifamily housing is not anticipated to have a detrimental impact on the existing operations of the surrounding roadway.

The developments are estimated to generate 1,553 trips per day adding approximately 1,100 daily trips to CSAH 23 (Golf Course Road) bringing the projected AADT along the corridor to 6,317 vehicles per day on the west end and 11,723 vehicles per day on the east end of the corridor just west of US 169. These projected traffic volumes are well within the carrying capacity of a three-lane roadway which can serve up to 18,000 vehicles per day.

Operational and safety performance of the minor street stop-controlled intersections along the corridor should be monitored as volumes increase along the corridor. The southbound approach of 22nd Avenue to CSAH 23 (Golf Course Road) should be monitored as longer delays are currently present during school pick-up and drop off times. Improvements to be considered at this intersection include converting the north leg of the intersection to a right-in/right-out intersection and allow motorists to utilize the CSAH 76 roundabout to make a U-turn to travel east along CSAH 23 (Golf Course Road).

CMJ

c: Sara Christenson – SEH
Karin Grandia – Itasca County
Ryan Sutherland – Itasca County
Matt Wegwerth – City of Grand Rapids.
Tom Pagel – City of Grand Rapids