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From: Matt Pacyna, PE, Principal
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Date: September 26, 2024

Subject: Tsunami Express Car Wash Traffic Review

INTRODUCTION

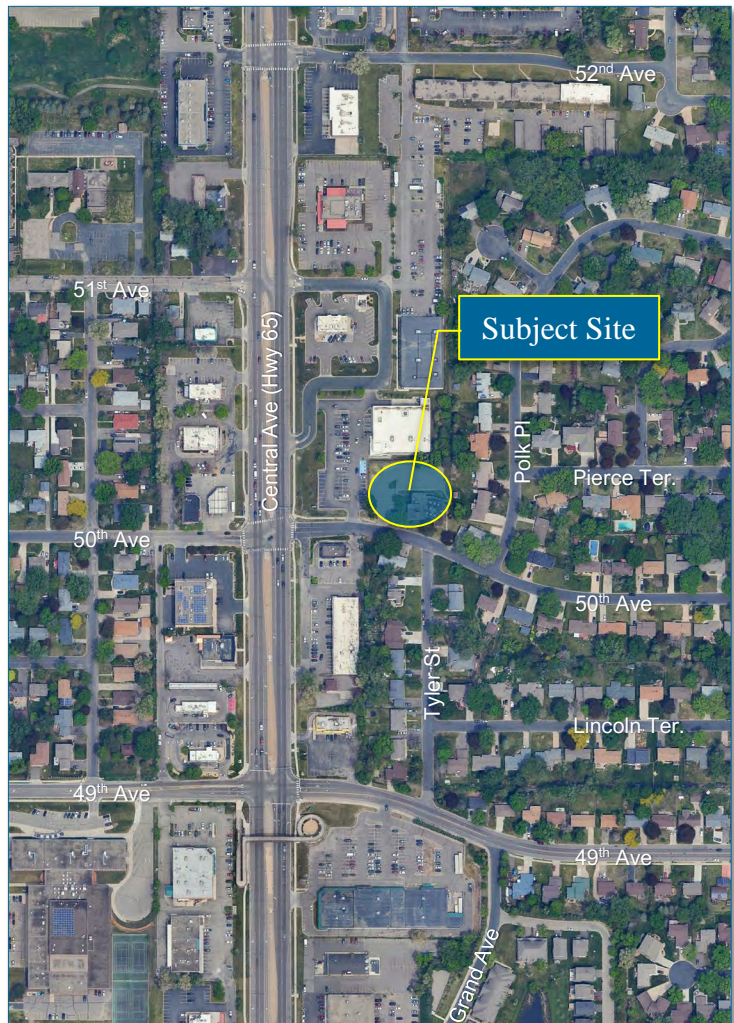
TC2 completed a traffic review of the proposed Tsunami Express Car Wash Development in the City of Columbia Heights. The subject site, as shown, is generally east of Central Avenue (Highway 65) and north of 50th Avenue. The main objectives of the study are to quantify existing traffic operations within the study area, evaluate potential impacts associated with the proposed development, and recommend improvements, if necessary, to ensure safe and efficient operations for all users. A review of internal site circulation, access, and operations is included as part of this review. The following study assumptions, methodology, and findings are offered for consideration.

EXISTING CONDITIONS

Existing conditions were reviewed within the study area to quantify current operations to help determine impacts associated with the proposed development. The evaluation of existing conditions included collecting traffic volumes, observing transportation characteristics, and analyzing intersection capacity, which are described in the following sections.

Traffic Volumes

Vehicular intersection turning movement and pedestrian / bicyclist counts were collected along 50th Avenue at Tyler Street and Polk Place on Tuesday, September 17, 2024. Historical traffic data at the Central Avenue (Highway 65) and 50th Avenue intersection was provided by MnDOT.



The counts included a combination of a.m. / p.m. peak period (i.e., 7 to 9 a.m. and 4 to 6 p.m.) and 13-hour (i.e., 6 a.m. to 7 p.m.) data. The a.m. and p.m. peak hours within the study area generally represent 7:30 to 8:30 a.m. and 4:45 to 5:45 p.m.; there is an additional afternoon p.m. peak period that occurs shortly after the nearby Columbia Heights High School lets out for the day around 3 p.m. Average daily traffic (ADT) volumes were provided by MnDOT or estimated based on the data collected.

Transportation Characteristics

Observations were conducted within the study area to identify various transportation characteristics such as roadway geometry, traffic controls, speed limits, and multimodal facilities. Within the study area, Central Avenue is a 4-lane divided minor arterial roadway with left- and right-lanes; there is a sidewalk along both sides of the roadway and the posted speed limit is 40-mph.

50th Avenue, Tyler Street, and Polk Place are local 2-lane roadways. These roadways do not have multimodal facilities within the study area, except for the north side of 50th Avenue between Central Avenue (Highway 65) and the subject site. The Central Avenue (Highway 65) / 50th Avenue intersection is signalized, while the other study intersections were assumed to operate similar to side-street stop control since the Tyler Street approach is uncontrolled and the Polk Place approach has yield control. Existing geometrics, traffic controls, and volumes within the study area are shown in [Figure 2](#).

Intersection Capacity

Intersection capacity was evaluated using Synchro / SimTraffic Software (version 11), which uses methods outlined in the *Highway Capacity Manual, 6th Edition*. The software is used to develop calibrated models that simulate observed traffic operations, account for peaking characteristics, and identify key metrics such as intersection Level of Service (LOS) and queues. These models incorporate collected traffic, pedestrian, and bicyclist volumes, traffic controls, heavy commercial vehicle activity (i.e., buses and trucks), and driver behavior factors. Existing signal timing was obtained from MnDOT.

Level of Service (LOS) quantifies how an intersection is operating. Intersections are graded from LOS A to LOS F, which corresponds to the average delay per vehicle values shown. An overall intersection LOS A through LOS D is generally considered acceptable in the study area. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity.

Level of Service	Average Delay / Vehicles	
	Stop, Yield, and Roundabout	Signalized Intersections
A	< 10 seconds	< 10 seconds
B	10 to 15 seconds	10 to 20 seconds
C	15 to 25 seconds	20 to 35 seconds
D	25 to 35 seconds	35 to 55 seconds
E	35 to 50 seconds	55 to 80 seconds
F	> 50 seconds	> 80 seconds

For side-street stop-controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service, which takes into account the total number of vehicles entering the intersection and the capability of the intersection to support the volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, most delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high-levels of delay (i.e., poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

The existing intersection capacity analysis results, summarized in [Table 1](#), indicate that all study intersections operate at an acceptable overall LOS C or better and all approaches operate near the LOS D / LOS E threshold or better during the typical weekday a.m. and p.m. peak hours. Existing 95th percentile queues are generally maintained within the current turn lanes, however, westbound queues along 50th Avenue from Central Avenue (Highway 65) occasionally extend to the existing Aldi / Jimmy John’s driveway during the p.m. peak hour. Peak queues at the 50th Avenue intersections with Tyler Street and Polk Place are approximately one (1) vehicle. Thus, there are no significant existing operational issues from an intersection capacity perspective.

Table 1 Existing Intersection Capacity

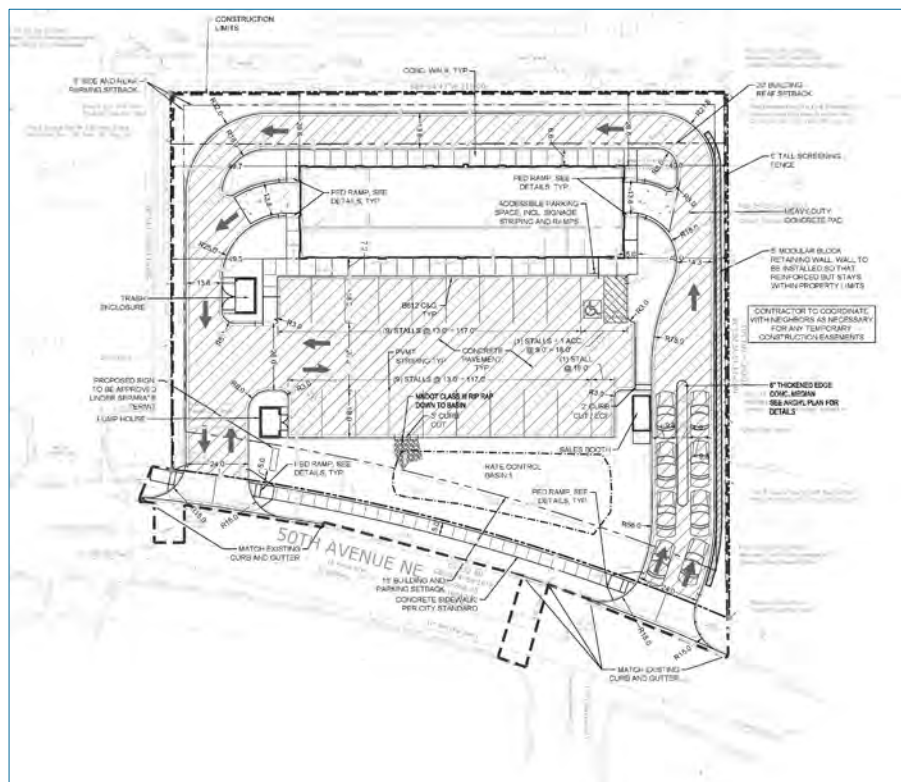
Study Intersection	Traffic Control	Level of Service (Delay)	
		AM Peak Hour	PM Peak Hour
50 th Avenue and Central Avenue (Hwy 65)	Signal	B (14)	C (28)
50 th Avenue and Tyler Street	Yield / SSS	A / B (10)	A / B (10)
50 th Avenue and Polk Place	Yield / SSS	A / A (9)	A / A (9)

SSS – Side-Street-Stop

PROPOSED DEVELOPMENT

The proposed development is generally east of Central Avenue (Highway 65) and north of 50th Avenue. As proposed, the Tsunami Express Car Wash is a single-tunnel automated drive-thru car wash that is approximately 4,500 square feet. The development would replace the existing 12,500 square foot professional office building that is currently vacant. About 20-parking spaces are proposed, as well as the extension of the existing sidewalk along the north side of 50th Avenue to the eastern site driveway. For study purposes, the proposed development was assumed to be fully operational by the year 2027.

Access to the site is planned at two locations; the existing office driveway would remain in its general location and provide two-way operations, while a new two-lane entrance-only access is proposed along 50th Avenue across from Tyler Street. The two-lane entrance provides accommodations for eight (8) vehicles to queue at the sales booth before proceeding to the car wash tunnel.



TRAFFIC FORECASTS

Traffic forecasts were developed for year 2027 build conditions. The traffic forecasts account for general background growth and trip generation from the proposed development. A year 2027 no build condition was not reviewed given the limited area growth between existing and year 2027 conditions. The following information summarizes the traffic forecast development process.

Background Growth

To account for general background growth in the study area, an annual growth rate of one (1) percent was applied to the existing traffic volumes to develop year 2027 background traffic forecasts. This growth rate is higher than historical ADT volumes in the study area over the past 20-years and represents a conservative approach. This rate accounts for growth outside the study area and is not related to the proposed development.

Proposed Development Trip Generation

A trip generation estimate for the proposed development was created using a combination of the *ITE Trip Generation Manual, 11th Edition*, historical data from the project team, and site observations at other similar car washes. The trip generation estimate includes trips for weekday a.m. and p.m. peak hours, as well as a daily basis. A trip generation estimate for the former professional office land use was also developed for comparison purposes. As shown in [Table 2](#), the proposed car wash is estimated to generate approximately 30 a.m. peak hour, 60 p.m. peak hour, and 300 daily trips during its busiest days. When compared to the former office use, the site would generate a similar amount of a.m. peak hour trips, but more p.m. peak hour and daily trips. Note that the trip generation estimate for the proposed car wash represents an active day as opposed to a rainy day, for example.

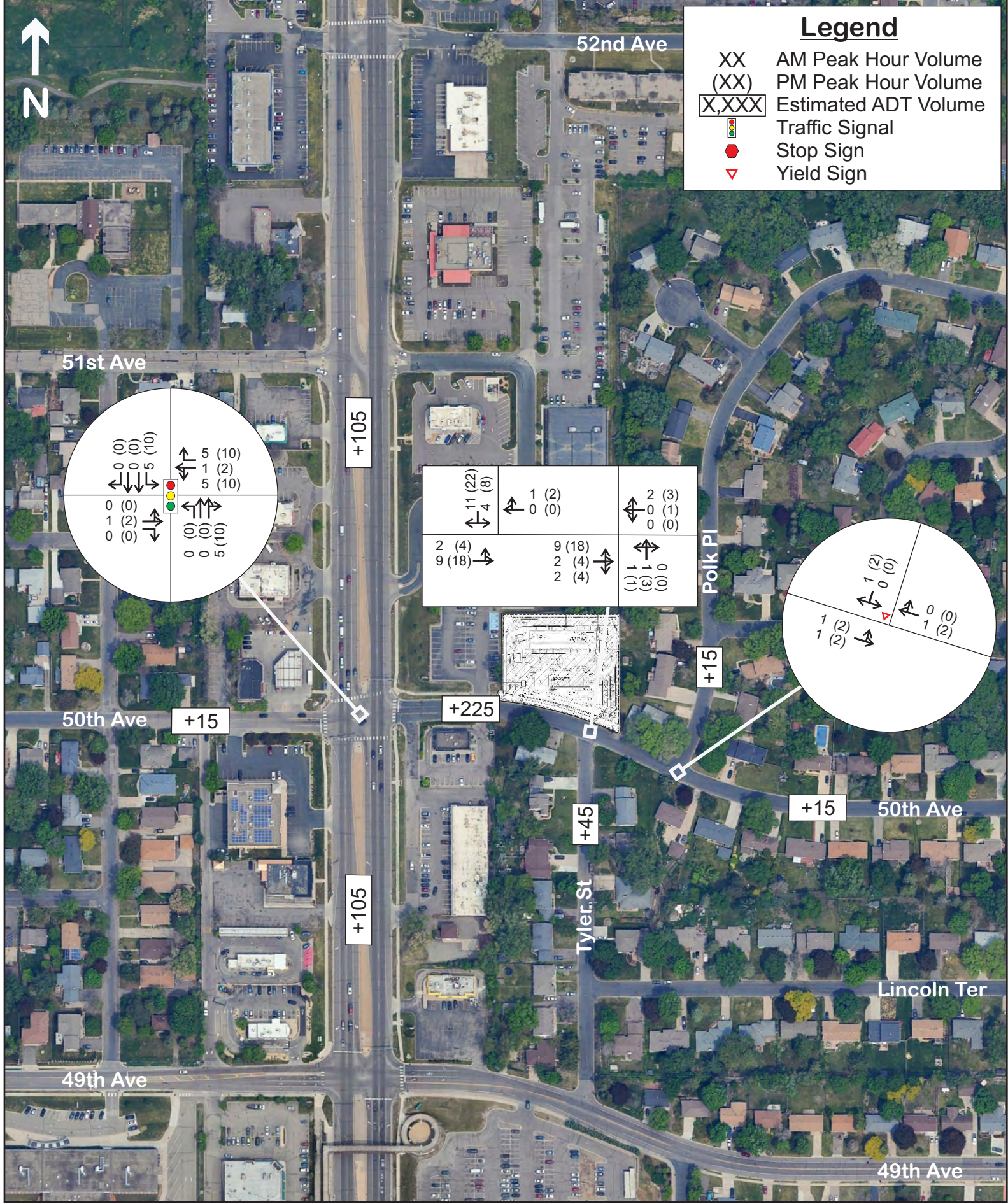
Table 2 Trip Generation Summary

Land Use Type (ITE Codes)	Size	AM Peak Hour		PM Peak Hour		Daily
		In	Out	In	Out	
<u>Proposed Development</u>						
Automated Car Wash (947-949)	1-Tunnel / 4,500 SF	15	15	30	30	300
<u>Former Land Use</u>						
Office (710)	12,500 SF	25	3	3	25	190
Overall Site Change (+ / -)		-10	+12	+27	+5	+110

Trips from the proposed development were routed to the adjacent roadway network using the following distribution, which is based on existing area travel patterns and engineering judgement.

- Central Avenue (Highway 65) North and South: 35% each
- Tyler Street: 15%
- 50th Avenue West, 50th Avenue East, and Polk Place: 5% each

A summary of the site generated trips is shown in [Figure 2](#). The resultant year 2027 build conditions, which accounts for the general background growth and the proposed development is illustrated in [Figure 3](#).



Legend

- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- X,XXX Estimated ADT Volume
- Traffic Signal
- Stop Sign
- Yield Sign

Intersection: Polk PI / Tyler St

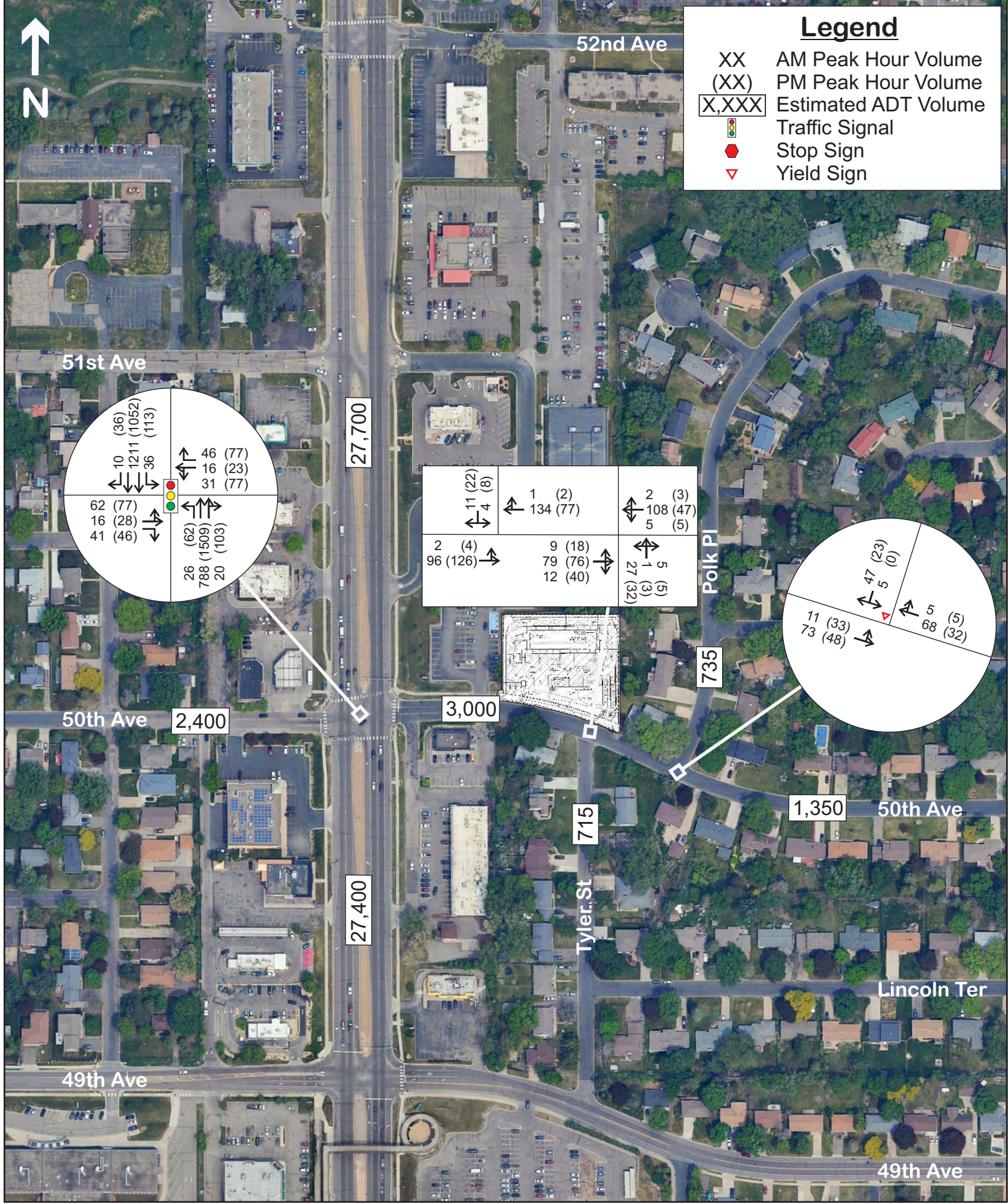
0 (0) 0 (0) 0 (0)	5 (10) 1 (2) 5 (10)		5 (10) 1 (2) 5 (10)
0 (0) 1 (2) 0 (0)	0 (0) 0 (0) 5 (10)		0 (0) 0 (0) 5 (10)

Intersection: Polk PI / 50th Ave

11 (22) 4 (8)	1 (2) 0 (0)	2 (3) 0 (1) 0 (0)
2 (4) 9 (18)	9 (18) 2 (4) 2 (4)	1 (1) 1 (1) 0 (0)

Intersection: Polk PI / 49th Ave

1 (2) 0 (0)	0 (0) 1 (2)
1 (2) 1 (2)	1 (2) 1 (2)



YEAR 2027 CONDITIONS

To understand impacts associated with the proposed development, a future intersection capacity analysis was completed for year 2027 build conditions. Table 3 provides a summary of the year 2027 intersection capacity analysis, as well as a comparison to existing conditions. Results of the future analysis indicate that all study intersections will continue to operate at an acceptable overall LOS C or better and all approaches will continue to operate near the LOS D / LOS E threshold or better during the typical weekday a.m. and p.m. peak hours. Minimal changes in queuing are expected and no impacts to the proposed development driveways are expected. The daily traffic volume changes along Polk Place, 50th Avenue, and Tyler Street are minimal and within a typical daily variation of most roadways. Thus, there are no significant impacts expected because of the proposed development from an intersection capacity perspective.

Table 3 Year 2027 Intersection Capacity Summary

Study Intersection	Traffic Control	Level of Service (Delay)			
		AM Peak Hour		PM Peak Hour	
		Existing	Build	Existing	Build
50 th Avenue and Central Avenue (Hwy 65)	Signal	B (14)	B (15)	C (28)	C (30)
50 th Avenue and West Site Access	SSS	---	A / B (10)	---	A / A (9)
50 th Avenue and Tyler Street / East Site Access	SSS	A / B (10)	A / B (11)	A / B (10)	A / B (11)
50 th Avenue and Polk Place	SSS	A / A (9)	A / A (9)	A / A (9)	A / A (9)

SSS – Side-Street-Stop

SITE PLAN REVIEW / CONSIDERATIONS

The proposed driveway for the car wash tunnel provides for eight (8) vehicles to queue within two-lanes before any impacts to 50th Avenue would occur. This driveway includes a member lane for quicker access. Typical service times once a vehicle enters the car wash is approximately two (2) minutes. Therefore, based on the level of trip generation and expected service rates of the sales booth and car wash tunnel, the provided vehicle stacking distance is adequate and no impacts to 50th Avenue are expected.

A review of the proposed site plan does not indicate any major issues. However, the following items are offered for further consideration and / or discussion between the City and / or project team.

- Locate signage and landscaping to avoid creating any sight distance issues.
- Review truck maneuverability to limit potential internal circulation conflicts.
- Add a stop or yield sign along Tyler Street at 50th Avenue to better define the right-of-way for motorists and reduce potential conflicts.
- Shift the east driveway to the west to better align with Tyler Street, if possible.

CONCLUSIONS

Based on the findings of the study, the following conclusions are offered for consideration.

- 1) All study intersections currently operate at an acceptable overall LOS C or better and all approaches operate near the LOS D / LOS E threshold or better during typical weekday a.m. / p.m. peak hours.
- 2) The development is a single-tunnel automated drive-thru car wash that is approximately 4,500 square feet and would replace an existing 12,500 square foot professional office building.
 - a. The proposed car wash is estimated to generate approximately 30 a.m. peak hour, 60 p.m. peak hour, and 300 daily trips during its busiest days.
- 3) Traffic forecasts were developed for year 2027 build conditions, which included a one (1) percent annual background growth and trip generation from the proposed development.
- 4) Results of the year 2027 build analysis indicates that all study intersections will continue to operate at an acceptable overall LOS C or better and all approaches will continue to operate near the LOS D / LOS E threshold or better during the typical weekday a.m. and p.m. peak hours.
 - a. Minimal changes in queuing and no impacts to the proposed development driveways are expected; the daily traffic volume changes along Polk Place, 50th Avenue, and Tyler Street are minimal and within a typical daily variation of most roadways.
 - b. No significant impacts expected because of the proposed development from an intersection capacity perspective.
- 5) Based on the level of trip generation and expected service rates of the sales booth and car wash tunnel, the provided vehicle stacking distance is adequate and no impacts to 50th Avenue are expected.
- 6) The following items are offered for further consideration and / or discussion between the City and / or project team.
 - a. Locate signage and landscaping to avoid creating any sight distance issues.
 - b. Review truck maneuverability to limit potential internal circulation conflicts.
 - c. Add a stop or yield sign along Tyler Street at 50th Avenue to better define the right-of-way for motorists and reduce potential conflicts.
 - d. Shift the east driveway to the west to better align with Tyler Street, if possible.