CASE #PL2021-50

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January 27, 2021

To: **Steve Furlong, Penn Lake City Homes**

From: **Vernon Swing, PE**

Re: **Traffic Analysis Memorandum – Penn Lake City Homes, Bloomington, MN**

Per your request, Swing Traffic Solutions, LLC has conducted a traffic analysis for the proposed development of the 1.88 acre site located in the northeast quadrant of the Penn Avenue S (CSAH 32) and W 86th Street intersection in Bloomington, MN. (See Figure 1, vicinity map.) The site is proposed to develop as 15 townhouse units. The site is bordered on the west by Penn Avenue S and on the south by W 86th Street. (See Figure 2, site plan.)

The site, per City Council direction, shall include one full access driveway from/to W 86th Street and one right in/right out (RIRO) access from Penn Avenue S. The following statement from the City Council supports this statement, "Motion by Lowman, seconded by Coulter, in Case # PL2020- 133, having been able to make the required findings, to approve Preliminary and Final Development Plans for a 15- unit townhome development located at 8525 and 8545 Penn Avenue South, subject to the conditions and Code requirements attached to the staff memorandum dated October 19, 2020, with the alternate condition for number 7 — " the development must include access to Penn Avenue South available for public use as approved by the City Engineer and fire Marshal. Approval for the access must be obtained from Hennepin County prior to site disturbance or development activity." Motion carried 5- 2, opposed by Carter and Busse."

Hennepin County has indicated that an access permit for the RIRO access from Penn Avenue S will not be granted. This traffic study has focused on the operations of the site access intersections as planned and is being provided to assist the County in reconsidering the access permit request. This memorandum documents the existing conditions, the anticipated site generated traffic and its distribution, and reviews the traffic operations of the Build conditions at the following intersections:

- Penn Avenue S and W 86th Street
- Penn Avenue S and RIRO Access
- W 86th Street and Full Access

Existing Conditions

The existing conditions of the roadways providing direct access to the proposed development of the Penn Lake City Homes site in Bloomington, MN were gathered during a site visit conduct in January of 2021. The field review revealed the following:

- Penn Avenue S and W 86th Street – Penn Avenue S runs north-south and is signed for 35 mph, with two shared through lanes in each direction, the left most through lane shares with left

turning traffic and the right most through lane shares with right turning traffic. W 86th Street is an east-west 35 mph road, and the approaches include a dedicated left turn lane, and a shared through and right turn lane, the east approach also includes a protected right turn island. The intersection is controlled with a traffic signal with protected/permitted left turn phasing for southbound traffic on Penn Avenue S. Transit is available on Penn Avenue S at the intersection.

Turning movement traffic counts from 2016 were used to establish the existing conditions, and ADT counts from 2016 and 2018 were compared to determine if adjustments are required. The ADT counts from the MnDOT and Hennepin Co websites indicate there has been no change in daily traffic volumes, so no adjustments were made. Figure 3 illustrates the existing traffic. It is noted daily and peak hour volumes have been lower in 2020 and 2021 due to COVID, however, as the 2016 volumes are the same as the 2018 numbers it is assumed they represent non-COVID conditions

To quantify the impacts this development has on the surrounding roadway system, it is necessary to determine the trip generation potential of the proposed development uses identified for the site, and add the new trips to the existing traffic passing the site.

Trip Generation and Distribution

The trip generation for the proposed land uses discussed in the introduction has been estimated based on the methodology described by the Institute of Transportation Engineers (ITE) in *Trip Generation*, 10th Edition. The ITE land use code coinciding with the development is Code 220 for the Low-Rise Multi-Family Residential. Table 1 summarizes the findings.

Table 1
Trip Generation

Land Use	Land Use Code	Size/Units	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Townhomes	220	15 Units	2 Trips	5 Trips	5 Trips	3 Trips
Net TOTAL			**7 Trips**		**8 Trips**	

As shown in Table 2, the site will generate 2 entering and 5 exiting trips during the morning traffic peak hour, and 5 entering and 3 exiting trips during the afternoon traffic peak hour. These trips were assigned to the site driveways per the existing traffic patterns, with approximately 65 percent northbound in the AM Peak and 65 percent southbound in the PM Peak, and then added to the existing traffic to represent the Build condition as shown on Figure 4.

Traffic Operations

The operating conditions of transportation facilities, such as roadways, traffic signals, roundabouts and stop-controlled intersections, are evaluated based on the relationship of the theoretical capacity of a facility to the actual traffic volume on that facility. Various factors affect capacity including travel speed, roadway geometry, grade, number of travel lanes, and intersection control. The current standards for evaluating capacity and operating conditions are contained in the 6th Edition of Highway Capacity Manual, published by the Transportation Research Board. The procedures describe operating

conditions in terms of driver delay represented as a Level of Service (LOS). Operations are given letter designations with "A" representing the best operating conditions and "F" representing the worst. Generally, level of service "D" represents the threshold for acceptable overall intersection operating conditions during a peak hour. The Chart below summarizes the level of service and delay criteria for signalized and unsignalized intersections.

LOS Designation	Signalized Intersection Average Delay/Vehicle (Sec.)	Unsignalized Intersection Average Delay/Vehicle (Sec.)
A	≤ 10	≤ 10
B	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80	> 50

For side street stop-controlled intersections special emphasis is given to providing an estimate for the level of service of the minor approaches. Traffic operations at an unsignalized intersection with side street stop-control can be described two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approaches, since the mainline does not have to stop. It is common for intersections with higher mainline traffic volumes to experience increased levels of delay and poor level of service on the side streets.

A final fundamental component of operational analyses is a study of vehicular queuing, or the line of vehicles waiting to pass through an intersection. An intersection can operate with an acceptable Level of Service, but if queues from the intersection extend back to block entrances to turn lanes or accesses to adjacent land uses, unsafe operating conditions could result. In this report, the Industry Design Standard 95th percentile queue length is used. The 95th Percentile Queue Length refers to that length of vehicle queue that has only a five-percent probability of occurring during an analysis hour.

This study has utilized Synchro/Simtraffic to analyze the No-Build and Build conditions and the results are summarized in Tables 2 and 3, respectively.

Table 2
No-Build Peak Hour Operations

Intersection	AM Peak		PM Peak	
	LOS/Delay (sec)	Queue(ft)	LOS/Delay (sec)	Queue(ft)
Penn Ave S & W 86th St	A(3.4)/A (ebl 25.6)	NB Q forecast at 88 ft	A (6.9)/C (wbl 30.1)	SB Q forecast at 204 ft

1. Overall and worst movement LOS reported from SimTraffic simulation delay results. The first letter represents the overall LOS, the second letter and delay are for the worst movement. Capital letters represent signals, lower case stop controlled.
2. 95th percentile queues are a result from an average of 10 SimTraffic simulations.

The results shown in Table 2 indicate the overall operations of the study area intersections are providing acceptable LOS with manageable vehicle queues.

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Table 3
Build Peak Hour Operations

Intersection	AM Peak		PM Peak	
	LOS/Delay (sec)	Queue(ft)	LOS/Delay (sec)	Queue(ft)
Penn Ave S & W 86th St	A (3.4)/A (ebl 25.9)	NB Q forecast at 91 ft	A (6.8)/C (wbl 26.4)	SB Q forecast at 183 ft
Penn Ave & RIRO	a (0.9)/a (wbr 4.9)	WBR Q forecast–19 ft	a (0.7)/a (wbr 2.5)	WBR Q forecast at 14 ft
W 86th St & Full Acc.	a (0.4)/a (sbr 2.4)	SBR Q forecast at 23 ft	a (0.8)/a (sbr 2.5)	SBR Q forecast at 23 ft

1. Overall and worst movement LOS reported from SimTraffic simulation delay results. The first letter represents the overall LOS, the second letter and delay are for the worst movement. Capital letters represent signals, lower case stop controlled.
2. 95th percentile queues are a result from an average of 10 SimTraffic simulations.

Again, the results shown in Table 3 indicate the overall operations of the study area intersections are providing acceptable LOS, with manageable vehicle queues. In fact, the results are essentially unchanged. Further the operations of the site accesses function at LOS A with no operational impacts forecast for the mainline traffic, suggesting the RIRO intersection will not burden the Penn Avenue S operating conditions.

RIRO Access Discussion

Hennepin County has expressed hesitation to allowing the RIRO access due to the potential for violators to turn left into or out of the access. The County has indicated it could allow the access if a median is installed, but they have indicated there is insufficient right of way to install this treatment. The County has indicated they would not allow a pork chop island because drivers might violate the intent of this treatment by turning around the island. It is noted the site will only generate 4 trips in the highest hour that would be traveling in a direction that would be potentially tempted to turn left into the site violating the intended access restriction. Further, the County's reasoning seems to contradict resent research published by the Transportation Research Board, conducted by the State of Oregon, which concludes, "Finally, the RIRO configuration, when executed effectively, mimics the median operations and removes all mid-block left-turn vehicles from the primary roadway. This turn restriction option optimizes corridor performance by eliminating cross traffic left-turns as except at designated locations." It is requested that the County reconsider this type of solution that includes a narrower entrance and exit lanes and tighter radiuses. The site designer offers to work with the County to provide a design that would meet the goals of eliminating left turns onto and out of the site.

The County further indicates their spacing guidelines adopted for CSAH 32 do not allow for access at locations closer than an 1/8 of a mile. The access spacing along the corridor, however, is not in compliance with this spacing restriction. Attached is Figures 5 which illustrate the precedent that has been establish. Further, the need to restrict the access to RIRO is also not applied along the corridor for similar developments, see Figure 6.

Conclusion

In conclusion, the proposed development with the planned RIRO access from Penn Avenue S and the full access from W 86th Street has effective and appropriate access to the site and to the surrounding roadway network. The operational analysis indicates acceptable level of service and manageable vehicle queues. Further, recent research publish by TRB suggests the RIRO access can be designed with a pork shop island resulting in conditions that mimics the effectiveness of a closed median design. The Penn

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Lake City Homes respectfully requests Hennepin County reconsider this RIRO access to Penn Avenue S, CSAH 32.

Please contact Vernon Swing at vswingtraffic@gmail.com or 612-968-4142 with any questions.

Attachments: Figures 1-6

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Figure 1
Vicinity Map

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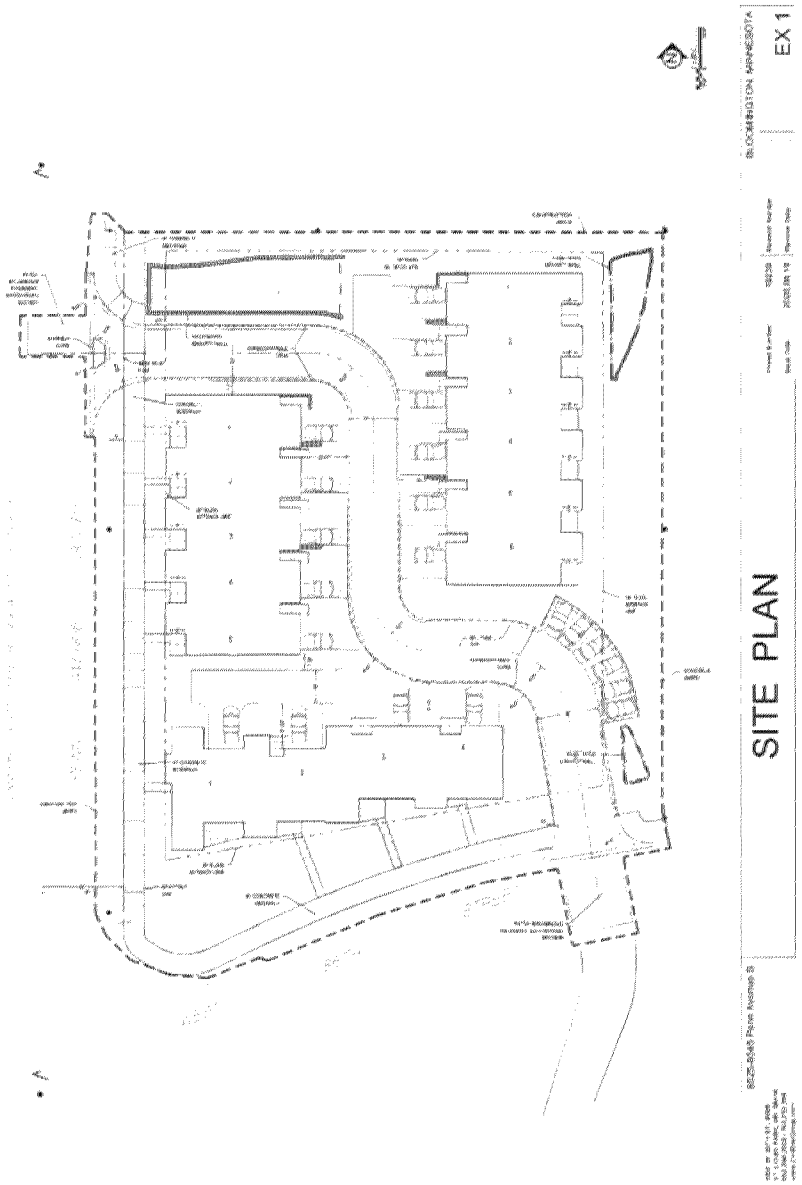

Figure 2
Site Plan

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AM Peak **PM Peak**

Figure 3
No-Build Traffic

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AM Peak **PM Peak**

Figure 4

Build Traffic

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Figure 5
Access in Vicinity of Site

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Figure 6

Access to Pendleton Apartments

Full south of W 91st St,

RIRO north of 91st St