	Calumet Avenue & 45th Avenue	Date: 2026.01.21

As part of the approval process for portions of the Centennial Village PUD, the Munster Plan Commission members have focused considerable discussion of the poor level of service (LOS) at the intersection of Calumet Avenue and 45th Avenue. As has been discussed at prior meetings, it has been explained that certain deficiencies exist at the intersection which cause this poor LOS. Some of these deficiencies are because of the PUD's traffic generation (intersection spacing) and some are necessary widening that was not performed as part of the grade separation project (dual left-turn lanes, adding right turn lanes) which was unrelated to the PUD.

At and immediately after the 1/13/2026 Plan Commission meeting, staff from SEH, Inc. (the Town's consulting engineers) requested that DVG Team prepare a comparison of scenarios and their respective LOS improvements. Exhibits have been prepared so decision makers can see the impacts to adjacent properties each improvement will make. It is the objective of this summary memo to provide that information:

	Calumet Avenue & 45th Avenue	Date: 2026.01.21

Existing Conditions (2025)

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Flash Don't Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	46.8	32.5		40.4	29.3		12.5	40.2		8.2	35.9	35.9
Actuated g/C Ratio	0.43	0.30		0.37	0.27		0.11	0.37		0.07	0.33	0.33
v/c Ratio	0.72	1.03		0.94	0.58		0.91	0.97		0.89	0.90	0.25
Control Delay (s/veh)	32.4	71.3		72.9	33.1		77.0	53.8		85.7	46.8	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay (s/veh)	32.4	71.3		72.9	33.1		77.0	53.8		85.7	46.8	5.6
LOS	C	E		E	C		E	D		F	D	A
Approach Delay (s/veh)		63.7			44.9			59.0			48.6	
Approach LOS		E			D			E			D	
Queue Length 50th (ft)	122	~414		115	157		131	447		85	370	1
Queue Length 95th (ft)	148	#551		#274	217		#200	#581		#124	417	47
Internal Link Dist (ft)		527			437			357			570	
Turn Bay Length (ft)	255			290			435			245		250
Base Capacity (vph)	387	1051		246	950		390	1274		255	1155	619
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.68	1.03		0.94	0.58		0.91	0.97		0.89	0.90	0.25

The intersection currently performs poorly at LOS E. Multiple movements exceed capacity.

Eastbound movements exceed capacity and starve the left-turn lane during peak hours. The lack of a right-turn lane diminishes the capacity of the thru lanes.

Northbound movements thru movements are very near capacity and are hampered by the lack of a northbound right-turn lane.

The westbound left-turn lane operates at capacity today, and queue spillover happens during certain portions of the peak hour on a regular basis.

The average intersection signal delay is 55.2 seconds and LOS E.

	Calumet Avenue & 45th Avenue	Date: 2026.01.21

Full-Build PUD – No Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Don't Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	60.2	43.5		57.5	42.0		18.5	52.6		15.4	49.5	49.5
Actuated g/C Ratio	0.42	0.30		0.40	0.29		0.13	0.36		0.11	0.34	0.34
v/c Ratio	0.71	1.14		1.19	0.67		0.79	1.02		0.88	0.86	0.27
Control Delay (s/veh)	39.4	116.6		146.9	42.8		68.1	68.5		88.8	53.2	11.0
Queue Delay	0.0	0.0		0.0	0.2		0.0	0.0		0.0	6.9	0.0
Total Delay (s/veh)	39.4	116.6		146.9	43.0		68.1	68.5		88.8	60.1	11.0
LOS	D	F		F	D		E	E		F	E	B
Approach Delay (s/veh)		104.5			73.7			68.4			60.6	
Approach LOS		F			E			E			E	
Queue Length 50th (ft)	135	~680		~278	295		170	~682		159	491	27
Queue Length 95th (ft)	200	#824		#484	380		#231	#808		#224	547	75
Internal Link Dist (ft)		527			437			357			316	
Turn Bay Length (ft)	255			290			435			245		250
Base Capacity (vph)	364	1048		240	1013		438	1260		366	1208	625
Starvation Cap Reductn	0	0		0	42		0	0		0	0	0
Spillback Cap Reductn	0	2		0	0		0	0		0	134	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.61	1.14		1.19	0.70		0.79	1.02		0.88	0.97	0.27

As discussed in prior Plan Commission meetings, the additional of network growth and trips created by further construction of the PUD exacerbate the existing conditions further. The same issues identified in the existing conditions will worsen.

Due to the addition of greater PUD trips in the northeast quadrant, queue spillover from the westbound left-turn lane will extend back to N Centennial Drive on a regular basis during the PM Peak Hour. This is evidenced by the 1.19 v/c (volume/capacity) ratio for the westbound left-turn movement.

The average intersection signal delay is 76.4 seconds and LOS E.

	Calumet Avenue & 45th Avenue	Date: 2026.01.21

Full-Build PUD – Add Dual Left-Turn Lanes EB/WB

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Don't Walk (s)		11.0			11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	13.8	47.0		12.7	45.9		18.1	53.0		14.3	49.2	49.2
Actuated g/C Ratio	0.10	0.32		0.09	0.32		0.12	0.37		0.10	0.34	0.34
v/c Ratio	0.68	1.05		0.95	0.62		0.81	1.01		0.95	0.87	0.27
Control Delay (s/veh)	74.1	86.9		94.6	34.6		69.9	66.2		102.0	53.8	11.1
Queue Delay	0.0	0.4		0.0	0.2		0.0	0.0		0.0	1.5	0.0
Total Delay (s/veh)	74.1	87.2		94.6	34.8		69.9	66.2		102.0	55.3	11.1
LOS	E	F		F	C		E	E		F	E	B
Approach Delay (s/veh)		85.2			52.5			67.0			60.2	
Approach LOS		F			D			E			E	
Queue Length 50th (ft)	106	~636		113	286		171	~662		160	492	27
Queue Length 95th (ft)	152	#780		#226	358		#236	#801		#238	548	76
Internal Link Dist (ft)		527			437			357			316	
Turn Bay Length (ft)	255			290			435			245		250
Base Capacity (vph)	364	1129		300	1104		428	1270		338	1200	622
Starvation Cap Reductn	0	0		0	77		0	0		0	0	0
Spillback Cap Reductn	0	1		0	0		0	0		0	56	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.61	1.05		0.95	0.66		0.81	1.01		0.95	0.91	0.27

As westbound left-turn lane spillover is the immediate concern, the intersection was re-modeled assuming both eastbound and westbound left-turn lanes are converted to duals in hopes of lessening this concern.

A reduction in the 50th/95th percentile queue lengths for the westbound left-turn movement is immediate and the v/c ratio is brought back below 1.0. However, the addition of this lane does little to alleviate considerable eastbound thru and northbound thru delay.

Eastbound and northbound thru movements still operate beyond their capacity.

The average intersection signal delay is 67.2 seconds under this scenario and LOS E.

	Calumet Avenue & 45th Avenue	Date: 2026.01.21

Full-Build PUD – Add Dual Left-Turn Lanes EB/WB, Add EB Right-Turn Lane, Add NB Right-Turn Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0		7.0			7.0	7.0		7.0	7.0
Flash Don't Walk (s)		11.0	11.0		11.0			11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0	0		0	0
Act Effct Green (s)	13.8	38.3	38.3	15.6	40.0		19.5	56.4	56.4	16.8	53.6	53.6
Actuated g/C Ratio	0.10	0.26	0.26	0.11	0.28		0.13	0.39	0.39	0.12	0.37	0.37
v/c Ratio	0.68	0.87	0.60	0.77	0.70		0.75	0.75	0.34	0.81	0.80	0.26
Control Delay (s/veh)	74.1	62.4	15.9	63.4	39.8		64.4	36.8	7.0	78.8	46.8	10.0
Queue Delay	0.0	0.0	0.1	0.0	0.2		0.0	0.0	0.0	0.0	0.4	0.0
Total Delay (s/veh)	74.1	62.4	16.0	63.4	40.1		64.4	36.8	7.0	78.8	47.2	10.0
LOS	E	E	B	E	D		E	D	A	E	D	A
Approach Delay (s/veh)		52.0			47.0			38.1			49.7	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	106	393	71	109	296		169	395	15	156	480	25
Queue Length 95th (ft)	152	477	183	160	370		211	398	64	201	535	71
Internal Link Dist (ft)		527			437			357			316	
Turn Bay Length (ft)	250		450	250			435		240	300		250
Base Capacity (vph)	364	964	633	390	989		461	1375	731	414	1309	668
Starvation Cap Reductn	0	0	0	0	42		0	0	0	0	0	0
Spillback Cap Reductn	0	0	12	0	0		0	0	0	0	43	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.85	0.60	0.73	0.72		0.75	0.75	0.34	0.78	0.82	0.26

The Calumet Avenue and 45th Avenue intersection is hampered the most by the absence of right-turn lanes. Without right-turn lanes, turning vehicles must slow for their turns within the thru lane. This behavior causes a decrease in the capacity of the thru lanes. Furthermore, right-turn lanes must queue *within* the thru lane, increasing the thru lanes queue lengths and causing operational issues when in areas with closely spaced intersections.

The above table represents the LOS assuming the addition of an eastbound right-turn lane and a northbound right-turn lane, in conjunction with the previously discussed dual left-turn lanes in the eastbound and westbound directions.

The average intersection signal delay decreases to 46.4 seconds under this scenario and LOS D.

While LOS D may not appear to be a substantial improvement to the lay person, it should be known that achieving even LOS C in an urban or dense suburban environment is nearly impossible. Simply put, two crossing roadways with substantial thru and turning volumes will not approach LOS C. Traffic signals make intersections more efficient than intersections without them, but they also create delay for each vehicle arriving to a red light.

What should be focused on under this scenario is a reduction in peak v/c ratio, from 1.05 down to 0.85.

There is also a drastic reduction in both 50th and 95th percentile queues in *all* movements. The concern for queues interrupting the function of the nearby intersections is removed.

	Calumet Avenue & 45th Avenue	Date: 2026.01.21

Full-Build PUD – Add Dual Left-Turn Lanes EB/WB, Add EB Right-Turn Lane, Add NB Right-Turn Lane, Add WB Right-Turn Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Walk Time (s)		7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0
Flash Don't Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	13.8	38.3	38.3	15.6	40.0	40.0	19.5	56.4	56.4	16.8	53.6	53.6
Actuated g/C Ratio	0.10	0.26	0.26	0.11	0.28	0.28	0.13	0.39	0.39	0.12	0.37	0.37
v/c Ratio	0.68	0.87	0.60	0.77	0.47	0.37	0.75	0.75	0.34	0.81	0.80	0.26
Control Delay (s/veh)	74.1	62.4	15.9	63.4	37.6	8.8	64.4	36.8	7.0	78.8	46.8	10.0
Queue Delay	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Total Delay (s/veh)	74.1	62.4	16.0	63.4	37.6	8.8	64.4	36.8	7.0	78.8	47.2	10.0
LOS	E	E	B	E	D	A	E	D	A	E	D	A
Approach Delay (s/veh)		52.0			38.7			38.1			49.7	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	106	393	71	109	203	73	169	395	15	156	480	25
Queue Length 95th (ft)	152	477	183	160	261	123	211	398	64	201	535	71
Internal Link Dist (ft)		527			437			357			316	
Turn Bay Length (ft)	250		450	250		200	435		240	300		250
Base Capacity (vph)	364	964	633	390	998	603	461	1375	731	414	1309	668
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	12	0	0	0	0	0	0	0	43	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.85	0.60	0.73	0.46	0.36	0.75	0.75	0.34	0.78	0.82	0.26

Realizing a westbound right-turn lane has been omitted from the previous scenario, that option was run as well. Under this new scenario, the intersection signal delay decreases only slightly further, to 44.9 seconds, and still operates at LOS D.

Admittedly, the currently presented PUD land plan has options to accommodate an additional one lane width widening on 45th Avenue without material affects to development operations (widening for dual left-turn lanes). Accommodating *two lane widths widening* (one for the dual left, and one for a westbound right-turn lane) would immediately have material affects to development operations and the overall land plan for the northeast quadrant of Calumet Avenue and 45th Avenue.

Summary / Conclusions

It is evident that entertaining dual-left turn lanes on 45th Avenue will alleviate some of the operational concerns with the N Centennial Drive intersection, but it is clear that this improvement alone will not substantially increase the capacity or efficiency of the Calumet Avenue and 45th Avenue intersection.

The additions of missing right-turn lanes, particularly northbound and eastbound, will provide the most substantive LOS reductions at this intersection.

Geometric Obstacles

As illustrated in the attached exhibits, consideration of widening both roadways in the future will require tackling issues likely avoided during the reconstruction of the intersection over the past 10 years.

Installation of an eastbound right-turn lane will almost certainly require relocation of a sanitary lift station in the southwest quadrant of the intersection.

Installation of the dual left-turns lanes and their associated widening will almost certainly require ROW takes and possible parking lot impacts to the development in the northwest quadrant of the intersection.

Installation of a northbound right-turn lane will likely require realignment of Calumet Avenue through the intersection due to existing buildings in the southeast quadrant that are close to existing ROW lines.

Holistically, the intersection will need to get larger as the current east/west stop bars are not a sufficient distance from each other to prevent the left-turn movements from conflicting with each other. While this obstacle may be solved through different signal phasing, that answer is best determined at a later date.