



Appendix E - Central Entrance Traffic Analysis Memo

Central Entrance Traffic Analysis

Prepared for
Duluth-Superior Metropolitan Interstate Council



Final Technical Report
October 2021

AECOM Imagine it.
Delivered.

Prepared for:

Duluth-Superior Metropolitan Interstate Council

Prepared by:

AECOM

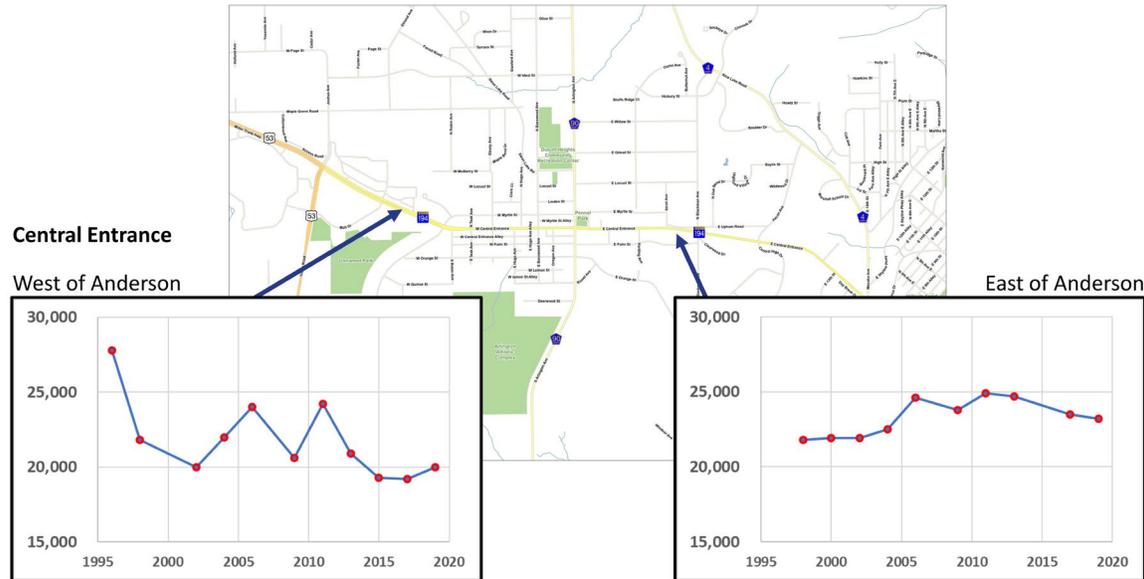
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October 2021

20,000 which is down from a high of approximately 27,800 in 1996. East of Anderson Road, the 2019 AADT is 23,200 which represents a decline from 2011 when this segment had a AADT of 24,900.

Figure 2. Historical AADT on Central Entrance



MnDOT conducted traffic counts along Central Entrance in mid-September 2021 to supplement the historical traffic data. Traffic counters were placed in two locations, one on each side of Arlington Avenue. The first counter was placed between the McDonalds and Burger King and had a 48 hour reading of 55,789. The second counter was placed by the UPS Store and had a 48 hour reading of 55,798. These readings represent raw data, meaning the values have not been adjusted to account for seasonal factors, semis, vehicles with trailers, etc.¹ Semis or vehicles with trailers would be counted as more than one vehicle depending on how many axles the vehicle combination has.

The current raw readings, when divided by two, result in a raw daily estimate of 27,900 vehicles. When this raw data is adjusted to account for semis, single unit trucks, vehicles with trailers, etc., the daily total will drop. Based on the information that is currently available at the time of this analysis, it is believed that the recent traffic counts are likely consistent with the historical AADT counts that have previously been documented.

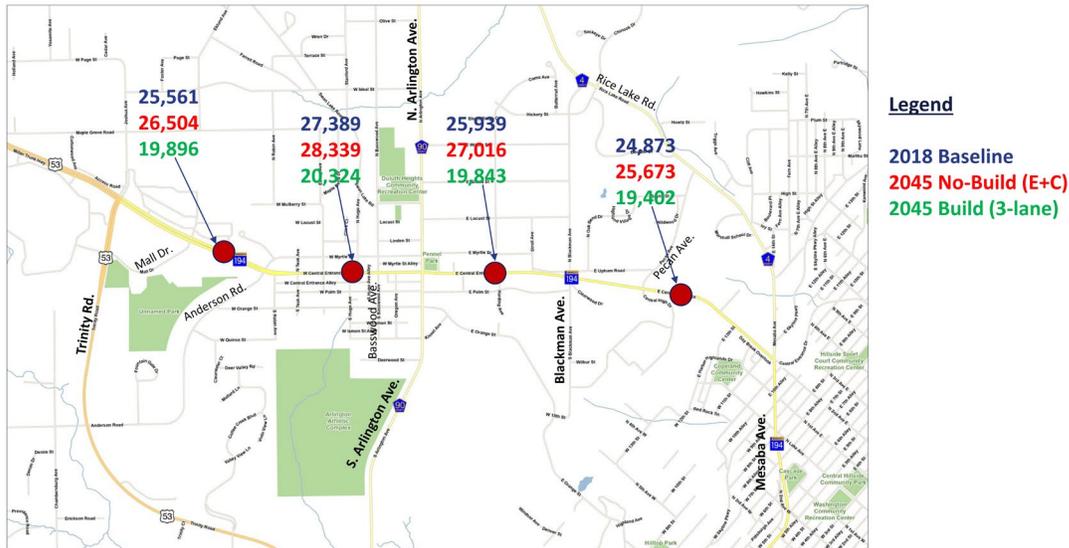
Regional Travel Demand Forecasting Model

The MIC regional travel demand forecasting model was used to evaluate the potential impacts of associated with the Build Concept #1 (reduced capacity along Central Entrance to represent a 3-lane cross section). As part of this process, the project team confirmed with MIC staff that were no modifications required to the 2045 socioeconomic model TAZ data. **Figure 3** summarizes the average weekday traffic volumes as produced from the model. The figure includes 2018 baseline volumes, 2045

¹ MnDOT is planning to apply the seasonal adjustment factors to determine an AADT; however, this data was not expected to be ready for this traffic analysis.

No-Build volumes (which included existing plus committed projects consistent with the 2045 LRTP), and 2045 Build Concept #1 volumes (3-lane cross section).

Figure 3. Average Weekday Traffic Volumes (from Regional Travel Demand Model)



Figures 4 to 6 show the volume change that might occur when comparing the respective scenarios.

Figure 4 shows that between 2018 and 2045 there is an expected increase in traffic volumes of approximately 3% to 4%. This reflects the estimated growth in traffic related to the projected increase in population and employment (consistent with the MIC socioeconomic data for the 2045 LRTP and travel model).

Figures 5 (regional view) and **6** (corridor view) show the estimated shift in traffic if Central Entrance is reduced to a 3-lane cross section. It should be noted that when the regional model was coded to reflect the 3-lane cross section, the coding is actually closer to reflecting a reduction to a 2-lane configuration (this is due to how the regional model capacity is determined/coded). As such, the model results for the 2045 Build Concept #1 show there could be between a 24% and 28% reduction in traffic along Central Entrance as traffic shifts to other area roadways. In essence, some drivers would choose an alternative travel route due to the reduced capacity and the slower travel time it would take to travel through the Central Entrance corridor.

It should also be noted, that for the purpose of this analysis, the project team was focused on the traffic impacts along Central Entrance and a detailed analysis was not completed to determine the impact on other area roadways. However, a preliminary review shows that Arrowhead could see an increase in traffic if Central Entrance was reduced to a 3-lane cross section. If the 3-lane cross section advances for further consideration, it is recommended that a more extensive analysis be completed to determine the operational impacts on surrounding area roadways.

Figure 4. Estimated Change in Traffic Volumes (2018 Existing Conditions compared to 2045 No-Build Conditions)



Figure 5. Estimated Change in Traffic Volumes (2045 No-Build Conditions compared to 2045 Build Concept #1 – 3-lane Cross Section; Regional View)

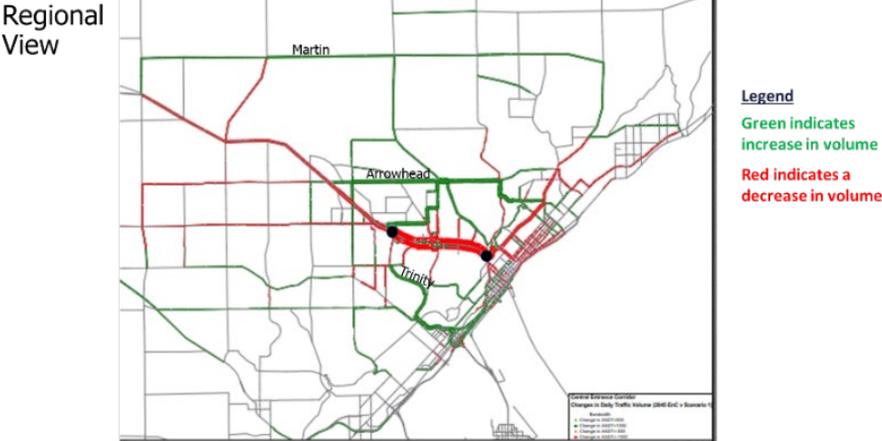
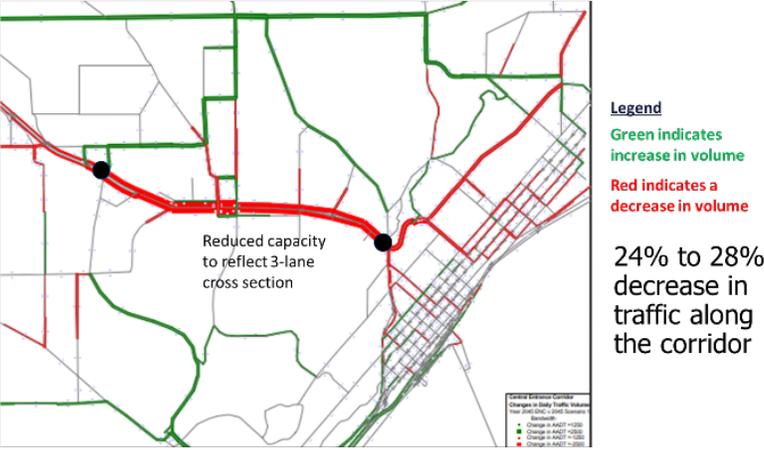


Figure 6. Estimated Change in Traffic Volumes (2045 No-Build Conditions compared to 2045 Build Concept #1 – 3-lane Cross Section; Central Entrance Zoom)



Year 2018 Intersection Level of Service (Existing Conditions)

AECOM utilized Synchro (existing network, turning movements, and signal timings provided to the project team) to conduct the 2018 a.m. and p.m. peak hour intersection LOS for the existing roadway configuration of Central Entrance. These results establish the baseline condition which was later compared to the 2045 No-Build scenario. These existing counts, as opposed to collecting current counts, were used to avoid potential impacts that COVID-19 might have on travel patterns. **Figure 7** displays the 2018 a.m. and p.m. peak hour intersection LOS results while **Table 1** summarizes the respective approach movement LOS.

Figure 7. 2018 Intersection Level of Service (existing cross section with current signal timings)

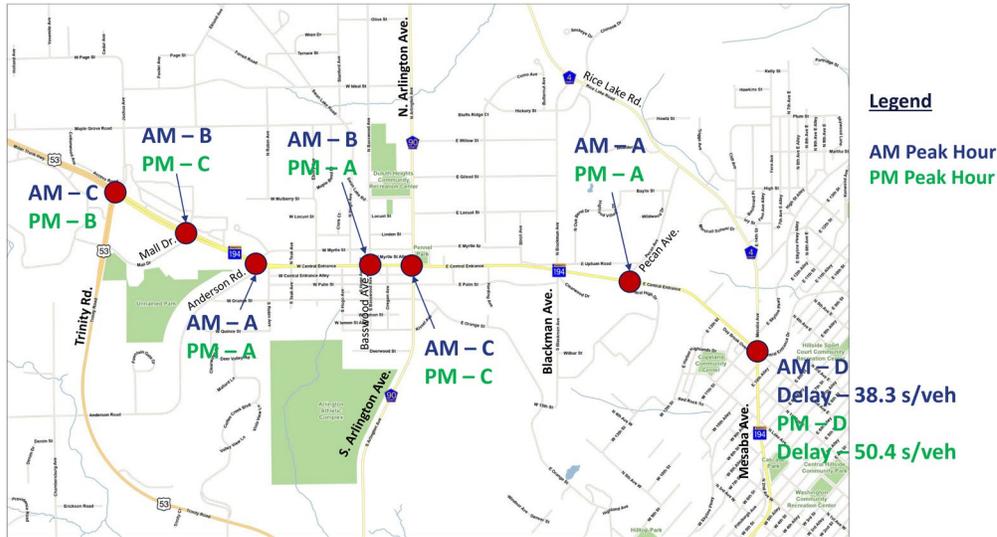


Table 1. 2018 Level of Service (by Approach Turn Movement)

Central Entrance @ Trinity Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D	B	A	E	E	A	D	A	A
PM Peak	E	D	A	E	A	A	E	E	A	D	A	A

Central Entrance @ Mall Dr												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	E	A	C	A	A	D		C	D	A	A
PM Peak	D	E	A	D	B	A	E	D		E	C	A

Central Entrance @ Anderson Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		E	C	A	A			D	B	A	A	A
PM Peak		E	B	A	A			E	C	A	A	A

Central Entrance @ Basswood Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		D	A	A	A			E	A	A		A
PM Peak		D	A	A	A			E	B	A		A

Central Entrance @ Arlington Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	C		E	B	C		C	D	A	A		B
PM Peak	E		D	B	B		D	E	B	C		A

Central Entrance @ Pecan Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		D	A	C	A	A		E	B	F	A	A
PM Peak		D	A	F	A	A		E	B	D	A	A

Central Entrance @ Mesaba Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D	D	D	D	D	A	C	D	B
PM Peak	D	D	A	C	D	D	D	E	A	F	E	C

The analysis shows that overall, the signalized intersections within the Central Entrance study area are operating at an acceptable LOS during the a.m. and p.m. peak hours. The intersection of Central Entrance and Mesaba Avenue was found to experience the highest overall delays, operating at LOS D during both the a.m. and p.m. peak hours (LOS D during peak periods is considered to be acceptable). Additionally, at the intersection of Central Entrance and Pecan Avenue, the eastbound left-turn movement was found to be operating at LOS F during the a.m. peak and westbound left-turn movement operating at LOS F during the p.m. peak. Given that this is a peak hour analysis, it is not unusual for certain turning movements to be operating at LOS E or F as long as the overall intersection LOS remains at an acceptable level.

Year 2045 Baseline Intersection Level of Service

AECOM utilized Synchro to conduct the a.m. and p.m. peak hour intersection LOS for the year 2045 baseline conditions, which assumes the existing roadway configuration of Central Entrance is maintained. Results from the regional travel demand forecasting model were used to develop growth factors that were applied to the 2018 a.m. and p.m. intersection turning movements. The application of the growth factors resulted in increased turning movements that were assumed to represent year 2045 conditions. Signal timings along Central Entrance for the a.m. and p.m. peak hour conditions were optimized to best accommodate the increase in traffic volumes/turning movements. **Figure 8** displays the 2045 No-Build a.m. and p.m. peak hour intersection LOS results while **Table 2** summarizes the respective approach movement LOS.

Figure 8. 2045 No-Build Intersection Level of Service (existing cross section with optimized signal timings)

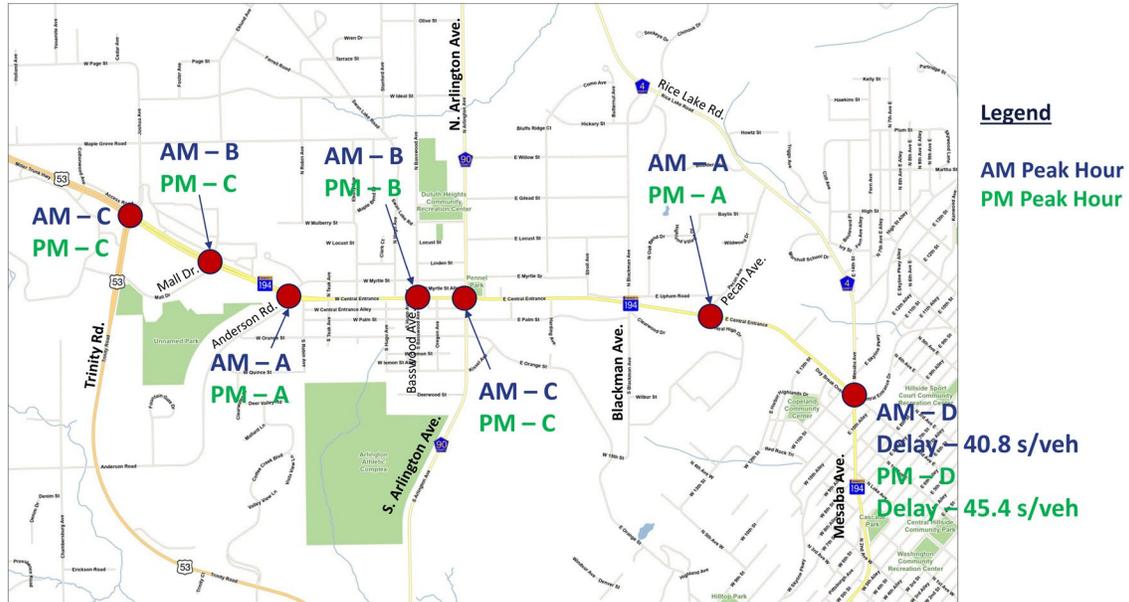


Table 2. 2045 No-Build Level of Service (by Approach Turn Movement)

Central Entrance @ Trinity Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D	B	A	E	E	A	D	A	A
PM Peak	E	D	A	E	A	A	E	E	A	D	A	A

Central Entrance @ Mall Dr												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	E	A	D	B	A	D	C		D	A	A
PM Peak	D	E	A	E	C	A	E	D		E	C	A

Central Entrance @ Anderson Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		D	B	A		A		D		B	A	A
PM Peak		D	B	A		A		D		B	A	A

Central Entrance @ Basswood Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		C	A	A		A		D		A	A	B
PM Peak		D	A	A		A		D		A	A	A

Central Entrance @ Arlington Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	B		D	C		C	C	C	A	B		C
PM Peak	D		D	A		C	C	D	A	D		C

Central Entrance @ Pecan Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		C	A	D	A	A		D		A	D	A
PM Peak		D	A	D	A	A		D		A	D	A

Central Entrance @ Mesaba Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D		D	D	D	A	D	D	A
PM Peak	D	D	A	C		D	D	E	A	E	D	A

The analysis shows that the signalized intersections within the Central Entrance study corridor are expected to continue to operate at an acceptable LOS during the a.m. and p.m. peak hours (again, signal timings were optimized to account for the increased traffic volumes). The intersection of Central Entrance and Mesaba Avenue continued to operate at LOS D during both the a.m. and p.m. peak hours, with a slight increase in overall delay of approximately three to five seconds compared to the 2018 LOS results. The signal timing optimization eliminated individual turning movements that were operating at LOS F. A few turning movements were found to be operating at LOS E at Trinity Road, Mall Drive, and Mesaba Avenue. These LOS E movements typically occur at side street approaches or mainline left-turns due to a continued prioritization of eastbound and westbound through movements on Central Entrance, which sees the largest traffic volumes.

Build Concept #1: Reduced Capacity (3-Lane Cross Section)

Build Concept #1 represents a condition where Central Entrance is reduced to a 3-lane cross section between Anderson Road and Pecan Avenue. For the purpose of this analysis, the results of the travel demand forecasting model were incorporated into the Synchro analysis. The travel demand model results were used to estimate the potential impact on travel patterns as a result of reducing the capacity along Central Entrance (decline of 24% to 28%). This adjustment factor was applied to the Central Entrance intersection turning movements which ultimately resulted in a reduction in traffic volumes.

As part of the analysis, the volumes were reviewed to identify intersections where turn lanes would improve overall intersection LOS, as well as improving both right-turn and through movements. A dedicated westbound right-turn lane at Central Entrance and Anderson Road, as well as dedicated eastbound and westbound right-turn lanes at Central Entrance and Basswood Avenue and Central Entrance and Arlington Drive were included in the model to improve traffic operations, and overall intersection LOS. **Figure 9** displays the 2045 3-lane cross section a.m. and p.m. peak hour intersection LOS results while **Table 3** summarizes the respective approach movement LOS.

Figure 9. 2045 Build Concept #1 Intersection Level of Service (3-lane cross section with optimized signal timings)



Table 3. 2045 Build Concept #1 Level of Service (by Approach Turn Movement)

Central Entrance @ Trinity Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D	B	A	D	D	A	D	B	A
PM Peak	D	D	A	D	C	A	D	D	A	D	C	A

Central Entrance @ Mall Dr												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	C	D	A	D	A	A	D		B	D	A	A
PM Peak	C	D	A	D	C	A	D		B	D	C	A

Central Entrance @ Anderson Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		D	B	A	A	A		D	B	A	A	A
PM Peak		D	B	A	A	A		D	B	A	A	A

Central Entrance @ Basswood Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		D	A	A	A	A		D	A	A	A	A
PM Peak		D	A	A	A	A		D	A	A	B	A

Central Entrance @ Arlington Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	B		D	B	C	A	C	C	A	B	C	A
PM Peak	D		D	B	D	A	C	D	A	C	C	A

Central Entrance @ Pecan Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		C	A	D	A	A		D	A	D	A	A
PM Peak		C	A	D	A	A		D	A	D	A	A

Central Entrance @ Mesaba Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	C		D	D	D	A	C	D	A
PM Peak	D	D	A	C		D	D	E	A	D	D	A

The analysis shows that acceptable overall traffic operations could be maintained throughout the project corridor under the 3-lane build concept (signal timings were optimized to account for the change in lane geometry). While some intersections show a slight increase in delay, for example overall LOS at Central Entrance and Arlington Avenue increased from LOS C to LOS D in the p.m. peak, most intersections are expected to have similar or better operations compared to the 2045 No-Build scenario. Additionally, no movements are expected to operate at LOS F and only one movement is expected to operate at LOS E (southbound through movement at Central Entrance and Mesaba Avenue during the p.m. peak). The maintained or improved operations can be attributed to the lower traffic volumes that were a result of reduced roadway capacity and trips diverting away from the corridor.

Sensitivity Analysis for 3-Lane Cross Section

After reviewing the initial LOS results for the 3-lane cross section, the project team determined that the regional model estimate of shifting 24% to 28% of traffic away from the Central Entrance corridor was likely overestimating the impact. The project team conducted a sensitivity analysis for the 3-lane cross section as an alternative to evaluate the potential operational impacts if no trips were to divert from Central Entrance. The sensitivity analysis assumes the same intersection turning movements as the 2045 No-Build scenario, representing a condition where the 3-lane geometry is assumed but no traffic is diverted to other area roadways as a result of a reduction in capacity along Central Entrance. Ultimately, if the 3-lane cross section is constructed, the percentage of trips that divert would most likely fall somewhere between the sensitivity analysis results and the original 3-lane cross section results; however, it is impossible to predict the actual percentage of drivers that would choose alternative travel routes.

Figure 10 displays the 2045 3-lane cross section (sensitivity analysis) a.m. and p.m. peak hour intersection LOS results while **Table 4** summarizes the respective approach movement LOS.

Figure 10. 2045 Build Concept #1: Sensitivity Analysis Intersection Level of Service (3-lane cross section with optimized signal timings)

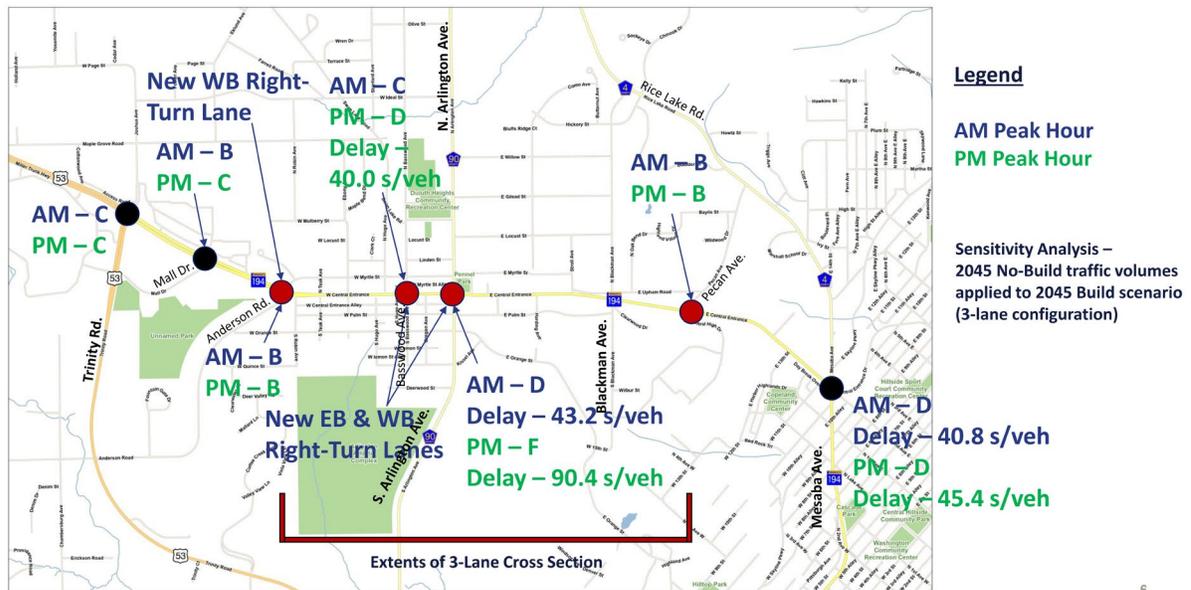


Table 4. 2045 Build Concept #1: Sensitivity Analysis (by Approach Turn Movement)

Central Entrance @ Trinity Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D	B	A	D	D	A	D	B	A
PM Peak	D	D	A	D	D	A	D	D	A	D	C	A

Central Entrance @ Mall Dr												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	C	D	A	D	A	A	D		B	D	B	A
PM Peak	C	C	A	D	C	A	D		C	E	D	A

Central Entrance @ Anderson Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		D	B	B	B	A		D	B	A	A	A
PM Peak		D	B	A	B	A		D	B	A	A	A

Central Entrance @ Basswood Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		C	A	A	B	A		D	A	A	C	A
PM Peak		D	A	A	E	A		D	A	A	C	A

Central Entrance @ Arlington Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	C		E	D	C	A	C	D	A	B	D	A
PM Peak	D		D	C	F	A	C	D	A	D	D	A

Central Entrance @ Pecan Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak		C	A	D	A	A		D	A	D	B	A
PM Peak		C	A	D	A	A		D	A	D	A	A

Central Entrance @ Mesaba Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D		D	D	D	A	D	D	A
PM Peak	D	D	A	C		D	D	E	A	E	D	A

The sensitivity analysis shows that there would likely be operational and LOS concerns if no traffic diverts to other routes after the reconstruction to a 3-lane cross section along Central Entrance. In particular, the intersection of Central Entrance and Arlington Avenue was found to be operating at LOS D during the a.m. peak hour and LOS F (90.4 seconds of delay) during the p.m. peak hour. Additionally, the westbound through movement at Arlington Avenue was found to be operating at LOS F during the p.m. peak with a delay of 191.5 seconds. The increase in delay and declining traffic operations is likely attributed to the heavy volumes, particularly mainline through volumes with only one through movement lane in the 3-lane cross section.

Build Concept #2: One-Way Pair

Build Concept #2 represents a condition where Central Entrance, along with Palm Street, is converted to a one-way pair between Anderson Road and Pecan Avenue. No intersection turning movements were available along Palm Street so WSB collected current turning movements for the a.m. and p.m. peak hours at the main intersections. The project team used the current turning movement counts to modify the Synchro network to include Palm Street as a one-way configuration eastbound and Central Entrance as a one-way westbound. Existing intersection turning movements were reallocated to reflect the one-way pair reconfiguration. Also, for the purpose of this analysis, engineering judgment was used to identify intersection geometry (such as adding turn-lanes to help obtain acceptable, or improved, intersection LOS). Intersections outside the one-way reconfiguration maintained the same optimized signal timing that was developed in the 2045 No-Build scenario, while intersections within the extents of the one-way pair were retimed and optimized based on the geometric and volume changes/reassignment. **Figure 11** displays the 2045 one-way pair a.m. and p.m. peak hour intersection LOS results while **Table 5** summarizes the respective approach movement LOS.

Figure 11. 2045 Build Concept #2 Intersection Level of Service (one-way pair with optimized signal timings)

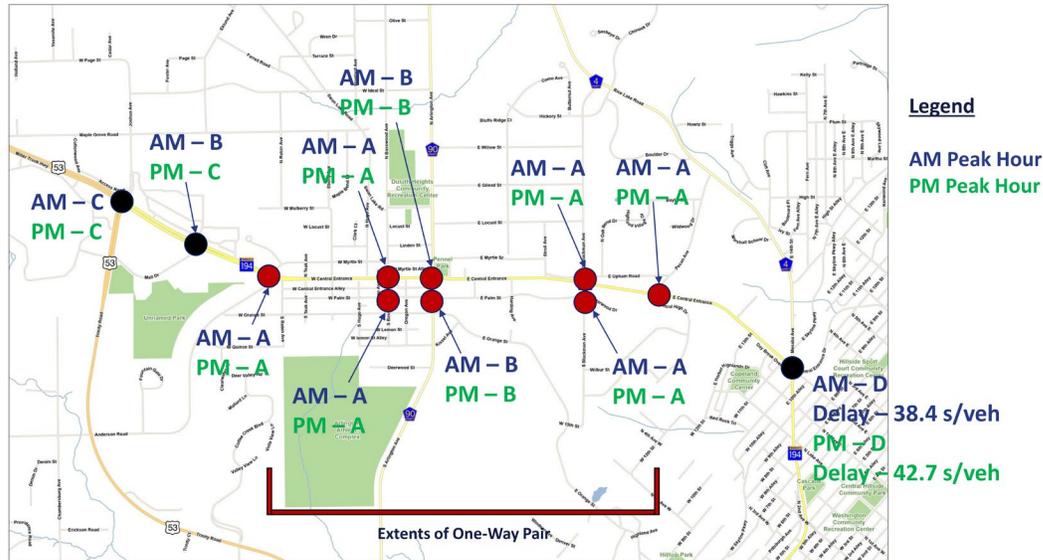


Table 5. 2045 Build Concept #2 Level of Service (by Approach Turn Movement)

Central Entrance @ Trinity Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	A	D	D	D	B	A	A	E	E	D	A	A
PM Peak	E	D	A	D	B	A	E	E	A	E	B	A

Central Entrance @ Mall Dr												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	D	D	A	D	B	A	D	C	D	A	A	A
PM Peak	D	D	A	E	C	A	E	D	E	B	A	A

Central Entrance/Palm St @ Anderson Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	C	A	A	A	A	A	C	A	A	A	A	A
PM Peak	C	A	B	A	A	A	C	B	A	A	A	A

Central Entrance @ Basswood Ave							Central Entrance @ Blackmon Ave							
Movement	NBL	NBT	WBL	WBT	WBR	SBT	SBR	NBL	NBT	WBL	WBT	WBR	SBT	SBR
AM Peak	C	A	A	A	A	C	A	C	A	A	A	A	B	B
PM Peak	C	A	A	A	A	C	A	C	A	A	A	A	B	B

Palm St @ Basswood Ave							Palm St @ Blackmon Ave								
Movement	NBT	NBR	SBL	SBT	EBL	EBT	EBR	NBL	NBT	NBR	SBL	SBT	EBL	EBT	EBR
AM Peak	A	B	B	A	A	A	A	B	B	C	C	A	A	A	A
PM Peak	B	B	B	B	A	A	A	B	B	C	C	A	A	A	A

Central Entrance @ Arlington Ave							Central Entrance/Palm St @ Pecan Ave												
Movement	NBL	NBT	WBL	WBT	WBR	SBT	SBR	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	A	B	A	B	A	C	A	C	A	A	A	A	A	A	C	A	A	A	A
PM Peak	B	B	B	C	A	C	A	C	C	A	A	A	A	A	C	C	C	C	A

Palm St @ Arlington Ave							Central Entrance @ Mesaba Ave												
Movement	NBT	NBR	SBL	SBT	EBL	EBT	EBR	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
AM Peak	C	C	C	A	A	A	A	D	E	A	D	D	D	D	D	A	C	D	A
PM Peak	C	C	B	B	A	A	B	D	E	A	D	D	D	D	D	A	C	D	A

The analysis shows that the one-way pair configuration is expected to operate at an acceptable LOS at all intersection locations during both a.m. and p.m. peak hours. This is consistent with the initial expectations as a one-way pair offers additional capacity as a result of eliminating some conflicting turning movements. Furthermore, the additional intersection turning movement counts collected along Palm Street are relatively low volumes, so the addition of the Palm Street volumes (reassigned to the westbound movement of Central) had little impact on the overall intersection operations.

SimTraffic Results

In addition to conducting the LOS analysis, the project team used SimTraffic for each scenario to estimate the overall travel time in each direction of travel along the corridor in the study area. While Synchro utilizes macroscopic analysis to determine expected LOS and delays, SimTraffic utilizes microscopic simulation which tracks each individual vehicle through the model and allows for additional calibration to match expected real-world conditions. SimTraffic is able to consider the full impact of queuing and blocking, making it a useful tool for determining approximate corridor travel times. **Table 6**

summarizes the SimTraffic travel time results. These results represent the estimated time that it would take a vehicle to travel through the study corridor, by direction.

Table 6. SimTraffic Travel Time Estimates

PM Peak Hour Travel Times				Change (in minutes)		
Scenario	Direction	Travel Time	Travel Time	2018 Baseline to 2045 No- Build	2045 No-Build to 2045 Build	2045 No-Build to 2045 Build (sensitivity analysis)
		(sec)	(min)			
2018 Baseline	EB	384.4	6.4			
	WB	443.1	7.4			
2045 No-Build	EB	372.2	6.2	-0.2		
	WB	476	7.9	0.5		
2045 Build (3-lane)	EB	378.4	6.3		0.1	
	WB	488.3	8.1		0.2	
2045 Build (3-lane) -Sensitivity Analysis	EB	418.5	7.0			0.8
	WB	693.6	11.6			3.7
2045 Build (One- way Pair)	EB	378	6.3		0.1	
	WB	427.1	7.1		-0.8	

The SimTraffic results show there is little change in travel time expected between the 2018 existing conditions and the 2045 No-Build condition. The results suggest that the travel time in the eastbound direction could drop a few seconds while travel in the westbound direction might increase approximately 30 seconds. Again, it should be noted that there was relatively modest increase in traffic volumes between 2018 and 2045, and the 2045 scenario also reflects optimized signal timings to accommodate the increased volumes.

The 3-lane Build Concept along Central Entrance, for 2045 conditions, was then compared to the 2045 No-Build. Both 3-lane scenarios (with traffic diverting away from Central Entrance, and the sensitivity analysis with no traffic diverting) were analyzed using SimTraffic. The results indicated that if traffic were to divert from Central Entrance, consistent with the regional travel demand model results showing a 24% to 28% shift, the travel time impact along the Central Entrance corridor when compared to the 2045 No-Build would be minimal (approximately 12 seconds or less of additional travel time). When SimTraffic is run for the sensitivity analysis (assumes no traffic diverts from the corridor), the travel time increased in the eastbound direction by approximately 48 seconds and increased in the westbound direction by approximately 222 seconds (3.7 minutes). The large increase in westbound travel time is consistent with what was observed in the Synchro model (LOS F, 191.5 second delay, and a 1.35 volume-to-capacity (V/C) ratio at Central Entrance and Arlington Avenue during the p.m. peak). This indicates that a single westbound through lane is insufficient to accommodate the expected through movement volume (1,113 vehicles) at this intersection under this scenario. As a result, travel times along the entire corridor would be expected to decline.

SimTraffic was also run for the one-way pair concept. This model run shows a very slight increase in travel time for the eastbound direction (less than 10 seconds) while the westbound direction would improve with a reduction in travel time of approximately 48 seconds. As previously referenced, this is not surprising given the operational benefits associated with a one-way pair configuration that can process more traffic. Overall, there are no anticipated operational issues that were identified with the

one-way pair concept (NOTE: there are other factors that should be considered with the one-way pair concept. These additional considerations are not reflected in this operational analysis but are being addressed as part of the larger corridor study process.)

Roundabout Analysis

In addition to conducting signalized intersection LOS, the project team evaluated the LOS for roundabouts at select locations for the 3-lane cross section (Build Concept #1) during the p.m. peak hour. Since traffic volumes along the corridor are lower during the a.m. peak, it was assumed that if operations were found to be acceptable in the p.m. peak hour, similar or better operations would most likely occur during the a.m. peak hour. Following an internal project team discussion, it was determined that no roundabout analysis would be conducted for the one-way pair configuration (Build Concept #2) given the already high LOS that was being observed for the signalized intersections (the thought process was that the roundabout analysis would show similar or better LOS and as such conducting the roundabout LOS would not add value to this study). Furthermore, it is worth noting that this roundabout analysis focuses only on the traffic operations (LOS analysis). The project team did not conduct any review of the potential right-of-way impacts, etc. If roundabouts are considered as part of any future design option, a more detailed analysis will be required.

The 2045 No-Build scenario was also evaluated with roundabouts at the intersections Central Entrance and Anderson Road, Central Entrance and Arlington Avenue, and Central Entrance and Pecan Avenue. No additional geometric improvements were applied to the roundabout intersections (such as additional dedicated turn-lanes) so that the No-Build roundabout scenario could be better compared with the No-Build signalized (existing conditions) scenario. Intersections which maintained signalization were not altered from the 2045 No-Build scenario.

Figure 12 displays the 2045 No-Build p.m. peak hour intersection roundabout LOS results while **Table 7** summarizes the respective approach movement LOS.

Figure 12. 2045 No-Build Level of Service (current cross section with roundabout analysis for p.m. peak hour) Level of Service (by Approach Turn Movement)

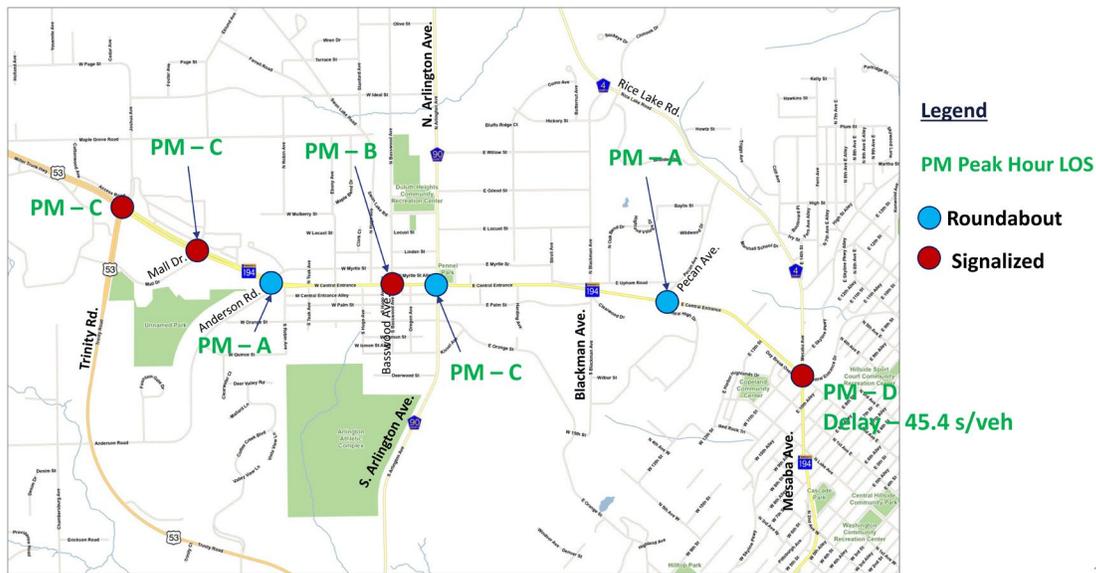


Table 7. 2045 No-Build Level of Service (by Approach Turn Movement for Roundabout Analysis)

Central Entrance @ Anderson Rd								
Movement	NBL/T	NBR	WBL/T	WBT/R	SBL/T	SBR	EBL/T	EBT/R
PM Peak	A	A	A	B	B	B	A	A

Central Entrance @ Arlington Ave									
Movement	NBL	NBT/R	WBL/T	WBT/R	SBL	SBT	SBR	EBL/T	EBT/R
PM Peak	B	C	C	C	B	F	C	B	B

Central Entrance @ Pecan Ave								
Movement	NBL/T	NBR	WBL/T	WBT/R	SBL/T	SBR	EBL/T	EBT/R
PM Peak	A	A	A	A	B	A	A	A

The analysis shows acceptable overall operations could be expected at the three roundabout intersections. It should be noted that the southbound through movement at Arlington Avenue is expected to operate at LOS F (50.1 second delay), which is likely due to a heavy southbound through movement volume (356 vehicles) conflicting with the even heavier eastbound and westbound through movements (553 vehicles and 696 vehicles, respectively).

The 3-lane cross section and turning movement volumes were then applied to the roundabouts at the same intersections. This represents the original 3-lane build concept which includes the diversion of traffic from the Central Entrance corridor as a result of reduced capacity. Engineering judgement was used to develop the intersection geometrics, in a similar manner as previously described for the signalized intersections. **Figure 13** displays the 2045 Build Concept #1 p.m. peak hour intersection roundabout LOS results while **Table 8** summarizes the respective approach movement LOS.

Figure 13. 2045 Build Concept #1 Level of Service (3-lane cross section with roundabout analysis for p.m. peak hour)



Table 8. 2045 Build Concept #1 Level of Service (by Approach Turn Movement for Roundabout Analysis)

Central Entrance @ Anderson Rd												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM Peak	A	A	A	A	B	A	A	A	A	A	B	

Central Entrance @ Arlington Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM Peak	A	A	A	A	F	A	C	B	A	C		

Central Entrance @ Pecan Ave												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM Peak	A	A	A	A	B	A	A	A	A	A	A	A

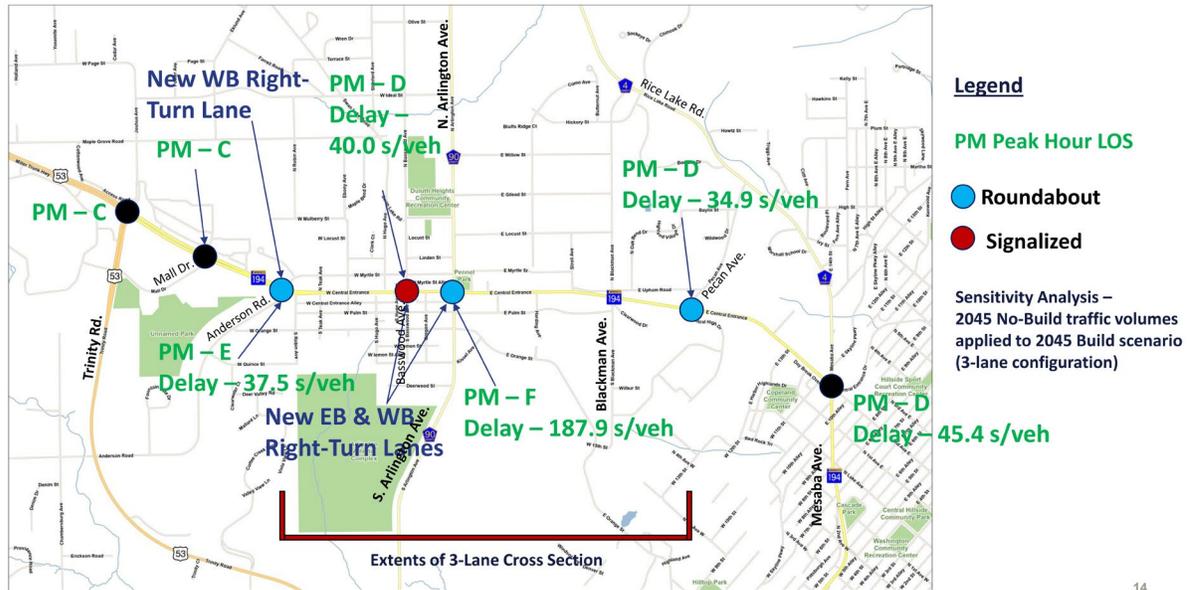
The analysis again shows acceptable overall operations at the three roundabout intersections, albeit a LOS D (27.1 second delay) is expected at Central Entrance and Arlington Avenue. Additionally, the westbound through movement at Arlington Avenue is expected to operate at LOS F (57.3 second delay). While a westbound right turn bypass lane could be added to provide acceptable operations to the westbound right turn movement, the westbound through movement would continue to operate at LOS F, experiencing a similar issue as described under the travel time section as a single through lane is likely not sufficient to accommodate the estimated traffic volumes.

Sensitivity Analysis for 3-Lane Cross Section

A similar sensitivity analysis, as previously described for signalized intersections, was then applied to the 3-lane cross section scenario using the 2045 No-Build turning movements (representing a condition where no traffic diverts from the Central Entrance corridor). Additional geometric improvements, such as adding right-turn bypass lanes, were applied to this scenario to attempt to provide acceptable LOS operations at the roundabout locations. This included a westbound right-turn bypass lane at Anderson Road and eastbound and westbound right-turn lanes at Arlington Avenue.

Figure 14 displays the 2045 Build Concept #1 (sensitivity analysis) p.m. peak hour intersection roundabout LOS results while Table 9 summarizes the respective approach movement LOS.

Figure 14. 2045 Build Concept #1: Sensitivity Analysis LOS (3-lane cross section with roundabout analysis for p.m. peak hour)



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Table 9. 2045 Build Concept #1: Sensitivity Analysis Level of Service (by Approach Turn Movement for Roundabout Analysis)

Central Entrance @ Anderson Rd (Roundabout)												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM Peak	A		A	A	F	A		B	B	A		C

Central Entrance @ Arlington Ave (Roundabout)												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM Peak	B	B	A	A	F	A	B	F	C	A	F	A

Central Entrance @ Pecan Ave (Roundabout)												
Movement	NBL	NBT	NBR	WBL	WBT	WBR	SBL	SBT	SBR	EBL	EBT	EBR
PM Peak	A		A	A	F		B		A	A		B

The analysis shows generally poor operations at all three roundabout intersections, with LOS E at Anderson Road, LOS F at Arlington Avenue, and LOS D at Pecan Avenue. The Arlington Avenue intersection is especially concerning as the eastbound, westbound, and southbound through movements are all expected to operate at LOS F. This can be attributed to much higher side road volumes at Arlington Avenue compared to the other roundabout intersections. In general, it was found that roundabout control will likely not be an effective form of traffic control under a scenario where no traffic diverts to other routes as a result of the reduced capacity along the corridor.

Roundabout and Signalized Intersection LOS Summary

Table 10 summarizes the roundabout LOS for the three scenarios previously discussed compared to the results of the signalized intersection LOS. The results indicate acceptable operations under the 2045 No-Build scenario for both signalized and roundabout control and slightly worsened, yet still acceptable operations, under the build scenario (assuming traffic diverts from Central Entrance as a result of the reduced capacity), for both signalized and roundabout control. The sensitivity analysis (assumes no traffic diverts from Central Entrance) indicated significantly worse operations under roundabout control compared to signalized control.

Table 10. Summary of Roundabouts and Signalized Intersection LOS

	Anderson Road				Arlington Avenue				Pecan Avenue			
	Signalized Intersection		Roundabout		Signalized Intersection		Roundabout		Signalized Intersection		Roundabout	
	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)	LOS	Delay (seconds)
2045 No-Build	A	7.9	A	8.8	C	27.9	C	21.5	A	8.9	A	7.3
2045 Build (3-lane)	A	5.9	B	11.4	D	37.3	D	27.1	A	8.8	B	10.4
2045 Build (3-lane) – Sensitivity Analysis	B	11.9	E	37.5	F	90.4	F	187.9	B	11.3	D	34.9

Conclusion

The purpose of this analysis was to evaluate the potential traffic impacts associated with two build concepts, a 3-lane cross section (representing reduced capacity along Central Entrance) and a one-way pair (representing the conversion of Central Entrance and Palm Street to function as a one-way operation). The results provide technical traffic input to the overall Central Entrance visioning process. Additional detailed study of the corridor traffic operations, and the intersections studied, will be necessary as the vision, and build concepts, is refined and advances to engineering and design.

The regional travel demand forecasting model suggests modest growth (3% to 4%) to the year 2045, which is consistent with a review of historical, and recent traffic counts, along the study corridor. The regional model also shows that between 24% and 28% of current traffic could divert from the Central Entrance corridor under a 3-lane build concept as a result of the reduced capacity. A sensitivity analysis was also conducted for the 3-lane build concept to evaluate the impacts if traffic does not divert from the corridor (this assumes all drivers continue to use Central Entrance even if the capacity is reduced). The amount of traffic that would divert likely falls somewhere between these two scenarios, but it is not possible to estimate an exact percentage.

The Synchro analysis results suggest that the 3-lane build concept may be feasible, based on peak hour LOS. A 3-lane cross section is likely to lead to increased travel times through the corridor; however, it is also important to consider the potential benefits/tradeoffs that could be recognized such as improved multimodal benefits for transit, bicyclists, and pedestrians, as well as potential safety benefits resulting from reduced traffic volumes and a reduction of potential conflict points. Ultimately, the results of the broader Central Entrance visioning process will play a significant role in determining what, if any, increase in travel time through the corridor is acceptable.

Roundabout analysis was also conducted for the 3-lane build concept, as well as the current roadway configuration. Roundabouts at Anderson Road and Pecan Drive may be feasible based on the 2045 conditions analysis. If traffic diverts to other routes, as the regional model suggests, roundabouts at these intersections could potentially be effective forms of traffic control; however, if no traffic diverts, there will be a noticeable increase in travel times and delay compared to signalized intersections.

The roundabout analysis also suggests that the intersection of Central Entrance and Arlington Avenue is most likely not an ideal candidate for a roundabout. Under a 3-lane cross section scenario, it is expected

that travelers would experience poor operations and increased LOS. A 4-lane cross section roundabout may be feasible; however, it would require an evaluation of roadway impacts and available right-of-way to determine if the construction is feasible.

The Synchro analysis results for the one-way pair build concept indicate no expected operational or LOS issues. A roundabout analysis was not completed for this scenario given the high LOS under the signalized condition, and it is expected that acceptable operations would be maintained under roundabout control. The one-way pair analysis focused on the traffic operations of this concept and did not consider other issues (i.e., transit access, bicycle facilities, impacts to residential areas, etc.) that would need to be evaluated in more detail.

Appendices

Signalized Intersection Level of Service

1. 2018 a.m. and p.m. peak hour LOS Synchro Results
2. 2045 No-Build (future year baseline) a.m. and p.m. peak hour LOS Synchro Results
3. 2045 Build Concept #1 (3-lane cross section, with traffic diverting to other roadways) a.m. and p.m. peak hour LOS Synchro Results
4. 2045 Build Concept #1 (3-lane cross section, with no traffic diverting) a.m. and p.m. peak hour LOS Synchro Results
5. 2045 Build Concept #2 (One-way pair) a.m. and p.m. peak hour LOS Synchro Results

Roundabouts Level of Service

6. 2045 No-Build (future year baseline) p.m. peak hour LOS Synchro Results
7. 2045 Build Concept #1 (3-lane cross section, with traffic diverting to other roadways) p.m. peak hour LOS Synchro Results
8. 2045 Build Concept #1 (3-lane cross section, with no traffic diverting) p.m. peak hour LOS Synchro Results

Central Entrance Traffic Analysis

Prepared for
Duluth-Superior Metropolitan Interstate Council



Appendices
October 2021

Prepared for:

Duluth-Superior Metropolitan Interstate Council

Prepared by:

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October 2021

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Roundabouts Level of Service

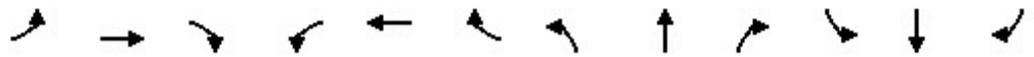
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Signalized Intersection Level of Service

1. 2018 a.m. and p.m. peak hour LOS Synchro Results

Central Entrance Corridor Study
 1: Trinity Rd & Miller Hill Rd/W Central Entrance

Existing Year (2018) - AM Peak
 09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	12	624	172	44	300	20	220	92	56	84	112	16
Future Volume (vph)	12	624	172	44	300	20	220	92	56	84	112	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			172			131			175			179
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	12	624	172	44	300	20	220	92	56	84	112	16
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Total Split (s)	20.0	59.0	59.0	20.0	59.0	59.0	23.0	23.0	23.0	18.0	18.0	18.0
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	9.9	70.6	70.6	7.4	73.1	73.1	12.9	14.2	14.2	10.4	9.2	9.2
Actuated g/C Ratio	0.08	0.59	0.59	0.06	0.61	0.61	0.11	0.12	0.12	0.09	0.08	0.08
v/c Ratio	0.04	0.30	0.17	0.21	0.14	0.02	0.59	0.22	0.16	0.54	0.41	0.06
Control Delay	39.6	7.6	0.5	41.7	11.9	0.5	54.1	46.3	3.2	65.2	57.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	7.6	0.5	41.7	11.9	0.5	54.1	46.3	3.2	65.2	57.0	0.4
LOS	D	A	A	D	B	A	D	D	A	E	E	A
Approach Delay		6.6			14.9			44.4				56.0
Approach LOS		A			B			D				E
Queue Length 50th (ft)	4	45	0	12	46	1	85	35	1	63	44	0
Queue Length 95th (ft)	m14	36	3	27	102	0	113	44	1	116	73	0
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	410	2103	1012	418	2176	1024	491	541	391	184	372	326
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.30	0.17	0.11	0.14	0.02	0.45	0.17	0.14	0.46	0.30	0.05

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 79 (66%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

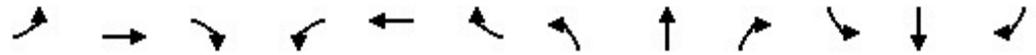
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Central Entrance Corridor Study
2: Mall Dr & W Central Entrance

Existing Year (2018) - AM Peak

09/13/2021



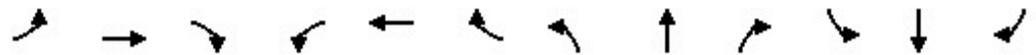
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	648	12	60	356	52	8	24	28	80	12	40
Future Volume (vph)	72	648	12	60	356	52	8	24	28	80	12	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1665	0
Flt Permitted	0.950			0.950			0.723			0.539		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1360	1881	1599	1014	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			129			127			176			40
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1432			891				373
Travel Time (s)		25.0			24.4			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	648	12	60	356	52	8	24	28	80	52	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	22.0	65.0	65.0	22.0	65.0	65.0	13.0	20.0	20.0	13.0	20.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	10.3	76.3	76.3	14.5	80.7	80.7	13.4	8.3	8.3	17.8	16.6	
Actuated g/C Ratio	0.09	0.64	0.64	0.12	0.67	0.67	0.11	0.07	0.07	0.15	0.14	
v/c Ratio	0.47	0.29	0.01	0.28	0.15	0.05	0.05	0.19	0.10	0.40	0.20	
Control Delay	52.5	8.5	0.0	30.3	2.9	0.1	40.9	55.3	0.8	49.1	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	52.5	8.5	0.0	30.3	2.9	0.1	40.9	55.3	0.8	49.1	21.2	
LOS	D	A	A	C	A	A	D	E	A	D	C	
Approach Delay		12.7			6.1			27.9				38.1
Approach LOS		B			A			C				D
Queue Length 50th (ft)	38	166	0	46	15	0	5	18	0	54	8	
Queue Length 95th (ft)	61	50	m0	90	28	0	19	45	0	99	48	
Internal Link Dist (ft)		1388			1352			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	247	2273	1063	244	2402	1116	246	225	346	216	293	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.29	0.01	0.25	0.15	0.05	0.03	0.11	0.08	0.37	0.18	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 1 (1%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.47

Central Entrance Corridor Study
3: Anderson Rd & W Central Entrance

Existing Year (2018) - AM Peak
09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	632	8	68	440	8	12	96	188	12	28	52
Future Volume (vph)	28	632	8	68	440	8	12	96	188	12	28	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		0	0		25	0		25
Storage Lanes	1		1	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3564	0	0	1870	1599	0	1853	1599
Flt Permitted	0.493			0.409				0.967			0.899	
Satd. Flow (perm)	927	3574	1599	769	3564	0	0	1819	1599	0	1691	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			17		4				131			52
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1432			2028			808				1196
Travel Time (s)		32.5			46.1			18.4				27.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	632	8	68	448	0	0	108	188	0	40	52
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6			4		4	4		4
Total Split (s)	91.0	91.0	91.0	91.0	91.0		29.0	29.0	29.0	29.0	29.0	29.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7			4.9	4.9		4.9	4.9
Act Effct Green (s)	95.8	95.8	95.8	95.8	95.8			14.6	14.6		14.6	14.6
Actuated g/C Ratio	0.80	0.80	0.80	0.80	0.80			0.12	0.12		0.12	0.12
v/c Ratio	0.04	0.22	0.01	0.11	0.16			0.49	0.61		0.20	0.22
Control Delay	0.3	0.6	0.1	2.2	2.3			55.6	24.7		47.4	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	0.3	0.6	0.1	2.2	2.3			55.6	24.7		47.4	13.9
LOS	A	A	A	A	A			E	C		D	B
Approach Delay		0.6			2.3			36.0			28.5	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	0	1	0	8	26			79	41		28	0
Queue Length 95th (ft)	1	2	m1	19	45			130	111		59	35
Internal Link Dist (ft)		1352			1948			728			1116	
Turn Bay Length (ft)	330		330	145					25			25
Base Capacity (vph)	740	2854	1280	613	2847			365	425		339	362
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	0.04	0.22	0.01	0.11	0.16			0.30	0.44		0.12	0.14

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 9 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61

Central Entrance Corridor Study
4: Basswood Ave & W Central Entrance

Existing Year (2018) - AM Peak
09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	32	844	4	16	528	76	12	16	20	176	20	28
Future Volume (vph)	32	844	4	16	528	76	12	16	20	176	20	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		0	165		0	50		50	50		50
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3571	0	1787	3506	0	0	1842	1599	0	1800	1599
Flt Permitted	0.398			0.307				0.861			0.728	
Satd. Flow (perm)	749	3571	0	578	3506	0	0	1620	1599	0	1370	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			25				58			58
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2028			786			670			530	
Travel Time (s)		46.1			17.9			15.2			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	32	848	0	16	604	0	0	28	20	0	196	28
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases	2			6			4		4	4		4
Total Split (s)	13.0	80.0		13.0	80.0		27.0	27.0	27.0	27.0	27.0	27.0
Total Lost Time (s)	4.7	4.7		4.7	4.7			4.7	4.7		4.7	4.7
Act Effct Green (s)	87.9	85.3		86.6	83.0			21.0	21.0		21.0	21.0
Actuated g/C Ratio	0.73	0.71		0.72	0.69			0.18	0.18		0.18	0.18
v/c Ratio	0.05	0.33		0.03	0.25			0.10	0.06		0.82	0.09
Control Delay	3.8	5.6		2.4	3.4			41.7	0.3		74.0	2.4
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.8	5.6		2.4	3.4			41.7	0.3		74.0	2.4
LOS	A	A		A	A			D	A		E	A
Approach Delay		5.6			3.4			24.5			65.1	
Approach LOS		A			A			C			E	
Queue Length 50th (ft)	4	76		1	32			18	0		146	0
Queue Length 95th (ft)	m10	118		5	49			45	0		#262	6
Internal Link Dist (ft)		1948			706			590			450	
Turn Bay Length (ft)	160			165					50			50
Base Capacity (vph)	624	2537		507	2432			301	344		254	344
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.05	0.33		0.03	0.25			0.09	0.06		0.77	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 68 (57%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.82

Central Entrance Corridor Study
 5: Arlington Ave & W Central Entrance/E Central Entrance

Existing Year (2018) - AM Peak
 09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	828	36	124	472	36	56	336	92	84	244	88
Future Volume (vph)	76	828	36	124	472	36	56	336	92	84	244	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	180		0	400		0	395		190
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3553	0	1787	3535	0	1787	1821	0	1787	1881	1599
Flt Permitted	0.435			0.211			0.428			0.129		
Satd. Flow (perm)	818	3553	0	397	3535	0	805	1821	0	243	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			8			11				104
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			2629			1069				1106
Travel Time (s)		17.9			59.8			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	864	0	124	508	0	56	428	0	84	244	88
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Total Split (s)	18.0	52.0		18.0	52.0		13.0	37.0		13.0	37.0	37.0
Total Lost Time (s)	4.7	4.7		4.7	4.7		5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	63.2	55.4		67.3	59.1		36.5	30.7		37.4	30.9	30.9
Actuated g/C Ratio	0.53	0.46		0.56	0.49		0.30	0.26		0.31	0.26	0.26
v/c Ratio	0.15	0.53		0.37	0.29		0.18	0.90		0.47	0.50	0.18
Control Delay	8.2	16.0		18.8	28.5		26.2	65.6		34.6	41.8	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	8.2	16.0		18.8	28.5		26.2	65.6		34.6	41.8	5.4
LOS	A	B		B	C		C	E		C	D	A
Approach Delay		15.4			26.6			61.1			32.6	
Approach LOS		B			C			E			C	
Queue Length 50th (ft)	18	195		68	201		28	309		42	159	0
Queue Length 95th (ft)	m28	235		115	248		57	#485		78	241	31
Internal Link Dist (ft)		706			2549			989			1026	
Turn Bay Length (ft)	150			180			400			395		190
Base Capacity (vph)	572	1641		383	1743		322	498		184	506	506
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	0.13	0.53		0.32	0.29		0.17	0.86		0.46	0.48	0.17

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 82 (68%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.90

Central Entrance Corridor Study
 5: Arlington Ave & W Central Entrance/E Central Entrance

Existing Year (2018) - AM Peak

09/13/2021

Intersection Signal Delay: 30.1 Intersection LOS: C
 Intersection Capacity Utilization 74.6% ICU Level of Service D
 Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

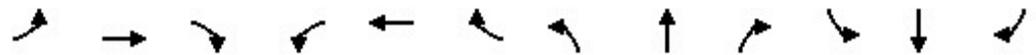
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Arlington Ave & W Central Entrance/E Central Entrance

 Ø1	 Ø2 (R)	 Ø3	 Ø4
18 s	52 s	13 s	37 s
 Ø5	 Ø6 (R)	 Ø7	 Ø8
18 s	52 s	13 s	37 s

Central Entrance Corridor Study
6: Central High Dr/Pecan Ave & E Central Entrance

Existing Year (2018) - AM Peak
09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	992	4	1	572	40	0	5	0	84	0	100
Future Volume (vph)	60	992	4	1	572	40	0	5	0	84	0	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	0	1881	1881	0	1787	1599
Flt Permitted	0.950			0.950							0.754	
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	0	1881	1881	0	1418	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			61			60						102
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1323			1196			1026				1617
Travel Time (s)		30.1			27.2			23.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	992	4	1	572	40	0	5	0	0	84	100
Turn Type	Prot	NA	Perm	Prot	NA	Perm		NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	18.0	59.0	59.0	25.0	66.0	66.0	36.0	36.0	36.0	36.0	36.0	36.0
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	9.6	92.0	92.0	9.6	85.0	85.0		13.4			13.4	13.4
Actuated g/C Ratio	0.08	0.77	0.77	0.08	0.71	0.71		0.11			0.11	0.11
v/c Ratio	0.42	0.36	0.00	0.01	0.23	0.03		0.02			0.53	0.37
Control Delay	88.3	2.5	0.0	33.0	1.0	0.1		44.8			61.7	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	88.3	2.5	0.0	33.0	1.0	0.1		44.8			61.7	12.5
LOS	F	A	A	C	A	A		D			E	B
Approach Delay		7.4			1.0			44.8			34.9	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	50	25	0	1	9	0		4			62	0
Queue Length 95th (ft)	m86	81	m0	m2	15	m0		15			111	48
Internal Link Dist (ft)		1243			1116			946			1537	
Turn Bay Length (ft)	330		380	415		315						
Base Capacity (vph)	198	2739	1240	300	2532	1150		487			367	489
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	0.30	0.36	0.00	0.00	0.23	0.03		0.01			0.23	0.20

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 53 (44%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53

Central Entrance Corridor Study
7: Mesaba Ave & E Central Entrance/Central Entrance Dr

Existing Year (2018) - AM Peak

09/13/2021



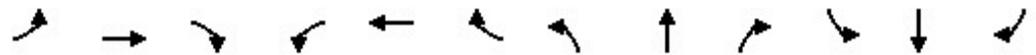
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	596	512	136	428	176	168	704	16	216	668	64
Future Volume (vph)	104	596	512	136	428	176	168	704	16	216	668	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		0	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3417	0	1626	3420	1599	1787	3574	1599
Flt Permitted	0.218			0.167			0.950	0.999		0.950		
Satd. Flow (perm)	410	3574	1599	314	3417	0	1626	3420	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			508		46				114			117
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1578			1071			1862				367
Travel Time (s)		35.9			24.3			42.3				6.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	104	596	512	136	604	0	151	721	16	216	668	64
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	12.0	27.0	27.0	13.0	28.0		38.0	38.0	38.0	42.0	42.0	42.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	34.6	25.8	25.8	38.1	27.6		31.5	31.5	31.5	31.2	31.2	31.2
Actuated g/C Ratio	0.29	0.22	0.22	0.32	0.23		0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	0.48	0.78	0.69	0.61	0.74		0.35	0.80	0.03	0.47	0.72	0.13
Control Delay	27.8	37.6	11.3	43.8	46.9		38.5	49.1	0.1	40.0	44.8	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	37.6	11.3	43.8	46.9		38.5	49.1	0.1	40.0	44.8	0.8
LOS	C	D	B	D	D		D	D	A	D	D	A
Approach Delay		25.7			46.4			46.4				40.7
Approach LOS		C			D			D				D
Queue Length 50th (ft)	32	249	194	76	222		104	285	0	140	245	0
Queue Length 95th (ft)	72	#333	104	#155	#324		172	362	0	204	296	3
Internal Link Dist (ft)		1498			991			1782				287
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	216	769	742	224	820		436	917	512	545	1090	569
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.78	0.69	0.61	0.74		0.35	0.79	0.03	0.40	0.61	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80

Central Entrance Corridor Study
 1: Trinity Rd & Miller Hill Rd/W Central Entrance

Existing Year (2018) - PM Peak
 09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖↗
Traffic Volume (vph)	132	704	384	156	844	56	288	200	36	64	132	108
Future Volume (vph)	132	704	384	156	844	56	288	200	36	64	132	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			384			121			162			165
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	704	384	156	844	56	288	200	36	64	132	108
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3		8
Permitted Phases			6			2			4			8
Total Split (s)	22.0	67.0	67.0	20.0	65.0	65.0	25.0	26.0	26.0	17.0	18.0	18.0
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	16.2	70.6	70.6	11.2	65.3	65.3	15.8	18.8	18.8	9.6	10.1	10.1
Actuated g/C Ratio	0.12	0.54	0.54	0.09	0.50	0.50	0.12	0.14	0.14	0.07	0.08	0.08
v/c Ratio	0.31	0.36	0.37	0.52	0.47	0.06	0.69	0.39	0.10	0.48	0.48	0.39
Control Delay	40.3	7.5	1.0	71.8	8.6	0.1	57.6	47.5	1.7	69.8	62.9	5.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	7.5	1.0	71.8	8.6	0.1	57.6	47.5	1.7	69.8	62.9	5.4
LOS	D	A	A	E	A	A	E	D	A	E	E	A
Approach Delay		9.0			17.5			49.9				44.0
Approach LOS		A			B			D				D
Queue Length 50th (ft)	53	51	0	54	60	0	123	84	0	53	56	0
Queue Length 95th (ft)	87	71	3	77	73	m0	168	101	5	101	90	10
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	432	1940	1043	386	1794	863	506	581	395	156	343	302
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.36	0.37	0.40	0.47	0.06	0.57	0.34	0.09	0.41	0.38	0.36

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 38 (29%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69

Central Entrance Corridor Study
2: Mall Dr & W Central Entrance

Existing Year (2018) - PM Peak
09/13/2021



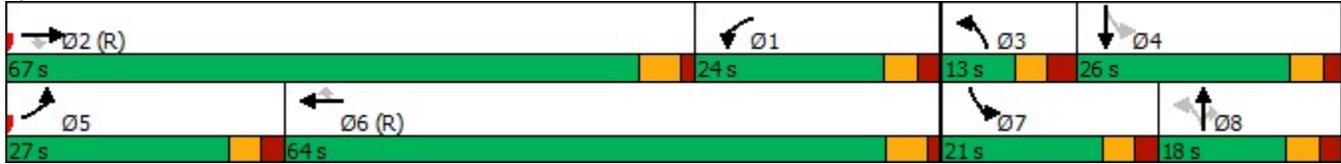
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	640	52	120	868	156	48	72	100	236	76	112
Future Volume (vph)	196	640	52	120	868	156	48	72	100	236	76	112
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1714	0
Flt Permitted	0.950			0.950			0.639			0.491		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1202	1881	1599	924	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			165			164			209			49
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1415			891				373
Travel Time (s)		25.0			24.1			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	640	52	120	868	156	48	72	100	236	188	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	27.0	67.0	67.0	24.0	64.0	64.0	13.0	18.0	18.0	21.0	26.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	18.4	63.4	63.4	18.4	63.6	63.6	17.2	10.7	10.7	31.7	21.6	
Actuated g/C Ratio	0.14	0.49	0.49	0.14	0.49	0.49	0.13	0.08	0.08	0.24	0.17	
v/c Ratio	0.78	0.37	0.06	0.48	0.50	0.18	0.25	0.47	0.31	0.72	0.58	
Control Delay	60.5	24.1	3.2	42.6	11.8	1.5	42.1	66.6	2.5	56.3	45.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.5	24.1	3.2	42.6	11.8	1.5	42.1	66.6	2.5	56.3	45.2	
LOS	E	C	A	D	B	A	D	E	A	E	D	
Approach Delay		30.9			13.6			32.1				51.4
Approach LOS		C			B			C				D
Queue Length 50th (ft)	162	234	0	96	131	5	32	59	0	173	111	
Queue Length 95th (ft)	245	298	22	159	167	18	65	109	0	257	192	
Internal Link Dist (ft)		1388			1335			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	296	1743	864	252	1749	866	207	179	341	333	334	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.37	0.06	0.48	0.50	0.18	0.23	0.40	0.29	0.71	0.56	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 116 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78

Intersection Signal Delay: 26.9	Intersection LOS: C
Intersection Capacity Utilization 71.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Study
3: Anderson Rd & W Central Entrance

Existing Year (2018) - PM Peak
09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	956	28	128	1312	4	20	24	72	12	36	32
Future Volume (vph)	36	956	28	128	1312	4	20	24	72	12	36	32
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		0	0		25	0		25
Storage Lanes	1		1	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	0	0	1840	1599	0	1859	1599
Flt Permitted	0.196			0.293				0.831			0.905	
Satd. Flow (perm)	369	3574	1599	551	3574	0	0	1563	1599	0	1702	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			28		1				72			32
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			2043			824			1148	
Travel Time (s)		32.2			46.4			18.7			26.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	956	28	128	1316	0	0	44	72	0	48	32
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6			4		4	4		4
Total Split (s)	101.0	101.0	101.0	101.0	101.0		29.0	29.0	29.0	29.0	29.0	29.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7			4.9	4.9		4.9	4.9
Act Effct Green (s)	113.6	113.6	113.6	113.6	113.6			10.2	10.2		10.2	10.2
Actuated g/C Ratio	0.87	0.87	0.87	0.87	0.87			0.08	0.08		0.08	0.08
v/c Ratio	0.11	0.31	0.02	0.27	0.42			0.36	0.38		0.36	0.21
Control Delay	0.9	0.5	0.0	1.9	1.3			64.1	17.6		63.5	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	0.9	0.5	0.0	1.9	1.3			64.1	17.6		63.5	20.4
LOS	A	A	A	A	A			E	B		E	C
Approach Delay		0.5			1.4			35.3			46.3	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	1	6	0	2	7			36	0		39	0
Queue Length 95th (ft)	m1	10	m0	3	11			74	47		78	32
Internal Link Dist (ft)		1335			1963			744			1068	
Turn Bay Length (ft)	330		330	145					25			25
Base Capacity (vph)	322	3122	1400	481	3122			289	355		315	322
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	0.11	0.31	0.02	0.27	0.42			0.15	0.20		0.15	0.10

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

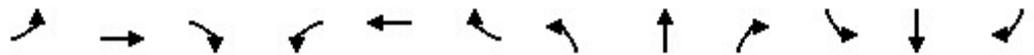
Offset: 114 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.42

Central Entrance Corridor Study
4: Basswood Ave & W Central Entrance

Existing Year (2018) - PM Peak
09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	952	16	20	1256	104	28	48	24	80	32	44
Future Volume (vph)	28	952	16	20	1256	104	28	48	24	80	32	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		0	165		0	50		50	50		50
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3567	0	1787	3535	0	0	1847	1599	0	1817	1599
Flt Permitted	0.160			0.268				0.855			0.729	
Satd. Flow (perm)	301	3567	0	504	3535	0	0	1608	1599	0	1371	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			13				54			54
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2043			786			670				530
Travel Time (s)		46.4			17.9			15.2				12.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	968	0	20	1360	0	0	76	24	0	112	44
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases	2			6			4		4	4		4
Total Split (s)	13.0	89.0		13.0	89.0		28.0	28.0	28.0	28.0	28.0	28.0
Total Lost Time (s)	4.7	4.7		4.7	4.7			4.7	4.7		4.7	4.7
Act Effct Green (s)	100.3	96.6		100.1	96.4			17.6	17.6		17.6	17.6
Actuated g/C Ratio	0.77	0.74		0.77	0.74			0.14	0.14		0.14	0.14
v/c Ratio	0.09	0.37		0.04	0.52			0.35	0.09		0.61	0.17
Control Delay	3.0	5.6		2.7	4.6			54.1	1.7		65.9	10.1
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.0	5.6		2.7	4.6			54.1	1.7		65.9	10.1
LOS	A	A		A	A			D	A		E	B
Approach Delay		5.5			4.6			41.5			50.2	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	3	128		2	101			59	0		90	0
Queue Length 95th (ft)	10	155		m4	138			104	4		149	27
Internal Link Dist (ft)		1963			706			590			450	
Turn Bay Length (ft)	160			165					50			50
Base Capacity (vph)	329	2650		475	2625			288	330		245	330
Starvation Cap Reductn	0	0		0	37			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.09	0.37		0.04	0.53			0.26	0.07		0.46	0.13

Intersection Summary

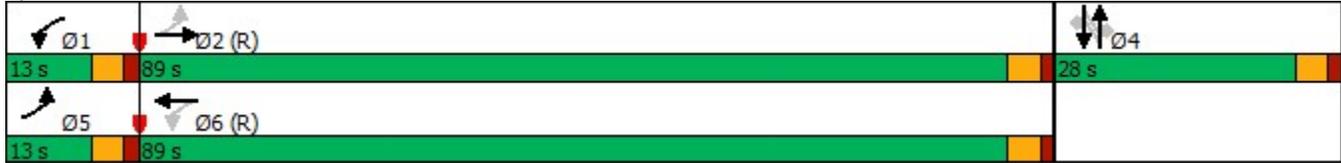
Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 57 (44%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61

Central Entrance Corridor Study
 4: Basswood Ave & W Central Entrance

Existing Year (2018) - PM Peak
 09/13/2021

Intersection Signal Delay: 9.0 Intersection LOS: A
 Intersection Capacity Utilization 61.4% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Basswood Ave & W Central Entrance



Central Entrance Corridor Study
 5: Arlington Ave & W Central Entrance/E Central Entrance

Existing Year (2018) - PM Peak
 09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	812	36	112	1044	64	152	204	100	84	340	156
Future Volume (vph)	152	812	36	112	1044	64	152	204	100	84	340	156
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	180		0	400		0	395		190
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3553	0	1787	3542	0	1787	1789	0	1787	1881	1599
Flt Permitted	0.148			0.250			0.152			0.290		
Satd. Flow (perm)	278	3553	0	470	3542	0	286	1789	0	546	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			6			18				141
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			2622			1069				1106
Travel Time (s)		17.9			59.6			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	848	0	112	1108	0	152	304	0	84	340	156
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Total Split (s)	15.0	66.0		15.0	66.0		15.0	36.0		13.0	34.0	34.0
Total Lost Time (s)	4.7	4.7		4.7	4.7		5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	74.4	65.0		73.1	64.3		39.1	29.5		35.0	27.2	27.2
Actuated g/C Ratio	0.57	0.50		0.56	0.49		0.30	0.23		0.27	0.21	0.21
v/c Ratio	0.57	0.48		0.32	0.63		0.76	0.73		0.38	0.87	0.35
Control Delay	30.8	6.8		10.1	14.0		57.1	54.2		35.7	71.1	10.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	30.8	6.8		10.1	14.0		57.1	54.2		35.7	71.1	10.8
LOS	C	A		B	B		E	D		D	E	B
Approach Delay		10.4			13.6			55.2			49.7	
Approach LOS		B			B			E			D	
Queue Length 50th (ft)	29	57		17	150		92	221		49	273	10
Queue Length 95th (ft)	110	77		38	333		#166	326		89	#417	68
Internal Link Dist (ft)		706			2542			989			1026	
Turn Bay Length (ft)	150			180			400			395		190
Base Capacity (vph)	280	1777		374	1754		205	444		235	423	469
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	0.54	0.48		0.30	0.63		0.74	0.68		0.36	0.80	0.33

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 63 (48%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87

Central Entrance Corridor Study
 6: Central High Dr/Pecan Ave & E Central Entrance

Existing Year (2018) - PM Peak
 09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	896	0	4	1164	48	0	5	0	72	0	84
Future Volume (vph)	60	896	0	4	1164	48	0	5	0	72	0	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1881	1787	3574	1599	0	1881	1881	0	1787	1599
Flt Permitted	0.950			0.950							0.754	
Satd. Flow (perm)	1787	3574	1881	1787	3574	1599	0	1881	1881	0	1418	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						55						94
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1326			1168			847				1617
Travel Time (s)		30.1			26.5			19.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	896	0	4	1164	48	0	5	0	0	72	84
Turn Type	Prot	NA	Perm	Prot	NA	Perm		NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	21.0	70.0	70.0	27.0	76.0	76.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	14.4	105.1		7.0	90.7	90.7		12.9			12.9	12.9
Actuated g/C Ratio	0.11	0.81		0.05	0.70	0.70		0.10			0.10	0.10
v/c Ratio	0.30	0.31		0.04	0.47	0.04		0.03			0.51	0.35
Control Delay	40.6	2.1		84.5	2.0	0.1		50.2			67.4	11.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay	40.6	2.1		84.5	2.0	0.1		50.2			67.4	11.9
LOS	D	A		F	A	A		D			E	B
Approach Delay		4.5			2.2			50.2			37.5	
Approach LOS		A			A			D			D	
Queue Length 50th (ft)	49	39		3	25	0		4			59	0
Queue Length 95th (ft)	m93	75		m5	47	m0		16			106	40
Internal Link Dist (ft)		1246			1088			767			1537	
Turn Bay Length (ft)	330			415		315						
Base Capacity (vph)	224	2890		305	2493	1132		406			306	419
Starvation Cap Reductn	0	0		0	0	0		0			0	0
Spillback Cap Reductn	0	0		0	0	0		0			0	0
Storage Cap Reductn	0	0		0	0	0		0			0	0
Reduced v/c Ratio	0.27	0.31		0.01	0.47	0.04		0.01			0.24	0.20

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 115 (88%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51

Central Entrance Corridor Study
7: Mesaba Ave & E Central Entrance/Central Entrance Dr

Existing Year (2018) - PM Peak

09/13/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	180	544	340	72	584	180	472	676	8	124	568	116
Future Volume (vph)	180	544	340	72	584	180	472	676	8	124	568	116
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3449	0	1626	3403	1599	1787	3574	1599
Flt Permitted	0.118			0.336			0.950	0.994		0.950		
Satd. Flow (perm)	222	3574	1599	632	3449	0	1626	3403	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			340		30				107			116
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1591			2779			1889				389
Travel Time (s)		36.2			63.2			42.9				6.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							21%					
Lane Group Flow (vph)	180	544	340	72	764	0	373	775	8	124	568	116
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	14.0	40.0	40.0	13.0	39.0		47.0	47.0	47.0	30.0	30.0	30.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	46.8	39.1	39.1	42.5	34.3		40.1	40.1	40.1	24.0	24.0	24.0
Actuated g/C Ratio	0.36	0.30	0.30	0.33	0.26		0.31	0.31	0.31	0.18	0.18	0.18
v/c Ratio	0.89	0.51	0.47	0.26	0.82		0.74	0.74	0.01	0.38	0.86	0.30
Control Delay	87.4	57.8	23.3	29.5	51.6		50.4	45.0	0.0	50.0	65.2	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	57.8	23.3	29.5	51.6		50.4	45.0	0.0	50.0	65.2	9.9
LOS	F	E	C	C	D		D	D	A	D	E	A
Approach Delay		51.8			49.7			46.4				54.9
Approach LOS		D			D			D				D
Queue Length 50th (ft)	132	251	109	40	310		305	317	0	92	245	0
Queue Length 95th (ft)	#257	310	178	75	389		438	395	0	154	#330	52
Internal Link Dist (ft)		1511			2699			1809				309
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	202	1075	718	278	933		515	1078	579	338	676	396
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.51	0.47	0.26	0.82		0.72	0.72	0.01	0.37	0.84	0.29

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 42 (32%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89

Signalized Intersection Level of Service

2. 2045 No-Build (future year baseline) a.m. and p.m. peak hour LOS Synchro Results

Central Entrance Corridor Study
1: Trinity Rd & Miller Hill Rd/W Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Future Volume (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180			131			175			179
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3		8
Permitted Phases			6			2			4			8
Total Split (s)	20.0	59.0	59.0	20.0	59.0	59.0	23.0	23.0	23.0	18.0	18.0	18.0
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	9.9	70.0	70.0	7.5	72.5	72.5	13.3	12.2	12.2	10.5	9.3	9.3
Actuated g/C Ratio	0.08	0.58	0.58	0.06	0.60	0.60	0.11	0.10	0.10	0.09	0.08	0.08
v/c Ratio	0.05	0.31	0.18	0.22	0.15	0.02	0.60	0.26	0.18	0.56	0.42	0.06
Control Delay	39.2	8.1	0.6	46.8	19.1	2.6	53.9	47.1	3.6	66.1	57.1	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.2	8.1	0.6	46.8	19.1	2.6	53.9	47.1	3.6	66.1	57.1	0.4
LOS	D	A	A	D	B	A	D	D	A	E	E	A
Approach Delay		7.0			21.6			44.5				56.2
Approach LOS		A			C			D				E
Queue Length 50th (ft)	5	71	0	18	91	0	90	37	1	65	45	0
Queue Length 95th (ft)	15	43	3	38	136	5	124	45	1	119	75	0
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	410	2085	1008	418	2159	1018	491	512	379	184	372	326
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.31	0.18	0.11	0.15	0.02	0.47	0.19	0.16	0.47	0.31	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 79 (66%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60

Central Entrance Corridor Study
2: Mall Dr & W Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	665	12	63	374	55	8	24	28	80	12	40
Future Volume (vph)	74	665	12	63	374	55	8	24	28	80	12	40
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1665	0
Flt Permitted	0.950			0.950			0.723			0.539		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1360	1881	1599	1014	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			129			127			176			40
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1432			891				373
Travel Time (s)		25.0			24.4			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	665	12	63	374	55	8	24	28	80	52	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	22.0	65.0	65.0	22.0	65.0	65.0	13.0	20.0	20.0	13.0	20.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	10.4	76.3	76.3	14.5	80.6	80.6	13.4	8.3	8.3	17.8	16.6	
Actuated g/C Ratio	0.09	0.64	0.64	0.12	0.67	0.67	0.11	0.07	0.07	0.15	0.14	
v/c Ratio	0.48	0.29	0.01	0.29	0.16	0.05	0.05	0.19	0.10	0.40	0.20	
Control Delay	54.0	8.1	0.0	50.6	10.5	0.1	40.9	55.3	0.8	49.1	21.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	54.0	8.1	0.0	50.6	10.5	0.1	40.9	55.3	0.8	49.1	21.2	
LOS	D	A	A	D	B	A	D	E	A	D	C	
Approach Delay		12.5			14.4			27.9				38.1
Approach LOS		B			B			C				D
Queue Length 50th (ft)	38	171	0	44	63	0	5	18	0	54	8	
Queue Length 95th (ft)	67	51	m0	89	101	0	19	45	0	99	48	
Internal Link Dist (ft)		1388			1352			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	247	2273	1063	244	2399	1115	246	225	346	216	293	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.29	0.01	0.26	0.16	0.05	0.03	0.11	0.08	0.37	0.18	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 1 (1%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48

Intersection Signal Delay: 16.2

Intersection LOS: B

Intersection Capacity Utilization 48.8%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Study
3: Anderson Rd & W Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	647	8	71	461	8	12	96	187	12	28	53
Future Volume (vph)	29	647	8	71	461	8	12	96	187	12	28	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		0	0		25	0		25
Storage Lanes	1		1	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3564	0	0	1870	1599	0	1853	1599
Flt Permitted	0.483			0.402				0.967			0.900	
Satd. Flow (perm)	909	3574	1599	756	3564	0	0	1819	1599	0	1693	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			21		2				187			53
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1432			2028			808				1196
Travel Time (s)		32.5			46.1			18.4				27.2
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	647	8	71	469	0	0	108	187	0	40	53
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6			4		4	4		4
Total Split (s)	55.0	55.0	55.0	55.0	55.0		45.0	45.0	45.0	45.0	45.0	45.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7			4.9	4.9		4.9	4.9
Act Effct Green (s)	76.9	76.9	76.9	76.9	76.9			13.5	13.5		13.5	13.5
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.77			0.14	0.14		0.14	0.14
v/c Ratio	0.04	0.24	0.01	0.12	0.17			0.44	0.50		0.18	0.20
Control Delay	3.9	3.9	0.8	7.9	6.7			44.2	10.2		37.9	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.9	3.9	0.8	7.9	6.7			44.2	10.2		37.9	11.8
LOS	A	A	A	A	A			D	B		D	B
Approach Delay		3.9			6.9			22.6			23.0	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	4	48	0	16	78			64	0		23	0
Queue Length 95th (ft)	13	90	2	71	163			109	57		50	32
Internal Link Dist (ft)		1352			1948			728			1116	
Turn Bay Length (ft)	330		330	145					25			25
Base Capacity (vph)	699	2749	1235	581	2742			729	753		678	672
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	0.04	0.24	0.01	0.12	0.17			0.15	0.25		0.06	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50

Intersection Signal Delay: 9.4	Intersection LOS: A
Intersection Capacity Utilization 54.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Anderson Rd & W Central Entrance



Central Entrance Corridor Study
4: Basswood Ave & W Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	863	4	17	561	81	12	15	19	226	26	36
Future Volume (vph)	33	863	4	17	561	81	12	15	19	226	26	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		0	165		0	50		50	50		50
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3571	0	1787	3506	0	0	1840	1599	0	1800	1599
Flt Permitted	0.360			0.278				0.862			0.729	
Satd. Flow (perm)	677	3571	0	523	3506	0	0	1622	1599	0	1371	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			21				70			70
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2028			786			670				530
Travel Time (s)		46.1			17.9			15.2				12.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	867	0	17	642	0	0	27	19	0	252	36
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases	2			6			4		4	4		4
Total Split (s)	10.0	50.0		10.0	50.0		40.0	40.0	40.0	40.0	40.0	40.0
Total Lost Time (s)	4.7	4.7		4.7	4.7			4.7	4.7		4.7	4.7
Act Effct Green (s)	62.7	60.3		61.5	58.1			26.1	26.1		26.1	26.1
Actuated g/C Ratio	0.63	0.60		0.62	0.58			0.26	0.26		0.26	0.26
v/c Ratio	0.07	0.40		0.04	0.31			0.06	0.04		0.71	0.08
Control Delay	8.4	12.0		5.9	6.9			24.7	0.2		43.5	1.6
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	8.4	12.0		5.9	6.9			24.7	0.2		43.5	1.6
LOS	A	B		A	A			C	A		D	A
Approach Delay		11.9			6.8			14.6			38.2	
Approach LOS		B			A			B			D	
Queue Length 50th (ft)	7	121		2	47			13	0		146	0
Queue Length 95th (ft)	21	218		m7	70			30	0		205	7
Internal Link Dist (ft)		1948			706			590			450	
Turn Bay Length (ft)	160			165					50			50
Base Capacity (vph)	489	2155		392	2045			572	609		483	609
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.07	0.40		0.04	0.31			0.05	0.03		0.52	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71

Central Entrance Corridor Study
 4: Basswood Ave & W Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021

Intersection Signal Delay: 14.2

Intersection LOS: B

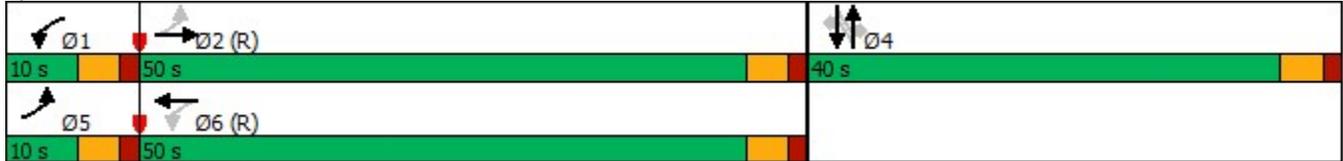
Intersection Capacity Utilization 55.8%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Basswood Ave & W Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	857	37	132	503	38	61	364	100	87	253	91
Future Volume (vph)	79	857	37	132	503	38	61	364	100	87	253	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	180		0	400		0	395		190
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3553	0	1787	3535	0	1787	1821	0	1787	1881	1599
Flt Permitted	0.414			0.163			0.476			0.162		
Satd. Flow (perm)	779	3553	0	307	3535	0	895	1821	0	305	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			9			15				124
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			2629			1069				1106
Travel Time (s)		17.9			59.8			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	894	0	132	541	0	61	464	0	87	253	91
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Total Split (s)	10.0	38.0		13.0	41.0		10.4	38.0		11.0	38.6	38.6
Total Lost Time (s)	4.7	4.7		4.7	4.7		5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	45.4	39.4		50.5	43.6		33.6	29.6		34.9	30.0	30.0
Actuated g/C Ratio	0.45	0.39		0.50	0.44		0.34	0.30		0.35	0.30	0.30
v/c Ratio	0.19	0.64		0.48	0.35		0.18	0.85		0.44	0.45	0.16
Control Delay	16.7	27.4		20.5	21.6		18.4	46.6		24.9	30.2	2.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	16.7	27.4		20.5	21.6		18.4	46.6		24.9	30.2	2.6
LOS	B	C		C	C		B	D		C	C	A
Approach Delay		26.6			21.4			43.4			23.3	
Approach LOS		C			C			D			C	
Queue Length 50th (ft)	29	313		46	132		23	260		33	125	0
Queue Length 95th (ft)	50	207		84	179		46	375		61	192	18
Internal Link Dist (ft)		706			2549			989			1026	
Turn Bay Length (ft)	150			180			400			395		190
Base Capacity (vph)	414	1403		281	1546		381	616		209	637	624
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	0.19	0.64		0.47	0.35		0.16	0.75		0.42	0.40	0.15

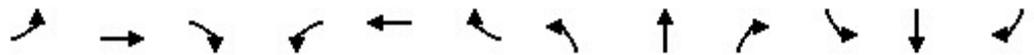
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.85

Central Entrance Corridor Study
6: Central High Dr/Pecan Ave & E Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	996	4	1	606	42	1	6	1	85	0	101
Future Volume (vph)	60	996	4	1	606	42	1	6	1	85	0	101
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	0	1868	1599	0	1787	1599
Flt Permitted	0.950			0.950				0.967			0.753	
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	0	1819	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			81			80			136			136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1323			1196			1026				1617
Travel Time (s)		30.1			27.2			23.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	996	4	1	606	42	0	7	1	0	85	101
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	15.0	44.0	44.0	13.0	42.0	42.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	8.7	65.9	65.9	7.2	57.5	57.5		11.9	11.9		11.9	11.9
Actuated g/C Ratio	0.10	0.73	0.73	0.08	0.64	0.64		0.13	0.13		0.13	0.13
v/c Ratio	0.35	0.38	0.00	0.01	0.27	0.04		0.03	0.00		0.45	0.31
Control Delay	43.1	6.3	0.0	38.0	8.9	0.8		31.6	0.0		42.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	43.1	6.3	0.0	38.0	8.9	0.8		31.6	0.0		42.8	5.2
LOS	D	A	A	D	A	A		C	A		D	A
Approach Delay		8.3			8.4			27.6			22.4	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	33	77	0	1	75	0		4	0		45	0
Queue Length 95th (ft)	69	221	0	5	133	5		15	0		85	23
Internal Link Dist (ft)		1243			1116			946			1537	
Turn Bay Length (ft)	330		380	415		315			75			
Base Capacity (vph)	208	2617	1192	162	2281	1049		567	592		442	592
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.29	0.38	0.00	0.01	0.27	0.04		0.01	0.00		0.19	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45

Central Entrance Corridor Study
 6: Central High Dr/Pecan Ave & E Central Entrance

Future Year (2045) No Build - AM Peak

09/15/2021

Intersection Signal Delay: 9.8

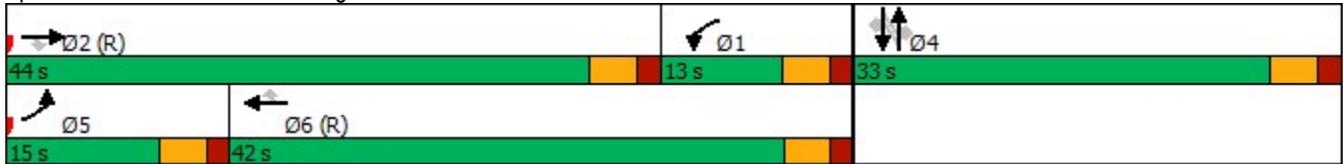
Intersection LOS: A

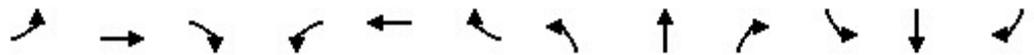
Intersection Capacity Utilization 56.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Central High Dr/Pecan Ave & E Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Future Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3417	0	1626	3420	1599	1787	3574	1599
Flt Permitted	0.241			0.169			0.950	0.999		0.950		
Satd. Flow (perm)	453	3574	1599	318	3417	0	1626	3420	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			512		46				114			117
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1578			1071			1862				367
Travel Time (s)		35.9			24.3			42.3				6.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	105	600	515	131	583	0	158	754	17	210	648	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	12.0	27.0	27.0	13.0	28.0		38.0	38.0	38.0	42.0	42.0	42.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	35.1	26.2	26.2	38.7	28.0		31.8	31.8	31.8	30.3	30.3	30.3
Actuated g/C Ratio	0.29	0.22	0.22	0.32	0.23		0.26	0.26	0.26	0.25	0.25	0.25
v/c Ratio	0.46	0.77	0.69	0.57	0.70		0.37	0.83	0.03	0.46	0.72	0.13
Control Delay	37.1	52.7	9.2	41.5	45.2		38.7	50.8	0.1	40.5	45.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	52.7	9.2	41.5	45.2		38.7	50.8	0.1	40.5	45.2	0.5
LOS	D	D	A	D	D		D	D	A	D	D	A
Approach Delay		33.0			44.6			47.8				41.2
Approach LOS		C			D			D				D
Queue Length 50th (ft)	57	241	2	72	208		108	302	0	138	241	0
Queue Length 95th (ft)	108	#350	110	#144	#305		179	381	0	199	286	2
Internal Link Dist (ft)		1498			991			1782				287
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	228	781	749	229	832		436	917	512	545	1090	569
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.77	0.69	0.57	0.70		0.36	0.82	0.03	0.39	0.59	0.11

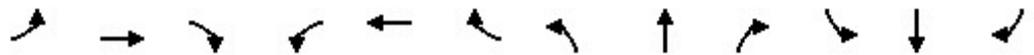
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83

Central Entrance Corridor Study
1: Trinity Rd & Miller Hill Rd/W Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Future Volume (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			403			121			162			165
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Total Split (s)	22.0	67.0	67.0	20.0	65.0	65.0	25.0	26.0	26.0	17.0	18.0	18.0
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	16.2	69.8	69.8	11.5	64.7	64.7	16.2	19.3	19.3	9.7	10.2	10.2
Actuated g/C Ratio	0.12	0.54	0.54	0.09	0.50	0.50	0.12	0.15	0.15	0.07	0.08	0.08
v/c Ratio	0.32	0.38	0.39	0.54	0.50	0.07	0.70	0.40	0.10	0.50	0.49	0.40
Control Delay	41.0	8.1	1.1	72.1	9.1	0.1	57.8	47.4	1.9	70.3	63.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	8.1	1.1	72.1	9.1	0.1	57.8	47.4	1.9	70.3	63.0	5.9
LOS	D	A	A	E	A	A	E	D	A	E	E	A
Approach Delay		9.4			17.9			50.0				44.3
Approach LOS		A			B			D				D
Queue Length 50th (ft)	55	56	0	58	63	0	129	88	0	54	58	0
Queue Length 95th (ft)	89	83	3	82	77	m0	175	107	5	102	92	13
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	432	1918	1044	386	1779	857	506	584	397	156	343	302
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.38	0.39	0.43	0.50	0.07	0.60	0.36	0.10	0.42	0.40	0.37

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 38 (29%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70

Intersection Signal Delay: 22.5

Intersection LOS: C

Intersection Capacity Utilization 63.7%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

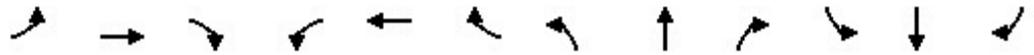
Splits and Phases: 1: Trinity Rd & Miller Hill Rd/W Central Entrance



Central Entrance Corridor Study
2: Mall Dr & W Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	657	53	126	912	164	48	72	100	235	76	111
Future Volume (vph)	201	657	53	126	912	164	48	72	100	235	76	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1714	0
Flt Permitted	0.950			0.950			0.640			0.491		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1204	1881	1599	924	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			165			164			209			48
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1415			891				373
Travel Time (s)		25.0			24.1			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	657	53	126	912	164	48	72	100	235	187	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	27.0	67.0	67.0	24.0	64.0	64.0	13.0	18.0	18.0	21.0	26.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	18.6	63.4	63.4	18.4	63.4	63.4	17.2	10.7	10.7	31.7	21.6	
Actuated g/C Ratio	0.14	0.49	0.49	0.14	0.49	0.49	0.13	0.08	0.08	0.24	0.17	
v/c Ratio	0.79	0.38	0.06	0.50	0.52	0.19	0.25	0.47	0.31	0.72	0.58	
Control Delay	60.5	24.3	3.4	59.2	25.1	3.5	42.1	66.6	2.5	56.1	45.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	60.5	24.3	3.4	59.2	25.1	3.5	42.1	66.6	2.5	56.1	45.4	
LOS	E	C	A	E	C	A	D	E	A	E	D	
Approach Delay		31.1			25.7			32.1				51.3
Approach LOS		C			C			C				D
Queue Length 50th (ft)	166	242	1	99	280	0	32	59	0	172	111	
Queue Length 95th (ft)	251	309	24	166	358	40	65	109	0	256	192	
Internal Link Dist (ft)		1388			1335			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	296	1743	864	252	1744	864	207	179	341	333	333	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.38	0.06	0.50	0.52	0.19	0.23	0.40	0.29	0.71	0.56	

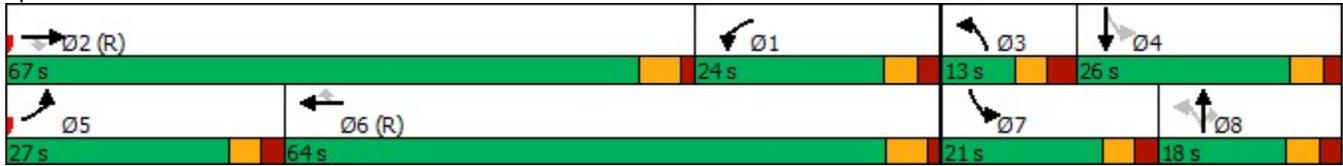
Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 116 (89%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79

Intersection Signal Delay: 31.9
 Intersection Capacity Utilization 73.2%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Study
3: Anderson Rd & W Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	978	29	134	1375	4	20	24	72	12	36	32
Future Volume (vph)	37	978	29	134	1375	4	20	24	72	12	36	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		0	0		25	0		25
Storage Lanes	1		1	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	0	0	1840	1599	0	1859	1599
Flt Permitted	0.179			0.285				0.831			0.904	
Satd. Flow (perm)	337	3574	1599	536	3574	0	0	1563	1599	0	1701	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29		1				72			32
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			2043			824			1148	
Travel Time (s)		32.2			46.4			18.7			26.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	978	29	134	1379	0	0	44	72	0	48	32
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6			4		4	4		4
Total Split (s)	65.0	65.0	65.0	65.0	65.0		35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7			4.9	4.9		4.9	4.9
Act Effct Green (s)	84.3	84.3	84.3	84.3	84.3			9.4	9.4		9.4	9.4
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.84			0.09	0.09		0.09	0.09
v/c Ratio	0.13	0.32	0.02	0.30	0.46			0.30	0.33		0.30	0.18
Control Delay	3.6	2.7	0.9	8.5	8.8			46.7	14.4		46.2	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	3.6	2.7	0.9	8.5	8.8			46.7	14.4		46.2	16.4
LOS	A	A	A	A	A			D	B		D	B
Approach Delay		2.7			8.7			26.6			34.3	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	4	62	0	43	358			27	0		29	0
Queue Length 95th (ft)	13	103	5	m94	368			59	40		62	27
Internal Link Dist (ft)		1335			1963			744			1068	
Turn Bay Length (ft)	330		330	145					25			25
Base Capacity (vph)	284	3012	1352	452	3013			470	531		512	503
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	0.13	0.32	0.02	0.30	0.46			0.09	0.14		0.09	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.46

Central Entrance Corridor Study
4: Basswood Ave & W Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	973	16	21	1334	110	27	46	23	103	41	56
Future Volume (vph)	29	973	16	21	1334	110	27	46	23	103	41	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		0	165		0	50		50	50		50
Storage Lanes	1		0	1		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3567	0	1787	3535	0	0	1847	1599	0	1815	1599
Flt Permitted	0.119			0.253				0.859			0.742	
Satd. Flow (perm)	224	3567	0	476	3535	0	0	1616	1599	0	1396	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			12				70			70
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2043			786			670				530
Travel Time (s)		46.4			17.9			15.2				12.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	989	0	21	1444	0	0	73	23	0	144	56
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases	2			6			4		4	4		4
Total Split (s)	10.0	55.0		10.0	55.0		35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	4.7	4.7		4.7	4.7			4.7	4.7		4.7	4.7
Act Effct Green (s)	70.8	68.2		69.7	66.0			18.0	18.0		18.0	18.0
Actuated g/C Ratio	0.71	0.68		0.70	0.66			0.18	0.18		0.18	0.18
v/c Ratio	0.12	0.41		0.05	0.62			0.25	0.07		0.58	0.16
Control Delay	6.0	8.9		4.9	7.5			35.3	0.4		45.6	6.5
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	0.0
Total Delay	6.0	8.9		4.9	7.5			35.3	0.4		45.6	6.5
LOS	A	A		A	A			D	A		D	A
Approach Delay		8.8			7.5			26.9			34.7	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	4	102		2	103			41	0		86	0
Queue Length 95th (ft)	15	231		m5	187			73	0		134	23
Internal Link Dist (ft)		1963			706			590			450	
Turn Bay Length (ft)	160			165					50			50
Base Capacity (vph)	252	2434		409	2337			489	533		422	533
Starvation Cap Reductn	0	0		0	0			0	0		0	0
Spillback Cap Reductn	0	0		0	0			0	0		0	0
Storage Cap Reductn	0	0		0	0			0	0		0	0
Reduced v/c Ratio	0.12	0.41		0.05	0.62			0.15	0.04		0.34	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62

Central Entrance Corridor Study
 4: Basswood Ave & W Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021

Intersection Signal Delay: 10.6

Intersection LOS: B

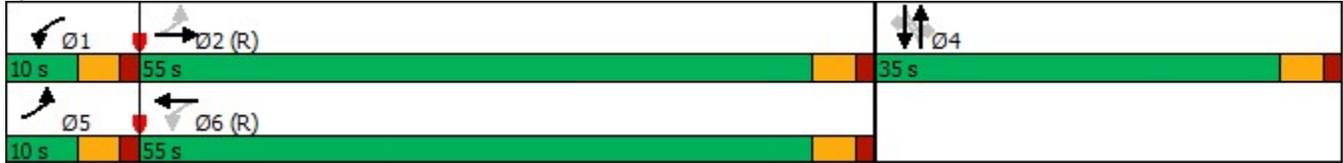
Intersection Capacity Utilization 63.8%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Basswood Ave & W Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	840	37	119	1113	68	165	221	108	87	352	162
Future Volume (vph)	157	840	37	119	1113	68	165	221	108	87	352	162
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	180		0	400		0	395		190
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3553	0	1787	3542	0	1787	1789	0	1787	1881	1599
Flt Permitted	0.098			0.200			0.227			0.354		
Satd. Flow (perm)	184	3553	0	376	3542	0	427	1789	0	666	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			7			25				162
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			2622			1069				1106
Travel Time (s)		17.9			59.6			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	877	0	119	1181	0	165	329	0	87	352	162
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Total Split (s)	13.0	41.8		14.0	42.8		12.2	33.2		11.0	32.0	32.0
Total Lost Time (s)	4.7	4.7		4.7	4.7		5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	50.2	41.6		49.6	41.3		32.7	27.2		29.9	23.8	23.8
Actuated g/C Ratio	0.50	0.42		0.50	0.41		0.33	0.27		0.30	0.24	0.24
v/c Ratio	0.69	0.59		0.39	0.80		0.70	0.65		0.32	0.79	0.32
Control Delay	44.6	24.7		7.4	23.3		39.5	36.6		24.0	48.4	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	44.6	24.7		7.4	23.3		39.5	36.6		24.0	48.4	6.5
LOS	D	C		A	C		D	D		C	D	A
Approach Delay		27.7			21.8			37.5				33.6
Approach LOS		C			C			D				C
Queue Length 50th (ft)	57	284		19	359		71	173		36	206	0
Queue Length 95th (ft)	#152	182		19	#463		#128	263		67	301	48
Internal Link Dist (ft)		706			2542			989			1026	
Turn Bay Length (ft)	150			180			400			395		190
Base Capacity (vph)	233	1482		321	1468		243	529		291	513	554
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	0.67	0.59		0.37	0.80		0.68	0.62		0.30	0.69	0.29

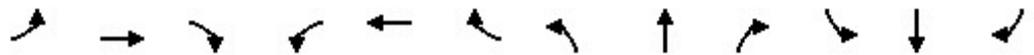
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80

Central Entrance Corridor Study
6: Central High Dr/Pecan Ave & E Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	900	0	4	1233	51	1	6	1	73	0	85
Future Volume (vph)	60	900	0	4	1233	51	1	6	1	73	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1881	1787	3574	1599	0	1868	1599	0	1787	1599
Flt Permitted	0.950			0.950				0.963			0.753	
Satd. Flow (perm)	1787	3574	1881	1787	3574	1599	0	1812	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						72			122			122
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1326			1168			847				1617
Travel Time (s)		30.1			26.5			19.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	900	0	4	1233	51	0	7	1	0	73	85
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	14.0	55.5	55.5	12.5	54.0	54.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	8.8	79.9		7.0	71.1	71.1		11.5	11.5		11.5	11.5
Actuated g/C Ratio	0.09	0.80		0.07	0.71	0.71		0.12	0.12		0.12	0.12
v/c Ratio	0.38	0.32		0.03	0.49	0.04		0.03	0.00		0.45	0.29
Control Delay	52.4	2.2		44.0	9.7	1.2		37.3	0.0		49.2	5.4
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	52.4	2.2		44.0	9.7	1.2		37.3	0.0		49.2	5.4
LOS	D	A		D	A	A		D	A		D	A
Approach Delay		5.3			9.4			32.6				25.6
Approach LOS		A			A			C				C
Queue Length 50th (ft)	39	4		2	200	0		4	0		44	0
Queue Length 95th (ft)	m68	223		13	290	9		17	0		85	20
Internal Link Dist (ft)		1246			1088			767			1537	
Turn Bay Length (ft)	330			415		315			75			
Base Capacity (vph)	166	2855		137	2539	1157		491	522		384	522
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	0.36	0.32		0.03	0.49	0.04		0.01	0.00		0.19	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.49

Central Entrance Corridor Study
 6: Central High Dr/Pecan Ave & E Central Entrance

Future Year (2045) No Build - PM Peak

09/15/2021

Intersection Signal Delay: 8.9

Intersection LOS: A

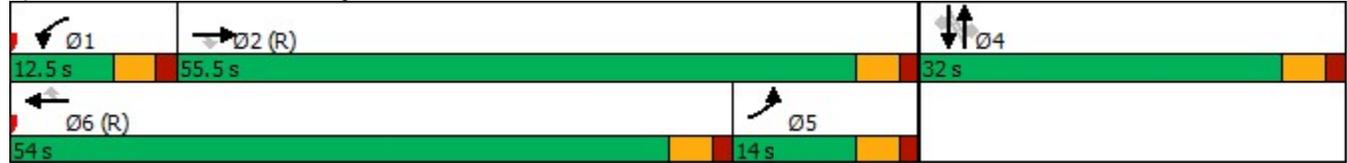
Intersection Capacity Utilization 62.5%

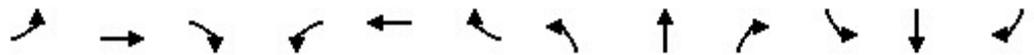
ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: Central High Dr/Pecan Ave & E Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	547	342	69	564	174	494	707	8	120	551	113
Future Volume (vph)	181	547	342	69	564	174	494	707	8	120	551	113
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3449	0	1626	3403	1599	1787	3574	1599
Flt Permitted	0.133			0.329			0.950	0.994		0.950		
Satd. Flow (perm)	250	3574	1599	619	3449	0	1626	3403	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			342		30				107			113
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1591			2779			1889				389
Travel Time (s)		36.2			63.2			42.9				6.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							21%					
Lane Group Flow (vph)	181	547	342	69	738	0	390	811	8	120	551	113
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	14.0	40.0	40.0	13.0	39.0		47.0	47.0	47.0	30.0	30.0	30.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	46.5	38.9	38.9	42.5	34.4		40.5	40.5	40.5	23.9	23.9	23.9
Actuated g/C Ratio	0.36	0.30	0.30	0.33	0.26		0.31	0.31	0.31	0.18	0.18	0.18
v/c Ratio	0.88	0.51	0.48	0.25	0.79		0.77	0.77	0.01	0.37	0.84	0.29
Control Delay	69.5	41.1	6.2	29.5	49.9		51.9	45.9	0.0	49.8	63.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	41.1	6.2	29.5	49.9		51.9	45.9	0.0	49.8	63.5	9.9
LOS	E	D	A	C	D		D	D	A	D	E	A
Approach Delay		34.7			48.2			47.6				53.7
Approach LOS		C			D			D				D
Queue Length 50th (ft)	106	210	0	38	296		324	336	0	89	236	0
Queue Length 95th (ft)	#238	270	75	72	373		462	417	0	150	#306	52
Internal Link Dist (ft)		1511			2699			1809				309
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	206	1068	717	274	934		515	1078	579	338	676	394
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.51	0.48	0.25	0.79		0.76	0.75	0.01	0.36	0.82	0.29

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 42 (32%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88

Intersection Signal Delay: 45.4

Intersection LOS: D

Intersection Capacity Utilization 86.8%

ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 7: Mesaba Ave & E Central Entrance/Central Entrance Dr



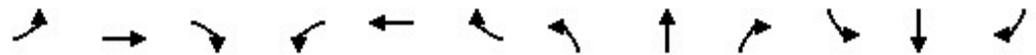
Signalized Intersection Level of Service

3. 2045 Build Concept #1 (3-lane cross section, with traffic diverting to other roadways) a.m. and p.m. peak hour LOS Synchro Results

Central Entrance Corridor Studt
1: Trinity Rd & Miller Hill Rd/W Central Entrance

Future Year Build Concept 1 - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	11	574	158	34	231	15	229	96	58	110	147	21
Future Volume (vph)	11	574	158	34	231	15	229	96	58	110	147	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214			217			211			215
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	11	574	158	34	231	15	229	96	58	110	147	21
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Total Split (s)	13.1	34.7	34.7	12.8	34.4	34.4	14.0	34.3	34.3	18.2	38.5	38.5
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	7.1	53.6	53.6	7.1	58.6	58.6	12.3	13.8	13.8	10.6	9.5	9.5
Actuated g/C Ratio	0.07	0.54	0.54	0.07	0.59	0.59	0.12	0.14	0.14	0.11	0.10	0.10
v/c Ratio	0.05	0.30	0.17	0.14	0.11	0.01	0.54	0.19	0.14	0.58	0.43	0.06
Control Delay	43.7	15.2	1.2	48.8	11.1	0.0	45.6	40.3	0.8	54.6	46.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.7	15.2	1.2	48.8	11.1	0.0	45.6	40.3	0.8	54.6	46.3	0.3
LOS	D	B	A	D	B	A	D	D	A	D	D	A
Approach Delay		12.6			15.1			37.5				46.1
Approach LOS		B			B			D				D
Queue Length 50th (ft)	3	113	0	11	20	0	71	30	0	67	47	0
Queue Length 95th (ft)	12	171	15	28	75	0	106	53	0	122	76	0
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	253	1916	956	256	2095	1027	427	1018	606	225	1179	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.30	0.17	0.13	0.11	0.01	0.54	0.09	0.10	0.49	0.12	0.03

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58

Central Entrance Corridor Studt
2: Mall Dr & W Central Entrance

Future Year Build Concept 1 - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	495	9	47	278	41	8	23	27	57	9	29
Future Volume (vph)	55	495	9	47	278	41	8	23	27	57	9	29
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1667	0
Flt Permitted	0.950			0.950			0.732			0.534		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1377	1881	1599	1005	1667	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			147			206			29
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1432			891				373
Travel Time (s)		25.0			24.4			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	495	9	47	278	41	8	23	27	57	38	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	16.0	40.2	40.2	14.0	38.2	38.2	12.0	35.0	35.0	10.8	33.8	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	8.8	69.3	69.3	7.8	66.1	66.1	12.5	8.1	8.1	13.5	12.8	
Actuated g/C Ratio	0.09	0.69	0.69	0.08	0.66	0.66	0.12	0.08	0.08	0.14	0.13	
v/c Ratio	0.35	0.20	0.01	0.34	0.12	0.04	0.04	0.15	0.08	0.31	0.16	
Control Delay	46.6	9.4	0.0	47.9	6.7	0.5	33.0	44.3	0.5	39.2	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	46.6	9.4	0.0	47.9	6.7	0.5	33.0	44.3	0.5	39.2	19.4	
LOS	D	A	A	D	A	A	C	D	A	D	B	
Approach Delay		12.9			11.3			22.3				31.3
Approach LOS		B			B			C				C
Queue Length 50th (ft)	34	75	0	27	14	0	4	14	0	31	5	
Queue Length 95th (ft)	m77	135	m0	71	52	1	17	38	0	64	36	
Internal Link Dist (ft)		1388			1352			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	192	2478	1154	150	2361	1106	489	553	615	341	497	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.20	0.01	0.31	0.12	0.04	0.02	0.04	0.04	0.17	0.08	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.35

Intersection Signal Delay: 14.5
 Intersection Capacity Utilization 42.8%
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Studt
3: Anderson Rd & W Central Entrance

Future Year Build Concept 1 - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	491	6	50	326	6	10	81	159	11	26	49
Future Volume (vph)	22	491	6	50	326	6	10	81	159	11	26	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		150	0		25	0		25
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	1881	1599	0	1872	1599	0	1853	1599
Flt Permitted	0.563			0.473				0.967			0.901	
Satd. Flow (perm)	1059	3574	1599	890	1881	1599	0	1819	1599	0	1695	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			21			21			159			49
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1432			2028			808			1196	
Travel Time (s)		32.5			46.1			18.4			27.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	491	6	50	326	6	0	91	159	0	37	49
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	78.4	78.4	78.4	78.4	78.4	78.4		12.0	12.0		12.0	12.0
Actuated g/C Ratio	0.78	0.78	0.78	0.78	0.78	0.78		0.12	0.12		0.12	0.12
v/c Ratio	0.03	0.18	0.00	0.07	0.22	0.00		0.42	0.48		0.18	0.21
Control Delay	6.9	5.8	3.5	5.5	7.1	2.5		45.3	11.2		39.7	12.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	6.9	5.8	3.5	5.5	7.1	2.5		45.3	11.2		39.7	12.9
LOS	A	A	A	A	A	A		D	B		D	B
Approach Delay		5.8			6.8			23.6			24.4	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	4	51	0	11	127	0		55	0		22	0
Queue Length 95th (ft)	15	82	2	37	205	m4		97	54		48	31
Internal Link Dist (ft)		1352			1948			728			1116	
Turn Bay Length (ft)	330		330	145		150			25			25
Base Capacity (vph)	829	2801	1257	697	1474	1257		638	664		594	593
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.03	0.18	0.00	0.07	0.22	0.00		0.14	0.24		0.06	0.08

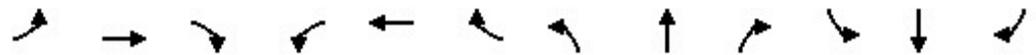
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48

Central Entrance Corridor Studt
4: Basswood Ave & W Central Entrance

Future Year Build Concept 1 - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	627	3	11	361	52	6	8	11	75	9	12
Future Volume (vph)	24	627	3	11	361	52	6	8	11	75	9	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		150	165		150	50		50	50		50
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	0	1842	1599	0	1800	1599
Flt Permitted	0.519			0.378				0.884			0.739	
Satd. Flow (perm)	976	1881	1599	711	1881	1599	0	1663	1599	0	1390	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			70			70			70
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2028			786			670			530	
Travel Time (s)		46.1			17.9			15.2			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	627	3	11	361	52	0	14	11	0	84	12
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	10.0	55.0	55.0	10.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.7	4.7		4.7	4.7
Act Effct Green (s)	79.3	78.9	78.9	78.1	76.7	76.7		13.1	13.1		13.1	13.1
Actuated g/C Ratio	0.79	0.79	0.79	0.78	0.77	0.77		0.13	0.13		0.13	0.13
v/c Ratio	0.03	0.42	0.00	0.02	0.25	0.04		0.06	0.04		0.46	0.04
Control Delay	5.0	8.9	0.0	2.8	4.1	0.6		36.5	0.3		47.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	5.0	8.9	0.0	2.8	4.1	0.6		36.5	0.3		47.6	0.3
LOS	A	A	A	A	A	A		D	A		D	A
Approach Delay		8.7			3.7			20.6			41.7	
Approach LOS		A			A			C			D	
Queue Length 50th (ft)	6	159	0	1	38	0		8	0		50	0
Queue Length 95th (ft)	19	264	m0	m3	84	1		25	0		94	0
Internal Link Dist (ft)		1948			706			590			450	
Turn Bay Length (ft)	160		150	165		150			50			50
Base Capacity (vph)	821	1485	1276	616	1443	1243		503	533		421	533
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.03	0.42	0.00	0.02	0.25	0.04		0.03	0.02		0.20	0.02

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.46

Central Entrance Corridor Studt
 4: Basswood Ave & W Central Entrance

Intersection Signal Delay: 9.8

Intersection LOS: A

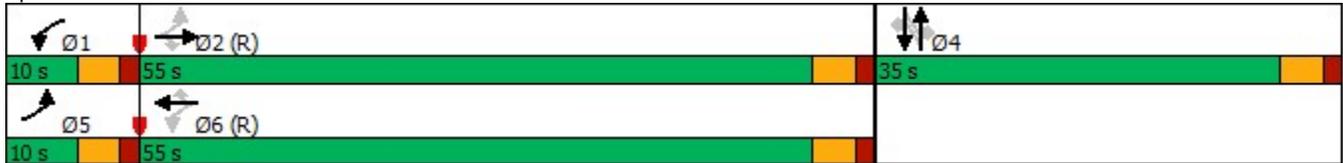
Intersection Capacity Utilization 56.4%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Basswood Ave & W Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	568	25	96	366	28	65	387	106	94	274	99
Future Volume (vph)	52	568	25	96	366	28	65	387	106	94	274	99
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	180		150	400		0	395		190
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	1821	0	1787	1881	1599
Flt Permitted	0.416			0.214			0.431			0.139		
Satd. Flow (perm)	783	1881	1599	403	1881	1599	811	1821	0	261	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			122			122		15				122
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			3313			1069				1106
Travel Time (s)		17.9			75.3			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	568	25	96	366	28	65	493	0	94	274	99
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	10.0	42.7	42.7	10.0	42.7	42.7	10.4	37.3		10.0	36.9	36.9
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	48.4	44.0	44.0	48.8	44.2	44.2	34.2	30.2		34.0	29.9	29.9
Actuated g/C Ratio	0.48	0.44	0.44	0.49	0.44	0.44	0.34	0.30		0.34	0.30	0.30
v/c Ratio	0.12	0.69	0.03	0.35	0.44	0.04	0.20	0.88		0.56	0.49	0.18
Control Delay	16.0	32.3	0.1	17.6	24.0	0.1	19.3	50.1		32.3	31.5	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	16.0	32.3	0.1	17.6	24.0	0.1	19.3	50.1		32.3	31.5	3.7
LOS	B	C	A	B	C	A	B	D		C	C	A
Approach Delay		29.7			21.4			46.6				25.8
Approach LOS		C			C			D				C
Queue Length 50th (ft)	16	375	0	32	177	0	24	279		36	138	0
Queue Length 95th (ft)	35	#504	m0	62	265	0	51	#446		68	213	25
Internal Link Dist (ft)		706			3233			989			1026	
Turn Bay Length (ft)	150		150	180		150	400			395		190
Base Capacity (vph)	434	827	771	276	830	774	349	603		173	605	597
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.12	0.69	0.03	0.35	0.44	0.04	0.19	0.82		0.54	0.45	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88

Central Entrance Corridor Studt
6: Central High Dr/Pecan Ave & E Central Entrance

Future Year Build Concept 1 - AM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	752	3	1	453	32	1	6	1	70	0	83
Future Volume (vph)	45	752	3	1	453	32	1	6	1	70	0	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	3574	1599	0	1868	1599	0	1787	1599
Flt Permitted	0.950			0.950				0.961			0.753	
Satd. Flow (perm)	1787	1881	1599	1787	3574	1599	0	1808	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			81			80			136			136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		643			1196			1026				1617
Travel Time (s)		14.6			27.2			23.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	752	3	1	453	32	0	7	1	0	70	83
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	12.5	45.6	45.6	11.9	45.0	45.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	8.1	70.5	70.5	7.0	64.7	64.7		10.8	10.8		10.8	10.8
Actuated g/C Ratio	0.09	0.78	0.78	0.08	0.72	0.72		0.12	0.12		0.12	0.12
v/c Ratio	0.28	0.51	0.00	0.01	0.18	0.03		0.03	0.00		0.41	0.27
Control Delay	42.3	7.6	0.0	38.0	6.7	0.0		33.0	0.0		42.9	3.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	42.3	7.6	0.0	38.0	6.7	0.0		33.0	0.0		42.9	3.7
LOS	D	A	A	D	A	A		C	A		D	A
Approach Delay		9.5			6.3			28.9				21.6
Approach LOS		A			A			C				C
Queue Length 50th (ft)	25	125	0	1	50	0		4	0		38	0
Queue Length 95th (ft)	57	393	0	5	90	1		16	0		75	12
Internal Link Dist (ft)		563			1116			946				1537
Turn Bay Length (ft)	330		380	415		315			75			
Base Capacity (vph)	168	1473	1270	140	2571	1172		554	584		434	584
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.27	0.51	0.00	0.01	0.18	0.03		0.01	0.00		0.16	0.14

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.51

Central Entrance Corridor Studt
 6: Central High Dr/Pecan Ave & E Central Entrance

Future Year Build Concept 1 - AM Peak

09/15/2021

Intersection Signal Delay: 9.8

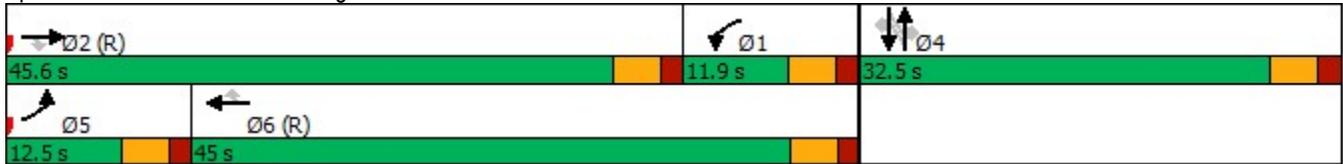
Intersection LOS: A

Intersection Capacity Utilization 63.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 6: Central High Dr/Pecan Ave & E Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	456	391	110	347	143	165	691	16	209	646	62
Future Volume (vph)	80	456	391	110	347	143	165	691	16	209	646	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3417	0	1626	3420	1599	1787	3574	1599
Flt Permitted	0.359			0.294			0.950	0.999		0.950		
Satd. Flow (perm)	675	3574	1599	553	3417	0	1626	3420	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			391		46				114			117
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1578			1071			1862				367
Travel Time (s)		35.9			24.3			42.3				6.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	80	456	391	110	490	0	148	708	16	209	646	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	12.0	27.0	27.0	13.0	28.0		38.0	38.0	38.0	42.0	42.0	42.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	35.8	27.6	27.6	39.6	31.4		31.3	31.3	31.3	30.3	30.3	30.3
Actuated g/C Ratio	0.30	0.23	0.23	0.33	0.26		0.26	0.26	0.26	0.25	0.25	0.25
v/c Ratio	0.29	0.56	0.59	0.39	0.53		0.35	0.79	0.03	0.46	0.72	0.13
Control Delay	32.1	45.5	8.2	34.0	39.2		38.5	48.7	0.1	40.5	45.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	45.5	8.2	34.0	39.2		38.5	48.7	0.1	40.5	45.3	0.5
LOS	C	D	A	C	D		D	D	A	D	D	A
Approach Delay		28.6			38.2			46.1				41.2
Approach LOS		C			D			D				D
Queue Length 50th (ft)	42	171	0	59	164		102	279	0	137	240	0
Queue Length 95th (ft)	86	234	90	113	232		169	354	0	198	285	2
Internal Link Dist (ft)		1498			991			1782				287
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	278	821	668	281	926		436	917	512	545	1090	569
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.56	0.59	0.39	0.53		0.34	0.77	0.03	0.38	0.59	0.11

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79

Intersection Signal Delay: 38.4

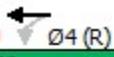
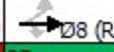
Intersection LOS: D

Intersection Capacity Utilization 73.4%

ICU Level of Service D

Analysis Period (min) 15

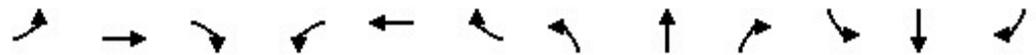
Splits and Phases: 7: Mesaba Ave & E Central Entrance/Central Entrance Dr

 Ø1 38 s	 Ø2 42 s	 Ø3 12 s	 Ø4 (R) 28 s
		 Ø7 13 s	 Ø8 (R) 27 s

Central Entrance Corridor Study
1: Trinity Rd & Miller Hill Rd/W Central Entrance

Future Year Build Concept 1 - PM Peak

09/15/2021



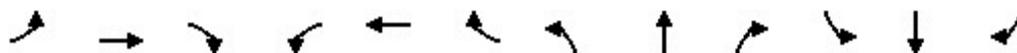
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	121	648	353	120	650	43	300	208	38	84	174	142
Future Volume (vph)	121	648	353	120	650	43	300	208	38	84	174	142
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			353			217			211			215
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	121	648	353	120	650	43	300	208	38	84	174	142
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3		8
Permitted Phases			6			2			4			8
Total Split (s)	13.1	34.7	34.7	12.8	34.4	34.4	14.0	36.7	36.7	15.8	38.5	38.5
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	7.3	41.8	41.8	8.9	43.1	43.1	16.5	20.4	20.4	9.2	10.4	10.4
Actuated g/C Ratio	0.07	0.42	0.42	0.09	0.43	0.43	0.16	0.20	0.20	0.09	0.10	0.10
v/c Ratio	0.48	0.43	0.40	0.39	0.42	0.05	0.53	0.29	0.08	0.52	0.47	0.40
Control Delay	51.2	22.7	4.0	49.2	35.0	2.5	41.9	35.8	0.3	54.4	45.8	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.2	22.7	4.0	49.2	35.0	2.5	41.9	35.8	0.3	54.4	45.8	4.3
LOS	D	C	A	D	C	A	D	D	A	D	D	A
Approach Delay		19.9			35.4			36.6				32.9
Approach LOS		B			D			D				C
Queue Length 50th (ft)	39	148	0	40	152	0	91	62	0	51	55	0
Queue Length 95th (ft)	68	225	58	70	294	14	132	91	0	100	86	11
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	253	1493	873	310	1540	812	571	1104	639	182	1179	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.43	0.40	0.39	0.42	0.05	0.53	0.19	0.06	0.46	0.15	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53

Central Entrance Corridor Study
2: Mall Dr & W Central Entrance

Future Year Build Concept 1 - PM Peak
09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	489	40	94	678	122	46	69	97	169	54	80
Future Volume (vph)	150	489	40	94	678	122	46	69	97	169	54	80
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1712	0
Flt Permitted	0.950			0.950			0.671			0.647		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1262	1881	1599	1217	1712	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			147			206			80
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1415			891				373
Travel Time (s)		25.0			24.1			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	150	489	40	94	678	122	46	69	97	169	134	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	17.2	32.0	32.0	16.6	31.4	31.4	11.4	40.6	40.6	10.8	40.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	13.9	51.8	51.8	10.2	45.8	45.8	18.1	13.1	13.1	20.3	17.4	
Actuated g/C Ratio	0.14	0.52	0.52	0.10	0.46	0.46	0.18	0.13	0.13	0.20	0.17	
v/c Ratio	0.60	0.26	0.04	0.52	0.41	0.15	0.18	0.28	0.25	0.61	0.37	
Control Delay	51.1	34.5	6.6	53.4	22.4	5.6	29.3	39.8	1.5	42.9	19.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	51.1	34.5	6.6	53.4	22.4	5.6	29.3	39.8	1.5	42.9	19.2	
LOS	D	C	A	D	C	A	C	D	A	D	B	
Approach Delay		36.5			23.4			20.0				32.4
Approach LOS		D			C			C				C
Queue Length 50th (ft)	103	157	1	60	133	4	23	41	0	92	32	
Queue Length 95th (ft)	169	228	m20	m99	228	m28	47	74	0	135	79	
Internal Link Dist (ft)		1388			1335			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	258	1852	900	196	1636	811	533	658	693	488	647	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.58	0.26	0.04	0.48	0.41	0.15	0.09	0.10	0.14	0.35	0.21	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61

Intersection Signal Delay: 28.6

Intersection LOS: C

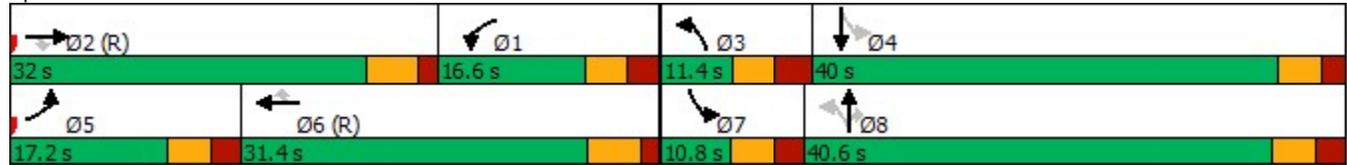
Intersection Capacity Utilization 60.2%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Study
3: Anderson Rd & W Central Entrance

Future Year Build Concept 1 - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	742	22	95	973	3	17	20	61	11	34	30
Future Volume (vph)	28	742	22	95	973	3	17	20	61	11	34	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		150	0		25	0		25
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	1881	1599	0	1840	1599	0	1859	1599
Flt Permitted	0.250			0.369				0.831			0.908	
Satd. Flow (perm)	470	3574	1599	694	1881	1599	0	1563	1599	0	1708	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			22			21			61			30
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1415			2043			824				1148
Travel Time (s)		32.2			46.4			18.7				26.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	28	742	22	95	973	3	0	37	61	0	45	30
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	65.0	65.0	65.0	65.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	84.5	84.5	84.5	84.5	84.5	84.5		9.2	9.2		9.2	9.2
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.84	0.84		0.09	0.09		0.09	0.09
v/c Ratio	0.07	0.25	0.02	0.16	0.61	0.00		0.26	0.30		0.29	0.17
Control Delay	0.7	0.5	0.0	3.7	6.2	0.3		45.7	15.0		46.2	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	0.7	0.5	0.0	3.7	6.2	0.3		45.7	15.0		46.2	16.6
LOS	A	A	A	A	A	A		D	B		D	B
Approach Delay		0.5			6.0			26.6				34.3
Approach LOS		A			A			C				C
Queue Length 50th (ft)	0	5	0	9	170	0		22	0		27	0
Queue Length 95th (ft)	1	9	1	m38	374	m0		52	37		60	27
Internal Link Dist (ft)		1335			1963			744			1068	
Turn Bay Length (ft)	330		330	145		150			25			25
Base Capacity (vph)	397	3019	1354	586	1589	1354		470	523		514	502
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.07	0.25	0.02	0.16	0.61	0.00		0.08	0.12		0.09	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61

Intersection Signal Delay: 5.9

Intersection LOS: A

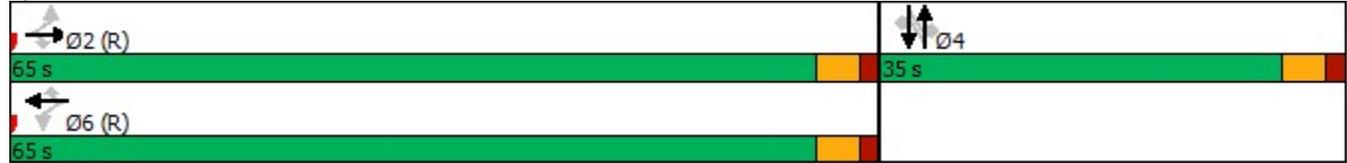
Intersection Capacity Utilization 84.7%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

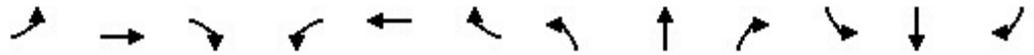
Splits and Phases: 3: Anderson Rd & W Central Entrance



Central Entrance Corridor Study
4: Basswood Ave & W Central Entrance

Future Year Build Concept 1 - PM Peak

09/15/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	707	12	14	859	71	15	25	13	34	14	19
Future Volume (vph)	21	707	12	14	859	71	15	25	13	34	14	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		150	165		150	50		50	50		50
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	0	1847	1599	0	1817	1599
Flt Permitted	0.254			0.344				0.869			0.764	
Satd. Flow (perm)	478	1881	1599	647	1881	1599	0	1635	1599	0	1437	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			70			70			70
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2043			786			670				530
Travel Time (s)		46.4			17.9			15.2				12.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	707	12	14	859	71	0	40	13	0	48	19
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	10.0	53.7	53.7	10.0	53.7	53.7	36.3	36.3	36.3	36.3	36.3	36.3
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.7	4.7		4.7	4.7
Act Effct Green (s)	81.7	81.4	81.4	80.6	79.2	79.2		10.5	10.5		10.5	10.5
Actuated g/C Ratio	0.82	0.81	0.81	0.81	0.79	0.79		0.10	0.10		0.10	0.10
v/c Ratio	0.05	0.46	0.01	0.02	0.58	0.06		0.23	0.06		0.32	0.08
Control Delay	3.3	12.0	1.4	2.6	8.6	1.6		43.5	0.5		46.4	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	3.3	12.0	1.4	2.6	8.6	1.6		43.5	0.5		46.4	0.7
LOS	A	B	A	A	A	A		D	A		D	A
Approach Delay		11.6			7.9			32.9				33.4
Approach LOS		B			A			C				C
Queue Length 50th (ft)	5	289	0	1	152	0		24	0		29	0
Queue Length 95th (ft)	5	430	6	6	447	14		54	0		63	0
Internal Link Dist (ft)		1963			706			590				450
Turn Bay Length (ft)	160		150	165		150			50			50
Base Capacity (vph)	465	1530	1314	586	1490	1281		516	553		454	553
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.05	0.46	0.01	0.02	0.58	0.06		0.08	0.02		0.11	0.03

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.58

Intersection Signal Delay: 11.1
 Intersection Capacity Utilization 68.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 4: Basswood Ave & W Central Entrance

 Ø1 10 s	 Ø2 (R) 53.7 s	 Ø4 36.3 s
 Ø5 10 s	 Ø6 (R) 53.7 s	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	557	25	87	809	50	175	235	115	94	382	175
Future Volume (vph)	104	557	25	87	809	50	175	235	115	94	382	175
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	180		150	400		0	395		190
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	1789	0	1787	1881	1599
Flt Permitted	0.099			0.233			0.234			0.305		
Satd. Flow (perm)	186	1881	1599	438	1881	1599	440	1789	0	574	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131			131		26				175
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			3265			1069				1106
Travel Time (s)		17.9			74.2			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	557	25	87	809	50	175	350	0	94	382	175
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	10.0	42.3	42.3	10.0	42.3	42.3	10.4	31.7		11.0	32.3	32.3
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	47.2	42.4	42.4	47.0	42.3	42.3	30.0	26.0		30.5	24.4	24.4
Actuated g/C Ratio	0.50	0.45	0.45	0.49	0.45	0.45	0.32	0.27		0.32	0.26	0.26
v/c Ratio	0.54	0.66	0.03	0.29	0.97	0.06	0.81	0.69		0.36	0.79	0.32
Control Delay	24.6	27.4	0.1	14.7	53.3	0.2	52.9	36.5		23.1	45.2	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	24.6	27.4	0.1	14.7	53.3	0.2	52.9	36.5		23.1	45.2	5.9
LOS	C	C	A	B	D	A	D	D		C	D	A
Approach Delay		25.9			47.0			42.0				31.4
Approach LOS		C			D			D				C
Queue Length 50th (ft)	31	283	0	26	~552	0	70	174		36	207	0
Queue Length 95th (ft)	#77	413	0	52	#777	0	#154	270		68	308	47
Internal Link Dist (ft)		706			3185			989			1026	
Turn Bay Length (ft)	150		150	180		150	400			395		190
Base Capacity (vph)	192	839	786	299	837	784	221	529		282	546	588
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.54	0.66	0.03	0.29	0.97	0.06	0.79	0.66		0.33	0.70	0.30

Intersection Summary

Area Type: Other

Cycle Length: 95

Actuated Cycle Length: 95

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

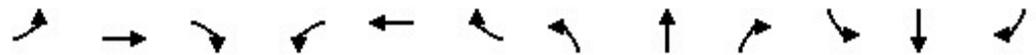
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.97

Central Entrance Corridor Study
6: Central High Dr/Pecan Ave & E Central Entrance

Future Year Build Concept 1 - PM Peak

09/15/2021



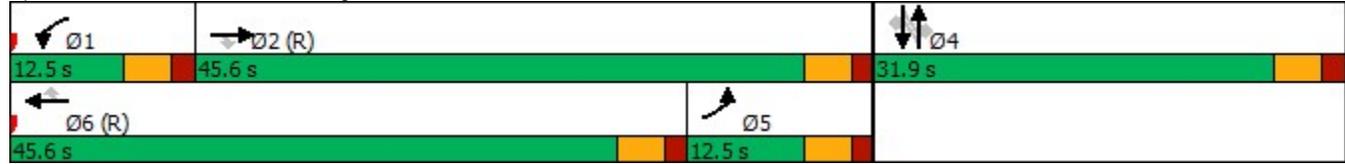
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	679	0	3	922	38	1	6	1	60	0	70
Future Volume (vph)	45	679	0	3	922	38	1	6	1	60	0	70
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1881	1787	3574	1599	0	1868	1599	0	1787	1599
Flt Permitted	0.950			0.950				0.961			0.753	
Satd. Flow (perm)	1787	1881	1881	1787	3574	1599	0	1808	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						80			136			136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		688			1168			847				1617
Travel Time (s)		15.6			26.5			19.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	679	0	3	922	38	0	7	1	0	60	70
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	12.5	45.6	45.6	12.5	45.6	45.6	31.9	31.9	31.9	31.9	31.9	31.9
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	7.5	71.1		7.0	66.0	66.0		10.3	10.3		10.3	10.3
Actuated g/C Ratio	0.08	0.79		0.08	0.73	0.73		0.11	0.11		0.11	0.11
v/c Ratio	0.30	0.46		0.02	0.35	0.03		0.03	0.00		0.37	0.23
Control Delay	44.4	6.6		38.7	7.0	0.3		33.9	0.0		42.6	2.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	44.4	6.6		38.7	7.0	0.3		33.9	0.0		42.6	2.0
LOS	D	A		D	A	A		C	A		D	A
Approach Delay		8.9			6.9			29.6			20.7	
Approach LOS		A			A			C			C	
Queue Length 50th (ft)	24	102		2	118	0		4	0		32	0
Queue Length 95th (ft)	58	321		10	177	3		16	0		68	2
Internal Link Dist (ft)		608			1088			767			1537	
Turn Bay Length (ft)	330			415		315			75			
Base Capacity (vph)	154	1486		152	2619	1193		542	574		425	574
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	0.29	0.46		0.02	0.35	0.03		0.01	0.00		0.14	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.46

Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 59.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 6: Central High Dr/Pecan Ave & E Central Entrance





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	416	260	58	474	146	463	663	8	120	549	112
Future Volume (vph)	138	416	260	58	474	146	463	663	8	120	549	112
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3449	0	1626	3403	1599	1787	3574	1599
Flt Permitted	0.224			0.434			0.950	0.994		0.950		
Satd. Flow (perm)	421	3574	1599	816	3449	0	1626	3403	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			260		30				107			112
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1591			2779			1889				389
Travel Time (s)		36.2			63.2			42.9				6.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							21%					
Lane Group Flow (vph)	138	416	260	58	620	0	366	760	8	120	549	112
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	14.0	40.0	40.0	13.0	39.0		47.0	47.0	47.0	30.0	30.0	30.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	47.2	39.5	39.5	44.0	36.0		39.9	39.9	39.9	23.9	23.9	23.9
Actuated g/C Ratio	0.36	0.30	0.30	0.34	0.28		0.31	0.31	0.31	0.18	0.18	0.18
v/c Ratio	0.56	0.38	0.39	0.17	0.64		0.73	0.73	0.01	0.37	0.84	0.29
Control Delay	37.3	38.5	6.1	28.2	43.3		50.0	44.8	0.0	49.8	63.4	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.3	38.5	6.1	28.2	43.3		50.0	44.8	0.0	49.8	63.4	9.8
LOS	D	D	A	C	D		D	D	A	D	E	A
Approach Delay		28.0			42.0			46.1				53.6
Approach LOS		C			D			D				D
Queue Length 50th (ft)	79	153	0	32	236		298	309	0	89	235	0
Queue Length 95th (ft)	129	204	66	63	304		428	386	0	150	#304	52
Internal Link Dist (ft)		1511			2699			1809				309
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	249	1087	667	337	976		515	1078	579	338	676	393
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.38	0.39	0.17	0.64		0.71	0.71	0.01	0.36	0.81	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 42 (32%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.84

Intersection Signal Delay: 42.7

Intersection LOS: D

Intersection Capacity Utilization 79.5%

ICU Level of Service D

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

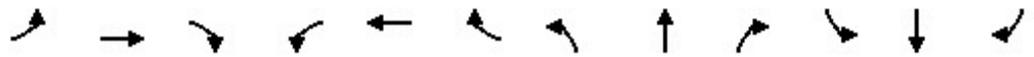
Splits and Phases: 7: Mesaba Ave & E Central Entrance/Central Entrance Dr

 Ø1 47 s	 Ø2 30 s	 Ø3 14 s	 Ø4 (R) 39 s
		 Ø7 13 s	 Ø8 (R) 40 s

Signalized Intersection Level of Service

4. 2045 Build Concept #1 (3-lane cross section, with no traffic diverting) a.m. and p.m. peak hour LOS Synchro Results

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 1: Trinity Rd & Miller Hill Rd/W Central Entrance 09/16/2021



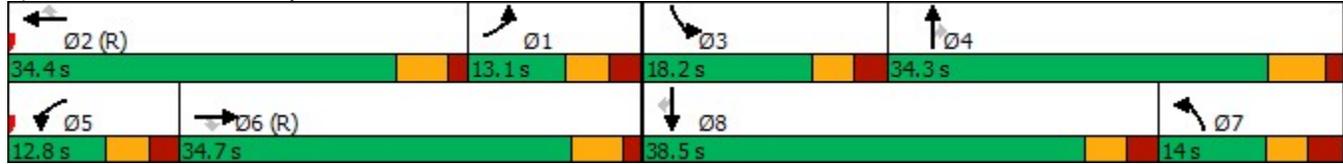
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Future Volume (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214			217			211			215
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Total Split (s)	13.1	34.7	34.7	12.8	34.4	34.4	14.0	34.3	34.3	18.2	38.5	38.5
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	7.1	54.1	54.1	7.3	59.3	59.3	12.4	13.7	13.7	10.0	8.8	8.8
Actuated g/C Ratio	0.07	0.54	0.54	0.07	0.59	0.59	0.12	0.14	0.14	0.10	0.09	0.09
v/c Ratio	0.05	0.34	0.19	0.19	0.15	0.02	0.54	0.20	0.15	0.49	0.37	0.05
Control Delay	43.9	15.3	1.8	48.8	12.2	0.0	45.6	40.6	0.8	51.3	46.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	15.3	1.8	48.8	12.2	0.0	45.6	40.6	0.8	51.3	46.1	0.3
LOS	D	B	A	D	B	A	D	D	A	D	D	A
Approach Delay		12.9			16.0			37.5				44.6
Approach LOS		B			B			D				D
Queue Length 50th (ft)	4	131	0	15	12	0	72	30	0	53	37	0
Queue Length 95th (ft)	13	196	25	36	112	1	107	53	0	100	64	0
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	253	1934	963	260	2120	1036	429	1018	606	225	1179	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.34	0.19	0.18	0.15	0.02	0.54	0.09	0.10	0.39	0.10	0.03

Intersection Summary
 Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.54

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 1: Trinity Rd & Miller Hill Rd/W Central Entrance 09/16/2021

Intersection Signal Delay: 22.5	Intersection LOS: C
Intersection Capacity Utilization 43.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Trinity Rd & Miller Hill Rd/W Central Entrance



Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 2: Mall Dr & W Central Entrance 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	665	12	63	374	55	8	24	28	80	12	40
Future Volume (vph)	74	665	12	63	374	55	8	24	28	80	12	40
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1665	0
Flt Permitted	0.950			0.950			0.723			0.528		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1360	1881	1599	993	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			147			206			40
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1432			891				373
Travel Time (s)		25.0			24.4			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	74	665	12	63	374	55	8	24	28	80	52	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	16.0	40.2	40.2	14.0	38.2	38.2	12.0	35.0	35.0	10.8	33.8	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	9.7	66.1	66.1	8.1	64.7	64.7	12.7	8.3	8.3	14.0	13.2	
Actuated g/C Ratio	0.10	0.66	0.66	0.08	0.65	0.65	0.13	0.08	0.08	0.14	0.13	
v/c Ratio	0.43	0.28	0.01	0.43	0.16	0.05	0.04	0.15	0.09	0.43	0.20	
Control Delay	50.2	11.1	0.0	50.8	7.8	0.5	32.8	44.0	0.5	42.9	18.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	50.2	11.1	0.0	50.8	7.8	0.5	32.8	44.0	0.5	42.9	18.3	
LOS	D	B	A	D	A	A	C	D	A	D	B	
Approach Delay		14.8			12.5			22.2				33.2
Approach LOS		B			B			C				C
Queue Length 50th (ft)	50	98	0	43	58	1	4	15	0	44	6	
Queue Length 95th (ft)	99	177	m0	88	55	3	16	39	0	82	43	
Internal Link Dist (ft)		1388			1352			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	199	2363	1107	150	2313	1086	485	553	615	340	504	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.28	0.01	0.42	0.16	0.05	0.02	0.04	0.05	0.24	0.10	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.43

Intersection Signal Delay: 16.0 Intersection LOS: B
 Intersection Capacity Utilization 48.8% ICU Level of Service A
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 3: Anderson Rd & W Central Entrance 09/16/2021



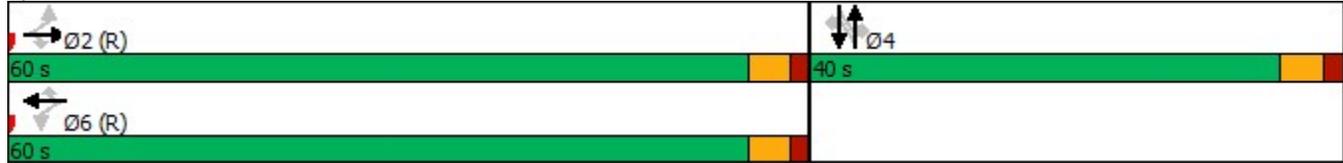
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	647	8	71	461	8	12	96	187	12	28	53
Future Volume (vph)	29	647	8	71	461	8	12	96	187	12	28	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		150	0		25	0		25
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	1881	1599	0	1870	1599	0	1853	1599
Flt Permitted	0.477			0.402				0.967			0.900	
Satd. Flow (perm)	897	3574	1599	756	1881	1599	0	1819	1599	0	1693	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			21			21			187			53
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1432			2028			808			1196	
Travel Time (s)		32.5			46.1			18.4			27.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	647	8	71	461	8	0	108	187	0	40	53
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	60.0	60.0	60.0	60.0	60.0	60.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	76.9	76.9	76.9	76.9	76.9	76.9		13.5	13.5		13.5	13.5
Actuated g/C Ratio	0.77	0.77	0.77	0.77	0.77	0.77		0.14	0.14		0.14	0.14
v/c Ratio	0.04	0.24	0.01	0.12	0.32	0.01		0.44	0.50		0.18	0.20
Control Delay	7.5	6.6	4.2	10.3	10.9	5.5		44.2	10.2		37.9	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	7.5	6.6	4.2	10.3	10.9	5.5		44.2	10.2		37.9	11.8
LOS	A	A	A	B	B	A		D	B		D	B
Approach Delay		6.6			10.8			22.6			23.0	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	6	70	0	17	132	0		64	0		23	0
Queue Length 95th (ft)	18	103	m2	66	314	m3		109	57		50	32
Internal Link Dist (ft)		1352			1948			728			1116	
Turn Bay Length (ft)	330		330	145		150			25			25
Base Capacity (vph)	690	2749	1235	581	1447	1235		638	682		594	595
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.04	0.24	0.01	0.12	0.32	0.01		0.17	0.27		0.07	0.09

Intersection Summary
 Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 3: Anderson Rd & W Central Entrance 09/16/2021

Intersection Signal Delay: 11.9 Intersection LOS: B
 Intersection Capacity Utilization 61.1% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Anderson Rd & W Central Entrance



Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 4: Basswood Ave & W Central Entrance 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	863	4	17	561	81	12	15	19	226	26	36
Future Volume (vph)	33	863	4	17	561	81	12	15	19	226	26	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		150	165		150	50		50	50		50
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	0	1840	1599	0	1800	1599
Flt Permitted	0.333			0.152				0.860			0.729	
Satd. Flow (perm)	626	1881	1599	286	1881	1599	0	1618	1599	0	1371	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			73			70			70
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2028			786			670			530	
Travel Time (s)		46.1			17.9			15.2			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	863	4	17	561	81	0	27	19	0	252	36
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	10.0	55.0	55.0	10.0	55.0	55.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.7	4.7		4.7	4.7
Act Effct Green (s)	63.8	61.6	61.6	62.8	59.5	59.5		24.9	24.9		24.9	24.9
Actuated g/C Ratio	0.64	0.62	0.62	0.63	0.60	0.60		0.25	0.25		0.25	0.25
v/c Ratio	0.07	0.74	0.00	0.06	0.50	0.08		0.07	0.04		0.74	0.08
Control Delay	9.9	23.0	0.0	8.2	16.0	4.0		26.5	0.2		47.2	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	9.9	23.0	0.0	8.2	16.0	4.0		26.5	0.2		47.2	1.9
LOS	A	C	A	A	B	A		C	A		D	A
Approach Delay		22.4			14.3			15.6			41.6	
Approach LOS		C			B			B			D	
Queue Length 50th (ft)	8	347	0	4	223	2		13	0		146	0
Queue Length 95th (ft)	26	#768	m0	13	351	26		32	0		223	7
Internal Link Dist (ft)		1948			706			590			450	
Turn Bay Length (ft)	160		150	165		150			50			50
Base Capacity (vph)	464	1159	1012	262	1118	980		490	533		415	533
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.07	0.74	0.00	0.06	0.50	0.08		0.06	0.04		0.61	0.07

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green

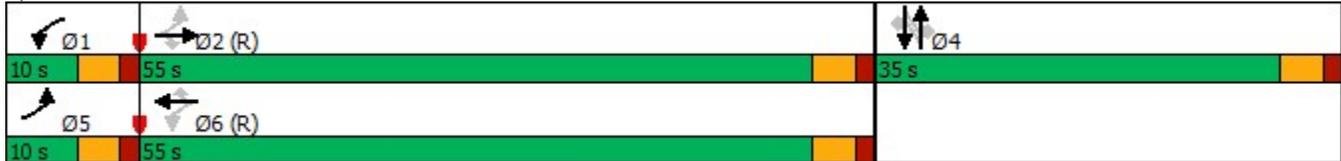
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.74

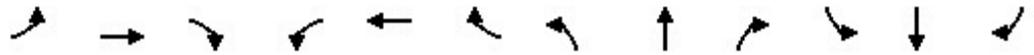
Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 4: Basswood Ave & W Central Entrance 09/16/2021

Intersection Signal Delay: 22.3 Intersection LOS: C
 Intersection Capacity Utilization 76.9% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Basswood Ave & W Central Entrance



Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 5: Arlington Ave & W Central Entrance/E Central Entrance 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	857	37	132	503	38	61	364	100	87	253	91
Future Volume (vph)	79	857	37	132	503	38	61	364	100	87	253	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	180		150	400		0	395		190
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	1821	0	1787	1881	1599
Flt Permitted	0.327			0.081			0.439			0.144		
Satd. Flow (perm)	615	1881	1599	152	1881	1599	826	1821	0	271	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			118			118		13				118
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			3313			1069				1106
Travel Time (s)		17.9			75.3			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	857	37	132	503	38	61	464	0	87	253	91
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	10.0	52.3	52.3	10.0	52.3	52.3	10.4	31.7		11.0	32.3	32.3
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	54.4	49.0	49.0	55.7	51.5	51.5	31.3	27.3		32.6	27.8	27.8
Actuated g/C Ratio	0.52	0.47	0.47	0.53	0.49	0.49	0.30	0.26		0.31	0.26	0.26
v/c Ratio	0.21	0.98	0.05	0.77	0.55	0.05	0.21	0.96		0.50	0.51	0.18
Control Delay	12.6	54.4	0.1	47.6	22.9	0.1	24.5	71.1		33.4	37.2	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.6	54.4	0.1	47.6	22.9	0.1	24.5	71.1		33.4	37.2	3.8
LOS	B	D	A	D	C	A	C	E		C	D	A
Approach Delay		48.9			26.4			65.7				29.4
Approach LOS		D			C			E				C
Queue Length 50th (ft)	24	~568	0	41	245	0	27	302		39	145	0
Queue Length 95th (ft)	47	#840	0	#147	352	0	56	#509		74	225	24
Internal Link Dist (ft)		706			3233			989				1026
Turn Bay Length (ft)	150		150	180		150	400			395		190
Base Capacity (vph)	379	877	809	171	922	844	295	482		173	497	509
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.21	0.98	0.05	0.77	0.55	0.05	0.21	0.96		0.50	0.51	0.18

Intersection Summary

Area Type: Other
 Cycle Length: 105
 Actuated Cycle Length: 105
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.98

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 5: Arlington Ave & W Central Entrance/E Central Entrance 09/16/2021

Intersection Signal Delay: 43.2 Intersection LOS: D
 Intersection Capacity Utilization 98.2% ICU Level of Service F

- Analysis Period (min) 15
- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 - # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 5: Arlington Ave & W Central Entrance/E Central Entrance

↙ Ø1	↘ Ø2 (R)	↙ Ø3	↘ Ø4
10 s	52.3 s	10.4 s	32.3 s
↙ Ø5	↘ Ø6 (R)	↙ Ø7	↘ Ø8
10 s	52.3 s	11 s	31.7 s

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 6: Central High Dr/Pecan Ave & E Central Entrance 09/16/2021



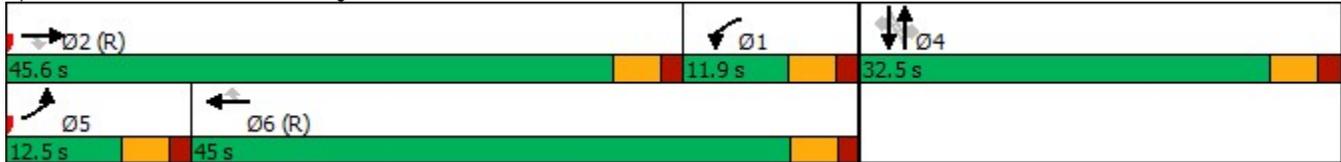
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	996	4	1	606	42	1	6	1	85	0	101
Future Volume (vph)	60	996	4	1	606	42	1	6	1	85	0	101
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	3574	1599	0	1868	1599	0	1787	1599
Flt Permitted	0.950			0.950				0.967			0.753	
Satd. Flow (perm)	1787	1881	1599	1787	3574	1599	0	1819	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			81			80			136			136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		643			1196			1026				1617
Travel Time (s)		14.6			27.2			23.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	996	4	1	606	42	0	7	1	0	85	101
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	12.5	45.6	45.6	11.9	45.0	45.0	32.5	32.5	32.5	32.5	32.5	32.5
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	8.7	66.1	66.1	7.0	57.5	57.5		11.9	11.9		11.9	11.9
Actuated g/C Ratio	0.10	0.73	0.73	0.08	0.64	0.64		0.13	0.13		0.13	0.13
v/c Ratio	0.35	0.72	0.00	0.01	0.27	0.04		0.03	0.00		0.45	0.31
Control Delay	43.1	13.4	0.0	38.0	8.9	0.8		31.6	0.0		42.8	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	43.1	13.4	0.0	38.0	8.9	0.8		31.6	0.0		42.8	5.2
LOS	D	B	A	D	A	A		C	A		D	A
Approach Delay		15.0			8.4			27.6			22.4	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	33	226	0	1	75	0		4	0		45	0
Queue Length 95th (ft)	69	#784	0	5	133	5		15	0		85	23
Internal Link Dist (ft)		563			1116			946			1537	
Turn Bay Length (ft)	330		380	415		315			75			
Base Capacity (vph)	178	1382	1196	140	2281	1049		557	584		434	584
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.34	0.72	0.00	0.01	0.27	0.04		0.01	0.00		0.20	0.17

Intersection Summary
 Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.72

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 6: Central High Dr/Pecan Ave & E Central Entrance 09/16/2021

Intersection Signal Delay: 13.5 Intersection LOS: B
 Intersection Capacity Utilization 76.2% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 6: Central High Dr/Pecan Ave & E Central Entrance



Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 7: Mesaba Ave & E Central Entrance/Central Entrance Dr 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Future Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3417	0	1626	3420	1599	1787	3574	1599
Flt Permitted	0.241			0.169			0.950	0.999		0.950		
Satd. Flow (perm)	453	3574	1599	318	3417	0	1626	3420	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			512		46				114			117
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1578			1071			1862				367
Travel Time (s)		35.9			24.3			42.3				6.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	105	600	515	131	583	0	158	754	17	210	648	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	12.0	27.0	27.0	13.0	28.0		38.0	38.0	38.0	42.0	42.0	42.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	35.1	26.2	26.2	38.7	28.0		31.8	31.8	31.8	30.3	30.3	30.3
Actuated g/C Ratio	0.29	0.22	0.22	0.32	0.23		0.26	0.26	0.26	0.25	0.25	0.25
v/c Ratio	0.46	0.77	0.69	0.57	0.70		0.37	0.83	0.03	0.46	0.72	0.13
Control Delay	37.1	52.7	9.2	41.5	45.2		38.7	50.8	0.1	40.5	45.2	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	52.7	9.2	41.5	45.2		38.7	50.8	0.1	40.5	45.2	0.5
LOS	D	D	A	D	D		D	D	A	D	D	A
Approach Delay		33.0			44.6			47.8				41.2
Approach LOS		C			D			D				D
Queue Length 50th (ft)	57	241	2	72	208		108	302	0	138	241	0
Queue Length 95th (ft)	108	#350	110	#144	#305		179	381	0	199	286	2
Internal Link Dist (ft)		1498			991			1782				287
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	228	781	749	229	832		436	917	512	545	1090	569
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.77	0.69	0.57	0.70		0.36	0.82	0.03	0.39	0.59	0.11

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 3 (3%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83

Central Entrance Corridor Studt Future Year Build Concept 1 Sensitivity Analysis - AM Peak
 7: Mesaba Ave & E Central Entrance/Central Entrance Dr 09/16/2021

Intersection Signal Delay: 40.8 Intersection LOS: D
 Intersection Capacity Utilization 79.9% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 7: Mesaba Ave & E Central Entrance/Central Entrance Dr

 Ø1 38 s	 Ø2 42 s	 Ø3 12 s	 Ø4 (R) 28 s
		 Ø7 13 s	 Ø8 (R) 27 s

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 1: Trinity Rd & Miller Hill Rd/W Central Entrance 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Future Volume (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			403			217			211			215
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3		8
Permitted Phases			6			2			4			8
Total Split (s)	13.1	34.7	34.7	12.8	34.4	34.4	14.0	36.7	36.7	15.8	38.5	38.5
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	7.3	41.6	41.6	10.1	44.1	44.1	16.6	19.7	19.7	8.8	9.3	9.3
Actuated g/C Ratio	0.07	0.42	0.42	0.10	0.44	0.44	0.17	0.20	0.20	0.09	0.09	0.09
v/c Ratio	0.55	0.50	0.45	0.47	0.57	0.07	0.52	0.30	0.08	0.42	0.41	0.32
Control Delay	53.3	23.7	4.0	41.5	40.0	4.1	41.7	36.7	0.3	51.2	46.2	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.3	23.7	4.0	41.5	40.0	4.1	41.7	36.7	0.3	51.2	46.2	2.5
LOS	D	C	A	D	D	A	D	D	A	D	D	A
Approach Delay		20.7			38.3			37.0				31.7
Approach LOS		C			D			D				C
Queue Length 50th (ft)	44	176	0	55	319	0	92	63	0	40	43	0
Queue Length 95th (ft)	76	258	61	m82	385	m11	133	95	0	82	72	0
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	253	1486	900	350	1576	826	576	1104	639	182	1179	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.50	0.45	0.47	0.57	0.07	0.52	0.19	0.06	0.36	0.12	0.17

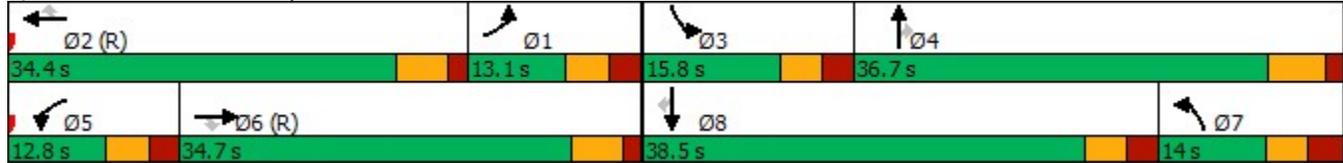
Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.57

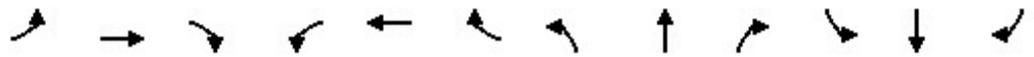
Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 1: Trinity Rd & Miller Hill Rd/W Central Entrance 09/16/2021

Intersection Signal Delay: 30.5 Intersection LOS: C
 Intersection Capacity Utilization 63.7% ICU Level of Service B
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Trinity Rd & Miller Hill Rd/W Central Entrance



Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 2: Mall Dr & W Central Entrance 09/16/2021



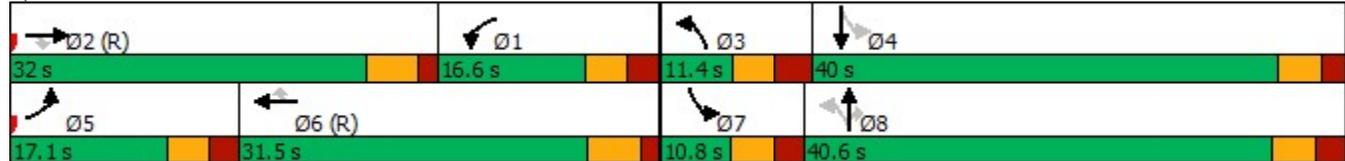
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	657	53	126	912	164	48	72	100	235	76	111
Future Volume (vph)	201	657	53	126	912	164	48	72	100	235	76	111
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1714	0
Flt Permitted	0.950			0.950			0.519			0.692		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	976	1881	1599	1302	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			149			164			206			81
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1415			891				373
Travel Time (s)		25.0			24.1			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	657	53	126	912	164	48	72	100	235	187	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	17.1	32.0	32.0	16.6	31.5	31.5	11.4	40.6	40.6	10.8	40.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	17.9	43.7	43.7	11.0	37.0	37.0	22.9	17.9	17.9	23.9	19.9	
Actuated g/C Ratio	0.18	0.44	0.44	0.11	0.37	0.37	0.23	0.18	0.18	0.24	0.20	
v/c Ratio	0.63	0.42	0.07	0.64	0.69	0.24	0.18	0.21	0.22	0.70	0.46	
Control Delay	55.9	42.8	9.2	51.8	30.7	6.3	24.8	33.4	1.1	42.6	22.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.9	42.8	9.2	51.8	30.7	6.3	24.8	33.4	1.1	42.6	22.5	
LOS	E	D	A	D	C	A	C	C	A	D	C	
Approach Delay		43.8			29.6			16.8				33.7
Approach LOS		D			C			B				C
Queue Length 50th (ft)	137	215	3	75	222	9	22	39	0	122	60	
Queue Length 95th (ft)	212	293	m27	m90	m#410	m16	42	69	0	164	111	
Internal Link Dist (ft)		1388			1335			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	319	1563	783	196	1323	695	434	658	693	529	649	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.42	0.07	0.64	0.69	0.24	0.11	0.11	0.14	0.44	0.29	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70

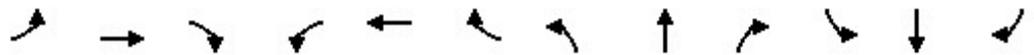
Intersection Signal Delay: 33.9 Intersection LOS: C
 Intersection Capacity Utilization 73.2% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Mall Dr & W Central Entrance



Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 3: Anderson Rd & W Central Entrance

09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	978	29	134	1375	4	20	24	72	12	36	32
Future Volume (vph)	37	978	29	134	1375	4	20	24	72	12	36	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		330	145		150	0		25	0		25
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	1881	1599	0	1840	1599	0	1859	1599
Flt Permitted	0.077			0.285				0.831			0.904	
Satd. Flow (perm)	145	3574	1599	536	1881	1599	0	1563	1599	0	1701	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			29			21			72			32
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1415			2043			824			1148	
Travel Time (s)		32.2			46.4			18.7			26.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	978	29	134	1375	4	0	44	72	0	48	32
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6			4				4
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	65.0	65.0	65.0	65.0	65.0	65.0	35.0	35.0	35.0	35.0	35.0	35.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	84.3	84.3	84.3	84.3	84.3	84.3		9.4	9.4		9.4	9.4
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.84	0.84		0.09	0.09		0.09	0.09
v/c Ratio	0.30	0.32	0.02	0.30	0.87	0.00		0.30	0.33		0.30	0.18
Control Delay	9.9	0.6	0.0	7.0	18.3	1.0		46.7	14.4		46.2	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	9.9	0.6	0.0	7.0	18.3	1.0		46.7	14.4		46.2	16.4
LOS	A	A	A	A	B	A		D	B		D	B
Approach Delay		0.9			17.3			26.6			34.3	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	1	6	0	28	580	0		27	0		29	0
Queue Length 95th (ft)	m17	10	m1	m49	m669	m0		59	40		62	27
Internal Link Dist (ft)		1335			1963			744			1068	
Turn Bay Length (ft)	330		330	145		150			25			25
Base Capacity (vph)	122	3012	1352	452	1585	1351		470	531		512	503
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.30	0.32	0.02	0.30	0.87	0.00		0.09	0.14		0.09	0.06

Intersection Summary

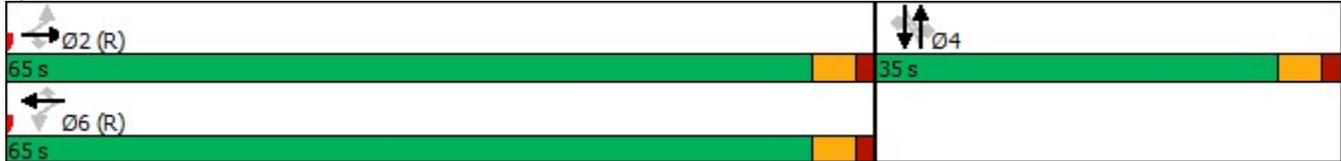
Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.87

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 3: Anderson Rd & W Central Entrance

09/16/2021

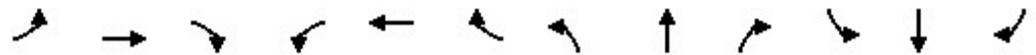
Intersection Signal Delay: 11.9 Intersection LOS: B
 Intersection Capacity Utilization 106.0% ICU Level of Service G
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Anderson Rd & W Central Entrance



Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 4: Basswood Ave & W Central Entrance

09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	973	16	21	1334	110	27	46	23	103	41	56
Future Volume (vph)	29	973	16	21	1334	110	27	46	23	103	41	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		150	165		150	50		50	50		50
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	0	1847	1599	0	1815	1599
Flt Permitted	0.061			0.142				0.859			0.742	
Satd. Flow (perm)	115	1881	1599	267	1881	1599	0	1616	1599	0	1396	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			70			70			70			70
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2043			786			670			530	
Travel Time (s)		46.4			17.9			15.2			12.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	973	16	21	1334	110	0	73	23	0	144	56
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4			4	
Permitted Phases	2		2	6		6	4		4	4		4
Total Split (s)	10.0	53.7	53.7	10.0	53.7	53.7	36.3	36.3	36.3	36.3	36.3	36.3
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.7	4.7		4.7	4.7
Act Effct Green (s)	70.8	68.2	68.2	69.7	66.0	66.0		18.0	18.0		18.0	18.0
Actuated g/C Ratio	0.71	0.68	0.68	0.70	0.66	0.66		0.18	0.18		0.18	0.18
v/c Ratio	0.16	0.76	0.01	0.08	1.07	0.10		0.25	0.07		0.58	0.16
Control Delay	7.3	25.3	2.1	7.0	56.9	5.5		35.3	0.4		45.6	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	7.3	25.3	2.1	7.0	56.9	5.5		35.3	0.4		45.6	6.5
LOS	A	C	A	A	E	A		D	A		D	A
Approach Delay		24.4			52.4			26.9			34.7	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	7	481	0	4	~966	6		41	0		86	0
Queue Length 95th (ft)	16	#877	m7	m5	m#805	m5		73	0		134	23
Internal Link Dist (ft)		1963			706			590			450	
Turn Bay Length (ft)	160		150	165		150			50			50
Base Capacity (vph)	181	1283	1113	276	1241	1079		510	553		441	553
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.16	0.76	0.01	0.08	1.07	0.10		0.14	0.04		0.33	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.07

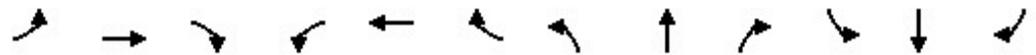
Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 4: Basswood Ave & W Central Entrance 09/16/2021

Intersection Signal Delay: 40.0 Intersection LOS: D
 Intersection Capacity Utilization 93.6% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Basswood Ave & W Central Entrance

↙ Ø1	↘ Ø2 (R)	↕ Ø4
10 s	53.7 s	36.3 s
↙ Ø5	↘ Ø6 (R)	
10 s	53.7 s	

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 5: Arlington Ave & W Central Entrance/E Central Entrance 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	157	840	37	119	1113	68	165	221	108	87	352	162
Future Volume (vph)	157	840	37	119	1113	68	165	221	108	87	352	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	180		150	400		0	395		190
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1599	1787	1881	1599	1787	1789	0	1787	1881	1599
Flt Permitted	0.091			0.093			0.245			0.306		
Satd. Flow (perm)	171	1881	1599	175	1881	1599	461	1789	0	576	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			124			124		24				153
Link Speed (mph)		30			30			30				30
Link Distance (ft)		786			3265			1069				1106
Travel Time (s)		17.9			74.2			24.3				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	840	37	119	1113	68	165	329	0	87	352	162
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		4
Total Split (s)	10.0	47.3	47.3	10.0	47.3	47.3	10.4	31.7		11.0	32.3	32.3
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7	5.0	4.7		4.8	4.7	4.7
Act Effct Green (s)	52.7	45.1	45.1	50.4	43.9	43.9	29.6	25.5		30.0	23.9	23.9
Actuated g/C Ratio	0.53	0.45	0.45	0.50	0.44	0.44	0.30	0.26		0.30	0.24	0.24
v/c Ratio	0.74	0.99	0.05	0.62	1.35	0.09	0.80	0.69		0.35	0.78	0.32
Control Delay	44.0	52.3	0.4	29.4	191.5	0.6	54.1	39.8		25.6	48.0	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	44.0	52.3	0.4	29.4	191.5	0.6	54.1	39.8		25.6	48.0	7.4
LOS	D	D	A	C	F	A	D	D		C	D	A
Approach Delay		49.2			166.7			44.5				33.8
Approach LOS		D			F			D				C
Queue Length 50th (ft)	55	~611	0	35	~950	0	74	178		37	206	4
Queue Length 95th (ft)	m#126	#805	m0	#108	#1197	4	#153	270		69	300	52
Internal Link Dist (ft)		706			3185			989			1026	
Turn Bay Length (ft)	150		150	180		150	400			395		190
Base Capacity (vph)	213	847	788	193	826	771	214	501		269	519	552
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.74	0.99	0.05	0.62	1.35	0.09	0.77	0.66		0.32	0.68	0.29

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.35

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 5: Arlington Ave & W Central Entrance/E Central Entrance 09/16/2021

Intersection Signal Delay: 90.4 Intersection LOS: F
 Intersection Capacity Utilization 110.9% ICU Level of Service H

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Arlington Ave & W Central Entrance/E Central Entrance

↙ Ø1	↘ Ø2 (R)	↙ Ø3	↓ Ø4
10 s	47.3 s	10.4 s	32.3 s
↗ Ø5	← Ø6 (R)	↘ Ø7	↑ Ø8
10 s	47.3 s	11 s	31.7 s

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 6: Central High Dr/Pecan Ave & E Central Entrance 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	900	0	4	1233	51	1	6	1	73	0	85
Future Volume (vph)	60	900	0	4	1233	51	1	6	1	73	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330		380	415		315	0		75	0		0
Storage Lanes	1		1	1		1	0		1	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	1881	1881	1787	3574	1599	0	1868	1599	0	1787	1599
Flt Permitted	0.950			0.950				0.962			0.753	
Satd. Flow (perm)	1787	1881	1881	1787	3574	1599	0	1810	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						80			136			136
Link Speed (mph)		30			30			30				30
Link Distance (ft)		688			1168			847				1617
Travel Time (s)		15.6			26.5			19.3				36.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	900	0	4	1233	51	0	7	1	0	73	85
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			4				4
Permitted Phases			2			6	4		4	4		4
Total Split (s)	12.5	45.6	45.6	12.5	45.6	45.6	31.9	31.9	31.9	31.9	31.9	31.9
Total Lost Time (s)	4.7	4.7	4.7	4.8	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	7.6	70.4		7.0	62.7	62.7		11.0	11.0		11.0	11.0
Actuated g/C Ratio	0.08	0.78		0.08	0.70	0.70		0.12	0.12		0.12	0.12
v/c Ratio	0.40	0.61		0.03	0.50	0.04		0.03	0.00		0.42	0.27
Control Delay	47.2	9.6		39.0	9.7	0.9		32.9	0.0		43.1	3.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	47.2	9.6		39.0	9.7	0.9		32.9	0.0		43.1	3.9
LOS	D	A		D	A	A		C	A		D	A
Approach Delay		12.0			9.4			28.7			22.0	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	33	175		2	185	0		4	0		39	0
Queue Length 95th (ft)	72	553		13	275	7		16	0		78	13
Internal Link Dist (ft)		608			1088			767			1537	
Turn Bay Length (ft)	330			415		315			75			
Base Capacity (vph)	154	1470		152	2490	1138		543	574		425	574
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	0.39	0.61		0.03	0.50	0.04		0.01	0.00		0.17	0.15

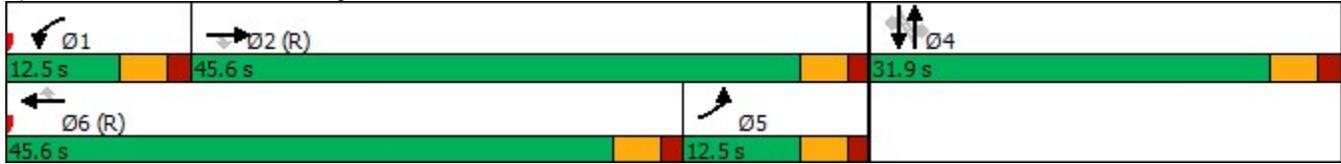
Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 6: Central High Dr/Pecan Ave & E Central Entrance 09/16/2021

Intersection Signal Delay: 11.3	Intersection LOS: B
Intersection Capacity Utilization 71.1%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Central High Dr/Pecan Ave & E Central Entrance



Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 7: Mesaba Ave & E Central Entrance/Central Entrance Dr 09/16/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	181	547	342	69	564	174	494	707	8	120	551	113
Future Volume (vph)	181	547	342	69	564	174	494	707	8	120	551	113
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3449	0	1626	3403	1599	1787	3574	1599
Flt Permitted	0.133			0.329			0.950	0.994		0.950		
Satd. Flow (perm)	250	3574	1599	619	3449	0	1626	3403	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			342		30				107			113
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1591			2779			1889				389
Travel Time (s)		36.2			63.2			42.9				6.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							21%					
Lane Group Flow (vph)	181	547	342	69	738	0	390	811	8	120	551	113
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	14.0	40.0	40.0	13.0	39.0		47.0	47.0	47.0	30.0	30.0	30.0
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	46.5	38.9	38.9	42.5	34.4		40.5	40.5	40.5	23.9	23.9	23.9
Actuated g/C Ratio	0.36	0.30	0.30	0.33	0.26		0.31	0.31	0.31	0.18	0.18	0.18
v/c Ratio	0.88	0.51	0.48	0.25	0.79		0.77	0.77	0.01	0.37	0.84	0.29
Control Delay	69.5	41.1	6.2	29.5	49.9		51.9	45.9	0.0	49.8	63.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	41.1	6.2	29.5	49.9		51.9	45.9	0.0	49.8	63.5	9.9
LOS	E	D	A	C	D		D	D	A	D	E	A
Approach Delay		34.7			48.2			47.6				53.7
Approach LOS		C			D			D				D
Queue Length 50th (ft)	106	210	0	38	296		324	336	0	89	236	0
Queue Length 95th (ft)	#238	270	75	72	373		462	417	0	150	#306	52
Internal Link Dist (ft)		1511			2699			1809				309
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	206	1068	717	274	934		515	1078	579	338	676	394
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.51	0.48	0.25	0.79		0.76	0.75	0.01	0.36	0.82	0.29

Intersection Summary

Area Type: Other

Cycle Length: 130

Actuated Cycle Length: 130

Offset: 42 (32%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green

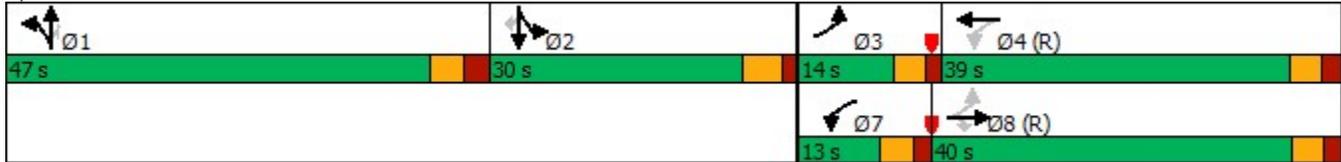
Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.88

Central Entrance Corridor Study Future Year Build Concept 1 Sensitivity Analysis - PM Peak
 7: Mesaba Ave & E Central Entrance/Central Entrance Dr 09/16/2021

Intersection Signal Delay: 45.4 Intersection LOS: D
 Intersection Capacity Utilization 86.8% ICU Level of Service E
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 7: Mesaba Ave & E Central Entrance/Central Entrance Dr



Signalized Intersection Level of Service

5. 2045 Build Concept #2 (One-way pair) a.m. and p.m. peak hour LOS Synchro Results

Central Entrance Corridor Study
1: Trinity Rd & Miller Hill Rd / 194/Central Entrance

Future Year Build Option 2 - AM Peak

09/28/2021



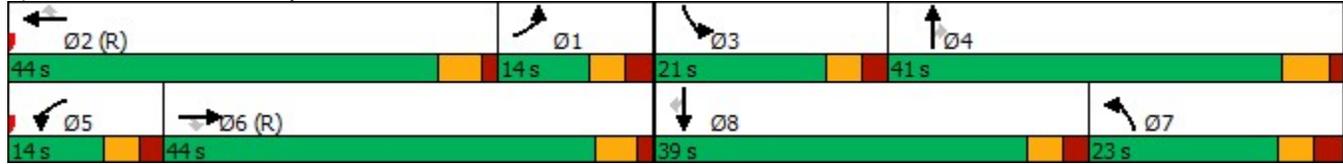
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Future Volume (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			180			181			175			179
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	13	655	180	47	317	21	231	96	59	87	116	17
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases			6			2			4			8
Total Split (s)	14.0	44.0	44.0	14.0	44.0	44.0	23.0	41.0	41.0	21.0	39.0	39.0
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	7.5	70.0	70.0	7.5	74.9	74.9	13.3	11.5	11.5	11.2	9.3	9.3
Actuated g/C Ratio	0.06	0.58	0.58	0.06	0.62	0.62	0.11	0.10	0.10	0.09	0.08	0.08
v/c Ratio	0.06	0.31	0.18	0.22	0.14	0.02	0.60	0.28	0.19	0.52	0.42	0.06
Control Delay	43.8	8.7	0.7	46.3	14.3	1.2	53.6	48.2	3.6	62.5	57.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	8.7	0.7	46.3	14.3	1.2	53.6	48.2	3.6	62.5	57.0	0.4
LOS	D	A	A	D	B	A	D	D	A	E	E	A
Approach Delay		7.6			17.5			44.6			54.8	
Approach LOS		A			B			D			D	
Queue Length 50th (ft)	5	56	0	18	81	0	90	37	1	65	45	0
Queue Length 95th (ft)	16	57	8	38	127	4	95	48	1	115	75	0
Internal Link Dist (ft)		841			1388			915			1127	
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	236	2085	1007	246	2230	1066	491	1048	592	229	997	575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.31	0.18	0.19	0.14	0.02	0.47	0.09	0.10	0.38	0.12	0.03

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 93 (78%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.60

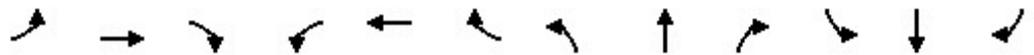
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 43.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Trinity Rd & Miller Hill Rd / 194/Central Entrance



Central Entrance Corridor Study
2: Mall Dr & Central Entrance

Future Year Build Option 2 - AM Peak
09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	75	665	12	63	374	55	8	24	28	80	12	40
Future Volume (vph)	75	665	12	63	374	55	8	24	28	80	12	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1665	0
Flt Permitted	0.950			0.950			0.723			0.582		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	1360	1881	1599	1095	1665	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			125			123			172			40
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1432			891				373
Travel Time (s)		25.0			24.4			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	75	665	12	63	374	55	8	24	28	80	52	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	23.0	51.0	51.0	21.0	49.0	49.0	14.0	36.0	36.0	12.0	34.0	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	10.5	77.5	77.5	13.7	80.9	80.9	14.0	8.7	8.7	17.0	16.0	
Actuated g/C Ratio	0.09	0.65	0.65	0.11	0.67	0.67	0.12	0.07	0.07	0.14	0.13	
v/c Ratio	0.48	0.29	0.01	0.31	0.16	0.05	0.04	0.18	0.10	0.42	0.20	
Control Delay	49.5	6.2	0.0	52.0	10.4	0.1	40.8	54.2	0.8	50.3	21.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	49.5	6.2	0.0	52.0	10.4	0.1	40.8	54.2	0.8	50.3	21.4	
LOS	D	A	A	D	B	A	D	D	A	D	C	
Approach Delay		10.4			14.6			27.5				38.9
Approach LOS		B			B			C				D
Queue Length 50th (ft)	54	153	0	45	62	0	5	18	0	55	8	
Queue Length 95th (ft)	81	175	m0	90	103	0	19	44	0	98	48	
Internal Link Dist (ft)		1388			1352			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	262	2309	1077	229	2409	1118	441	476	533	309	430	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.29	0.01	0.28	0.16	0.05	0.02	0.05	0.05	0.26	0.12	

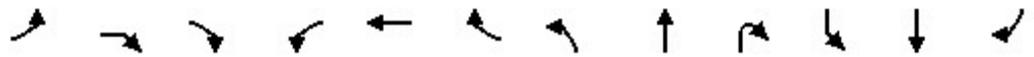
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 18 (15%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.48

Central Entrance Corridor Study
3: Anderson Rd & Central Entrance

Future Year Build Option 2 - AM Peak

09/28/2021



Lane Group	EBL	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	647	8	71	461	8	12	96	187	12	28	53
Future Volume (vph)	29	647	8	71	461	8	12	96	187	12	28	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330	330		145		150	0			0		25
Storage Lanes	1	0		1		1	0			0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	2814	1599	1787	3574	1599	0	1870	1599	0	1853	1599
Flt Permitted	0.487			0.950				0.967			0.901	
Satd. Flow (perm)	916	2814	1599	1787	3574	1599	0	1819	1599	0	1695	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			30			183			53
Link Speed (mph)					30			30			30	
Link Distance (ft)					2020			808			1196	
Travel Time (s)					45.9			18.4			27.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	647	8	71	461	8	0	108	187	0	40	53
Turn Type	Perm	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases					6			4				4
Permitted Phases	2	2	2	6		6	4		4	4		4
Total Split (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	48.7	48.7	48.7	48.7	48.7	48.7		11.7	11.7		11.7	11.7
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.70	0.70		0.17	0.17		0.17	0.17
v/c Ratio	0.05	0.33	0.01	0.06	0.19	0.01		0.36	0.45		0.14	0.17
Control Delay	4.8	5.4	0.4	3.3	2.9	0.5		27.7	7.9		23.9	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	4.8	5.4	0.4	3.3	2.9	0.5		27.7	7.9		23.9	8.4
LOS	A	A	A	A	A	A		C	A		C	A
Approach Delay					3.0			15.2			15.1	
Approach LOS					A			B			B	
Queue Length 50th (ft)	3	49	0	4	13	0		42	1		15	0
Queue Length 95th (ft)	14	102	1	17	37	m0		76	46		36	24
Internal Link Dist (ft)					1940			728			1116	
Turn Bay Length (ft)	330	330	330	145		150			25			25
Base Capacity (vph)	637	1957	1121	1243	2486	1121		704	731		656	651
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.05	0.33	0.01	0.06	0.19	0.01		0.15	0.26		0.06	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 35 (50%), Referenced to phase 2:EBL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45

Intersection Signal Delay: 6.9	Intersection LOS: A
Intersection Capacity Utilization 59.4%	ICU Level of Service B
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

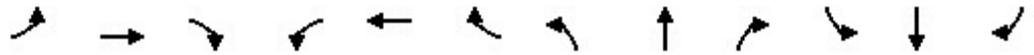
Splits and Phases: 3: Anderson Rd & Central Entrance



Central Entrance Corridor Study
4: Basswood Ave & Central Entrance

Future Year Build Option 2 - AM Peak

09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	17	572	93	12	58	0	0	252	39
Future Volume (vph)	0	0	0	17	572	93	12	58	0	0	252	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		150	165		150	50		50	50		50
Storage Lanes	0		0	1		1	0		0	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	0	0	1787	3574	1599	0	1866	0	0	1881	1599
Flt Permitted				0.950				0.933				
Satd. Flow (perm)	0	0	0	1787	3574	1599	0	1755	0	0	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						93						39
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2020			792			343				530
Travel Time (s)		45.9			18.0			7.8				12.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	17	572	93	0	70	0	0	252	39
Turn Type				pm+pt	NA	Perm	Perm	NA			NA	Perm
Protected Phases				1	6			4			4	
Permitted Phases				6		6	4					4
Total Split (s)				33.0	33.0	33.0	37.0	37.0			37.0	37.0
Total Lost Time (s)				4.7	4.7	4.7		4.7			4.7	4.7
Act Effct Green (s)				43.0	43.0	43.0		17.6			17.6	17.6
Actuated g/C Ratio				0.61	0.61	0.61		0.25			0.25	0.25
v/c Ratio				0.02	0.26	0.09		0.16			0.53	0.09
Control Delay				3.8	3.5	0.4		20.1			25.8	6.5
Queue Delay				0.0	0.0	0.0		0.0			0.0	0.0
Total Delay				3.8	3.5	0.4		20.1			25.8	6.5
LOS				A	A	A		C			C	A
Approach Delay					3.1			20.1			23.2	
Approach LOS					A			C			C	
Queue Length 50th (ft)				1	19	0		27			94	0
Queue Length 95th (ft)				m5	43	1		57			136	18
Internal Link Dist (ft)		1940			712			263			450	
Turn Bay Length (ft)				165		150						50
Base Capacity (vph)				1096	2193	1017		809			867	758
Starvation Cap Reductn				0	0	0		0			0	0
Spillback Cap Reductn				0	0	0		0			0	0
Storage Cap Reductn				0	0	0		0			0	0
Reduced v/c Ratio				0.02	0.26	0.09		0.09			0.29	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 1 (1%), Referenced to phase 2: and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.53

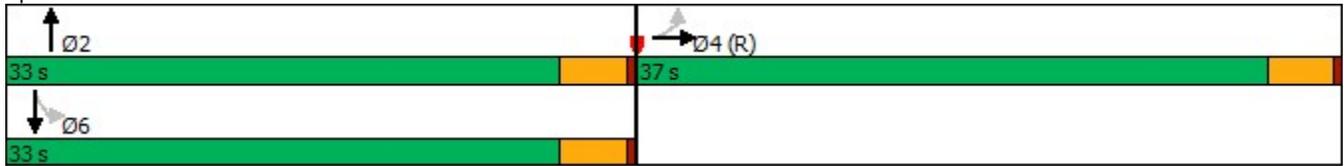


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↔			↕	
Traffic Volume (vph)	45	870	5	0	0	0	0	6	20	243	8	0
Future Volume (vph)	45	870	5	0	0	0	0	6	20	243	8	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3564	0	0	0	0	0	1686	0	0	1795	0
Flt Permitted		0.998									0.714	
Satd. Flow (perm)	0	3564	0	0	0	0	0	1686	0	0	1343	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1						20				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1451			780			318			343	
Travel Time (s)		33.0			17.7			7.2			7.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	920	0	0	0	0	0	26	0	0	251	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Total Split (s)	37.0	37.0						33.0		33.0	33.0	
Total Lost Time (s)		4.0						4.0			4.0	
Act Effct Green (s)		43.5						18.5			18.5	
Actuated g/C Ratio		0.62						0.26			0.26	
v/c Ratio		0.42						0.06			0.71	
Control Delay		6.2						8.8			16.1	
Queue Delay		0.0						0.0			0.0	
Total Delay		6.2						8.8			16.1	
LOS		A						A			B	
Approach Delay		6.2						8.8			16.1	
Approach LOS		A						A			B	
Queue Length 50th (ft)		62						2			13	
Queue Length 95th (ft)		102						16			25	
Internal Link Dist (ft)		1371			700			238			263	
Turn Bay Length (ft)												
Base Capacity (vph)		2216						710			556	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.42						0.04			0.45	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	0 (0%), Referenced to phase 4:EBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.71
Intersection Signal Delay:	8.3
Intersection LOS:	A
Intersection Capacity Utilization:	52.7%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 5: Basswood Ave & Palm St



Central Entrance Corridor Study
6: Arlington Ave & Central Entrance

Future Year Build Option 2 - AM Peak
09/28/2021

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	147	504	61	76	443	0	0	340	98
Future Volume (vph)	0	0	0	147	504	61	76	443	0	0	340	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	180		150	150		0	395		190
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	0	0	1787	3574	1599	1787	1881	0	0	1881	1599
Flt Permitted				0.950			0.287					
Satd. Flow (perm)	0	0	0	1787	3574	1599	540	1881	0	0	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						104						104
Link Speed (mph)		30			30			30				30
Link Distance (ft)		792			2637			336				1106
Travel Time (s)		18.0			59.9			7.6				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	147	504	61	76	443	0	0	340	98
Turn Type				pm+pt	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8				4
Permitted Phases				6		6	8					4
Total Split (s)				28.0	28.0	28.0	10.3	42.0			31.7	31.7
Total Lost Time (s)				4.7	4.7	4.7	5.0	4.7			4.7	4.7
Act Effct Green (s)				32.5	32.5	32.5	27.8	28.1			19.8	19.8
Actuated g/C Ratio				0.46	0.46	0.46	0.40	0.40			0.28	0.28
v/c Ratio				0.18	0.30	0.08	0.25	0.59			0.64	0.19
Control Delay				9.7	10.3	1.4	9.7	15.7			27.1	4.3
Queue Delay				0.0	0.0	0.0	0.0	0.2			0.0	0.0
Total Delay				9.7	10.3	1.4	9.7	15.9			27.1	4.3
LOS				A	B	A	A	B			C	A
Approach Delay					9.4			15.0			22.0	
Approach LOS					A			B			C	
Queue Length 50th (ft)				35	64	0	13	83			129	0
Queue Length 95th (ft)				27	38	1	m21	100			179	25
Internal Link Dist (ft)		712			2557			256			1026	
Turn Bay Length (ft)				180		150	150					190
Base Capacity (vph)				830	1661	798	379	1002			725	680
Starvation Cap Reductn				0	0	0	0	119			0	0
Spillback Cap Reductn				0	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.18	0.30	0.08	0.20	0.50			0.47	0.14

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 66 (94%), Referenced to phase 2: and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64

Central Entrance Corridor Study
7: Arlington Ave & Palm St

Future Year Build Option 2 - AM Peak

09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Volume (vph)	87	857	44	0	0	0	0	315	125	103	466	0
Future Volume (vph)	87	857	44	0	0	0	0	315	125	103	466	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	3535	0	0	0	0	0	1810	0	1787	1881	0
Flt Permitted		0.996								0.269		
Satd. Flow (perm)	0	3535	0	0	0	0	0	1810	0	506	1881	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9						37				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		780			1244			733			336	
Travel Time (s)		17.7			28.3			16.7			7.6	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	988	0	0	0	0	0	440	0	103	466	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Total Split (s)	35.0	35.0						35.0		35.0	35.0	
Total Lost Time (s)		4.0						4.0		4.0	4.0	
Act Effct Green (s)		38.5						23.5		23.5	23.5	
Actuated g/C Ratio		0.55						0.34		0.34	0.34	
v/c Ratio		0.51						0.70		0.61	0.74	
Control Delay		8.6						23.8		27.0	20.1	
Queue Delay		0.0						0.0		0.0	0.1	
Total Delay		8.6						23.8		27.0	20.2	
LOS		A						C		C	C	
Approach Delay		8.6						23.8			21.4	
Approach LOS		A						C			C	
Queue Length 50th (ft)		70						147		20	89	
Queue Length 95th (ft)		157						200		38	121	
Internal Link Dist (ft)		700			1164			653			256	
Turn Bay Length (ft)										50		
Base Capacity (vph)		1950						822		224	833	
Starvation Cap Reductn		0						0		0	33	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.51						0.54		0.46	0.58	

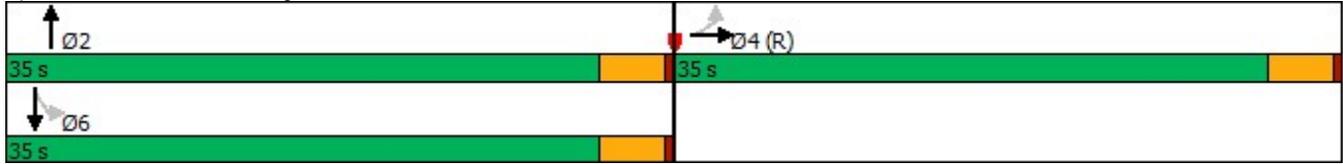
Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 68 (97%), Referenced to phase 4:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.74

Intersection Signal Delay: 15.6
Intersection Capacity Utilization 67.5%
Analysis Period (min) 15

Intersection LOS: B
ICU Level of Service C

Splits and Phases: 7: Arlington Ave & Palm St



Central Entrance Corridor Study
8: Central Entrance & Blackmon Ave

Future Year Build Option 2 - AM Peak

09/28/2021

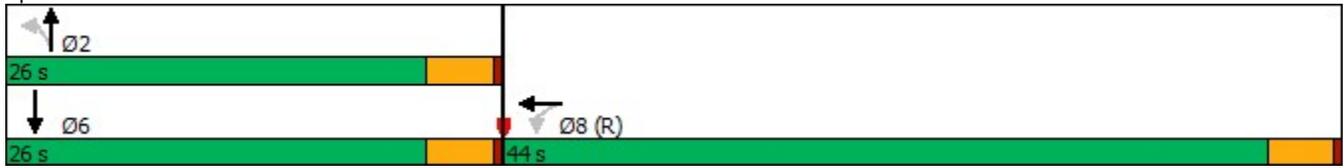


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Volume (vph)	0	0	0	11	673	14	7	25	0	0	7	68
Future Volume (vph)	0	0	0	11	673	14	7	25	0	0	7	68
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3560	0	0	1860	0	0	1652	0
Flt Permitted					0.999			0.912				
Satd. Flow (perm)	0	0	0	0	3560	0	0	1716	0	0	1652	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5							68
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2637			1332			227				521
Travel Time (s)		59.9			30.3			5.2				11.8
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	698	0	0	32	0	0	75	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2				6
Permitted Phases				8			2					
Total Split (s)				44.0	44.0		26.0	26.0				26.0
Total Lost Time (s)					4.0			4.0				4.0
Act Effct Green (s)					57.8			6.9				6.9
Actuated g/C Ratio					0.83			0.10				0.10
v/c Ratio					0.24			0.19				0.33
Control Delay					3.7			32.5				13.9
Queue Delay					0.0			0.0				0.0
Total Delay					3.7			32.5				13.9
LOS					A			C				B
Approach Delay					3.7			32.5				13.9
Approach LOS					A			C				B
Queue Length 50th (ft)					27			11				3
Queue Length 95th (ft)					137			35				37
Internal Link Dist (ft)		2557			1252			147				441
Turn Bay Length (ft)												
Base Capacity (vph)					2939			539				565
Starvation Cap Reductn					0			0				0
Spillback Cap Reductn					0			0				0
Storage Cap Reductn					0			0				0
Reduced v/c Ratio					0.24			0.06				0.13

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	18 (26%), Referenced to phase 8:WBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.33
Intersection Signal Delay:	5.8
Intersection LOS:	A
Intersection Capacity Utilization:	33.4%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 8: Central Entrance & Blackmon Ave





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕						↕			↕	
Traffic Volume (vph)	25	845	7	0	0	0	0	9	22	15	12	0
Future Volume (vph)	25	845	7	0	0	0	0	9	22	15	12	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3567	0	0	0	0	0	1701	0	0	1830	0
Flt Permitted		0.999									0.972	
Satd. Flow (perm)	0	3567	0	0	0	0	0	1701	0	0	1829	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2						22				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1425			605			542			227	
Travel Time (s)		32.4			13.8			12.3			5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	877	0	0	0	0	0	31	0	0	27	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Total Split (s)	47.0	47.0						23.0		23.0	23.0	
Total Lost Time (s)		4.0						4.0			4.0	
Act Effct Green (s)		63.6						6.5			6.7	
Actuated g/C Ratio		0.91						0.09			0.10	
v/c Ratio		0.27						0.17			0.16	
Control Delay		0.6						18.1			27.3	
Queue Delay		0.0						0.0			0.0	
Total Delay		0.6						18.1			27.3	
LOS		A						B			C	
Approach Delay		0.6						18.1			27.3	
Approach LOS		A						B			C	
Queue Length 50th (ft)		0						4			11	
Queue Length 95th (ft)		19						26			31	
Internal Link Dist (ft)		1345			525			462			147	
Turn Bay Length (ft)												
Base Capacity (vph)		3243						477			496	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.27						0.06			0.05	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	47 (67%), Referenced to phase 4:EBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.27
Intersection Signal Delay:	1.9
Intersection LOS:	A
Intersection Capacity Utilization:	39.1%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 9: Blackmon Ave & Palm St





Lane Group	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations		↔↔		↖	↗↗	↗		↖	↗		↖	↗
Traffic Volume (vph)	60	996	4	1	606	42	1	6	1	85	0	101
Future Volume (vph)	60	996	4	1	606	42	1	6	1	85	0	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	415	1000		0		100	0		
Storage Lanes	0		0	1	2		0		1	0		
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	3560	0	1787	2814	1599	0	1868	1599	0	1787	1599
Flt Permitted		0.997		0.248				0.960			0.753	
Satd. Flow (perm)	0	3560	0	467	2814	1599	0	1806	1599	0	1417	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				42			26			101
Link Speed (mph)		30						30			30	
Link Distance (ft)		827						1010			1617	
Travel Time (s)		18.8						23.0			36.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1060	0	1	606	42	0	7	1	0	85	101
Turn Type	custom	NA		Perm	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases								8				4
Permitted Phases	2	2		6	6	6	8		8	4		4
Total Split (s)	37.0	37.0		37.0	37.0	37.0	33.0	33.0	33.0	33.0	33.0	33.0
Total Lost Time (s)		4.0		4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)		53.5		52.9	52.9	52.9		8.7	8.7		10.8	10.8
Actuated g/C Ratio		0.76		0.76	0.76	0.76		0.12	0.12		0.15	0.15
v/c Ratio		0.39		0.00	0.28	0.03		0.03	0.00		0.39	0.30
Control Delay		3.6		4.0	4.4	1.6		24.9	0.0		30.8	8.3
Queue Delay		0.0		0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		3.6		4.0	4.4	1.6		24.9	0.0		30.8	8.3
LOS		A		A	A	A		C	A		C	A
Approach Delay		3.6						21.8			18.6	
Approach LOS		A						C			B	
Queue Length 50th (ft)		37		0	43	0		3	0		34	0
Queue Length 95th (ft)		136		2	85	9		12	0		67	35
Internal Link Dist (ft)		747						930			1537	
Turn Bay Length (ft)				415	1000	1000			100			
Base Capacity (vph)		2720		353	2127	1219		724	657		568	702
Starvation Cap Reductn		0		0	0	0		0	0		0	0
Spillback Cap Reductn		0		0	0	0		0	0		0	0
Storage Cap Reductn		0		0	0	0		0	0		0	0
Reduced v/c Ratio		0.39		0.00	0.28	0.03		0.01	0.00		0.15	0.14

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 44 (63%), Referenced to phase 2:EBTL and 6:WBL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.39

Intersection Signal Delay: 5.4

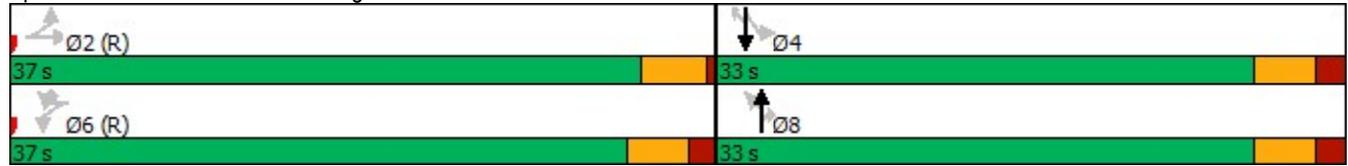
Intersection LOS: A

Intersection Capacity Utilization 73.3%

ICU Level of Service D

Analysis Period (min) 15

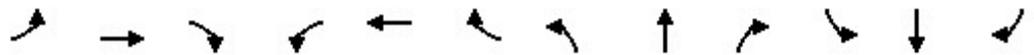
Splits and Phases: 10: Central High Dr/Pecan Ave & Palm St & Central Entrance



Central Entrance Corridor Study
11: Mesaba Ave & Central Entrance

Future Year Build Option 2 - AM Peak

09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Future Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3417	0	1626	3420	1599	1787	3574	1599
Flt Permitted	0.285			0.242			0.950	0.999		0.950		
Satd. Flow (perm)	536	3574	1599	455	3417	0	1626	3420	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			515		51				114			117
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1578			1071			1862				367
Travel Time (s)		35.9			24.3			42.3				6.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	105	600	515	131	583	0	158	754	17	210	648	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	9.1	36.8	36.8	10.0	37.7		35.8	35.8	35.8	37.4	37.4	37.4
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	39.2	32.9	32.9	41.2	33.9		30.0	30.0	30.0	28.8	28.8	28.8
Actuated g/C Ratio	0.33	0.27	0.27	0.34	0.28		0.25	0.25	0.25	0.24	0.24	0.24
v/c Ratio	0.44	0.61	0.63	0.56	0.58		0.39	0.88	0.04	0.49	0.76	0.13
Control Delay	34.7	41.6	7.0	39.5	36.7		40.8	56.4	0.1	42.8	48.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	41.6	7.0	39.5	36.7		40.8	56.4	0.1	42.8	48.2	0.6
LOS	C	D	A	D	D		D	E	A	D	D	A
Approach Delay		26.4			37.2			52.7				43.7
Approach LOS		C			D			D				D
Queue Length 50th (ft)	55	216	0	69	190		112	309	0	138	242	0
Queue Length 95th (ft)	98	280	91	#131	251		184	#419	0	211	303	2
Internal Link Dist (ft)		1498			991			1782				287
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	237	979	812	233	1001		406	855	485	476	953	512
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.61	0.63	0.56	0.58		0.39	0.88	0.04	0.44	0.68	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88

Central Entrance Corridor Study
 1: Trinity Rd & Miller Hill Rd / 194/Central Entrance

Future Year Build Option 2 - PM Peak

09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖↗	↑↑	↖	↖↗	↑↑	↖	↖↗	↑↑	↖	↖	↑↑	↖
Traffic Volume (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Future Volume (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	270		390	326		520	560		510	190		155
Storage Lanes	2		1	2		1	2		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3467	3574	1599	3467	3574	1599	3467	3574	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			403			167			162			165
Link Speed (mph)		40			40			45				30
Link Distance (ft)		921			1468			995				1207
Travel Time (s)		15.7			25.0			15.1				27.4
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	138	738	403	165	892	59	302	210	38	66	136	111
Turn Type	Prot	NA	Perm									
Protected Phases	1	6		5	2		7	4		3		8
Permitted Phases			6			2			4			8
Total Split (s)	16.0	50.5	50.5	17.0	51.5	51.5	24.0	46.5	46.5	16.0	38.5	38.5
Total Lost Time (s)	5.8	5.4	5.4	5.5	5.4	5.4	6.0	5.8	5.8	5.6	5.5	5.5
Act Effct Green (s)	10.2	69.2	69.2	11.5	70.2	70.2	16.5	20.2	20.2	9.3	10.3	10.3
Actuated g/C Ratio	0.08	0.53	0.53	0.09	0.54	0.54	0.13	0.16	0.16	0.07	0.08	0.08
v/c Ratio	0.51	0.39	0.39	0.54	0.46	0.06	0.69	0.38	0.10	0.52	0.48	0.40
Control Delay	64.4	19.8	3.0	49.9	13.3	0.6	62.3	51.6	0.5	72.5	62.5	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	19.8	3.0	49.9	13.3	0.6	62.3	51.6	0.5	72.5	62.5	5.8
LOS	E	B	A	D	B	A	E	D	A	E	E	A
Approach Delay		19.3			18.1			53.9				44.5
Approach LOS		B			B			D				D
Queue Length 50th (ft)	58	185	0	58	297	2	127	87	0	54	58	0
Queue Length 95th (ft)	93	276	57	82	374	m5	170	121	0	103	91	13
Internal Link Dist (ft)		841			1388			915				1127
Turn Bay Length (ft)	270		390	326		520	560		510	190		155
Base Capacity (vph)	272	1903	1040	330	1930	940	496	1118	611	142	907	529
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.39	0.39	0.50	0.46	0.06	0.61	0.19	0.06	0.46	0.15	0.21

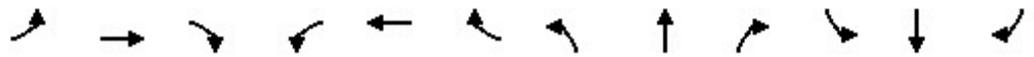
Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 83 (64%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.69

Central Entrance Corridor Study
2: Mall Dr & Central Entrance

Future Year Build Option 2 - PM Peak

09/28/2021



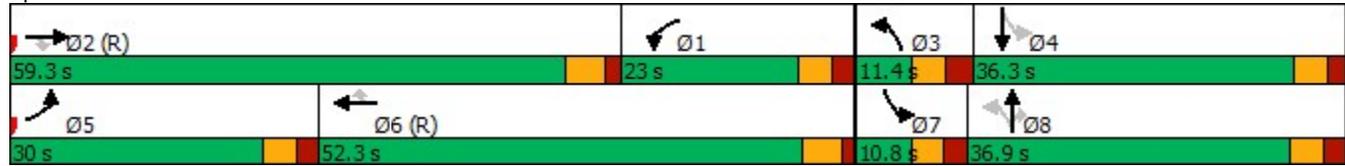
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	201	657	53	126	912	164	48	72	100	235	76	111
Future Volume (vph)	201	657	53	126	912	164	48	72	100	235	76	111
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		300	380		380	150		100	0		135
Storage Lanes	1		1	1		1	1		1	1		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3574	1599	1787	1881	1599	1787	1714	0
Flt Permitted	0.950			0.950			0.453			0.695		
Satd. Flow (perm)	1787	3574	1599	1787	3574	1599	852	1881	1599	1307	1714	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			115			164			159			53
Link Speed (mph)		40			40			30				30
Link Distance (ft)		1468			1432			891				373
Travel Time (s)		25.0			24.4			20.3				8.5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	201	657	53	126	912	164	48	72	100	235	187	0
Turn Type	Prot	NA	Perm	Prot	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6	8		8	4		
Total Split (s)	30.0	59.3	59.3	23.0	52.3	52.3	11.4	36.9	36.9	10.8	36.3	
Total Lost Time (s)	5.4	5.4	5.4	5.6	5.4	5.4	6.0	5.6	5.6	5.5	5.2	
Act Effct Green (s)	19.4	63.6	63.6	17.4	61.8	61.8	26.6	21.6	21.6	27.6	23.6	
Actuated g/C Ratio	0.15	0.49	0.49	0.13	0.48	0.48	0.20	0.17	0.17	0.21	0.18	
v/c Ratio	0.76	0.38	0.06	0.53	0.54	0.19	0.23	0.23	0.25	0.79	0.53	
Control Delay	55.7	13.3	3.2	61.3	27.9	4.5	37.0	45.6	2.1	64.5	38.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	55.7	13.3	3.2	61.3	27.9	4.5	37.0	45.6	2.1	64.5	38.7	
LOS	E	B	A	E	C	A	D	D	A	E	D	
Approach Delay		22.0			28.2			24.0				53.1
Approach LOS		C			C			C				D
Queue Length 50th (ft)	165	198	7	100	286	0	31	53	0	169	103	
Queue Length 95th (ft)	243	278	23	168	422	47	59	91	6	231	168	
Internal Link Dist (ft)		1388			1352			811				293
Turn Bay Length (ft)	700		300	380		380	150		100			
Base Capacity (vph)	338	1749	841	239	1700	846	276	452	505	371	450	
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.38	0.06	0.53	0.54	0.19	0.17	0.16	0.20	0.63	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 130
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79

Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 73.2%	ICU Level of Service D
Analysis Period (min) 15	

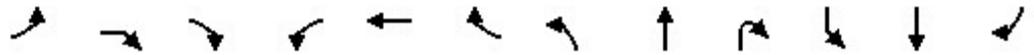
Splits and Phases: 2: Mall Dr & Central Entrance



Central Entrance Corridor Study
3: Anderson Rd & Central Entrance

Future Year Build Option 2 - PM Peak

09/28/2021



Lane Group	EBL	EBR	EBR2	WBL	WBT	WBR	NBL	NBT	NBR2	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	978	29	71	461	8	20	24	72	12	36	32
Future Volume (vph)	37	978	29	71	461	8	20	24	72	12	36	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	330	330		145		150	0			0		25
Storage Lanes	1	0		1		1	0			0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	2814	1599	1787	3574	1599	0	1840	1599	0	1859	1599
Flt Permitted	0.487			0.950				0.831			0.904	
Satd. Flow (perm)	916	2814	1599	1787	3574	1599	0	1563	1599	0	1701	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			30			30			71			32
Link Speed (mph)					30			30			30	
Link Distance (ft)					2020			808			1196	
Travel Time (s)					45.9			18.4			27.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	978	29	71	461	8	0	44	72	0	48	32
Turn Type	Perm	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases					6			4				4
Permitted Phases	2	2	2	6		6	4		4	4		4
Total Split (s)	38.1	38.1	38.1	38.1	38.1	38.1	31.9	31.9	31.9	31.9	31.9	31.9
Total Lost Time (s)	4.7	4.7	4.7	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)	55.1	55.1	55.1	55.1	55.1	55.1		8.7	8.7		8.7	8.7
Actuated g/C Ratio	0.79	0.79	0.79	0.79	0.79	0.79		0.12	0.12		0.12	0.12
v/c Ratio	0.05	0.44	0.02	0.05	0.16	0.01		0.23	0.28		0.23	0.14
Control Delay	3.1	4.3	1.3	0.7	0.7	0.0		29.8	10.7		29.6	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay	3.1	4.3	1.3	0.7	0.7	0.0		29.8	10.7		29.6	11.7
LOS	A	A	A	A	A	A		C	B		C	B
Approach Delay					0.7			17.9			22.4	
Approach LOS					A			B			C	
Queue Length 50th (ft)	3	69	0	1	5	0		18	0		19	0
Queue Length 95th (ft)	12	127	6	m3	7	m0		43	32		46	22
Internal Link Dist (ft)					1940			728			1116	
Turn Bay Length (ft)	330	330	330	145		150			25			25
Base Capacity (vph)	720	2213	1264	1405	2811	1264		602	660		656	636
Starvation Cap Reductn	0	0	0	0	0	0		0	0		0	0
Spillback Cap Reductn	0	0	0	0	0	0		0	0		0	0
Storage Cap Reductn	0	0	0	0	0	0		0	0		0	0
Reduced v/c Ratio	0.05	0.44	0.02	0.05	0.16	0.01		0.07	0.11		0.07	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 54 (77%), Referenced to phase 2:EBL and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.44

Central Entrance Corridor Study
4: Basswood Ave & Central Entrance

Future Year Build Option 2 - PM Peak
09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	25	1353	126	27	75	0	0	144	60
Future Volume (vph)	0	0	0	25	1353	126	27	75	0	0	144	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	160		150	165		150	50		50	50		50
Storage Lanes	0		0	1		1	0		0	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	0	0	1787	3574	1599	0	1857	0	0	1881	1599
Flt Permitted				0.950				0.892				
Satd. Flow (perm)	0	0	0	1787	3574	1599	0	1678	0	0	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						126						29
Link Speed (mph)		30			30			30				30
Link Distance (ft)		2020			792			343				530
Travel Time (s)		45.9			18.0			7.8				12.0
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	25	1353	126	0	102	0	0	144	60
Turn Type				pm+pt	NA	Perm	Perm	NA			NA	Perm
Protected Phases				1	6			4			4	
Permitted Phases				6		6	4					4
Total Split (s)				40.0	40.0	40.0	30.0	30.0			30.0	30.0
Total Lost Time (s)				4.7	4.7	4.7		4.7			4.7	4.7
Act Effct Green (s)				47.2	47.2	47.2		13.4			13.4	13.4
Actuated g/C Ratio				0.67	0.67	0.67		0.19			0.19	0.19
v/c Ratio				0.02	0.56	0.11		0.32			0.40	0.18
Control Delay				2.3	3.8	0.3		24.5			27.0	14.5
Queue Delay				0.0	0.0	0.0		0.0			0.0	0.0
Total Delay				2.3	3.8	0.3		24.5			27.0	14.5
LOS				A	A	A		C			C	B
Approach Delay					3.5			24.5			23.3	
Approach LOS					A			C			C	
Queue Length 50th (ft)				1	52	0		39			56	11
Queue Length 95th (ft)				m3	87	m1		69			93	36
Internal Link Dist (ft)		1940			712			263			450	
Turn Bay Length (ft)				165		150						50
Base Capacity (vph)				1205	2410	1119		606			679	596
Starvation Cap Reductn				0	0	0		0			0	0
Spillback Cap Reductn				0	0	0		0			0	0
Storage Cap Reductn				0	0	0		0			0	0
Reduced v/c Ratio				0.02	0.56	0.11		0.17			0.21	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 4 (6%), Referenced to phase 2: and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.56

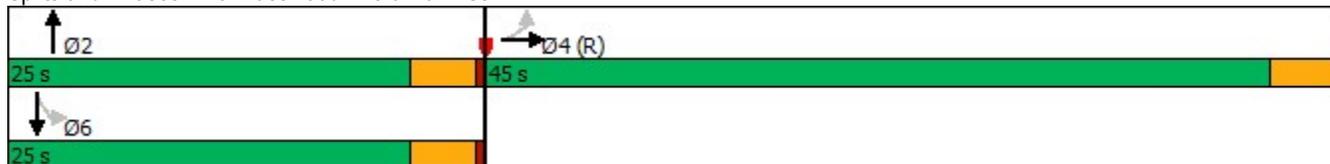


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔			↔	
Traffic Volume (vph)	32	975	16	0	0	0	0	12	23	121	45	0
Future Volume (vph)	32	975	16	0	0	0	0	12	23	121	45	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3560	0	0	0	0	0	1714	0	0	1815	0
Flt Permitted		0.998									0.762	
Satd. Flow (perm)	0	3560	0	0	0	0	0	1714	0	0	1433	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4						23				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1451			780			318			343	
Travel Time (s)		33.0			17.7			7.2			7.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1023	0	0	0	0	0	35	0	0	166	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Total Split (s)	45.0	45.0						25.0		25.0	25.0	
Total Lost Time (s)		4.0						4.0			4.0	
Act Effct Green (s)		48.8						13.2			13.2	
Actuated g/C Ratio		0.70						0.19			0.19	
v/c Ratio		0.41						0.10			0.61	
Control Delay		4.6						12.5			15.7	
Queue Delay		0.0						0.0			0.0	
Total Delay		4.6						12.5			15.7	
LOS		A						B			B	
Approach Delay		4.6						12.5			15.7	
Approach LOS		A						B			B	
Queue Length 50th (ft)		70						4			12	
Queue Length 95th (ft)		97						24			21	
Internal Link Dist (ft)		1371			700			238			263	
Turn Bay Length (ft)												
Base Capacity (vph)		2483						530			429	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.41						0.07			0.39	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	7 (10%), Referenced to phase 4:EBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.61
Intersection Signal Delay:	6.3
Intersection LOS:	A
Intersection Capacity Utilization:	50.8%
ICU Level of Service:	A
Analysis Period (min):	15

Splits and Phases: 5: Basswood Ave & Palm St



Central Entrance Corridor Study
6: Arlington Ave & Central Entrance

Future Year Build Option 2 - PM Peak
09/28/2021

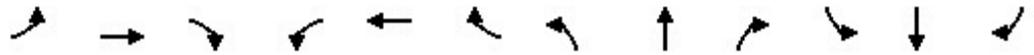
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	167	1129	153	174	374	0	0	439	181
Future Volume (vph)	0	0	0	167	1129	153	174	374	0	0	439	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		150	180		150	150		0	395		190
Storage Lanes	0		0	1		1	1		0	0		1
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	0	0	1787	3574	1599	1787	1881	0	0	1881	1599
Flt Permitted				0.950			0.218					
Satd. Flow (perm)	0	0	0	1787	3574	1599	410	1881	0	0	1881	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						139						104
Link Speed (mph)		30			30			30				30
Link Distance (ft)		792			2637			336				1106
Travel Time (s)		18.0			59.9			7.6				25.1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	167	1129	153	174	374	0	0	439	181
Turn Type				pm+pt	NA	Perm	pm+pt	NA			NA	Perm
Protected Phases				1	6		3	8			4	
Permitted Phases				6		6	8					4
Total Split (s)				28.0	28.0	28.0	10.3	42.0			31.7	31.7
Total Lost Time (s)				4.7	4.7	4.7	5.0	4.7			4.7	4.7
Act Effct Green (s)				27.9	27.9	27.9	32.4	32.7			22.4	22.4
Actuated g/C Ratio				0.40	0.40	0.40	0.46	0.47			0.32	0.32
v/c Ratio				0.23	0.79	0.21	0.59	0.43			0.73	0.31
Control Delay				14.5	21.9	4.0	16.0	12.2			28.0	8.7
Queue Delay				0.0	0.0	0.0	0.0	0.6			0.0	0.0
Total Delay				14.5	21.9	4.0	16.0	12.9			28.0	8.7
LOS				B	C	A	B	B			C	A
Approach Delay					19.1			13.9			22.4	
Approach LOS					B			B			C	
Queue Length 50th (ft)				34	122	1	51	119			161	23
Queue Length 95th (ft)				72	#365	31	m60	m167			236	59
Internal Link Dist (ft)		712			2557			256			1026	
Turn Bay Length (ft)				180		150	150					190
Base Capacity (vph)				711	1422	720	320	1002			725	680
Starvation Cap Reductn				0	0	0	0	322			0	0
Spillback Cap Reductn				5	0	0	0	0			0	0
Storage Cap Reductn				0	0	0	0	0			0	0
Reduced v/c Ratio				0.24	0.79	0.21	0.54	0.55			0.61	0.27

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 68 (97%), Referenced to phase 2: and 6:WBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79

Central Entrance Corridor Study
7: Arlington Ave & Palm St

Future Year Build Option 2 - PM Peak
09/28/2021



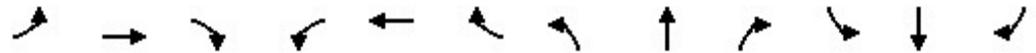
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔						↔		↔	↔	
Traffic Volume (vph)	164	844	50	0	0	0	0	332	133	102	416	0
Future Volume (vph)	164	844	50	0	0	0	0	332	133	102	416	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	50		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	0	3521	0	0	0	0	0	1808	0	1787	1881	0
Flt Permitted		0.992								0.161		
Satd. Flow (perm)	0	3521	0	0	0	0	0	1808	0	303	1881	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9						31				
Link Speed (mph)		30			30			30				30
Link Distance (ft)		780			1244			733				336
Travel Time (s)		17.7			28.3			16.7				7.6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1058	0	0	0	0	0	465	0	102	416	0
Turn Type	Perm	NA						NA		pm+pt	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4									6		
Total Split (s)	33.0	33.0						28.0		9.0	37.0	
Total Lost Time (s)		4.0						4.0		4.0	4.0	
Act Effct Green (s)		33.9						20.9		28.1	28.1	
Actuated g/C Ratio		0.48						0.30		0.40	0.40	
v/c Ratio		0.62						0.83		0.45	0.55	
Control Delay		11.9						34.7		13.6	14.8	
Queue Delay		0.0						0.0		0.0	0.9	
Total Delay		11.9						34.7		13.6	15.7	
LOS		B						C		B	B	
Approach Delay		11.9						34.7			15.3	
Approach LOS		B						C			B	
Queue Length 50th (ft)		130						168		31	150	
Queue Length 95th (ft)		165						#270		m41	218	
Internal Link Dist (ft)		700			1164			653			256	
Turn Bay Length (ft)										50		
Base Capacity (vph)		1710						640		227	886	
Starvation Cap Reductn		0						0		0	234	
Spillback Cap Reductn		0						0		0	0	
Storage Cap Reductn		0						0		0	0	
Reduced v/c Ratio		0.62						0.73		0.45	0.64	

Intersection Summary

Area Type: Other
 Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 28 (40%), Referenced to phase 4:EBTL, Start of Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83

Central Entrance Corridor Study
8: Central Entrance & Blackmon Ave

Future Year Build Option 2 - PM Peak
09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕↕			↕			↕	
Traffic Volume (vph)	0	0	0	26	1382	28	7	104	0	0	8	92
Future Volume (vph)	0	0	0	26	1382	28	7	104	0	0	8	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	0	0	0	3560	0	0	1876	0	0	1648	0
Flt Permitted					0.999			0.977				
Satd. Flow (perm)	0	0	0	0	3560	0	0	1838	0	0	1648	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5						50	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2637			1332			227			521	
Travel Time (s)		59.9			30.3			5.2			11.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	1436	0	0	111	0	0	100	0
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Total Split (s)				46.0	46.0		24.0	24.0			24.0	
Total Lost Time (s)					4.0			4.0			4.0	
Act Effct Green (s)					55.3			9.5			9.4	
Actuated g/C Ratio					0.79			0.14			0.13	
v/c Ratio					0.51			0.45			0.38	
Control Delay					2.1			34.2			19.3	
Queue Delay					0.0			0.0			0.0	
Total Delay					2.1			34.2			19.3	
LOS					A			C			B	
Approach Delay					2.1			34.2			19.3	
Approach LOS					A			C			B	
Queue Length 50th (ft)					20			44			20	
Queue Length 95th (ft)					30			84			57	
Internal Link Dist (ft)		2557			1252			147			441	
Turn Bay Length (ft)												
Base Capacity (vph)					2812			525			506	
Starvation Cap Reductn					0			22			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.51			0.22			0.20	

Intersection Summary	
Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	20 (29%), Referenced to phase 8:WBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.51
Intersection Signal Delay:	5.3
Intersection LOS:	A
Intersection Capacity Utilization:	57.7%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 8: Central Entrance & Blackmon Ave





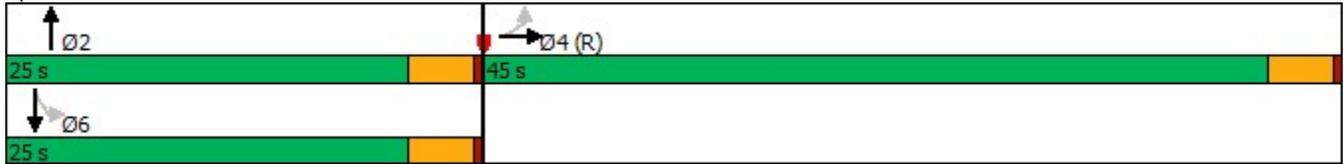
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔						↔			↔	
Traffic Volume (vph)	122	1107	10	0	0	0	0	8	27	17	31	0
Future Volume (vph)	122	1107	10	0	0	0	0	8	27	17	31	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3553	0	0	0	0	0	1686	0	0	1849	0
Flt Permitted		0.995									0.868	
Satd. Flow (perm)	0	3553	0	0	0	0	0	1686	0	0	1633	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2						27				
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1425			605			542			227	
Travel Time (s)		32.4			13.8			12.3			5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1239	0	0	0	0	0	35	0	0	48	0
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Total Split (s)	45.0	45.0						25.0		25.0	25.0	
Total Lost Time (s)		4.0						4.0			4.0	
Act Effct Green (s)		60.1						7.3			7.4	
Actuated g/C Ratio		0.86						0.10			0.11	
v/c Ratio		0.41						0.18			0.28	
Control Delay		1.2						15.9			30.9	
Queue Delay		0.0						0.0			0.0	
Total Delay		1.2						15.9			30.9	
LOS		A						B			C	
Approach Delay		1.2						15.9			30.9	
Approach LOS		A						B			C	
Queue Length 50th (ft)		28						3			20	
Queue Length 95th (ft)		38						27			m44	
Internal Link Dist (ft)		1345			525			462			147	
Turn Bay Length (ft)												
Base Capacity (vph)		3052						524			489	
Starvation Cap Reductn		0						0			0	
Spillback Cap Reductn		0						0			0	
Storage Cap Reductn		0						0			0	
Reduced v/c Ratio		0.41						0.07			0.10	

Intersection Summary

Area Type:	Other
Cycle Length:	70
Actuated Cycle Length:	70
Offset:	6 (9%), Referenced to phase 4:EBTL, Start of Green
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.41
Intersection Signal Delay:	2.6
Intersection LOS:	A
Intersection Capacity Utilization:	50.4%
ICU Level of Service:	A
Analysis Period (min):	15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: Blackmon Ave & Palm St





Lane Group	EBL	EBT	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations											
Traffic Volume (vph)	60	900	4	1233	51	1	6	1	73	0	85
Future Volume (vph)	60	900	4	1233	51	1	6	1	73	0	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		415	1000		0		100	0		
Storage Lanes	0		1	2		0		1	0		
Taper Length (ft)	100		100			100			100		
Satd. Flow (prot)	0	3564	1787	2814	1599	0	1868	1599	0	1787	1599
Flt Permitted		0.997	0.282				0.959			0.753	
Satd. Flow (perm)	0	3564	530	2814	1599	0	1804	1599	0	1417	1599
Right Turn on Red					Yes			Yes			Yes
Satd. Flow (RTOR)					51			26			33
Link Speed (mph)		30					30			30	
Link Distance (ft)		827					1010			1617	
Travel Time (s)		18.8					23.0			36.8	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	960	4	1233	51	0	7	1	0	73	85
Turn Type	custom	NA	Perm	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases							8			4	
Permitted Phases	2	2	6	6	6	8		8	4		4
Total Split (s)	38.1	38.1	38.1	38.1	38.1	31.9	31.9	31.9	31.9	31.9	31.9
Total Lost Time (s)		4.0	4.7	4.7	4.7		4.9	4.9		4.9	4.9
Act Effct Green (s)		54.2	53.6	53.6	53.6		8.4	8.4		10.1	10.1
Actuated g/C Ratio		0.77	0.77	0.77	0.77		0.12	0.12		0.14	0.14
v/c Ratio		0.35	0.01	0.57	0.04		0.03	0.00		0.36	0.33
Control Delay		3.0	3.8	6.3	1.4		25.7	0.0		31.2	21.0
Queue Delay		0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0
Total Delay		3.0	3.8	6.3	1.4		25.7	0.0		31.2	21.0
LOS		A	A	A	A		C	A		C	C
Approach Delay		3.0					22.5			25.7	
Approach LOS		A					C			C	
Queue Length 50th (ft)		25	0	117	0		3	0		29	20
Queue Length 95th (ft)		54	3	214	9		12	0		62	55
Internal Link Dist (ft)		747					930			1537	
Turn Bay Length (ft)			415	1000	1000			100			
Base Capacity (vph)		2759	406	2156	1237		695	632		546	637
Starvation Cap Reductn		0	0	0	0		0	0		0	0
Spillback Cap Reductn		0	0	0	0		0	0		0	0
Storage Cap Reductn		0	0	0	0		0	0		0	0
Reduced v/c Ratio		0.35	0.01	0.57	0.04		0.01	0.00		0.13	0.13

Intersection Summary

Area Type: Other

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 2:EBTL and 6:WBL, Start of 1st Green

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 6.2

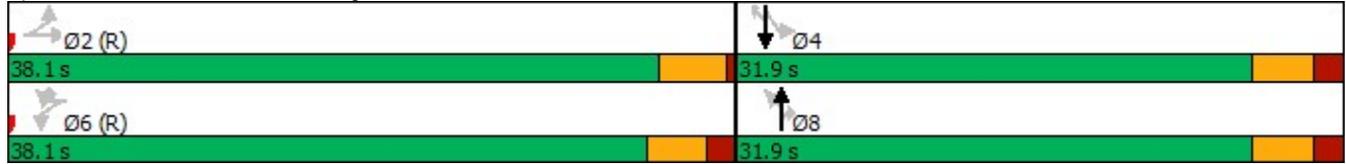
Intersection LOS: A

Intersection Capacity Utilization 91.8%

ICU Level of Service F

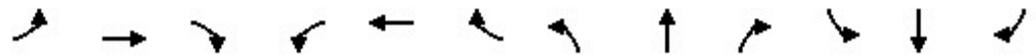
Analysis Period (min) 15

Splits and Phases: 10: Central High Dr/Pecan Ave & Palm St & Central Entrance



Central Entrance Corridor Study
11: Mesaba Ave & Central Entrance

Future Year Build Option 2 - PM Peak
09/28/2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Future Volume (vph)	105	600	515	131	413	170	176	736	17	210	648	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	310		280	280		0	430		140	230		230
Storage Lanes	1		1	1		0	1		1	1		2
Taper Length (ft)	100			100			100			100		
Satd. Flow (prot)	1787	3574	1599	1787	3417	0	1626	3420	1599	1787	3574	1599
Flt Permitted	0.285			0.242			0.950	0.999		0.950		
Satd. Flow (perm)	536	3574	1599	455	3417	0	1626	3420	1599	1787	3574	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			515		51				114			117
Link Speed (mph)		30			30			30				40
Link Distance (ft)		1578			1071			1862				367
Travel Time (s)		35.9			24.3			42.3				6.3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Shared Lane Traffic (%)							10%					
Lane Group Flow (vph)	105	600	515	131	583	0	158	754	17	210	648	62
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Split	NA	Perm	Split	NA	Perm
Protected Phases	3	8		7	4		1	1		2	2	
Permitted Phases	8		8	4					1			2
Total Split (s)	9.1	36.8	36.8	10.0	37.7		35.8	35.8	35.8	37.4	37.4	37.4
Total Lost Time (s)	4.8	5.1	5.1	5.0	5.3		5.8	5.8	5.8	5.4	5.4	5.4
Act Effct Green (s)	39.2	32.9	32.9	41.2	33.9		30.0	30.0	30.0	28.8	28.8	28.8
Actuated g/C Ratio	0.33	0.27	0.27	0.34	0.28		0.25	0.25	0.25	0.24	0.24	0.24
v/c Ratio	0.44	0.61	0.63	0.56	0.58		0.39	0.88	0.04	0.49	0.76	0.13
Control Delay	34.7	41.6	7.0	39.5	36.7		40.8	56.4	0.1	42.8	48.2	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	41.6	7.0	39.5	36.7		40.8	56.4	0.1	42.8	48.2	0.6
LOS	C	D	A	D	D		D	E	A	D	D	A
Approach Delay		26.4			37.2			52.7				43.7
Approach LOS		C			D			D				D
Queue Length 50th (ft)	55	216	0	69	190		112	309	0	138	242	0
Queue Length 95th (ft)	98	280	91	#131	251		184	#419	0	211	303	2
Internal Link Dist (ft)		1498			991			1782				287
Turn Bay Length (ft)	310		280	280			430		140	230		230
Base Capacity (vph)	237	979	812	233	1001		406	855	485	476	953	512
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.61	0.63	0.56	0.58		0.39	0.88	0.04	0.44	0.68	0.12

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 0 (0%), Referenced to phase 4:WBTL and 8:EBTL, Start of 1st Green
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.88

Roundabouts Level of Service

6. 2045 No-Build (future year baseline) p.m. peak hour LOS Synchro Results

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Anderson Rd
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	1	1	0	0	1	1
Lane Assignment	LT		TR		LT		TR		LT		R		LT		R	
Volume (V), veh/h	0	37	978	29	0	134	1375	4	0	20	24	72	0	12	36	32
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	37	988	29	0	135	1389	4	0	20	24	73	0	12	36	32
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.6453	4.3276		4.6453	4.3276	
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.6667	2.5352		2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	495	559		718	810		44	73		48	32	
Entry Volume, veh/h	490	553		711	802		44	72		48	32	
Circulating Flow (v _c), pc/h	183			81			1037			1544		
Exiting Flow (v _{ex}), pc/h	1073			1441			65			200		
Capacity (C _{PCE}), pc/h	1202	1202		1319	1319		520	588		326	382	
Capacity (c), veh/h	1190	1190		1306	1306		515	582		323	378	
v/c Ratio (x)	0.41	0.46		0.54	0.61		0.08	0.12		0.15	0.08	

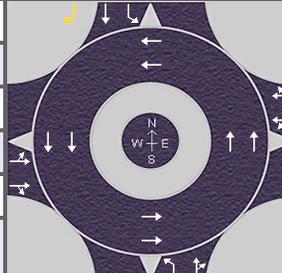
Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	7.2	8.0		8.8	10.2		8.1	7.7		13.8	10.8	
Lane LOS	A	A		A	B		A	A		B	B	
95% Queue, veh	2.1	2.6		3.5	4.7		0.3	0.4		0.5	0.3	
Approach Delay, s/veh	7.6			9.5			7.8			12.6		
Approach LOS	A			A			A			B		
Intersection Delay, s/veh LOS	8.8						A					

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Arlington Ave
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	1	0	0	1	1	0
Lane Assignment	LT		TR		LT		TR		L		TR		L		T	
Volume (V), veh/h	0	157	840	37	0	119	1113	68	0	165	221	108	0	87	352	162
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	159	848	37	0	120	1124	69	0	167	223	109	0	88	356	164
Right-Turn Bypass	None				None				None				Yielding			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.6453	4.3276		4.6453	4.3276		4.6453	4.3276		4.6453	4.3276	4.9763
Follow-Up Headway (s)	2.6667	2.5352		2.6667	2.5352		2.6667	2.5352		2.6667	2.5352	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	491	553		617	696		167	332		88	356	164
Entry Volume, veh/h	486	548		611	689		165	329		87	352	162
Circulating Flow (v _c), pc/h	564			549			1095			1411		
Exiting Flow (v _{ex}), pc/h	1045			1291			451			513		
Capacity (C _{PCE}), pc/h	803	879		815	890		493	560		369	428	370
Capacity (c), veh/h	796	870		807	882		488	554		365	424	366
v/c Ratio (x)	0.61	0.63		0.76	0.78		0.34	0.59		0.24	0.83	0.44

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	14.6	14.2		21.8	22.1		12.8	18.8		14.1	50.1	19.8
Lane LOS	B	B		C	C		B	C		B	F	C
95% Queue, veh	4.6	4.9		8.6	9.7		1.5	4.2		0.9	11.3	2.3
Approach Delay, s/veh	14.4			21.9			16.8			36.7		
Approach LOS	B			C			C			E		
Intersection Delay, s/veh LOS	21.5						C					

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Pecan Ave
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	0	1	0	0	0	1	1
Lane Assignment	LT		TR		LT		TR				LT		LT		R	
Volume (V), veh/h	0	60	900	0	0	4	1233	51	0	1	6	1	0	73	0	85
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	61	909	0	0	4	1245	52	0	1	6	1	0	74	0	86
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436			4.3276	4.9763	4.6453	4.3276	
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352			2.5352	2.6087	2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	456	514		611	690			7	1	74	86	
Entry Volume, veh/h	451	509		605	683			7	1	73	85	
Circulating Flow (v _c), pc/h	78			68			1044			1250		
Exiting Flow (v _{ex}), pc/h	983			1332			119			4		
Capacity (C _{PCE}), pc/h	1323	1323		1335	1335			585	506	427	491	
Capacity (c), veh/h	1310	1310		1322	1322			579	501	423	486	
v/c Ratio (x)	0.34	0.39		0.46	0.52			0.01	0.00	0.17	0.18	

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	5.9	6.4		7.3	8.2			6.4	7.2	11.2	9.9	
Lane LOS	A	A		A	A			A	A	B	A	
95% Queue, veh	1.6	1.9		2.5	3.2			0.0	0.0	0.6	0.6	
Approach Delay, s/veh	6.2			7.8			6.5			10.5		
Approach LOS	A			A			A			B		
Intersection Delay, s/veh LOS	7.3						A					

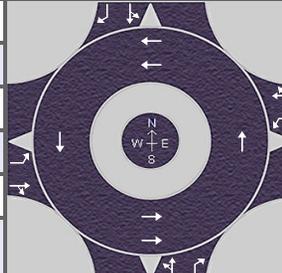
Roundabouts Level of Service

7. 2045 Build Concept #1 (3-lane cross section, with traffic diverting to other roadways) p.m. peak hour LOS Synchro Results

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Anderson Rd
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	1
Lane Assignment	L		TR		L		TR		LT		R		LT		R	
Volume (V), veh/h	0	28	742	22	0	95	973	3	0	17	20	61	0	11	34	30
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	28	749	22	0	96	983	3	0	17	20	62	0	11	34	30
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.6453	4.3276		4.6453	4.3276	
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.6667	2.5352		2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	28	771		96	986		37	62		45	30	
Entry Volume, veh/h	28	763		95	976		37	61		45	30	
Circulating Flow (v _c), pc/h	141			65			788			1096		
Exiting Flow (v _{ex}), pc/h	822			1030			51			152		
Capacity (C _{PCE}), pc/h	1249	1249		1338	1338		654	727		493	559	
Capacity (c), veh/h	1237	1237		1325	1325		647	720		488	554	
v/c Ratio (x)	0.02	0.62		0.07	0.74		0.06	0.09		0.09	0.05	

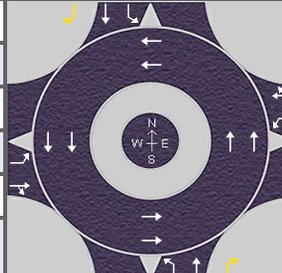
Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	3.1	10.7		3.3	13.9		6.2	5.9		8.6	7.1	
Lane LOS	A	B		A	B		A	A		A	A	
95% Queue, veh	0.1	4.7		0.2	8.0		0.2	0.3		0.3	0.2	
Approach Delay, s/veh	10.4			12.9			6.0			8.0		
Approach LOS	B			B			A			A		
Intersection Delay, s/veh LOS	11.4						B					

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Arlington Ave
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
Lane Assignment	L		TR		L		TR		L		T		L		T	
Volume (V), veh/h	0	104	557	25	0	87	809	50	0	175	235	115	0	94	382	175
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v_{pce}), pc/h	0	105	563	25	0	88	817	50	0	177	237	116	0	95	386	177
Right-Turn Bypass	None				None				Yielding				Yielding			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.6453	4.3276		4.6453	4.3276		4.6453	4.3276	4.9763	4.6453	4.3276	4.9763
Follow-Up Headway (s)	2.6667	2.5352		2.6667	2.5352		2.6667	2.5352	2.6087	2.6667	2.5352	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v_e), pc/h	105	588		88	867		177	237	116	95	386	177
Entry Volume, veh/h	104	582		87	858		175	235	115	94	382	175
Circulating Flow (v_c), pc/h	569			519			763			1082		
Exiting Flow (v_{ex}), pc/h	658			994			392			499		
Capacity (C_{pce}), pc/h	800	875		837	913		669	742	705	499	566	501
Capacity (c), veh/h	792	867		829	904		662	735	698	494	560	496
v/c Ratio (x)	0.13	0.67		0.11	0.95		0.26	0.32	0.16	0.19	0.68	0.35

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	5.9	15.9		5.4	57.3		8.7	8.8	7.0	10.0	23.3	13.0
Lane LOS	A	C		A	F		A	A	A	A	C	B
95% Queue, veh	0.5	5.9		0.4	26.2		1.1	1.4	0.6	0.7	6.0	1.6
Approach Delay, s/veh	14.4			52.5			8.4			18.6		
Approach LOS	B			F			A			C		
Intersection Delay, s/veh LOS	27.1						D					

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Pecan Ave
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	1	1	0	0	1	1	0	0	0	1	0	0	0	1	1
Lane Assignment	L		TR		L		TR						LT		R	
Volume (V), veh/h	0	45	679	0	0	3	922	38	0	1	6	1	0	60	0	70
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	45	686	0	0	3	931	38	0	1	6	1	0	61	0	71
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436			4.3276	4.9763	4.6453	4.3276	
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352			2.5352	2.6087	2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	45	686		3	969			7	1	61	71	
Entry Volume, veh/h	45	679		3	959			7	1	60	70	
Circulating Flow (v _c), pc/h	64			52			792			935		
Exiting Flow (v _{ex}), pc/h	747			1003			89			3		
Capacity (C _{PCE}), pc/h	1340	1340		1354	1354			724	644	571	641	
Capacity (c), veh/h	1326	1326		1341	1341			717	638	565	635	
v/c Ratio (x)	0.03	0.51		0.00	0.72			0.01	0.00	0.11	0.11	

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	3.0	8.1		2.7	12.9			5.1	5.7	7.7	6.9	
Lane LOS	A	A		A	B			A	A	A	A	
95% Queue, veh	0.1	3.1		0.0	7.3			0.0	0.0	0.4	0.4	
Approach Delay, s/veh	7.8			12.9			5.2			7.3		
Approach LOS	A			B			A			A		
Intersection Delay, s/veh LOS	10.4						B					

Roundabouts Level of Service

8. 2045 Build Concept #1 (3-lane cross section, with no traffic diverting) p.m. peak hour LOS Synchro Results

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Anderson Rd
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	1	1	0	0	1	1	0	0	0	1	1	0	0	1	1
Lane Assignment	L		TR		L		T		LT		R		LT		R	
Volume (V), veh/h	0	37	978	29	0	134	1375	4	0	20	24	72	0	12	36	32
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	37	988	29	0	135	1389	4	0	20	24	73	0	12	36	32
Right-Turn Bypass	None				Yielding				None				None			
Conflicting Lanes	1				1				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436	4.9763	4.6453	4.3276		4.6453	4.3276	
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352	2.6087	2.6667	2.5352		2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	37	1017		135	1389	4	44	73		48	32	
Entry Volume, veh/h	37	1007		134	1375	4	44	72		48	32	
Circulating Flow (v _c), pc/h	183			81			1037			1544		
Exiting Flow (v _{ex}), pc/h	1073			1441			61			200		
Capacity (C _{PCE}), pc/h	1202	1202		1319	1319	1297	520	588		326	382	
Capacity (c), veh/h	1190	1190		1306	1306	1284	515	582		323	378	
v/c Ratio (x)	0.03	0.85		0.10	1.05	0.00	0.08	0.12		0.15	0.08	

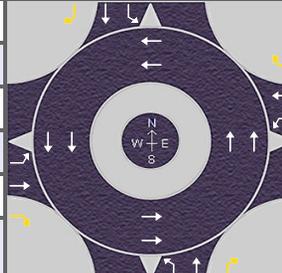
Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	3.3	21.1		3.6	57.7	2.8	8.1	7.7		13.8	10.8	
Lane LOS	A	C		A	F	A	A	A		B	B	
95% Queue, veh	0.1	11.1		0.3	27.4	0.0	0.3	0.4		0.5	0.3	
Approach Delay, s/veh	20.5			52.8			7.8			12.6		
Approach LOS	C			F			A			B		
Intersection Delay, s/veh LOS	37.5						E					

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Arlington Ave
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
Lane Assignment	L		T		L		T		L		T		L		T	
Volume (V), veh/h	0	157	840	37	0	119	1113	68	0	165	221	108	0	87	354	162
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	159	848	37	0	120	1124	69	0	167	223	109	0	88	358	164
Right-Turn Bypass	Yielding				Yielding				Yielding				Yielding			
Conflicting Lanes	2				2				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.6453	4.3276	4.9763	4.6453	4.3276	4.9763	4.6453	4.3276	4.9763	4.6453	4.3276	4.9763
Follow-Up Headway (s)	2.6667	2.5352	2.6087	2.6667	2.5352	2.6087	2.6667	2.5352	2.6087	2.6667	2.5352	2.6087

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	159	848	37	120	1124	69	167	223	109	88	358	164
Entry Volume, veh/h	157	840	37	119	1113	68	165	221	108	87	354	162
Circulating Flow (v _c), pc/h	566			549			1095			1411		
Exiting Flow (v _{ex}), pc/h	936			1291			382			478		
Capacity (C _{PCE}), pc/h	802	878	847	815	890	935	493	560	531	369	428	370
Capacity (c), veh/h	794	869	839	807	882	925	488	554	526	365	424	366
v/c Ratio (x)	0.20	0.97	0.04	0.15	1.26	0.07	0.34	0.40	0.21	0.24	0.84	0.44

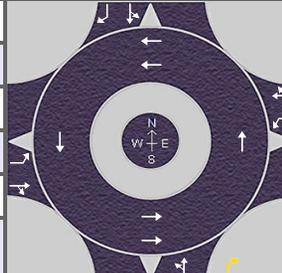
Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	6.6	68.7	4.7	6.0	500.0	4.6	12.8	12.8	9.6	14.1	51.1	19.8
Lane LOS	A	F	A	A	F	A	B	B	A	B	F	C
95% Queue, veh	0.7	28.9	0.1	0.5	128.6	0.2	1.5	2.0	0.8	0.9	11.5	2.3
Approach Delay, s/veh	57.0			428.8			12.1			37.4		
Approach LOS	F			F			B			E		
Intersection Delay, s/veh LOS	187.9						F					

HCS7 Roundabouts Report

General Information

Site Information

Analyst	AECOM		Intersection	
Agency or Co.	AECOM		E/W Street Name	Central Entrance
Date Performed	10/5/2021		N/S Street Name	Pecan Ave
Analysis Year	2045		Analysis Time Period (hrs)	1.00
Time Analyzed	PM Peak		Peak Hour Factor	1.00
Project Description	Central Entrance Corridor St...		Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Movement																
Number of Lanes (N)	0	1	1	0	0	1	1	0	0	0	1	0	0	0	1	1
Lane Assignment	L		TR		L		TR		LT				LT		R	
Volume (V), veh/h	0	60	900	0	0	4	1233	51	0	1	6	1	0	73	0	85
Percent Heavy Vehicles, %	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
Flow Rate (v _{PCE}), pc/h	0	61	909	0	0	4	1245	52	0	1	6	1	0	74	0	86
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				2				2			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.3276	4.9763		4.6453	4.3276	
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.5352	2.6087		2.6667	2.5352	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Entry Flow (v _e), pc/h	61	909		4	1297		7	1		74	86	
Entry Volume, veh/h	60	900		4	1284		7	1		73	85	
Circulating Flow (v _c), pc/h	78			68			1044			1250		
Exiting Flow (v _{ex}), pc/h	983			1332			119			4		
Capacity (C _{PCE}), pc/h	1323	1323		1335	1335		585	506		427	491	
Capacity (c), veh/h	1310	1310		1322	1322		579	501		423	486	
v/c Ratio (x)	0.05	0.69		0.00	0.97		0.01	0.00		0.17	0.18	

Delay and Level of Service

Approach	EB			WB			NB			SB		
	Left	Right	Bypass									
Lane Control Delay (d), s/veh	3.1	12.2		2.7	55.7		6.4	7.2		11.2	9.9	
Lane LOS	A	B		A	F		A	A		B	A	
95% Queue, veh	0.1	6.4		0.0	35.5		0.0	0.0		0.6	0.6	
Approach Delay, s/veh	11.6			55.5			6.5			10.5		
Approach LOS	B			F			A			B		
Intersection Delay, s/veh LOS	34.9						D					



Appendix F - Travel Demand Forecasting Methodology and Result Summary Memo



Memorandum

SRF No. 13501.02

To: Jim Meyer, AECOM

From: Florence Ngai, Senior Associate
Alen Lau, Associate

Date: October 25, 2021

Subject: Central Entrance Project
Travel Demand Forecasting Methodology and Result Summary

Introduction

The Duluth-Superior Area Travel Demand Model (TDM) was originally developed to support Metropolitan Interstate Council (MIC) and the Duluth Superior Metropolitan Area Long Range Transportation Plan planning studies. The model was updated to incorporate a truck component in 2019 and was further refined earlier this year to support the I-535 Blatnik Bridge Project. The refined model was recalibrated and validated to Average Weekday Traffic (AWDT) that were estimated based on the MnDOT official Annual Average Daily Traffic (AADT).

In support of the traffic analysis of the Central Entrance project, the MIC TDM Blatnik Bridge version was adopted. The study corridor is Central Entrance (Highway 194) between US 53 / Trinity Road and Rice Lake Road / Mesaba Avenue. The model input assumptions, including the socioeconomic data (households, employments, and school employments) and the highway network (network connectivity, the traffic loading points, and the number of lanes) were reviewed, verified, and updated, where necessary.

This technical memorandum describes the modeling methodology and summarizes the model results.

Current Model Review

The MIC TDM was reviewed with special attention to the Central Entrance corridor. The model is validated well in the corridor. The figure in Appendix A shows the comparison of model estimates and observed. The model review tasks included:

- Reviewing of socioeconomic data in the corridor
- Reviewing the network coding in the corridor

The tasks are briefly discussed below.

Zonal Socioeconomic Data

Traffic Analysis Zone (TAZ) is the unit of geography to store population, employment, and school enrollment data. The TAZ boundary is shown with the highway network in Figure 1. A total of twenty (20) relevant TAZs that are immediately along the corridor were identified. Their TAZ numbers are shown in Figure 1. The current 2018 socioeconomic data (SED) and 2045 future year assumptions of these TAZs were summarized in Table 1. Households in the corridor are projected to increase 2.3% from 2018 to 2045 while the total employment is expected to increase by 4.3%. School enrollment remains unchanged over that period. Details can be found in Appendix B. These assumptions were summarized. MIC approved them on August 17, 2021.

Figure 1. Relevant TAZs along Central Entrance Corridor

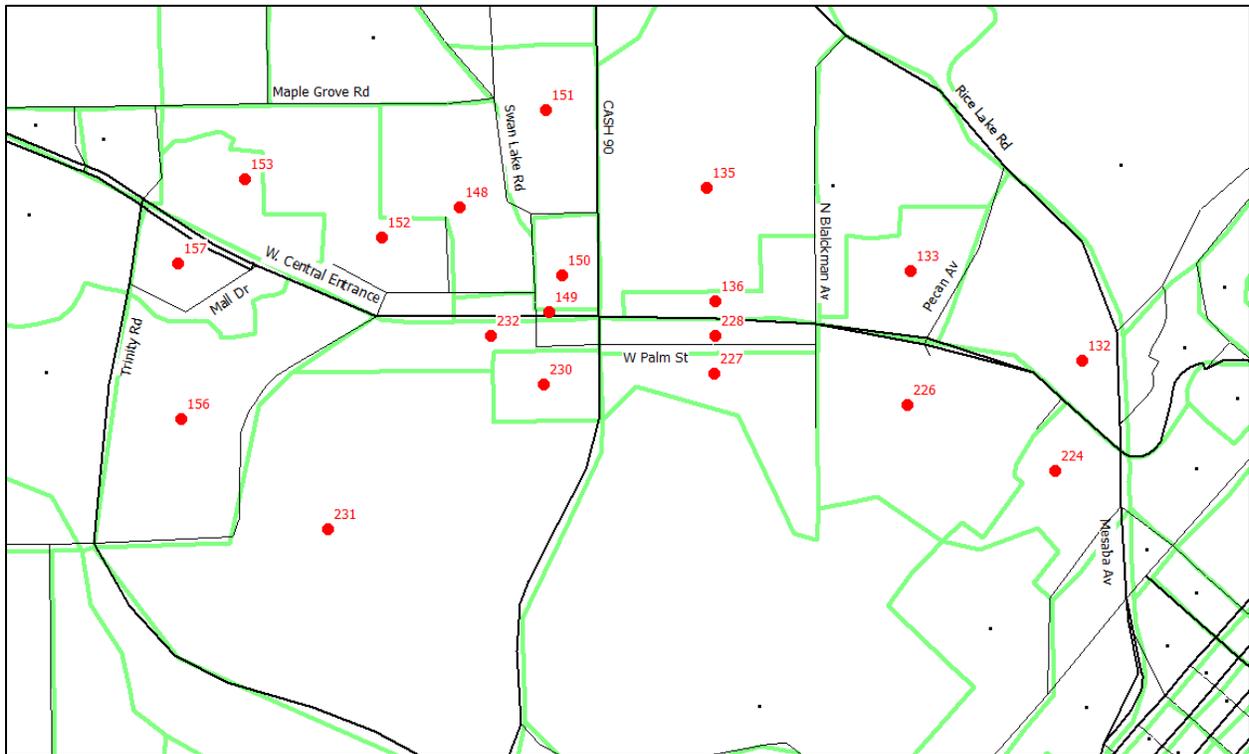


Table 1. 2018 and 2045 Socio-Economic Data Summary

SED	2018	2045
Households	2,647	2,707
Service Employment	1,455	1525
Retail Employment	499	529
Industrial Employment	106	106
Other Employment	266	266
Total Employment	2,326	2,426
College Enrollment	0	0
High School Enrollment	350	350
Middle School Enrollment	229	229
Elementary School Enrollment	112	112

Source: MIC

Highway Network

It is critical to the overall travel demand model integrity to maintain a roadway network database that is free of obvious errors and inconsistencies that may adversely affect the model results. The highway network was reviewed as described below.

- The network connectivity and attributes (e.g., number of lanes) of the Central Entrance corridor, including the corridor itself and its cross-streets were checked and verified that they are reflective of 2018 conditions.
- The traffic circulation within the study area corridor is heavily influenced by local traffic access/exiting locations. Accordingly, the loading points of the centroid connectors (network links representing local or non-functionally classified roads) were reviewed and reconnected to proper locations, as necessary.

It is confirmed that the general network coding in terms of roadway connectivity and physical attributes in the corridor are reasonable without any obvious inconsistencies. Central Entrance between Basswood Avenue and Blackman Avenue is coded with five lanes. However, several localized highway network details and TAZ loading points were identified for refinement. This refinement effort was primarily focusing on improving the connectivity, to more realistically reflecting the overall magnitude of traffic level under the base year (2018) traffic condition. The changes are reported in Appendix C.

Future Year Model Scenarios

Corridor trips were captured as subarea trip tables for the zone structure depicted in Figure 2 under the 2018 existing and two future year highway network scenarios:

- 2045 No-Build (or E+C)
- 2045 Build

Figure 2. Central Entrance Subarea Zone Map



The No-Build condition reflects the existing highway conditions with committed roadway projects in year 2045. The build condition involves reduced capacity on Central Entrance, between Anderson Road and Pecan Road, to three lanes.

Model Runs

The MIC model was executed for the 2018 existing, 2045 No Build and Build scenarios. The model predicts average weekday trips and traffic. The subarea trip matrices are summarized from Table 2 to Table 4. The results seem reasonable as the total daily vehicle trips increased by approximately 3% from 2018 to 2045 (no-build), which correspond well with the socioeconomic growth. A decrease of approximately 7% is observed from No-Build to Build with reduced roadway capacity in the Central Entrance corridor, which also seem to make sense.

Table 2. 2018 Model Estimated Average Weekday Trips

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1	130	40	110	130	130	430	1,200	670	100	30	560	900	4,430
2	40	0	20	10	10	210	30	150	80	0	60	40	650
3	110	20	70	80	70	380	50	260	310	0	360	240	1,950
4	140	20	80	60	100	760	120	160	200	10	720	530	2,900
5	150	10	80	110	490	890	120	20	120	230	1,430	460	4,110
6	420	210	390	740	810	0	5,700	730	60	40	3,110	4,380	16,590
7	1,250	40	60	130	110	5,460	0	380	10	20	190	470	8,120
8	680	160	270	160	20	650	370	0	1,720	0	180	80	4,290
9	200	100	420	220	100	60	10	2,140	0	10	40	340	3,640
10	30	0	0	10	260	60	20	0	20	0	4,900	740	6,040
11	560	30	270	740	1,360	3,510	110	120	50	5,070	0	820	12,640
12	760	40	230	480	350	4,170	410	70	290	580	2,240	0	9,620
Total	4,470	670	2,000	2,870	3,810	16,580	8,140	4,700	2,960	5,990	13,790	9,000	74,980

Table 3. 2045 Model Estimated Average Weekday Trips, No Build Scenario

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1	130	40	120	140	130	440	1,230	660	140	30	520	900	4,480
2	40	0	20	10	10	210	30	150	120	0	20	40	650
3	120	30	100	90	80	450	70	290	600	0	260	360	2,450
4	140	20	90	70	100	780	120	160	250	10	630	540	2,910
5	140	10	100	110	500	900	120	20	120	230	1,310	480	4,040
6	430	220	460	760	810	0	6,250	640	60	40	3,220	4,530	17,420
7	1,270	40	90	140	120	5,750	0	380	10	20	170	500	8,490
8	680	160	300	160	20	650	370	0	1,920	0	120	90	4,470
9	200	100	560	280	100	60	10	2,230	0	10	50	330	3,930
10	40	0	10	10	260	60	20	0	20	0	4,810	760	5,990
11	560	30	330	700	1,540	3,760	130	120	60	5,070	0	920	13,220
12	750	40	340	480	360	4,360	500	70	320	590	1,460	0	9,270
Total	4,500	690	2,520	2,950	4,030	17,420	8,850	4,720	3,620	6,000	12,570	9,450	77,320

Table 4. 2045 Model Estimated Average Weekday Trips, Build Scenario

	1	2	3	4	5	6	7	8	9	10	11	12	Total
1	420	190	70	120	110	450	1,670	560	10	10	390	730	4,730
2	220	0	30	10	10	280	40	160	120	0	20	30	920
3	50	30	490	50	40	300	50	140	240	0	120	160	1,670
4	120	20	50	80	80	680	90	210	310	0	580	550	2,770
5	120	10	40	90	630	700	90	60	100	250	1,320	490	3,900
6	480	250	350	680	640	0	6,560	430	70	20	2,620	3,180	15,280
7	1,780	40	60	90	80	6,080	0	70	0	0	50	180	8,430
8	610	160	150	210	50	430	70	0	2,530	0	180	180	4,570
9	10	100	220	310	90	60	0	2,810	0	0	0	230	3,830
10	10	0	0	10	280	30	0	0	0	0	4,720	940	5,990
11	410	30	140	680	1,640	3,070	30	240	0	4,950	0	1,190	12,380
12	540	30	140	470	360	2,920	160	170	210	770	2,040	0	7,810
Total	4,770	860	1,740	2,800	4,010	15,000	8,760	4,850	3,590	6,000	12,040	7,860	72,280

2018 to 2045 No Build and 2045 No Build to Build growth factors of approach and exit volumes at the following intersections were calculated based on model results.

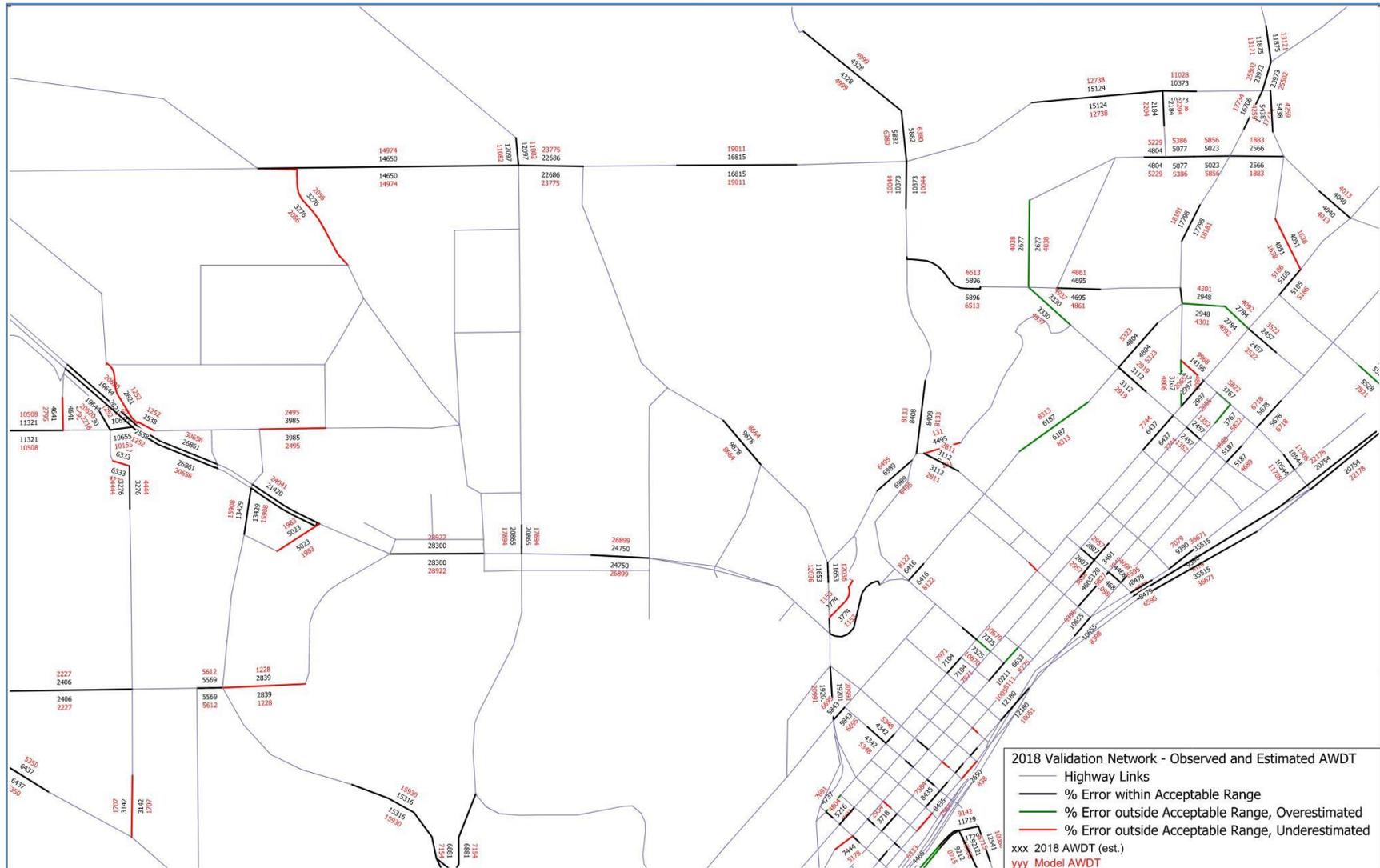
- W Central Entrance at Trinity Road
- W Central Entrance at Mall Drive
- W Central Entrance at Anderson Road
- W Central Entrance at Basswood Avenue
- E Central Entrance at S. Arlington Avenue (CSAH 90)
- E Central Entrance at H Countney Drive
- E Central Entrance at Mesaba Avenue

The growth factors are reported in Appendix D.

The predicted average weekday traffic (AWDT) was factored to Annual Average Daily Traffic (AADT). The resulting AADT under the 2018 existing, 2045 No Build, and Build scenarios are presented in Appendix D. The changes in AADT can also be found in Appendix E.

APPENDIX A. Validation – Comparison of Model Estimates and Observed Volumes

Figure A1. Comparison of Model Estimates and Observed Volumes



APPENDIX B. TAZ Socioeconomic Data

**Central Entrance Corridor
2018 and 2045 Population, Employment and School Employments**

TAZ	Year 2018 (1)										Year 2045 E+C (2)									
	HH	SERVICE	RETAIL	IND	OTHER	TOTAL	C	H	M	E	HH	SERVICE	RETAIL	IND	OTHER	TOTAL	C	H	M	E
132	51	537	0	63	224	824	0	261	161	0	51	537	0	63	224	824	0	261	161	0
133	296	9	0	0	0	9	0	0	0	0	296	9	0	0	0	9	0	0	0	0
134	841	65	0	0	0	65	0	0	0	0	841	65	0	0	0	65	0	0	0	0
135	282	12	0	0	0	12	0	0	0	0	282	12	0	0	0	12	0	0	0	0
136	24	82	4	5	1	92	0	0	0	0	24	82	4	5	1	92	0	0	0	0
148	150	0	0	0	0	0	0	0	0	0	150	0	0	0	0	0	0	0	0	0
149	26	15	75	2	1	93	0	89	68	112	86	55	105	2	1	163	0	89	68	112
150	27	4	0	0	0	4	0	0	0	0	27	4	0	0	0	4	0	0	0	0
151	30	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
152	113	54	0	0	0	54	0	0	0	0	113	54	0	0	0	54	0	0	0	0
153	0	129	188	8	0	325	0	0	0	0	0	129	188	8	0	325	0	0	0	0
156	104	16	0	0	0	16	0	0	0	0	104	16	0	0	0	16	0	0	0	0
157	0	150	125	0	0	275	0	0	0	0	0	150	125	0	0	275	0	0	0	0
224	231	0	0	0	0	0	0	0	0	0	231	0	0	0	0	0	0	0	0	0
226	41	182	0	7	0	189	0	0	0	0	41	212	0	7	0	219	0	0	0	0
227	20	0	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0
228	4	125	72	19	39	255	0	0	0	0	4	125	72	19	39	255	0	0	0	0
230	65	0	0	0	0	0	0	0	0	0	65	0	0	0	0	0	0	0	0	0
231	245	17	7	2	1	27	0	0	0	0	245	17	7	2	1	27	0	0	0	0
232	97	58	28	0	0	86	0	0	0	0	97	58	28	0	0	86	0	0	0	0
Total	2,647	1,455	499	106	266	2,326	0	350	229	112	2,707	1,525	529	106	266	2,426	0	350	229	112

Note: C - College
H - High school
M - Middle school
E - Elementary school
(1) source .\ModelRun\Base\Yr2018\CntrEntrance\Inputs\emp&school.dbf
(2) source .\ModelRun\Base\Yr2045Enc\CntrEntrance\Inputs\emp&school.dbf

APPENDIX C. Highway Network Refinement

The changes in the highway network are depicted in the following figures, showing the TAZ centroid locations prior (in green) and after (in red) the refinements, as well as corresponding the loading points.

Figure C1. Central Entrance Corridor between Anderson Rd and CSAH 90/S. Arlington Ave.

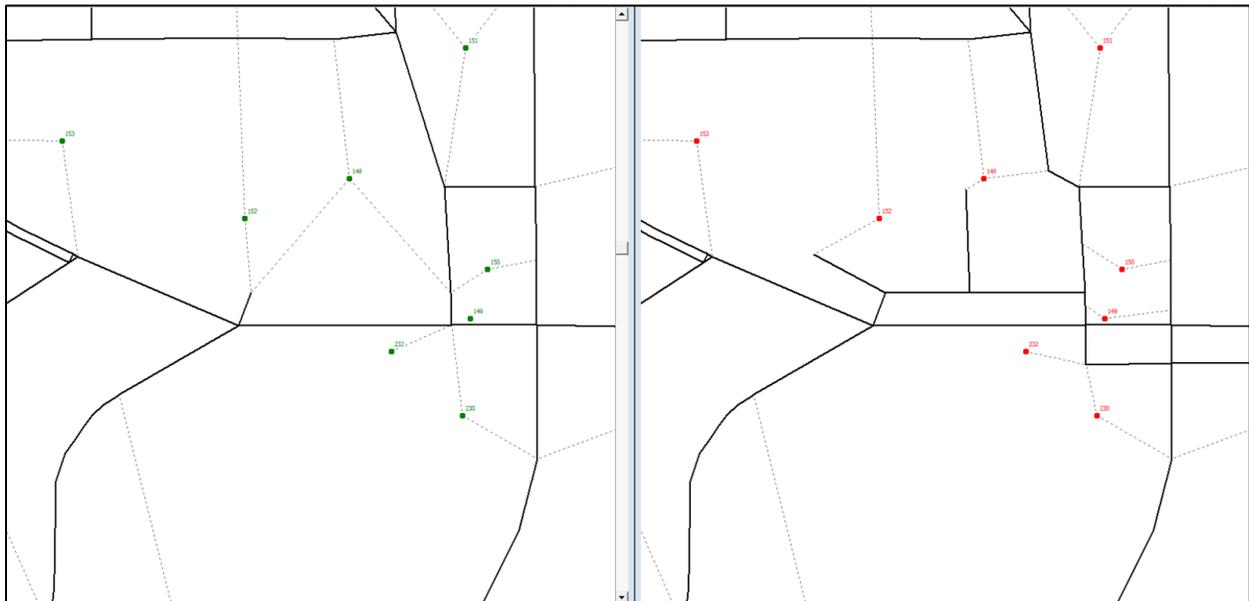


Figure C2. Central Entrance Corridor between CSAH 90/S. Arlington Ave. and Blackman Ave.

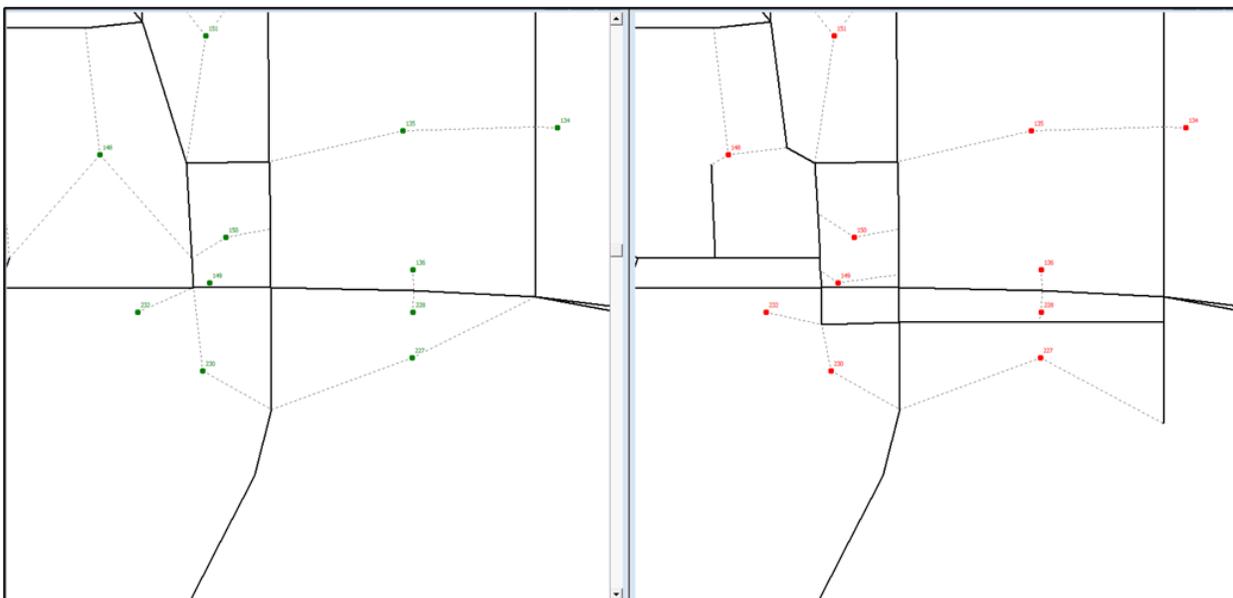
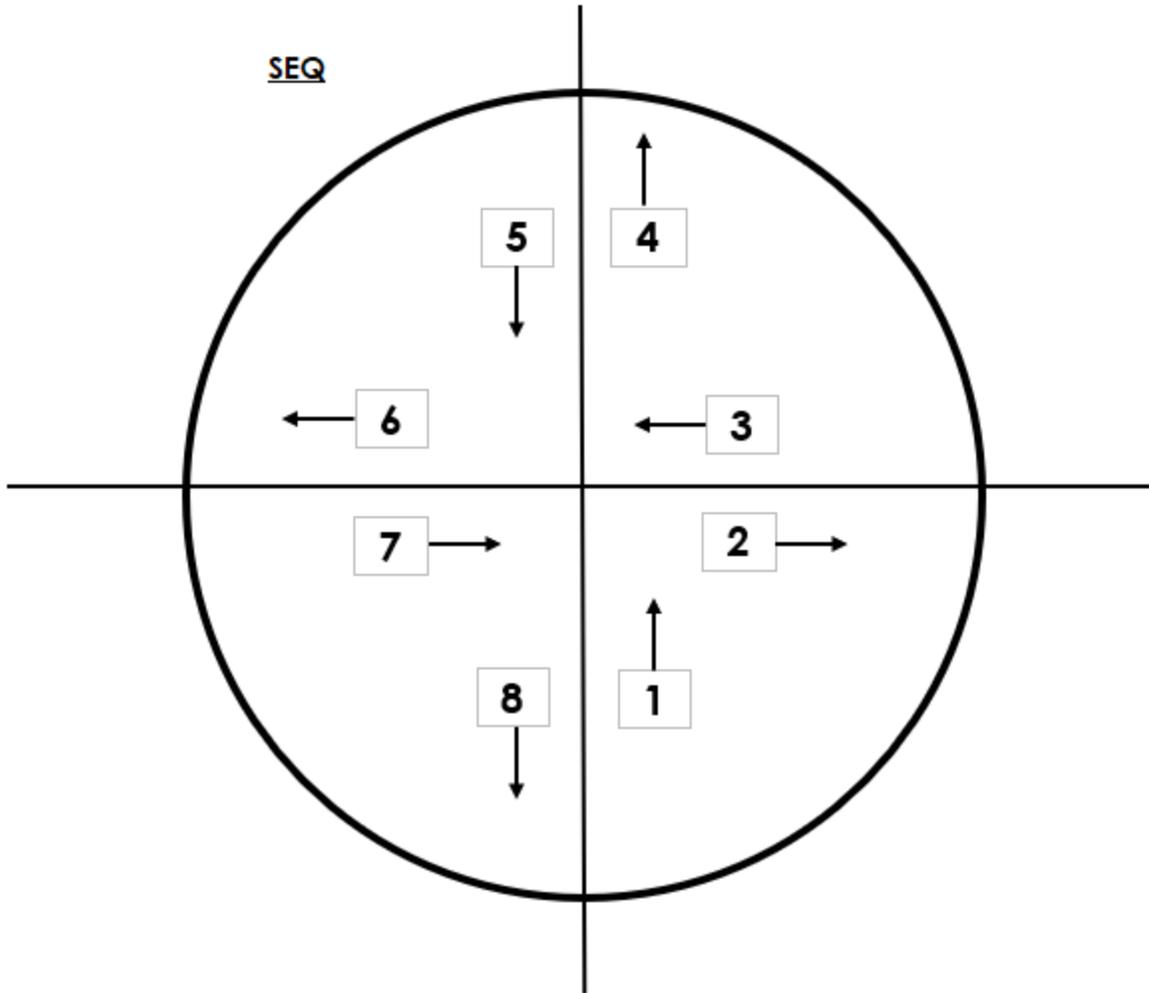


Figure C3. Central Entrance Corridor between Blackman Ave. and Rice Lake Rd/Mesaba Ave.



APPENDIX D. Intersection Growth Factors



Intersection	Descriptions	Growth Factor		Orientation	Appr/Exit	SEQ
		2045 ENC / 2018 BY	2045 S1 / 2045 ENC			
1	W Central Entrance at Trinity Road	1.048	0.994	NB	APPR	1
1	W Central Entrance at Trinity Road	1.057	0.729	WB	APPR	3
1	W Central Entrance at Trinity Road	1.032	1.274	SB	APPR	5
1	W Central Entrance at Trinity Road	1.049	0.877	EB	APPR	7
2	W Central Entrance at Mall Drive	0.997	0.968	NB	APPR	1
2	W Central Entrance at Mall Drive	1.051	0.743	WB	APPR	3
2	W Central Entrance at Mall Drive	0.994	0.719	SB	APPR	5
2	W Central Entrance at Mall Drive	1.026	0.744	EB	APPR	7
3	W Central Entrance at Anderson Rd	0.997	0.850	NB	APPR	1
3	W Central Entrance at Anderson Rd	1.048	0.708	WB	APPR	3
3	W Central Entrance at Anderson Rd	1.010	0.930	SB	APPR	5
3	W Central Entrance at Anderson Rd	1.023	0.759	EB	APPR	7
4	W Central Entrance at Basswood Ave	0.960	0.547	NB	APPR	1
4	W Central Entrance at Basswood Ave	1.062	0.644	WB	APPR	3
4	W Central Entrance at Basswood Ave	1.284	0.332	SB	APPR	5
4	W Central Entrance at Basswood Ave	1.022	0.727	EB	APPR	7
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.083	1.064	NB	APPR	1
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.066	0.727	WB	APPR	3
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.036	1.085	SB	APPR	5
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.035	0.663	EB	APPR	7
6	E Central Entrance at H Countney Dr	1.109	1.000	NB	APPR	1
6	E Central Entrance at H Countney Dr	1.059	0.748	WB	APPR	3
6	E Central Entrance at H Countney Dr	1.013	0.817	SB	APPR	5
6	E Central Entrance at H Countney Dr	1.004	0.755	EB	APPR	7
7	E Central Entrance at Mesaba Ave	1.046	0.938	NB	APPR	1
7	E Central Entrance at Mesaba Ave	0.965	0.841	WB	APPR	3
7	E Central Entrance at Mesaba Ave	0.970	0.997	SB	APPR	5
7	E Central Entrance at Mesaba Ave	1.006	0.760	EB	APPR	7

Intersection	Descriptions	Growth Factor		Orientation	Appr/Exit	SEQ
		2045 ENC / 2018 BY	2045 S1 / 2045 ENC			
1	W Central Entrance at Trinity Road	1.022	1.272	NB	EXIT	4
1	W Central Entrance at Trinity Road	1.052	0.862	WB	EXIT	6
1	W Central Entrance at Trinity Road	1.090	0.991	SB	EXIT	8
1	W Central Entrance at Trinity Road	1.026	0.744	EB	EXIT	2
2	W Central Entrance at Mall Drive	0.996	0.711	NB	EXIT	4
2	W Central Entrance at Mall Drive	1.057	0.729	WB	EXIT	6
2	W Central Entrance at Mall Drive	0.997	0.944	SB	EXIT	8
2	W Central Entrance at Mall Drive	1.023	0.759	EB	EXIT	2
3	W Central Entrance at Anderson Rd	1.003	0.812	NB	EXIT	4
3	W Central Entrance at Anderson Rd	1.051	0.743	WB	EXIT	6
3	W Central Entrance at Anderson Rd	0.999	0.831	SB	EXIT	8
3	W Central Entrance at Anderson Rd	1.022	0.727	EB	EXIT	2
4	W Central Entrance at Basswood Ave	1.287	0.318	NB	EXIT	4
4	W Central Entrance at Basswood Ave	1.048	0.708	WB	EXIT	6
4	W Central Entrance at Basswood Ave	1.002	0.541	SB	EXIT	8
4	W Central Entrance at Basswood Ave	1.035	0.663	EB	EXIT	2
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.007	1.088	NB	EXIT	4
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.062	0.644	WB	EXIT	6
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.223	1.068	SB	EXIT	8
5	E Central Entrance at S Arlington Ave (CSAH 90)	1.018	0.750	EB	EXIT	2
6	E Central Entrance at H Countney Dr	1.001	0.850	NB	EXIT	4
6	E Central Entrance at H Countney Dr	1.056	0.738	WB	EXIT	6
6	E Central Entrance at H Countney Dr	1.111	1.000	SB	EXIT	8
6	E Central Entrance at H Countney Dr	1.006	0.763	EB	EXIT	2
7	E Central Entrance at Mesaba Ave	1.024	1.011	NB	EXIT	4
7	E Central Entrance at Mesaba Ave	1.060	0.744	WB	EXIT	6
7	E Central Entrance at Mesaba Ave	0.911	0.958	SB	EXIT	8
7	E Central Entrance at Mesaba Ave	1.048	0.834	EB	EXIT	2

APPENDIX E. Model Estimated Annual Average Daily Traffic

Figure E1. Model Annual Average Daily Traffic Estimates, 2018 Existing



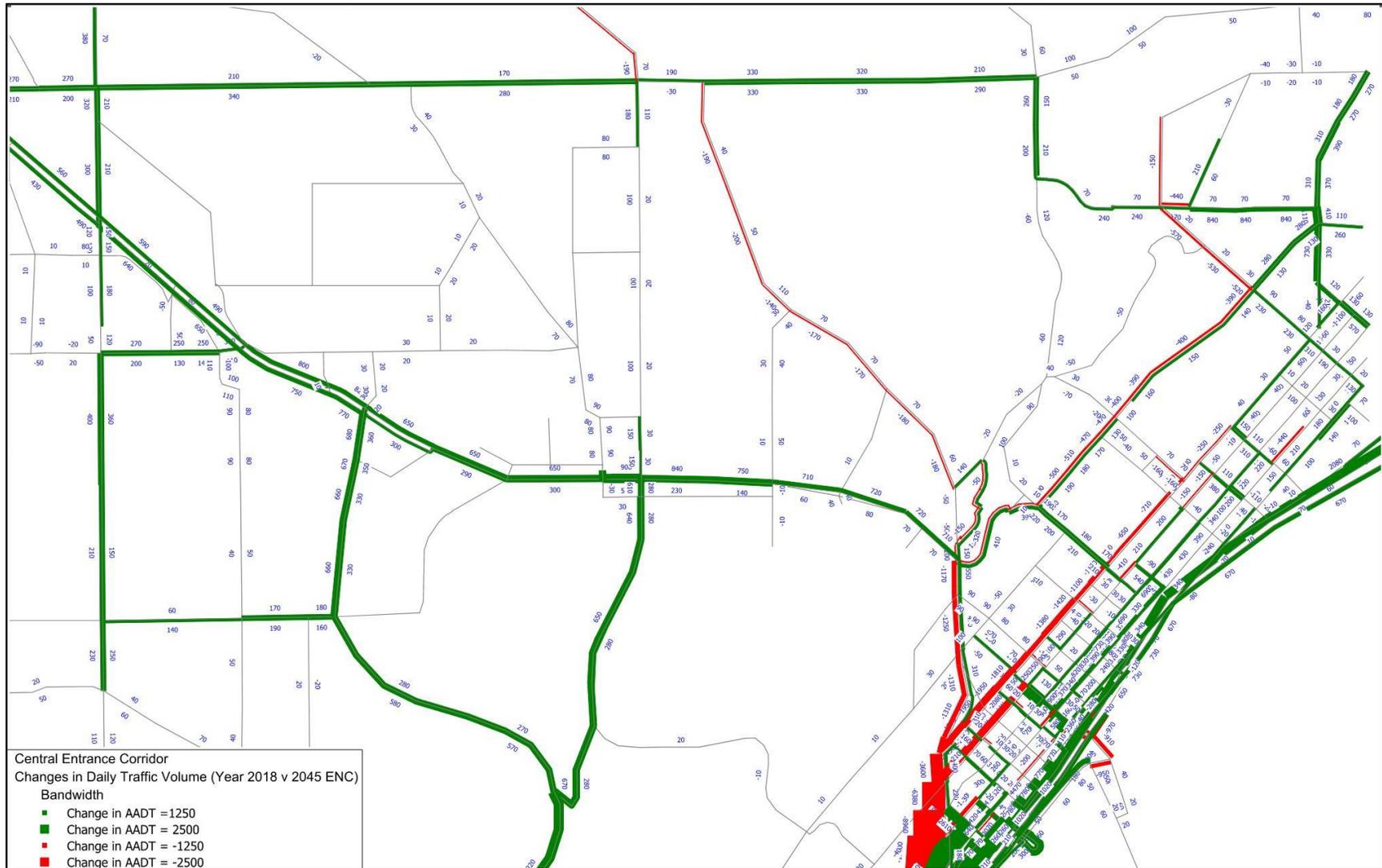
Figure E2. Model Annual Average Daily Traffic Estimates, 2045 No Build Scenario



Figure E3. Model Annual Average Daily Traffic Estimates, 2045 Build Scenario



Figure E4. Changes in Annual Average Daily Traffic, 2018 Existing vs. 2045 No Build





Appendix G - Realistic Development Scenario Trip Generation

EXISTING TRIP GENERATION*																								
Site	Land Use	% of LU	Existing Use	# of Units	Unit Type	ITE Code/Description	AM Rate			PM Rate			Weekday	AM Trips			PM Trips			Weekday Trips				
							In	Out	Rate	In	Out	Rate		In	Out	Total	In	Out	Total					
Central Entrance 6-1/4 Mile Project Nodes	Residential Land Use	67%	Single-Family Homes	2,391	Dwelling Units	210 - Single-Family Detached Housing	0.25	0.75	0.74	0.63	0.37	0.99	9.44	443	1,327	1,770	1,492	876	2,368	22,569				
		33%	Multi-Family Homes	1,195	Dwelling Units	221 - Multi-Family Housing (Mid-Rise)	0.26	0.74	0.36	0.61	0.39	0.44	5.44	112	319	431	321	206	527	6,502				
	SUBTOTAL				3,586										555	1,645	2,201	1,813	1,082	2,895	29,071			
	Mixed-Use Land Use	60%	Retail Shops	3,393.27	KSF	820 - Shopping Center	0.62	0.38	0.94	0.48	0.52	3.81	37.75	1,978	1,212	3,190	6,206	6,723	12,929	128,096				
		5%	Sit-down Restaurant	282.77	KSF	931 - Quality Restaurant	0.5	0.5	0.73	0.67	0.33	7.8	83.84	104	103	207	1,478	728	2,206	23,708				
		5%	High-Turnover Restaurant	282.77	KSF	932 - High-Turnover (Sit-Down) Restaurant	0.55	0.45	9.94	0.62	0.38	9.77	112.18	1,546	1,265	2,811	1,713	1,050	2,763	31,721				
		5%	Fast Food Restaurant	282.77	KSF	934 - Fast-Food Restaurant w/ drive-through	0.51	0.49	40.19	0.52	0.48	32.67	470.95	5,796	5,569	11,365	4,804	4,435	9,239	133,172				
		5%	Hotel**	282.77	KSF	310 - Hotel	0.59	0.41	0.47	0.51	0.49	0.6	8.36	139	96.4	235	153	147	300	4,180				
		10%	Office	565.54	KSF	710 - General Office Building	0.86	0.14	1.16	0.16	0.84	1.15	9.74	565	92	657	105	547	652	5,509				
		10%	Clinics	565.54	KSF	630 - Clinic	0.78	0.22	3.69	0.29	0.71	3.28	38.16	1628	459.2	2087	538	1318	1856	21,581				
	SUBTOTAL				5,655										11,756	8,797	20,552	14,997	14,948	29,945	347,966			
	TOTAL																	12,311	10,442	22,753	16,810	16,030	32,840	377,037

*Trip generation based on a high level estimation of existing land uses.

**based on 500 hotel rooms, not SF

TRIP GENERATION FOR REALISTIC DEVELOPMENT SCENARIO (GROWTH OVER 25 YEARS)*																							
Site	Land Use	% of LU	Existing Use	# of Units	Unit Type	ITE Code/Description	AM Rate			PM Rate			Weekday	AM Trips			PM Trips			Weekday Trips			
							In	Out	Rate	In	Out	Rate		In	Out	Total	In	Out	Total				
Central Entrance 6-1/4 Mile Project Nodes	Residential	100%	Multi-Family Homes	825	Dwelling Units	221 - Multi-Family Housing (Mid-Rise)	0.26	0.74	0.36	0.61	0.39	0.44	5.44	78	220	298	222	142	364	4,488			
	SUBTOTAL				825										78	220	298	222	142	364	4,488		
	Mixed-Use Land Use	60%	Retail Shops	175.20	KSF	820 - Shopping Center	0.62	0.38	0.94	0.48	0.52	3.81	37.75	103	63	166	321	348	669	6,614			
		10%	Sit-down Restaurant	29.20	KSF	931 - Quality Restaurant	0.5	0.5	0.73	0.67	0.33	7.8	83.84	11	11	22	153	76	229	2,448			
		10%	High-Turnover Restaurant	29.20	KSF	932 - High-Turnover (Sit-Down) Restaurant	0.55	0.45	9.94	0.62	0.38	9.77	112.18	160	131	291	177	109	286	3,276			
		20%	Office	58.40	KSF	710 - General Office Building	0.86	0.14	1.16	0.16	0.84	1.15	9.74	59	10	69	11	57	68	569			
	SUBTOTAL				292										333	214	548	662	590	1,252	12,907		
TOTAL																	411	433	846	884	732	1,616	17,395

*Trip generation based on a high level estimation of future land uses.