
TRAFFIC MEMORANDUM

DATE: September 2, 2020
PROJECT: Claremont – Pleasant Street Revitalization Project
SUBJECT: Glidden Street and Broad Street Intersection Improvements

PURPOSE: The purpose of this memorandum is to summarize the results of the traffic analysis performed at the intersections of Glidden Street and Broad Street in Claremont. The study was initiated to evaluate the intersection of Glidden Street and Broad Street to determine the best form of traffic control alternatives including stop control, signalization, and a roundabout to improve the overall operations of the intersection following the Pleasant Street one-way conversion.

INTRODUCTION: The Claremont – Pleasant Street Revitalization Project will convert Pleasant Street to a one-way street southbound and add downtown parking and traffic calming. Traffic on Pleasant Street that is currently traveling northbound to get to downtown will be directed to use Glidden Street to access Broad Street. A traffic analysis for the intersections of Glidden Street and Pleasant Street and Glidden Street and Broad Street was undertaken to determine if improvements at these intersections were warranted based on the changes in traffic patterns.

Traffic counts were performed on Thursday March 5, 2020 and Saturday March 7, 2020 and were used for the traffic analyses for the intersections of Glidden Street with Broad Street and Pleasant Street. A 1% per year background growth factor per year was used to grow the seasonally adjusted 2020 traffic volumes to the 2030 design year analysis.

MJ reviewed the existing weekday volumes during the AM and the PM peak hours and the existing Saturday volumes during the Midday peak hour to determine if one time period would govern the operations of the intersection. Based on a review of the volumes it appeared that the weekday PM peak hour would be the controlling time period. MJ modeled traffic operations at this intersection during the three peak hours and determined that the weekday PM peak hour volumes would, in fact be the controlling analysis time period.

TRAFFIC ANALYSIS: Presently, Glidden Street is a two-way road that exits as a right-only onto Broad Street southbound. With the transition of Pleasant Street to a one-way street southbound, Glidden Street will also transition to a one-way street eastbound as a means to connect northbound traveling vehicles to downtown Claremont and beyond. Therefore, vehicles that currently travel north on Pleasant Street past Glidden Street will need to use Glidden Street to make a left onto Broad Street. Three scenarios were analyzed at the intersection of Glidden Street and Broad Street: Stop Control, Signalization, and a Roundabout. Each of these scenarios included modifying the center median dividing Broad Street at the intersection with Glidden Street to accommodate left turning northbound traffic out of Glidden Street.

The analysis of the intersection where Glidden Street is controlled by a stop sign showed that the increased traffic turning onto Broad Street will result in excessive delay and queuing of vehicles on Glidden Street since the high volume of traffic on Broad Street does not have sufficient gaps for the Glidden Street traffic to enter Broad Street. Queue lengths and user delay in the weekday PM and Saturday midday peak hours would be unacceptably long with queues backing onto Pleasant Street.

The intersection of Glidden Street and Broad Street was analyzed for signal warrants with the increased traffic volumes. This new layout met the Eight Hour, Four Hour and Peak Hour signal warrants for the weekday volumes

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and the Four Hour and Peak Hour warrants for the Saturday Midday peak hour volume. The intersection was then analyzed with signalization. An option was explored that installed a traffic signal at this intersection and maintained a single thru-lane in each direction on Broad Street with a dedicated left-turn lane and dedicated right-turn lane on Glidden Street. Preliminary analysis of this alternative showed that a single lane for each movement could not provide enough capacity, resulting in long queues and moderate delays in the weekday PM and the Saturday midday peak hours.

An expanded signal alternative with two through lanes in each direction on Broad Street was then analyzed. A second through lane would be added to both the northbound and southbound approach of Broad Street. In order to accommodate the additional through lanes, some parking will be removed along Broad Street to improve traffic flow and minimize weaving. Glidden Street will have a dedicated left-turn lane with a shared left-right turn lane. This will allow the larger left turning volumes to move through the signal without significant queueing and delay to the right turning volumes. This option would maintain the existing U-turn movement at Broad Street Park from the north but remove the opposing U-turn movement from the south. It was assumed that the majority of southbound U-turn users were intending to turn onto Glidden Street which is no longer possible under the new one-way transition. Any traffic exiting the Post Office intending to go south on Broad Street will need make a right out of the driveway and go around Broad Street Park.

Roundabouts were also considered as an alternative. Early analysis, however, showed that a single lane roundabout would not provide enough capacity due to the nature of the movements. A double lane roundabout would perform well, however there is insufficient space to construct a double lane roundabout without significant impacts to the businesses on the corners of the intersection and the Post Office across Broad Street. Therefore, this alternative is not considered a realistic option.

CONCLUSIONS: Table 1 below compares the two signalization alternatives with estimated 2030 traffic volumes. As shown in Table 1, the proposed signal alternative that provides two lanes on the Broad Street approaches is expected to provide minimal overall delay of the intersection, maximize the capacity of the intersection, and result in queue lengths shorter compared to the signal alternative that only provides a single lane on the Broad Street approaches. It is worth noting that the addition of traffic control to Broad Street will introduce delay to Broad Street through traffic that does not presently exist. However, to accommodate the Pleasant Street Revitalization Project's goals, constructing a signal at the Broad Street and Glidden Street intersection reduces that delay to the greatest extent possible within the available right-of-way.

This intersection was not analyzed with an exclusive pedestrian phase under the signalized option which would add to the overall delay of the intersection. It is anticipated that if concurrent pedestrian phases were introduced into the intersection, the reported LOS, and queue lengths would be realized. Pedestrians have multiple means to cross Broad Street and it is not anticipated that pedestrians will cause notable delays.

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Claremont - Pleasant Street
2030 Intersection Alternative Results for Glidden St at Broad St

2030 Single Lane Signal Alternative									
Approach	AM			PM			SAT		
	Queue (ft)	Delay (sec)	LOS	Queue (ft)	Delay (sec)	LOS	Queue (ft)	Delay (sec)	LOS
Broad St (SB)	263	13.3	B	1048	27.7	C	1110	19.4	B
Glidden St	188	28.1	C	679	51.9	D	773	49.3	D
Broad St (NB)	278	19.7	B	595	32.8	C	606	31.8	C

2030 Double Lane Signal Alternative									
Approach	AM			PM			SAT		
	Queue (ft)	Delay (sec)	LOS	Queue (ft)	Delay (sec)	LOS	Queue (ft)	Delay (sec)	LOS
Broad St (SB)	222	8.5	A	408	11.2	B	293	9.9	A
Glidden St	156	11.6	B	198	14.3	B	196	13.4	B
Broad St (NB)	160	9.5	A	148	11.5	B	199	11.1	B

A	
B	
C	
D	
E	
F	

Signalized Intersection Level of Service*		
Control Delay (seconds per vehicle)	LOS by V/C Ratio	
	≤ 1	> 1
≤ 10	A	F
> 10-20	B	F
> 20-35	C	F
> 35-55	D	F
> 55-80	E	F
> 80	F	F

Source

* FHWA Signalized Intersections: Informational Guide, Exhibit 7-4

Table 1: Design Year Signalization Results Comparison