

City of Madison, Wisconsin

# E Mifflin St & N Blair St Diverter

Test Traffic Diverter Analysis, March 19, 2018

## **Background**

The Tenney-Lapham Neighborhood Association asked City Traffic Engineering to attend and present data at a Transportation Safety Meeting on April 17, 2017. Prior to that meeting, the Tenney-Lapham Neighborhood Association formed a steering committee to make suggestions to improve the East Mifflin Bicycle Boulevard.

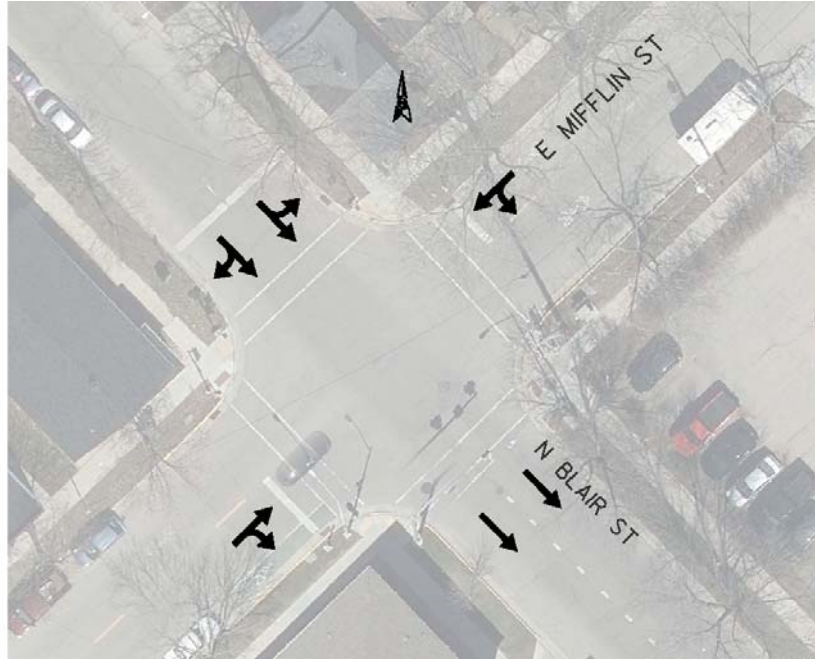
One of the requests from the steering committee was to construct a half traffic diverter at the intersection of East Mifflin Street and North Blair Street. In response to this request, city Traffic Engineering agreed to test a temporary, 90-day, traffic diverter at the intersection in order to collect traffic data and public feedback.

The city plans to reconstruct North Blair Street from East Johnson Street to East Washington Avenue during the summer of 2018. Traffic Engineering decided to set up a test diverter as soon as possible in order to collect the data and public feedback necessary to make a recommendation as to whether a permanent diverter would be included with the reconstruction of North Blair Street.

This report provides the public feedback submitted to city Traffic Engineering and reports the data findings from the effects of the test traffic diverter on traffic volume and speed on the surrounding streets.

## **Existing Intersection Conditions**

The existing traffic movements permitted at Blair-Mifflin intersection are shown below in Figure 1.



**Figure 1. Existing Traffic Movements at Blair-Mifflin Intersection**

The following are the existing conditions (pre-test) of the intersection:

- North Blair Street is a two lane, one-way street heading in the southeast direction
- East Mifflin Street is a stop sign-controlled two-way street
- East Mifflin Street is signed and marked as a bicycle boulevard
- Pedestrians are accommodated with crosswalks on all four legs of the intersection
- A “HAWK” signal stops North Blair Street traffic at the intersection when a pedestrian or bicyclist pushes a button to actuate the signal

## Test Diverter Intersection Conditions

Traffic Engineering installed the test diverter on Wednesday, October 4, 2017. The following were the intersection conditions after the test diverter was put in place:

- Outbound (eastbound) East Mifflin Street motor vehicles were required to turn right at North Blair Street, except authorized vehicles including garbage collection vehicles, snow plows and bikes
- Left turns from North Blair Street to East Mifflin Street were restricted, except authorized vehicles including garbage collection vehicles, snow plows and bikes

These conditions are shown below in Figure 2.



**Figure 2. Traffic Movements permitted at Blair-Mifflin intersection with diverter**

In discussion with city Streets Division, it was decided that garbage collection vehicles would be allowed to continue through the diverter. Restricting these vehicles would require them to back down the 600 block of East Mifflin Street, from Blount Street in order to collect garbage on that block.

Snowplows were allowed to drive eastbound against the diverter to remove snow from the intersection.

## Traffic Volumes

Traffic Engineering staff collected traffic volumes and speeds in the area confined by North Blair Street, East Washington Avenue, East Johnson Street and North Brearly Street on three separate occasions:

1. Before the test diverter was installed (before)
2. While the test diverter was installed (during)
3. After the test diverter was removed (after)

During the “before” data collection period, there were several, major, private development projects under construction, which occupied portions of streets and affected traffic. They included:

- Veritas Village Apartments, 110 N Livingston St
- Lyric Apartments, 1010 E Washington Ave
- The Breese Apartments, 1003 E Mifflin St

- Starliner Lofts, 800 block, E Mifflin St

However, construction of each of these projects were complete for the “during” and “after” data collection. Due to these circumstances, Traffic Engineering found comparing the “during” data to the “after” data the most useful. Therefore, the volume and speed comparisons in this report will compare the “during” data to the “after” data.

Traffic Engineering collected traffic volume data using the following two methods:

- **Mechanical hose counters**, which use pulses of air from vehicles driving over rubber hoses to determine speed and volume data on an hourly basis.
- **Turning movement counts** at specific intersections were collected manually by Traffic Engineering staff. These counts were collected from 7:00 a.m. to 9:00 a.m., from 11:00 a.m. to 1:00 p.m. and from 4:00 p.m. to 6:00 p.m. That data is then extrapolated using typical hourly volume trends in order to get total daily volumes.

First, the comparison of the Average Weekday Traffic (AWT) obtained from the 24-hour hose counts (shown in Figures 3, 4 and 5 below), shows that the diverter generally decreased traffic in the area, with the exception of the 10 blocks of North Livingston Street and North Paterson Street. The 23 percent increase in North Livingston Street traffic is likely due to drivers rerouting from using Blair Street and East Mifflin Street to using the route of Blair Street to East Washington Avenue to North Livingston Street. While this is a relatively large percent increase in traffic volume, it is still within the capacity of the street, especially since the increase was mainly in the direction away from East Washington Avenue.

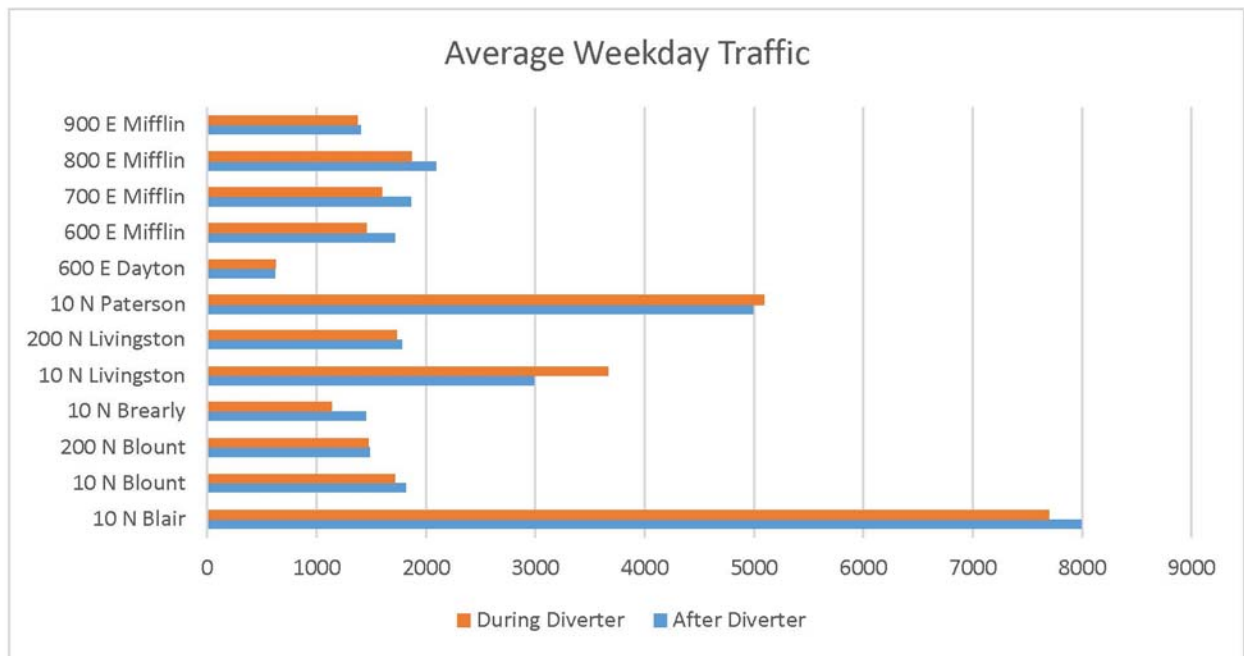


Figure 3. AWT Volumes—“During Diverter” compared to “After Diverter”

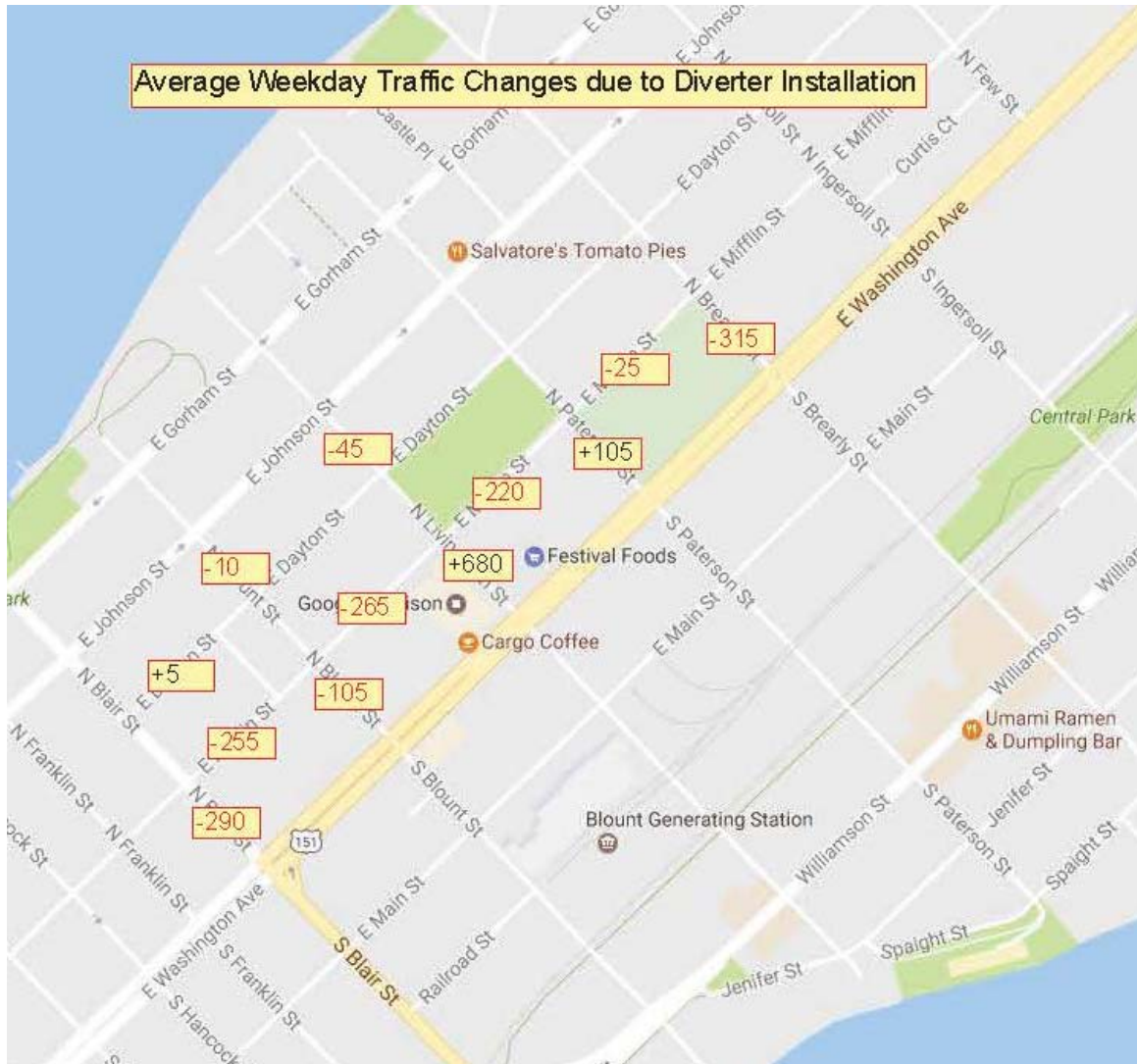


Figure 4. Changes in AWT due to Blair/Mifflin diverter

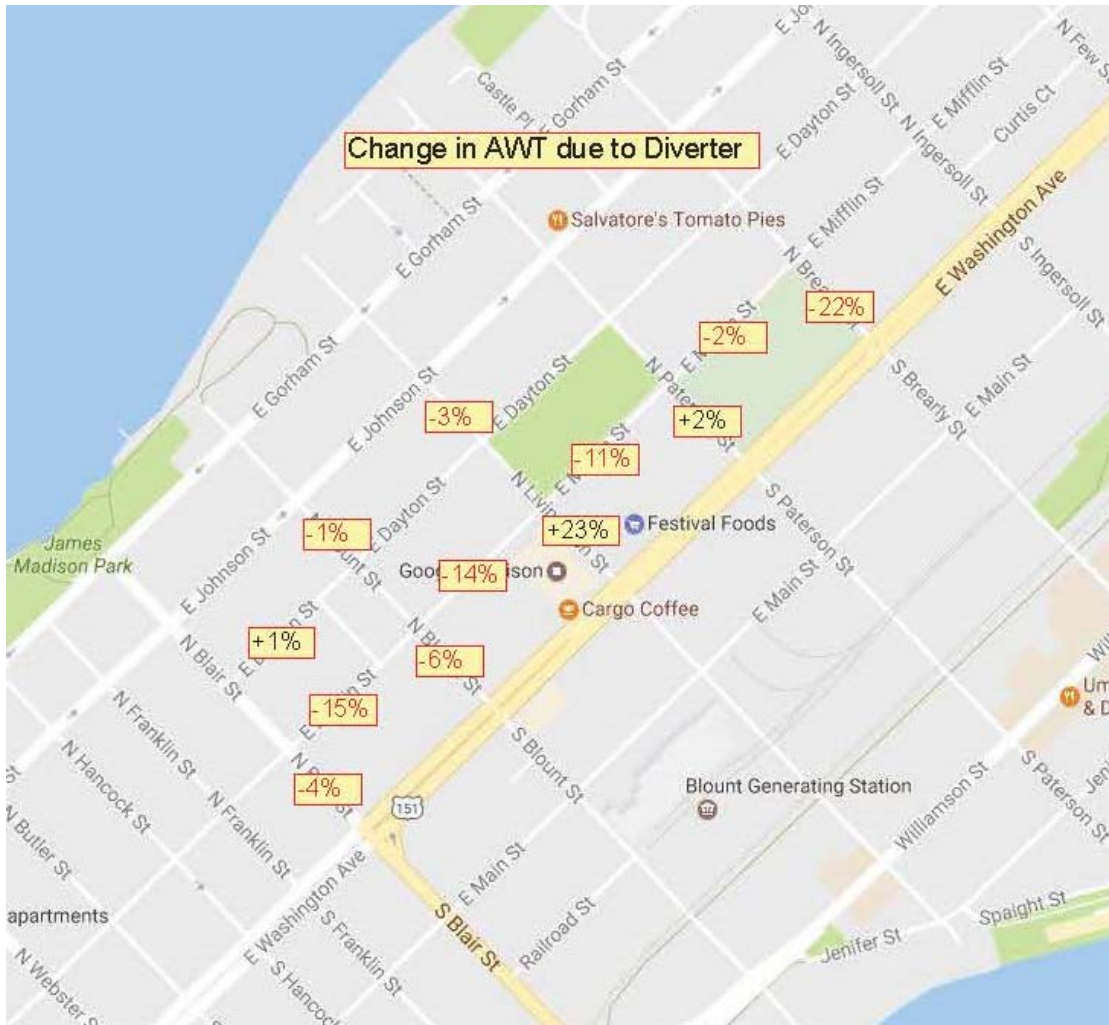


Figure 5. Changes in AWT due to Blair/Mifflin diverter

Figure 6 below shows the average weekday traffic for the turning movements at the North Blair and East Mifflin Street intersection after the diverter was removed. Figure 7 below shows the volumes while the diverter was in place. The changes in turning movements at the North Blair Street & East Mifflin Street intersection are shown in Figures 8 & 9. Eastbound East Mifflin Street traffic decreased by about 675 vehicles per day. Volumes at the intersection decreased overall, with North Blair Street decreasing by 11 percent, between East Mifflin Street and East Washington Avenue.

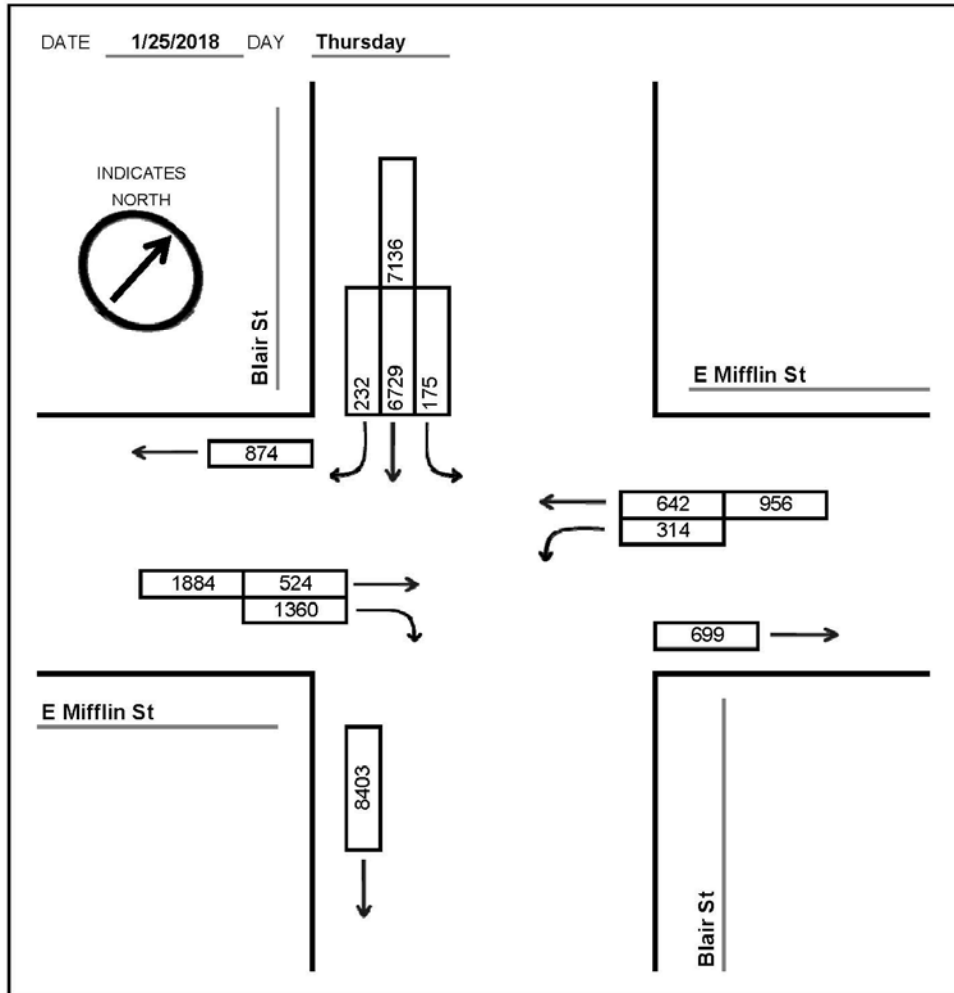


Figure 6. Average Weekday Traffic (AWT) after diverter was removed



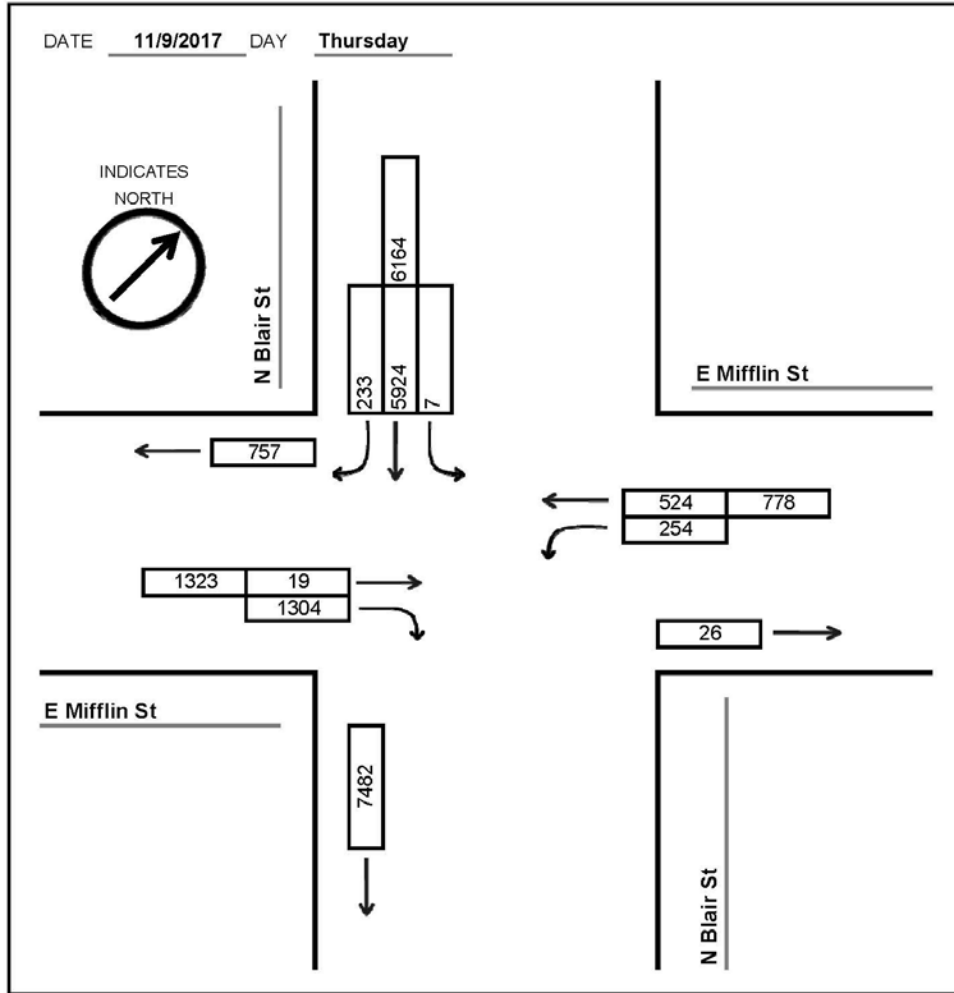


Figure 7. AWT while test diverter was in place

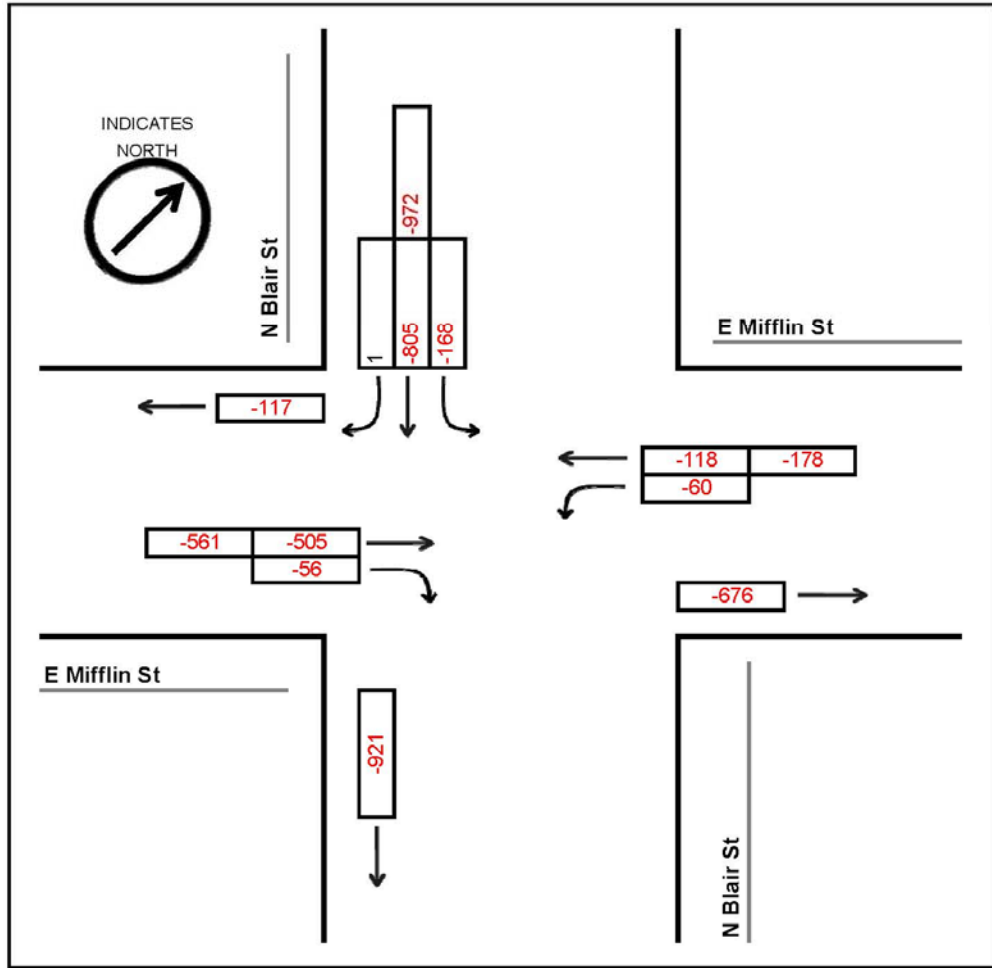


Figure 8. Difference in AWT due to test diverter

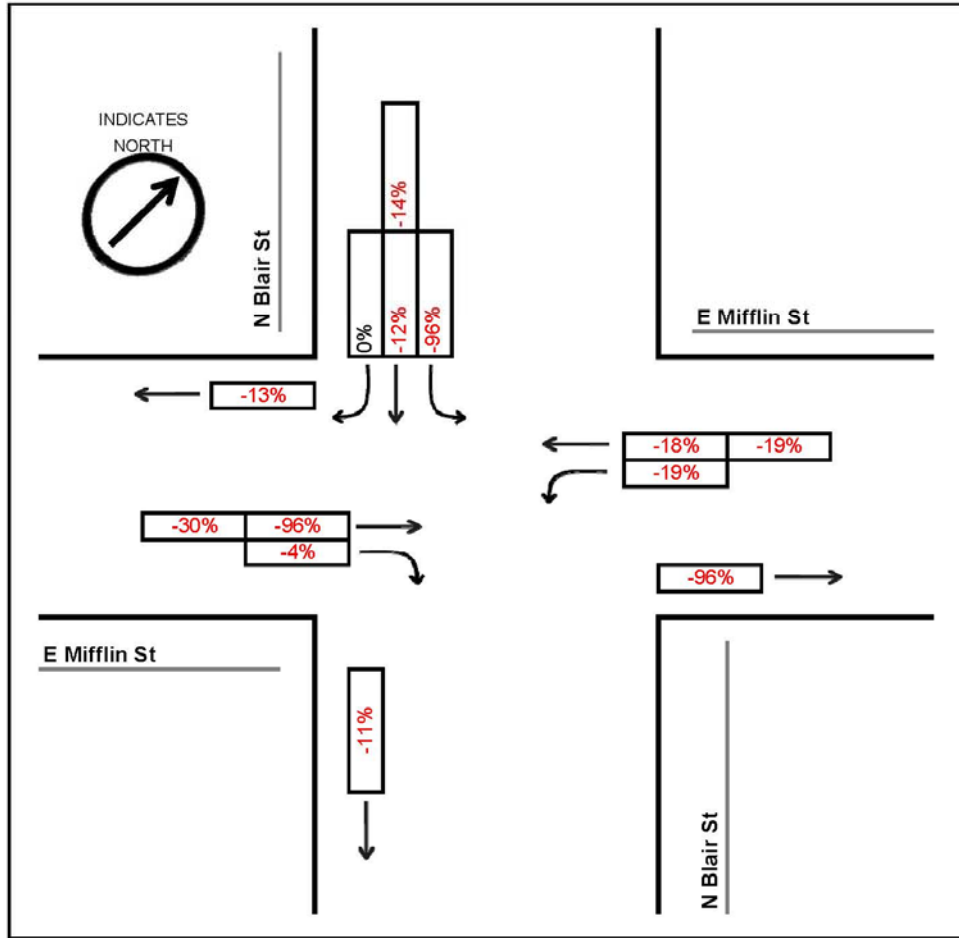


Figure 9. Percent change in AWT volumes due to test diverter

**Left turns from East Washington Ave.** Traffic Engineering staff observed traffic on East Washington Avenue before and during the diverter to review the traffic queues for vehicles turning left from East Washington Avenue to North Blount Street and North Livingston Street. These left turning movements were expected to increase due to the installation of the diverter. The concern was the possibility of traffic queueing beyond the left turn bays on East Washington Avenue during the afternoon peak traffic period. Although left turns did increase at North Blount Street and North Livingston Street as shown in Tables 1 & 2 below, Traffic Engineering staff observed that the queues did not extend beyond the left turn bays, and the existing signal timing at Livingston Street was able to clear the queues during each signal cycle.

**Table 1: Left turns from East Washington Avenue to North Blount Street**

Before Diverter	Tuesday, 10/3/2017	
	4pm to 5pm	17
	5pm to 6pm	37
	<b>Total</b>	<b>54</b>
	Wednesday, 10/11/2017	
	4pm to 5pm	30
	5pm to 6pm	49
	<b>Total</b>	<b>79</b>
During Diverter	Wednesday, 10/18/2017	
	4pm to 5pm	33
	5pm to 6pm	43
	<b>Total</b>	<b>76</b>
	Wednesday, 11/22/17	
	4pm to 5pm	32
	5pm to 6pm	39
	<b>Total</b>	<b>71</b>

**Table 2: Left turns from East Washington Avenue to North Livingston Street**

Before Diverter	Tuesday, 10/3/2017	
	4pm to 5pm	144
	5pm to 6pm	156
	<b>Total</b>	<b>300</b>
During Diverter	Wednesday, 10/4/2017	
	4pm to 5pm	148
	5pm to 6pm	182
	<b>Total</b>	<b>330</b>
	Thursday, 10/5/2017	
	4pm to 5pm	144
	5pm to 6pm	186
	<b>Total</b>	<b>330</b>
	Tuesday, 12/5/17	
	4pm to 5pm	133
5pm to 6pm	191	
<b>Total</b>	<b>324</b>	
Wednesday, 12/6/17		
4pm to 5pm	142	
5pm to 6pm	175	
<b>Total</b>	<b>317</b>	

**Bicycle Volumes.** Traffic Engineering staff counted bicyclists travelling through the North Blair Street intersection on East Mifflin Street before, during, and after the diverter. Bicycle volumes differ from motor vehicle volumes in that bicycle volumes are highly dependent on weather and time of year, while motor vehicle volumes are relatively consistent year-round. The “before” data was collected on March 28, 2017. The high temperature was 57 degrees with 10 mph wind speed. The “during” data was collected on November 9, 2017. The weather was 41 degrees with 10-20 mph winds. The “after” data was collected on January 25, 2018. The weather was 35 degrees with 5-10 mph winds. The bicycle volumes are shown in Table 3 below.

**Table 3: Bike counts on East Mifflin Street, crossing North Blair Street**

		<b>3/28/2017</b>	<b>11/9/2017</b>	<b>1/25/2018</b>
		<b>Before</b>	<b>During</b>	<b>After</b>
<b>7am to 9am</b>	Outbound Bikes thru	11	7	2
	Inbound Bikes thru	98	95	51
<b>11am to 1pm</b>	Outbound Bikes thru	11	11	9
	Inbound Bikes thru	22	10	13
<b>4pm to 6pm</b>	Outbound Bikes thru	71	70	35
	Inbound Bikes thru	26	17	11

The “before” and “during” volumes are similar, while the “after” volumes are generally lower. Traffic Engineering staff believe this difference is mostly due to time of year. There was no significant change in bicycle volumes due to the installation of the diverter.

## Traffic Speeds

Traffic Engineering collected speeds with the hose counters at the same time as the volume data.

The posted speed limit on East Mifflin Street and its cross streets is 25 mile per hour. Traffic Engineering uses the percent of traffic travelling faster than five miles per hour over the posted speed limit as an indicator of the amount of speeding on a street when considering traffic calming measures. For all the streets that were studied, this equates to the percent of traffic travelling over 30 miles per hour. This is shown in the Figure 10 below. The additional streets listed at the bottom of the chart are the streets that will receive speed humps during the 2018 construction season. This comparison is only to show the speeds in the East Mifflin Street area to other areas of the city with neighborhood-identified speeding problems.

In comparison, the speeds on East Mifflin Street are not as high as other streets in the city. The speeds on East Mifflin Street are, generally, typical of residential streets in the city.

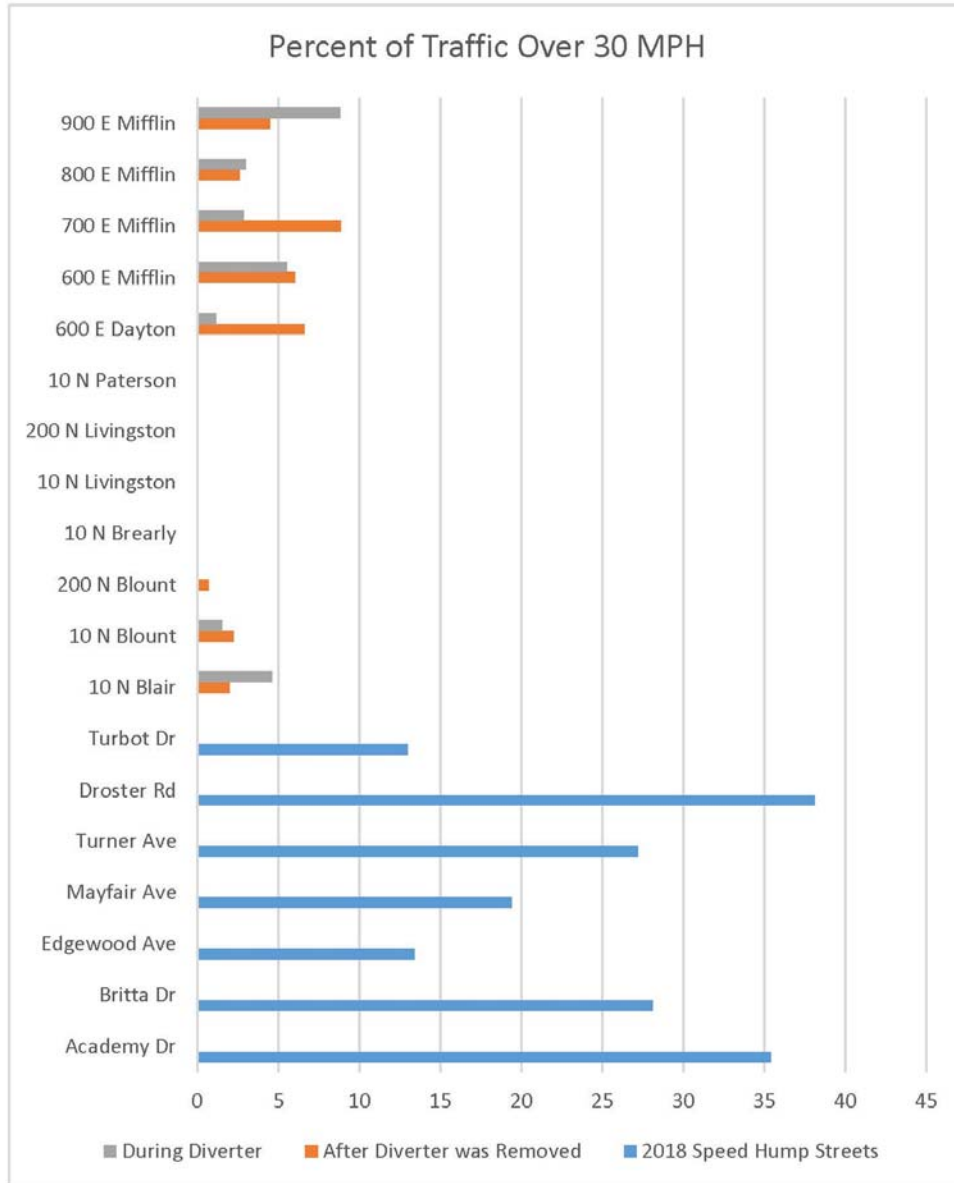


Figure 10. Comparison of traffic speeds using percent of traffic over 30 miles per hour

**600 Block of East Mifflin Speeds.** To compare speeds on the 600 block of East Mifflin, which is the block directly to the east of the diverter, the best comparison to use is the change in total number of speeders on the block, rather than percentage of speeders, since the volume of traffic on the block also changed. The following are the total number of vehicles traveling over 30 miles per hour on the 600 block during the 24-hour data collection periods:

- **Before Diverter 2/9/17—137 vehicles over 30 mph**
- **Before Diverter 9/14/17—89 vehicles over 30 mph**
- **During Diverter 11/8/17—79 vehicles over 30 mph**
- **After Diverter 2/27/18—103 vehicles over 30 mph**

## License Plate Study

Traffic Engineering staff collected license plates of vehicles on East Mifflin Street at North Livingston Street before and during the test diverter installation. The license plate study showed that a large majority—roughly 80 percent—of vehicles were registered to locations outside the Tenney—Lapham neighborhood both before and during the diverter installation.

However, due to the high number of apartments in the area, it should be noted that residents in apartments might use a vehicle that is registered to a separate, permanent address not located in the neighborhood. For example, a UW student or young professional might use a vehicle registered to their parents' address.

## Safety

East Mifflin Street was designated a “bicycle boulevard” in 2011. Since then, the only bicycle-related crashes reported to the police along the bicycle boulevard were three crashes at the North Blount Street intersection and two crashes near North Blair Street. The people involved in these three crashes reported they were due to not seeing the stop signs on North Blount Street. Since these crashes, additional signs were installed. Based on the reduction of crashes, this measure appears to have ameliorated the problem.

One crash at North Blair Street was a vehicle rear-ending a bicycle at the stop sign. The other crash was from a driver backing out of a driveway, striking a bicyclist they reportedly did not see.

**All-Way Stop Installations.** Prior to the test diverter, Traffic Engineering converted the intersection of North Livingston Street & East Mifflin Street to an all-way stop-controlled intersection around May 30, 2017. This intersection was previously a two-way stop controlled intersection with the stop signs on Livingston Street. In addition, Traffic Engineering converted the intersection of North Paterson Street and East Mifflin Street to an all-way stop-controlled intersection around September 10, 2017. This intersection was previously a two-way stop-controlled intersection with the stop signs on North Paterson Street. Traffic Engineering installed these all-way stops due to the increase in vehicle and pedestrian volume in this area—likely a result of increasing development. Observations have been that this has decreased the confusion in the area and made the intersections safer for all users.

Because traffic crashes are generally a rare event and because the test diverter was in place for a relatively short duration of time, no conclusions can be made in regards to the change in crash frequency along East Mifflin Street—only anecdotal observations of safety can be made. From the feedback that Traffic Engineering has received, there was an overall sense that East Mifflin Street “felt safer” and “felt better” to bicyclists due to the lower volume of vehicles in the blocks east of North Blair Street.



However, Traffic Engineering also received several comments of concern regarding vehicles driving the “wrong way” around the diverter to enter the neighborhood and an increase in the traffic queue on North Blair Street from 5:00 p.m. to 6:00 p.m. on weekdays.

## **Public Feedback**

One of the central reasons for the installation of any traffic test is to collect feedback from the public. Alder Ledell Zellers and Traffic Engineering staff encouraged public feedback during the test diverter. Traffic Engineering sent a postcard to all residents in the area bound by East Washington Avenue, East Johnson Street, North Blair Street and Baldwin Street. The postcard included contact information and encouraged feedback.

In addition, Traffic Engineering placed signs on the test diverter with contact information to provide feedback.

In total, Traffic Engineering received 48 emails and phone calls in favor of the diverter and 43 emails and phone calls in opposition of the diverter.

In addition, Traffic Engineering received 97 postcards, each identical to the one shown in Figure 11 below, apart from the signature.



Figure 11. One of 97 identical postcards sent to Traffic Engineering regarding the diverter

## North Blair Street Reconstruction Project

North Blair Street will be reconstructed during the summer of 2018, with work scheduled to start in May of this year. If the Common Council approves a permanent diverter, the construction of the diverter would be included in the Blair St. reconstruction plans.

## **Conclusion**

The East Mifflin Street, bicycle boulevard corridor has changed significantly, especially the 700-900 blocks, in the past several years due to the addition of several large apartment buildings and a grocery store. With these additions, there has been an increase in motor vehicle, bicycle and pedestrian traffic. The increase in traffic has led to reports of additional conflicts between bicyclists and motor vehicles, leading some bicyclist to feel unsafe during high traffic times on a street designated by the city as a bicycle boulevard.

Data collection during the test diverter period does not show a significant diversion of traffic onto the surrounding neighborhood streets such as East Dayton Street or North Blount Street.

Therefore, and although traffic queues at the North Blair Street intersection increase during afternoon peak traffic times due to the diverter, it is Traffic Engineering's recommendation to include a permanent diverter as part of the North Blair Street reconstruction project in 2018. This change will reduce cut-through traffic and maintain the bicycle boulevard as a more bicycle-friendly street.