ITEM # 30
DATE: 6-10-14

COUNCIL ACTION FORM

SUBJECT: **6TH STREET TRAFFIC ANALYSIS**

BACKGROUND:

City Council referred a letter from Matthew Mauk concerning "the increase in traffic density" after the 3-lane with bike-lanes conversion that took place on 6th Street between Grand Avenue and Hazel Avenue. The three recommendations that Mr. Mauk suggested are: 1) adding east-west traffic control (4-Way Stop) at the intersection of 6th Street and Northwestern Avenue, 2) reducing the crossing width of the 6th Street and Northwestern Avenue intersection, and 3) lowering the speed limit to 25 MPH from Grand Avenue west to the Squaw Creek Bridge. In response, staff collected speed, volume, and crash data for this section of 6th Street.

The following are some important attributes regarding the current condition of section of 6th Street:

- The posted speed limit is 30 MPH,
- 6th Street is federally classified as a Minor Arterial street, and
- 6th Street is designated in Section 26.62 of the *Municipal Code* as being a "Through Street", which requires 2-way traffic control along the length of the roadway at all connecting streets unless otherwise designated by an engineering study. Currently north-south traffic along Northwestern is stopped at 6th Street.

1) Adding 4-Way Stop Control and Reducing Width at Intersection

The Manual on Uniform Traffic Control Devices (MUTCD), which is the federal standard used for all traffic control within the state, designates three main criteria to be evaluated to justify the installation of a 4-way stop condition. The following are those criteria from the MUTCD:

A. *Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.*

B. *Five or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right-turn and left-turn collisions as well as right-angle collisions.*

C. Minimum volumes:

1. *The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day; and*

2. *The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but*

3. *If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in Items 1 and 2.*

The evaluation of Criterion A is not relevant for the purposes of this study as stated in the language above. **Criterion A is intended mainly to justifying a 4-Way Stop when used as an interim step while evaluating the need for a traffic signal.**

Criterion B states there must be five or more crashes in a 12-month period that could be potentially mitigated by a 4-way stop condition. Staff utilized the Crash Mapping Analysis Tool (CMAT) provided by the Iowa Department of Transportation to look at the most current data (2004-2014) for this intersection. Over the last 5-years, there have been a total of three reported accidents, one of which resulted in a possible injury (see Figure 1). That accident happened during February with "slushy" road conditions. **Therefore, the thresholds in Criterion B have also not been met.**

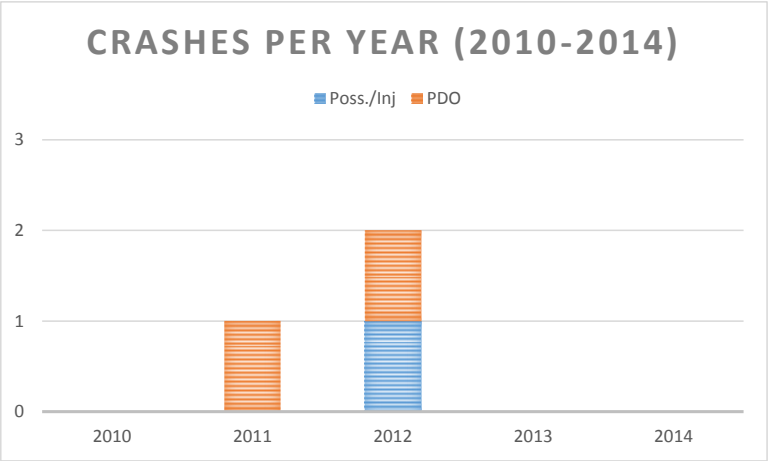

Figure 1: 5-Year Crash History by Severity

Criterion C is an analysis using traffic volume thresholds. It has three sub criteria as follows: (1) major road volumes must be >= 300 vehicles per hour (VPH) for an eight-hour period while (2) the minor road volumes must be >= 200 VPH for the same eight-

hour period; and (3) there must also be at least 30 seconds of total delay during the peak-hour. This intersection was found to have approximately 26.3 seconds of delay. **The data showed that neither criteria under C1 or C1 were met. This is been illustrated in Figure 2 below.**

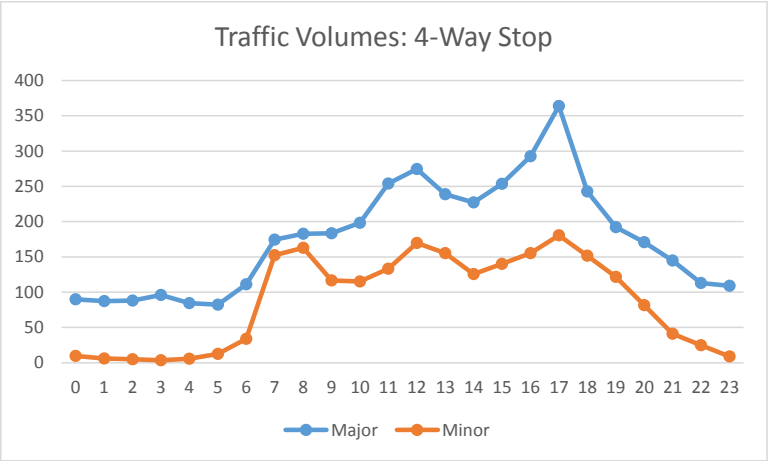

Figure 2: Average Volumes by Hour of the Day

The evaluation allows for a reduced threshold to be used if the 85th Percentile Speed along the main road is found to be 40 MPH or greater. The 85th Percentile Speed is defined as the speed at which 85% of the vehicles are traveling at or below. The data showed that 6th Street has an 85th Percentile Speed equaling 33 MPH, which is below the 40 MPH threshold speed. Therefore, the original thresholds under Criteria C1 and C2 stand. Figure 3 below shows the probability (PDF) and cumulative (CDF) distributions of the data.

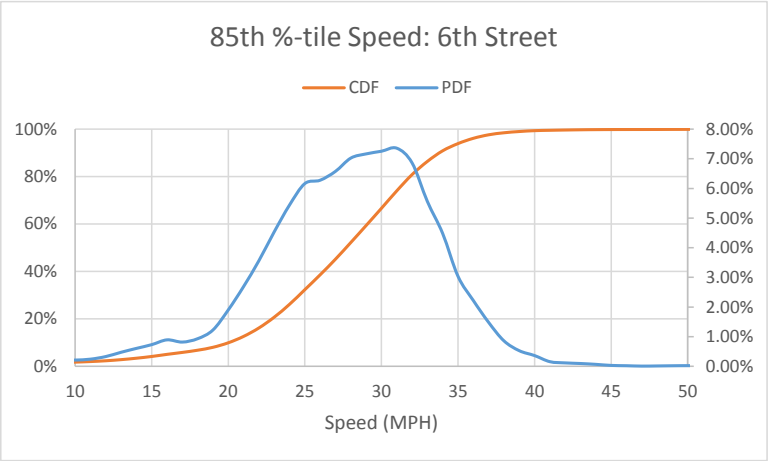

Figure 3: Vehicle Speeds in Percent of Distribution

In summary, none of the criteria were met for adding 4-way stop control or reducing width at this intersection. The safety and operational analysis all indicate that 6th Street is currently operating in an acceptable manner. Therefore, it is recommended that no changes be made at this time.

2) Reducing Speed on 6th Street to 25 MPH

The three main criteria for evaluating the operational speed of a roadway to establish the proper posted speed limit include (1) 85th Percentile Speed, (2) Pace, and (3) the Prevailing Speed. The 85th Percentile Speed is defined as the speed at which 85% of the vehicles are traveling at or below. The Pace is the 10 MPH range of speeds that contain the highest volume of vehicles. The Prevailing Speed is the average of the 85th Percentile Speed and the upper limit of Pace. The data collected along this section of 6th Street is summarized in Table 1 below.

Table 1: Summary of Speed Data along 6th Street

	85th %-tile		Pace		Prevailing Speed	
	EB	WB	EB	WB	EB	WB
E/W	33.7	34.1	27-36	26-35	34.9	34.6
Overall	33.9		26-35		34.5	

The overall Prevailing Speed was found to be approximately 34.5 MPH, which indicates that the posted speed limit of 30 MPH is slightly low for the natural flow of traffic along this section of 6th Street. However, because it is still +/- 5 MPH from the posted limit, the current limit would be considered appropriate. Therefore, it is recommended that 6th Street remain as a 30 MPH roadway.

This area of 6th Street is one of the few arterial corridors in Ames that has successfully been able to fully incorporate multi-modal design allowing for the integration of walking, biking, transit, and motor vehicles. This is due to the many factors that have come together making this roadway highly appropriate for multi-modal design. One of these is that the majority of this section of 6th Street has a continuous and uninterrupted flow of on-street bicycle faculties. Because of this, it is important to not install traffic control where it is not warranted.

ALTERNATIVES:

1. Direct staff to maintain the current conditions along 6th Street and at the 6th Street and Northwestern Avenue intersection.

2. Direct staff to explore or implement other alternatives, such as establishing a 4-way stop at the intersection of 6th Street and Northwestern.

MANAGER'S RECOMMENDED ACTION:

6th Street has been identified as one of the main east-west connections from east Ames going west to Iowa State University. This is true for all modes of travel, and therefore is important that this roadway continue to operate in a safe, efficient, and continuous manner to support the goal of 6th Street serving as a multimodal corridor. The data

collected during this study reinforces that goal. Staff will continue to monitor this area for any decrease in safety or operations.

Therefore, it is the recommendation of the City Manager that the City Council adopt Alternative No. 1, thereby directing staff to maintain the current conditions along 6th Street and at the 6th Street and Northwestern Avenue intersection.