City of Waukesha

DEPARTMENT OF PUBLIC WORKS

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TECHNICAL MEMORANDUM

DATE: October 28, 2020

RE: Arcadian Avenue & Pleasant Street Crash and Traffic Control Study

Ald. Miller has requested a study of Arcadian Avenue & Pleasant Street in a referral to the Buildings & Grounds Committee under item ID#20-0800 *"Because of recent accidents at the intersection of Pleasant Street and Arcadian Avenue, please authorize a study for enhancements to stop signs particularly the stop sign on the north east corner."* Ald. Miller had sighted evidence from the nearby neighbors that drivers constantly blow through the All-Way stop signs and this study will evaluate the crash patterns and observe the traffic control compliance. See below for study location.

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Traffic Volume Information

- Entering ADT on Arcadian Avenue 2,644
- Entering ADT on Pleasant Street 1,117
- Total Entering ADT 3,761

Crash Statistics

The crash data collected was from 9/1/2018 to present day. This crash data was provided by the police department.

The statewide average crash rate (circa 2015) was 1.2 crashes / MEV (million entering vehicles). The crash rate calculated for Arcadian Avenue & Pleasant Street was 1.66 which is higher than the statewide average for an urban intersection with stop condition.

All crashes happened in the daytime hours. One accident was in wet conditions and the others were all dry. There was no particular time of day that crashes were the most evident.

From the MV4000 reports, all reported accidents involved a westbound driver that did not stop, either rear ending a stopped car or entering the intersection and colliding with a right angle crash.

See Exhibit 1 which shows a summary of the crash data.

Driver Compliance with the All-Way Stop

Through means of a Count Cam, which is a video recording device, engineering staff made observations during a 16-hour period of time on Thursday July 16, 2020.

During this period, 22 vehicles were counted as not stopping for the stop sign. The observations of no stop vehicles were broken into two types:

- Blows through stop sign at posted speed
- Blows stop sign (slight slow down, overtly not stopping)

Drivers observed not fully complying with a stop (i.e. rolling stop), were not counted. Drivers that blow through stop sign at postevvd speed, made no apparent attempt to stop at all or, in some cases, applied the brakes in the middle of the intersection. Drivers that blow a stop sign with a slight slow-down, tap of brakes and then accelerate through the intersection were counted as a blown stop.

1	Northbound blown stop sign at posted speed
2	Southbound blown stop sign at posted speed
1	Eastbound blown stop sign at posted speed
10	Westbound blown stop sign at posted speed
1	SB driver blows stop sign (slight slow down, overtly not

	stopping)
1	EB driver blows stop sign (slight slow down, overtly not stopping)
6	WB driver blows stop sign (slight slow down, overtly not stopping)

22 Total

The All-Way stop behavior observed does rise to the level of concern that drivers may not fully see the westbound approach stop sign or it is not overtly obvious.

Another observation made was that westbound traffic tends to see the traffic signal indications at Arcadian & East Ave. This traffic signal is located 350 feet west of Arcadian & Pleasant. If a westbound driver approaching Pleasant Street sees the signal changing from red to green (only 350 feet away), it may give the false impression that the changing signal indication is theirs and they totally forget the stop sign at Pleasant St.

Conclusions and Recommendations

- Due to its proximity, relocate the No Parking sign that is just east of the stop sign on the westbound approach. Parking sign does obstruct view of stop sign.

- Install a Flashing Stop sign system for all 4 quadrants of the intersection. The system shall be a Binkerstop brand flashing stop sign with a solar power. Said system for all 4 legs of the intersection will be $5,120.

If a flashing stop sign system is not desired, the following shall be done:

- Due to its proximity, relocate the No Parking sign that is just east of the stop sign on the westbound approach. Parking sign does obstruct view of stop sign.

- Install a Stop Ahead sign for the westbound approach since that is the approach that has the most blown stops.

- Install a second stop sign in the opposite corner of all the approaches.

- Install a post reflector that is red. Said reflector will add more noticeability to the upcoming stop

- Install geometrically programmed louvers on the east-facing traffic signals at Arcadian & Pleasant. Said louvers are not necessary if the flashing stop signs are installed.

INTERSECTION CRASH STATISTICS

INTERSECTION:	Arcadian Avenue & Pleaseant Street								
MUNICIPALITY:	Waukesha				COUNTY:	Waukehsa		STATE:	WI
PERIOD:	1	YEARS	9	MONTHS	FROM:	9/1/2018	TO:	6/1/2020	

PROJECT ID:	PREPARED BY:	MFG	DATE:	10/20/2020

INTERSECTION CHARACTERISTICS

TRAFFIC CONTROL:	MINOR STOP CONTROLLED	POSTED SPEED MAJOR:	25
INTERSECTION AADT (2020):	3,760	POSTED SPEED MINOR:	25
NUMBER OF LEGS:	4		

CRASH STATISTICS

CRASH FREQUENCY & SEVERITY				
YEAR	PDO	INJURY	FATAL	TOTAL
2018	1	0	0	1
2019	1	0	0	1
2020	1	1	0	2
TOTAL	3	1	0	4
PERCENT	75.0%	25.0%	0.0%	100.0%
YEAR AVG.	1.71	0.57	0.00	2.28

CRASH RATES		per MEV	DOT State Average
CRASH RATE		1.66	**1.2**
INJURY CRASH RATE		0.42	Urban Unsignalized
FATAL CRASH RATE		0.00	stop on minor street

LIGHT CONDITIONS		%
DAY	3	100.0%
DARK	0	0.0%
TOTAL	3	100.0%

ROAD CONDITIONS		%
DRY	3	75.0%
WET	1	25.0%
SNOW	0	0.0%
ICE	0	0.0%
OTHER	0	0.0%
TOTAL	4	100.0%

CRASH TYPE		%
ANGLE	2	50.0%
REAR-END	2	50.0%
HEAD-ON	0	0.0%
SS-SAME	0	0.0%
SS-OPPOSITE	0	0.0%
PEDESTRIAN	0	0.0%
BICYCLE	0	0.0%
FIXED	0	0.0%
NOT FIXED	0	0.0%
DEER	0	0.0%
OVERTURN	0	0.0%
OTHR/UNKN	0	0.0%
TOTAL	4	100.0%

DAY AND TIME							
DAY OF WEEK	*EARLY MORNING* 12:00 AM TO 5:59 AM	*AM PEAK* 6:00 AM TO 9:59 AM	*MIDDAY* 10:00 AM TO 2:59 PM	*PM PEAK* 3:00 PM TO 6:59 PM	*LATE EVENING* 7:00 PM TO 11:59 PM	TOTAL	
MONDAY	0	0	0	0	0	0	
TUESDAY	0	0	1	1	0	2	
WEDNESDAY	0	0	0	0	0	0	*Weekday*
THURSDAY	0	0	0	1	0	1	
FRIDAY	0	0	0	0	0	0	
SATURDAY	0	0	0	0	0	0	*Weekend*
SUNDAY	0	1	0	0	0	1	
TOTAL	0	1	1	2	0	4	

Notes: MEV is per Million Entering Vehicle. Crash rate calculated based on crash per million vehicles intering the intersection. PDO is Property Damage Only crash.

EXHIBIT 1

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INTERSECTION CRASH DATA

INTERSECTION:	Arcadian Avenue & Pleaseant Street								
MUNICIPALITY:	Waukesha				COUNTY:	Waukehsa		STATE:	WI
PERIOD:	1	YEARS	9	MONTHS	FROM:	9/1/2018	TO:	6/1/2020	

PROJECT ID:	PREPARED BY: MFG	DATE: 10/20/2020

CRASH DETAILS

REF. NUMBER	LABEL	DATE	DAY OF WEEK	TIME OF DAY	SEVERITY	MANNER OF COLLISION	ACCIDENT TYPE	LIGHT COND.	ROAD COND.
3VL09N3P49	1	9/18/2018	TUESDAY	2 PM	PDO	REAR-END	MV IN TRANS	DAY	DRY
3VL08QXVV8	2	11/26/2019	TUESDAY	6 PM	PDO	ANGLE	MV IN TRANS	DARK	WET
3VL0DPGFB5	3	5/7/2020	THURSDAY	6 PM	PDO	ANGLE	MV IN TRANS	DAY	DRY
3VL0DXVN02	4	5/24/2020	SUNDAY	9 AM	INJ	REAR-END	MV IN TRANS	DAY	DRY

Notes: Label refers to the crash location number on the crash diagram. Time given represents the hour of day the crash occurred (10:00 labled is refers to period of time from 10:00 to 11:00). PDO = Property Damage Only crash, INJ = Injury crash, SSS = side swipe same direction, Angle = right angle crashes, MV IN TRANS = vehicle was moving at time of crash.

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