TOOLE DESIGN

WOODWARD AVENUE ROAD DIET FEASIBILITY STUDY

Traffic Analysis Report

May 18, 2020 | FINAL

CONTENTS

INTRODUCTION

BACKGROUND

In June 2019 a Bicycling and Walking Safety Audit was conducted for the Woodward Avenue Corridor which crosses through the Cities of Pleasant Ridge and Ferndale, from Eight Mile Road in the south to Interstate 696 (Ten Mile Road) in the north. The ultimate intent of the Bicycling and Walking Safety Audit was to provide the safety impetus for establishing and supporting a convenient multimodal street that attracts new cycling and pedestrian activity to increase mode share and enhance quality of life in the community. Consideration of a road diet was included in the recommendations of that study to promote safer speeds and provide space for a separated bike facility along Woodward Avenue. The 2017 Ferndale Master Plan also includes a recommendation to modify Woodward Avenue to improve safety, reduce pedestrian crossing distances, and provide a more multi-modal and connected experience on this major road.

This report documents a more detailed assessment of the feasibility of a road diet on Woodward Avenue. The overall goal of this assessment is to complete the analysis requirements of the Michigan Department of Transportation (MDOT) Road Diet Checklist. Specifically, this study includes level of service (LOS) analysis of key intersections within the study corridor both under existing conditions and with a proposed lane removal, crash history analysis and recommendations for future work.

STUDY AREA

The limits of the study area for the Woodward Avenue Road Diet traffic analysis are an approximately two-mile section, from the intersection with Eight Mile Road in Ferndale north to Interstate 696 (Ten Mile Road) in Pleasant Ridge. Generally, Woodward Avenue cross section consists of a 70’ planted median that divides the road into a one-way pair. Each side of the median has three 11’ travel lanes, a 12’ travel lane on the inside, a 10’ parking lane on the outside, and an 11’ sidewalk with curb extensions at intersections and other locations.

Key corridor intersections chosen for study based on input from Ferndale and Pleasant Ridge staff, as well as MDOT requests include (shown in Figures 1 and 2):

1. Northbound Woodward Avenue at eastbound 8 Mile Road
2. Northbound Woodward Avenue at westbound 8 Mile Road
3. Southbound Woodward Avenue at eastbound 8 Mile Road
4. Southbound Woodward Avenue at westbound 8 Mile Road
5. Woodward Avenue at Fielding St
6. Woodward Avenue at Marshall St
7. Woodward Avenue at College St/Pearson St
8. Woodward Avenue at 9 Mile Rd
9. Woodward Avenue at Cambourne St
10. Woodward Avenue U-turn signal near Woodward Heights
11. Woodward Avenue at Sylvan Ave/Oakland Park Boulevard
12. Northbound Woodward Avenue at eastbound 10 Mile Road
13. Northbound Woodward Avenue at westbound 10 Mile Road
14. Southbound Woodward Avenue at eastbound 10 Mile Road
15. Southbound Woodward Avenue at westbound 10 Mile Road
16. Overpass road at eastbound 10 Mile Road (just west of Woodward Ave)
17. Overpass road at westbound 10 Mile Road (just west of Woodward Ave)
18. Main Street at westbound 10 Mile Road
19. Main Street at eastbound 10 Mile Road

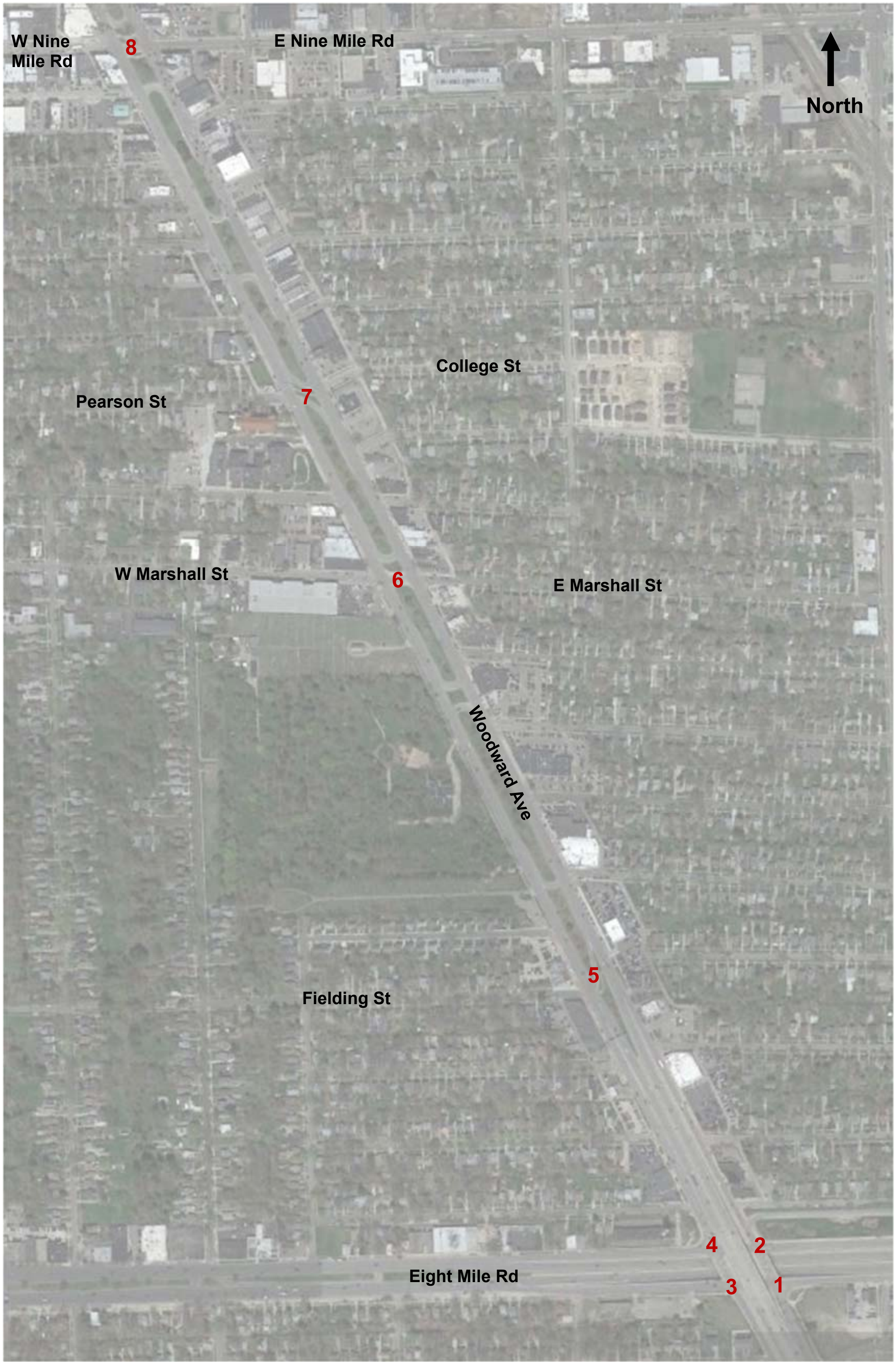

Figure 1: Woodward Avenue Corridor, South (Study Intersections 1-8)

Figure 2: Woodward Avenue Corridor, North (Study Intersections 9-19)

EXISTING CONDITIONS

Traffic data for Woodward Avenue was collected in order to model the existing conditions. Signal timing information was provided by Oakland County and Wayne County. Signal timing information is provided in Appendix A. Turning movement counts at the study intersections were collected on Wednesday, October 30, 2019 from 7:00AM – 10:00AM and 4:00PM – 7:00PM. Link counts were conducted at two locations on the corridor from October 29-31, 2019. At the time of the October 2019 counts, construction was underway on I-75 and anecdotal evidence suggested that diverted traffic may have been creating higher than usual volumes on Woodward Avenue through the study section. Additional traffic counts at three key intersections were conducted on Tuesday, February 4, 2020 to provide a comparison, which is summarized in Table 1 below. The turning movement and link volume counts are provided in Appendix B.

As shown in Table 1, there is a notable decrease in overall intersection peak hour volume that varies between 7 and 22 percent at the three locations noted during both peak hours. Based on this information, the February counts at these three intersections were utilized for the existing conditions analysis and the remaining October count data was reduced by 7 percent for through movements along Woodward Avenue, which is a conservative reduction using the lowest observed volume reduction along the corridor. The resulting corridor volumes are summarized in Appendix B.

Table 1: Existing Count Comparison

Location	Total Approach Volumes						% Change		
	October Counts			February Counts					
		SB	NB		SB	NB		SB	NB
Woodward Avenue & Sylvan Avenue	AM	3684	2616	AM	3426	2250	AM	-7%	-14%
	PM	2649	3713	PM	2442	3188	PM	-8%	-14%
Woodward Avenue & 9 Mile Road	AM	3779	1865	AM	3523	1619	AM	-7%	-13%
	PM	2321	3355	PM	2066	3062	PM	-11%	-9%
Woodward Avenue & Marshall Street	AM	3792	1543	AM	3490	1202	AM	-8%	-22%
	PM	1888	3379	PM	1494	2796	PM	-21%	-17%

According to the link counts collected in October 2019, volumes on the corridor are heavier in the southbound direction during the AM peak hour, and in the northbound direction during the PM peak hour. The AM peak generally occurs from 7:30 to 8:30 AM with some variation and the PM peak occurs from 4:00 PM to 5:00 PM. The Woodward Avenue through movement volume peaks sharply, and becomes quickly lower during adjacent time periods as shown in Table 1 and Figures 3 and 4.

Table 2: Woodward Avenue Peaking Characteristics

Woodward Avenue North of Cambourne Street			Woodward Avenue South of Marshall Street		
Hour Beginning	Bi-directional Hourly Volume	% Change from Peak	Hour Beginning	Bi-directional Hourly Volume	% Change from Peak
6:30AM	2,788	-46%	6:45AM	3,049	-35%
7:00AM	4,308	-16%	7:15AM	4,313	-8%
7:30AM	**5,142**	**--**	**7:45AM**	**4,699**	**--**
8:00AM	4,810	-6%	8:15AM	3,923	-17%
8:30AM	3,689	-28%	8:45AM	2,715	-42%
4:00PM	4,311	-16%	4:00PM	4,039	-14%
4:30PM	4,690	-9%	4:30PM	4,517	-4%
5:00PM	**4,868**	**--**	**5:00PM**	**4,698**	**--**
5:30PM	4,676	-9%	5:30PM	4,212	-10%
6:00PM	4,110	-20%	6:00PM	3,406	-28%

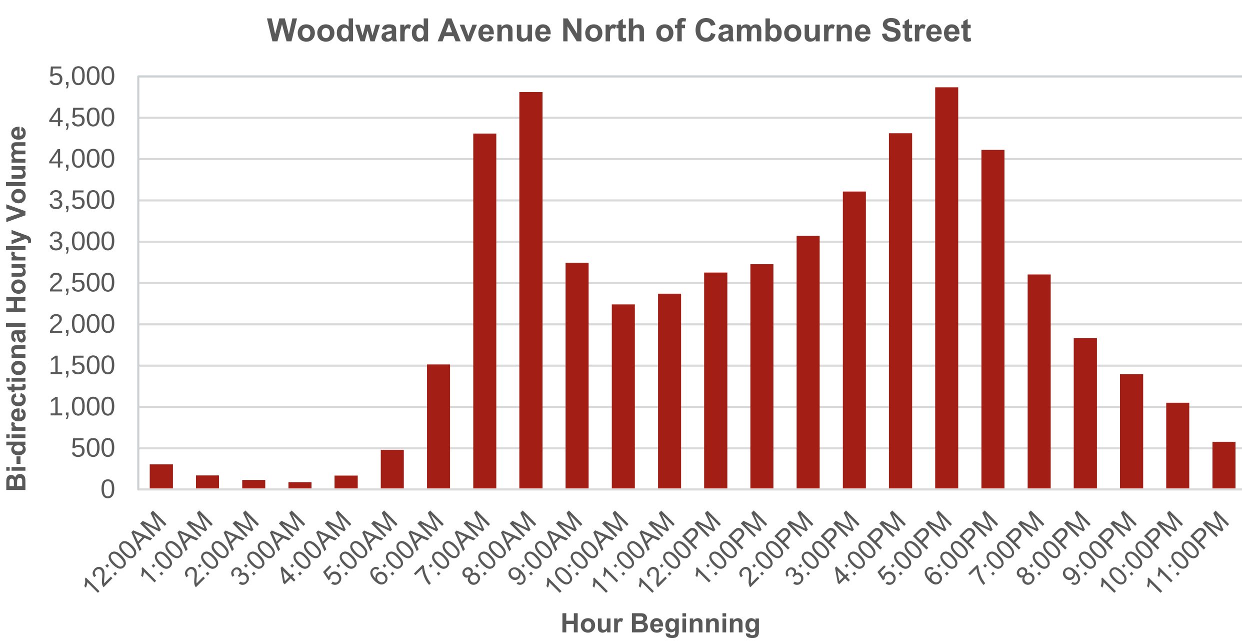

Figure 3: Woodward Avenue Peaking Characteristics – North of Cambourne Street

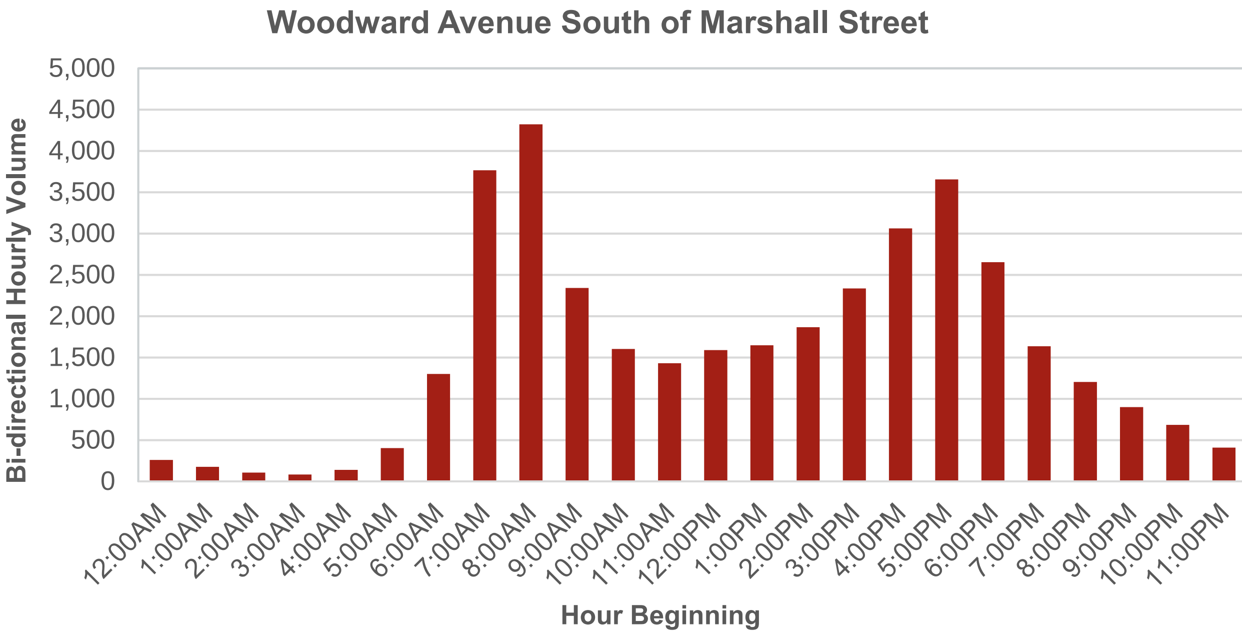

Figure 4: Woodward Avenue Peaking Characteristics – South of Marshall Street

CRASH DATA

Crash data for Woodward Avenue was gathered from the Michigan Traffic Crash Facts online web portal for the years 2016-2018. These crashes are shown on Figures 5 – 8. A 200-foot influence area was applied to assign crashes to each of the study intersections. As shown on the map, the heaviest concentration of crashes directly on Woodward Avenue occurred at the intersection of 9 Mile Road and Woodward Avenue. This result is not unexpected, as this area is the core of the downtown sector of Ferndale, and as such has higher cross street traffic and may have more active curb cuts and parking maneuvers than elsewhere on the corridor.

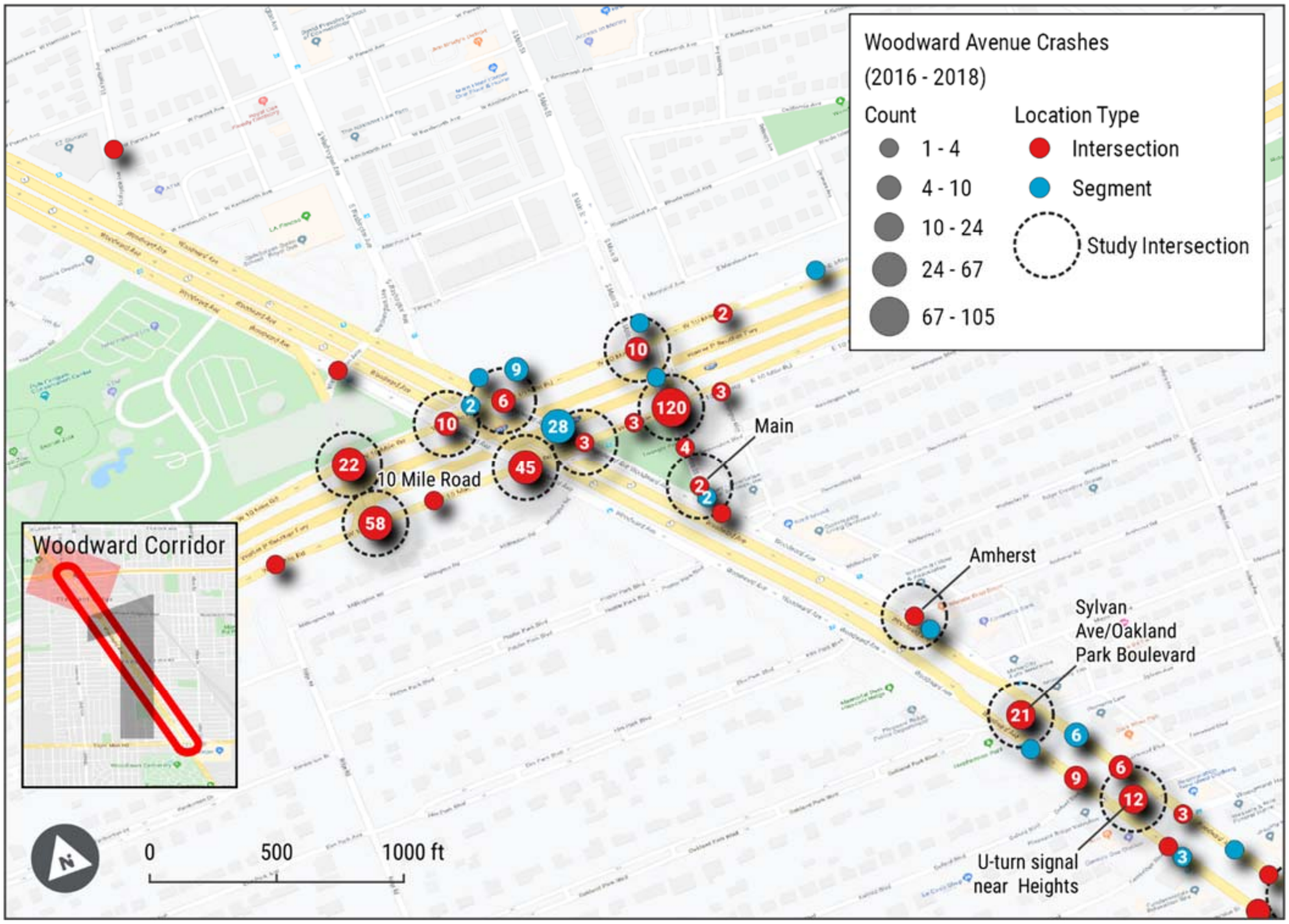

Figure 5: Woodward Avenue Crash Diagram (1 of 4)

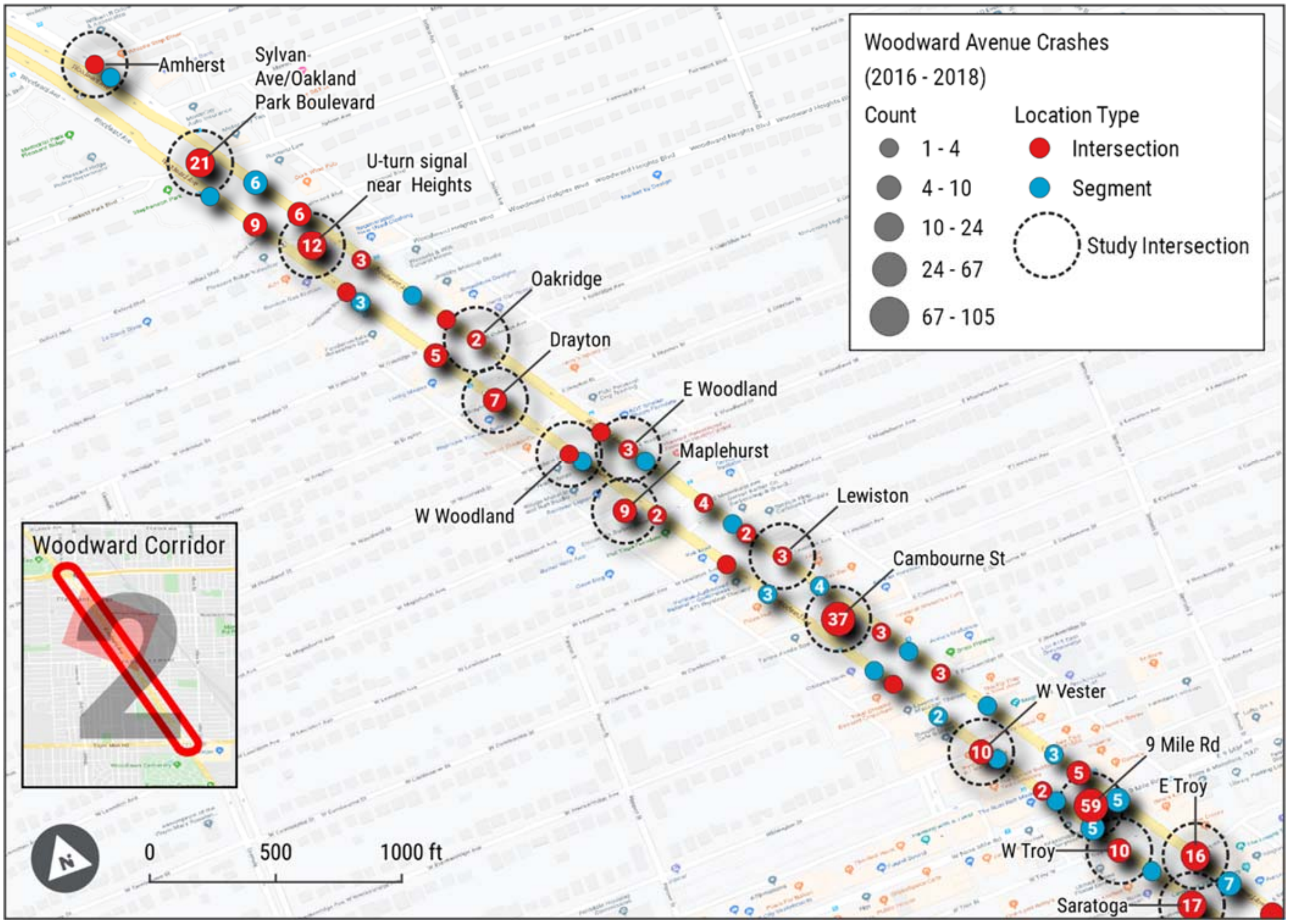

Figure 6: Woodward Avenue Crash Diagram (2 of 4)

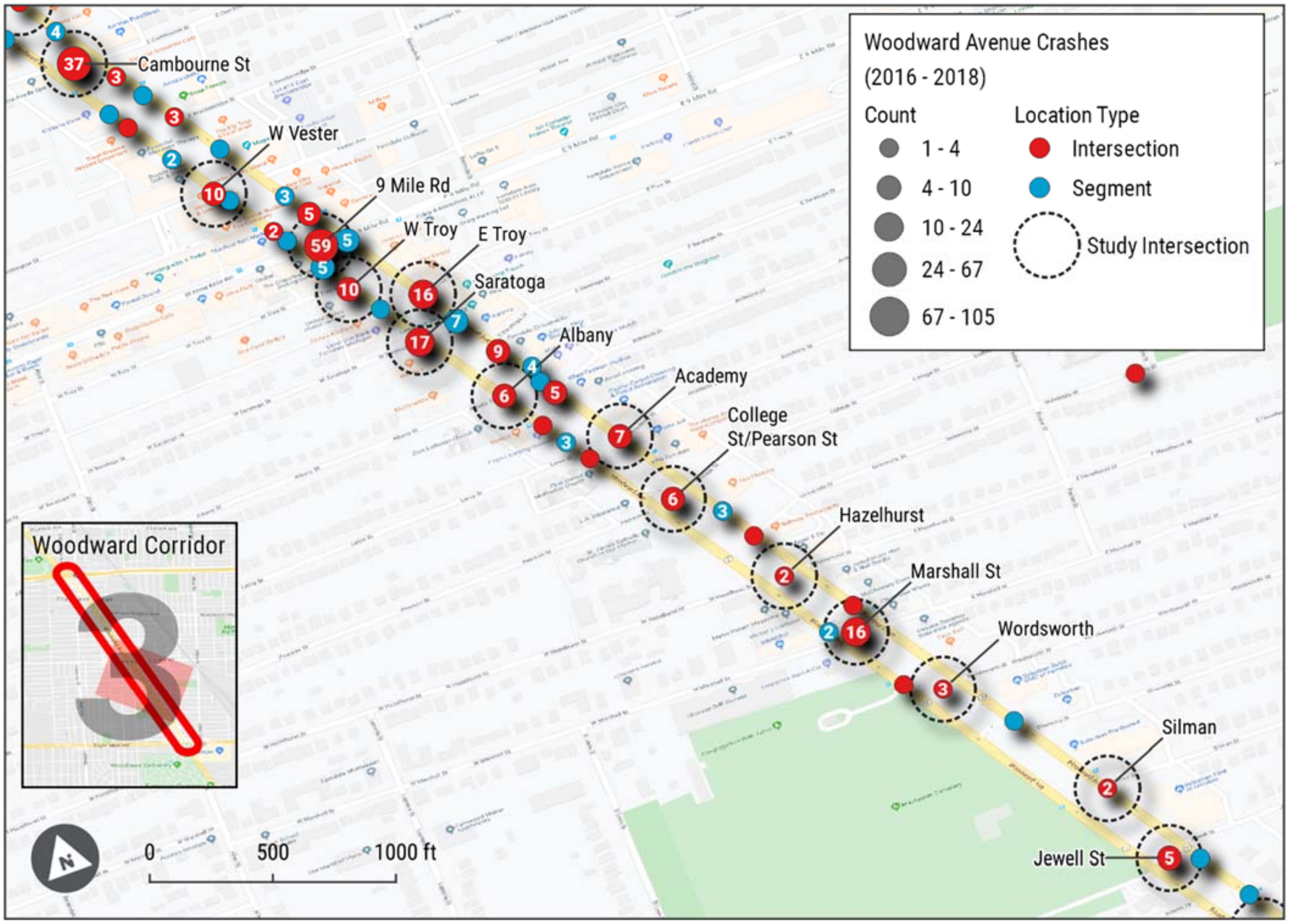

Figure 7: Woodward Avenue Crash Diagram (3 of 4)

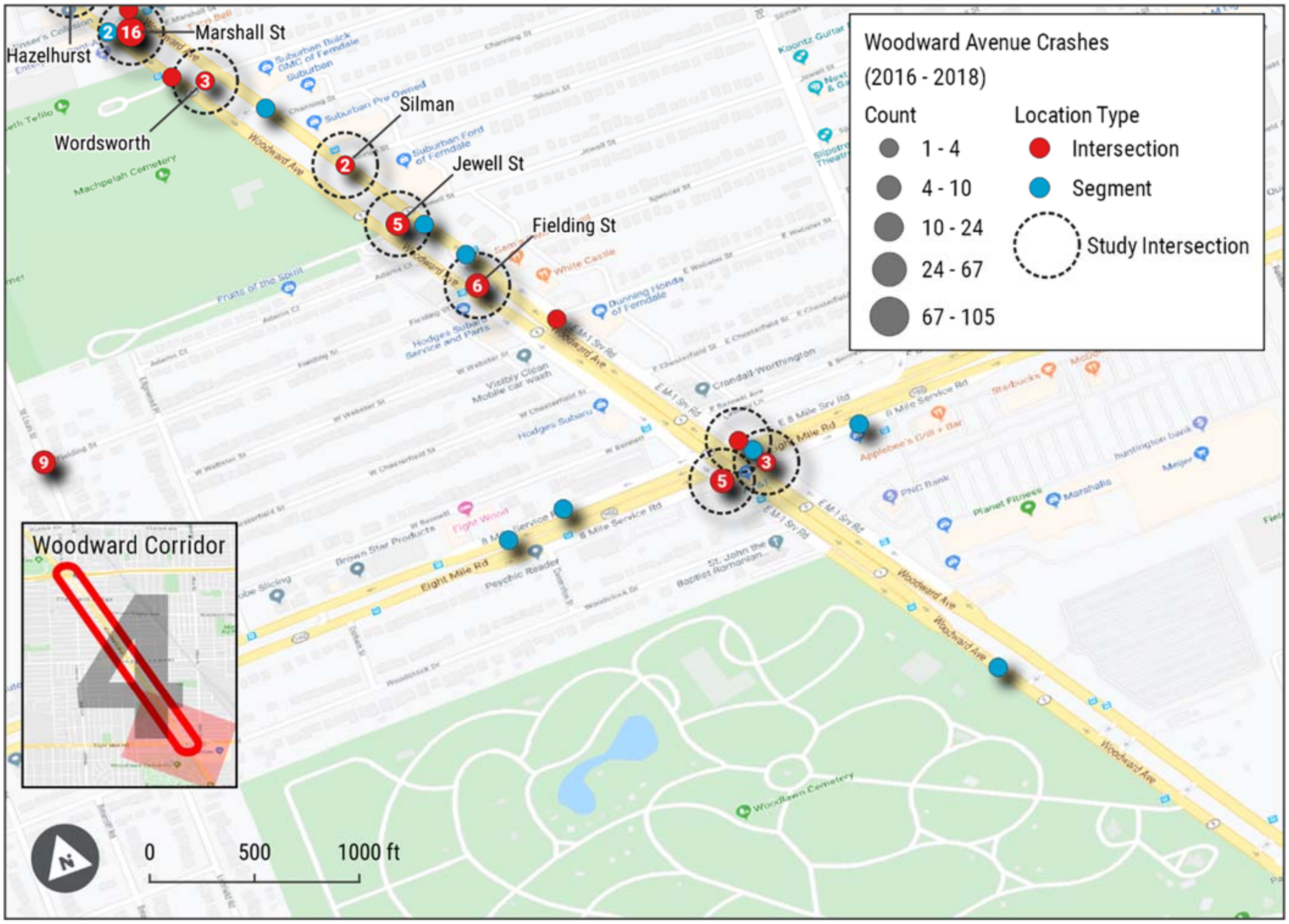

Figure 8: Woodward Avenue Crash Diagram (4 of 4)

The crash type, crash severity, bicycle crashes, and pedestrian crashes by year are shown in Tables 3 – 5.

Table 3: Crash Type

Crash Type	2016	2017	2018	Total
Rear-end	98	110	97	**305 (37.7%)**
Sideswipe same direction	81	103	76	**260 (32.2%)**
Angle	39	48	52	**139 (17.2%)**
Other	13	12	12	**37 (4.6%)**
Single motor vehicle	19	8	6	**33 (4.1%)**
Rear-end right turn	5	4	4	**13 (1.6%)**
Rear-end left turn	6	1	4	**11 (1.4%)**
Backing	1	5	1	**7 (0.9%)**
Head-on	0	1	0	**1 (0.1%)**
Head-on / left turn	0	1	0	**1 (0.1%)**
Unknown	0	0	1	**1 (0.1%)**
All	**262**	**293**	**253**	**808**

Table 4: Crash Severity

Crash Severity	2016	2017	2018	Total
No injury (O)	221	252	215	**688**
Possible injury (C)	29	28	23	**80**
Suspected minor injury (B)	9	12	13	**34**
Suspected serious injury (A)	3	1	2	**6**
Fatality (K)	0	0	0	**0**
Total	**262**	**293**	**253**	**808**

Table 5: Pedestrian and Bicycle Crashes

Involvement	2016	2017	2018
Pedestrian Involved	4	4	2
Bicyclist Involved	5	3	5

As shown in the Tables 3 & 4, the number of crashes on the study corridor have fluctuated from 2016-2018 with an increase in crashes from 2016-2017 and a decrease from 2017-2018. The most common crash types were rear-end followed by sideswipe same direction and angle.

The prevalence of rear end crashes may be influenced by excessive speed encouraged by the wide roadway combined with frequent curb cuts, driveways and access points leading to unexpected slowing and stopping. The high number of same direction sideswipe crashes, and potentially also the angle crashes, may be influenced by the large number of lanes and the location of the diverted “Michigan Left” U-turn locations. Motorists who wish to make a left-turn onto Woodward Avenue must generally make a right-hand turn, and proceed until they reach a U-turn location, making multiple lane use changes. These frequent lane-change maneuvers may contribute to the high number of the same direction crash types.

With appropriate design, the proposed road diet will reduce the lane change maneuvers that may be contributing to side-swipe crashes by reducing the number of lanes. During the design phase of this project, the potential for reducing driveway curb cuts through consolidation or relocation should be evaluated, which may also reduce rear-end and sideswipe crashes. Per the Crash Modification Factor Clearinghouse, reducing driveways from 48 to 26-48 per mile, 26-28 to 10-24 per mile, and 10-14 to less than 10 per mile results in crash modification factors of 0.71, 0.69, and 0.75, respectively, for all crash types[1]. Additionally, lower speeds through the calming effect of the road diet may also contribute to lower crash rates. Though there are no available documented crash modification factors (CMF) for the specific layout change contemplated on Woodward Avenue, it is likely that a similar effect to other road diet CMF’s may be seen, with values of 0.53 for suburban areas and 0.748 for urban areas[2].

According to the crash data, there were no fatalities on the study corridor during the analysis period. There were 10 reported pedestrian crashes and 13 reported bicycle crashes during the analysis period. The pedestrian and bicycle crash locations are shown on Figure 9.

[1] Elvik, R. and Vaa, T., "Handbook of Road Safety Measures." Oxford, United Kingdom, Elsevier, (2004)
[2] Persaud, B., Lana, B., Lyon, C., and Bhim, R. "Comparison of empirical Bayes and full Bayes approaches for before-after road safety evaluations." Accident Analysis & Prevention, Vol. 42, Issue 1, pp. 38-43 (2010)

Figure 9: Woodward Avenue Pedestrian and Bicycle Crash Diagram

Based on an investigation of the crash reports, nearly half of the pedestrian crashes (4) occurred when drivers were turning right onto Woodward Avenue and pulled into the crosswalk while looking left to see oncoming traffic, typically colliding with people walking from the right and attempting to cross in front of the vehicle. These crashes can likely be attributed to the visibility issues at cross streets related to the skew between Woodward Avenue and the cross streets; in addition to needing to pull across the crosswalk to see oncoming traffic at an angle, drivers do not look right to see traffic coming from the other direction and likely do not pay sufficient attention to pedestrians approaching from the right. Another nearly half (4) of the pedestrian crashes occurred when the pedestrian was attempting to cross Woodward Avenue itself. One of these crashes resulted in a suspected serious injury. Given the high speeds of cars traveling on Woodward Avenue and the need to cross multiple lanes, this is not surprising. Research shows that the risk of fatality in a crash increases dramatically as vehicle speeds increase, while drivers' cone of vision is simultaneously reduced, making it less likely for a driver to see a pedestrian and stop in time.

The majority of the bicycle crashes occurred under similar circumstances to the pedestrian crashes when drivers were turning right onto Woodward Avenue and pulled into the crosswalk while looking left to see oncoming traffic, colliding with bicycling in the sidewalk and attempting to cross in front of the vehicle. Several crashes also occurred when drivers were turning right from Woodward onto the side street and failed to yield to bicyclists either traveling in the sidewalk or the curbside lane.

CAPACITY ANALYSIS APPROACH

The performance of the study intersections for motor vehicles was analyzed in Synchro 10.0. The layout of Woodward Avenue with the wide median and the signal phasing scheme at each intersection require the majority of the study intersections to be modeled as clustered pairs. Due to this nontraditional phasing at the signalized intersections in the study area, the reported results are based on the 2000 Highway Capacity Manual as the newer Highway Capacity Manual 6 methodology cannot analyze a clustered intersection, or other nonstandard phasing schemes. The intersections in the study area were analyzed delay and level of service. For the clustered pair intersections, a weighted average of the approach delays for each intersection were combined to produce an overall intersection delay and level of service.

Definition of Performance Measures

Delay – Delay is the average amount of time, in seconds, that it takes a vehicle passing through an intersection beyond what would be experienced in a free-flow condition. The value given is the average for all vehicles completing the movement during the peak hour.

Level of Services (LOS) – LOS are letter grades assigned to various degrees of delay. An LOS A corresponds with free, or near free-flowing conditions, while an LOS F corresponds with higher delays and poor traffic flow. The goal in traffic operations is not to achieve LOS A, but to create conditions that maintain stable traffic flow.

At signalized intersections, capacity is determined for all movements and encompasses several variables including signal phasing, coordination, cycle length, and traffic volumes. Control delay is the delay resulting from a control device (i.e. a stop sign or red light), measured as compared to an uncontrolled intersection. Table 6 illustrates the relationship between Level of Service and control delay for unsignalized intersections.

Table 6: Relationship of Control Delay to Level of Service

Level of Service	Signalized Control Delay (seconds)
A	0 to 10
B	> 10 to 20
C	> 20 to 35
D	> 35 to 55
E	> 55 to 80
F	> 80

The following questions pertaining to the capacity analysis are included on the MDOT Road Diet Checklist:

- A Synchro analysis for proposed conditions and future traffic volumes[3] shows that a reasonable Level of Service (LOS) will be maintained during the peak hour at all signalized and major un-signalized intersections. A reasonable LOS is defined as D or better for urban and C or better for rural/between.
- Delay mitigation techniques have been incorporated into the design for individual intersection movements that are predicted to operate at LOS D or worse according to the SYNCHRO model.
- Potential timing and/or phasing changes to existing traffic signals have been vetted through the Traffic Signals Unit for incorporation into the Road Diet.

[3] Future traffic volumes refer to 15-20 years out when reestablishment of curb lines is required; 3 years out when only pavement marking and signing changes are required. Seasonal fluctuations in traffic volumes, if they exist, should also be considered.

EXISTING CONDITIONS OPERATIONS

The existing conditions analysis provides a baseline for understanding the operations of the current lane arrangements. This baseline provides a comparison of traffic operations with and without the proposed road diet. Table 7 summarizes the overall delay, level of service, and v/c ratio for the study intersections with the existing roadway layout and existing volumes discussed previously. As shown in Table 7, all study intersections currently operate at LOS D or better.

Table 7: Existing Conditions Operations

Intersection	Original October Counts				Adjusted February Counts			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1: NB Woodward Ave at EB 8 Mile Rd	10.7	B	26.3	C	10.2	B	21.0	C
2: NB Woodward Ave at WB 8 Mile Rd	26.7	C	11.5	B	27.5	C	11.7	B
3: SB Woodward Ave at EB 8 Mile Rd	18.1	B	23.4	C	18.0	B	24.0	C
4: SB Woodward Ave at WB 8 Mile Rd	15.8	B	17.1	B	15.8	B	16.2	B
5: Woodward Ave at Fielding St	1.6	A	0.9	A	1.7	A	0.9	A
6: Woodward Ave at Marshall St	6.7	A	14.4	B	5.4	A	11.3	B
7: Woodward Ave at College St / Pearson St	20.2	C	4.5	A	21.7	C	4.9	A
8: Woodward Ave at 9 Mile Rd	25.3	C	19.7	B	16.0	B	15.7	B
9: Woodward Ave at Cambourne St	9.7	A	11.1	B	11.0	B	9.8	A
10: NB Woodward Ave U-turn signal near Woodward Heights	8.6	A	9.4	A	8.6	A	7.7	A
11: Woodward Ave at Sylvan Ave / Oakland Park Blvd	16.9	B	17.0	B	14.1	B	13.6	B
12: NB Woodward Ave at EB 10 Mile Rd	2.6	A	5.0	A	2.5	A	4.7	A
13: NB Woodward Ave at WB 10 Mile Rd	26.1	C	16.1	B	25.6	C	15.2	B
14: SB Woodward Ave at EB 10 Mile Rd	14.8	B	15.3	B	14.8	B	14.7	B
15: SB Woodward Ave at WB 10 Mile Rd	5.7	A	5.8	A	5.8	A	5.4	A
16: Overpass Rd at EB 10 Mile Rd	14.4	B	13.7	B	14.4	B	14.1	B
17: Overpass Rd at WB 10 Mile Rd	17.1	B	19.5	B	17.1	B	18.5	B
18: Main Street at WB 10 Mile Rd	24.7	C	26.5	C	24.9	C	25.9	C
19: Main Street at EB 10 Mile Rd	12.4	B	17.4	B	12.2	B	17.7	B

FUTURE VOLUME PROJECTIONS

Historic volume patterns along Woodward Avenue as well as adjacent roadways were analyzed to determine an appropriate growth rate for future traffic along Woodward Avenue. Based on available MDOT AADT data, Woodward Avenue has experienced an average negative growth rate from 2008 to 2018 of approximately -5% per year over the course of ten years. This data may be misleading, with an unexpected single year drop in data that could be based on a shift in location of the data collection. This data is contained in Appendix C.

Southeast Michigan Council of Governments (SEMCOG) data also indicates that limited growth is expected in the area, with the Ferndale and Pleasant Ridge communities noted as areas expected to experience no or limited growth to 2045. SEMCOG map data and historic count data is included in Appendix C.

In the absence of additional historical AADT data available the SEMCOG information was used to determine that a zero percent growth rate is appropriate for the future analysis scenario. This assumption is consistent with the purpose of the proposed road diet, which is supportive of increasing walking and biking through the Woodward Avenue corridor in favor of increases in single occupancy vehicles.

PROPOSED STUDY AREA CHANGES

In the proposed conditions with a road diet, one travel lane was removed from Woodward Avenue between Fielding Street and Sylvan Avenue / Oakland Park Boulevard in the traffic model. Traffic signal timings were modified to give through traffic on Woodward Avenue more time in locations where a lane was removed in order to provide reasonable LOS at all intersections, as defined by MDOT. Signal phasing and cycle length were maintained, and it was assumed that the pedestrian clearance interval would extend into the first portion of the side street clear phase. Signal offsets were optimized for the road diet scenario. With these signal timing modifications, all study intersections are forecast to operate at an overall LOS D or better.

The removal of one 11’ travel lane in each direction on Woodward Avenue would create space for a parking protected bike lane each direction, providing a comfortable dedicated space for cyclists to travel efficiently through the area. A potential typical cross section for a near term future condition is shown in Figure 10 below. Please note, the specific design may vary from the cross section shown here and would be determined during the design process. This layout assumes no change to curb locations, but will require consideration of lane shifts around the existing sidewalk extensions, accommodation for bus stops and will vary in locations where there is no curbside parking. A facility with physical protection is recommended to protect cycles from moving traffic and prevent drivers from blocking the bike lane while parking or loading and unloading.

Figure 10: Typical Cross Section of Potential Future Condition

CAPACITY ANALYSIS RESULTS

The delay and LOS, for each intersection with the proposed conditions as outlined above are summarized in Table 8 and 9. As shown in Tables 8 and 9, with the signal timing adjustments discussed above all study intersections will operate at a reasonable LOS, as defined by MDOT as D or better. Individual movements were also studied as per the MDOT Road Diet Checklist, and results are shown in Appendix D. Signal timings were adjusted where possible to bring the individual movement to LOS A-C or to improve it to better than existing operations. Additional motor vehicle lanes to address any remaining delay would be counterproductive to the goals of this project. Four individual movements are still forecast to operate at LOS E or F in at least one peak hour. As previously discussed, Woodward Avenue has very pronounced peaking characteristics with hourly through volumes falling by between 4 and 16 percent when only thirty minutes off the absolute peak hour. Therefore, the movements that are anticipated to operate at LOS E or F would operate with those conditions for an approximately 30-minute period of the day, while the additional benefits of the road diet for all users would last throughout the day. Upon implementation of the road diet, if a short period of congestion is experienced during the peak 30 minutes, it is likely that motor vehicle users who have the ability to do so will adjust their travel patterns to avoid the that 30-minute period, creating a more efficient use of the road network. Full Synchro Reports are shown in Appendix E.

Table 8: AM Peak Proposed Conditions Operations

Intersection	Original October Counts				Adjusted February Counts			
	Existing Conditions		Road Diet with Revised Timings		Existing Conditions		Road Diet with Revised Timings	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1: NB Woodward Ave at EB 8 Mile Rd	10.7	B	10.7	B	10.2	B	10.2	B
2: NB Woodward Ave at WB 8 Mile Rd	26.7	C	26.7	C	27.5	C	27.5	C
3: SB Woodward Ave at EB 8 Mile Rd	18.1	B	18.1	B	18.0	B	18.0	B
4: SB Woodward Ave at WB 8 Mile Rd	15.8	B	15.8	B	15.8	B	15.8	B
5: Woodward Ave at Fielding St	1.6	A	8.2	A	1.7	A	7.9	A
6: Woodward Ave at Marshall St	6.7	A	49.8	D	5.4	A	32.9	C
7: Woodward Ave at College St / Pearson St	20.2	C	47.7	D	21.7	C	36.0	D
8: Woodward Ave at 9 Mile Rd	25.3	C	49.1	D	16.0	B	36.6	D
9: Woodward Ave at Cambourne St	9.7	A	45.3	D	11.0	B	21.4	C
10: NB Woodward Ave U-turn signal near Woodward Heights	8.6	A	9.2	A	8.6	A	9.4	A
11: Woodward Ave at Sylvan Ave / Oakland Park Blvd	16.9	B	53.9	D	14.1	B	32.8	C
12: NB Woodward Ave at EB 10 Mile Rd	2.6	A	2.6	A	2.5	A	2.5	A
13: NB Woodward Ave at WB 10 Mile Rd	26.1	C	26.1	C	25.6	C	25.6	C
14: SB Woodward Ave at EB 10 Mile Rd	14.8	B	14.8	B	14.8	B	14.8	B
15: SB Woodward Ave at WB 10 Mile Rd	5.7	A	5.7	A	5.8	A	5.8	A
16: Overpass Rd at EB 10 Mile Rd	14.4	B	14.4	B	14.4	B	14.4	B
17: Overpass Rd at WB 10 Mile Rd	17.1	B	17.1	B	17.1	B	17.1	B
18: Main Street at WB 10 Mile Rd	24.7	C	24.7	C	24.9	C	24.9	C
19: Main Street at EB 10 Mile Rd	12.4	B	12.4	B	12.2	B	12.2	B

Table 9: PM Peak Proposed Conditions Operations

Intersection	Original October Counts				Adjusted February Counts			
	Existing Conditions		Road Diet with Revised Timings		Existing Conditions		Road Diet with Revised Timings	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1: NB Woodward Ave at EB 8 Mile Rd	26.3	C	26.3	C	21.0	C	21.0	C
2: NB Woodward Ave at WB 8 Mile Rd	11.5	B	11.5	B	11.7	B	11.7	B
3: SB Woodward Ave at EB 8 Mile Rd	23.4	C	23.4	C	24.0	C	24.0	C
4: SB Woodward Ave at WB 8 Mile Rd	17.1	B	17.1	B	16.2	B	16.2	B
5: Woodward Ave at Fielding St	0.9	A	1.2	A	0.9	A	1.2	A
6: Woodward Ave at Marshall St	14.4	B	31.1	C	11.3	B	12.7	B
7: Woodward Ave at College St / Pearson St	4.5	A	7.4	A	4.9	A	6.4	A
8: Woodward Ave at 9 Mile Rd	19.7	B	25.6	C	15.7	B	14.0	B
9: Woodward Ave at Cambourne St	11.1	B	22.1	C	9.8	A	12.4	B
10: NB Woodward Ave U-turn signal near Woodward Heights	9.4	A	28.5	C	7.7	A	13.7	B
11: Woodward Ave at Sylvan Ave / Oakland Park Blvd	17.0	B	55.0	D	13.6	B	21.6	C
12: NB Woodward Ave at EB 10 Mile Rd	5.0	A	5.0	A	4.7	A	4.7	A
13: NB Woodward Ave at WB 10 Mile Rd	16.1	B	16.1	B	15.2	B	16.1	B
14: SB Woodward Ave at EB 10 Mile Rd	15.3	B	15.3	B	14.7	B	15.3	B
15: SB Woodward Ave at WB 10 Mile Rd	5.8	A	5.8	A	5.4	A	5.4	A
16: Overpass Rd at EB 10 Mile Rd	13.7	B	13.7	B	14.1	B	14.0	B
17: Overpass Rd at WB 10 Mile Rd	19.5	B	19.5	B	18.5	B	18.3	B
18: Main Street at WB 10 Mile Rd	26.5	C	26.5	C	25.9	C	26.0	C
19: Main Street at EB 10 Mile Rd	17.4	B	17.4	B	17.7	B	17.4	B

CONCLUSION

Woodward Avenue is a major thoroughfare that serves as the “main street” of the Ferndale and Pleasant Ridge area. Currently with four travel lanes in each direction, and a wide planted median, it is a formidable barrier to pedestrian crossings and inhospitable to bike travel. In accordance with the recommendations in the previously completed Bicycling and Walking Safety Audit, this report studies the feasibility of removing one travel lane in each direction in terms of the impact on traffic operations. This road diet will have the potential to slow the remaining travel lanes, simplify lane change maneuvers and provide a dedicated space for cyclists.

Based on the Synchro analysis summarized in this report, with the removal of a vehicular travel lane in each direction, all study intersection on Woodward Avenue between 10 Mile Road and 8 Mile Road will operate with reasonable overall LOS during both the AM and PM peak hours, as defined by MDOT in the Road Diet Checklist. This study also considered engineering improvements on individual approaches forecast to operate at LOS D , E or F during at least one peak hour and found that with signal timing adjustments, the majority of approaches are forecast to operate at LOS A, B or C, or if LOS D or worse, they will operate at the same LOS as existing conditions.

Existing travel patterns on Woodward Avenue include a marked peaking characteristic, with a significant drop in hourly volume for all time periods other than the AM and PM peak hours. A shift of only 30 minutes from the peak period results in a drop of up to 16 percent of through volume. A shift in driver behavior to another time period within the AM Peak period would result a reduction of peak movement delay, resulting in a more efficient use of the roadway network, while providing a comfortable and inviting route for cyclists. This provision may also help shift driver behavior, with more people choosing to bike for shorter trips, removing vehicles from the roadway.

A road diet consisting of a vehicular lane removal is recommended based on the analysis results and potential for increased safety, comfort and cyclist mode split. The recommended next step is to advance to design of a road diet intended to repurpose one travel lane in each direction of Woodward Avenue through the study area.