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INTRODUCTION

The following is a summary of a safety review for the Canton Township M-153 (Ford Road) Boulevard Reconstruction Project in Canton Township, Wayne County, Michigan.

M-153 between Sheldon Road and Lotz Road in Canton Township is a 5-lane undivided arterial with a 2-way center left turn lane and posted speed limit of 45 mph. The land use within the project limits is dense commercial, with numerous driveways connecting M-153 to major retailers such as IKEA, Home Depot, Walmart, ALDI, and Target. The density of access points has resulted in higher-than-average crash rates and significant travel delays along the corridor.

To mitigate the crash issues and reduce congestion, MDOT will convert the 5-lane road into a narrow 4-lane raised median boulevard with directional median crossovers to limit access along the corridor. To confirm that all opportunities to improve safety and maintain access are being achieved as part of the reconstruction of M-153, AECOM completed an access review of the location of driveways, access to parcels, and functionally of the proposed directional median crossovers. The results are depicted in a separate Access Management Study memorandum.

The extent of the safety review along M-153 was from Canton Center Road on the west to the Walmart/Home Depot driveways on the east (east of I-275). The safety review includes ten (10) signalized intersections, four (4) unsignalized intersections, thirteen (13) roadway segments, and six (6) ramps at the I-275/M-153 interchange.



The following intersections were included in the safety review (signalized intersections in **bold**):

M-153 Intersections

- 1. Canton Center Road
- 2. Sheldon Road
- 3. Target/Oakview Drive/5th-3rd driveway
- 4. Morton Taylor Road
- 5. Morrison Boulevard-Willowcreek Drive
- 6. Outback-World of Beer driveways
- 7. Lilley Road
- 8. Panera Bread/Buffalo Wild Wings-Chuck E. Cheese driveways
- 9. IKEA-Art Van driveways
- 10. Haggerty Road
- 11. I-275 SB Ramps Terminal
- 12. I-275 NB Ramp Terminal
- 13. Lotz Road
- 14. Walmart-Home Depot driveways

Crash data was provided by the Traffic Improvement Association (TIA) via their database, Traffic Crash Analysis Tool (TCAT) 2.0. The crash database provides various crash analysis tools and summaries, including all police crash reports (UD-10's) for every crash queried. Crash data was provided for the 3-year period from July 1, 2016 to July 1, 2019. The crash data was purged by AECOM to include only those crashes that occurred within 150 feet (0.028 miles) of each intersection.

The crash data was examined in order to identify high crash locations and to identify crash patterns that are correctable. Particular attention was given to head-on and angle crashes, which tend to result in more serious injuries and greater property damage. A summary of the M-153 crash data is shown at the end of this memorandum - **Table 1** (signalized and unsignalized intersections) and **Table 2** (roadway segments). No fatalities were reported among any of the intersection, segment, and ramp crashes over the 3-year period.

INTERSECTION CRASHES

As shown in Table 1, the (10) signalized intersections in the project limits had a total of 965 intersection crashes reported in the 3-year study period (an average of 32 crashes per year per intersection). In addition, a total of 34 crashes occurred at the four unsignalized intersections.

Crash rates were calculated for each intersection. Seven (7) of the fourteen (14) intersections had higher than average crash rates: six (6) of the ten (10) signalized intersections, and one (1) of the four (4) unsignalized intersections. Intersections with above average crash rates are listed in **Table 3**.

Four (4) of the signalized intersections experienced crash rates more than <u>double</u> the average crash rate. Average crash rates were derived from the <u>Crash Analysis Process</u>, Southeast Michigan Council of Governments (SEMCOG), January 2016, as depicted on the next page.



	Intersection										
Entering ADT	SEMCOG Aver	age Crash Rates ⁽¹⁾									
_	Signal	Stop									
1-10,000	1.55	1.05									
10-20,000	0.87	0.46									
20-30,000	0.96	0.37									
30-40,000	1.07	0.27									
40-50,000	1.14	0.28									
50-60,000	1.35	0.28									

⁽¹⁾ Per Million Entering Vehicles (PMEV), 150-foot radius Source: Southeast Michigan Council of Governments (SEMCOG), January 2016.

TABLE 3
M-153 INTERSECTIONS WITH ABOVE AVERAGE CRASH RATES

	Entoring	Crash Rate (PMEV)										
Intersection		Pata	Average (1)	Over								
	ADI	Nale	Average	Average								
Signalized Intersections (west to east)												
M-153 (Ford Road) @ Canton Center Road	46,250	3.26	1.14	186%								
M-153 (Ford Road) @ Sheldon Road	40,650	2.99	1.14	162%								
M-153 (Ford Road) @ Morton Taylor Road	34,810	1.34	1.07	25%								
M-153 (Ford Road) @ Lilley Road	45,790	4.13	1.14	262%								
M-153 (Ford Road) @ Haggerty Road	58,500	3.20	1.35	137%								
M-153 (Ford Road) @ Lotz Road	40,900	1.99	1.14	74%								
Unsignalized Intersections												
M-153 (Ford Road) @ Panera Bread/BWW driveway	35,570	0.36	0.27	33%								

⁽¹⁾ Source: Southeast Michigan Council of Governments (SEMCOG), January 2016.

The four (4) of the seven (7) intersections in Table 3 had crash rates were well over 100% above the average crash rate, and are shaded and bolded in Table 1, and collision summaries are attached to this memo in **Appendix A**. The collision summaries were generated using the TCAT database.

Three (3) other intersections, two (2) signalized and one (1) unsignalized, had higher-than-average crash rates (ranging from 25% to 74% above average) and are also shaded in Table 1, resulting in a total of seven (7) of the fourteen (14) study area intersections having higher-than-average crash rates.

Of the 14 intersections, the intersection with easily the highest crash rate above average was M-153 @ Lilley Road, which had a crash rate 262% above average, followed by M-153 @ Canton Center Road (186% above average), M-153 @ Sheldon Road (162% above average), and M-153 @ Haggerty Road (137% above average).

SIGNALIZED INTERSECTION CRASH FINDINGS

Easily the largest crash type at signalized intersection in the study area was rear-end, accounting for 42% of all crashes. Rear-end crashes on busy arterials are often result from stop-and-go conditions caused by signals and traffic congestion.

The second-largest crash type in the study area was angle, accounting for 26% of all crashes. Angle crashes often result from motorists not being able to clear the intersection or motorists that run the red light.



The third-largest crash type in the study area was sideswipe-same, accounting for 13% of all crashes. Sideswipe same crashes tend to be more common along multiple lane roadways like M-153 due to lane changing in congested conditions.

Signalized Intersection-By-Intersection Summary

The following is an intersection-by-intersection summary of crash history at the 10 signalized study area intersections for the 3-year period from July 1, 2016 to July 1, 2019. A total of 965 crashes were reported among the 10 intersections in the 3-year study period. No fatal crashes and four (4) "A" level injury crashes were reported. "A" level injury crashes include individuals who sustained incapacitating injuries, such as broken limbs or paralysis, often referred to as critical injuries. Following is a listing of crash findings of the signalized intersections, from west to east:

- 1) M-153 @ Canton Center Road: Rate of 3.26 crashes PMEV; 165 total crashes.
 - Crash rate is 186% above the average crash rate, the second-highest percent above average among the 10 signalized intersections.
 - One of the four highest crash rate locations in the study area. This intersection is shaded and bolded in Table 1, and a collision summary diagram for this intersection is attached to this memo.
 - 45 of the 165 crashes (27%) were angle type crashes and were generally evenly distributed among the four approaches.
 - 32 crashes (19%) were side-swipe same, the highest percentage of that crash type among the signalized intersections.
 - 12 crashes (7%) were head-on left-turn, the second-highest frequency of head-on left-turn crashes among signalized intersections.
- 2) M-153 @ Sheldon Road: Rate of 2.99 crashes PMEV; 133 total crashes.
 - Crash rate is 162% above the average crash rate, the third-highest percent above average.
 - One of the four highest crash rate locations in the study area. This intersection is shaded and bolded in Table 1, and a collision summary diagram for this intersection is attached to this memo.
 - 55 of the 133 (41%) crashes were rear-end straight and were generally evenly distributed among the four approaches.
 - 45 of the crashes (34%) were angle type crashes, the highest percentage of angle crashes among the signalized intersections and were generally evenly distributed among the four approaches.
 - 29% of the crashes occurred after dark, the most of any signalized intersection.
 - 28% of the crashes occurred under slippery surface conditions, the most of any signalized intersection.
 - 26% of crashes were injury crashes, third-highest among the signalized intersections.
- 3) <u>M-153 @ Morton Taylor Road</u>: Rate of 1.34 crashes PMEV; 51 total crashes.
 - Crash rate is 25% above the average crash rate.
 - 20 of the 51 (39%) crashes were rear-end straight.
 - 13 of the crashes (25%) were angle type crashes.
 - 5 crashes (10%) were head-on left-turn.
 - 29% of crashes were injury crashes, tied for highest among the signalized intersections.
- 4) <u>M-153 @ Lilley Road</u>: Rate of 4.13 crashes PMEV; 207 total crashes.
 - Crash rate is 262% above the average crash rate, the highest percent above average among the 10 signalized intersections.



- One of the four highest crash rate locations in the study area. This intersection is shaded and bolded in Table 1, and a collision summary diagram for this intersection is attached to this memo.
- 80 of the 207 (39%) crashes were rear-end straight.
- A pattern of rear-end crashes occurred on M-153 as 63 of the 80 (79%) rear-end straight crashes were on M-153 (38 eastbound, 25 westbound).
- 66 of the crashes (32%) were angle type crashes, the second-highest percentage of angle crashes among the signalized intersections.
- A pattern of angle crashes occurred as 58 of the 66 (88%) angle crashes involved either westbound and northbound vehicles or westbound and southbound vehicles (39 westbound and northbound, 18 westbound and eastbound).
- 33 crashes (16%) were side-swipe same.
- 5) <u>M-153 @ IKEA/Art Van driveways</u>: Rate of 0.28 crashes PMEV; 11 total crashes.
 - Crash rate is 74% <u>below</u> the average crash rate, the second-lowest crash rate among the 10 signalized intersections.
 - The 11 crashes were distributed among six (6) different crash types, with no discernable crash pattern.
- 6) M-153 @ Haggerty Road: Rate of 3.20 crashes PMEV; 205 total crashes.
 - Crash rate is 137% above the average crash rate, the fourth-highest percent above average among the 10 signalized intersections.
 - One of the four highest crash rate locations in the study area. This intersection is shaded and bolded in Table 1, and a collision summary diagram for this intersection is attached to this memo.
 - 91 of the 205 (44%) crashes were rear-end straight, second-highest percentage of the signalized intersections.
 - A pattern of rear-end crashes occurred on M-153 as 69 of the 91 (76%) rear-end straight crashes were on the eastbound or westbound M-153 approach (34 eastbound, 35 westbound).
 - 58 of the crashes (28%) were angle type crashes and were generally evenly distributed among the four approaches.
 - 14 crashes (7%) were head-on left-turn, the second highest frequency of head-on left-turn crashes among signalized intersections.
- 7) M-153 @ I-275 SB Ramps: Rate of 1.24 crashes PMEV; 70 total crashes.
 - Crash rate is 8% below the average crash rate.
 - 50 of the 70 (71%) crashes were rear-end straight (46) or rear-end right-turn (4), the secondhighest percentage of the signalized intersections.
 - A pattern of rear-end crashes occurred on the southbound off-ramp approach as 41 of the 50 (76%) rear-end crashes were along the ramp (37 RE-ST, 4 RE-RT).
- 8) <u>M-153 @ I-275 NB Off-Ramp</u>: Rate of 0.53 crashes PMEV; 27 total crashes.
 - Crash rate is 54% below the average crash rate.
 - 20 of the 27 (74%) crashes were rear-end related (16 RE-ST, 2 RE-LT, 2 RE-RT), the highest percentage of the signalized intersections.
 - A pattern of rear-end crashes occurred on the northbound off-ramp approach as 18 of the 20 (90%) rear-end crashes were along the ramp (14 RE-ST, 2 RE-LT, 2 RE-RT).
- 9) <u>M-153 @ Lotz Road</u>: Rate of 1.99 crashes PMEV; 89 total crashes.
 - Crash rate is 74% above the average crash rate.
 - 37 of the 89 (42%) crashes were rear-end straight.



- A pattern of rear-end crashes occurred on M-153 as 30 of the 37 (81%) rear-end straight crashes were on the eastbound or westbound M-153 approach (20 eastbound, 10 westbound).
- 22 of the crashes (25%) were angle type crashes.
- A pattern of angle crashes occurred as 10 of the 22 (45%) angle crashes involved westbound/northbound collisions.
- 14 crashes (16%) were side-swipe same.
- 29% of crashes were injury crashes, tied for highest among the signalized intersections.
- 10) M-153 @ Walmart/Home Depot driveways: Rate of 0.19 crashes PMEV; 7 total crashes.
 - Crash rate is 82% <u>below</u> the average crash rate, the lowest crash rate among the 10 signalized intersections.
 - 4 crashes were rear-end straight, 1 head-on left-turn, 1 angel, and 1 side-swipe same.

Peak Period Crashes

Most signalized intersections had a high percentage of crashes between 11:00 AM and 7:00 PM, Monday through Saturday. For the intersections with higher-than-average crash rates, the percent of crashes occurring in the above time period and days ranged from 59% to 75%. The high traffic volumes and commercial nature of the corridor lends itself to higher incidences of crashes during busy commuter and shopping periods.

Hazardous Actions

All signalized intersections examined involved a high incidence of hazardous actions by motorists. The percent of crashes for the 10 intersections involving a hazardous action ranged from 83% to 96% per intersection. Failure-To-Stop in an assured clear distance and/or Failure-To-Yield were by far the most common hazardous actions.

A Failure-To-Stop hazardous action is often associated with rear-end crashes, which at least in part explains why nine (9) of the ten (10) intersections had more than 35% of their crashes involving rear-end collisions. A Failure-To-Yield hazardous action is often associated with angle crashes, which at least in part explains why seven (7) of the ten (10) intersections had more than 25% of their crashes involving angle collisions.

Unsignalized Intersections Summary

The following is summary of crash history at the four (4) unsignalized study area intersections for the 3-year period from July 1, 2016 to July 1, 2019. The unsignalized intersections all serve multiple retail and other commercial businesses as well as minor side streets (see Table 1).

A total of 34 crashes were reported among the four unsignalized intersections in the 3-year study period. While crash frequency/crash rate was low at the unsignalized intersections, a high percentage of crashes were angle-related (18 of 34, or 53%). No fatal crashes and no "A" level injury crashes were reported among the unsignalized intersections. Following is a listing of crash findings of the signalized intersections, from west to east:

M-153 @ Oakview Drive-Target/5th3rd/ driveway: Rate of 0.27 crashes PMEV; 9 total crashes.

- Crash rate is 1% <u>below</u> the average crash rate for unsignalized intersections.
- 6 of the 9 crashes were angle-related.

M-153 @ Morrison Boulevard-Willow Creek Drive: Rate of 0.17 crashes PMEV; 6 total crashes.

- Crash rate is 37% below the average crash rate.
- 3 of the 6 crashes were rear-end related and 1 crash was angle-related.

M-153 @ Outback driveway-World of Beer driveway: Rate of 0.14 crashes PMEV; 5 total crashes.



- Crash rate is 48% <u>below</u> the average crash rate, lowest crash rate of the unsignalized intersections.
- 2 of the 5 crashes were angle-related and 1 crash was rear-end related.

<u>M-153 @ Panera Bread-BWW-Chuck E. Cheese driveways</u>: Rate of 0.36 crashes PMEV; 14 total crashes.

- Crash rate is 33% above the average crash rate.
- 9 of the 14 crashes were angle-related and 3 were rear-end related.

M-153 SEGMENT CRASHES

The following is summary of crash history at the 13 study area segments for the 3-year period from July 1, 2016 to July 1, 2019. The segments entail the segments between the signalized and unsignalized intersections in the study area, minus the 150-foot radius encompassing intersection crashes. Most of the M-153 segments have multiple driveways and/or side streets serving retail and other commercial businesses. Segment lengths were short, ranging from 0.06 miles (317 feet) to 0.44 miles (2,323 feet). Due to the short segment lengths, segmental crash rates were not computed.

As shown in Table 2, a total of 587 crashes were reported among the M-153 segments in the 3-year study period. Overall, angle crashes were most common (39%), followed by rear-end straight (36%), and side-swipe same (14%). No fatal crashes and one (1) "A" injury crash were reported among the segments.

Table 4 denotes the M-153 crash densities per mile by segment. The average crash density was 275 crashes per mile over the 3-year period. As noted in Table 4 in **bold**, three (3) segments had crash densities much higher than the average crash density, with the Lilley Road to Panera Bread/BWW driveway having by far the highest crash density per mile of any segment.

		C	rash Rate (Pl	MEV)
Segment Begins	Segment Ends	Total Crashes	Segment Length (mi)	Crash Density (per mile)
Canton Center Road	Sheldon Road	82	0.44	186
Sheldon Road	Oakview Dr-Target-5th3rd driveway	46	0.19	237
Oakview Dr-Target-5th3rd driveway	Morton Taylor Road	21	0.19	109
Morton Taylor Road	Morrison Boulevard-Willow Creek Drive	6	0.13	47
Morrison Boulevard-Willow Creek Drive	Outback-World of Beer driveways	2	0.04	50
Outback-World of Beer driveways	Lilley Road	35	0.16	226
Lilley Road	Panera Bread/BWW driveway	132	0.08	1,608
Panera/BWW driveway	IKEA-Art Van Furniture driveways	29	0.12	244
IKEA-Art Van Furniture driveways	Haggerty Road	83	0.12	691
Haggerty Road	I-275 SB Ramps	25	0.10	252
I-275 SB Ramps	I-275 NB Ramps	86	0.21	417
I-275 NB Ramps	Lotz Road	25	0.30	84
Lotz Road	Walmart-Home Depot driveways	15	0.06	246
M-153 (Ford Road	d) Segments TOTAL	587	2.14	275

TABLE 4 M-153 SEGMENTS CRASH DENSITIES



Following is a summary of crash findings of selected M-153 segments, those with the highest crash frequencies and highest segmental driveway density:

<u>M-153 from Canton Center Road to Sheldon Road</u>: 82 crashes in 0.44 miles; 23 driveways.

- Most total driveways of any segment
- High driveway density one driveway every 101 feet.
- 35 of the 82 crashes (43%) were angle type crashes, the third-highest percentage of angle crashes among the M-153 segments.
- 22 (27%) of the crashes were rear-end straight.

<u>M-153 from Sheldon Road to Oakview Drive-Target/5th3rd/ driveway</u>: 46 crashes in 0.19 miles; 13 driveways.

- High driveway density one driveway every 79 feet.
- 18 of the 46 crashes (39%) were angle type crashes.
- 17 (37%) of the crashes were rear-end straight.

M-153 from Lilley Road to Panera Bread-BWW driveway: 132 crashes in 0.08 miles; 6 driveways.

- By far the highest crash density (crashes/mile) of any segment.
- High driveway density one driveway every 72 feet.
- 81 of the 132 crashes (61%) were angle type crashes, the second-highest percentage of angle crashes among the M-153 segments.
- 20 (15%) of the crashes were rear-end straight.

<u>M-153 from Panera Bread-BWW driveway to IKEA/Art Van driveways</u>: 29 crashes in 0.12 miles; 9 driveways.

- High driveway density one driveway every 70 feet.
- 18 of the 29 crashes (62%) were angle type crashes, the highest percentage of angle crashes among the M-153 segments.
- 7 (24%) of the crashes were rear-end straight.

M-153 from IKEA/Art Van driveways to Haggerty Road: 83 crashes in 0.12 miles; 9 driveways.

- Second highest crash density (crashes/mile) of any segment.
- High driveway density one driveway every 72 feet.
- 34 of the 83 crashes (41%) were angle type crashes.
- 33 (40%) of the crashes were rear-end straight.



M-153/I-275 INTERCHANGE CRASHES

The following is summary of crash history at the six (6) M-153/I-275 Interchange ramps for the 3-year period from July 1, 2016 to July 1, 2019. No fatal crashes and no "A" injury crashes were reported among the six ramps.

As shown in Table 2, there were 30 ramp crashes reported for the six interchange ramps. Overall, most of the crashes were either single vehicle (40%), rear-end (23%), or side-swipe same (20%). For the 12 single vehicle crashes, there were eight (8) fixed object, two (2) overturn, and two (2) miscellaneous single vehicle.

Crash frequency on the six ramps was low, mostly ranging from two (2) to five (5) crashes over the 3-year period. The only ramp with more than five crashes was the I-275 southbound Off-Ramp, with 12 crashes. Eight (8) of the twelve (12) southbound Off-Ramp crashes were either rear-end (4) or side-swipe (4). The 12 crashes were generally evenly distributed along the 0.29-mile segment of the I-275 southbound Off-Ramp.

CRASH REDUCTION FACTORS

The American Association of State Highway and Transportation Officials (AASHTO), *Highway Safety Manual* (HSM), and the Crash Modification Factors Clearinghouse (CFMC) were referenced.

The CMF Clearinghouse presents both Crash Modification Factors (CMFs) and Crash Reduction Factors (CRFs). CMFs and CRFs were developed from previous research to estimate the effect of a certain improvement on certain or all crash types. The main difference between CRF and CMF is that CRF provides an estimate of the percentage reduction in crashes, while CMF is a multiplicative factor used to compute the expected number of crashes after implementing a given improvement. Both terms are presented in the Clearinghouse because both are widely used in the field of traffic safety.

For the purposes of this analysis, CRFs were reviewed to ascertain the potential percent reduction in crashes/crash types for applicable intersection and roadway segment improvements, given a particular improvement. It is important to note that a CRF represents the long-term expected reduction in crashes and this estimate is based on the crash experience at a limited number of study sites; the actual reduction may vary.

The following CRFs were deemed applicable to applicable intersection and roadway segment improvements:

Signalized Intersection Crash Reduction

Install backplates for signal heads: CRF of 0.15 (15% crash reduction) for all crash types.

Convert from direct left-turn to indirect left-turn intersections: The CMFC does not have CRFs for this treatment. Research conducted by MDOT in the 1990s regarding the safety performance of indirect left-turn intersections indicated the treatment decreased crashes at intersections by 16% and reduced injury crashes at intersections by 30%

M-153 Segment Crash Reduction

Reduce driveway density: A reduction in driveway density would correspond with CRFs ranging from 0.05 to 0.37, depending on extent of driveway density reduction, for all crash types. Based on the CRFs, MDOT could expect to have crash reductions of 5% to 37%, if various existing driveways along M-153 are closed as part of the reconstruction.



Convert from direct left-turn to indirect left-turn intersections: The CMFC does not have CRFs for this treatment. Research conducted by MDOT in the 1990s regarding the safety performance of indirect left-turn intersections indicated the treatment decreased crashes on arterial segments by 14% and reduced injury crashes at intersections by 30%.

SUMMARY OF RECOMMENDATIONS

Following is a summary of the recommendations for those study area intersections where mitigation measures could help reduce crashes. Nine (9) of the twelve (12) study area intersections were identified as candidates for mitigation measures.

Signalized Intersections

- 1) M-153 @ Canton Center
 - Convert intersection to indirect left-turns on all approaches with median crossovers on M-153 for indirect left-turns.
 - Install back plates for the signal heads.
- 2) <u>M-153 @ Sheldon</u>
 - Convert intersection to indirect left-turns on all approaches with median crossovers on M-153 for indirect left-turns.
 - Install back plates for the signal heads.
- 3) M-153 @ Morton Taylor
 - Convert intersection to indirect left-turns on all approaches with median crossovers on M-153 for indirect left-turns.
- 4) <u>M-153 @ Lilley</u>
 - Convert intersection to indirect left-turns on all approaches with median crossovers on M-153 for indirect left-turns.
 - Install back plates for the signal heads.
- 5) M-153 @ IKEA/Art Van driveways
 - Relocated traffic signal approximately 200 feet as denoted in the Access Management study.
 - Convert intersection to indirect left-turns on all approaches with median crossovers on M-153 for indirect left-turns.
- 6) M-153 @ Haggerty
 - Convert intersection to indirect left-turns on all approaches with median crossovers on M-153 and Haggerty Road for indirect left-turns.
- 7) <u>M-153 @ I-275 SB Ramps</u>
 - No recommendations.
- 8) <u>M-153 @ I-275 NB Off-Ramp</u>
 - No recommendations.
- 9) <u>M-153 @ Lotz</u>
 - No recommendations.
- 10) <u>M-153 @ Walmart/Home Depot driveways</u>
 - Install back plates for the signal heads.



Unsignalized Intersections

M-153 @ Oakview Drive-Target/5th3rd driveway

- Maintain eastbound M-153 left-turn into Target/5th3rd driveway.
- Convert direct left-turns on the three other approaches to indirect left-turns with median crossovers.

M-153 @ Morrison Boulevard-Willow Creek Drive

• Convert intersection to indirect left-turns on all approaches with median crossovers for indirect left-turns.

M-153 @ Outback driveway-World of Beer driveway

• Convert intersection to indirect left-turns on all approaches with median crossovers for indirect left-turns.

M-153 @ Panera Bread/BWW-Chuck E. Cheese driveways

- Maintain westbound M-153 left-turn into Chuck E. Cheese driveway.
- Convert direct left-turns on the three other approaches to indirect left-turns with median crossovers.

M-153 Segments

Eliminating driveways would also provide additional crash mitigation. It is suggested that MDOT and Canton Township work with the property owners to reduce driveway density along M-153 as part of the reconstruction of the roadway as a boulevard.

TABLE 1 M-153 (Ford Road) INTERSECTION CRASH HISTORY - July 1, 2016 thru July 1, 2019 (3 Years)

Intersection	TOTAL Crashes	Single Veh	Ped	Bike	HD- ON	HD- ON LT	Angle	RE	RE- LT	RE- RT	SS- SM	SS- OP	Oth- er	Total Injury Crashes	"A" Inj's	Crash Rate	Avg Rate Semcog	% +/- Avg Crash Rate	Total Entering ADT
Signalized Intersections																			
M-153 (Ford Rd) @ Canton Center Rd	165	4	0	0	0	12	45	56	2	4	32	1	9	27	2	3.26	1.14	186%	46,250
M-153 (Ford Rd) @ Sheldon Rd	133	6	0	1	1		45	55	0	0	9	3	8	35	0	2.99	1.14	162%	40,650
M-153 (Ford Rd) @ Morton Taylor Rd	51	2	0	1	0	5	13	20	1	0	3	1	5	15	0	1.34	1.07	25%	34,810
M-153 (Ford Rd) @ Lilley Rd	207	2	3	0	0	10	66	80	0	0	33	6	7	38	1	4.13	1.14	262%	45,790
M-153 (Ford Rd) @ IKEA Drwy	11	0	0	1	0	1	3	2	0	0	3	1	0	1	0	0.28	1.07	-74%	35,870
M-153 (Ford Rd) @ Haggerty Rd	205	3	0	1	1	14	58	91	1	1	21	3	11	39	0	3.20	1.35	137%	58,500
M-153 (Ford Rd) @ I-275 SB Ramps	70	7	0	1	1	0	1	46	0	4	9	0	1	9	0	1.24	1.35	-8%	51,720
M-153 (Ford Rd) @ I-275 NB Off-Ramp	27	3	0	0	0	0	0	16	2	2	3	0	1	3	0	0.53	1.14	-54%	46,790
M-153 (Ford Rd) @ Lotz Rd	89	3	0	1	0	5	22	37	1	0	14	2	4	26	1	1.99	1.14	74%	40,900
M-153 (Ford Rd) @ Walmart/Home Depot	7	0	0	0	1	0	1	4	0	0	1	0	0	0	0	0.19	1.07	-82%	33,390
Signalized Intersections TOTAL	965	30	3	6	4	52	254	407	7	11	128	17	46	193	4				
Percent	100%	3%	0%	1%	0%	5%	26%	42%	1%	1%	13%	2%	5%						
					U	nsigna	lized In	tersec	tions										
M-153 (Ford Rd) @ Target/5 th 3 rd /Oakview	9	0	1	0	0	0	6	0	0	0	1	0	1	3	0	0.27	0.27	-1%	30,840
M-153 (Ford Rd) @ Morrison/Willow Creek	6	2	0	0	0	0	1	3	0	0	0	0	0	1	0	0.17	0.27	-37%	31,960
M-153 (Ford Rd) @ Outback/World of Beer	5	0	0	0	1	0	2	1	0	0	1	0	0	1	0	0.14	0.27	-48%	32,330
M-153 (Ford Rd) @ Panera/BWW	14	0	0	0	0	1	9	3	0	0	1	0	0	0	0	0.36	0.27	33%	35,570
Unsignalized Intersections TOTAL	34	2	1	0	1	1	18	7	0	0	3	0	1	5	0				
Percent	100%	6%	3%	0%	3%	3%	53%	21%	0%	0%	9%	0%	3%						

⁽¹⁾ Per million entering vehicles, 150-foot radius.

Source: Crash Data - Traffic Crash Analysis Tool 2.0, Traffic Improvement Association, 150-foot intersection radius.

Source: Crash Rates - Crash Analysis Process, Southeast Michigan Council of Governments, Appendix A, Table 1.4, January 2016.

Note: No fatal crashes were reported at any of the intersections in the three-year study period.

Intersection Crash Rates 100%+ above avera	ge
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Intersection Crash Rates from 1% to 99% above average

Signalized **32%** = Most severe crash types, representing 32% of all crashes for signalized intersections



	INTERSECTION										
	SEMCOG AV	G RATES									
Entering	Crash	Rate									
ADT	<u>Signal</u>	<u>Stop</u>									
1-10,000	1.55	1.05									
10-20,000	0.87	0.46									
20-30,000	0.96	0.37									
30-40,000	1.07	0.27									
40-50,000	1.14	0.28									
50-60,000	1.35	0.28									

Rates: 150-foot radius

 TABLE 2

 M-153 (Ford Road) SEGMENT AND I-275 INTERCHANGE CRASH HISTORY - July 1, 2016 thru July 1, 2019 (3 Years)

																		No.	of Drive	ways
Segment Begins	Segment Ends	Distance	TOTAL Crashes	Single Veh	Ped	Bike	HD- ON	HD- ON LT	Angle	RE	RE- LT	RE- RT	SS- SM	SS- OP	Oth- er	Total Injury Crashes	"A" Inj's	North Side	South Side	Tota
		٨	1-153 (Ford	d Road)	Segm	nents			•											
Canton Center Road	Sheldon Road	0.44	82	1	1	0	1	4	35	22	0	0	10	2	6	17	0	13	10	23
Sheldon Road	Oakview Dr-Target-5th3Road drwy	0.19	46	0	0	0	0	2	18	17	0	0	8	0	1	9	0	6	7	13
Oakview Dr-Target-5th3Road drwy	Morton Taylor Road	0.19	21	3	0	1	0	1	6	6	0	0	4	0	0	3	0	5	3	8
Morton Taylor Road	Morrison Blvd-Willow Creek Dr	0.13	6	0	0	0	0	0	0	5	0	0	0	0	1	0	0	1	2	3
Morrison Blvd-Willow Creek Dr	Outback-World of Beer drwys	0.04	2	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1
Outback-World of Beer drwys	Lilley Road	0.16	35	1	0	0	0	2	10	19	0	0	3	0	0	8	0	4	1	5
Lilley Road	Panera/BWW drwy	0.08	132	3	0	0	0	11	81	20	0	0	14	1	2	38	0	3	3	6
Panera/BWW drwy	IKEA Drwy	0.12	29	0	0	0	0	2	18	7	0	0	2	0	0	9	0	3	6	9
IKEA Drwy	Haggerty Road	0.12	83	0	0	0	0	6	34	33	0	0	9	1	0	21	0	4	5	9
Haggerty Road	I-275 SB Ramps	0.10	25	0	0	0	0	0	9	7	0	0	9	0	0	3	0	2	3	5
I-275 SB Ramps	I-275 NB Ramps	0.21	86	6	0	0	0	1	5	56	1	1	15	0	1	13	1	0	0	0
I-275 NB Ramps	Lotz Road	0.30	25	1	0	1	0	0	7	9	0	0	4	1	2	11	0	2	1	3
Lotz Road	Walmart/Home Depot Drwys	0.06	15	0	0	0	0	0	3	7	0	0	5	0	0	3	0	0	1	1
M-153 (Ford Road	d) Segments TOTAL	2.14	587	15	1	2	1	29	227	209	1	1	83	5	13	135	1	43	43	86
	Percent		100%	3%	0%	0%	0%	5%	39%	36%	0%	0%	14%	1%	2%					

I-275/M-153 (Ford Road) Interchange Ramps																
I-275 Ramp	Distance	TOTAL Crashes	Single Veh	Ped	Bike	HD- ON	HD- ON LT	Angle	RE	RE- LT	RE- RT	SS- SM	SS- OP	Oth- er	Total Injury Crashes	"A" Inj's
I-275 NB Off-Ramp	0.38	5	3	0	0	0	0	0	1	0	0	0	0	1	1	0
I-275 NB On-Ramp	0.41	5	3	0	0	0	0	0	1	0	0	1	0	0	2	0
I-275 SB Off-Ramp	0.35	12	4	0	0	1	0	0	2	0	1	4	0	0	0	0
I-275 SB On-Ramp	0.29	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0
I-275 NB On-Loop	0.24	4	1	0	0	0	0	0	1	0	1	0	0	1	1	0
I-275 SB On-Loop	0.25	2	1	0	0	0	0	0	0	0	0	1	0	0	0	0
Ramps TOTAL	1.92	30	12	0	0	1	0	0	7	0	2	6	0	2	4	0
Percent		100%	40%	0%	0%	3%	0%	0%	23%	0%	7%	20%	0%	7%		

Source: Crash Data - Traffic Crash Analysis Tool 2.0, Traffic Improvement Association.

Note: No fatal crashes were reported at any of the intersections in the three-year study period.

Appendix A

Collision Summary Diagrams

- M-153 (Ford Road) @ Canton Center Road
- M-153 (Ford Road) @ Sheldon Road
- M-153 (Ford Road) @ Lilley Road
- M-153 (Ford Road) @ Haggerty Road
 - Angle Crashes
 - Rear-End Crashes



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Collision Summary



Transportation Improvement Association First Page | Previous Page | Next Page | Last Page Displaying 23 of 23 Records Page 1 of 1 Haggerty & M-153 7/1/2016 - 7/1/2019 58 Crashes M-153 @ Haggerty Rd ANGLE (0 crash(es) not drawn) Haggerty M-153 1 □+ . ,+6-| 0+1-| 0×1-| 0×4-| 0+4-¢ __⊙z __⊙z Â Straight ←
 Backing +>>> Erratic Injury **Right Turn** Passing ↔ Out of Control Fatality Left Turn - U-Turn +---- Unknown ৰ Not to Scale Parked Fixed Object Printed: 12/19/2019 → Stopped

