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# Memorandum

The City of Traverse City  
Engineering Department



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TO: Timothy J. Lodge, P.E., City Engineer, Jessica Cichowski, Engineering Technician  
FROM: John Zarafonitis, Seasonal Engineering Aide *JZ*  
DATE: Wednesday, July 30, 2014  
SUBJECT: Cass St. Neighborhood Intersections Study

City Engineering was tasked with assessing the intersections in the Cass St. Neighborhood, to determine the effect of the current traffic calming markings and intersection layouts on motorists, pedestrians, and bicyclists. In order to assess the intersections, one-hour long observations were done at random times throughout the work week. Normally, this would be done during peak traffic hours, but due to the observations being done during the Cherry Festival, all times were deemed representative of normal peak hours. This study is meant to be compared to and compiled with the observations gathered by the residents of the area, to gain a comprehensive view of the current state of the Cass St. Neighborhood intersections.

The Cass St. intersections observed were at 9<sup>th</sup>, 10<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, Griffin, and 13<sup>th</sup> St. All 6 intersections had a few common observations, including the number of commercial vehicles and the number of bicyclists. The intersections were also separated into controlled Crosswalk and uncontrolled Crosswalk categories. The 10<sup>th</sup> and 12<sup>th</sup> St. intersections are four-way stop locations and are therefore considered controlled intersections. 9<sup>th</sup>, 11<sup>th</sup>, Griffin, and 13<sup>th</sup> are two-way stop locations with vehicles on the minor roads having to stop and are therefore considered uncontrolled intersections. Observations done on the uncontrolled intersections prioritized vehicles interaction with pedestrians and traffic calming markings, while observations of the controlled intersections focused on rolling stops.

During the study, some trends between the uncontrolled intersections emerged. The most common behavior of drivers passing straight through these intersections was that they neither tried to avoid nor drive over the traffic calming markings, they would instead just stay on their current path. This led to subjective recordings for both vehicles visibly veering around and vehicles driving over the traffic calming markings when passing through the intersection. In order to keep these observations consistent, vehicles that had two of their tires fully on the markings were counted as driving over them, and those clearly swerving to get around them were counted as veering around. The vehicles that turned at these intersections on the other hand tended to drive over the markings, with only a few vehicles visibly veering around them.

The one trend that emerged between the controlled intersections was that almost every vehicle rolling stopped, to an extent, through the stop signs. This led to only clear, obvious rolling stops being recorded.

Once the data was compiled, a few interesting trends emerged; these are listed below:

1. Generally speaking, the farther the intersection is from downtown, the higher the number of commercial vehicles
2. The closer the intersection is to downtown, the higher the pedestrian traffic
3. The number of vehicles coming to only a rolling stop at the Controlled Crosswalk intersections was very high

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4. Griffin St. and Cass St. intersection had a large number of vehicles in the bike lane
  5. Cass St. and 9<sup>th</sup> St. had the only recorded higher use of bicycles/coaster toys on the sidewalk than in the bike lane
  6. Difference between Circle and Teardrop traffic calming markings
    - a. Circle markings appear to be easier to veer around
    - b. Teardrop markings appear to deter people driving over them more

For more information on these trends please see attached spreadsheet.

It should be noted that when approaching the Cass St. and Griffin St. intersection from the North and going through the intersection toward 14<sup>th</sup> St., vehicles are forced into the bike lane due to the addition of a left turn lane South of Griffin. Due to this lane layout, vehicles in (when the full tire was over the white line) and borderline in (when the vehicle's tires were on the white line) the bike lane were only recorded North of Griffin St. Also, the number of vehicles in and borderline in the bike lane for all six intersections came from the total number of vehicles traveling on Cass St. only. This is due to the lack of a bike lanes on the cross streets.

Encl.: Cass St. Intersection Assessment Comparison Tables  
Cass St. Neighborhood Intersection Assessment Worksheets for each intersection

**Cass St. Neighborhood Intersection Assessment Comparison**

General Information	Uncontrolled Crosswalk						Controlled Crosswalk		
	Cass St. & 9 <sup>th</sup> St.	Cass St. & 11 <sup>th</sup> St.	Cass St. & Griffin St.	Cass St. & 13 <sup>th</sup> St.	Cass St. & 10 <sup>th</sup> St.	Cass St. & 12 <sup>th</sup> St.			
Date	Monday, 7/7/14	Monday, 7/7/14	Tuesday, 7/8/14	Tuesday, 7/8/14	Monday, 7/7/14	Tuesday, 7/8/14			
Conditions	Sunny, 81°	Sunny, 77°	Cloudy, 68°	Cloudy, 64°	Sunny, 81°	Cloudy, 64°			
Time	3:30 - 4:30 PM	1:10 - 2:10 PM	10:40 - 11:40 AM	9:35 AM - 10:35 AM	2:20 - 3:20 PM	8:25 - 9:25 AM			
Calming Markings	Teardrop	Teardrop	Teardrop	Circle	None	None			
Road Users	Cass St. 9 <sup>th</sup> St.	Cass St. 11 <sup>th</sup> St.	Griffin St.	Cass St. 13 <sup>th</sup> St.	Cass St. 10 <sup>th</sup> St.	Cass St. 12 <sup>th</sup> St.			
Commercial Vehicles	27	33	0	54	29	65 <sup>1</sup>			
Bicyclists / Coaster Toys in Bike Lane / Road	8	6	1	1	6 <sup>2</sup>	3			
Bicyclists / Coaster Toys on Sidewalk	10 <sup>3</sup>	4	0	1	6 <sup>2</sup>	2			
Vehicles in Bike Lane	34	N/A	N/A	8	0	0			
Vehicles in Borderline in Bike Lane	52	N/A	N/A	25	0	14			

**Notes:**

- BATA Buses were observed to be at least partially in the bike lane almost every time
- When approaching the Cass St. and 14<sup>th</sup> St. Intersection from the North, cars are forced into the bicycle lane if they are going straight after the Griffin St. intersection. This is due to the addition of a left-turn lane, therefore the number of vehicles in and borderline in the bike lane for the Griffin St. intersection will only be counted North of the intersection

**Cass St. Neighborhood Intersection Assessment Comparison**

	Uncontrolled Crosswalk												Controlled Crosswalk		
	Cass St. & 9 <sup>th</sup> St.		Cass St. & 11 <sup>th</sup> St.		Cass St. & Griffin St.		Cass St. & 13 <sup>th</sup> St.		Cass St. & 10 <sup>th</sup> St.		Cass St. & 12 <sup>th</sup> St.				
	Crossing Cass / Turning Off Cass	Crossing 9 <sup>th</sup> / Turning Onto Cass	Crossing Cass / Turning Off Cass	Crossing 11 <sup>th</sup> / Turning Onto Cass	Crossing Cass / Turning Off Cass	Crossing Griffin / Turning Onto Cass	Crossing Cass / Turning Off Cass	Crossing 13 <sup>th</sup> / Turning Onto Cass	Crossing Cass / Turning Off Cass	Crossing 10 <sup>th</sup> / Turning Onto Cass	Crossing Cass / Turning Off Cass	Crossing 12 <sup>th</sup> / Turning Onto Cass			
Pedestrians	1	27	0	15	0	0	0	0	1	N/A	N/A	N/A	N/A		
Vehicles	0	1	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A		
Yielding to Pedestrians	2	0	0	0	0	0	0	0	0	N/A	N/A	N/A	N/A		
Vehicles Not Yielding to Pedestrians															
Vehicles	5	3	2	6	5	0	0	7	27	N/A	N/A	N/A	N/A		
Visibly Veering Around Traffic															
Calming Markings															
Vehicles Driving Over Traffic Calming Markings	6	14	15	18	11	17	1	36	N/A	N/A	N/A	N/A	N/A		

**Notes:**

- Most vehicles appeared to stay on their current path when going through the intersection on cass, neither trying to avoid / hit the traffic calming markings

**Cass St. Neighborhood Intersection Assessment Comparison**

	Uncontrolled Crosswalk												Controlled Crosswalk			
	Cass St. & 9 <sup>th</sup> St.			Cass St. & 11 <sup>th</sup> St.			Cass St. & Griffin St.			Cass St. & 13 <sup>th</sup> St.			Cass St. & 10 <sup>th</sup> St.		Cass St. & 12 <sup>th</sup> St.	
	On Cass / Turning Off Cass	On 9 <sup>th</sup> / Turning onto Cass	N/A	On Cass / Turning Off Cass	On 11 <sup>th</sup> / Turning onto Cass	N/A	On Cass / Turning Off Cass	On Cass / Turning onto Cass	On Griffin / Turning onto Cass	N/A	N/A	On Cass / Turning Off Cass	On 13 <sup>th</sup> / Turning onto Cass	On Cass / Turning Off Cass	On 10 <sup>th</sup> / Turning onto Cass	On Cass / Turning Off Cass
Vehicle: Rolling Stop	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	179	25	216	38
Bicycle: Rolling Stop	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10	5	5	3
Bicycle: Complete Stop	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	9	0	2

**Notes:**

- Almost every vehicle rolling stopped through the intersections in some way, due to this, only the clearest rolling stops were counted
- 10<sup>th</sup> and 12<sup>th</sup> had no traffic calming markings

Cass St. Neighborhood Intersection Assessment Comparison

Additional Information	Uncontrolled Crosswalk						Controlled Crosswalk	
	Cass St. & 9 <sup>th</sup> St.	Cass St. & 11 <sup>th</sup> St.	Cass St. & Griffin St.	Cass St. & 13 <sup>th</sup> St.	Cass St. & 10 <sup>th</sup> St.	Cass St. & 12 <sup>th</sup> St.		
Semi	0	1	2	1	0	4		
Light & Power	0	2	0	3	1	1		
Mailvan	0	0	1	0	2	0		
Municipal	0	3	0	1	1	0		
Government	0	0	0	0	0	1		
Vehicles Stopping when there is no Stop Sign	0	4	0	0	0	0		

Notes:

<sup>1</sup> Municipal and Government Vehicles were cars

<sup>1</sup> High number of commercial vehicles at Cass St. and 12<sup>th</sup> St. attributed to Cone Drive being nearby

<sup>2</sup> Cass St. and 10<sup>th</sup> St. intersection's large number of bicycles and coaster toys attributed to Oryana and TART Trail access being nearby

<sup>3</sup> Cass St. and 9<sup>th</sup> St. higher use of bicycles and coaster toys on the sidewalk than in the bike lane attributed to more families with younger children and people on skateboards/longboards