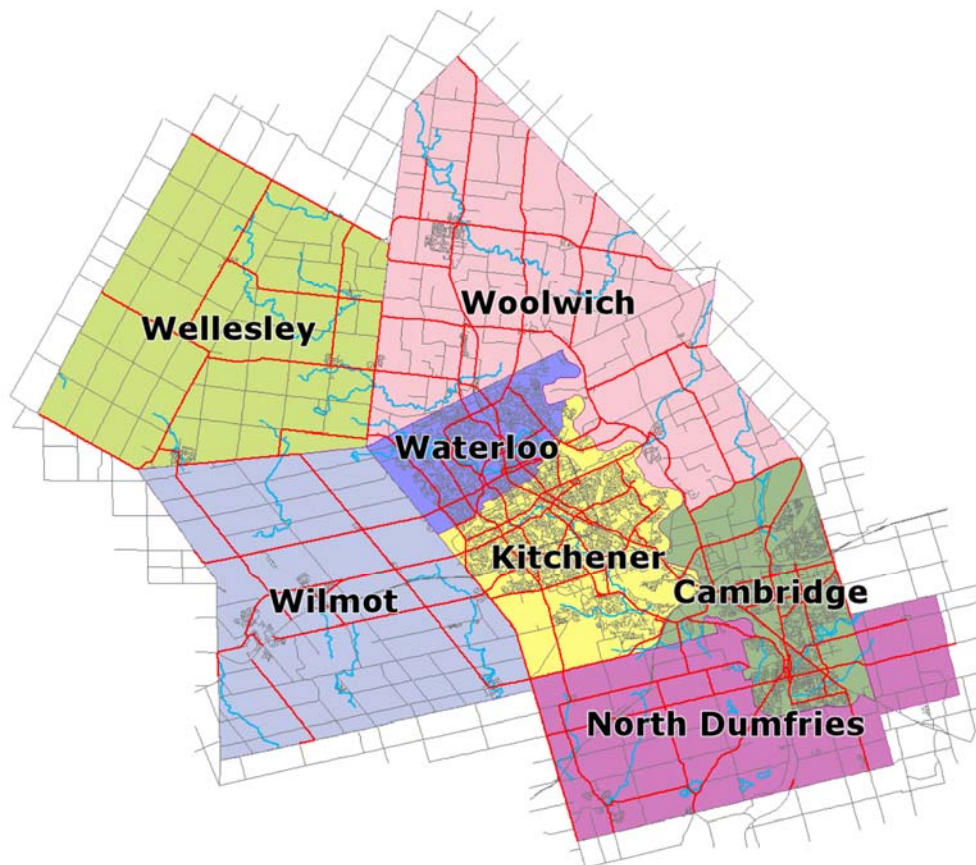


2018 Collision Report



Prepared by:

Regional Municipality of Waterloo
Transportation & Environmental Services Department
Transportation Division

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Introduction

This annual report is a summary of factors associated with traffic collisions that occurred in 2018. Also presented are comparison factors for the years 2014 to 2018. The information presented in this report is based upon vehicle collisions occurring on roads under the jurisdiction of the Regional Municipality of Waterloo or occurring at signalized intersections (including pedestrian and mid-block signals) under the jurisdiction of local municipalities and either investigated by Regional Police or reported at the Collision Reporting Centre.

The following local municipalities are situated within the Region:

- Township of North Dumfries;
- Township of Wellesley;
- Township of Wilmot;
- Township of Woolwich;
- City of Cambridge;
- City of Kitchener; and
- City of Waterloo.

The estimated total population within the Region, including post-secondary students, was 601,220 in 2018 estimated from 2018 published statistics.

The intention of this report is to provide factual information to those agencies and persons concerned with the safety of the roadway transportation system within the Regional Municipality of Waterloo.

Traffic collisions frequently involve complex interactions between human behaviour, vehicle characteristics, and environmental conditions. The factor or factors responsible for causing a collision are not always the most obvious nor are they always readily apparent. Caution should be exercised in drawing conclusions from the statistics presented in this report and conclusions should be drawn only with appropriate qualifications and supportive information.

Executive Summary

A total of 6370 reported traffic collisions occurred on roads under the jurisdiction of the Regional Municipality of Waterloo or at signalized intersections (including pedestrian and mid-block signals) under the jurisdiction of local municipalities during 2018. At the time of publishing this report these collisions resulted in the following statistics:

Statistic	2018	2017	2016	2015	2014
Number of Collisions	6370	6263	5791	6319	6462
Number of Fatal Collisions	6	9	6	9	9
Number of Injury Collisions	1338	1424	1371	1486	1441
Number of Collisions Involving Pedestrians	110	139	120	150	111
Number of Collisions Involving Cyclists	79	101	95	110	110
Number of Persons Injured in Collisions (includes drivers, passengers, cyclists and pedestrians)	1893	1949	1851	2049	1974
Number of Persons Sustaining Fatal Injuries in Collisions (includes drivers, passengers, cyclists and pedestrians)	6	9	6	11	9
Percentage of Collisions Occurring at Intersections	70%	66%	64%	66%	63%
Day with Highest Number of Collisions	Friday	Friday	Thursday	Friday	Friday
Month with Highest Number of Collisions	November	November	December	February	January
Time of Day with Highest Number of Collisions	17:00	17:00	17:00	17:00	17:00
Most Common Collision Type	Rear End	Rear End	Rear End	Rear End	Rear End
Most Frequently Recorded Improper Driving Action	Following Too Close	Following Too Close	Following Too Close	Following Too Close	Following Too Close
Percentage of Alcohol-Related Collisions	1.20%	1.70%	1.70%	1.30%	1.30%
Horse-Drawn Vehicle Collisions	3	3	0	5	5

Glossary of Terms

Motor Vehicle Collision:

Any incident in which bodily injury or damage to property is sustained as a result of the movement of a motor vehicle, or of its load while a motor vehicle is in motion.

Driver:

Unless specified otherwise, any person, whether licensed or not, considered to be in care and control of a motor vehicle at the time of a collision.

Cyclist:

Any person considered to be in the care and control of a bicycle at the time of a collision.

Pedestrian:

Any person not riding in or on a vehicle involved in a motor vehicle collision including person on roller blades, scooters, wheelchair, etc.

Fatal Collision:

A motor vehicle collision in which at least one person sustains bodily injuries resulting in death within 30 days of the date of the motor vehicle collision.

Personal Injury Collision:

A collision involving a motorist, cyclist or pedestrian in which at least one person involved sustains bodily injuries not resulting in death.

Property Damage Collision:

A collision involving a motorist, cyclist or pedestrian in which no person sustains bodily injury, but in which there is damage to any public property or damage to private property.

Had Been Drinking:

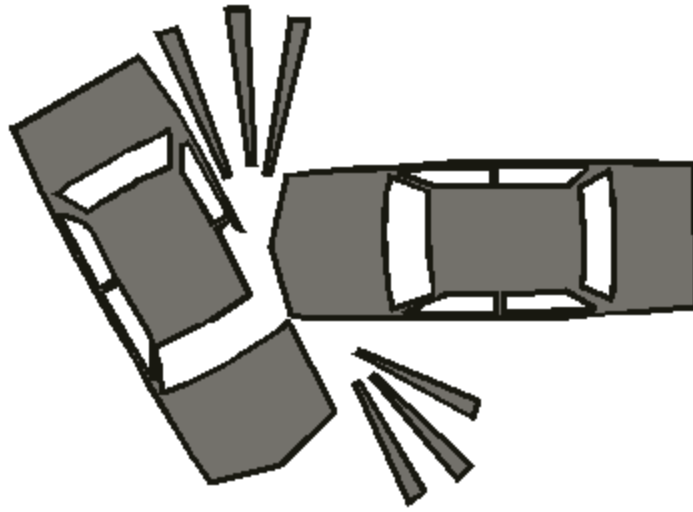
Driver had consumed alcohol but their physical condition was not legally impaired.

Ability Impaired Alcohol >80 mg:

Driver had consumed alcohol and upon testing was found to have a blood-alcohol level in excess of 80 milligrams in 100 milliliters of blood.

Ability Impaired Alcohol:

Driver had consumed sufficient alcohol to warrant being charged with a drinking and driving offence in the judgment of the investigating officer.



Chapter One

Selected Characteristics

1.0 Selected Characteristics

1.1 Motor Vehicle Collision History

Exhibit 1.1.1 provides historical trends of motor vehicle collisions from 1996 to 2018 inclusive.

Exhibit 1.1.1 Motor Vehicle Collision History

Year	Fatal Collisions	Injury Collisions	Property Damage	Total Collisions	Estimated Population	Collisions Per 1,000 Pop.
1996	13	1239	4404	5656	423,200	13.4
1997	14	1039	3634	4687	427,500	11.0
1998	15	1130	3699	4844	435,700	11.1
1999	7	1167	3964	5138	443,900	11.6
2000	12	1489	4873	6374	451,500	14.1
2001	12	1561	4757	6330	459,500	13.8
2002	20	1638	5338	6976	469,800	14.8
2003	14	1521	5122	6657	478,600	13.9
2004	11	1476	4574	6061	488,490	12.4
2005	12	1460	4276	5748	497,900	11.5
2006	9	1398	4281	5688	506,150	11.2
2007	5	1355	4620	5980	511,700	11.7
2008	11	1359	4453	5823	533,710	10.9
2009	9	1196	4342	5547	534,920	10.4
2010	8	1341	4460	5809	543,800	10.7
2011	15	1379	4637	6031	552,930	10.9
2012	10	1350	4435	5795	559,050	10.4
2013	10	1433	4832	6275	563,030	11.1
2014	9	1441	5012	6462	568,500	11.4
2015	9	1486	4824	6319	575,000	11.0
2016	6	1371	4414	5791	581,500	10.0
2017	9	1424	4830	6263	594,100	10.5
2018	6	1338	5026	6370	601,220	10.6

Exhibit 1.1.2 Regional Collision History vs. Population

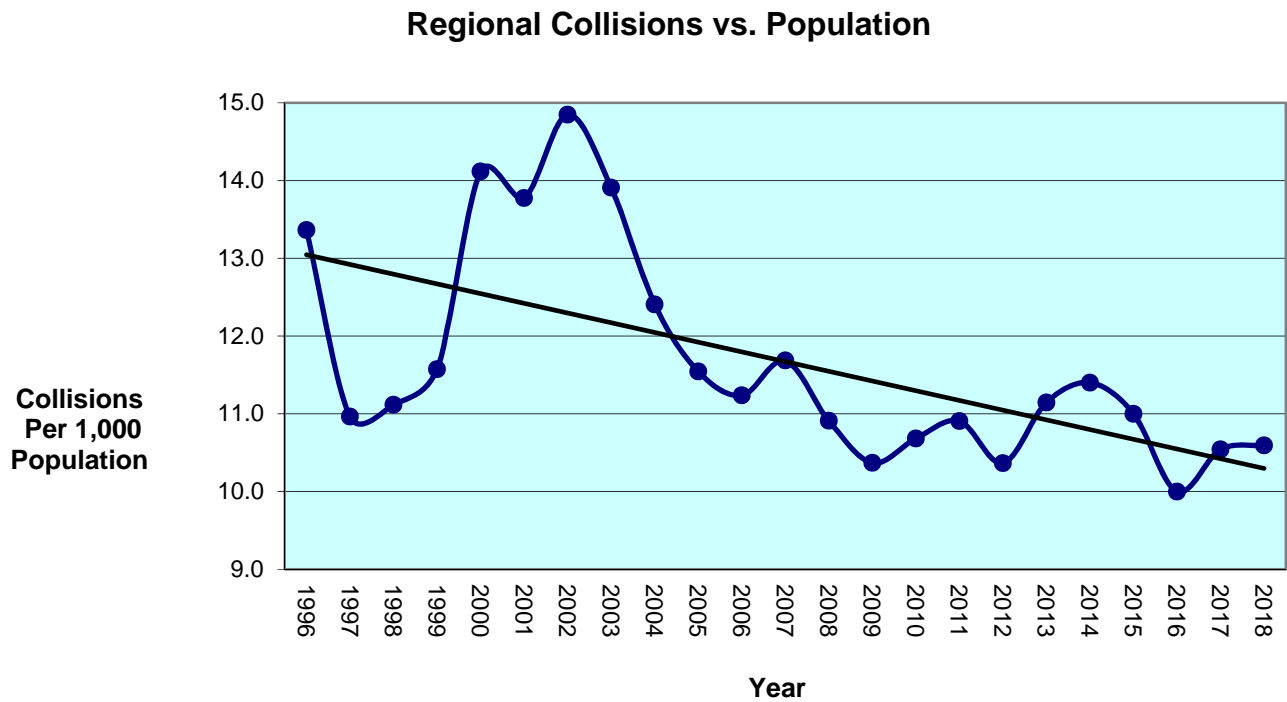
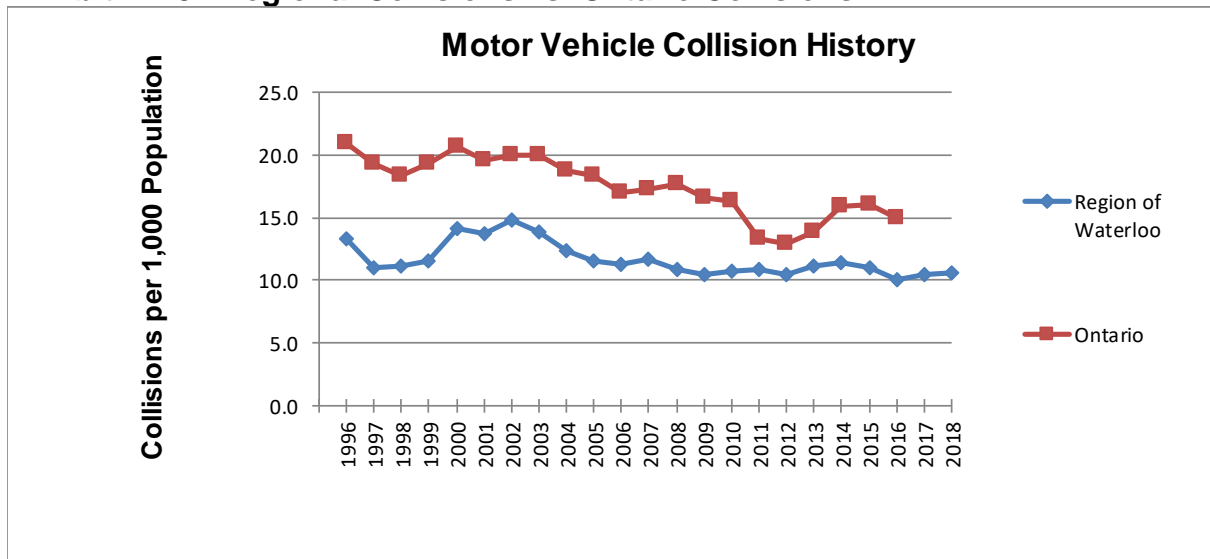


Exhibit 1.1.3 compares trends in motor vehicle collisions per 1,000 population between the Region of Waterloo and the Province of Ontario.

Exhibit 1.1.3 Regional Collisions vs. Ontario Collisions

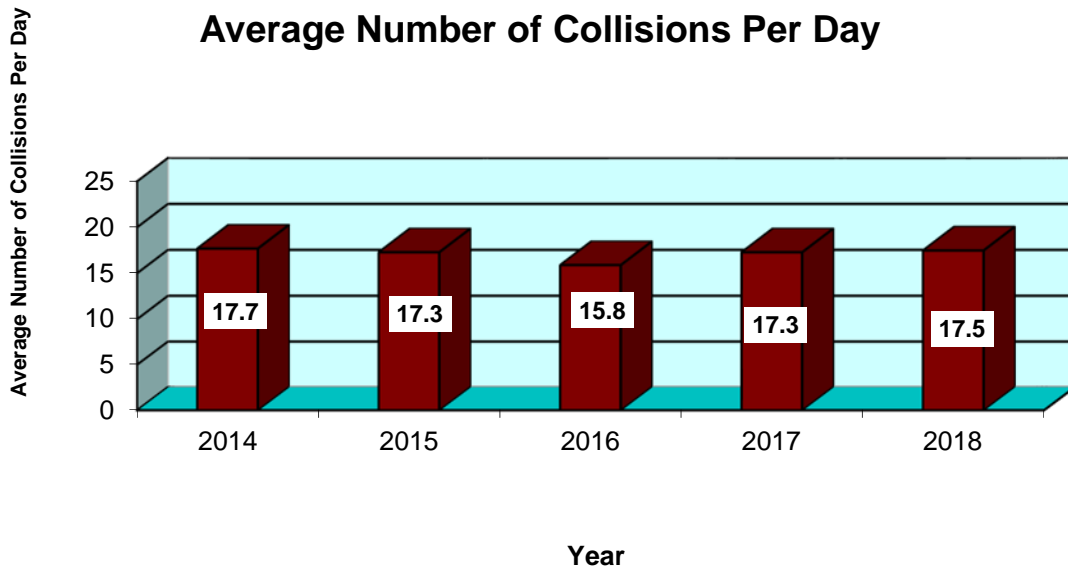


Note – Ontario statistics gathered from the latest (2014) Ministry of Transportation Ontario Road Safety Annual Report and include all jurisdictions in the Province of Ontario. Statistics have not been available since 2017.

1.2 Day/Time/Month of Occurrence

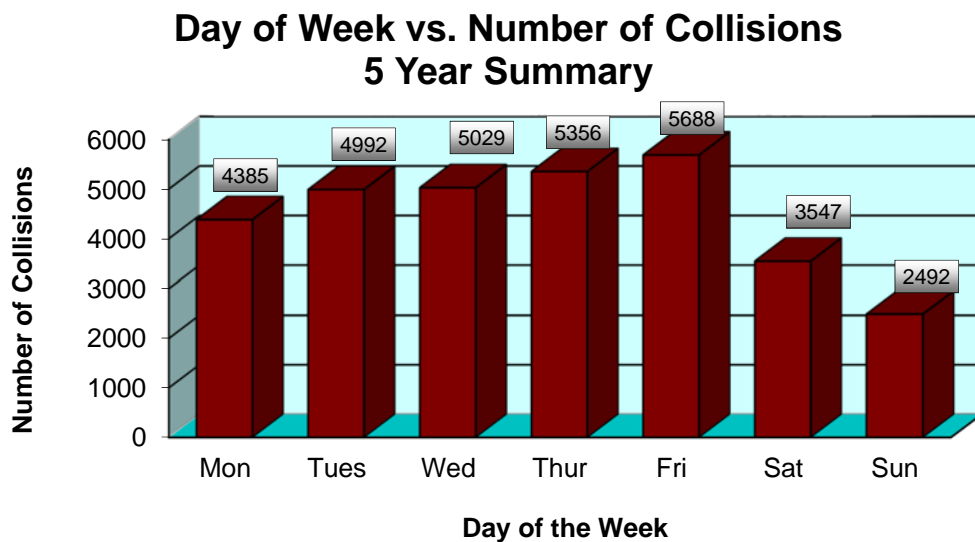
Exhibit 1.2.1 indicates that in **2018** the average number of collisions per day was **17.5**.

Exhibit 1.2.1



In **2018** the largest proportion of collisions occurred on **Friday**. Exhibit 1.2.2 demonstrates that the largest proportion of collisions over a 5-year period occurred on Fridays.

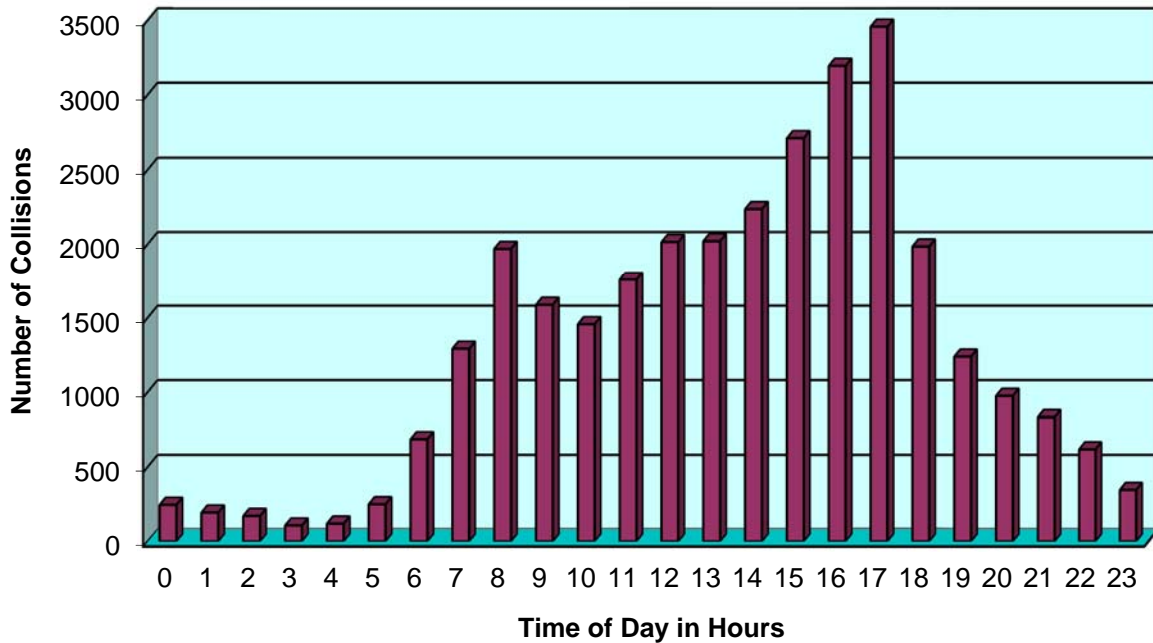
Exhibit 1.2.2



The hour **17:00** was the time of day that experienced the highest number of collisions in **2018**. Exhibit 1.2.3 demonstrates that over 5 years the hour with the highest number of collisions is 17:00.

Exhibit 1.2.3

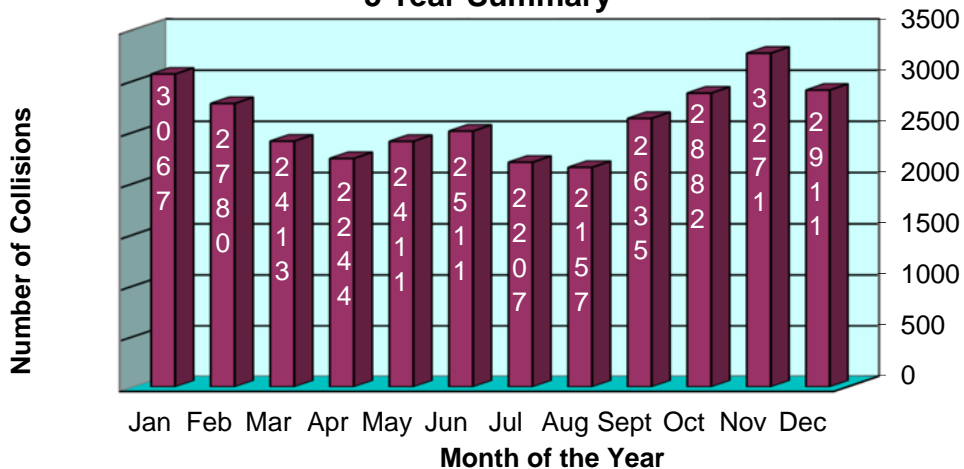
Time of Day vs. Number of Collisions 5 Year Summary



The month with the highest number of collisions during **2018** was **November** with 689 collisions. Exhibit 1.2.4 shows that over 5 years November was the month with the highest number of collisions.

Exhibit 1.2.4

Month of Year vs. Number of Collisions 5 Year Summary



1.3 Impact Type

The most common impact type in motor vehicle collisions was “**Rear End**”. However, collisions with pedestrians result in the highest percentage of injury followed by the impact type “**Approaching (head on)**” for the year 2018 and historically over 5 years (see Exhibit 1.3.1).

Exhibit 1.3.1

Impact Type vs. Type of Collision					
2018 Summary (Number of Collisions)					
Initial Impact Type	Type Of Collision				% of Type Involving Injury & Fatal Collisions
	Fatal Injury	Personal Injury	Property Damage	Total	
Approaching (head on)	0	17	13	30	57%
Angle	2	170	594	766	22%
Rear End	1	466	1838	2305	20%
Sideswipe	0	67	762	829	8%
Turning Movement	2	369	1092	1463	25%
Single Motor Vehicle (Animal)	0	5	146	151	3%
Single Motor Vehicle (Fixed Object)	0	104	426	530	20%
Single Motor Vehicle (Pedestrian)	1	105	4	110	96%
Other	0	35	151	186	19%
TOTAL	6	1338	5026	6370	
5 Year Summary (Number of Collisions)					
Initial Impact Type	Type Of Collision				% of Type Involving Injury & Fatal Collisions
	Fatal Injury	Personal Injury	Property Damage	Total	
Approaching (head on)	2	81	43	126	66%
Angle	5	866	2475	3346	26%
Rear End	5	2770	9238	12013	23%
Sideswipe	2	296	3586	3884	8%
Turning Movement	8	1755	5202	6966	25%
Single Motor Vehicle (Animal)	0	27	777	804	3%
Single Motor Vehicle (Fixed Object)	6	478	2254	2738	18%
Single Motor Vehicle (Pedestrian)	6	605	33	644	95%
Other	4	193	771	968	20%
TOTAL	39	7071	24379	31489	

Exhibit 1.3.2 shows that in 2018, 39% of all collisions occurred where there was **no traffic control** and the most common collision type with no traffic control was “**Rear End**”. “**Rear End**” collisions were also the most common collision type at traffic signal locations. Overall, 42% of all collisions occurred at locations with **traffic signals**. Exhibit 1.3.2 also shows that over 5 years the pattern remains similar.

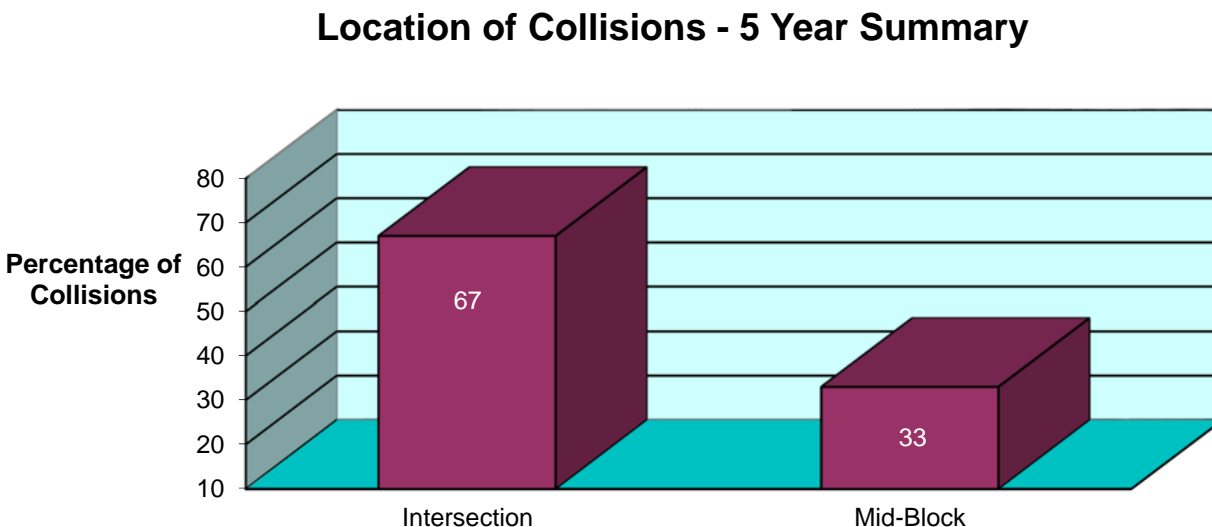
Exhibit 1.3.2

Impact Type vs. Type of Traffic Control							
Impact Type	Traffic Signal	Stop Sign	Yield Sign	Other**	No Control	Total	% of all types of impact
2018 Summary (Number of Collisions)							
Approaching	6	1	0	0	23	30	0%
Angle	212	111	399	1	43	766	12%
Rear End	1201	98	174	6	826	2305	36%
Sideswipe	342	8	61	0	418	829	13%
Turning Movement	646	207	55	1	554	1463	23%
SMV(*)/Animal	1	5	0	0	145	151	2%
SMV(*)/Fixed Object	134	36	22	4	334	530	8%
SMV(*)/Pedestrian	74	8	0	0	28	110	2%
Other	50	17	8	0	111	186	3%
Total	2666	491	719	12	2482	6370	100%
% of all types of control	42%	8%	11%	0.2%	39%		
5 Year Summary (Number of Collisions)							
Approaching	17	3	0	0	106	126	0%
Angle	1133	569	1355	3	286	3346	11%
Rear End	6344	416	602	43	4608	12013	38%
Sideswipe	1489	28	223	5	2139	3884	12%
Turning Movement	3220	961	203	9	2569	6962	22%
SMV(*)/Animal	2	7	0	3	792	804	3%
SMV(*)/Fixed Object	563	172	133	13	1857	2738	9%
SMV(*)/Pedestrian	437	48	5	8	146	644	2%
Other	201	53	28	3	683	968	3%
Total	13406	2257	2549	87	13186	31485	100%
% of all types of control	43%	7%	8%	0.3%	42%		

1.4 Location of Collisions

During **2018**, **70%** of all collisions occurred at intersections and **30%** occurred within mid-block locations. Exhibit 1.4.1 indicates that over 5 years this pattern is similar with 67% at intersections and 33% within mid-block locations.

Exhibit 1.4.1

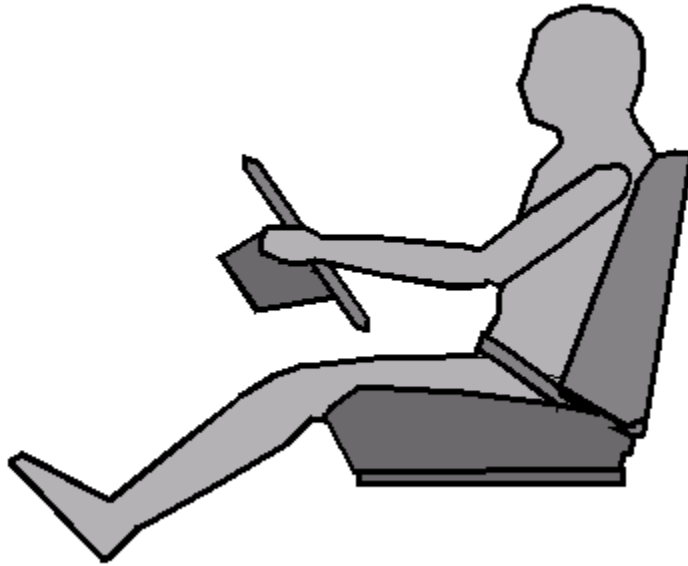


1.5 Injuries

During **2018** there were 1338 injury collisions with 1893 persons injured and 6 persons sustaining fatal injuries. Exhibit 1.5.1 shows a summary of injuries over 5 years.

Exhibit 1.5.1

Year	Total Collisions	Injury Collisions	Total Injured Persons*		Injured Occupants of Vehicles		Injured Pedestrians		Injured Cyclists	
			Injury	Fatal	Injury	Fatal	Injury	Fatal	Injury	Fatal
2014	6462	1441	1974	9	1786	7	103	2	85	0
2015	6319	1486	2049	9	1809	8	148	1	92	0
2016	5791	1371	1851	6	1653	4	126	1	74	1
2017	6263	1424	1949	9	1733	7	142	1	77	1
2018	6370	1338	1893	6	1705	4	120	1	68	1



Chapter Two

Drivers

2.0 Drivers

2.1 Driver Age

Exhibit 2.1.1 indicates the age category with the highest number of **improper driving** collisions was the **25 to 34-year-old age group**. The most frequent improper driving actions recorded for this group was **“Following Too Close”**. The most frequent improper driving action for all ages was **“Following Too Close”**. Historically over 5 years the pattern remains the same.

Exhibit 2.1.1

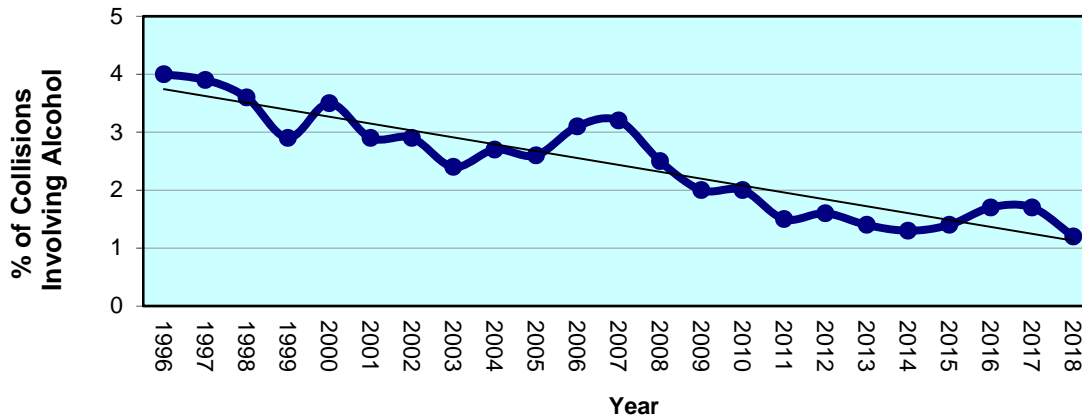
Driver Age vs. Driver Action Involved in Collisions											
Driver Action	Driver Age								Unknown Age	Total	% of all actions
	16 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75+			
2018 Summary (Number of Collisions)											
Driving Properly	199	629	1282	1116	1149	856	428	195	8	5862	48%
Following Too Close	119	234	376	279	233	162	76	48	3	1530	13%
Exceeding Speed Limit	5	5	7	3	0	1	0	0	1	22	0%
Speed Too Fast	38	85	140	65	68	49	17	11	3	476	4%
Speed Too Slow	0	0	1	0	0	0	0	0	0	1	0%
Improper Turn	52	117	173	123	120	119	95	67	14	880	7%
Disobeyed Traffic Control	21	48	64	49	52	37	31	21	6	329	3%
Failed To Yield R.O.W.	67	138	223	171	155	172	105	81	24	1136	9%
Improper Passing	5	13	25	18	15	13	4	5	3	101	1%
Lost Control	31	88	103	47	53	35	16	10	10	393	3%
Wrong way on one-way road	0	1	0	1	0	1	0	0	0	3	0%
Improper Lane Change	33	61	101	89	72	67	57	32	6	518	4%
Evasive Action	1	7	5	2	1	7	2	0	1	26	0%
Other (undetermined)	43	81	164	132	143	126	58	29	34	810	7%
Total # of drivers involved in collisions	614	1507	2664	2095	2061	1645	889	499	113	12087	100%
Total # of drivers involved in improper driving collisions (excluding other)	372	797	1218	847	769	663	403	275	71	5415	45%
% of drivers who were recorded as driving properly	32%	42%	48%	53%	56%	52%	48%	39%	7%	48%	
5 Year Summary (Number of Collisions)											
Driving Properly	926	2825	6017	5615	5808	4300	2017	881	92	28481	48%
Following Too Close	569	1222	1806	1334	1120	792	346	209	67	7465	13%
Exceeding Speed Limit	24	36	30	19	9	5	0	1	4	128	0%
Speed Too Fast	221	498	633	435	382	249	109	49	26	2602	4%
Speed Too Slow	1	0	5	2	0	3	0	2	1	14	0%
Improper Turn	252	554	759	551	637	511	376	294	74	4008	7%
Disobeyed Traffic Control	100	245	315	250	237	223	137	112	44	1663	3%
Failed To Yield R.O.W.	315	676	942	722	805	696	508	389	118	5171	9%
Improper Passing	13	60	98	70	82	66	26	27	58	500	1%
Lost Control	198	415	558	336	307	218	122	70	45	2269	4%
Wrong way on one-way road	1	2	3	2	1	2	2	0	1	14	0%
Improper Lane Change	144	309	463	343	406	318	259	175	56	2473	4%
Evasive Action	7	25	38	25	18	22	11	4	4	154	0%
Other (undetermined)	243	523	911	827	790	617	281	178	379	4749	8%
Total # of drivers involved in collisions	3014	7390	12578	10531	10602	8022	4194	2391	969	59691	100%
Total # of drivers involved in improper driving collisions (excluding other)	1845	4042	5650	4089	4004	3105	1896	1332	498	26461	44%
% of drivers who were recorded as driving properly	31%	38%	48%	53%	55%	54%	48%	37%	9%	48%	

2.2 Drinking Drivers

Exhibit 2.2.1 indicates that drinking drivers were involved in **1.2%** of all reported collisions in **2018**, a total of 77 collisions.

Exhibit 2.2.1

Alcohol Involvement in Collisions



In **2018** the highest number of collisions involving alcohol occurred on both **Friday** and **Saturday**, each with 24 collisions. Exhibit 2.2.2 shows on average over 5 years the highest number of collisions occurring during the hours of **17:00 to 18:00** and the day with the highest number of collisions was **Saturday** followed by **Friday** and **Sunday**.

Exhibit 2.2.2

Collisions Involving Alcohol vs. Time of Day and Day of Week - 5 Year Summary								
Time of Day	Day of Week							Total
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
00:00-01:00	5	3	1	1	5	8	11	34
01:00-02:00	0	2	3	3	4	9	10	31
02:00-03:00	3	2	4	2	6	14	17	48
03:00-04:00	3	1	0	1	4	6	10	25
04:00-05:00	2	3	0	1	4	1	3	14
05:00-06:00	0	0	0	0	2	6	1	9
06:00-07:00	1	2	1	3	1	4	1	13
07:00-08:00	2	1	1	4	3	1	4	16
08:00-09:00	4	3	4	5	4	3	1	24
09:00-10:00	2	0	0	7	2	2	1	14
10:00-11:00	3	2	0	1	2	4	3	15
11:00-12:00	1	2	4	6	1	3	2	19
12:00-13:00	3	0	0	3	5	3	4	18
13:00-14:00	2	3	2	2	4	5	2	20
14:00-15:00	2	0	2	3	7	3	4	21
15:00-16:00	3	5	2	7	5	4	3	29
16:00-17:00	5	4	10	7	3	2	3	34
17:00-18:00	12	6	7	10	10	7	5	57
18:00-19:00	7	2	5	5	6	9	9	43
19:00-20:00	4	2	5	6	5	8	2	32
20:00-21:00	3	6	4	6	9	4	5	37
21:00-22:00	5	3	4	7	8	6	8	41
22:00-23:00	4	3	5	3	7	8	3	33
23:00-00:00	5	2	1	4	7	5	2	26
TOTAL	81	57	65	97	114	125	114	653

During **2018**, **0.6%** of drivers in all age groups had consumed alcohol before being involved in a collision. Exhibit 2.2.3 shows that **0.8%** of drivers in all age groups over 5 years of collisions had consumed alcohol before being involved in a collision.

Exhibit 2.2.3

Driver Age vs. Driver Condition Involved in Collisions - 5 Year Summary											
Driver Condition	Driver Age (Number of Drivers)								Unknown	Total	% of Total Drivers
	16 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75+	Age		
Normal	1375	3802	7547	6839	6929	5168	2497	1187	103	35447	58.7%
Had Been Drinking	5	35	39	22	20	15	2	5	5	148	0.2%
Impaired - alcohol >80mg	4	43	72	46	28	22	7	2	0	224	0.4%
Impaired - alcohol	5	20	28	16	16	5	3	2	2	97	0.2%
Impaired - drugs	2	12	15	8	4	3	0	1	0	45	0.1%
Fatigue	14	37	36	18	21	15	11	5	1	158	0.3%
Medical disability	1	9	16	16	13	16	18	26	0	115	0.2%
Inattentive	1583	3358	4714	3495	3484	2727	1629	1145	240	22375	37.1%
Other	26	77	123	81	97	64	35	21	1251	1775	2.9%
Total # of drivers involved in collisions	3015	7393	12590	10541	10612	8035	4202	2394	1602	60384	100%
% of drinking drivers involved, in each category	0.5%	1.3%	1.1%	0.8%	0.6%	0.5%	0.3%	0.4%		0.8%	

2.3 Horse-Drawn Vehicles

There were **3** reported collisions involving horse-drawn vehicles in **2018**.

There were **16** reported collisions involving horse-drawn vehicles from **2014 to 2018**. Of these **16** collisions, 7 occurred in Wellesley Township and 9 occurred in Woolwich Township. Exhibit 2.3.1 indicates that **38%** of motor vehicle drivers involved in horse and buggy collisions were involved in improper driving actions with the most frequent improper driving actions recorded being **“Improper Passing”**. Exhibit 2.3.1 also indicates that **38%** of horse and buggy drivers were involved in improper driving actions with the most frequent improper driving action recorded being **“Improper Turn”** and **“Failed to Yield Right-Of-Way”**.

Exhibit 2.3.1

Driver Action Involved in Horse and Buggy Collisions				
5 Year Summary (Number of Horse and Buggy Collisions)				
Driver Action	Motor Vehicle Drivers		Horse and Buggy Drivers	
	Total	% of all actions	Total	% of all actions
Driving Properly	10	63%	5	31%
Following Too Close	0	0%	0	0%
Exceeding Speed Limit	1	6%	0	0%
Speed Too Fast	1	6%	0	0%
Speed Too Slow	0	0%	0	0%
Improper Turn	0	0%	3	19%
Disobeyed Traffic Control	0	0%	0	0%
Failed To Yield R.O.W.	1	6%	3	19%
Improper Passing	3	19%	0	0%
Lost Control	0	0%	0	0%
Wrong way on one-way road	0	0%	0	0%
Improper Lane Change	0	0%	0	0%
Other (undetermined)	0	0%	5	31%
Total # of collisions involving horse and buggy	16	100%	16	100%
Total # of drivers involved in improper driving actions (excluding other)	6	38%	6	38%



Chapter Three

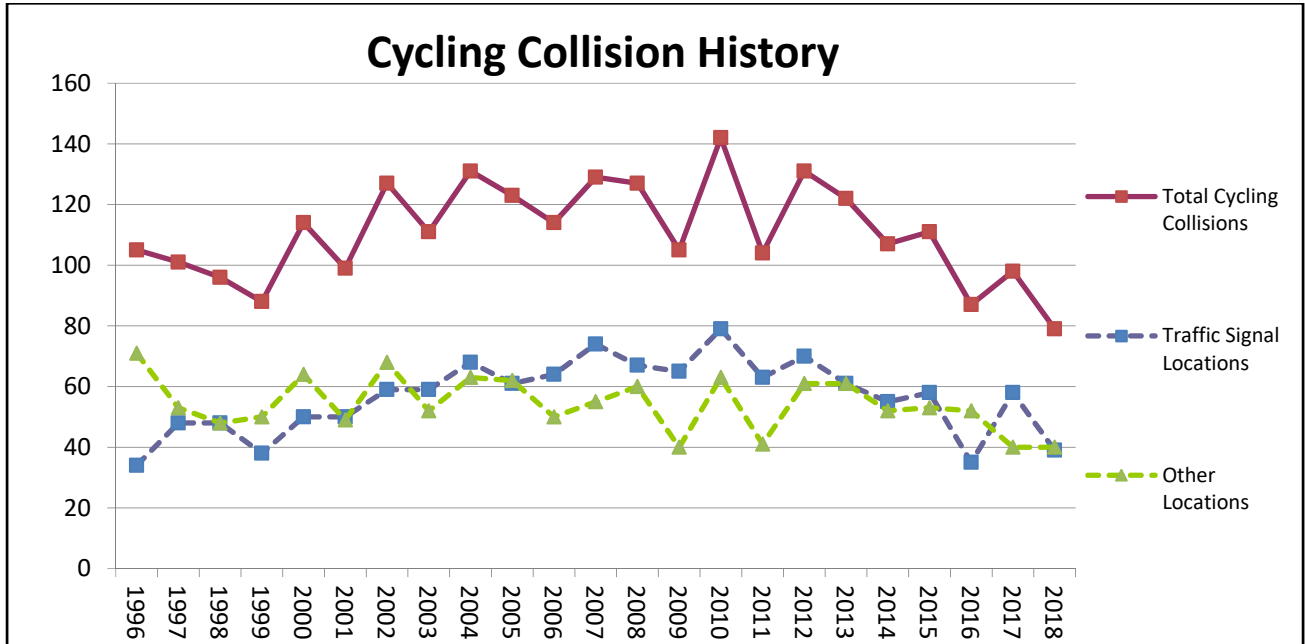
Cyclists

3.0 Cyclists

3.1 Cycling Collision History

Exhibit 3.1.1 provides historical trends of cycling collisions from 1996 to 2018 inclusive.

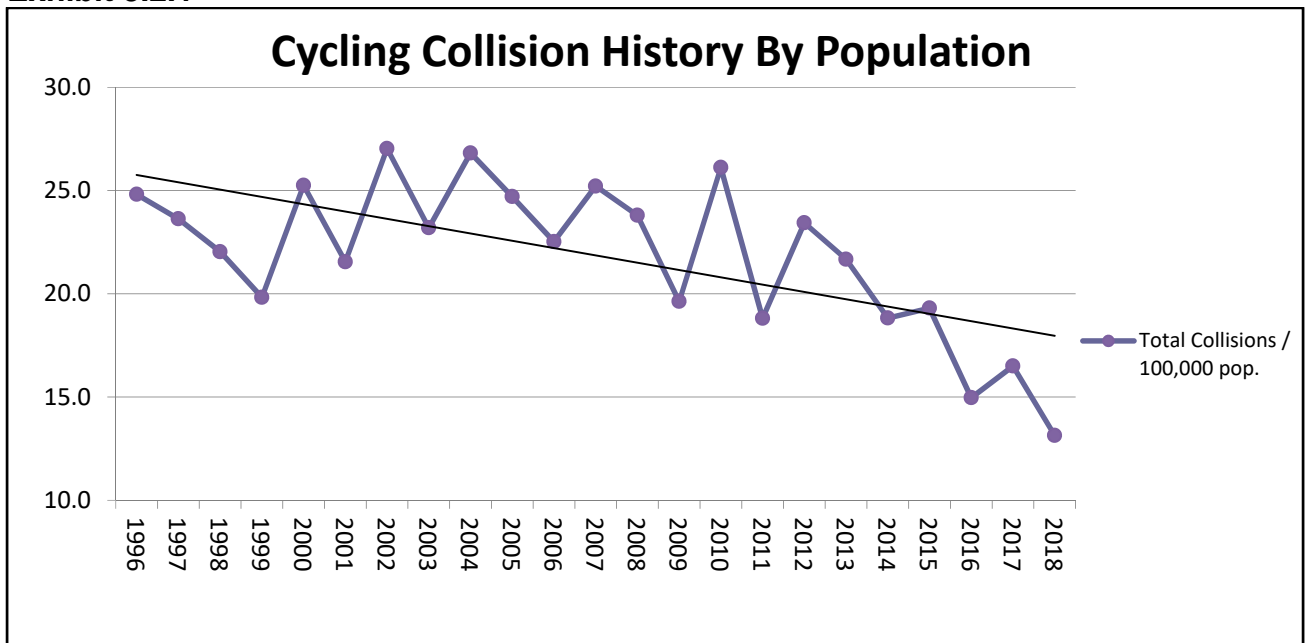
Exhibit 3.1.1



3.2 Cycling Collision History by Population

Exhibit 3.2.1 provides historical trends of cycling collisions by population from 1996 to 2018 inclusive.

Exhibit 3.2.1



3.3 Cyclist Age Versus Cyclist Action

In **2018** there were **79** collisions involving cyclists. In **35%** of these collisions cyclists were riding improperly. Exhibit 3.3.1 indicates over 5 years there were 495 collisions involving cyclists. In **31%** of these collisions cyclists were riding improperly. Cyclists in the age group **25 to 34** had the highest number of improper driving collisions.

Exhibit 3.3.1

Cyclist Age vs. Cyclist Action Involved in Collisions - 5 Year Summary														
Cyclist Action	Cyclist Age (Number of Cyclists)												Total	% of Total Cyclist Collisions
	Under 5	5 - 9	10 - 15	16 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75+	Unknown Age		
Driving Properly	0	0	11	19	20	31	24	24	19	7	2	1	158	32%
Following Too Close	0	0	0	0	0	4	1	0	1	0	0	0	6	1%
Exceeding Speed Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Speed Too Fast	0	0	0	0	0	0	0	0	0	0	0	1	1	0%
Speed Too Slow	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Improper Turn	0	1	1	0	0	4	1	2	3	0	3	0	15	3%
Disobeyed Traffic Control	0	0	6	1	9	7	3	5	4	1	0	3	39	8%
Failed To Yield R.O.W.	0	3	8	10	13	12	5	5	3	0	1	2	62	13%
Improper Passing	0	0	0	0	0	2	0	1	0	1	0	2	6	1%
Lost Control	0	1	0	0	3	4	2	2	2	0	0	1	15	3%
Wrong way on one-way road	0	0	0	0	0	0	0	0	1	0	0	0	1	0%
Improper Lane Change	0	0	0	0	1	2	3	0	1	1	0	0	8	2%
Other (undetermined)	0	1	15	37	31	30	17	16	12	6	3	16	184	37%
Total # of cyclists involved in collisions	0	6	41	67	77	96	56	55	46	16	9	26	495	100%
Total # of cyclists involved in improper driving collisions (excluding other)	0	5	15	11	26	35	15	15	15	3	4	9	153	31%
% of cyclists involved, in each category, who were recorded as driving properly	0%	0%	27%	28%	26%	32%	43%	44%	41%	44%	0%	0%	32%	

3.4 Cyclist Age Versus Cyclist Condition

During **2018** approximately **1%** of cyclists involved in a collision had consumed alcohol. Exhibit 3.4.1 indicates over 5 years **2%** of cyclists involved in a collision had consumed alcohol.

Exhibit 3.4.1

Cyclist Age vs. Cyclist Condition Involved in Collisions - 5 Year Summary														
Cyclist Condition	Cyclist Age (Number of Cyclists)												Total	% of Total Collisions
	Under 5	5 - 9	10 - 15	16 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75+	Unknown Age		
Normal	0	2	20	36	34	48	29	29	25	9	4	2	238	48%
Had Been Drinking	0	0	0	0	0	0	2	2	3	1	0	1	9	2%
Impaired - alcohol >80mg	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Impaired - alcohol	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
Impaired - drugs	0	0	0	0	1	0	1	0	0	0	0	0	2	0%
Fatigue	0	0	0	0	0	0	0	1	0	0	0	0	1	0%
Medical disability	0	0	0	0	1	0	1	0	0	0	0	0	2	0%
Inattentive	0	4	21	29	41	45	23	23	17	5	5	7	220	44%
Other	0	0	0	2	0	3	0	0	1	1	0	16	23	5%
Total # of Cyclists	0	6	41	67	77	96	56	55	46	16	9	26	495	100%
% of Drinking Cyclists involved, in each category	0%	0%	0%	0%	0%	0%	4%	4%	7%	6%	0%	4%	2%	

3.5 Location of Cyclists

Exhibit 3.5.1 indicates that the majority of cyclists involved in collisions occurred while cycling on the roadway (40%). A total of 47% of cyclists involved in collisions occurred while cycling in a crosswalk.

Exhibit 3.5.1

Location of Cyclists Involved in Collisions - 5 Year Summary														
Cyclist Location	Cyclist Age (Number of Cyclists)												Total	% of Total Cyclist Collisions
	Under 5	5 - 9	10 - 15	16 - 19	20 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 - 74	75+	Unknown Age		
Cycling in Crosswalk	0	3	7	11	8	11	9	2	6	2	1	3	63	13%
Cycling in Crosswalk against traffic	0	0	26	30	32	27	16	11	12	4	3	7	168	34%
Cycling on Sidewalk	0	2	0	2	1	2	2	0	1	1	0	0	11	2%
Cycling on Sidewalk against traffic	0	0	1	6	8	5	0	5	2	0	0	2	29	6%
Cycling on Roadway	0	1	3	11	25	42	27	30	22	8	4	12	185	37%
Cycling on Roadway against traffic	0	0	2	2	1	3	1	4	1	0	0	2	16	3%
Cutting through traffic	0	0	1	1	1	2	0	3	1	1	1	0	11	2%
Cycling in Roundabout Crosswalk with entering vehicle	0	0	0	1	0	1	0	0	0	0	0	0	2	0%
Cycling in Roundabout Crosswalk with exiting vehicle	0	0	0	2	0	1	0	0	0	0	0	0	3	1%
Other	0	0	1	1	1	2	1	0	1	0	0	0	7	1%
Total # of cyclists involved in collisions	0	6	41	67	77	96	56	55	46	16	9	26	495	100%

3.6 Motor Vehicle Driver Action

Exhibit 3.6.1 indicates that **39%** of motor vehicle drivers involved in cyclist collisions were involved in improper driving actions with the most frequent improper driving actions recorded being “**Failed To Yield Right-of-Way**”.

Exhibit 3.6.1

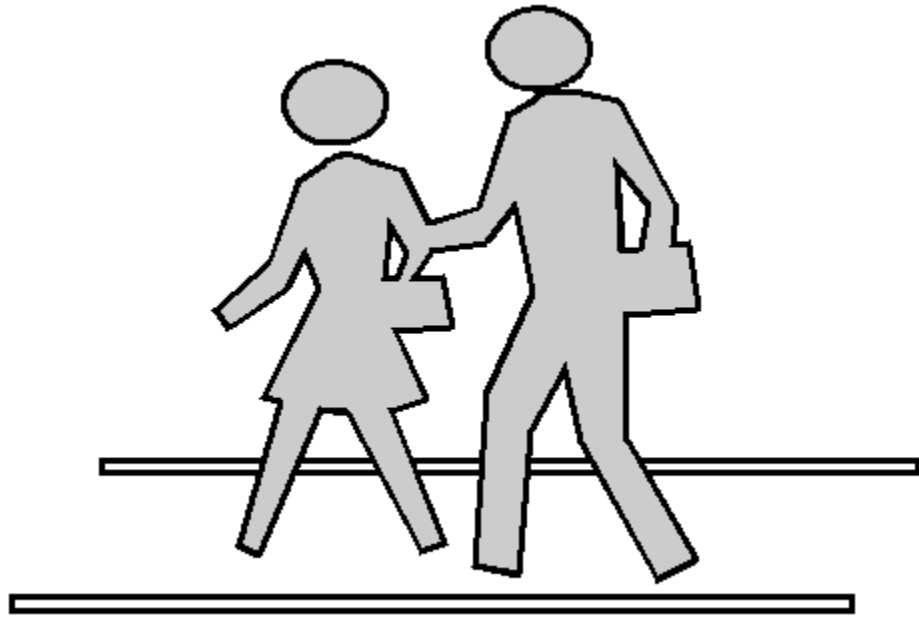
Motor Vehicle Driver Action Involved in Cyclist Collisions		
Motor Vehicle Driver Action	Total	% of all actions
5 Year Summary (Number of Collisions Involving Cyclists)		
Driving Properly	243	49%
Following Too Close	3	1%
Exceeding Speed Limit	1	0%
Speed Too Fast	0	0%
Speed Too Slow	0	0%
Improper Turn	53	11%
Disobeyed Traffic Control	10	2%
Failed To Yield R.O.W.	108	22%
Improper Passing	11	2%
Lost Control	1	0%
Wrong way on one-way road	0	0%
Improper Lane Change	4	1%
Evasive Action	3	1%
Other (undetermined)	58	12%
Total # of collisions involving cyclists	495	100%
Total # of motor vehicle drivers involved in improper driving actions (excluding other)	191	39%

3.7 Motor Vehicle Driver Condition

Exhibit 3.7.1 indicates that the condition of the majority of motor vehicle drivers **(54%)** involved in cyclist collisions was normal with **36%** of **drivers noted as inattentive**.

Exhibit 3.7.1

Motor Vehicle Driver Condition Involved in Cyclist Collisions		
5 Year Summary (Number of Collisions Involving Cyclists)		
Motor Vehicle Driver Condition	Total	% of all conditions
Normal	265	54%
Had Been Drinking	1	0%
Impaired - alcohol >80mg	1	0%
Impaired - alcohol	0	0%
Impaired - drugs	0	0%
Fatigue	0	0%
Medical disability	0	0%
Inattentive	178	36%
Other	50	10%
Total # of collisions involving cyclists	495	100%



Chapter Four

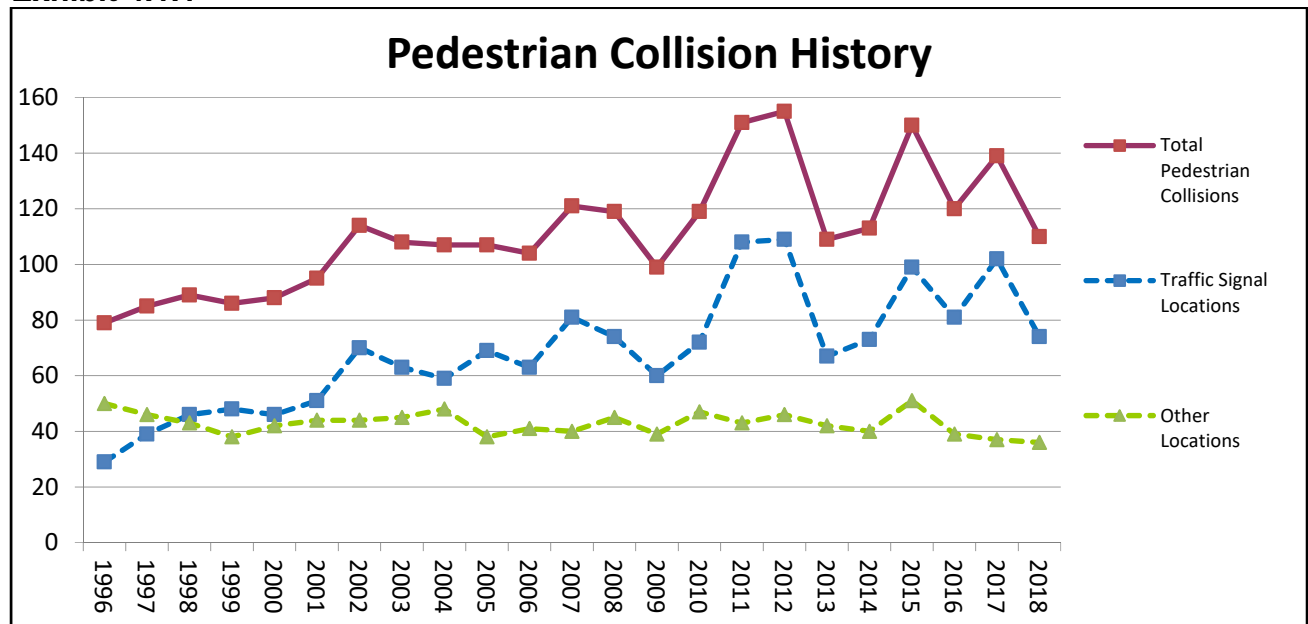
Pedestrians

4.0 Pedestrians

4.1 Pedestrian Collision History

Exhibit 4.1.1 provides historical trends of pedestrian collisions from 1996 to 2018 inclusive.

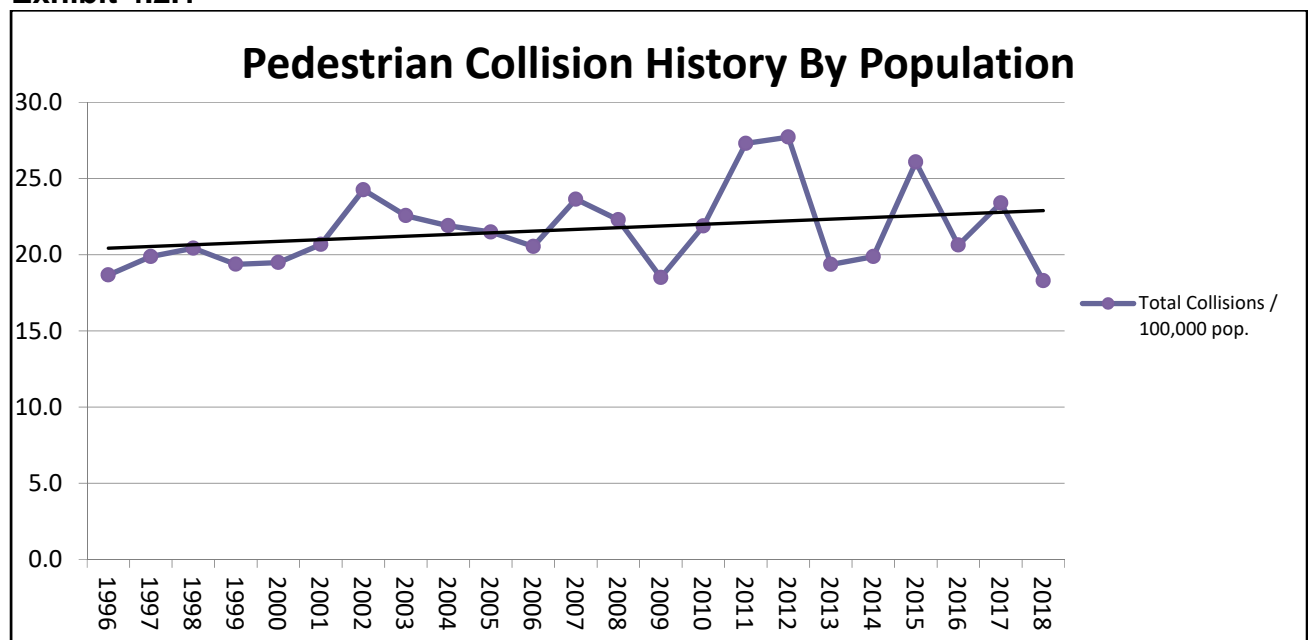
Exhibit 4.1.1



4.2 Pedestrian Collision History by Population

Exhibit 4.2.1 provides historical trends of pedestrian collisions by population from 1996 to 2018 exclusive.

Exhibit 4.2.1

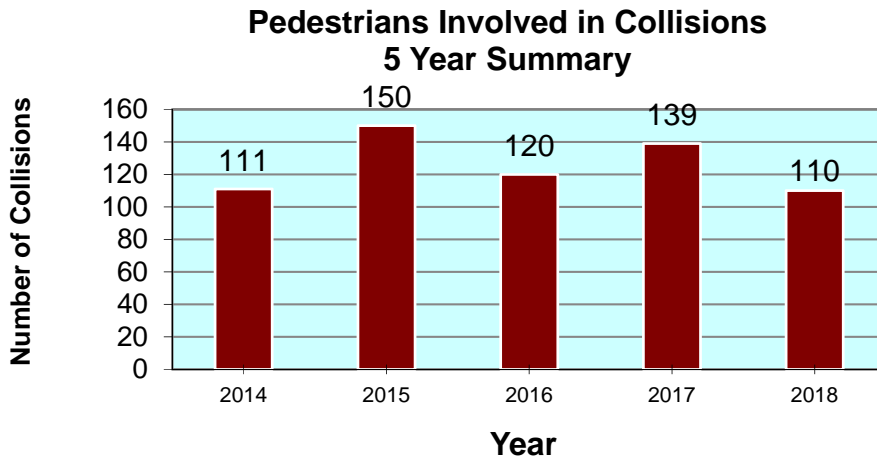


4.3 Pedestrians Involved in Collisions by Year

In 2018 there were 110 pedestrian collisions.

Exhibit 4.3.1 shows pedestrian involved in collisions over 5 years.

Exhibit 4.3.1

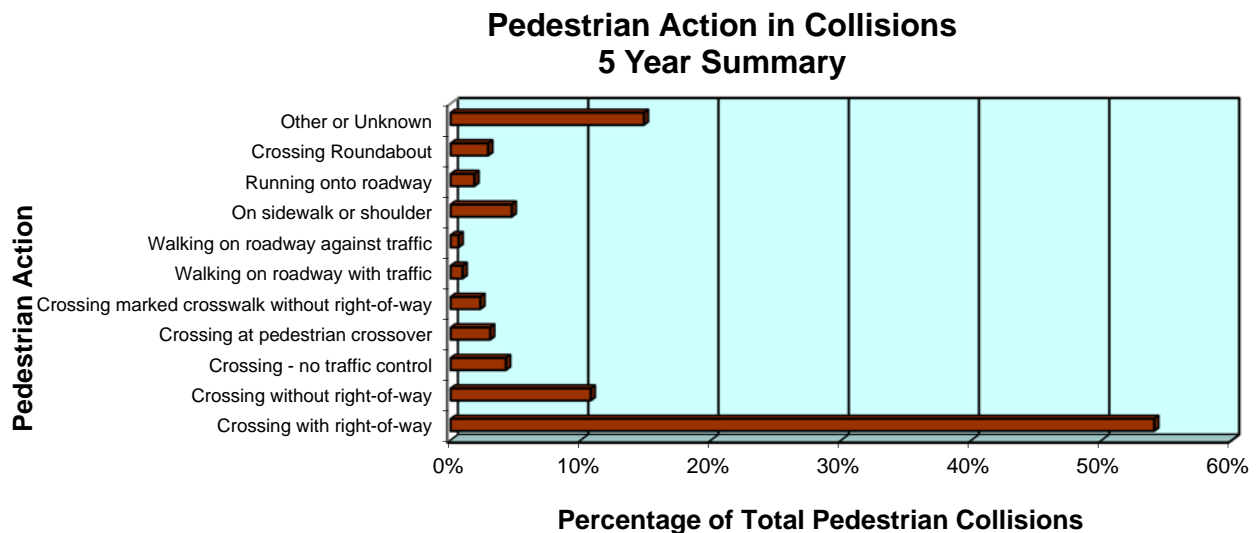


4.4 Pedestrian Action

In 58% of all pedestrian collisions in 2018 the pedestrian was crossing with the right-of-way and in 13% of all pedestrian collisions in 2018 the pedestrian was crossing without the right-of-way.

Exhibit 4.4.1 indicates historically over 5 years the majority of pedestrian actions were crossing with the right-of-way.

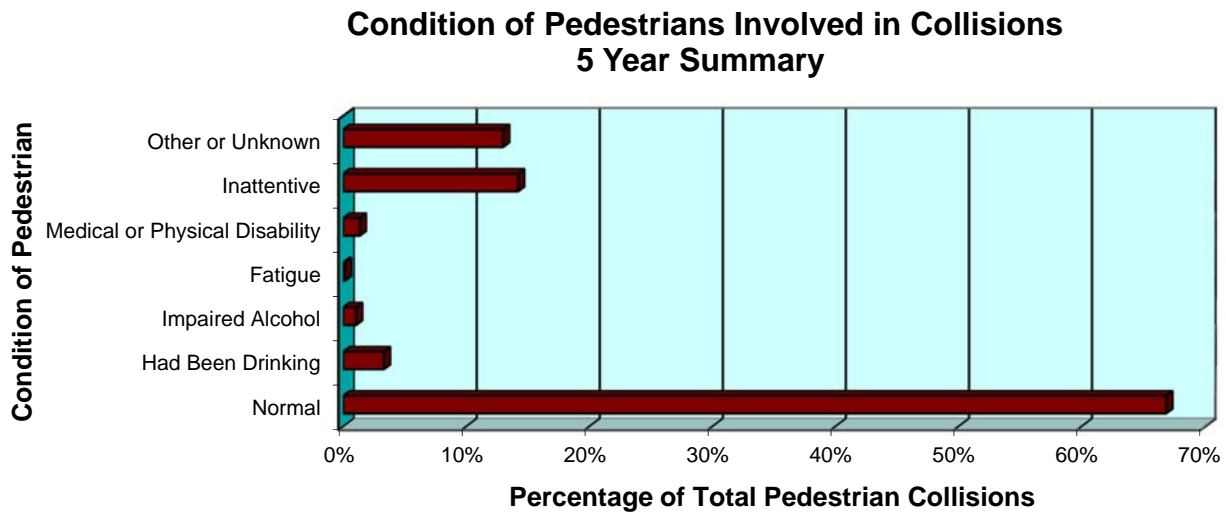
Exhibit 4.4.1



4.5 Pedestrian Condition

During **2018** the majority of pedestrian collisions (**74%**) showed the condition of the pedestrian reported as normal. Exhibit 4.5.1 indicates the same pattern over 5 years (**67%**).

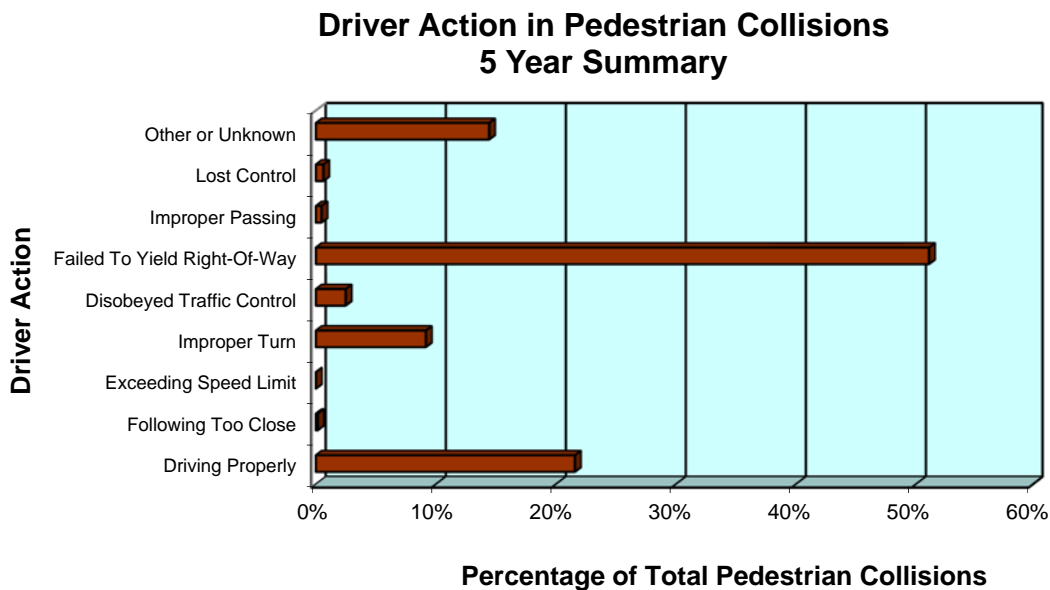
Exhibit 4.5.1



4.6 Driver Action

Exhibit 4.6.1 indicates that 51% of the time “Failed To Yield Right-Of-Way” was the most frequently recorded improper driver action in pedestrian collisions (**43% in 2018**). It was also noted, that in 22% of all pedestrian collisions, the driver was recorded as driving properly (**25% in 2018**).

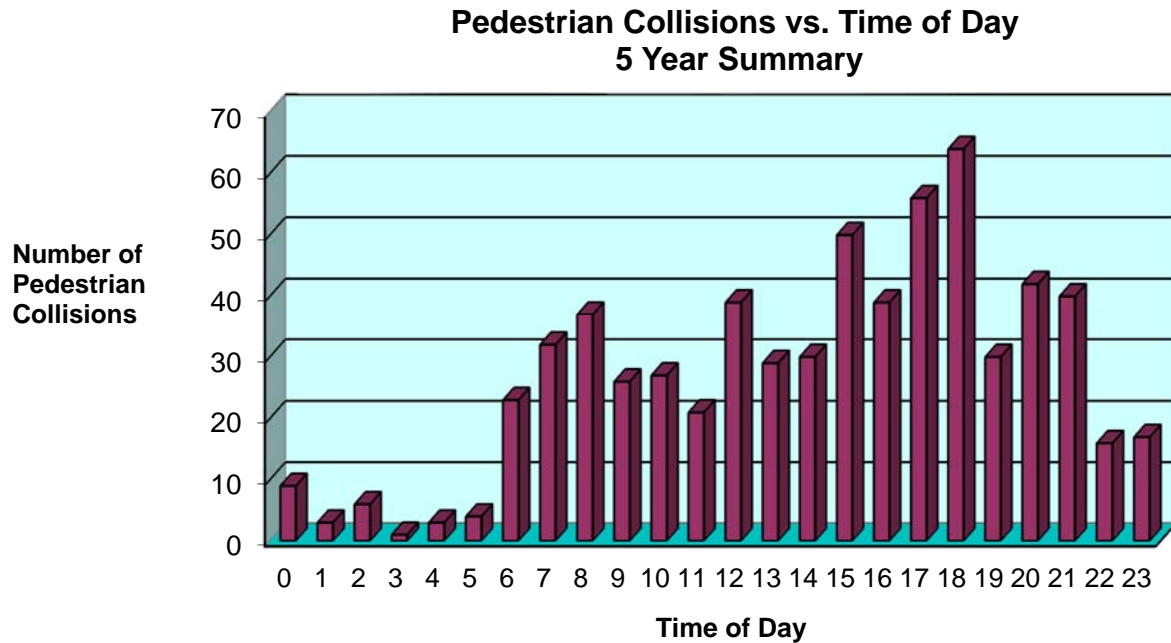
Exhibit 4.6.1



4.7 Time of Day

In **2018** the time of the day with the highest number of pedestrian collisions was the hour starting at **17:00**. Exhibit 4.7.1 indicates that the hour starting at 18:00 had the highest number of pedestrian collisions over 5 years.

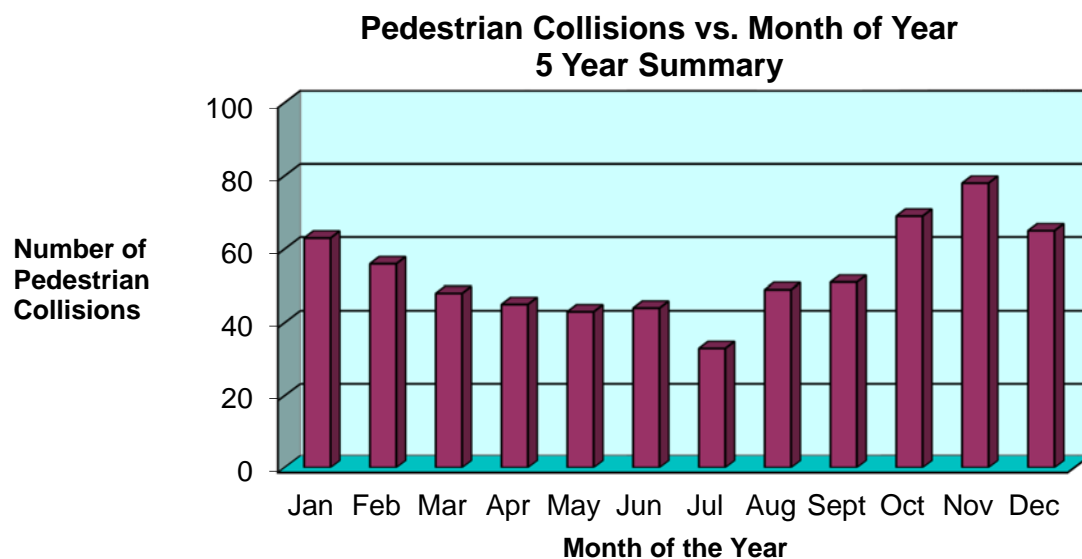
Exhibit 4.7.1



4.8 Month of Year

In **2018** the month of year with the highest number of pedestrian collisions was **November** with 14 collisions. Exhibit 4.8.1 indicates that **November** had the highest number of pedestrian collisions over 5 years.

Exhibit 4.8.1

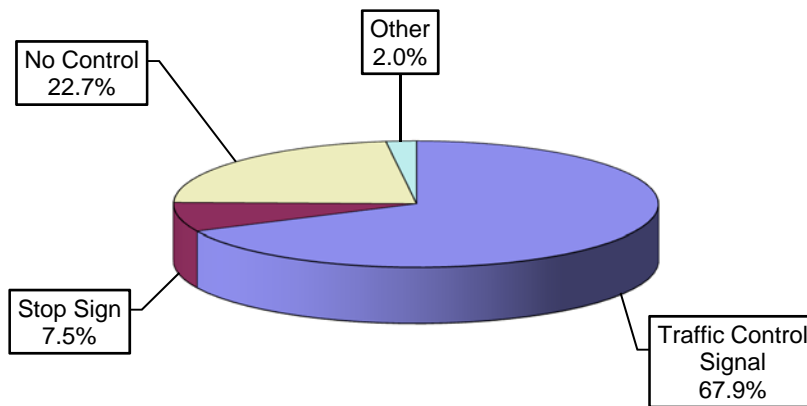


4.9 Traffic Control at Pedestrian Collision Locations

Exhibit 4.9.1 indicates historically 22.7% of pedestrian collisions (**25.5% in 2018**) occurred at mid-block locations where there was no traffic control, 67.9% at traffic control signals (**67.3% in 2018**), 7.5% at locations with stop signs (**7.3% in 2018**) and 2.0% at other locations (e.g., yield signs, police control) (**0.0% in 2018**).

Exhibit 4.9.1

**Traffic Control at Pedestrian Collision Locations
5 Year Summary**



4.10 Traffic Control at Fatal Injury Pedestrian Collision Locations

Historically, between 2014 and 2018, 100% of fatal injury pedestrian collisions occurred at mid-block locations where there was no traffic control. Exhibit 4.10.1 shows the number of fatal injury pedestrian collisions in each municipality between 2014 and 2018.

Exhibit 4.10.1

Municipality	Number of Fatal Injury Pedestrian Collision
Cambridge	1
Kitchener	2
Waterloo	1
North Dumfries	0
Wellesley	1
Wilmot	0
Woolwich	1
Total	6



Chapter Five

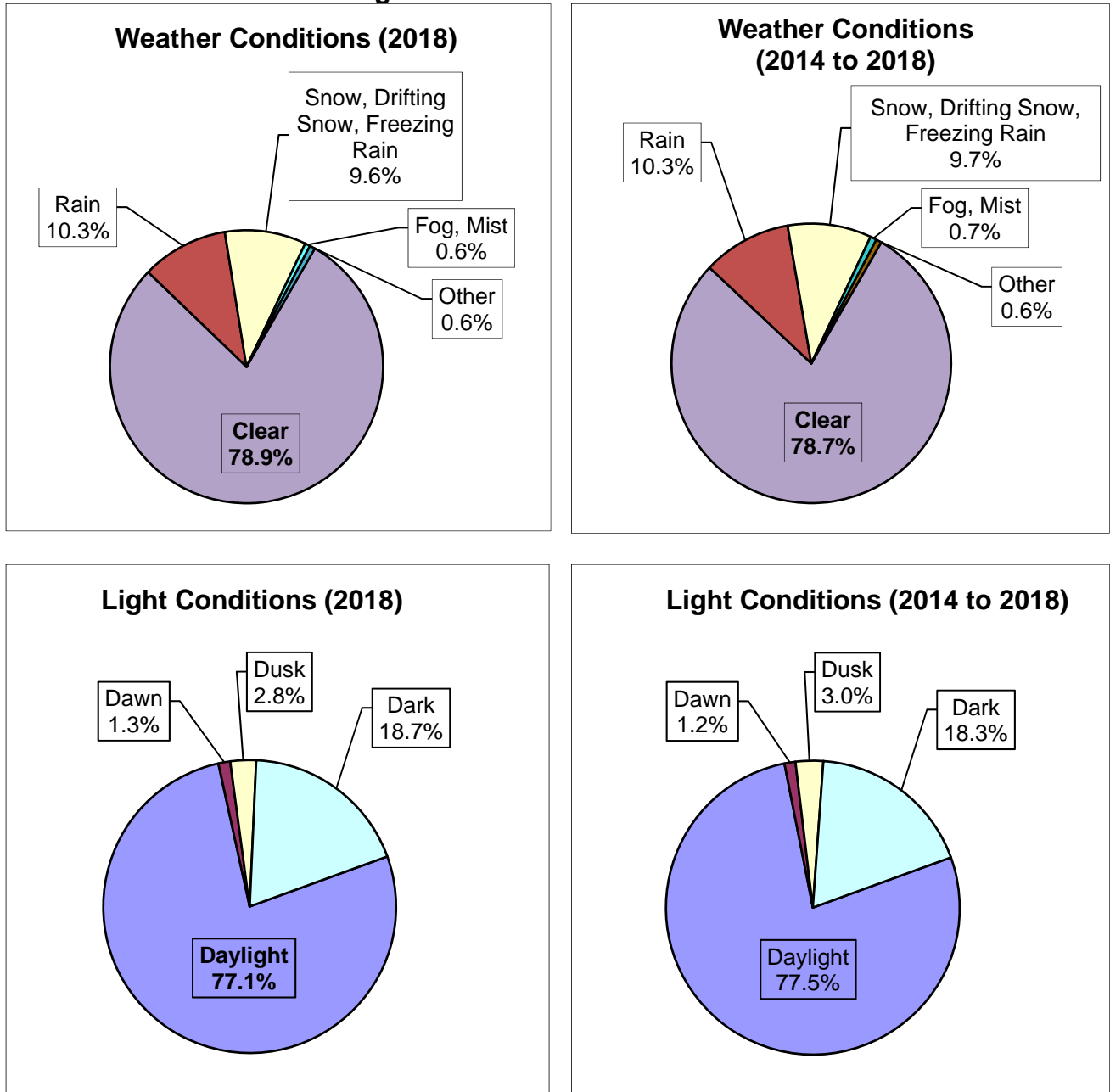
Environment

5.0 Environment

5.1 Weather and Light Conditions

In 2018 and historically (2014 to 2018) most collisions occurred during clear weather and daylight conditions (see Exhibit 5.1.1).

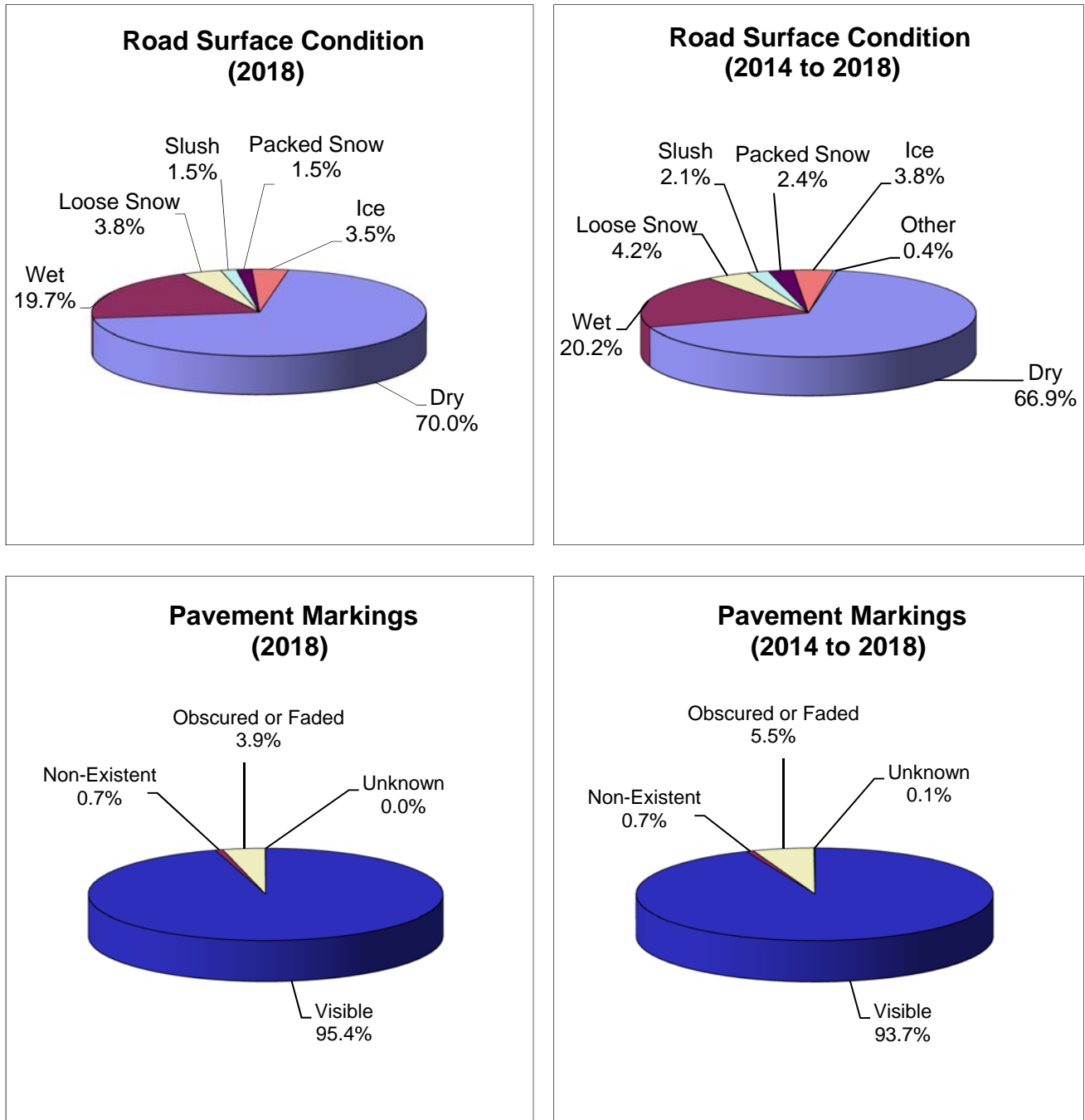
Exhibit 5.1.1 Weather and Light Conditions in Motor Vehicle Collisions



5.2 Road Surface and Pavement Markings

In 2018 and historically (2014 to 2018) most collisions occurred under dry pavement conditions and in most collisions the pavement markings were visible.

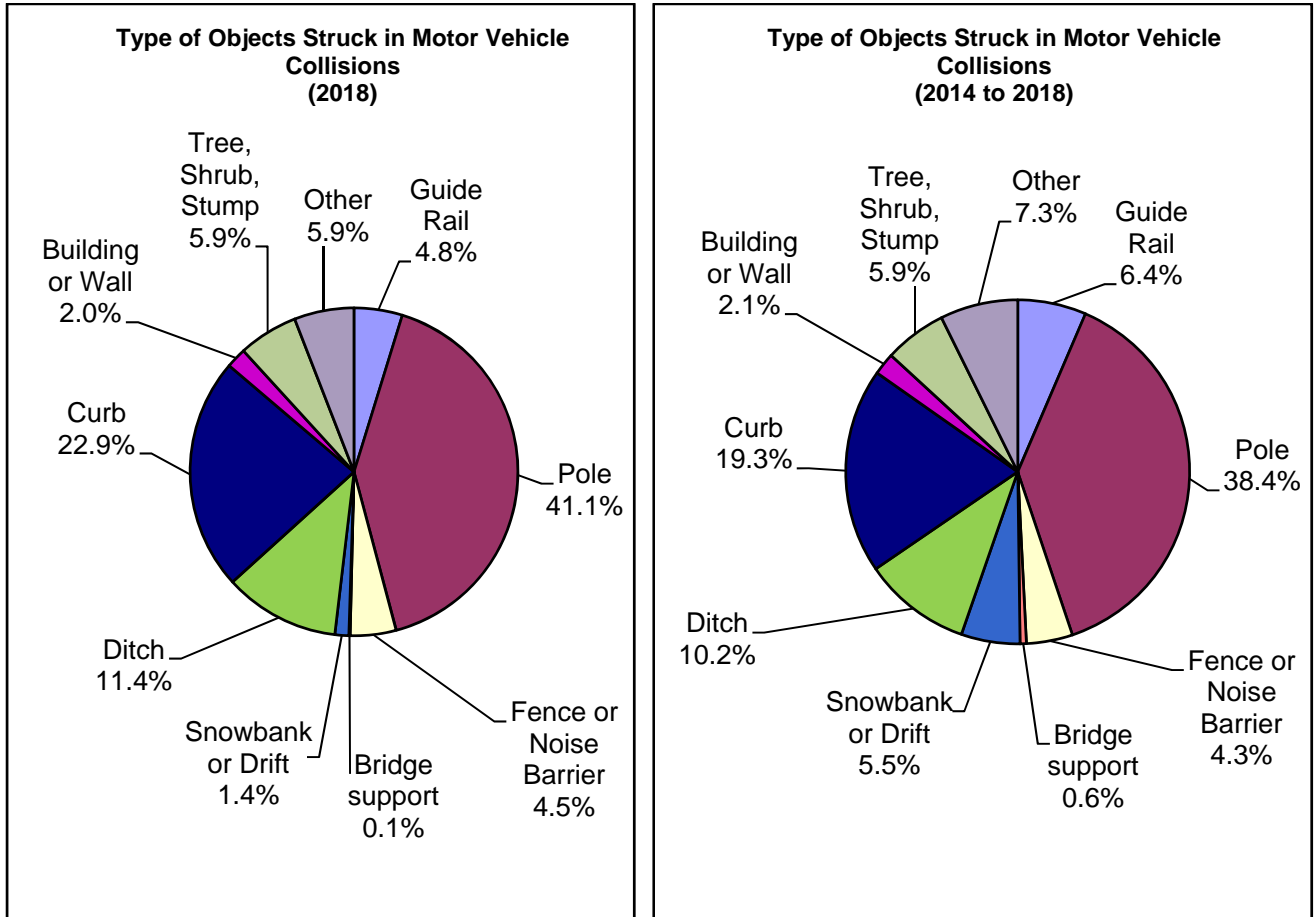
Exhibit 5.2.1 Road Surface Conditions and Pavement Markings in Motor Vehicle Collisions

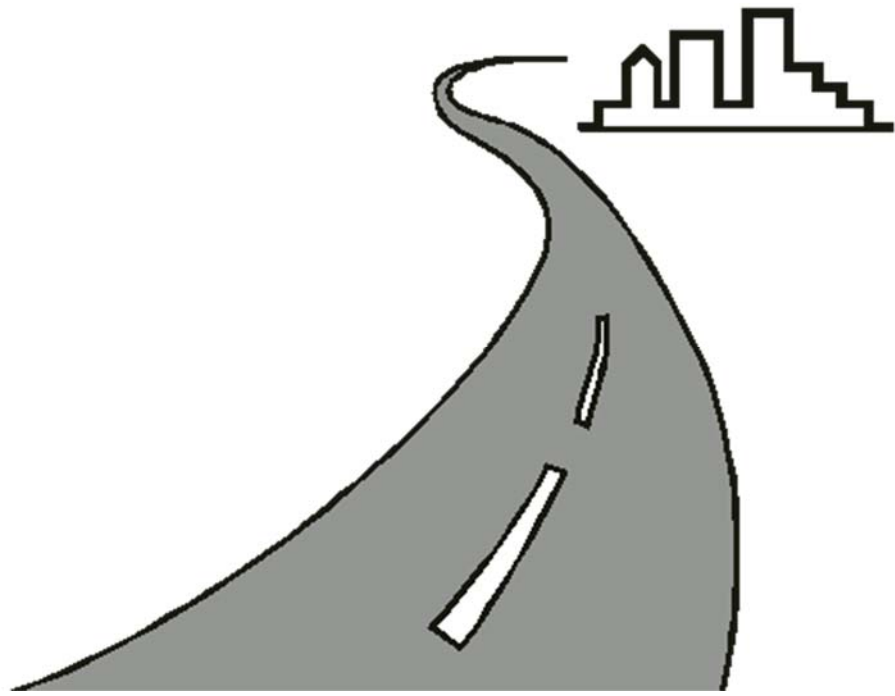


5.3 Fixed Objects

Vehicles struck poles in **41.1%** of all collisions with fixed objects in **2018** and 38.4% of all collisions with fixed objects historically from 2014 to 2018.

Exhibit 5.3.1





Chapter Six

Locations

6.0 Locations

6.1 Local Municipality

Exhibit 6.1.1 provides total collision statistics for collisions on Regional roads and signalized intersections in each local municipality.

Exhibit 6.1.1 Collisions by Local Municipality

2018 Summary (Number of Collisions)							
Municipality	Class of Collision			Total Collisions	Estimated Population	Collisions per 1,000 Pop.	
	Fatal Injury	Personal Injury	Property Damage				
Cambridge	1	355	1385	1741	136,810	12.7	
Kitchener	2	564	2155	2721	255,070	10.7	
Waterloo	2	248	963	1213	139,490	8.7	
North Dumfries	1	42	116	159	10,610	15.0	
Wellesley	0	13	59	72	11,540	6.2	
Wilmot	0	35	95	130	21,570	6.0	
Woolwich	0	81	253	334	26,150	12.8	
Region of Waterloo	6	1338	5026	6370	601,220	10.6	
5 Year Summary (Number of Collisions)							
Municipality	Class of Collision			Total Collisions	5 Year Average Collisions	5 Year Average Population	5 Year Average of Collisions per 1,000 Pop.
	Fatal Injury	Personal Injury	Property Damage				
Cambridge	6	1992	6687	8685	1737	135,314	12.8
Kitchener	9	3055	10182	13246	2649	245,458	10.8
Waterloo	5	1269	4849	6123	1225	135,602	9.0
North Dumfries	6	173	605	784	157	10,090	15.5
Wellesley	5	75	271	351	70	11,256	6.2
Wilmot	2	151	483	636	127	21,026	6.0
Woolwich	6	356	1302	1664	333	25,308	13.1
Region of Waterloo	39	7071	24379	31489	6298	584,054	10.8

Notes: Students included in population.

Exhibit 6.1.2 provides total cyclist collision statistics for collisions on Regional roads and signalized intersections in each local municipality.

Exhibit 6.1.2 Cyclist Collisions by Local Municipality

2018 Summary (Number of Cyclist Collisions)								
Municipality	Class of Collision				Total Collisions	Estimated Population	Collisions per 1,000 Pop.	
	Fatal Injury	Personal Injury	Property Damage					
Cambridge	1	17	2		20	136,810	0.15	
Kitchener	0	31	5		36	255,070	0.14	
Waterloo	0	17	2		19	139,490	0.14	
North Dumfries	0	0	0		0	10,610	0.00	
Wellesley	0	0	0		0	11,540	0.00	
Wilmot	0	2	0		2	21,570	0.09	
Woolwich	0	2	0		2	26,150	0.08	
Region of Waterloo	1	69	9		79	601,220	0.13	
5 Year Summary (Number of Cyclist Collisions)								
Municipality	Class of Collision				Total Collisions	5 Year Average Collisions	5 Year Average Population	5 Year Average of Collisions per 1,000 Pop.
	Fatal Injury	Personal Injury	Property Damage					
Cambridge	1	102	24		127	25	135,314	0.19
Kitchener	0	200	32		232	46	245,458	0.19
Waterloo	1	93	0		94	19	135,602	0.14
North Dumfries	0	2	16		18	4	10,090	0.36
Wellesley	0	1	1		2	0	11,256	0.04
Wilmot	0	7	0		7	1	21,026	0.07
Woolwich	1	12	2		15	3	25,308	0.12
Region of Waterloo	3	417	75		495	99	584,054	0.17

Exhibit 6.1.3 provides total pedestrian collision statistics for collisions on Regional roads and signalized intersections in each local municipality.

Exhibit 6.1.3 Pedestrian Collisions by Local Municipality

2018 Summary (Number of Pedestrian Collisions)							
Municipality	Class of Collision			Total Collisions	Estimated Population	Collisions per 1,000 Pop.	
	Fatal Injury	Personal Injury	Property Damage				
Cambridge	0	27	2	29	136,810	0.21	
Kitchener	1	45	2	48	255,070	0.19	
Waterloo	0	31	0	31	139,490	0.22	
North Dumfries	0	0	0	0	10,610	0.00	
Wellesley	0	0	0	0	11,540	0.00	
Wilmot	0	1	0	1	21,570	0.05	
Woolwich	0	1	0	1	26,150	0.04	
Region of Waterloo	1	105	4	110	601,220	0.18	
5 Year Summary (Number of Pedestrian Collisions)							
Municipality	Class of Collision			Total Collisions	5 Year Average Collisions	5 Year Average Population	5 Year Average of Collisions per 1,000 Pop.
	Fatal Injury	Personal Injury	Property Damage				
Cambridge	1	154	10	165	33	135,314	0.24
Kitchener	2	279	14	295	59	245,458	0.24
Waterloo	1	159	9	169	34	135,602	0.25
North Dumfries	0	1	0	1	0	10,090	0.02
Wellesley	1	1	0	2	0	11,256	0.04
Wilmot	0	4	0	4	1	21,026	0.04
Woolwich	1	7	0	8	2	25,308	0.06
Region of Waterloo	6	605	33	644	129	584,054	0.22

6.2 Roundabouts

There currently are 20 locations which have five years or more of operation and they have been included in the overall rankings.

The remaining 16 locations are included in Exhibit 6.2.1 which shows details of the total number of collisions and the total number of injury collisions.

Exhibit 6.2.1 Collisions at Roundabout Locations

Location	Opened	2014				2015				2016				2017				2018			
		I	P	C	T	I	P	C	T	I	P	C	T	I	P	C	T	I	P	C	T
Westmount & Laurelwood, Waterloo	Dec. 2014	0*	0*	0*	0*	1	0	0	2	0	0	0	1	0	0	0	2	0	0	0	3
Franklin & Savage, Cambridge	Dec. 2015	n/a	n/a	n/a	n/a	0*	0*	0*	1*	2	0	0	8	2	1	0	7	2	0	0	4
Franklin & Sheldon, Cambridge	Dec. 2015	n/a	n/a	n/a	n/a	0*	0*	0*	2*	3	0	0	39	7	0	0	37	2	0	0	27
Franklin & Bishop, Cambridge	Dec. 2015	n/a	n/a	n/a	n/a	0*	0*	0*	1*	4	0	0	46	9	0	0	41	4	0	0	38
Bleams & Manitou, Kitchener	Dec. 2015	n/a	n/a	n/a	n/a	0*	0*	0*	0*	4	0	0	15	1	0	0	17	1	0	0	10
Franklin & Main, Cambridge	Sep. 2016	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0*	0*	0*	19*	1	0	0	57	3	0	0	34
Franklin & Pinebush	Sep. 2016	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	2*	0*	0*	49*	22	0	0	138	5	0	1	60
Clyde & Franklin, Cambridge	Sep. 2016	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1*	0*	0*	5*	4	1	0	22	3	0	1	21
Erb & Landfill Gate 1 /Waterloo West Centre (Costco), Waterloo	Nov. 2016	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0*	0*	0*	0*	2	0	0	3	0	0	0	0
Erb & Landfill Gate 2 /Platinum, Waterloo	Nov. 2016	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0*	0*	0*	0*	0	0	0	1	0	0	0	0
Dundas St & Franklin Blvd, Cambridge	Jul. 2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	7*	1*	0*	14*	6	1	0	48
Franklin Blvd & Champlain Blvd, Cambridge	Aug. 2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1*	0*	0*	2*	0	0	0	1
Ottawa & Homer Watson, Kitchener	Oct. 2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	6*	0*	0*	51*	18	1	0	181
Ottawa & Alpine/Hwy 7/8 EB on/off Ramp, Kitchener	Oct. 2017	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	1*	0*	2*	5*	1	0	0	37
Franklin blvd & Myers Rd, Cambridge	Sep. 2018	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0*	0*	0*	2*
Herrgott Rd & Ament Ln, Wellesley	Sep. 2018	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0*	0*	0*	0*

* Note: denotes partial year
I = Injury Collision
P = Pedestrian Collision
C = Cyclist Collision
T = Total Number of Collisions

6.3 Collision Ranking

Collision ranking is used to identify those locations most likely to benefit from collision countermeasures. The locations that are ranked include:

- Intersections of Regional roads;
- Intersections of Regional roads with City/Township roads;
- Signalized intersections;
- Stop-controlled intersections; and
- Mid-block locations along Regional roads. Mid-block locations are the roadway sections between any two intersections, signalized or unsignalized.

The Region of Waterloo has adopted a network screening methodology outlined in the American Association of State Highway and Transportation Officials Highway Safety Manual (HSM). The HSM provides the best factual information and proven analysis tools for crash frequency prediction. The primary focus of the HSM is to provide the analytical tools for assessing the safety impacts of transportation project and program decisions.

Several advantages are recognized using the HSM network screening approach and include:

- Major and minor road volumes are accounted for to predict collisions at intersections;
- The impact of random fluctuations in collisions is lessened;
- Severity of collisions is now factored into the rankings; and
- Estimated social costs for collisions are used to rank locations.

Exhibit 6.3.1 lists the top 100 ranked locations sorted by rank. Exhibit 6.3.2 lists the top 100 ranked locations sorted alphabetically

Exhibit 6.3.3 and 6.3.4 rank locations based on pedestrian and cyclist collisions respectively.

Collision Ranking Table Definitions

Definitions for Exhibit 6.3.1, 6.3.2, 6.3.3 and 6.3.4 are defined below:

MUN	municipality
Fatal/Injury (FI)	Motor vehicle collisions in which at least one person sustains bodily injuries resulting in death or motor vehicle collisions in which at least one person involved sustains bodily injuries not resulting in death
Property Damage (PD)	Motor vehicle collisions in which no person sustains bodily injury, but in which there is damage to any public property or damage to private property
Observed	Average number of reported collisions per year observed over 5 years

Predicted	Estimate of long-term average crash frequency per year which is forecast to occur at a site using predictive models
Expected	Estimate of long-term expected average crash frequency of a site based on observed crash frequency at the site and predicted crash frequency at the site
Excess Social Costs	<p>Annual cost to society due to collisions (including factors like property damage, loss of income due to injury, etc.)</p> <ul style="list-style-type: none"> - Average FI cost (\$60,500) - Average PD cost (\$5,000) - Average PD cost at roundabouts (\$4,500)

Exhibit 6.3.1

Collision Ranking (By Rank) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
1	10941	HOMER WATSON BLVD	AT	Block Line Rd	KIT	9.2	4.4	5.7	88.8	39.2	77.8	\$255,549
2	10710	FAIRWAY RD	AT	Wilson Ave	KIT	5.8	3.7	5.1	26.4	10.0	24.1	\$153,303
3	20363	HESPELER RD	AT	BISHOP ST	CAM	6.4	4.2	5.7	17.2	11.6	16.5	\$113,288
4	18701	HESPELER RD	AT	MAPLE GROVE RD/Fisher Mills Rd	CAM	5.2	2.3	3.9	7.0	5.4	6.6	\$101,642
5	19457	HESPELER RD	AT	Beaverdale Rd/Queen St	CAM	4.2	2.2	2.6	45.8	20.1	36.6	\$94,046
6	10831	OTTAWA ST	AT	Strasburg Rd	KIT	4.4	2.6	3.6	12.2	6.3	11.0	\$86,340
7	28255	HESPELER RD	AT	CAN-AMERA/YMCA (250 Hespeler Rd)	CAM	5.2	3.4	4.6	11.6	8.4	11.1	\$82,528
8	21818	HOMER WATSON BLVD	AT	MANITOU DR/Doon Village Rd	KIT	6.4	4.9	6.0	17.2	13.9	16.9	\$80,187
9	22058	HOMER WATSON BLVD	AT	Pioneer Dr	KIT	4.2	2.9	3.7	15.2	7.1	13.7	\$79,703
10	17215	KING ST	AT	BISHOP ST/Bishop St	CAM	4.6	1.9	3.3	3.6	4.2	3.8	\$79,083
11	19445	EAGLE ST N	BTWN	HESPELER & Industrial	CAM	3.4	1.0	1.7	13.2	3.0	10.0	\$78,946
12	20632	VICTORIA ST	AT	FISCHER-HALLMAN RD	KIT	5.4	3.6	4.8	11.6	9.7	11.3	\$77,614
13	28246	FAIRWAY RD	AT	Fairview Park Mall/Cineplex (225 Fairway S)	KIT	4.4	2.5	3.6	9.0	5.8	8.3	\$77,404
14	12688	VICTORIA ST N	BTWN	BRUCE & EDNA	KIT	3.8	1.5	2.3	11.8	4.3	9.9	\$75,157
15	8511	WESTMOUNT RD	AT	VICTORIA ST	KIT	5.6	4.1	5.1	14.4	11.3	14.0	\$74,952
16	6349	OTTAWA ST	AT	WESTMOUNT RD	KIT	4.4	3.1	3.9	14.4	8.4	13.4	\$72,380
17	26749	WESTMOUNT RD/Max Becker Dr	AT	FISCHER-HALLMAN RD	KIT	3.8	2.5	3.2	11.2	6.2	10.1	\$64,998
18	7533	WEBER ST	AT	UNIVERSITY AVE	WAT	4.4	3.6	4.1	17.6	9.9	16.5	\$64,482
19	18343	DUNDAS ST	AT	Wellington St	CAM	4.0	0.3	1.1	7.4	0.8	3.7	\$60,798
20	10258	LACKNER BLVD/Bingemans Centre	AT	VICTORIA ST	KIT	5.4	4.0	4.9	11.4	10.6	11.3	\$60,242
21	21307	TRUSSLER RD	AT	CEDAR CREEK RD	NDF	3.0	0.6	1.5	3.6	1.1	2.4	\$60,087
22	10410	VICTORIA ST N	BTWN	Forfar & Frederick	KIT	3.4	1.4	2.2	7.8	4.1	6.9	\$59,735
23	17750	WATER ST	AT	Samuelson St/GCI driveway	CAM	3.6	2.1	2.9	7.0	4.0	6.1	\$58,711
24	20086	HESPELER RD	AT	Avenue Rd/Jaffray St	CAM	4.0	2.5	3.4	7.6	5.7	7.2	\$58,043
25	22082	HOMER WATSON BLVD	AT	Doon South Dr (com'l driveway)	KIT	4.2	2.8	3.6	7.6	6.2	7.3	\$56,175

Exhibit 6.3.1

Collision Ranking (By Rank) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
26	19604	Franklin Blvd	AT	Holiday Inn Dr/Jamieson Pkwy	CAM	4.0	2.1	3.1	3.6	4.9	3.9	\$55,414
27	17349	KING ST	AT	FOUNTAIN ST (RR 8/17)	CAM	3.8	2.1	2.6	13.2	5.7	10.5	\$53,052
28	14619	DUNDAS ST	AT	Elgin St	CAM	3.0	1.3	2.0	6.2	2.6	4.8	\$53,012
29	18120	HESPELER RD	AT	Brooklyne Rd	CAM	2.8	0.5	1.2	4.8	1.2	3.2	\$51,879
30	19083	FRANKLIN BLVD	AT	Elgin St/Saginaw Pkwy	CAM	5.6	4.2	5.2	9.6	11.4	9.8	\$50,214
31	30828	HIGHLAND RD	AT	IRA NEEDLES BLVD	KIT	3.4	3.3	3.3	44.6	29.8	40.6	\$49,549
32	8754	HIGHLAND RD	AT	Belmont Ave	KIT	4.0	2.9	3.6	9.0	6.8	8.6	\$48,465
33	374	UNIVERSITY AVE	AT	Regina St	WAT	3.2	1.8	2.5	5.8	4.0	5.3	\$46,773
34	18248	DUNDAS ST	AT	BEVERLY ST/Beverly St	CAM	3.8	2.8	3.4	9.4	6.9	8.9	\$46,611
35	20586	UNIVERSITY AVE	AT	FISCHER-HALLMAN RD	WAT	4.0	3.1	3.7	11.2	8.1	10.7	\$45,800
36	20365	HESPELER RD	AT	Dunbar Rd	CAM	4.4	3.5	4.1	11.8	9.2	11.4	\$44,885
37	6110	HIGHLAND RD	AT	FISCHER-HALLMAN RD	KIT	5.0	3.9	4.6	10.4	10.5	10.4	\$44,399
38	21742	OTTAWA ST	AT	International Pl/Wilderness Dr	KIT	2.8	1.2	1.8	4.4	2.3	3.6	\$43,868
39	600734	IRA NEEDLES BLVD	BTWN	HIGHLAND & VICTORIA	KIT	2.4	0.7	1.2	6.2	2.9	5.2	\$42,977
40	20569	ERB ST	AT	UNIVERSITY AVE	WAT	3.4	2.6	3.0	9.8	6.3	9.1	\$42,974
41	20994	HIGHLAND RD W	BTWN	Butler & WESTMOUNT	KIT	2.4	0.6	0.9	9.2	1.9	6.1	\$38,880
42	29541	ERB ST	AT	ERBSVILLE RD/IRA NEEDLES BLVD	WAT	6.8	6.0	6.3	60.0	54.1	59.0	\$38,861
43	14504	AINSLIE ST	AT	PARK HILL RD/Park Hill Rd	CAM	3.2	2.5	2.9	9.6	6.0	8.8	\$37,530
44	8991	UNIVERSITY AVE E	BTWN	Regina & WEBER	WAT	2.0	0.7	0.9	10.2	2.0	6.8	\$37,299
45	2650	ARTHUR ST (RR21/85)	AT	LISTOWEL RD/Union St	WOO	1.4	0.7	1.2	6.8	2.5	4.3	\$36,929
46	21651	FISCHER-HALLMAN RD	BTWN	BLEAMS & Seabrook Dr	KIT	2.6	1.6	2.0	7.4	4.5	6.7	\$36,737
47	27986	FRANKLIN BLVD	AT	CAN-AMERA PKWY	CAM	4.6	4.1	4.4	15.2	11.3	14.7	\$36,619
48	6672	VICTORIA ST	AT	Margaret Ave	KIT	2.4	1.0	1.5	4.4	1.8	3.2	\$36,447
49	15020	TOWNLINE RD	AT	PINEBUSH RD/Cty Rd 32(Lake Rd)	CAM	3.6	2.4	3.1	4.8	5.7	5.0	\$36,201
50	7290	UNIVERSITY AVE	AT	Lester St	WAT	1.4	0.6	0.9	8.0	1.4	5.2	\$35,795
51	358	UNIVERSITY AVE	AT	Hazel St/WLU Mid Campus (75 University Ave)	WAT	2.2	1.6	1.8	8.6	3.1	6.7	\$35,732

Exhibit 6.3.1

Collision Ranking (By Rank) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
52	11642	King St	AT	Borden Ave	KIT	2.4	0.9	1.4	4.0	1.5	2.7	\$35,642
53	13957	DUNDAS ST	AT	MAIN ST	CAM	3.0	2.7	2.9	12.6	6.7	11.5	\$35,550
54	8688	VICTORIA ST	AT	Patricia Ave	KIT	2.0	0.6	1.1	3.4	1.3	2.5	\$34,934
55	275	UNIVERSITY AVE	AT	Phillip St (com'l driveway)	WAT	2.4	1.5	1.9	6.4	3.1	5.3	\$34,711
56	14172	DUNDAS ST	AT	Chalmers St/Gore St	CAM	2.0	0.6	1.1	3.2	1.3	2.4	\$34,223
57	5888	VICTORIA ST	AT	Duke St	KIT	2.8	2.0	2.4	6.6	4.1	5.9	\$34,137
58	13830	FRANKLIN BLVD	BTWN	CLYDE (SAMUELSON) & Savage	CAM	3.0	1.7	2.1	6.6	4.5	6.1	\$33,798
59	20352	HESPELER RD	BTWN	Munch & CAN-AMERA/YMCA #250	CAM	2.6	0.8	1.2	6.2	2.8	4.5	\$33,300
60	366	KING ST N	BTWN	Hickory & UNIVERSITY	WAT	2.0	0.5	0.7	9.2	1.6	5.7	\$32,282
61	6480	WEBER ST	AT	Young St	KIT	2.4	1.4	1.8	4.6	2.5	3.7	\$32,271
62	9851	WEBER ST	AT	Stirling Ave	KIT	2.0	0.6	1.0	2.4	1.2	1.9	\$31,913
63	14477	AINSLIE ST	AT	Main St	CAM	2.6	1.7	2.1	4.8	3.5	4.4	\$31,003
64	6913	King St	AT	Stirling Ave	KIT	2.4	1.3	1.8	4.0	2.7	3.5	\$30,807
65	20333	HESPELER RD	AT	Langs Dr/Sheldon Dr	CAM	4.4	3.7	4.2	10.4	9.6	10.3	\$30,404
66	21985	HOMER WATSON BLVD	AT	BLEAMS RD	KIT	4.4	3.7	4.2	10.2	9.8	10.1	\$29,904
67	10741	COURTLAND AVE	AT	Siebert Ave (com'l driveway)	KIT	1.8	0.7	1.1	3.4	1.9	2.9	\$29,747
68	14495	WATER ST	AT	PARK HILL RD	CAM	3.0	2.4	2.7	7.8	5.5	7.3	\$29,574
69	13954	DUNDAS ST S	BTWN	FRANKLIN & MAIN	CAM	1.2	0.4	0.6	10.2	1.4	5.8	\$29,563
70	23064	FAIRWAY RD	AT	Thaler Ave	KIT	1.8	0.5	1.0	3.0	1.2	2.2	\$29,493
71	7544	ERB ST	AT	Devitt Ave	WAT	1.8	0.6	1.0	2.6	1.3	2.0	\$28,490
72	2695	ARTHUR ST S	BTWN	Gerrat & SAWMILL	WOO	3.6	1.0	1.3	8.4	3.1	5.9	\$28,379
73	8558	WESTMOUNT RD	AT	Glasgow St	KIT	2.8	2.1	2.4	6.0	4.7	5.7	\$27,811
74	3884	WATERLOO ST/SNYDER'S RD W	AT	NAFZIGER RD	WIL	1.4	0.6	1.0	2.6	2.1	2.3	\$27,238
75	2483	ARTHUR ST	AT	Oriole Pkwy	WOO	1.4	0.8	1.3	2.0	2.9	2.5	\$27,070
76	21754	FISCHER-HALLMAN RD	BTWN	Activa & OTTAWA	KIT	1.6	0.8	1.1	7.0	2.5	5.4	\$27,046
77	6767	WEBER ST	AT	Queen St	KIT	2.4	1.9	2.2	7.4	4.1	6.5	\$26,159

Exhibit 6.3.1

Collision Ranking (By Rank) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
78	3180	ARTHUR ST	AT	South Field Dr/Whippoorwill Dr	WOO	1.4	0.5	1.0	1.8	1.9	1.9	\$25,156
79	8449	ERB ST	AT	FISCHER-HALLMAN RD	WAT	3.8	3.4	3.7	11.4	9.0	11.0	\$25,072
80	19875	CORONATION BLVD/KING ST	AT	Blue Heron Ridge/Concession Rd	CAM	2.8	2.0	2.4	4.4	4.3	4.4	\$24,571
81	16210	FOUNTAIN ST	AT	MAPLE GROVE RD	CAM	2.4	2.1	2.2	8.6	4.8	7.7	\$24,458
82	12550	SAWMILL RD	AT	KATHERINE ST/Crowsfoot Rd	WOO	1.2	0.6	1.0	3.0	2.3	2.6	\$23,852
83	32195	IRA NEEDLES BLVD	AT	Lifestyle Way (N. Boardwalk Access-Empire Thtr)	WAT	2.2	0.2	0.5	4.4	0.5	1.8	\$23,755
84	14580	DUNDAS ST	AT	Marion Way/Spruce St	CAM	1.8	0.3	0.6	3.2	0.8	1.8	\$23,623
85	2269	ARTHUR ST	AT	CHURCH ST	WOO	1.2	0.6	1.0	2.8	2.3	2.5	\$23,446
86	9182	BENTON ST	AT	COURTLAND AVE	KIT	2.2	1.4	1.8	3.8	2.8	3.5	\$23,368
87	3872	ERB'S RD	AT	Sandhills Rd	WIL	2.0	0.3	0.7	0.2	0.7	0.5	\$23,282
88	18979	HESPELER RD	BTWN	Hwy 401 Ramps	CAM	2.2	0.7	1.0	4.4	2.6	3.5	\$23,241
89	20367	BLAIR RD	BTWN	Cruickston Park Lane & GEORGE/Blair	NDF	2.0	1.7	1.8	8.4	4.7	7.6	\$23,241
90	23163	OTTAWA ST	AT	LACKNER BLVD	KIT	2.0	1.4	1.7	5.4	3.1	4.6	\$22,653
91	6658	VICTORIA ST	AT	Ahrens St/Water St	KIT	1.4	0.6	0.9	3.4	1.3	2.5	\$22,596
92	15591	FRANKLIN BLVD	BTWN	Hwy 401 & PINEBUSH	CAM	1.6	0.8	1.1	5.6	2.6	4.5	\$22,439
93	10072	KING ST/Hwy 8	AT	Dixon St/Montgomery Rd	KIT	2.2	1.7	1.9	5.8	3.8	5.2	\$21,454
94	32522	COURTLAND AVE	AT	Block Line Rd	KIT	2.6	1.9	2.1	8.0	4.4	6.5	\$21,239
95	1308	WESTMOUNT RD	AT	Gage Ave	KIT	2.2	1.3	1.5	7.2	2.7	4.8	\$21,217
96	6308	OTTAWA ST	AT	Valleyview Rd	KIT	1.8	0.3	0.6	2.2	0.7	1.4	\$21,107
97	322	WEBER ST	AT	Lincoln Rd/Bridgeport Plaza	WAT	3.0	2.4	2.7	6.0	5.6	5.9	\$21,076
98	5982	WESTMOUNT RD	AT	William St	WAT	2.0	1.3	1.6	3.0	2.3	2.7	\$20,015
99	28655	CORONATION BLVD	AT	Cam Mem Hosp (700 Coronation)	CAM	1.6	0.6	0.9	3.4	0.9	1.8	\$19,563
100	270	UNIVERSITY AVE	AT	Albert St	WAT	3.8	3.0	3.5	5.6	7.7	6.0	\$19,562

Exhibit 6.3.2

Collision Ranking (Alphabetically) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
43	14504	AINSLIE ST	AT	PARK HILL RD/Park Hill Rd	CAM	3.2	2.5	2.9	9.6	6.0	8.8	\$37,530
63	14477	AINSLIE ST	AT	Main St	CAM	2.6	1.7	2.1	4.8	3.5	4.4	\$31,003
75	2483	ARTHUR ST	AT	Oriole Pkwy	WOO	1.4	0.8	1.3	2.0	2.9	2.5	\$27,070
78	3180	ARTHUR ST	AT	South Field Dr/Whippoorwill Dr	WOO	1.4	0.5	1.0	1.8	1.9	1.9	\$25,156
85	2269	ARTHUR ST	AT	CHURCH ST	WOO	1.2	0.6	1.0	2.8	2.3	2.5	\$23,446
45	2650	ARTHUR ST (RR21/85)	AT	LISTOWEL RD/Union St	WOO	1.4	0.7	1.2	6.8	2.5	4.3	\$36,929
72	2695	ARTHUR ST S	BTWN	Gerrat & SAWMILL	WOO	3.6	1.0	1.3	8.4	3.1	5.9	\$28,379
86	9182	BENTON ST	AT	COURTLAND AVE	KIT	2.2	1.4	1.8	3.8	2.8	3.5	\$23,368
89	20367	BLAIR RD	BTWN	Cruickston Park Lane & GEORGE/Blair	NDF	2.0	1.7	1.8	8.4	4.7	7.6	\$23,241
99	28655	CORONATION BLVD	AT	Cam Mem Hosp (700 Coronation)	CAM	1.6	0.6	0.9	3.4	0.9	1.8	\$19,563
80	19875	CORONATION BLVD/KING ST	AT	Blue Heron Ridge/Concession Rd	CAM	2.8	2.0	2.4	4.4	4.3	4.4	\$24,571
67	10741	COURTLAND AVE	AT	Siebert Ave (com'l driveway)	KIT	1.8	0.7	1.1	3.4	1.9	2.9	\$29,747
94	32522	COURTLAND AVE	AT	Block Line Rd	KIT	2.6	1.9	2.1	8.0	4.4	6.5	\$21,239
19	18343	DUNDAS ST	AT	Wellington St	CAM	4.0	0.3	1.1	7.4	0.8	3.7	\$60,798
28	14619	DUNDAS ST	AT	Elgin St	CAM	3.0	1.3	2.0	6.2	2.6	4.8	\$53,012
34	18248	DUNDAS ST	AT	BEVERLY ST/Beverly St	CAM	3.8	2.8	3.4	9.4	6.9	8.9	\$46,611
53	13957	DUNDAS ST	AT	MAIN ST	CAM	3.0	2.7	2.9	12.6	6.7	11.5	\$35,550
56	14172	DUNDAS ST	AT	Chalmers St/Gore St	CAM	2.0	0.6	1.1	3.2	1.3	2.4	\$34,223
84	14580	DUNDAS ST	AT	Marion Way/Spruce St	CAM	1.8	0.3	0.6	3.2	0.8	1.8	\$23,623
69	13954	DUNDAS ST S	BTWN	FRANKLIN & MAIN	CAM	1.2	0.4	0.6	10.2	1.4	5.8	\$29,563
11	19445	EAGLE ST N	BTWN	HESPELER & Industrial	CAM	3.4	1.0	1.7	13.2	3.0	10.0	\$78,946
40	20569	ERB ST	AT	UNIVERSITY AVE	WAT	3.4	2.6	3.0	9.8	6.3	9.1	\$42,974
42	29541	ERB ST	AT	ERBSVILLE RD/IRA NEEDLES BLVD	WAT	6.8	6.0	6.3	60.0	54.1	59.0	\$38,861
71	7544	ERB ST	AT	Devitt Ave	WAT	1.8	0.6	1.0	2.6	1.3	2.0	\$28,490
79	8449	ERB ST	AT	FISCHER-HALLMAN RD	WAT	3.8	3.4	3.7	11.4	9.0	11.0	\$25,072
87	3872	ERB'S RD	AT	Sandhills Rd	WIL	2.0	0.3	0.7	0.2	0.7	0.5	\$23,282

Exhibit 6.3.2

Collision Ranking (Alphabetically) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
2	10710	FAIRWAY RD	AT	Wilson Ave	KIT	5.8	3.7	5.1	26.4	10.0	24.1	\$153,303
13	28246	FAIRWAY RD	AT	Fairview Park Mall/Cineplex (225 Fairway S)	KIT	4.4	2.5	3.6	9.0	5.8	8.3	\$77,404
70	23064	FAIRWAY RD	AT	Thaler Ave	KIT	1.8	0.5	1.0	3.0	1.2	2.2	\$29,493
46	21651	FISCHER-HALLMAN RD	BTWN	BLEAMS & Seabrook Dr	KIT	2.6	1.6	2.0	7.4	4.5	6.7	\$36,737
76	21754	FISCHER-HALLMAN RD	BTWN	Activa & OTTAWA	KIT	1.6	0.8	1.1	7.0	2.5	5.4	\$27,046
81	16210	FOUNTAIN ST	AT	MAPLE GROVE RD	CAM	2.4	2.1	2.2	8.6	4.8	7.7	\$24,458
26	19604	Franklin Blvd	AT	Holiday Inn Dr/Jamieson Pkwy	CAM	4.0	2.1	3.1	3.6	4.9	3.9	\$55,414
30	19083	FRANKLIN BLVD	AT	Elgin St/Saginaw Pkwy	CAM	5.6	4.2	5.2	9.6	11.4	9.8	\$50,214
47	27986	FRANKLIN BLVD	AT	CAN-AMERA PKWY	CAM	4.6	4.1	4.4	15.2	11.3	14.7	\$36,619
58	13830	FRANKLIN BLVD	BTWN	CLYDE (SAMUELSON) & Savage	CAM	3.0	1.7	2.1	6.6	4.5	6.1	\$33,798
92	15591	FRANKLIN BLVD	BTWN	Hwy 401 & PINEBUSH	CAM	1.6	0.8	1.1	5.6	2.6	4.5	\$22,439
3	20363	HESPELER RD	AT	BISHOP ST	CAM	6.4	4.2	5.7	17.2	11.6	16.5	\$113,288
4	18701	HESPELER RD	AT	MAPLE GROVE RD/Fisher Mills Rd	CAM	5.2	2.3	3.9	7.0	5.4	6.6	\$101,642
5	19457	HESPELER RD	AT	Beaverdale Rd/Queen St	CAM	4.2	2.2	2.6	45.8	20.1	36.6	\$94,046
7	28255	HESPELER RD	AT	CAN-AMERA/YMCA (250 Hespeler Rd)	CAM	5.2	3.4	4.6	11.6	8.4	11.1	\$82,528
24	20086	HESPELER RD	AT	Avenue Rd/Jaffray St	CAM	4.0	2.5	3.4	7.6	5.7	7.2	\$58,043
29	18120	HESPELER RD	AT	Brooklyne Rd	CAM	2.8	0.5	1.2	4.8	1.2	3.2	\$51,879
36	20365	HESPELER RD	AT	Dunbar Rd	CAM	4.4	3.5	4.1	11.8	9.2	11.4	\$44,885
59	20352	HESPELER RD	BTWN	Munch & CAN-AMERA/YMCA #250	CAM	2.6	0.8	1.2	6.2	2.8	4.5	\$33,300
65	20333	HESPELER RD	AT	Langs Dr/Sheldon Dr	CAM	4.4	3.7	4.2	10.4	9.6	10.3	\$30,404
88	18979	HESPELER RD	BTWN	Hwy 401 Ramps	CAM	2.2	0.7	1.0	4.4	2.6	3.5	\$23,241
31	30828	HIGHLAND RD	AT	IRA NEEDLES BLVD	KIT	3.4	3.3	3.3	44.6	29.8	40.6	\$49,549
32	8754	HIGHLAND RD	AT	Belmont Ave	KIT	4.0	2.9	3.6	9.0	6.8	8.6	\$48,465
37	6110	HIGHLAND RD	AT	FISCHER-HALLMAN RD	KIT	5.0	3.9	4.6	10.4	10.5	10.4	\$44,399
41	20994	HIGHLAND RD W	BTWN	Butler & WESTMOUNT	KIT	2.4	0.6	0.9	9.2	1.9	6.1	\$38,880

Exhibit 6.3.2

Collision Ranking (Alphabetically) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
1	10941	HOMER WATSON BLVD	AT	Block Line Rd	KIT	9.2	4.4	5.7	88.8	39.2	77.8	\$255,549
8	21818	HOMER WATSON BLVD	AT	MANITOU DR/Doon Village Rd	KIT	6.4	4.9	6.0	17.2	13.9	16.9	\$80,187
9	22058	HOMER WATSON BLVD	AT	Pioneer Dr	KIT	4.2	2.9	3.7	15.2	7.1	13.7	\$79,703
25	22082	HOMER WATSON BLVD	AT	Doon South Dr (com'l driveway)	KIT	4.2	2.8	3.6	7.6	6.2	7.3	\$56,175
66	21985	HOMER WATSON BLVD	AT	BLEAMS RD	KIT	4.4	3.7	4.2	10.2	9.8	10.1	\$29,904
39	600734	IRA NEEDLES BLVD	BTWN	HIGHLAND & VICTORIA	KIT	2.4	0.7	1.2	6.2	2.9	5.2	\$42,977
83	32195	IRA NEEDLES BLVD	AT	Lifestyle Way (N. Boardwalk Access-Empire Thtr)	WAT	2.2	0.2	0.5	4.4	0.5	1.8	\$23,755
10	17215	KING ST	AT	BISHOP ST/Bishop St	CAM	4.6	1.9	3.3	3.6	4.2	3.8	\$79,083
27	17349	KING ST	AT	FOUNTAIN ST (RR 8/17)	CAM	3.8	2.1	2.6	13.2	5.7	10.5	\$53,052
52	11642	King St	AT	Borden Ave	KIT	2.4	0.9	1.4	4.0	1.5	2.7	\$35,642
64	6913	King St	AT	Stirling Ave	KIT	2.4	1.3	1.8	4.0	2.7	3.5	\$30,807
60	366	KING ST N	BTWN	Hickory & UNIVERSITY	WAT	2.0	0.5	0.7	9.2	1.6	5.7	\$32,282
93	10072	KING ST/Hwy 8	AT	Dixon St/Montgomery Rd	KIT	2.2	1.7	1.9	5.8	3.8	5.2	\$21,454
20	10258	LACKNER BLVD/Bingemans Centre	AT	VICTORIA ST	KIT	5.4	4.0	4.9	11.4	10.6	11.3	\$60,242
6	10831	OTTAWA ST	AT	Strasburg Rd	KIT	4.4	2.6	3.6	12.2	6.3	11.0	\$86,340
16	6349	OTTAWA ST	AT	WESTMOUNT RD	KIT	4.4	3.1	3.9	14.4	8.4	13.4	\$72,380
38	21742	OTTAWA ST	AT	International Pl/Wilderness Dr	KIT	2.8	1.2	1.8	4.4	2.3	3.6	\$43,868
90	23163	OTTAWA ST	AT	LACKNER BLVD	KIT	2.0	1.4	1.7	5.4	3.1	4.6	\$22,653
96	6308	OTTAWA ST	AT	Valleyview Rd	KIT	1.8	0.3	0.6	2.2	0.7	1.4	\$21,107
82	12550	SAWMILL RD	AT	KATHERINE ST/Crowsfoot Rd	WOO	1.2	0.6	1.0	3.0	2.3	2.6	\$23,852
49	15020	TOWNLINE RD	AT	PINEBUSH RD/Cty Rd 32(Lake Rd)	CAM	3.6	2.4	3.1	4.8	5.7	5.0	\$36,201
21	21307	TRUSSLER RD	AT	CEDAR CREEK RD	NDF	3.0	0.6	1.5	3.6	1.1	2.4	\$60,087
33	374	UNIVERSITY AVE	AT	Regina St	WAT	3.2	1.8	2.5	5.8	4.0	5.3	\$46,773
35	20586	UNIVERSITY AVE	AT	FISCHER-HALLMAN RD	WAT	4.0	3.1	3.7	11.2	8.1	10.7	\$45,800

Exhibit 6.3.2

Collision Ranking (Alphabetically) – Top 100 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	FI Observed	FI Predicted	FI Expected	PD Observed	PD Predicted	PD Expected	Excess Social Costs
50	7290	UNIVERSITY AVE	AT	Lester St	WAT	1.4	0.6	0.9	8.0	1.4	5.2	\$35,795
51	358	UNIVERSITY AVE	AT	Hazel St/WLU Mid Campus (75 University Ave)	WAT	2.2	1.6	1.8	8.6	3.1	6.7	\$35,732
55	275	UNIVERSITY AVE	AT	Phillip St (com'l driveway)	WAT	2.4	1.5	1.9	6.4	3.1	5.3	\$34,711
100	270	UNIVERSITY AVE	AT	Albert St	WAT	3.8	3.0	3.5	5.6	7.7	6.0	\$19,562
44	8991	UNIVERSITY AVE E	BTWN	Regina & WEBER	WAT	2.0	0.7	0.9	10.2	2.0	6.8	\$37,299
12	20632	VICTORIA ST	AT	FISCHER-HALLMAN RD	KIT	5.4	3.6	4.8	11.6	9.7	11.3	\$77,614
48	6672	VICTORIA ST	AT	Margaret Ave	KIT	2.4	1.0	1.5	4.4	1.8	3.2	\$36,447
54	8688	VICTORIA ST	AT	Patricia Ave	KIT	2.0	0.6	1.1	3.4	1.3	2.5	\$34,934
57	5888	VICTORIA ST	AT	Duke St	KIT	2.8	2.0	2.4	6.6	4.1	5.9	\$34,137
91	6658	VICTORIA ST	AT	Ahrens St/Water St	KIT	1.4	0.6	0.9	3.4	1.3	2.5	\$22,596
14	12688	VICTORIA ST N	BTWN	BRUCE & EDNA	KIT	3.8	1.5	2.3	11.8	4.3	9.9	\$75,157
22	10410	VICTORIA ST N	BTWN	Forfar & Frederick	KIT	3.4	1.4	2.2	7.8	4.1	6.9	\$59,735
23	17750	WATER ST	AT	Samuelson St/GCI driveway	CAM	3.6	2.1	2.9	7.0	4.0	6.1	\$58,711
68	14495	WATER ST	AT	PARK HILL RD	CAM	3.0	2.4	2.7	7.8	5.5	7.3	\$29,574
74	3884	WATERLOO ST/SNYDER'S RD W	AT	NAFZIGER RD	WIL	1.4	0.6	1.0	2.6	2.1	2.3	\$27,238
18	7533	WEBER ST	AT	UNIVERSITY AVE	WAT	4.4	3.6	4.1	17.6	9.9	16.5	\$64,482
61	6480	WEBER ST	AT	Young St	KIT	2.4	1.4	1.8	4.6	2.5	3.7	\$32,271
62	9851	WEBER ST	AT	Stirling Ave	KIT	2.0	0.6	1.0	2.4	1.2	1.9	\$31,913
77	6767	WEBER ST	AT	Queen St	KIT	2.4	1.9	2.2	7.4	4.1	6.5	\$26,159
97	322	WEBER ST	AT	Lincoln Rd/Bridgeport Plaza	WAT	3.0	2.4	2.7	6.0	5.6	5.9	\$21,076
15	8511	WESTMOUNT RD	AT	VICTORIA ST	KIT	5.6	4.1	5.1	14.4	11.3	14.0	\$74,952
73	8558	WESTMOUNT RD	AT	Glasgow St	KIT	2.8	2.1	2.4	6.0	4.7	5.7	\$27,811
95	1308	WESTMOUNT RD	AT	Gage Ave	KIT	2.2	1.3	1.5	7.2	2.7	4.8	\$21,217
98	5982	WESTMOUNT RD	AT	William St	WAT	2.0	1.3	1.6	3.0	2.3	2.7	\$20,015
17	26749	WESTMOUNT RD/Max Becker Dr	AT	FISCHER-HALLMAN RD	KIT	3.8	2.5	3.2	11.2	6.2	10.1	\$64,998

Exhibit 6.3.3

Pedestrian Collision Ranking – Top 20 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	Avg /Yr over 5-year Observed Pedestrian Coll	Avg /Yr Total Predicted Pedestrian Collisions	Collision Difference (Observed - Predicted)	Excess Social Cost
1	270	UNIVERSITY AVE	AT	Albert St	WAT	1.8	0.3	1.5	\$89,799
2	14477	AINSLIE ST	AT	Main St	CAM	1.6	0.2	1.4	\$87,667
3	17215	KING ST	AT	BISHOP ST/Bishop St	CAM	1.4	0.2	1.2	\$73,771
4	29541	ERB ST	AT	ERBSVILLE RD/IRA NEEDLES BLVD	WAT	1.8	0.7	1.1	\$68,963
5	10715	Kingsway Dr (multi-res driveway)	AT	Wilson Ave	KIT	1.2	0.1	1.1	\$66,236
6	275	UNIVERSITY AVE	AT	Phillip St (com'l driveway)	WAT	1.2	0.1	1.1	\$64,383
7	28246	FAIRWAY RD	AT	Fairview Park Mall/Cineplex (225 Fairway S)	KIT	1.2	0.2	1.0	\$57,884
8	8511	WESTMOUNT RD	AT	VICTORIA ST	KIT	1.4	0.5	0.9	\$57,388
9	11503	River Rd	AT	Holborn Dr/Access to Stanley Park Mall	KIT	1.0	0.1	0.9	\$54,165
10	20365	HESPELER RD	AT	Dunbar Rd	CAM	1.2	0.4	0.8	\$49,980
11	373	KING ST	AT	UNIVERSITY AVE	WAT	1.4	0.6	0.8	\$49,394
12	20086	HESPELER RD	AT	Avenue Rd/Jaffray St	CAM	1.0	0.2	0.8	\$45,875
13	18765	Guelph Ave/Adam St	AT	Queen St	CAM	0.8	0.1	0.7	\$41,716
14	20275	Industrial Rd	AT	Lang's Dr	CAM	0.8	0.1	0.7	\$41,665
15	8999	FISCHER-HALLMAN RD	AT	Keats Way	WAT	0.8	0.2	0.6	\$39,297
16	374	UNIVERSITY AVE	AT	Regina St	WAT	0.8	0.2	0.6	\$37,969
17	20333	HESPELER RD	AT	Langs Dr/Sheldon Dr	CAM	1.0	0.4	0.6	\$36,825
18	6504	WESTMOUNT RD	AT	Greenbrook Dr	KIT	0.8	0.2	0.6	\$36,792
19	6110	HIGHLAND RD	AT	FISCHER-HALLMAN RD	KIT	1.0	0.4	0.6	\$34,977
20	2269	ARTHUR ST	AT	CHURCH ST	WOO	0.6	0.0	0.6	\$34,800

Exhibit 6.3.4

Cyclist Collision Ranking – Top 20 Locations

2018 Ranking	GEO ID	STREET 1	LOCATE	STREET 2	MUN	Avg /Yr over 5-year Observed Cyclist Coll	Avg /Yr Total Predicted Cyclist Collisions	Collision Difference (Observed - Predicted)	Excess Social Cost
1	20107	HESPELER RD	AT	Munch Ave/Isherwood Ave	CAM	1.6	0.3	1.3	\$81,261
2	20363	HESPELER RD	AT	BISHOP ST	CAM	1.6	0.4	1.2	\$74,031
3	10741	COURTLAND AVE	AT	Siebert Ave (com'l driveway)	KIT	1.0	0.1	0.9	\$56,410
4	20086	HESPELER RD	AT	Avenue Rd/Jaffray St	CAM	1.0	0.2	0.8	\$48,705
5	17762	WATER ST N	BTWN	AINSLIE & Simcoe	CAM	0.8	0.0	0.8	\$47,883
6	22350	WEBER ST E	BTWN	Fergus & Kinzie	KIT	0.8	0.0	0.8	\$46,599
7	20994	HIGHLAND RD W	BTWN	Butler & WESTMOUNT	KIT	0.8	0.0	0.8	\$45,762
8	8991	UNIVERSITY AVE E	BTWN	Regina & WEBER	WAT	0.8	0.0	0.8	\$45,600
9	28255	HESPELER RD	AT	CAN-AMERA/YMCA (250 Hespeler Rd)	CAM	1.0	0.3	0.7	\$43,617
10	14619	DUNDAS ST	AT	Elgin St	CAM	0.8	0.1	0.7	\$42,776
11	6913	King St	AT	Stirling Ave	KIT	0.8	0.1	0.7	\$42,643
12	11301	King St	AT	Cedar St	KIT	0.8	0.1	0.7	\$42,614
13	7057	WEBER ST	AT	Water St	KIT	0.8	0.1	0.7	\$42,530
14	6110	HIGHLAND RD	AT	FISCHER-HALLMAN RD	KIT	1.0	0.3	0.7	\$39,917
15	8700	QUEEN ST/Queen St	AT	COURTLAND AVE/Courtland Ave	KIT	0.8	0.2	0.6	\$36,111
16	12615	LANCASTER ST	BTWN	General & Shirk	KIT	0.6	0.0	0.6	\$35,746
17	13957	DUNDAS ST	AT	MAIN ST	CAM	0.8	0.2	0.6	\$34,951
18	1616	KING ST S	BTWN	William & Willis Way	WAT	0.6	0.0	0.6	\$34,729
19	7615	WEBER ST N	BTWN	Hickory & UNIVERSITY	WAT	0.6	0.0	0.6	\$34,655
20	18248	DUNDAS ST	AT	BEVERLY ST/Beverly St	CAM	0.8	0.2	0.6	\$34,570