TORONTO

REPORT FOR ACTION

Vision Zero 2.0 - Road Safety Plan Update

Date: June 13, 2019
To: Infrastructure and Environment Committee
From: General Manager, Transportation Services and General Manager, Solid Waste Management Services
Wards: All

SUMMARY

With a renewed commitment to the safe systems approach, this report presents the City of Toronto's update to the Vision Zero Road Safety Plan ("RSP") (2016) - Vision Zero 2.0.While the 2016 RSP included a larger set of mostly shorter term improvements, Vision Zero 2.0 recommends a set of more extensive, more proactive and more targeted initiatives, informed by data and aimed at eliminating serious injury and fatalities on Toronto's roads.

While the number of serious injury collisions have remained relatively steady over the past decade, the number of fatal collisions in the past 5 years has seen a general increase compared to the previous 5 years. The upward trend is most notably seen in pedestrian fatalities.

Compared to 2016, the year with a ten-year record high of 78 traffic fatalities, the number of fatalities in the past two years appears to have begun to decline. However, no loss of life as a result of traffic collisions is acceptable in a Vision Zero approach, and addressing road safety continues to be a priority for residents, elected officials and staff.

The Vision Zero philosophy is a significant departure from the traditional approach to road safety. This transformative change will take several years to fully establish.

As Vision Zero solutions are planned and implemented, there are circumstances when decisions to improve road safety may result in outcomes at odds with other objectives like reducing motor vehicle delay. Vision Zero 2.0 reiterates that human life should be prioritized over all other objectives within all aspects of the transportation system.

Since Council approved the Vision Zero RSP in June 2016 Transportation Services has made progress in a wide range of over 40 countermeasures.

Following a safe systems approach, Vision Zero 2.0 continues to draw solutions from the 5Es of engineering, enforcement, education, engagement and evaluation. The plan focuses these solutions on 6 emphasis areas of pedestrians, cyclists, motorcyclists, school-aged children, older adults and aggressive and distracted driving. Vision Zero 2.0 focuses on a set of the most effective actions including:

- **Speed management strategy**: Higher speeds contribute to higher risk of serious injuries and fatalities by reducing driver reaction time, increasing the vehicle stopping distance, and inflicting more severe blunt force trauma on victims upon impact. The proposed speed management strategy is comprised of seven integrated speed reduction tools aimed at mitigating risks associated with high speeds. These include revised speed limit setting practices, road design improvements, enhanced police enforcement, proactive deployment of Watch Your Speed signs, speed limit reductions, automated speed enforcement and public education.
- **Road design improvements**: Geometric modifications to the design of the road are known to be one of the most effective ways of achieving the intended target speed for the context and improving road user behaviour. There will be a greater focus on this safety countermeasure, including integration of safety improvements as a component of planned road work, implementation of shorter-term interim safety improvements and enhancing road illumination.
- **Proactively addressing high-risk mid-block crossings**: Mid-block crossings are the most prevalent type of pedestrian collisions resulting in a killed or serious injury incident and account for over 50% of pedestrian fatalities. Wide arterials roads with several lanes of traffic, high travel speeds and long distances between signalized crossing opportunities all contribute to high-risk mid-block crossings. Going forward, recommendations in staff reports on traffic signals will be based upon a new contextual approach to traffic signal assessment and will result in the installation of new signals that may not have been previously warranted.
- **Proactively addressing turning collisions at signalized intersection**: left turn and right collisions at signalized intersections are the second most prevalent type of Killed and Serious Injury collisions involving pedestrians (24%) and cyclists (20%). Pedestrian head start signals will be proactively implemented at most signalized intersections across the city as a default safety feature. Bicycle head start signals will also be implemented where feasible. Right-turn-on-red prohibitions will be strategically deployed at intersections with known relevant collision patterns.
- **Education and engagement plan**: The overarching goals of the education and engagement component of Vision Zero programming are informing and consulting with the public, building support for infrastructure improvements, and instituting a shift in social norms and road user behaviour.

In addition to the focus actions listed above, a number of other supporting initiatives are outlined in this report. These include:

- Expansion of the red light camera program;
- Adding safety features such as side guards to City fleet, particularly large vehicles, starting with the Solid Waste Management Division;
- Development of District Safety Action Plans;
- Expansion of partnerships for school travel planning programs;
- Reviewing signal operations practices with a lens of vulnerable road user safety;
- Advocacy to the Province for mandatory motorcycle training, improved driver training, changing the maximum Blood Alcohol Concentration for all licensed motorcycle drivers to 0%.

A key focus of Vision Zero 2.0 will be a renewed emphasis on data-driven decision making and prioritization. Efforts in this area include:

- Using predictive analytics to more effectively prioritize and target our safety measures
- Incorporating a social justice and equity lens;
- Implementing performance monitoring and evaluation to measure the impact of our safety programs;
- Working with partners to acquire better data.

It is possible that Toronto will continue to see fluctuations, and at times, increases in year-over-year number of serious injuries and fatalities in the short term until the effects of various Vision Zero initiatives are realized. Experience of other cities and countries that have adopted the Vision Zero approach suggests that meaningful change is only possible after several years of sustained and focused commitment.

Transportation Services is committed to implementing these actions, with adequate resources, in order to eliminate all traffic fatalities and serious injuries on Toronto's roads.

RECOMMENDATIONS

The General Manager, Transportation Services and the General Manager, Solid Waste Management Services recommend that:

1. City Council endorse in principle the Vision Zero 2.0 plan as outlined in this report, and direct the General Manager, Transportation Services to report back to the appropriate committee where additional authorities are required in order to implement the Vision Zero 2.0 Plan.

2. City Council designate as Community Safety Zones the secondary school locations set out in Attachment 1 to the report dated June 13, 2019 from the General Manager, Transportation Services, subject to availability of funding in the 2020 budget.

3. City Council authorize the General Manager, Transportation Services, to negotiate, enter into, and execute agreements, as may be required, with Vital Strategies to receive funding of $50,000USD for the expansion of the Active and Safe Routes to School Pilot project and the continuation of the City of Toronto's involvement in the Bloomberg Philanthropies' Partnership for Healthy Cities Initiative, on such terms and conditions satisfactory to the General Manager, Transportation Services and in a form satisfactory to the City Solicitor.

4. City Council authorize the General Manager, Transportation Services, to negotiate, enter into, and execute agreements, as may be required, with Green Communities Canada to receive funding in the amount of $60,000CAD from the Ontario Active School Travel Fund for the expansion of the Active and Safe Routes to School Pilot project, on such terms and conditions satisfactory to the General Manager, Transportation Services and in a form satisfactory to the City Solicitor.

5. City Council reduce the speed limit from 60 km/h to 50 km/h on the following road segments as part of the Speed Management Strategy outlined on page 21 in the report dated June 13, 2019 from the General Manager, Transportation Services:

a. Albion Road from Todd Brook Drive to Silverstone Drive
b. Bathurst Street from Delhi Avenue to Steeles Avenue West
c. Birchmount Road from Eglinton Avenue East to Steeles Avenue East
d. Brimley Road from Eglinton Avenue East to Progress Avenue
e. Brimley Road from Sheppard Avenue East to Steeles Avenue East
f. Danforth Road from Brimley Road to McCowan Road
g. Don Mills Road from A point 24 metres south of the centre line of the Don Valley Parkway to Kern Road
h. Don Mills Road from Duncan Mills Road to Steeles Avenue East
i. Dundas Street West from Dunbloor Road to East Mall Crescent
j. Eglinton Avenue East from Brentcliffe Road to Kingston Road
k. Eglinton Avenue West from Bicknell Ave / Municipal Dr to 200 m west of Pearen Street
l. Ellesmere Road from Morningside Avenue to Victoria Park Avenue
m. Finch Avenue East from Bayview Avenue to Victoria Park Avenue
n. Finch Avenue East from Birchmount Road to Midland Avenue
o. Finch Avenue West from Albion Road to Yonge Street
p. Islington Avenue from Prince George Drive/Ridgevalley Crescent to Monogram Place
q. Keele Street from Greenbrook Drive to Finch Avenue West
r. Lawrence Avenue East from Railside Road (west intersection) to Morningside Ave
s. Leslie Street from Eglinton Avenue East to McNicoll Avenue
t. Markham Road from Kingston Road to Progress Avenue
u. Markham Road from Milner Avenue to Steeles Avenue East
v. Martin Grove Road from Eglinton Avenue West to Dixon Road
w. Martin Grove Road from Jeffcoat Drive to point 250 metres north of Mercury Road/ Westhumber Boulevard
x. McCowan Road from Danforth Road to Progress Avenue
y. McCowan Road from Milner Avenue to Steeles Avenue East
z. Morningside Avenue (Scarborough) from Kingston Road to Tams Road/ Pan Am Drive
aa. Morningside Avenue (Scarborough) from Milner Avenue to McLevin Avenue/ Casebridge Court
bb. Sheppard Avenue East from Yonge Street to Meadowvale Road
cc. Sheppard Avenue West from Weston Road to Yonge Street
dd. St. Clair Avenue East from Danforth Road to Birchmount Road
ee. Steeles Avenue East from Yonge Street to Warden Avenue
ff. Steeles Avenue West from Fenmar Drive to Jane Street
gg. Steeles Avenue West from Keele Street to Yonge Street
hh. The Queensway from Ellis Avenue to Kipling Avenue
ii. Victoria Park Avenue from O'Connor Drive to York Mills Road
jj. Victoria Park Avenue from Consumers Road to Steeles Avenue East
kk. Warden Avenue from St Clair Avenue East to Metropolitan Road
ll. Warden Avenue from Arkona Drive to Steeles Avenue East

6. City Council reduce the speed limit from 70 km/h to 60 km/h on the following road segments as part of the Speed Management Strategy outlined on page 21 of the report dated June 13, 2019 from the General Manager, Transportation Services:

a. Black Creek Drive (Northbound) from Eglinton Avenue West to Weston Road; and

b. Black Creek Drive (Southbound) from A point 200 metres north of Weston Road to Eglinton Avenue West.

7. City Council reduce the speed limit from 60 km/h to 50 km/h on the following road segments for Pedestrian Safety Corridors as outlined on page 26 of the report dated June 13, 2019 from the General Manager, Transportation Services

a. Eglinton Avenue East from Kennedy Road to Kingston Road

b. Kennedy Road from St. Clair Avenue East to Lawrence Avenue East

c. Victoria Park Avenue from O'Connor Drive/Eglinton Square to Lawrence Avenue East.

8. City Council reduce the speed limit from 50 km/h to 40 km/h on the following road segments for Pedestrian Safety Corridors as outlined on page 26 of the report dated June 13, 2019 from the General Manager, Transportation Services

a. Bathurst Street from St. Clair Avenue West to Briar Hill Avenue

b. Dufferin Street from Geary Avenue to Eglinton Avenue West

c. St. Clair Avenue West from Runnymede Road to Dufferin Street

d. Victoria Park Avenue from Dawes Road to O'Connor Drive/Eglinton Square

e. Yonge Street from Eglinton Avenue East/West to Broadway Avenue

9. City Council amend the Zebra Crosswalk Policy outlined in Attachment 17 to include them at stop-controlled intersections that meet the following conditions:

a. located within Pedestrian Safety Corridors,

b. located within School Safety Zones,

c. located within Senior Safety Zones, and

d. at locations where safety is, in the opinion of the General Manager, Transportation Services, an issue.

10. City Council:

a. adopt the Missing Sidewalk Installation Policy in Attachment 2 to this report.

b. delegate final decision making authority to the General Manager, Transportation Services to add sidewalks to local roads as part of a reconstruction or to accommodate a request for a person with a disability.

c. amend Chapter 27, Council Procedures to revoke the legislative delegation to Community Councils in respect of sidewalk proposals as set out in Section 27-18.4B.7.

d. direct that sidewalk proposals not otherwise delegated to the General Manager, Transportation Services, by Recommendation 10b. above shall be reported on an annual basis to the Infrastructure and Environment Committee for recommendation to City Council.

11. City Council amend Municipal Code Chapter 950, Traffic and Parking, to add motorcycles to the Designated Class of Vehicles permitted in reserved lanes on Bay Street from Front Street West to Bloor Street East.

12. City Council request the Ministry of Transportation of Ontario to review and amend road safety related educational programs with a Vision Zero lens related to vulnerable road users including but not limited to mandatory motorcycle training program for M-class Licensing; improved cycling education in schools; enhanced vulnerable road user training requirements for all M and G Class driver education schools including improvements to the MTO Driver's Handbook, Knowledge and Road Tests.

13. City Council request the Ministry of Transportation of Ontario and Transport Canada to explore mandatory Intelligent Speed Assistance in all new motor vehicles including private vehicles and evaluate other in-vehicle safety technologies.

14. City Council request the Ministry of Transportation of Ontario to change the maximum Blood Alcohol Concentration for all licensed motorcycle drivers to 0%.

15. City Council authorize the General Manager, Solid Waste Management Services to implement vehicle side guards and to further the current video-based telematics technology to improve road safety by:

a. authorizing the General Manager, Solid Waste Management Services to negotiate, and enter into, and execute any and all agreements and amending agreements necessary, subject to available funding, to implement a fleet safety and accountability program for all new and existing, in-house and contracted out vehicles, which aligns with the principles of Vision Zero and the technologies outlined in this Report and attachment 3 on terms and conditions satisfactory to the General Manager, Solid Waste Management Services, and in a form satisfactory to the City Solicitor;

b. requesting the General Manager, Solid Waste Management Services, to report back annually, through the budget process, on any fleet related safety and accountability enhancements that have been implemented and integrate fleet safety performance as a key performance indicator moving forward;

c. approving funding for the capital acquisition for the safety and accountability enhancement retrofits to existing solid waste vehicles in the amount of $3,850,000 to be budgeted in the amount of $2,530,000 in 2019 and $1,320,000 in 2020 from the Waste Management Reserve Fund (XR1404); and

d. approving funding for annual operating costs associated with monitoring and equipment maintenance to be budgeted in the annual Operating Budget in the amount of $55,200 in the 2019 Operating Budget with an equal offset to the contribution to the Waste Management Reserve Fund (XR1404), and directing that future costs be included in the annual Solid Waste Management Services Budget.

FINANCIAL IMPACT

Transportation Services Division Financial Impacts

The estimated capital funding required to implement RSP 2.0 is approximately $123 million gross and $100 million debt (excluding HST recoveries) between 2020 – 2024, and is partially available within the 2019-2028 Capital Budget & Plan for Transportation Services. The incremental capital funding required is approximately $57 million gross and $49 million debt (excluding HST recoveries) and would need to be included for consideration as part of the 2020-2029 Capital Budget & Plan submission for Transportation Services.

The estimated operating funding required to implement RSP 2.0 is approximately $16 million gross and $4.4 million net for 2020, and is not available in the Operating Base Budget for Transportation Services. This required funding would need to be included for consideration as part of the 2020 Operating Budget submission for Transportation Services. In addition, future operating budget impacts of capital investments in infrastructure developments associated with RSP 2.0 (i.e. maintenance costs, etc.), would need to be included for consideration as part of future Operating Budget submissions for Transportation Services.

Solid Waste Management Division Financial Impacts

The following section outlines the financial implication of installing the desired safety and accountability enhancements on Solid Waste vehicles and recommended changes to the Division's capital and operating budgets.

The average costs of installing the desired safety and accountability enhancements on Solid Waste vehicles are outlined in Attachment 4, Table 1 Costs for doing so from factory are estimated to be up to 25 - 50% less expensive, dependent on the type of equipment. Figures presented represent the total cost for retrofitting all vehicles currently on the road totaling 350 units, with a planned total expenditure of up to $3,850,000 over the phased transition period.

The retroactive installation of the enhanced safety and accountability enhancement measures on Solid Waste vehicles will be budgeted in the 2019 Capital Budget in this report and will be funded by the Solid Waste Management Services Waste Management Reserve Fund (XR1404). In future, the Division will have the opportunity to purchase new vehicles with the enhanced safety equipment already installed, at which point the funds will stem from the Solid Waste Management Services Vehicle Replacement Reserve (XQ1014).

There are two components to the fleet safety program comprised of the capital acquisition and retrofit costs and ongoing monitoring and system maintenance costs as shown Attachment 4, Table 2. Solid Waste Management Services will begin installing safety enhancements in 2019, with a total budget up to $2,530,000 with the remainder in 2020. Cost per capital retrofit is approximately $11,000 per unit and ongoing monitoring and maintenance costs are estimated to be $480 per vehicle, per year.

Estimated operating costs will amount to $55,200 in 2019 for a half-year, increasing to $168,000 in 2020 once all 350 collection vehicles safety equipment are installed. Funding is to be provided in the Solid Waste Management Division's 2019 Operating Budget, however, it is anticipated that over time savings may materialize due to lower risk and claims as this is a clear step the City is taking to help prevent loss of life, injury, and/or property damage. Any future savings realized in risk management claims will be used to reduce Solid Waste Management Services contribution to the Insurance Reserve Fund (XR1010) in the operating budget.

Operating budget cost centres and elements recommended for approval for implementation of this initiative in the 2019 Operating Budget and the 10-Year Capital budget our outlined in Attachment 4, Tables 3 and 4.
Upon approval of the 2019 Solid Waste Management Services Operating and Capital Budget, City Council directed the General Manager, Solid Waste Management Services, and the executive Director of Financial Planning, to develop a Multi-Year Financial Strategy and rate structure for the Division. These additional costs will be taken into account to ensure sufficient funding is available in both the 2019 and 2020 Operating Budget and 10-year Capital Budget and Plan.

The Chief Financial Officer and Treasurer has reviewed this report and agrees with the financial impact information.

EQUITY IMPACT STATEMENT

The Vision Zero Road Safety Plan is a critical part in building a safe and inclusive city. It is an important mechanism to remove barriers for equity seeking groups by prioritizing vulnerable road users. The recommendations in this report will help to provide a transportation network with safer walking, cycling, and motor vehicle routes.

Transportation Services has investigated the relationship between Killed and Serious Injury (KSI) collisions and other demographic factors including children and older adults. Data analysis has revealed that more KSI collisions occur in the suburban districts, especially in Scarborough with the lowest average household income, highest percentage of immigrant population, lowest number of daily auto trips, but a more car dependent built form. The implementation of Vision Zero 2.0 will use this analysis to target improvements where they will benefit residents most vulnerable to serious injury or death.

Other cities and jurisdictions with more long standing Vison Zero programs have reported that police enforcement of speeding or distracted driving can be applied unequally, potentially reflecting systemic bias. This type of data is not available in the Toronto context but concerns have been raised by equity-seeking groups throughout the city to ensure that police enforcement for Vision Zero be applied consistently and not target certain groups. The most effective way to prevent unintentional bias in police speed enforcement is through the use of automated speed enforcement, according to consistent deployment guidelines, which is a component of Vision Zero 2.0. It should be noted that automated enforcement cannot be applied to issues such as aggressive or distracted driving where assessing violations is qualitative. Enforcement by police officers is a critical component of any Vision Zero strategy.

Another common concern raised in stakeholder consultations was a perceived unequal distribution of infrastructure improvements. Vision Zero's data driven approach focuses on unsafe road environment characteristics and KSI collisions wherever they may be throughout the city. The intention of Vision Zero is that it is widely imbedded in infrastructure improvements, including regular state of good repair programs.

DECISION HISTORY

At its meeting on June 26, 27, 28 and 29, 2018 City Council adopted a number of recommendations in relation to allocation of additional Vision Zero funding including the following items
app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.EX35.26

- City Council authorized up to $22 million in additional 2018 funding to improve and accelerate the implementation of road safety measures identified in the City's Vision Zero Strategy.

- City Council directed the General Manager, Transportation Services to report on the details of the road safety measures that are part of the accelerated implementation plan.

- City Council directed Transportation Services, in consultation with Fire Services, to retain consultant support in order to undertake a study of the availability and suitability of smaller fire trucks, Toronto Paramedic Services vehicles and solid waste vehicles as well as the use of truck guards.

City Council at its meeting of June 26, 27, 28 and 29, 2018 (MM43.53), requested the General Manager, Transportation Services to report on expanding the Designated Class of Vehicles permitted to use the reserved lanes on the following streets to include motorcycles:
a. Bay Street, from Front Street West to Bloor Street East; and
b. Don Valley Parkway, from Lawrence Avenue East to north of York Mills Road.

At the same meeting (MM43.53) City Council requested the General Manager, Transportation Services in consultation with Toronto Public Health to report on a pilot project along the Richmond Street and Adelaide Street corridors which would allow motorcycles to filter between stopped vehicles, up to the stop line at controlled intersections where a stop signal is active, and only along lane boundaries that are not adjacent to any curb or pedestrian walkway, with implications for minimizing the risk of rear or front end collisions, and the overall flow of traffic.
app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.MM43.53

City Council at its meeting of December 13, 14 and 15, 2016 (MM23.27), requested the General Manager, Transportation Services to review the current warrants for traffic control measures.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.MM23.27

At its meeting of July 12, 13, 14 and 15, 2016, City Council endorsed the Road Safety Plan (2017-2021) and endorsed in principle the countermeasures and enhanced Road Safety Plan identified within the supplementary report (July 11, 2016).
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PW14.1

Decision History on Fleet Safety

At its meeting of July 4, 2017, City Council adopted item GM21.12, entitled "Award of Request for Proposal No. 2110-16-3160 to BSM Technologies Ltd. for the Provision of Telematics Solution". City Council adopted the recommendations without amendments.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.GM21.12

At its meeting of May 29, 2017, the Government Management Committee adopted item GM21.12, entitled "Award of Request for Proposal No. 2110-16-3160 to BSM Technologies Ltd. for the Provision of Telematics Solution." The Government Management Committee adopted the recommendations with amendments, directing the General Manager, Fleet Services to exclude the in-cab camera equipment in negotiating the Agreement with BSM Technologies for the provision of Telematics Solution and to reduce the contract value accordingly.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2017.GM21.12

At its meeting on July 12, 13, 14 and 15, 2016 City Council directed the General Manager, Transportation Services and the Director, Purchasing and Materials Management to provide an update on the 2011 motion MM14.16 - Request to implement use of truck side guards and other safety measures to improve safety for cyclists - by Councillor Glenn De Baeremaeker, seconded by Councillor Paula Fletcher, and such report to include information on the feasibility of implementing side guards on City Trucks and a side guard policy related to the businesses the City works with through contracts.
http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PW14.1

Attachment 5 provides a comprehensive list of all relevant decisions.

BACKGROUND

The main objective of the Vision Zero Road Safety Plan is to eliminate serious injury and fatal collisions and to provide further protection for vulnerable road users. By improving the built environment to make walking and cycling safer, the outcomes of the Vision Zero Road Safety Plan can also have the additional benefit of changing modal share away from driving and auto dependence and towards active forms of transportation.

For example, it has been observed that cycling volumes have increased significantly on roads where dedicated cycling infrastructure has been introduced. Similarly, increasing daily physical activity by walking and biking to school can result in the development of lifelong healthy lifestyles choices and has been shown to improve readiness to learn in students.

Vision Zero 2.0 will continue to enhance safety for vulnerable road users and will further support and align with other municipal, provincial and federal active transportation and road safety policies.

Table 1 outlines existing City of Toronto policies and guidelines and the goals, targets or directives outlines in these documents as they relate to Vision Zero.
Table 1 Existing City of Toronto Policies and Guidelines Supporting Vision Zero Goals and Objectives

Policy / Guideline	**Relevant Goal/Target/Directive**	**Authorized by**
City of Toronto Official Plan	Guiding the growth and development by making cycling, walking and transit, increasingly attractive relative to car use.	City Council
Reducing Health Risks from Traffic-Related Air Pollution (TRAP) in Toronto	Support the work of public health agencies in reducing TRAP by increasing active transportation and reducing motor vehicle trips by making active transportation safer and more appealing.	City Council
Seniors Strategy Version 2.0 (2018)	Support positive social, health and wellbeing outcomes for seniors by making active transportation (walking in particular) safer and therefore more attractive.	City Council
Resilience Strategy (2019)	Move more people more efficiently within the existing rights of way by expanding demonstration projects.	City Council
Road to Health - Improving Walking and Cycling in Toronto (2012)	Implement recommended strategies to improve the safety and accessibility for cyclists and pedestrians through changes in planning policy, built environment and public education in order to increase active transportation.	Board of Health
TransformTO - Climate Action Strategy	Reduction of Toronto's greenhouse gas emissions by 80% from 1990 levels by 2050 75% of trips under 5 km will be walked or cycled.	City Council
Cycling Network 10 Year Plan (2016)	Make the cycling environment safer and more appealing by removing barriers for increased cycling uptake and encouraging modal shift from motorized forms of transport.	City Council
Complete Streets Guidelines (2017)	Redesigning streets to be safe and accessible for all users, including pedestrians, cyclist, public transit users and drivers, and varying ages and levels of ability.	City Council
Toronto Walking Strategy (2009)	Make the walking environment safer and more appealing by removing barriers for higher walking uptake and encouraging modal shift from motorized forms of transport.	City Council
Vision Zero Road Safety Plan (2016)	Eliminating KSI collisions in Toronto.	City Council

The relevant federal and provincial policies and other documents include:

- Canada's Road Safety Strategy 2025
- The Growth Plan for the Greater Golden Horseshoe (2017)
- Coroner's report- Cycling Death Review (2012)
- Coroner's report- Pedestrian Death Review (2012)

Further background on the above policies is provided in Attachment 6.

Vision Zero Road Safety Plan (2016)
In July 2016, City Council approved the Vision Zero Road Safety Plan (RSP), an action plan focused on reducing traffic-related fatalities and serious injuries on Toronto's streets. This was in response to a general upward trend in traffic-related fatalities starting in 2012, particularly among vulnerable road users, as well as change in values representing Vision Zero approach.

The RSP follows a widely accepted, holistic approach to improving road safety which includes 5 E's:

- Engineering,
- Enforcement,
- Education,
- Engagement
- Evaluation.

Road Safety solutions in Toronto are focused on 6 emphasis areas:

- Pedestrians
- Cyclists
- Motorcyclists
- School-aged children (age 4 to 19)
- Older adults (age 65 and over)
- Aggressive and distracted driving

Vulnerable road users are defined as road users who are most at risk of being seriously injured or killed when they are involved in a motor-vehicle related collision. This includes the five user groups represented in the emphasis areas.

The RSP plan was approved in 2016 set out an action plan for over 50 countermeasures. This includes mostly shorter term improvements in the area of signs (e.g., warning signs delineating pedestrian safety corridors, senior safety zones and school zones and variable speed display signs) and pavement markings (e.g., new and refreshed zebra crosswalks). In the past couple of years extensive work was completed in implementation of the Vision Zero RSP, as outlined later in this report.

COMMENTS

Vision Zero 2.0 is an update to the City of Toronto Vision Zero Road Safety Plan. The plan continues to draw solutions from the 5Es, focuses on the 6 emphasis areas and identifies a set of the most effective focus actions.

Vision Zero 2.0 - A Renewed Focus

Vision Zero is the application of the safe systems approach to road safety. This approach recognizes that the human body is vulnerable to injury and that humans make mistakes. Therefore, a set of measures are needed to create safer road infrastructure, vehicles, speeds and road user behaviours. Under this approach, if one of these parts fails in a given scenario the other parts will minimize risks of a serious injury or fatal collision.

In the City of Toronto, successful implementation of a safe systems approach requires collaboration between Transportation Services, Toronto Police Services, Toronto Transit Commission, Toronto Public Health and School Boards, in addition to other community partners and other levels of government. Attachment 7 outlines Vision Zero Partners and accomplishments and plans by the major partners.

The Vision Zero philosophy is a significant departure from the traditional approach to road safety. Table 2 below illustrates components of this paradigm shift.

Table 2. Traditional versus Vision Zero Approach to Road Safety

Traditional Road Safety Approach	**Vision Zero Approach**
Traffic fatalities are inevitable	Traffic fatalities are preventable
Crashes are caused by non-compliant road users	Humans make mistakes. The roadway system should be designed and operated so those mistakes are not deadly
Try to reduce all collisions	Prevent collisions that result in serious injuries and fatalities. No serious injuries or loss of life is acceptable
Individual road users are responsible for their own safety	Safety is a shared responsibility between those who design, operate, maintain, and use the road
Reactive to historical crashes	Proactive and systemic prioritization

With a renewed commitment to the safe systems approach, Vision Zero 2.0, City of Toronto's update to the Vision Zero RSP, recommends a set data driven, more extensive, more proactive and more targeted initiatives, informed by data and aimed at eliminating serious injury and fatalities on Toronto's roads.

The key focus actions being proposed in Vision Zero 2.0 include:

- Speed management strategy;
- Road design improvements;
- Proactive application of pedestrian head start signals;
- Proactively addressing high-risk mid-block crossings;
- Education and Engagement Plan

Key facts supporting proposed Vision Zero 2.0 focus actions:

- Vulnerable road users make up 10% of overall collisions in the City, but account for 74% of serious injuries and fatalities.

- 83% of KSI collisions happen on arterial roadways, where traffic volumes and travel speeds are higher. Vulnerable road users have a 95% likelihood of death in a collision at 60 km/hr, while at 40 km/hr the likelihood of death is reduced to 30%.
- 40% of pedestrian KSI collisions happen as pedestrians are crossing mid-block at uncontrolled locations. An additional 400m in walking distance to the nearest traffic signal can take an additional 10 minutes for a person with disabilities.
- Collisions involving turning vehicles at signalized intersections are the second most prevalent type of KSI collisions involving pedestrians and cyclists.
- Older adults make up 16% of the population of the City but account for 36% of KSI collisions. The body of an older individual is more susceptible to major damage at high impact speeds

In developing Vision Zero 2.0, staff have also looked at road safety best practices among other jurisdictions. This is summarized in Attachment 8 and illustrates that City of Toronto road safety measures are in line with the work of comparable jurisdictions in North America.

As a part of the data-driven approach in Vision Zero 2.0 staff have conducted analysis on identifying the effectiveness of various countermeasures. Table 3 provides a list of top 5 most effective safety countermeasures and their relative impact.

Table 3. Most Effective Vision Zero Countermeasures in Toronto

Countermeasure	**% of Killed and Serious Injury collisions potentially prevented**
Effective speed reductions	19%
Road design modifications	12%
Signalized mid-block crossings	11%
Cycling corridor enhancements	8%
Pedestrian head start signals	6%

Trends in Killed and Serious Injury Collisions

After a relatively steady decline of about 7% per year between 2005 and 2011, fatalities began to increase starting in 2012. This increase remains apparent even after accounting for population growth in the City. There has been an average of 65 traffic fatalities per year in the past five years. These trends are shown in Figure 1.

Figure 1. Traffic fatalities by mode [2005 - 2019]

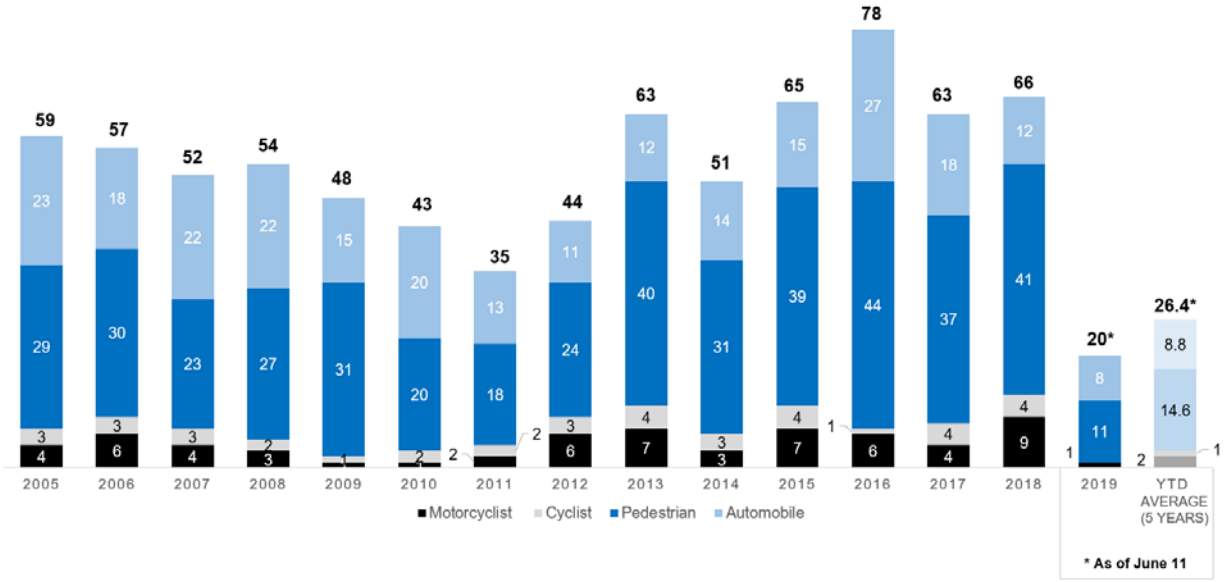
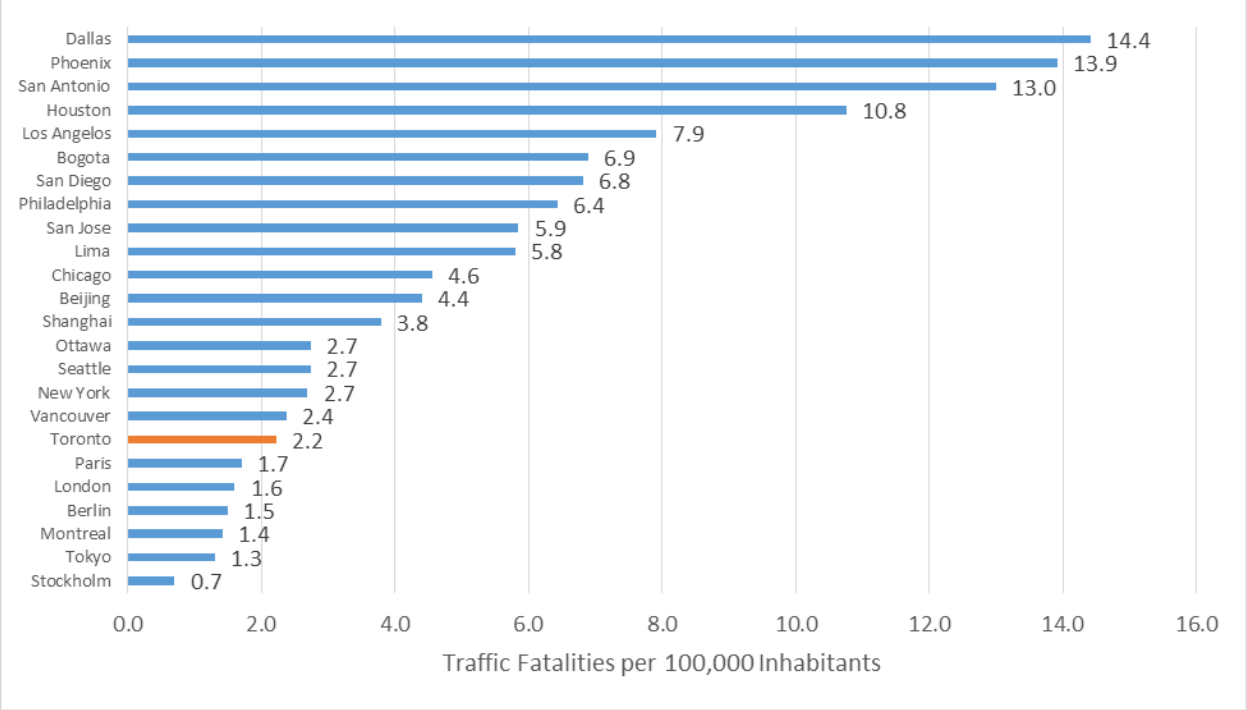


Figure 2. Traffic Fatalities per 100,000 Inhabitants in Major World Cities[1]



At 2.2 traffic fatalities per 100,000 inhabitants, Toronto is leading in road safety amongst most North American cities. That said, Montreal and several European cities including Stockholm, the birthplace of Vision Zero, have lower rates of traffic fatalities. Figure 2 provides a comparison in traffic fatalities between Toronto and other large cities across the world.

[1] Data for City of Toronto is based on 2018 collisions. Data for all other cities is the most recent data available within that past 5 years.

The upward trend is most notably seen in pedestrian fatalities, followed by motorcyclists. Compared to 2016, the year with a record high number of fatal collisions in the past 14 years, fatalities in the past two years appear to have begun to decline. However, no loss of life as a result of traffic collisions is acceptable in a Vision Zero approach, and addressing road safety continues to be a priority for all.

Experience of other jurisdictions that have adopted the Vision Zero approach suggests that meaningful change is only possible after several years of sustained and focused efforts. As such, it is possible that Toronto will continue to see fluctuations, and at times, increases in year-over-year number of fatalities until the effects of various Vision Zero initiatives are realized.

Historically, road safety analysis examined and targeted a reduction in all collisions, including less serious property-damage-only collisions. In contrast, Vision Zero focuses on reducing collisions resulting in death and serious injuries (injuries that require admittance to hospital). These are referred to as "killed and seriously injured" (KSI) collisions.

Figure 3. Killed and Seriously Injured [2005 - 2018][2]

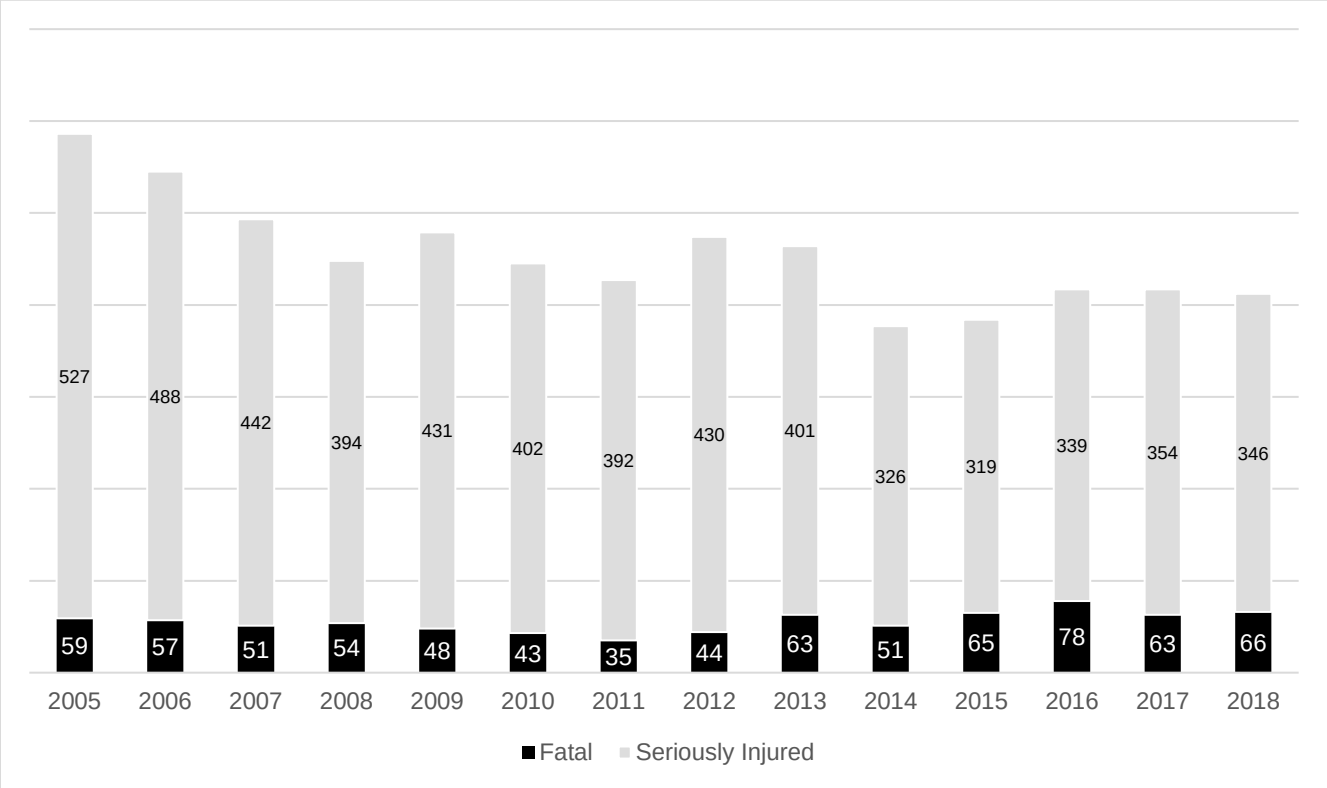


Figure 3. illustrates the trend in KSI collisions since 2005, which shows a general downward trend up to 2011. In the past 5 years, while the number of fatalities have been on the rise, the number of serious injuries have remained relatively steady.

[2] Starting in 2014, the Toronto Police Service made amendments to collision reporting practices that made the criteria for reportable collisions stricter, likely resulting in less reported collisions. For this reason, there may be inconsistencies in data between years prior to 2014 and those after.

Attachment 9 shows the trend and facts in KSI collisions for each of the 6 emphasis areas between 2005 and 2018. It should be noted that there is overlap in the number of KSI collisions between various emphasis areas since collision events often involve multiple road users and multiple road user actions and conditions.

Accomplishments of City of Toronto Vision Zero Road Safety Plan

Since Council approved the Vision Zero RSP in June 2016 Transportation Services has made progress on a wide range of over 40 countermeasures. The most notable acceleration and expansion was approved in 2018 where City Council authorized up to $22 million in additional 2018 funding to improve and accelerate the implementation of road safety measures.

Some of the plan's major accomplishments since adoption in June 2016 to the end of 2018 include:

- Adding pedestrian head start features to over 80 signalized intersections
- Completing implementation of geometric safety improvement at 31 locations across the city and started construction on 14 other locations in 2018. Improvements include curb extensions, corner radius reductions, lane width reductions and removal of right-turn channelizations.
- Implementing over 50 Pedestrian Safety Corridors, including enhanced pedestrian crosswalk markings, speed limit reductions and considerations for pedestrian head start signals
- Implementing over 50 Senior Safety Zones including enhanced signage and pavement markings
- Implementing over 100 School Safety Zones, including enhanced signage and pavement markings
- Installing 18.3 km of new sidewalks
- The Cycling Network Plan outlines steps to grow, connect and renew cycling infrastructure within the City. Vision Zero funding has gone towards renewing 107 km of existing cycling infrastructure.
- Launching major road safety education campaigns such as the Art of Distraction safety campaign. Education and engagement efforts have resulted in three-in-ten residents reporting to be aware of Toronto’s Vision Zero Road Safety Plan.

Attachment 10 provides a detailed list of accomplishments of the Vision Zero program in each Community Council area.

Data Driven Decision Making and Prioritization Strategy

A key focus of Vision Zero 2.0 will be an emphasis on data-driven decision making and prioritization. This will be accomplished by building a comprehensive data collection and analytics program that will focus on the following elements:

1) Using predictive analytics to more effectively prioritize and target our safety measures and incorporating a social justice and equity lens;
2) Implementing performance monitoring and evaluation to measure the impact of our safety programs; and

3) Working with partners to get better data.

This Vision Zero 2.0 data program will continue to build on the existing evidence based approach to road safety in the City by focusing on identifying the underlying causes of KSI collisions and prioritizing proposed actions accordingly. This will involve continued analysis of collision data (as shown in the maps in Attachment 11) in addition to other supporting data including road characteristics, traffic volumes, pedestrian and cyclist volumes and demographics. Particular attention will be made to vulnerable populations and the creation of new partnerships with Toronto Public Health and the Toronto Police.

Performance Monitoring and Evaluation
Under Vision Zero 2.0, rigorous and ongoing evaluation will be conducted in order to assess the effectiveness of safety programs. The evaluations will allow the City to learn from past deployments and to focus efforts on the initiatives that have shown to be the most effective at reducing traffic injuries and fatalities. This will be conducted in combination with identifying a high injury network, an analysis that maps corridors where a high number of KSI collisions have historically taken place, and will involve targeted pilot studies and evaluations of new safety programs including Automated Speed Enforcement, interventions at high risk mid-block crossings and measures deployed to reduce right and left turn collisions.

A focus of the performance monitoring and evaluation program will be establishing standard metrics/key performance indicators (KPI) to track the effectiveness of the program including measures such as KSI rates, vehicle speed, and reduced near-miss conflicts as identified through video analytics.

Vision Zero 2.0 Focus Action: Speed Management Strategy

This Vision Zero focus action covers the three following areas:

- The problem with speed
- A holistic speed management strategy
- Pedestrian safety corridors

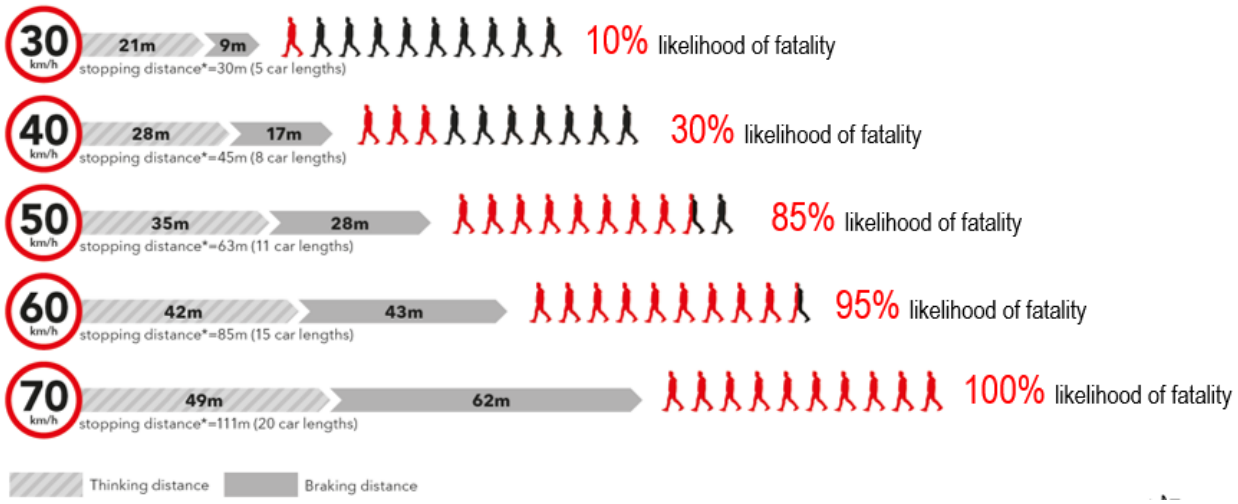
The Problem with Speed

One of the main principles of Vision Zero is that road users make mistakes and collisions are always likely to happen, however no one should die or sustain serious injury as a result of such mistakes. At high speeds, road user mistakes can prove to be deadly. The impact of vehicle speed in injury severity is particularly strong for vulnerable road users.

The relationship between vehicle speed and severity of collision outcome is well established. Small reductions in speeds greatly reduce the likelihood of a crash and increase the chances of surviving crashes that do occur. Reductions in average speeds of approximately 5% yield a reduction in fatalities by as much as 20%[3]. As illustrated in Figure 4 vulnerable road users have a 95% likelihood death in a collision at 60 km/hr, while at 40 km/hr the likelihood of death is reduced to 30%.

[3] OECD/ECMT, 2006 Research Centre: Speed Management report

Figure 4. Impact of Speed on Collision Outcome



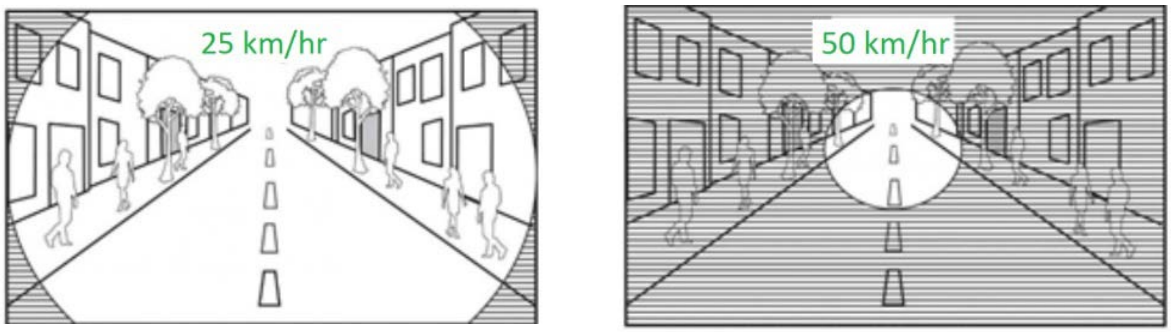
Studies comparing the risk of speeding and the risk of drunk driving have found driving at speeds 10 to 20% above the mean operating speed for the road carries the similar increased collision risk as driving above drunk driving limits; the risk of exceeding a 60 km/h speed limit by 10 km/h is higher than driving with a blood alcohol content of 0.08[4]. Although speeding is found to be just as or even riskier than drunk driving, it does not carry the same level of stigma. Therefore, managing vehicle/road speed and creating safe speeds for specific roadside contexts is a core element of Vision Zero 2.0.

Higher speeds contribute to higher risk of serious injuries and fatalities in three ways:

- Higher driving speeds reduce drivers' field of vision as well as peripheral vision and consequently, situational awareness, which is crucial for anticipating and reacting to unexpected events or sudden changes in road conditions (see Figure 5).
- The higher the speed, the greater the stopping distance required when braking, and as a result, the increased risk of a collision.
- Should a collision occur, impact at higher speeds inflicts more severe blunt force trauma on victims as more kinetic energy must be absorbed. The effect is most pronounced for vulnerable road users who do not have protection.

[4] Kloeden et al., 1997. Speed and accident risk https://ec.europa.eu/transport/road_safety/specialist/knowledge/speed/speed_is_a_central_issue_in_road_safety/speed_and_accident_risk_en

Figure 5. Field of vision based on speed of motorist[5]



There is strong rationale that reducing operating speeds, particularly on arterial roadways, would result in the greatest reduced risk of serious injury and fatality for all road users, especially those who are more vulnerable. While arterial roads make up only 21% of the kilometers of roads in the city, 83% of collisions resulting in fatalities or serious injuries occur on these roadways. This is largely due to higher traffic volumes coupled with higher speeds on arterial roads, compared to local and collector roads. With a Vision Zero lens, an arterial's through traffic function is balanced with its mix of uses and with the way the adjacent land is accessed by vehicles and vulnerable road users. The road's layout and speed limit is designed accordingly. If eliminating serious injury and fatal collisions is going to be achieved, speed management efforts need to focus on arterial roads.

Studies have shown travel time is more dependent on congestion, roadway design and geometry factors, than on the posted speed limits[5]. Under medium congestion levels, where traffic is periodically able to travel at or near the speed limit, a lower speed limit may actually reduce overall travel time by allowing a smoother traffic rhythm because lower speeds reduce space required between vehicles[6].

Speed management is the most essential element for improving road safety for all road users, especially those who are most vulnerable. It is an active approach that requires (or persuades) drivers to adopt speeds that offer mobility without compromising safety. However, improving compliance with speed limits and reducing unsafe driving speeds are not easy tasks.

Vision Zero emphasizes that all design elements of the roadway convey to drivers the appropriate speed, promoting speed compliance in a sustained way. Due to the nature of their design, arterial roadways make it comfortable for drivers to drive at fast speeds. Studies have shown that simply reducing the signed speed limit on such roads is not an

[5] TRB (1998).TRB Special Report 254: Managing Speed - Review of Current Practice for Setting and Enforcing Speed Limit http://onlinepubs.trb.org/onlinepubs/sr/sr254.pdf

[6] Roger P. Roess, Elena S. Prassas and William R. McShane (1998), Traffic Engineering, Prentice Hall. https://civil808.com/sites/default/files/field/files/node_3951-roger_roess_elena_prassas_william_mcshane_trafbookzz.org_.pdf

effective way of reducing average operating speeds, but rather the likelihood of people travelling at very fast speeds drop significantly[7].

A Holistic Speed Management Strategy

Speed management aims to reduce the number of road traffic crashes and the serious injury and death that can result from them. Speed management requires the deployment of a range of integrated measures that include enforcement, engineering and education. The more widespread the measures and implementation of sanctions against speeding, particularly enforcement, the more compliance will result.
In order to achieve sustained, effective speed management, staff have developed a speed management strategy comprised of seven integrated speed reduction tools. These include:

1) Revised speed limit setting practices
2) Road design improvements
3) Enhanced police enforcement
4) Proactive deployment of Watch Your Speed signs
5) Speed limit reductions
6) Public education
7) Automated speed enforcement

The following subsections provide a brief overview of each component of the speed management strategy.

Revised Speed Limit Setting Practices
This policy emphasis is focused on *setting appropriate speeds based on the street's roadside context.* It involves driving speed reduction primarily on streets in residential or mixed-use areas, where there is a significant amount of traffic interaction with pedestrians and cyclists may be expected.

The traditional road engineering design and speed limit setting practices of designing streets to actual observed motor vehicle speeds regardless of the posted speed limit (commonly referred to as 85th percentile operating speed) is not suitable for the urban context and multi-modal environments where vulnerable road users interact/conflict with motor vehicles. A more context-sensitive approach is *target speed* - designing streets for the speed you intend drivers to go based on a street's specific roadside context, rather than operating speed.

Target speed considers road context factors such as driveway frequency, land-use, road classification, presence of sidewalks and cycling facilities, on-street parking, presence of vulnerable road users and collision history. By factoring in the level of multi-modal activity generated by adjacent land uses, both mobility for motor vehicles and a safe environment for pedestrians, cyclists, and public transit users- of all ages and abilities- are considered. The City's existing speed limit warrants already looks at most

[7] The Insurance Institute for Highway Safety (2019) found that lowering the speed limit by 5 mph on city streets in Boston by changing the default speed limit from 30 mph to 25 mph did not change the 85th percentile speed of 31 mph but rather the odds of speeding; resulting in a 29.3% decline in the odds of speeding for vehicles traveling faster than 35 mph

of these factors. That said, there is a need to revise the City's 30 km/hr, 40 km/hr, and 50 km/hr warrants to harmonize with the speed limit reductions we are recommending as part of Vision Zero 2.0.

Road Design Improvements
In order to manage travel speeds effectively, speed limits must be compatible with the design speed of the road. Research has shown that the design speed tends to have a greater effect on a driver's choice of speed than the actual speed limit. The design of streets and street retrofits that match the desired, target speed ensures that all design elements of the roadway convey the appropriate speed to drivers. By bringing the design speed in line with the target speed by narrowing lane widths, and adding roadside landscaping, speed humps, and curb extensions, operating speeds can be reduced; improving the safety and quality of the public realm and encouraging modal shift towards active transportation.

Reconstruction and resurfacing through the City's State of Good Repair program provide the most effective opportunities to reconfigure the roadway and rebuild with safety-related design modifications, and in some cases temporary geometric improvements can be implemented. The road design section of this report describes this approach in more detail.

Police Enforcement
Appropriately set speed limits must be enforced to be optimally effective. In the absence of infrastructure engineering treatments that force drivers to reduce their speed (such as speed humps) police enforcement is an integral part to ensure the conformity of a minority of drivers who will only obey traffic regulations if they perceive a credible threat of detection and punishment for noncompliance.

To utilize police enforcement efficiently, police can focus on targeting areas that are identified as hot spots for speed-related injuries or a high risk of crashes. The four offences most likely to cause death or serious injury to vulnerable road users include:

1. Speeding/ stunt driving offences
2. Driving with a hand held device/ distracted driving
3. Impaired driving offences
4. Aggressive driving offences

Toronto Police have started focusing on the big four traffic offences that are most likely to cause death or serious injury to vulnerable road users. Through this focus driver behaviour can be changed to prevent these serious collisions from occurring. Consistent enforcement of these violations provides police with the opportunity to share safe-driving messaging, making drivers aware that the choices they make can have a grave effect on them and other road users, especially the most vulnerable.

Proactive Deployment of Watch Your Speed Program
The Watch Your Speed Program (WYSP) involves the deployment of mobile radar speed display signs which are used to measure and display the speed of oncoming vehicles. They are electronic devices composed of a radar speed detector and an LED display, which are typically attached to poles or trailers installed on the side of the road,

facing oncoming traffic. These devices have shown to be effective in reducing the speed of traffic and reducing excessive speeding (over 10 km/h above the speed limit) over a long-term application[8]. Proactive deployment of these devices complements posted speed limit reductions, making drivers aware of their speed which has been shown to help correct driver speeding behaviour.

The City currently operates the WYSP, rotating 188 mobile radar speed display signs to locations within each ward on a monthly basis. The locations are selected based on complaints and requests from the public, Councillors, Transportation Services staff, and police. Moving forward, Vision Zero 2.0 recommends modifying the program to proactively deploy 50% of the units based on speed issues and KSI data and the remaining 50% will continue to be deployed at locations at the discretion of the local Councillor.

Speed Limit Reductions
In June 2016, City Council requested the General Manager, Transportation Services to report on the possibility, advisability and safety merit of requesting that the Province reduce default speed limits on roads and the potential savings that might be achieved from such a reduction.

On May 30, 2017, the Province of Ontario amended the Highway Traffic Act in respect to speed limits in municipalities. Although this legislative change does not give the City the authority to reduce the default speed limit within its boundary, it allows the City to designate areas through by-laws and prescribe a rate of speed that is lower than 50 km/h. It is recommended this authority be used to facilitate the implementation of lower speed limits on local roads.

In May 2018 City Council directed the General Manager, Transportation Services to report on the suitability of current speed regulations on all City streets and provide recommendations on new speed limits that would better align with the Road Safety Plan.

More recently in April 2019 the Infrastructure and Environment Committee requested the General Manager, Transportation Services to report back with recommendations on lower speed limits on strategic arterial, collector and local roads across the city.

Since approval of Vison Zero RSP in 2016, speed limits were reduced on 151 km of arterial roadways. Transportation Services will take the approach described below to further reduce the speed limits on the various classes of road, giving priority to arterial roads, where the highest number of KSI collisions happen.

All speed limit reductions will be accompanied by other components of the speed management strategy, such as Police enforcement, city wide education, WYSP where

[8] After 11 months of operation, the WYSP was found to be effective at: decreasing operating speeds, ranging from 1 km/h to 9 km/h; decreasing the number of vehicles travelling over the speed limit, ranging from 2.6% to 33.8%; decreasing the number of vehicles speeding excessively (greater than 10 km/h over the speed limit), ranging from 0.5% to 18.1%; increasing in the number of vehicles travelling near the speed limit; speed reduction effects were more pronounced at locations with higher initial operating speeds.

possible, and lane width modifications as a minimum for geometric improvements, where applicable.

- *Arterial and Collector Roads*
  Currently 375 Km of major arterial roads have a speed limit of 60 km/hr. Under Vision Zero 2.0 staff recommend that the posted speed limit on 249 Km of these roadways be reduced to 50 km/h, with some exceptions of roads around highways and industrial areas (see Attachment 12).

  Under Vision Zero 2.0, staff are also recommending that most minor arterial roads that currently have a posted speed limit of 60 km/h should have the posted speed limit reduced to 50 km/h and most collector roads that currently have the default speed limit of 50 km/h should have the posted speed limit reduced to 40km/h with certain exceptions, to be determined. Community Council has delegated authority over changes in speed limit on minor arterial roads. As such, separate reports identifying all minor arterial roads where the speed limits are proposed to be changed to 50km/h, will be submitted to the appropriate Community Council for by-law amendments. All reports should be submitted to Community Council by the end of 2020.

  Implementation is expected to take one to two years, starting in 2020 subject to funding and staff availability. Priority will be given to areas of high KSI collisions.

- *Local Roads*
  All local roads that have posted speed limit of 40km/h or higher are recommended to have the speed limit reduced to 30 km/hr, with local roads in non-residential areas being an exception. It is recommended that the City designate 30 km/hr local roads on a neighbourhood basis. The City is no longer required to sign every individual street but only the streets that enter and exit the designated area at the boundary of the designated area. A similar approach has been done in the City of Ottawa. To help identify these 30km/h neighbourhood zones, the gateway signage will be coupled with gateway pavement marking illustrating the 30 km/hr speed limit; a technique that is used commonly in other jurisdictions. Attachment 13 shows an example of a designated area.

  Community Council has delegated authority over changes in speed limit on local roads. As such, separate reports identifying the designated areas where the speed limit will be changed to 30km/h, will be submitted to the appropriate Community Council.

  Given that all of the local roads within the former Toronto and East York Community Council boundary already had the posted speed limit changed to 30km/h, only the areas that have been added to the Toronto and East York Community Council boundary as part of the new ward system will be included in this approach.

  Implementation is proposed to be done on a Ward to Ward basis over five (5) years, starting in 2021 until 2026, with priority going to wards with higher rate of

pedestrian and cyclists collisions on local roads. Table 4 below summarizes the approach to lower the posted speed limits in arterial, collector and local roads.

Table 4. Summary of Proposed Speed Limit Reductions

Road Classification	Proposed Change	Process	Implementation
Major Arterial	60 km/h to 50km/h	Vision Zero 2.0 Report	2020-2021
Minor Arterial	60 km/h to 50km/h	Future reports to appropriate Community Councils by end of 2019	2020-2021
Collector	50 km/h to 40km/h	Future reports to appropriate Community Councils by end of 2019	2020-2021
Local	50 km/h or 40km/h to 30km/h	Future reports to appropriate Community Council	2021-2026+

Public Education

Drivers tend to underestimate the risks involved with speeding and they often perceive the benefits as outweighing the consequences. Broadly-reaching public education campaigns are needed to increase public awareness of speeding as a traffic safety issue and change driver attitudes towards this risk. Then to change driver behaviour most effectively, speed limit reductions need to be coupled with aggressive education and enforcement campaigns. The Education and Engagement section of the Vision Zero 2.0 plan provides a framework of the planned future initiatives designed to bolster road safety.

Automated Speed Enforcement

Automated speed enforcement (ASE) has been found to be an effective strategy in reducing vehicle speeds, reducing collisions resulting in fatalities or serious injuries and reducing the overall number of collisions[9]. It augments the work of police officers, especially when placed in speed-related collision hot spots, in a sustained and equitable way by broadly enforcing safe speed across all road users.

On May 30, 2017, the Province passed legislation allowing municipalities to use ASE in School Zones and Community Safety Zones. Enabling regulations required to implement ASE have not yet been enacted by the Provincial government. Under the direction of Council, city staff have been working with the Ministry of Transportation, the Ministry of the Attorney General, and other partnering municipalities to jointly develop this program and a report will be brought forward regarding implementation.

[9] Delaney et. al. (2005) Controversies and Speed Cameras: Lessons Learnt Internationally. Journal of Public Health Policy. Blais, E. and Carnis, L. (2015). Improving the safety effect of speed camera programs through innovations: Evidence from the French experience. Journal of Safety Research

Pedestrian Safety Corridors

In 2018 an additional 10 Pedestrian Safety Corridors were identified based on further data analysis. Seven of these corridors require reductions in speed limits and are listed in Table 5 below.

Table 5. Speed Limit Changes Associated with Pedestrian Safety Corridors Identified in 2018

Street	From	To	Speed Limit Reduction [Current/Proposed]
Yonge St	Broadway Ave	Eglinton Ave	50/40
Bathurst St	St Clair Ave W	Briar Hill Ave	50/40
Victoria Pk Ave	Lawrence Ave	Dawes Rd	60/50
Kennedy Rd	Lawrence Ave	Clair Ave	50/40
Eglinton Ave	Kennedy Ave	Kingston Rd	60/50
St Clair Ave W	Runnymede Rd	Dufferin St	60/50
Dufferin St	Eglinton Ave W	Geary Ave	50/40

The following three segments were also identified as Pedestrian Safety Corridors, however these segments already have a posted speed limit of 40 km/hr and do not warrant further speed limit reductions:

- Jameson Ave / Landsdowne Ave, from Dundas St W to Springhurst Ave
- Bay St, from Queens Quay to Queen St
- Sherbourne St, from Bloor St E to Queens Quay

The speed limit reductions and a range of other safety measures such as pavement marking improvements and signal retiming for these safety corridors will be rolled out in 2019.

Vision Zero 2.0 Focus Action: Road Design Improvements

This Vision Zero focus action covers the six following areas:

- Implementation of geometric road safety modifications
- Alternative approaches to delivering the Traffic Calming program
- Measures to complete the sidewalk network
- Improved night-time visibility
- Cultural corridors safety review
- Community safety zone designations

Implementation of Geometric Road Safety Modifications

In May 2018, City Council directed the General Manager, Transportation Services to report on an accelerated process, including costs, to design and reconfigure streets to promote safety and adherence to the City's speed regulations.

More recently in April 2019, the Infrastructure and Environment Committee requested the General Manager, Transportation services to report back with recommendations on appropriate, safer road design, including protected intersections.

Historically the design of arterial roadways, particularly in the suburbs, were originally intended only for automobile travel and not for use by pedestrians and cyclists. This type of environment encourages speeding above the posted speed limit.

Geometric modifications to the design of the road are known to be one of the most effective ways of achieving the intended target speed for the context and improving road user behaviour. Modifications to the geometry of the road, however, are costly and take several years to plan, design, coordinate and deliver. Given the length of kilometers of roads we need to improve, this is going to take several decades to achieve.

The most effective opportunity to modify the design of a road is during road reconstruction. A road reconstruction is undertaken when a road has reached the end of its lifespan and short term repairs or resurfacing is no longer adequate. During reconstruction, the full foundation and asphalt surface is completely rebuilt. Arterials and collectors are typically considered for reconstruction every 50 years. Collector roads and Local roads may be reconstructed once every 75-100 years.

Road reconstruction presents a once in a lifetime opportunity to reconfigure the roadway and rebuild with an improved design. When roads are reconstructed, Transportation Services often “bundles” improvements such as lane width modifications, curb radius reductions, curb extensions, intersection normalizations and right-turn channel removals.

While full reconstruction of a road presents the greatest opportunity for design modifications, road resurfacing can also present some opportunities for safety changes such as lane width modifications and curb radius reductions. Roadways are typically resurfaced every 20-25 years.

When road reconstruction and resurfacing is programmed potential road safety design modifications include:

- Right-sizing travel lane widths and roadway widths to meet target speeds for the street’s context including allocation of excess roadway width to other uses;
- Curb extensions and rightsizing intersection corners to improve visibility, reduce speed of turning vehicles and reduce crossing distances and exposure of vulnerable users to vehicles in the roadway; and
- Providing separation between different users (e.g., cycle tracks) and increasing level of separation with increasing speeds.

Since the Vision Zero RSP was approved in 2016, geometric safety improvements have been made at 31 locations across the city with another 14 locations planned for completion in 2019.

Vision Zero 2.0 places a greater emphasis on a proactive process in the following areas:

- Undertake geometric safety improvements as a part of planned road resurfacing and reconstruction, or on a standalone basis; and
- Developing a program for implementing interim geometric modifications in advance of planned permanent modifications through the use of paint, bollards and other temporary features.

Candidate locations for road design improvements are selected based on analysis of historical traffic collision patterns, outcome of fatal collision reviews, unsafe road characteristics based on local knowledge of staff and Councillors, and bundling opportunities with planned resurfacing and reconstruction projects.

Improvements to Delivery of Traffic Calming

In December 2018 City Council requested the General Manager, Transportation Services to report on the feasibility and financial implications of establishing a contract open year-round to expedite the procurement and installation of traffic calming measures.

Current procedures require staff to ensure all unit quantity estimates in tender documents are reasonably accurate. To accomplish this mandate, Transportation Services only includes approved and known locations within its traffic calming contracts. These approved and known locations are all individually quantified and totalled into the final quantity estimate which is included in the tender documents for bidding. This approach is consistent with the Auditor General's recent recommendations to move our contracts to firm locations and estimates in all tender documents.

Transportation Services will explore the option of an open year-round contract in 2020, as requested by Council. Moving towards an open year-round contract would decrease the accuracy of unit quantity estimates because the locations and number of installations approved in a given year are unknown. The financial impact of these changes and efficiency of the installation would be evaluated and will inform a way forward for future procurement. The contract would be subject to budget availability, construction season, and weather.

Missing Sidewalk Installations on Local Roads

Why Sidewalks Matter
Provision of safe, comfortable and accessible sidewalks on all public streets is a fundamental objective of Vision Zero 2.0 as sidewalks support safety, accessibility, affordable transportation, physical activity, safe routes to school, aging in place and sustainable growth.

From a safety perspective, sidewalks provide:

- Safety. Sidewalks offer a protected, dedicated space for all pedestrians. This is especially important for vulnerable pedestrians and when visibility is poor (i.e. weather events; dark).
- Universal accessibility. Sidewalks are a fundamental requirement for an accessible city. They must be free of all barriers, safe, convenient, direct and comfortable for persons of all ages and abilities.
- Safe routes to school. Walking to school develops lifelong active habits and has been shown to improve learning.
- Traffic calming. Sidewalks can also help to calm fast-moving traffic by narrowing the roadway. The City of Toronto's Traffic Calming Policy states that on streets where there are no sidewalks, the installation of sidewalk on at least one side of the street must have first been considered.
- Aging in place. Sidewalks support gentle exercise for older adults and provide safer access to local amenities such as shops and recreation. This is critical for those older adults who do not drive, and who may feel vulnerable as pedestrians without sidewalks.

Current Sidewalk Installation Program

In 2002, City Council adopted the “City-Wide Program for Provision of Essential Sidewalk Links” report, including an annual budget of $2.1M to construct new sidewalks. The report prioritizes missing sidewalks as a Health and Safety initiative within the Capital Budget and states that sidewalks should be provided on arterial and collector roads, where pedestrian and vehicle volumes are the highest and to consider sidewalks on local roads “by request”.

Since the adoption of the 2002 report, the City has built approximately 90 km of new sidewalks, the majority of which have been on arterial and collector roads. Today, only 6% of Toronto's nearly 1900 km of arterial and collector roads remain without a sidewalk on at least one side.

Installing sidewalks on local roads

Local roads remain the largest gap in the walking network and generate the highest number of requests from the public to complete missing links. Nearly one-quarter of all local roads in Toronto, or 800 km, are without a sidewalk, as illustrated in Table 6 below.

Table 6. Local Roads without Sidewalks

District	**Without Sidewalks(kms)**	**Total Local Roads(kms)**	**% Without Sidewalks**
Etobicoke -York	259	992	26
North York	299	884	34
Toronto and East York	41	622	7
Scarborough	190	793	24
City of Toronto	788	3,291	24

Most local roads have residential land uses, with some serving industrial or employment areas. They connect the final stages of many trips to work, home, transit, schools, parks, recreation centers, libraries, places of worship, shops and the wider pedestrian network. In locations where sidewalks are missing, pedestrians have no alternative but to walk on the roadway or on unimproved road shoulders. In winter months when the roads are icy, pavement width is narrowed due to snow, and daylight hours are reduced, the walking conditions on such roads are unfavourable. As such, providing sidewalks on local roads is vital to enhance safety and accessibility.

The 2002 Essential Sidewalk Links Report indicated that when requests are received from the public to add sidewalks to local roads, community support is needed. This has been in the form of sign-off from the Ward Councillor after input from local residents. Since 2002, local Councillors have taken a variety of approaches to consultation including polls on one or both sides of a street, online surveys, community meetings or, in some instances, the local Councillor independently approves or denies the proposed location.

In the majority of instances, a local road sidewalk project does not proceed based on lack of support from the directly affected residents. Objections typically include:

- the loss of additional driveway parking
- the loss of hard or soft landscaping or mature trees
- perception of a loss of neighbourhood character ('rural' feel)
- perception of reduced home value
- perception that “outsiders” will use the street, and
- desire for traffic calming, but opposition to sidewalks.

Installing Sidewalks on all Local Roads as part of road reconstruction
The most effective opportunity to install sidewalks is during road reconstruction which takes place every 75-100 years for local roads. The additional cost of implementing sidewalks when "bundled" with a road reconstruction is negligible.

When reconstructing the road, sidewalks can more easily be added within the existing right of way, often even within the existing road pavement width, thus reducing impacts to existing frontages. Roads and sidewalks can also be re-aligned to minimize the impact on mature street trees, or other infrastructure which can be costly to relocate. Where a tree cannot be protected as a result of the addition of a sidewalk, plan to replace and enhance the local tree canopy is developed with consultation from abutting properties and Forestry staff.

Prioritizing all other sidewalk installation requests and resurfacing on local roads
The City of Toronto receives 80-100 requests per year to build sidewalks where they are missing – mostly on local roads. These are investigated for technical feasibility.

When requests for sidewalks are received on local roads it is recommended that City staff review and prioritize each request according to the following considerations:

- Safety issues (e.g. collisions, poor sight lines, clear desire paths);
- Land-use context (e.g. nearby schools, parks, community centres, senior facilities, and businesses);

- Areas where users are more dependent on walking as a main mode of transportation or to access transit;
- Network connectivity (e.g. presence of sidewalks on one side already, connection to existing sidewalks and the pedestrian network);
- Traffic operations (e.g. transit routes, traffic volumes, and on-street parking);
- Funding availability and opportunities for bundling with capital programs (e.g. resurfacing);
- Soft and hard landscaping (e.g. shrubs and hedges, trees, boulders, etc.) and impact to abutting property owners; and
- Technical feasibility and cost of implementation (e.g. grading, drainage type (curb or ditch), utilities (poles, chambers, boxes) and topography.

The City sometimes receives requests for sidewalks on local roads in order to accommodate a person with a disability. These infrequent occurrences should be accommodated in order to provide vulnerable users safe and accessible infrastructure. Therefore it is recommended that staff be granted authority to install sidewalks if requested for a person with a disability. These requests will be reviewed according to current applicable legislation and policies with appropriate installation taking place.

It is sometimes possible to add missing sidewalks to the scope of a road resurfacing project depending on the technical feasibility. When road resurfacing is programmed, city staff review each location for potential sidewalk installation according to the above criteria, similar to sidewalk requests.

The Missing Sidewalk Installation Policy recommended in this report stipulates that City staff program sidewalk installations according to the above prioritization, and prepare an annual report to the Infrastructure & Environment Committee with recommendations for implementing local road sidewalks that are not being installed in a reconstruction. Attachment 14 outlines the recommended amendment to Procedural Bylaw Chapter 27 to conform with the Missing Sidewalk Installation Policy.

When sidewalks are being designed on residential local roads, City staff will consult with abutting property owners on the proposed design and alignment. Such consultations are an opportunity to also address individual concerns, e.g. driveways and landscaping. The final design will be based on the ideal alignment and public input. Public meetings will continue to be held by the delivery partner, Engineering and Construction Services, in line with their on-going practice.

Improved Night-time Visibility

Data shows that there is a disproportionate number of KSI collisions in dark conditions. While vehicular traffic in dark conditions (period of time after sunset and before sunrise) accounts for 36% of total daily traffic, almost 45% of KSI collisions occur during these times. Reduced visibility in low light conditions is speculated to be one of the main contributors to this disparity. Other contributing factors may be increased prevalence of speeding overnight due to free flow conditions, or the concept of "safety in numbers", whereby motorists make safer choices in the presence of higher volumes of pedestrians and cyclists during the busier times of the day, when drivers expect to see people walking and cycling.

Partnership with Toronto Hydro
As a part of Vision Zero 2.0 Transportation Services will work with Toronto Hydro to meet illumination standards and target lighting level enhancements at high-priority locations where historically a disproportionate amount of KSI collision have occurred during the night time. In addition, through a systemic road network analysis, factors that contribute to night-time collisions should be identified and proactive illumination improvements should be introduced at locations that share these attributes.

Enhancement can include re-lamping and repairs of existing light fixtures in addition to introduction of additional light fixtures where the need is identified. The second component is a longer term initiative since introduction of hard infrastructure such as light posts involves extensive civil work. Opportunities can also be identified through planned road reconstruction projects in order to coordinate such civil infrastructure improvements.

Staff in Transportation Services can provide a list of high priority locations to Toronto Hydro on an annual basis and will work with them to enhance the collaboration process. Staff will also investigate the possibility of conducting city-wide light level assessments in order to identify locations where lighting levels may need enhancements.

Cultural Corridor Safety Reviews

In the Downtown Plan (OPA 406), Cultural Corridors are defined as, "Historically and culturally significant streets that anchor important arts, entertainment and new media cultural resources Downtown. The corridors contain a variety of cultural and heritage destinations in a variety of scales, that welcome residents and tourists to gather and interact."

In June 2018, City Council directed the General Manager, Transportation Services to increase the level of road safety along the City's designated Cultural Corridors and review this against data driven priorities and report back on the status and additional steps necessary to achieve this higher level of road safety.

Transportation Services has recently retained an engineering consultant to conduct safety studies on seven Cultural Corridors. These corridors are outlined in Attachment 15.

The findings and recommendations of the safety reviews will inform Transportation Services in the planning and delivery of capital projects in the next few years, as well as identity any immediate safety deficiencies and improvement opportunities that may be addressed in the short term.

Community Safety Zone

In 2018, City Council lifted the moratorium on the creation of new Community Safety Zones (CSZ) and designated the frontages of more than 754 elementary (kindergarten to grade 8) TDSB and TCDSB schools within the City as CSZ in order to help reduce aggressive driving and speeding in areas within the City that have higher concentrations of school children. By doing so, these zones are assured to be eligible for automated

speed enforcement under the Highway Traffic Act in the event an enabling regulation is enacted by the Province, while providing the immediate benefit of speeding fines being doubled along these key walking and biking routes to schools. The implementation of CSZ at TDSB and TCDSB elementary schools is expected to be completed by the end of 2019.

Under Vision Zero 2.0, the designation and implementation of Community Safety Zones will expand to all other remaining elementary schools in the City and TDSB and TCDSB secondary schools.

Vision Zero 2.0 Focus Action: Addressing High Risk Mid-Block Crossings

In April 2019, the Infrastructure and Environment Committee requested the General Manager, Transportation services to report back with recommendations on introducing more mid-block crossings.

Every year about 62 pedestrians are killed or seriously injured while crossing mid-block. More pedestrians are killed or seriously injured in this type of collision than any other collision scenario in the City of Toronto. Mid-block collisions account for 40% of pedestrian KSI collisions and 9% of cyclist KSI collisions.

The term 'mid-block crossing' in this report covers all crossings at uncontrolled locations, whether mid-block, or crossing a major road at an unsignalized intersection.

A pedestrian or cyclist might choose to cross mid-block for a combination of a number of factors. These include presence of transit stops or specific land uses (e.g., shopping/retail) situated on either side of a roadway, long walking distance or difficult walking conditions to access the nearest signalized crossing.

Older adults and persons with disabilities are more negatively affected by the dangers of mid-block crossings as their mobility limitations and inability to walk long distances may compel them to cross mid-block. An additional 400m in walking distance to a traffic signal can take about 6 minutes by an able bodied person, or up to 10 minutes by a person with disabilities.

Not all mid-block crossings are considered high risk. A combination of some of the following factors can contribute to making mid-block crossings prone to high risk collisions:

- Multiple lanes of traffic
- High operating speeds
- Limited visibility and inadequate sightlines

Vision Zero 2.0 strategies to address high-risk mid-block crossings include:

- **Updated traffic control warrants**
  Transportation Services will apply the newly developed contextual assessment checklist as part of all traffic signal investigations. This contextual assessment includes consideration of road width, posted speed limit, operating speeds, adjacent land uses (including new development in the area), pedestrian desire

lines and demographics, presence of a transit stop, sight lines, and distance between existing signalized crossing opportunities. This will result in the installation of new signals that may not have been previously warranted.

- **TTC stop consolidations**
  Given that the presence of TTC stops at mid-block locations may encourage mid-block crossing behaviour, stop consolidation, the practice of removing a stop from service, is used to reduce motivations for mid-block crossings.

  Stakeholders representing pedestrians with disabilities have raised concerns with the practice of stop consolidation due to the additional walking distance resulting from this practice. TTC currently uses a comprehensive approach in investigating each stop location and engages in proactive communication with community stakeholders to solicit public feedback on major changes to stop locations.

  Stop consolidation reviews, led by the TTC, and assessment of new mid-block signalized crossings, led by Transportation Services, need to be considered in concert in order to maximize safety and minimize impact to people with disabilities. Under Vision Zero 2.0 the process of collaboration and communication between Transportation Services and TTC will be enhanced in order to achieve this goal.

- **A systemic review of high-risk mid-block segments**
  A network-wide review will be conducted in order to proactively identify mid-block segments prone to high-risk mid-bock collisions and develop appropriate solutions for these segments. This will likely include longer segments along wider and higher speed arterials.

- **Review of Pedestrian Refuge Islands**
  The City is undertaking a study to review all existing Pedestrian Refuge Islands (PRI) to determine which locations should be considered for conversion to either PXOs or mid-block signalization. In addition, selection and design criteria will be developed for any new pedestrian refuge islands in the future.

Review of Traffic Signal Wait Times for Pedestrians
Eight percent of head-on collisions between motor vehicles and pedestrians at signalized crossings each year occur when the pedestrian crosses without the right of way. Long wait times for pedestrians at signalized crossings may contribute to prevalence of signal non-compliance. At suburban traffic signals with cycle lengths of up to 140 seconds, pedestrians may have to wait over a minute for the Walk signal. A long wait time can contribute to a pedestrian choosing to cross against the red light if they find a gap in traffic.

As part of Vision Zero 2.0, Transportation Services will conduct a study to investigate the impact of long traffic signal wait times on pedestrian signal compliance and formalize guidance on suitable wait times and the resulting cycle length in addition to employing more responsive signal features.

Vision Zero 2.0 Focus Action: Addressing Left Turn and Right Turn Collisions

After mid-block crossings, left turn collisions at signalized intersections are the second most prevalent type of KSI collisions involving pedestrians (18%) and cyclists (8%). Right turn collisions at signalized intersections are responsible for 6% of pedestrian and 12% of cyclists KSI collisions. Left turn collisions with vulnerable road users are typically more dangerous compared to right turn collisions because drivers have picked up more speed by the time impact occurs.

Pedestrian and Bicycle Head Start Signals

Pedestrian head start signals, also known as Leading Pedestrian Intervals (LPI), are one of the most effective[10], low cost safety features applicable to signalized intersections for addressing left turn collisions with pedestrians. LPI is a feature of a traffic signal that provides pedestrians with the opportunity to begin crossing the street before vehicles are permitted to proceed by delaying the green signal. This allows pedestrians to establish a presence in the crosswalk, which increases the visibility of pedestrians to drivers, and thereby reduces conflicts with turning vehicles.

A bicycle head start signal, also known as Leading Bicycle Interval (LBI), operates in the same manner as an LPI and provides similar safety benefit in reducing conflicts between turning vehicles and cyclists[11].

LPIs are a feature of 94 of the City's 2300 signalized intersections, with plans for implementation at an additional 100 in 2019. Currently, Transportation Services uses a reactive approach for selecting locations for LPIs.

Under Vision Zero 2.0, staff are developing a proactive approach for application of LPIs as a default safety feature for the majority of existing and new signalized intersections across the City, where feasible. The additional 5 seconds of pedestrian head start could have a negative impact on overall intersection operations and the screening process takes this into consideration.

Large scale roll out of LPIs will require modifications at hundreds of traffic signals. Implementation will be phased over the next several years and priority will be determined based on a systemic review of the traffic signal network and intersection conditions in addition to coordination with planned corridor traffic signal reviews as a part of the Congestion Management Plan.

In the short term, LBIs will be implemented at all traffic signals with LPIs where dedicated bicycle-specific signals are already in operation. This is a technical requirement based on the Highway Traffic Act for application of LBIs. This feature will also be considered at all signalized intersections along a cycling corridor with bicycle-

[10] Studies across North America have shown that LPIs can reduce pedestrian-vehicle collisions by 20% to 60%. Goughnour et al. (2018) "Safety Evaluation of Protected Left-Turn Phasing and Leading Pedestrian Intervals on Pedestrian Safety", FHWA, Fayish & Gross (2009) "Safety Effectiveness of Leading Pedestrian Intervals Using the Empirical Bayes Method", Transportation Research Records.

[11] Data is not available on effectiveness of LBIs as they are a relatively new practice, but it is speculated that they would have similar levels of safety benefits

specific signals. In the longer term, intersections with dedicated cycling facilities will be assessed from a safety perspective and bicycle-specific signals will be added at select locations in order to make LBI application possible.

Right Turn on Red Prohibitions
Right-turn-on-red prohibitions protect pedestrians and cyclists at intersections by restricting vehicles facing a red signal from turning right across the path of pedestrians or cyclists having the right-of-way. Historically about 2% of pedestrian KSI collisions and 4% of cyclists KSI collisions have been with right turning vehicle turning on a red signal. This suggests that conflicts between right turning vehicles during the red signal and pedestrians or cyclists is not a systemic issue across the entire network. However, prohibiting right-turns-on-red is an effective tool in the safety toolbox for locations with particular collision patterns.

Under Vision Zero 2.0 Transportation Services, through a consultant assignment, is assessing strategic implementation of RTOR prohibitions. This includes an assessment of historical collision patterns and conflicts between right turning vehicles and pedestrians/cyclists in addition to prioritizing skewed intersections where sightlines for right turning drivers are a common concern.

Expanding the Toolbox
Future studies will investigate safety benefits of additional countermeasures for addressing collisions with turning vehicles. These include:

- *Fully protected signal turn phases*
  This signal feature separates the movement of pedestrians and vehicles by permitting turns only during a dedicated turn phase when all other conflicting directions of traffic, including pedestrians, are stopped. This eliminates potential safety conflicts. This is in place at about 20 intersections across the city.

  While this feature has safety benefits, it results in reduced intersection capacity and increased vehicular and transit delay. Transportation Services will conduct a review of the criteria for adding fully protected turn phases with the lens of vulnerable road user safety. The revised criteria will aim to provide guidance on the trade-offs between safety and vehicular delay. The development of the revised criteria will be followed by a systemic review of all traffic signals in order to identify locations that could benefit from safety improvements with this feature.

- *Left turn calming*
  High speed left turns are particularly an issue at wider suburban intersections where more speed can be picked up as a driver is completing a left turn at a relatively wide radius. Left turn calming treatments encourage left turning drivers to approach a crosswalk at a sharper angle, resulting in slower turning speeds and better visibility of pedestrians in the crosswalk and cyclists on the road[12]. Transportation Services will pilot left turn calming treatments and evaluate their impact on mitigating safety risks associated with left turns. Applicability of such

[12] Left turn calming treatments implemented widely in New York City have been found to slow down left turning vehicles by 20%.

treatments depends heavily on the layout and operation of each individual intersection.

Vision Zero 2.0 Focus Action: Enhanced Police Enforcement

Aggressive and distracted driving contribute to 44% of all fatal collisions and 52% of KSI collisions. The four offences most likely to cause death or serious injury to vulnerable road users include:
1. Speeding/ stunt driving offences
2. Driving with a hand held device/ distracted driving
3. Impaired driving offences
4. Aggressive driving offences

There is a strong correlation between the significant drop in police enforcement efforts starting 2011 and increase in traffic fatalities in Toronto. As such, addressing aggressive and distracted driving through enforcement is likely to result in significant improvements in road safety.

In May 2018 Council adopted recommendation to request the Toronto Police Services Board to request the Chief of Police to provide necessary resources to adequately enforce the Highway Traffic Act in Toronto's neighbourhoods.

The City's Traffic Assistant Personnel pilot in 2016 involved deploying Paid Duty officers key congested intersections in the downtown core. Evaluations showed that during the time when officers were not present, there were increased incidents of intersection blockage by vehicles.

TPS previously had a larger complement of dedicated traffic enforcement officers that was initiated in 2003 as part of the Strategic Traffic Enforcement Measures (STEM) Team. The team was proven to be successful in reducing traffic deaths, non-life threatening injuries and collisions at key locations. During the first year after the activation of the STEM team, there was a 26% reduction in the number of fatal collisions.

Due to budget pressures and changes in priorities in the organization, the capacity of the Traffic Services Unit has been reduced significantly over the years.

Under Vision Zero 2.0 Transportation Services capital budget will pay Toronto Police Services to run a two year pilot for additional officers in the Traffic Services Unit that will target priority areas identified by Vision Zero Road Safety Plan in order to evaluate the effectiveness of this program in changing driver behaviour and preventing serious collisions through traffic enforcement. Officers would be strategically deployed to high-risk locations based on collision data, targeting areas that are identified as hot spots for speed-related injuries or a high risk of crashes.

Vision Zero 2.0 Focus Action: Education and Engagement Plan

Effective, coordinated, and integrated communication is integral to achieving the objectives of the Vision Zero Road Safety Plan. This section outlines the education and

engagement efforts staff have accomplished since 2016 and provides a framework of the planned future initiatives designed to bolster road safety.

The overarching goals of the education and engagement component of Vision Zero programming are informing and consulting with the public, building support for infrastructure improvements, and instituting a shift in social norms and road user behavior. This component also aims to consolidate all communication efforts undertaken by Transportation Services and its partners, namely Toronto Police Service, Toronto Public Health, the Toronto Transit Commission, the Toronto District School Board, and the Toronto Catholic District School Board.

Summary of Education an Engagement Accomplishments
Transportation Services has employed a variety of education and engagement initiatives in support of Vision Zero. Descriptions of the following initiatives are included in Attachment 16. Below is a brief summary.

- Jan 2017: Vision Zero overview video
- March 2017: Vision Zero overview brochure
- March 2017: Safety Guide for Pedestrians
- July 2018: Safety Guide for School Children and Parents
- Sept 2018: Protected intersections flyer
- Jul–Oct 2018: Bicycle safety campaign
- Nov–Dec 2018: Art of Distraction campaign
- Nov 2018: Active and Safe Routes to School pilot project
- Nov 2018: New Vision Zero webpage and mapping tool
- Jan–Feb 2019: School Safety campaign

The Art of Distraction campaign was one of the key highlights of the Division's efforts in this area. Launched in late 2018, Art of Distraction was an awareness campaign that aimed to bring public attention to road safety by showcasing real stories of tragedy and loss on Toronto's streets.

The campaign was intended to advance the education component of Toronto's Vision Zero Road Safety Plan. It was featured at key transit shelter locations and was promoted through radio spots, print and digital media ad placements, and social media posts.

In January 2019, City staff concluded a research survey to evaluate the effectiveness of the campaign and gather baseline data that can be used to measure and track changes in behaviours about road safety and distracted driving among residents.

Below are the key findings based on 1,500 responses:

- Overall, four-in-ten respondents recall reading or seeing ads that promote road safety in Toronto.
- There was strong agreement that the ads were easy to understand, were aimed at everyone on the road, effectively caught one's attention, and were effective at making people aware of the dangers of distracted driving.

- Overall, two-thirds of residents ranked road safety as an important problem, with 15% reporting it is the "most" important problem.
- Aggressive or distracted driving behavior and road user attitudes are considered the top two key issues affecting the safety of Toronto roads.
- Three-in-ten residents reported being aware of Toronto's Vision Zero Road Safety Plan.

Overview of Upcoming Initiatives
Under Vision Zero 2.0, over the next five years, Transportation Services intends to adopt a comprehensive framework for road safety education and engagement that builds on previous accomplishments, expands the scope of the plan's communication strategy, and consolidates all the communication efforts jointly undertaken by partners.

Upcoming initiatives would include:

- Public awareness campaigns such as billboard, media messages and creation of a joint road safety calendar with all Vision Zero partners.
- Education, outreach, and advocacy efforts such as training for taxi and vehicle-for-hire drivers and improve safety literacy by creating targeted education resources in different formats.
- Collaboration efforts such as deploy joint TS/TPS/TPH Vision Zero street teams to neighbourhoods with historically high KSI collisions.
- Conducting research and data analysis to inform education and engagement efforts

Internal Staff Education and Training
In addition to public facing education efforts described above, Vision Zero 2.0 will put greater emphasis on institutionalizing this change internally within Transportation Services.

All City staff who drive for work purposes must acquire a City driving permit by passing a one day in-class and on the road training and assessment of their driving skills. This training focuses on safety of the driver, as well as other road users. In order to enhance this driving skills training to achieve a culture shift, as of April 2019, all Transportation Services staff with a City driving permit are required to complete an additional driver simulation training with the goal of helping them make better decisions on the road and protect all road users.

Review of Traffic Warrants

Traffic warrants for various measures have historically put a low emphasis on safety considerations with higher regard to maintaining efficient traffic flow.

In December 2016, City Council requested that Transportation Services review the current warrants for traffic control measures, in order to identify changes that can be made to enhance the safety of all road users, particularly vulnerable road users such as pedestrians, school children, and cyclists. This is in light of a pattern that the existing process for traffic control measure investigations often result in locations of concern not meeting the established warrants.

Changes to the Traffic Calming Policy have recently been addressed through the recommendation in the PW29.6 Next Steps on Traffic Safety Measures report, adopted with amendments by Council on May 22, 2018. Changes included the following:

- Reduce the required polling response rate from 50-percent-plus-one to 25-percent in Community Safety Zones and School Safety Zones;
- Permit the General Manager, Transportation Services to report directly to Community Council, notwithstanding the requirements for an initial petition, on recommended traffic safety measures within School Safety Zones and Community Safety Zones contiguous with School Safety Zones, including speed changes and road alterations; and
- Delegate to Community Councils the authority to waive petition and polling requirements for traffic calming measures.

The following warrants and policies for traffic control measures have also recently been assessed:

- Traffic Control Signals;
- Pedestrian Crossovers (PXO);
- All-Way Stop Control;
- Zebra Crosswalk Markings;
- Pedestrian head start signals, also known as Leading Pedestrian Intervals (LPI); and
- School Crossing Guards.

A summary of recommended changes is provided in Table 7 below. Of the recommended changes, only the proposed modifications to the Zebra Crosswalk policy require Council endorsement.

Table 7. Summary of Recommended Warrant Changes

Traffic Control Measure	**Existing Warrant/Policy**	**Proposed Changes**	**Expected Impact**
Traffic Control Signal (TCS)	Ontario Traffic Manual Book 12 - Traffic Signals	Ontario Traffic Manual Book 12 - Traffic Signals AND Contextual Assessment	Future staff assessment of the need for a TCS may result in a TCS being recommended despite not meeting the numerical warrant.

Traffic Control Measure	Existing Warrant/Policy	Proposed Changes	Expected Impact
Pedestrian Crossover (PXO)	City of Toronto PXO Warrants AND Review of Environmental Safety Characteristics	Ontario Traffic Manual Book 15 - Pedestrian Crossing Treatments AND Review of Environmental Safety Characteristics	With the lowered thresholds for pedestrian crossing volumes a higher number of locations are likely to meet the PXO warrant. Staff may recommend a TCS at many of these locations instead based on review of Environmental Safety Characteristics.
All-Way Stop Control (AWSC)	City of Toronto AWSC Warrant	Add: New factor of 2 for All Pedestrians	Future staff assessment of the need for an AWSC may result in more locations meeting the warrant.
Zebra Crosswalk Markings Policy	Applied at: - Signalized crossings - Pedestrian crossovers	Add: Application at Stop-controlled intersections in: - Pedestrian Safety Corridors - School Safety Zones - Senior Safety Zones - Locations where safety is an issue	Increased pedestrian visibility at high priority stop-controlled intersections.
Leading Pedestrian Interval (LPI)	City of Toronto Pedestrian Interval (LPI) Assessment and Implementation Guidelines	Screening methodology is currently under development for proactive application of LPIs at majority of traffic control signals, where feasible.	Application of the LPI feature at majority of traffic control signals.

Traffic Control Measure	Existing Warrant/Policy	Proposed Changes	Expected Impact
School Crossing Guard	School Crossing Guard Warrant	All new requests received for the July 31, 2019 submission deadline will be assessed based on improved methodology that incorporates Vision Zero criteria.	School Crossing Guards will be considered alongside other suitable safety improvements to address particular safety concerns at each individual location.

Attachment 17 further outlines the results of this review and the changes that Transportation Services will be making to the warrants that are within the Division's authority.

Expansion of the Red Light Camera Program

About 7% of pedestrian KSI collisions are caused by red light running.

In June 2018, City Council directed the General Manager, Transportation Services to evaluate the feasibility of significantly expanding the Red Light Camera program.

More recently in April 2019 the Infrastructure and Environment Committee requested the General Manager, Transportation services to report back with recommendations on significantly increasing the number of red light cameras.

In response to this direction staff are in the process of developing a Request for Proposal to be issued later this year to procure additional resources to double the number of Red Light Cameras from 149 to 298. Roll out of new cameras will begin in the first quarter of 2020.

Staff will also be improving and expanding the selection criteria for Red Light Camera locations in order to give a greater emphasis to vulnerable road users. This includes applications at mid-block pedestrian or bicycle-only traffic signals and greater considerations for historical pedestrian and cyclist collisions.

City Fleet Vehicle Safety

In July 2016 Council requested a report on the feasibility of implementing side guards on City trucks and developing a side guard policy related to the businesses the City works with through contracts. More recently in June 2018 Council directed Transportation Services to undertake a study of the availability and suitability of smaller municipal trucks as well as the use of truck guards.

Faculty at the University of Windsor, completed this study earlier this year for Transportation Services. The findings of this study are summarized below:

- Commercial and municipal trucks have a large role to play in the safety of vulnerable road users. Results of the analysis of collisions between 2007 and 2017 revealed that trucks are disproportionately involved in pedestrian and cyclist fatalities than non-truck vehicles. Based on this data, the study found that 38% of collisions between pedestrians and trucks resulted in the death of the pedestrian, as compared to 16% of collisions with non-trucks. Similarly, 13% of collisions between cyclists and trucks resulted in the death of the cyclist, as compared to 5% of collisions with non-trucks.

  Truck size is one factor that can reduce the impacts of collisions with vulnerable road users. Collisions involving smaller vehicles are less likely to lead to fatalities and serious injuries than those involving trucks. The visibility in smaller vehicles is generally better than larger trucks. Specific design features, such as seat location, the design of windows and mirrors, and the use of cameras and sensors can all help to improve driver visibility and reduce driver “blind spots”.

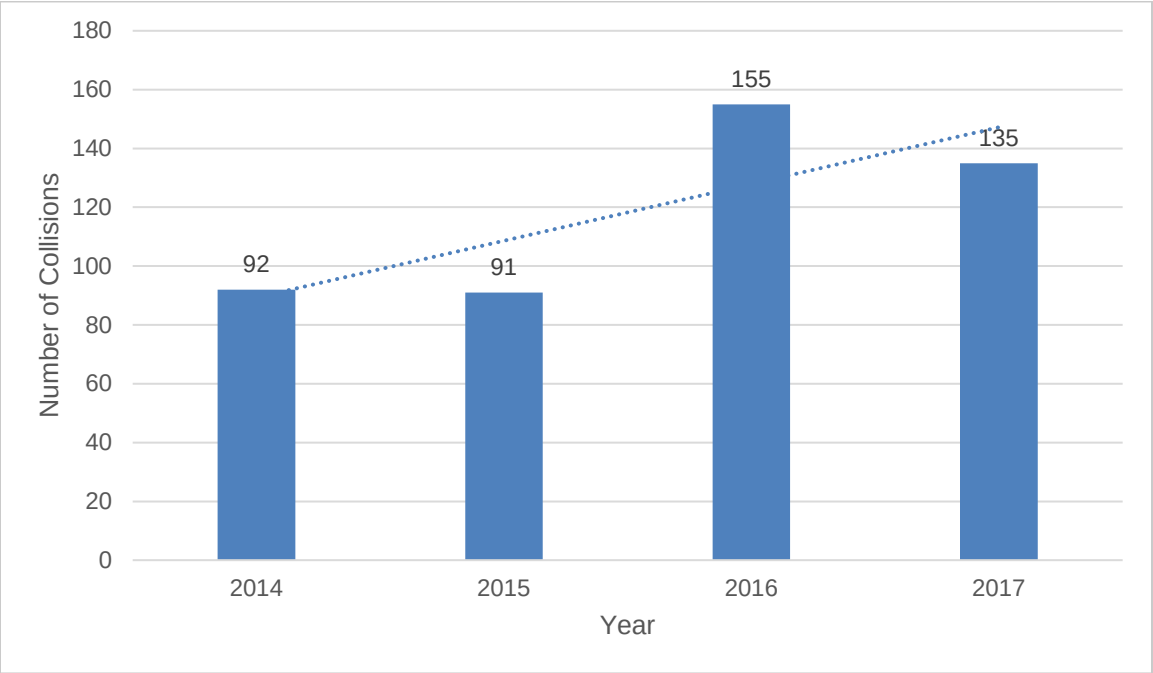
  Safety guards are another feature that has been implemented in many municipalities to protect vulnerable road users. Rear underride guards are mandatory in Canada since these are intended to prevent vehicles from driving under the truck in a collision. These specific guards are not designed to help vulnerable road users. Likewise, front bumpers are designed to protect the vehicle and not vulnerable road users. Side impact guards have become more popular in recent years, as many cities adopt them to support greater safety for vulnerable road users. Studies have shown that these side impact guards can be effective in reducing cyclist fatalities and serious injuries in side swipe collisions where the cyclist and truck are headed in the same direction. They have also been shown to reduce pedestrian fatalities in the same types of collisions.

In support of Vision Zero 2.0, Solid Waste Management Services is proposing to further the current video-based telematics technology and to pilot implementation of vehicle side guards to improve road safety.

The Solid Waste Management Services Division is committed to promoting and fostering a safety-based culture. This is particularly important given the public facing nature of the Division’s operations and the daily interactions the Division has with all road users. Currently, the Division oversees approximately 350 collection vehicles operating in dense urban areas, each of which travels about 15,000 to 20,000 km per year, in high traffic areas, on narrow streets (particularly with on-street parking and after snowfall events), and in high volume pedestrian locations. Accordingly, the potential for serious collisions with other road users does exist and while the Division has demonstrated an excellent safety record, there are improvements that can be made.

Figure 6 illustrates the increase in the number of collisions from 2014 to 2017. Despite 2017 having fewer collisions than 2016, the data shows an upward trend line.

Figure 6. Solid Waste Management Services Collision [2014-2017]



The data presented above represents “at-fault” collisions. In addition, the data now suggests that when a collision does occur it is 4.5 times more likely to be an “at-fault, as opposed to a “not-at-fault” type collision.

Recently, a renewed focus on safety has been at the forefront of the waste industry[13]. In the first 22 days of 2019, there were 17 fatal incidents relating to the solid waste industry in the United States and Canada. Attachment 3 provides Solid Waste Division's summary of various technologies applicable to large vehicles that are intended to improve road safety, particularly for vulnerable road users.

Fleet Services proactively manages the driving privileges of approximately 11,000 qualified City of Toronto Employees. The division's goal is to ensure that the City leads by example and contributes to safe roads for all road users.

The City's fleet safety is maintained through a fact-based approach to issues identification, combined with a strategic approach to risk reduction that focuses on behaviour modification. Some of the key aspects of this multi-faceted approach includes:

- Driver training – licence upgrades and certification which exceed provincial standards Ministry of Transportation (MTO) Driver Certification Program (DCP).
- Commercial Vehicle Operators Registration (CVOR) Review – monthly abstract review of city licensed drivers to ensure accurate operating record.
- Compliance Checks - spot checks for vehicle and driver monitoring using predetermined criteria and score cards.

[13] On January 22, 2019, the Solid Waste Association of North America (SWANA) published a news release titled, "Unprecedented Surge in Industry-Related Deaths in January 2019."

- Professional Driver Improvement Course (P.D.I.C) – an educational program to help operators identify factors that can impact safe driving, as well as collision reporting procedures, collision types and how to prevent them.
- Safe Roads Partnerships - partnership with Client Divisions, Road Safety User Groups and Law Enforcement, sharing ideas and experiences contributing to a safe driving environment.
- Driving Complaints - investigation and response of any unsafe road actions by City of Toronto Drivers.
- Expanding the use of a wide range of technology and advanced driver assistance systems to assist with issues identification, risk reduction and reporting.
- Behaviour Modification Training through risk focused issues identification - A targeted approach, with the intent to educate and eliminate re-occurrence of unsafe behaviours that can lead to more serious incidents if left unchecked.
- Collision Investigation / scene attendance - management and documentation of collisions (personnel and vehicles) in addition to reviewing for preventative measures and adjusting safety training where appropriate to minimize risk to City.

These services are provided to all Divisions as well as participating Agencies.

Within Transportation Services, the Division is working to equip all expressway and arterial road snow plows with 360-Degree camera systems to more easily identify vulnerable road users. Operators of snow clearing and removal vehicles face a tough task of navigating large vehicles in inclement weather, with numerous blind spots and limited visibility. Using external video-based telematics, drivers will be better able to maneuver their vehicles safely by eliminating blind spots and improving visibility around the vehicle. This will be rolled out with the start of the City's new snow clearing contracts in 2022.

District Safety Action Plans

As a part of Vision Zero 2.0, Community Council District Safety Action Plans are being developed in order to identify unique road safety challenges that contribute to KSI collisions in each District. Using a data driven approach, these plans will identify particular intersections and corridors in each district with road safety concerns along with a set of actions geared towards addressing the highlighted issues and locations. Engaging local community groups and understanding their road safety concerns is an important part of informing the plans.

The Scarborough Community Council District is the first priority. Scarborough has the highest rate of fatal collisions amongst the four Districts. This is in spite of the fact that Scarborough has a lower number overall traffic collisions compared to North York and Toronto & East York Districts. Moreover, a disproportionate number of KSI collisions involving school-aged children have happened in Scarborough over the last five years.

The Scarborough District Safety Action Plan investigated what factors contribute to Scarborough having a disproportionate rate of KSI collisions and making collisions in Scarborough more deadly. The full action plan provided in Attachment 18, outlines the findings of this investigation and a list of proposed actions.

Additional Measures Targeted at Particular Emphasis Areas

- **Older Adults**

In addition to implementation of several road safety countermeasures that improve conditions for seniors city wide, under Vision Zero 2.0 staff will focus on improving existing Senior Safety Zones priori to identifying additional locations. The improvements in these areas include:

- Implementing enhanced pavement markings and signage to raise awareness of the older adult population;
- Analysis of pedestrian crossing times at traffic signals to ensure that the lower speed of older adults crossing is accounted for in signal timings; and
- Conducting In Service Road Safety Reviews to identify potential short term and long term improvements including identification of interim or permanent road design improvements.

- **School-Aged Children**

School Safety Zones
Since approval of the Vision Zero Road Safety Plan in 2016 rate of implementation of school safety zones has been accelerated twice, leading up to the most recent commitment of completing 80 school zones per year and the ultimate goal of implementing enhanced pavement markings and signage to all elementary and secondary schools in the city.

Partnership for Expansion of School Travel Planning
In a letter to the City Manager dated May 2018, the Directors of Education for both the Toronto District School Board (TDSB) and Toronto Catholic District School Board (TCDSB) requested funding from the City of Toronto to support the expansion of their existing school travel planning (STP) programs. STP is a process for promoting and identifying barriers to walking and cycling to school and has the potential to improve safety by reducing traffic around schools, health by increasing daily physical activity and the environment by reducing greenhouse gas emissions and air pollution. In the first year of the Vision Zero Road Safety Plan, staff worked closely with the Boards to co-ordinate the delivery of the School Safety Zones and STP programs to maximize the benefits and effectiveness of both programs. However, in 2018, the City increased its efforts to implement School Safety Zones from 20 to 80 schools per year and as a result, the Boards are unable to match the delivery of STP at schools, which is limited to 15-25 schools per year between both Boards based on their current funding levels. The Boards are requesting up to $320,000 of additional annual funding from the City through the Vision Zero Road Safety Plan to increase the rate of STP delivery to match the current rate of School Safety Zones implementation. The funding support from Vision Zero would be provided contingent on perpetuation of the Board's financial commitments toward their respective STP programs. If approved, the funding will be provided through a Schedule A with the Boards

Active and Safe Routes to School
This pilot was launched in 2018 at three locations (five schools) and funded in part by Bloomberg Philanthropies through its Partnership for Healthy Cities. The objectives of

the pilot are to increase student participation in walking and cycling to school and increase safety along designated walking/biking routes to school. The pilot includes road markings, sidewalk activity stenciling and installation of signage to encourage children to walk or bike to school and to help reduce vehicular speed and increase safety.

The City is currently working with partners to expand the pilot to more schools in 2019/2020 through the Ontario Active School Travel Fund and the Partnership for Healthy Cities.

- **People on bicycles**

Under the cycling Renew program, existing cycling infrastructure will be upgraded through measures such as separation, paint enhancement and bringing existing infrastructure up to current standards. This program will be funded through Vision Zero 2.0. The selection of routes for each year will primarily be based on identifying locations with safety concerns through collision analysis, bringing up to current standards as well as coordination with resurfacing and reconstruction projects.

- **Motorcyclists**

Motorcycle riding requires a greater level of both cognitive skills and vehicle control than driving a car. In the event of a crash, the potential outcome, whether caused by the rider, other road users, the road environment or the vehicle itself, are severe. The following are four main strategies for addressing motorcycle safety.

Strategy 1: Working with key safety partners and industry to raise awareness and education of the inherent risk of motorcycling

In collaboration with Rider Training Institute (RTI) and other industry representatives, the City will roll out a Motorcycle warning signs study that will review and recommend advisory signage on popular and high-risk motorcyclist routes to provide guidance to riders. Studies have shown adequate advisory signage, in particular curve speed signage, is useful for mitigating turning-related crash risk. A crowdsourcing platform may be created to collect and communicate areas of the road system the motorcyclist community feels is higher risk or could benefit from advisory signage, infrastructure upgrade or enhanced maintenance

Transportation Services will also collaborate with partners such as RTI and the Motorcycle and Moped Industry Council to launch an ongoing motorcycle safety education program geared towards both motorcyclists and drivers.

Strategy 2: Addressing driver inexperience among motorcycle riders and increasing crash rate of older riders.

Similar to G class licencing, motorcycle driver education courses and testing would benefit greatly from more robust safety awareness for vulnerable road users. Motorcyclists are a unique emphasis area within the Vision Zero Strategy due to higher KSI collisions as compared to passenger vehicles. It is recommended that ministry-approved driver education courses and the Official MTO Motorcycle Handbook, and M-class Knowledge and Road Tests be updated, as well as mandatory M-Class training regarding vulnerable road users including ways to counter motion camouflage, a dynamic type of camouflage where motorcyclists appear stationary from a drivers' perspective.

Strategy 3: Addressing increased motorcyclist crash risk due to alcohol use

Motorcyclists are also uniquely affected by alcohol use. According to a 2014 Ontario Road Safety Annual Report, 59 Motorcyclists were killed on Ontario roads in 2014. Of those, 13.8% exceeded the maximum permitted Blood Alcohol Concentration (BAC) of 0.08%. This is comparable to 14% of passenger vehicle drivers killed in 2014. However, there is a considerable difference when examining those drivers killed who had been drinking but did not exceed the 0.08% BAC level, of which 3.4% are motorcyclists, compared with 0.3% of passenger vehicle driver deaths. This demonstrates that any level of alcohol impairment increases the risk of fatality when compared to passenger vehicle drivers. This difference is thought to be attributed to factors such as the effect of alcohol on a motorist's balance. It is therefore recommended that City Council request the Province of Ontario to change the maximum blood alcohol concentration for motorcyclists to 0%. This was supported by representatives of the motorcycle industry based on staff consultation.

Strategy 4. Ensuring that the safety of motorcycle riders is considered in the design and maintenance of roads, provisions of road infrastructure and the implementation of traffic management plans

In June 2016, City Council requested the General Manager, Transportation Services, to report on a number of items related to motorcycle safety. The following subsections outline the results of Transportation Services' review of these requests.

Use of Reserved Lanes
City Council requested the General Manager, Transportation Services, to report on expanding the Designated Class of Vehicles permitted to use the reserved lanes on the following streets to include motorcycles:

a. Bay Street, from Front Street West to Bloor Street East; and
b. Don Valley Parkway, from Lawrence Avenue East to north of York Mills Road.

Currently motorcyclists are allowed on all designated High Occupancy Lanes (HOV) in the City. Bay Street from Cumberland Street to Front Street West, both sides, is designated as a reserved lane from 7:00 a.m. to 7:00 p.m. Monday to Friday, except public holidays. During this period, only public transit vehicles, taxicabs, and bicycles are allowed on these lanes.

Allowing motorcycles on the Bay Street reserved lanes should not negatively impact the TTC bus drivers or transit service, as bicycles are already allowed on these lanes. TTC bus drivers are well trained and able to operate their buses in a mixed vehicle environment. In addition, motorcyclists have a recognized vulnerability given their relatively small footprint as compared to other vehicles on the road. It is recommended to allow use of these reserved lanes in order to provide increased visibility to other motorists traveling in the corridor and to provide motorcyclists with an additional measure of safety operating in the curb lanes.

The reserved lanes on the Don Valley Parkway (DVP), which we refer to as bus-bypass lanes, are currently restricted to authorized GO Transit and TTC vehicles. These lanes were built to make sure that reliable transit service can be provided to transit riders. In addition, all GO Transit and TTC operators have been fully trained and certified on the operating protocol for these lanes. Expanding the use of these lanes to others, such as motorcyclists, would not be appropriate as there would be no way to ensure that they comply with the provisions of the operating protocol. Furthermore, the transit service reliability that customers have been accustomed to would be jeopardized. For these reasons, allowing motorcyclists on the DVP bus-bypass lanes would not be feasible.

Lane Filtering Pilot
City Council requested the General Manager, Transportation Services, to consider a pilot project along the Richmond Street and Adelaide Street corridors which would allow motorcycles to filter between stopped vehicles, up to the stop line at controlled intersections where a stop signal is active.

Staff contacted the Ministry of Transportation's Road Safety Policy Office to confirm their position regarding allowing motorcycles to lane filter at a red light. While the Highway Traffic Act (HTA) does not expressly prohibit lane filtering, the Ministry of Transportation has indicated that there are a number of provisions in the HTA that deem illegal maneuvers involved in lane filtering, including:

- Subsection 148(8) prohibits passing another vehicle going in the same direction unless the roadway to the front and left of the vehicle is clear to do so. If both lanes of traffic are occupied with vehicles, the way in front and to the left of the vehicle being passed by the motorcyclist is not clear.
- Subsection 150(1) prohibits passing to the right of another vehicle unless there is sufficient unobstructed pavement for two or more lines of vehicles in each direction.
- Subsection 154(1) requires a vehicle to be driven entirely within a single lane and to only move from the lane when this can be done safely.
- Lane filtering may be considered careless driving under Section 130.
- Lane filtering may fall within the definition of a “stunt” under O. Reg. 455/07 (Races, Contests and Stunts) and the street racing provisions in section 172 of the HTA.

In addition, MTO also states that maneuvers that put motorcyclists in close proximity to other vehicles may pose unnecessary safety risks to riders as drivers may not expect a vehicle to be in that space. A small movement, such as a vehicle starting to change

lanes or a door opening, can cause a collision as there is no other place for the motorcyclist to move. This issue would require further review and consideration by the Ontario Ministry of Transportation.

As of May 2019 motorcycle lane filtering became legal in the state of Utah in the United States. Research on motorcyclist lane filtering cite the reduction of rear end collisions as the main safety benefit of permitting filtering. A review of historical collisions in the City of Toronto suggests that less than 1% of KSI collisions involving motorcyclists may have been avoided by permitting lane filtering. While lane filtering has been found to increase the sense of safety amongst motorcyclists, research has shown that the risk of motorcycle riders being involved in injury crashes while filtering is significantly higher than the risk for riders who do not filter[14]. In addition, lane filtering has been found to pose a risk to pedestrians due to motorcyclists potentially intruding into the pedestrian crosswalk[15].

- **Aggressive and Distracted Driving**

Under Vision Zero 2.0 staff will continuing to implement existing programs that are aimed to eliminate distracted driving as a risk on Toronto's roads. In January 2019 fines and penalties for distracted drivers on Ontario were increased. Transportation Services supported Toronto Police Services in raising awareness about the new penalties and continues to work with key partners on key education and enforcement measures to raise awareness of the risks and consequences of distracted driving.

In order to effectively educate all road users, targeted improvements are needed to a wide range of existing educational programs throughout the City of Toronto including driving school and testing. Many of these programs are regulated by the Province. As such, it is recommended that City Council request the MTO to review road safety education programs under their remit and apply a Vision Zero lens, with special focus on the safety of vulnerable road users.

It is important that all drivers across the province learn such vision zero driving techniques. To holistically ensure that driver education meets Vision Zero objectives, improvements are needed to both the curriculum for ministry-approved driver education courses, and the Official MTO Driver Handbook, Knowledge and Road Tests. Such changes would prioritize Vision Zero road safety concepts. Driver education courses differ across the province and every course must strike a balance between the skills related to operating a vehicle, with those critical to ensuring the safety of all road users. This may include such concepts as the "Dutch reach" which teaches drivers to open car doors with their right hand in order to improve sightlines and avoid dooring cyclists.

There have been great advancements with regards to in-vehicle technologies to improve road safety. The European Commission has recently approved a requirement for Intelligent Speed Assistance (ISA) in all new private vehicles starting in 2022. ISA is

[14] Nicolas Clabaux, J.-Y. F.-E. (2017). Powered two-wheeler riders' risk of crashes associated with filtering on urban roads. Traffic Injury Prevention, VOL. 18, NO. 2, 182–187

[15] Transport for New South Whales (2014). Motorcycle lane filtering trial. https://roadsafety.transport.nsw.gov.au/downloads/motorcyclists/lane-filtering-results.pdf

a speed limiting technology based on digital road maps and GPS where the driver is alerted when travelling above posted speed limits. The European Transport Safety Council predicts this regulatory change will result in 20% fewer road deaths. Mandating such technologies requires the federal government to regulate and govern their use. It is recommended that City Council request Transport Canada explore legal and policy changes necessary to mandate the use of Intelligent Speed Assistance and other in-vehicle safety technologies for all future vehicles.

Future Reports

Transportation Services Staff will bring forward reports to future Community Council meetings with proposed reductions in speed limits for select minor arterial and collector roads in 2019. Reports will also be brought forward to future Community Council meetings to implement the proposed area based local road speed limit reductions on a ward by ward basis over the next several years. Additional budget associated with Vision Zero initiatives will be presented as a part of future operating and capital budget submissions for Transportation Services.

CONTACT

Jacquelyn Hayward
Director, Project Design & Management
Transportation Services
Tel: (416) 392-5348
Email: Jacquelyn.Hayward@toronto.ca

Kris Hornburg
Manager, Program & Strategic Initiatives
Solid Waste Management Services, Office of the General Manager
Tel: (416) 392-8219
Email: Kris.Hornburg@toronto.ca

SIGNATURE

Barbara Gray
General Manager, Transportation Services

Matt Keliher
General Manager, Solid Waste Management Services

ATTACHMENTS

- Attachment 1 - Amendments to Community Safety Zones
- Attachment 2 - Missing Sidewalk Installation Policy
- Attachment 3 - Solid Waste Management Review of Large Vehicle Safety Technologies
- Attachment 4 - Details of Financial Impacts to Operating and Capital Budget of Solid Waste Management Division
- Attachment 5 - Decision History Related to Components of Vision Zero Road Safety Plan
- Attachment 6 - Vision Zero Alignment with municipal, Provincial and Federal Policies
- Attachment 7 - Vision Zero Partners and Partnerships
- Attachment 8 - Jurisdictional scan of Vision Zero initiatives
- Attachment 9 - Killed or Serious Injury Collisions Trends by Emphasis Area
- Attachment 10 - Vision Zero RSP Accomplishments by District
- Attachment 11 - Killed and Serious Injury Heat Maps and Thematic Maps
- Attachment 12- Proposed Major Arterial Speed Limit Reductions
- Attachment 13 - Sample Local Road Reduced Speed Limit Area Gateway Signage
- Attachment 14 - Missing Sidewalks - Recommended Amendment to Procedural Bylaw Chapter 27
- Attachment 15 - List of Cultural Corridor Safety Reviews
- Attachment 16 - Vision Zero Campaigns, Education Material and Communications
- Attachment 17 - Traffic Control Warrants Review
- Attachment 18 - Scarborough District Safety Action Plan