Document 2 – Response to Motions No 15/6 and 15/7

Background:

At the June 12, 2019 Council meeting, Motion No 15/6 brought forward by Councillors McKenney and Menard, directed staff to review a number of measures that could potentially further enhance road safety in Ottawa. At this same meeting, Motion No 15/7, brought forward by Councillors Blais and Hubley, directed staff to address Motion No 15/6 items as part of the Strategic Road Safety Action Plan Update Report.

Transportation Services staff reviewed each of the seven items identified in the Motion to determine its feasibility and effectiveness in enhancing road safety in the context of the SRSAP. A summary of staff's review of each item presented in Motion 15/6, and where applicable, a recommendation to include the measures as part of the 2020-2024 SRSAP is provided below.

Responses by Item:

"a) A plan to optimize all traffic lights for the safety of vulnerable road users first, transit priority second and traffic flow third;"

Transportation Services currently has several existing policies and analysis tools that account for all users of the transportation system network including vulnerable road users, transit users and general traffic.

For new road facilities and/or modifications, the City of Ottawa uses the Multimodal Level of Service (MMLOS) analysis to review designs and assist in the evaluation of different design options. The MMLOS tool establishes performance measures for all modes of travel including walking, cycling, transit and general traffic. Currently, the multimodal level of service analysis is used as part of the Complete Street Implementation Framework and helps to support the process by which all modes are considered, evaluated and prioritized.

For existing signalized intersections, signal phasing and timing at traffic signals must accommodate all intersection users in a safe and efficient manner. There are examples of situations where prioritization is interlinked between multiple modes of travel. For instance, a location that exhibits high left turn movement collision trends with high collision severities, may warrant a protected left turn signal phase. The addition of signal phases often results in higher cycle lengths which increases pedestrian wait times and tends to decrease adherence to the signal displays. However, protecting left turn movements eliminates conflicts within the parallel crosswalk between left turning vehicles and pedestrians. Between 2013 and 2017, the greatest number of pedestrian collisions involved left turning vehicles. Signalized intersections operate with unique

characteristics and signal timing and phasing designs must weigh safety and operational impacts of the intersection as a whole and potential impacts to neighboring intersections.

The City of Ottawa's signal timing strategies follow provincial legislation, standards, best practices and similar strategies developed in other municipalities. The City of Ottawa follows guidelines set out in the Ontario Traffic Manuals (OTM), the Manual of Uniform Traffic Control Devices (MUTCD) for Canada and Transportation Association of Canada (TAC) guidelines.

Pedestrians

Many features and programs currently exist to provide increased safety, comfort and efficiency for vulnerable road users at signalized intersections. Currently there are 1,178 traffic control signals in Ottawa and 945 locations are equipped with audible/accessible pedestrian signal features and 998 are equipped with Pedestrian Countdown Signals (PCS). Staff currently equip all new traffic control signals and those undergoing major rehabilitation with PCS and Accessible Pedestrian Signals (APS) to comply with the Design of Public Spaces Standards of the Accessibility for Ontarians with Disabilities Act, 2005 (AODA).

Other features include, leading pedestrian intervals which are where pedestrians receive the WALK display in advance of the vehicle GREEN display, slower walk speed for crossing times in areas where there are seniors and schools, longer walk time in areas of high pedestrian demand and pedestrian recalls in areas of schools. With pedestrian recalls, pedestrians do not need to push the button to cross, the WALK is displayed automatically every signal cycle.

Cyclists

The City of Ottawa has been one of the leading municipalities in providing traffic signal functionality for cycling movements. In recent years, the province of Ontario has approved the use of dedicated traffic signal displays for cycling movements. The City of Ottawa has been including cycling infrastructure such as enhanced pavement markings, advanced and exclusive cycling signal phases and alternative detection technologies for bicycles. The measure provided for cycling movements will vary significantly based on the specific intersection geometry and the make-up of the pedestrian, bicycle, transit and passenger vehicle movements at that location.

Transit

Transit priority measures are techniques designed to minimize delays to buses at intersections and along congested roads ensuring a faster commute time for passengers. A variety of techniques are implemented at a number of locations throughout the City including the following:

- Implementing a dedicated transit lane on the approach to an intersection to allow buses to bypass queued traffic. Examples of this type of measure include Industrial Avenue Westbound at Riverside Drive, Bronson Avenue Northbound at Holmwood Avenue (to be constructed in Winter 2019-2020), Riverside Drive Northbound at the Highway 417 overpass and at the intersection of Innes Road at Orleans Boulevard;
- Queue jump with advanced stop bar to allow transit vehicles to pull ahead of general traffic that is stopped at an intersection. General traffic stops further back from the intersection which allows transit vehicles the opportunity to pull in front of traffic. Examples of locations with this type of measure include Rideau Street Eastbound and Westbound between Dalhousie Street and Sussex Drive (to be constructed as part of the Rideau Streetscaping project planned for 2020), previously at Albert Street and Empress Avenue which was removed for the construction of O-Train Line 1;
- The transit priority signal allows transit vehicles to enter the intersection ahead of other traffic. The “cigar signal” allows transit vehicles to jump the queue and enter the intersection first to create the necessary space for buses to merge into regular traffic. Examples of this type of measure include Richmond Road Eastbound at Golden Avenue; Baseline Road Westbound at Prince of Wales Drive; Westbound left turn from Strandherd Drive into the Nepean Woods Park and Ride entrance, and at Heron Road Eastbound at Bronson Avenue;
- Signal priority which allows buses to arrive and travel through an intersection with little or no delay. Detectors identify and distinguish buses from other vehicles. The detectors then interact with the traffic signal to give priority to buses. Examples of this type of measure are along St-Laurent Boulevard between Innes Road/Industrial Avenue and Smyth Road, which work in conjunction with the dedicated bus lanes along this corridor, at Woodroffe Avenue between Fallowfield Road and Strandherd Drive, and at Rideau Street between King Edward Avenue and the Cummings Bridge;
- Providing more response signal timing along high transit volume corridors.

Transit priority allows public transit to be a more attractive and viable option for commuters. Buses freed from congestion and on schedule provide an efficient mode of transportation. The City of Ottawa continues to work closely with OC Transpo to explore new opportunities for Transit Priority Measures throughout the City, including through the use of innovation signal design and programming, and through the exploration of new and developing Transit Signal Priority technology.

General Traffic

Traffic signal retiming is one of the most cost-effective ways to improve traffic movement and make our streets safer. Approximately 200 signalized intersections along major corridors undergo signal timing updates on an annual basis through the Traffic Operations Sub Area Update initiative. These corridors are reviewed with the intent of providing better traffic flow to all modes of travel. Improvements to traffic flow along a corridor can reduce stops and delays at intersections which improves safety, minimizes motorist frustration as well as reduces emissions and fuel consumption. Corridors are reviewed every 3 to 5 years to accommodate traffic fluctuations that occur over time as a result of growth and changing travel patterns.

The continually changing travel pattern throughout Ottawa has created the need for ongoing signal timing review and update. The efficiency of traffic operations greatly influences transit operations where buses are operating in mixed traffic lanes. As part of this program and the new Strategic Road Safety Action Plan update, a detailed assessment of collision data for each location undergoing a timing update will be reviewed and high-volume pedestrian locations will be assessed for potential mitigation measures such as leading pedestrian interval (LPI) implementation, turn restrictions, separate signal phases for turning movements, etc.

<u>Recommendations</u>

Staff recommendations are to continue to assess new roadway infrastructure or upgraded facilities based on MMLOS guidelines and continue to take all modes of travel into account when designing and updating signal operations at existing traffic signals. Improvements to pedestrian, cycling, transit and general traffic operations are also initiated by requests from members of the public, Council, internal requests and field observations by staff responsible for the operation of signals. The Strategic Road Safety Action Plan recommends the creation of a new position in the traffic signals group whose responsibility will be to proactively evaluate signal timing as it relates to vulnerable road users (ex. LPI implementation).

"b) That the City look at options to eliminate all "revert reds";"

The all-red clearance interval at a traffic signal is a safety measure to provide enough time for a vehicle that legally enters the intersection at the end of the amber clearance interval to avoid conflict with traffic from an opposing direction. In the City, the all-red clearance interval is determined in accordance with the Ministry of Transportation Ontario, *Ontario Traffic Manual Book 12 – Traffic Signals*.

Red-revert is a traffic signal timing parameter. It is only applicable for actuated traffic signal control which is where signals do not change automatically after a fixed time has elapsed and only change when a pedestrian or vehicle is detected. This mode is used

at locations where side street pedestrian, bike and vehicle volumes are low and infrequent for most of the day in comparison to heavier volumes on the main street.

At actuated intersections, the main street signal indications rest on GREEN, WALK and Bike GREEN where a bike display is present. Actuations on side streets are detected by a vehicle/bike positioning themselves at the appropriate location over the vehicle/bike detector which is generally at the stop line. In addition, the side street pedestrian movement is actuated by pedestrians pressing the pedestrian pushbutton.

If a bike or a vehicle moves off the side street vehicle/bike detector are during the amber phase of the main street movement, the signal will time the amber followed by a longer all-red clearance time prior to returning to main street green/walk indications. The longer all-red clearance time is referred to as the red revert time. This only occurs when:

- A side street vehicle/bike moves off the detector (therefore is no longer detected by the traffic controller) during the amber or red clearance time prior to receiving their green indication.

The red revert forces the main street signal to stay red for a longer period (the City of Ottawa uses a red-revert time of 5 seconds) after the amber change interval before the main street can turn green again. This only occurs when a call for a conflicting phase is detected, and then cancelled as a result of a vehicle/bike moving off of the detector.

The red-revert parameter is typical across other municipalities in Ontario and the MTO, and it is programmed into a traffic signal controller.

Red revert timing is a safety feature and used for the following conditions:

- Without the red revert parameter programmed in a controller, an actuated traffic signal could change from GREEN to AMBER to RED to GREEN with a shorter RED clearance time. Red revert timing forces the traffic controller to time additional all-red time after the amber indication;
- Some locations have signal pre-emptions for emergency and/or transit vehicles. These pre-emption systems, upon an approaching emergency or transit vehicle, will trigger timing or phasing changes at a traffic signal in order to reduce the delay for the emergency vehicle through the intersection. In some cases, a red-revert is required to safely provide a longer vehicle clearance time to minimize potential conflicts; and,
- By fixing the demand at the end of green (preventing the potential for red revert), it is very possible for a phase to be skipped, such as a pedestrian phase, or a left turn phase. This could result in reduced signal adherence and public complaints. It is important to note that the occurrence of the red revert display, under normal operating conditions, is a very small percentage of all traffic signal cycles.

Recommendations

Consequently, red reverts cannot be eliminated at all intersections. Staff recommend assessing site specific operations to determine if there are special cases where the actuation can be held if a vehicle/bike moved off of the sensor. This will only be considered after other measures to improve signal adherence have been explored. A pilot study of new technology is currently being developed to provide cyclists with visual feedback once they have initiated a signal change by being on a sensor. Implementation of this new technology at test locations is anticipated in the spring of 2020.

At traffic signal locations where multi-use pathways cross roadways with bicycle signal displays, the multi-use pathway traffic signal operations will be adjusted to hold the call for a signal change even when a bike moves off the detector area. This adjustment will also be made at all signalized intersections that are actuated, which have a bike lane, and operate in a 2-phase operation. This change will be implemented in 2020 following upgrades to the traffic signal controller and central traffic system to ensure this new functionality does not negatively impact other elements of the traffic controller and central traffic system. Once the technology is available within the traffic signal controller and centralized traffic control systems, staff will review and implement at locations with on road cycling facilities on a case by case basis to determine if the revised "holding the call for a signal change" function is appropriate.

"c) That staff develop criteria to eliminate "beg buttons" so that pedestrians and vehicles are treated the same at actuated intersections;"

Important Clarification: The terminology "beg buttons" as used in motion item c), refers to the need for pedestrians to press a signal's pedestrian push button to actuate the pedestrian WALK display at an actuated traffic signal. Similarly, at an actuated signal, vehicles activate the GREEN display by entering the detection zone. Item c) suggests that if a signal cycle changes to GREEN to allow for vehicle movement, then the corresponding pedestrian walk signal in the same crossing direction should appear whether the pedestrian push button was pressed.

This request refers specifically to actuated traffic signal operations, i.e. signals that do not change automatically after a fixed time has elapsed and only change when a pedestrian or vehicle is detected. At these locations, side street pedestrian, bike and vehicle volumes are light and infrequent for most of the day in comparison to heavier volumes on the main street.

It should be noted that many of the signalized intersections in Wards 12, 14, 15 and 17 operate as "fixed time" which means that pedestrians do not need to push the button as vehicle and pedestrian indications change automatically even if there are no vehicles or pedestrians present on the side street. This type of operation is common and typical in

downtown areas were both intersecting roadways have similar and consistent pedestrian, bike and vehicle volumes throughout the day.

Pedestrian push buttons are an integral component of an Accessibility for Ontarians with Disabilities Act, 2005 (AODA) compliant accessible signal – pedestrian pushbuttons trigger a signal's accessibility features and are required by law. Pedestrian push buttons cannot be eliminated at intersections. Newly constructed or replacement traffic signals in the City of Ottawa are built to include Accessible Pedestrian Signals (APS) to comply with the Design of Public Spaces Standards of the Accessibility for Ontarians with Disabilities Act, 2005 (AODA).

Recommendations

Staff's recommendation is to implement a project to develop a new mode of traffic signal operations. This new mode of operation would revise the Traffic Signal Controller software and Centralized Traffic Control System to be able to have the presence of a detected vehicle at a signalized intersection activate the pedestrian walk displays even though the pedestrian pushbutton has not been pressed – the push button would still need to be pressed to activate accessible signal features where present and/or if a pedestrian wishes to activate the crossing when no vehicle is present. Development work is required to ensure the Traffic Signal Control System operation is not compromised with the addition of this new mode. Further development work is also required to ensure that this mode of operation does not prevent the use of the leading pedestrian interval (LPI) feature. Development work to support this new mode of operation is anticipated to be completed by the end of the second quarter of 2020. Should development work show that this mode of operation can be used without compromising the Traffic Signal Control System and Leading Pedestrian Interval (LPI) function, staff will review signals on a case by case basis and implement this mode based on the following criteria:

- Locations where there is not a large difference between the typical side street green time and the Walk and Flashing Don't Walk time;
- Locations where adjacent signals operate fixed time and impacts would be minimal; and,
- In some instances, it may be more appropriate to operate signals as fixed time during a time of day when there are peaks of pedestrian activity, for example, at locations close to schools.

"d) That staff devise criteria to eliminate right-on-reds where bike lanes are present;"

"No-right turn on red" restrictions are implemented to address various safety concerns such as:

- right turning collisions with pedestrians, cyclist or other vehicles;

- inadequate sightlines;
- high speed traffic on intersecting roadways;
- heavy pedestrian volumes crossing perpendicular to the right turn movement; and,
- locations with dual right turn lanes.

There are a number of factors to consider when prohibiting right turns on red. The restriction can reduce conflicts between vehicular traffic and pedestrians/cyclists, however; the restriction may lead to higher right turn conflicts during the parallel WALK and GREEN display if a high right turn volume is present. In some cases, allowing a right turn on red during a cross street protected left turn phase allows vehicles to clear before pedestrians and cyclists receive the WALK and GREEN display.

Recommendations

The following criteria is recommended when prohibiting right turns on red:

- Implement “No right turn on red” restrictions at intersection approaches where bike boxes are present;
- Evaluate the need for “No right turn on red” restrictions or advanced straight through arrow displays at locations with protected bike facilities where cyclists are provided with advanced bike signal phase;
- Consider “No right turn on red” restrictions at locations with leading pedestrian intervals (LPI) if pedestrian conflict studies show a high number of conflicts between pedestrians and right turning vehicles;
- Where a right turn lane is present and a “No right turn on red” restriction will lead to significant operational impacts, an overlapping right turn phase/display will be considered; and,
- Where a double right turn lane is present.

“e) That staff identify all floating painted bike lanes and develop criteria and plan to convert any identified through this process to safe, segregated, protected bike lanes;

And:

f) That staff develop criteria and devise a plan wherein all painted bike lanes that meet the criteria currently on arterials, arterial mainstreets and mainstreets, or that are part of the city’s current bike network, are converted to safe, segregated, protected bike lanes and intersections;”

In Ottawa, there are approximately 300 intersections that have floating bike lanes and about 300 kms of on-road painted bicycle lanes (each side). In many locations, the existing painted bike lanes and floating bike lanes are an acceptable design solution (Transportation Association of Canada; Ontario Traffic Manual) and are not high priority for conversion to higher standard facilities.

The criteria for conversion of painted or floating bike lanes to segregated infrastructure is a demonstrated safety issue or a planned infrastructure project to which the conversion can be included cost effectively. Safety issues are evaluated based on collision history, vehicle speeds, level of traffic stress and resident feedback. Locations with demonstrated safety problems will be addressed through the City's Strategic Road Safety Action Plan (SRSAP).

The updates underway for the Ottawa Cycling and Pedestrian Plans will evaluate the remaining locations that do not have known safety issues for conversion to cycle tracks and protected intersections. The same criteria of collision history, vehicle speeds and level of traffic stress will be used to prioritize upgrades within the City's affordability framework, to be delivered through the City's active transportation infrastructure programs. These conversion projects will be competing with investments in new facilities.

Furthermore, staff recommend that these conversions be increasingly incorporated into the City's ongoing infrastructure renewal program to achieve economies of scale, rather than as costly stand-alone projects. Full road reconstruction projects offer opportunities to incorporate cycling improvements at a low cost, but most of the renewal program consists of projects with less than full reconstruction. For this reason, the conversion of all existing floating bike lanes and on-road painted bike lanes, even while leveraging renewal projects, will require additional funding for the integrated road renewal program.

For new streets, the City is already focussing on building separated cycling facilities and protected intersections from day one guided by several existing Council-approved policies, guidelines and studies such as the Complete Streets Framework, Building Better and Smarter Suburbs, and the Designing Neighbourhood Collector Streets. For road widening projects, cycle tracks are part of the road design, as well as protected intersections where space permits.

"g) That staff review the requirements and costs to accelerate and implement the entryway measures for a gateway speed limit of 30 km/hour on residential roads in the urban core"

As part of the Strategic Road Safety Action Plan collision review, Traffic Services identified five geographic areas by grouping Traffic Analysis Zones (TAZs) used in the City's long-range transportation planning model to determine if, or how, collisions varied by locations with different land use characteristics. The five areas were identified as: Central Business District (CBD), Core Residential, Inner Suburban, Outer Suburban and Rural. Traffic Services included CBD and Core Residential areas to define the "urban core" for the purposes of the review. The "urban core" is bounded by the following:

- Lincoln Fields/Western Parkway/Transitway to the west;
- Highway 417 to Dow's Lake to Carleton University/Rideau River to the south;
- Highway 417 to the Aviation Parkway to the south/east; and,

- The Ottawa River to the north.

Traffic Services identified the Speed Limit Gateway Areas that fall within the “urban core” and reviewed existing data available for those roadways to help determine a high-level estimate of the number of intersection narrowings that would be needed to meet the entry width requirement of 7 m for roadways under the 30 km/h Speed Limit Policy. The data review identified that within the “urban core” Speed Limit Gateway Areas, there are approximately 3,150 roadway segments and 670 existing intersection narrowings. It was also determined that approximately:

- 20 per cent of speed surveys conducted within those areas had an 85th percentile operating speed of less than or equal to 35 km/h; and that,
- 50 per cent of existing intersection narrowings within the area have entryway widths of less than or equal to 7.0 m.

Under the 30 km/h Speed Limit Policy, roadways that have an operating speed of 35 km/h or less are not subject to the 7 m entry width requirement. Assuming 20 per cent of the 3,150 roadway segments within the “urban core” Speed Limit Gateway Areas have an operating speed less than or equal to 35 km/h, based on the speed survey data review, 2,520 roadway segments would still require entry width narrowings if they are wider than 7 m.

For the remaining 2,520 roadway segments, narrowings would be required on both ends of the segment to achieve entry width requirements, for a total of 5,040 intersection narrowings. Subtracting half of the approximately 670 existing intersection narrowings which have already been constructed and have resulted in an entry width of less than 7 m, the total estimated number of intersection narrowings required would be approximately 4,700.

The cost of intersection narrowings varies considerably based on site conditions. Many factors influencing costs must be considered including, but not limited to:

- Width and length of the narrowing;
- Sidewalk width;
- Removal or relocation of catch basins;
- Number of tactile devices required to help communicate the approach of a roadway crossing through a non-visual format such as a Tactile Walking Surface Indicator (TWSI);
- Signage changes;
- Removal or relocation of existing utilities; and,
- Police presence for traffic control purposes, etc.

A high-level cost estimate to narrowing the entrance of a roadway by up to 2 m in width and 15 m in length for one intersection ranges approximately from $28,000 to $90,000. Many factors influence the cost of such a project and these range from property requirements to the need for police presence for traffic control during construction.

These elements are typically not determined until the design phase of a project. Therefore, this estimate includes a 50% contingency which is appropriate for the level of detail available at this time. Based on this information, the funding required to implement 4,700 intersection narrowings is approximately $131,600,000 to $423,000,000.