

4. Intersection All-Way Stop Control Warrant Review

Examen des critères de justification associés à l'installation de panneaux d'arrêt toutes directions

Committee Recommendation

That Council approve the warrant processes and criteria associated with the implementation of All-Way Stop Control (AWSC), as outlined in the report.

Recommandation du comité

Que le Conseil approuve les processus et critères de justification associés à l'installation de panneaux d'arrêt toutes directions, tels qu'ils sont présentés dans le rapport.

DOCUMENTATION

1. Director's report, Traffic Services, dated 28 September 2020 (ACS2020-TSD-TRF-0002)

Rapport du directeur, Services de la circulation, daté le 28 septembre 2020 (ACS2020-TSD-TRF-0002)

**Transportation Committee
Report 11
October 7, 2020**

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**Comité des transports
Rapport 11
Le 7 octobre 2020**

**Report to
Rapport au:**

**Transportation Committee
Comité des transports
7 October 2020 / 7 octobre 2020**

**and Council
et au Conseil
14 October 2020 / 14 octobre 2020**

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**Submitted by
Soumis par:**

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Ward: CITY WIDE / À L'ÉCHELLE DE LA VILLE File Number: ACS2020-TSD-TRF-0002

SUBJECT: Intersection All-Way Stop Control Warrant Review

**OBJET: Examen des critères de justification associés à l'installation de
panneaux d'arrêt toutes directions**

REPORT RECOMMENDATION

That the Transportation Committee recommend that Council approve the warrant processes and criteria associated with the implementation of All-Way Stop Control (AWSC), as outlined in the report.

RECOMMANDATION DU RAPPORT

Que le Comité des transports recommande au Conseil d'approuver les processus et critères de justification associés à l'installation de panneaux d'arrêt toutes directions, tels qu'ils sont présentés dans le rapport.

BACKGROUND

The City's current All-Way Stop Control (AWSC) warrant procedure, established in 2006, is based on past practices of former Regional Municipalities of Ottawa-Carleton (RMOC), a survey of other Ontario municipalities, internet research, a review of North American technical agencies, and generally aligns with the 2001 edition of the Ontario Traffic Manual Book 5 – *Regulatory Signage* warrant criteria.

The Intersection All-Way-Stop-Control (AWSC) Warrant Review report is being brought forward as per direction given at the November 1, 2017 Transportation Committee meeting. The direction to staff, which was presented through deliberation of Councillor Blais' request for all-way stop controls at three unwarranted locations was:

“That Transportation Services staff look at other jurisdictions that use the warrant system and how they balance the ongoing concerns and report back to the Transportation Committee.”

The report seeks Council approval of updated warrant processes and criteria for the implementation of AWSC that better reflect the desire for the City's related warrants to consider local context. The proposed warrant processes and criteria will take into consideration the most up-to-date best practices and will continue to meet *Highway Traffic Act (HTA)* requirements.

DISCUSSION

AWSC is a form of traffic control that requires that vehicles on all approaches to an intersection stop prior to proceeding through the intersection. As indicated in the Ontario Traffic Manual Book 5 – Regulatory Signs (OTM Book 5), “The purpose of the STOP sign is to clearly assign right-of-way between vehicles approaching an intersection from different directions when traffic signals are not warranted or not yet installed and it has been determined that a YIELD sign is inadequate. The STOP sign requires the driver to stop the vehicle before entering the intersection, yield to any traffic in or approaching the intersection and then proceed when safe to do so. The introduction of STOP sign control can reduce the frequency of certain types of collision (e.g. right angle or turning), but also results in delay to motorists and may increase some other types of collision (e.g., rear-end). STOP signs should, therefore, not be used indiscriminately.”¹

Furthermore, there are conditions under which the use of All-Way Stop Control is deemed inappropriate. As per OTM Book 5, listed below are some of the conditions in which “...all-way stop controls should *not* be used...:

- Where the protection of pedestrians, school children in particular, is a prime concern. This concern can usually be addressed by other means;
- As a speed control device; and,
- As a means of deterring the movement of through traffic in a residential area;...”²

In summary, AWSC is not intended as a traffic calming measure.

The recommended warrant criteria provides greater flexibility for the installation of AWSC at intersections citywide in comparison to the existing warrant procedure established in 2006. That being said, the recommended warrant continues to support that AWSC are only installed where they are deemed an appropriate traffic control measure. Installing AWSC where not appropriate can contribute to:

¹ [Ontario Traffic Manual Book 5 – Regulatory Signs](#)

² [Ontario Traffic Manual Book 5 – Regulatory Signs](#)

- A low stop compliance, which usually becomes worse over time as motorists develop a habit of not stopping because of a lack of conflicting movements. The only solution to improve compliance at these locations is continual police enforcement; larger signs or flashing lights would likely not improve compliance as motorists are willingly disregarding the stop sign;
- An increased risk for the potential of collisions;
- An increase in operating speeds along corridors and between stop signs;
- Negative impacts to cycling as cyclists have to exert extra effort to re-gain momentum after stopping for stop signs; and,
- Negative environmental impacts such as noise pollution due to sounds accompanying motor vehicle acceleration and/or braking and air pollution with an increase in greenhouse gas emissions due to stops and starts.

Existing AWSC Warrant Criteria

Within the City's existing AWSC warrant, there are three intersection types: Rural Arterial, Urban Arterial and Urban Collector. All three intersection types have the same warrant criteria, which are related to collisions, visibility and traffic volume. All three intersection types share the same visibility criteria, however, they have different collision and traffic volume criteria. The volume criteria differs based on density and roadway classification. Please see Table 1 below for further details.

Table 1 - AWSC Warrant Criteria – Established in 2006

Intersection type	Total vehicle volume for all approaches average per hour	Total minor street volume including pedestrians crossing major street average per hour	Number of preventable collisions per year over a three-year period
Rural Arterial	350	140	4
Urban Arterial	500	200	3
Urban Local-Collector	200	80	3

AWSC can be warranted on volume alone only if both the total vehicle volume criteria and the minor street volume criteria including pedestrians crossing the major street are 100 per cent met, along with the directional split criteria. Directional split is the amount of traffic on the major approaches versus the minor approaches. For a four-leg intersection, the amount of traffic on the minor approach must be at least 35 per cent of the total intersection volume and for a three-leg intersection, the minor approach must be at least 25 per cent. These warrant criteria provide no flexibility, for example if all the criteria are met except for the directional split being one per cent off, the AWSC is deemed not warranted.

Summary of International Review of AWSC Warrant Criteria

Transportation Services staff have completed an international review of warrant criteria and have found that outside of North America, the use of AWSC is very limited. Please find below a summary of the high-level key findings of the review:

- In Australia and across the territory of the Southern African Community Area, an inter-governmental organization headquartered in Gaborone, Botswana, AWSC is used as a form of traffic control. However, the use is largely at locations where traffic signals are warranted but cannot be immediately installed, and as such, AWSC warrants do not exist;

- In Europe, the use of AWSC is extremely rare and, in some cases, completely outlawed. For example, in the United Kingdom, the use of AWSC has been formally prohibited by the Department for Transport since 2002 due to the ambiguity presented by AWSC; and,
- In the United States, most jurisdictions follow the Federal Highway Administration's Manual of Uniform Traffic Control Devices (MUTCD) warrant criteria or a warrant that is similar but with minimum traffic volume criteria with varying thresholds and application. The MUTCD warrant criteria is largely based on vehicle volume. The MUTCD warrant criteria is the same as the one currently identified in the Ontario Traffic Manual (OTM) Book 5 - Regulatory Signage (OTM Book 5). The OTM Book 5 warrant criteria was recently updated but remains fundamentally based on collisions, visibility and traffic volume data.

The City of San Diego's Department of Engineering and Development developed a unique warrant ('San Diego warrant') in 1962 that includes a 'local context' criteria to be used when considering the implementation of AWSC. The 'San Diego warrant' is a points-based system where points are assigned for collision history, unusual conditions (local context near the intersection), traffic volumes (major and minor approaches), traffic volume difference, and number of pedestrians crossing the major street. Monroe County in New York State also uses a similar 'San Diego warrant'. The points-based 'San Diego warrant' criteria provides flexibility, in that not all criteria needs to be 100 per cent met for the implementation of an AWSC.

AWSC Warrant Criteria – Explored Options

Transportation Services staff evaluated a number of different warrant options, including keeping the existing 2006 warrant procedure, adopting the 'San Diego warrant' as used by San Diego or Monroe County, adopting the new Ontario Traffic Manual Book 5 warrant criteria, or developing a hybrid warrant that uses the idea of a points-based warrant that uses the existing traffic volumes while adding a pedestrian exposure and a proximity to pedestrian generator criteria. The outcome of the evaluation of the various options is the following:

- Keeping the current 2006 warrant procedure would not provide the desired flexibility for the installation of AWSC, and as such, it would be likely that Councillor reports

would continue to be presented to Committee and Council for the installation of AWSC at unwarranted locations;

- Using the 'San Diego warrant' would result in fewer locations in Ottawa being warranted for the installation of AWSC, as the traffic volumes required in the 'San Diego warrant' exceed those in the City's existing warrant; and,
- Using the recently updated OTM Book 5 AWSC warrant would not provide flexibility to apply the desired pedestrian lens, given that it already generally aligns with the City's warrant procedure adopted in 2006.

Based on the above, staff are recommending a hybrid warrant criteria for the City of Ottawa.

Recommended AWSC Warrant Criteria

The recommended warrant criteria will be applied to intersections where at least three of the approaches are designated as public highways in line with the *Highway Traffic Act* definition of a public highway. It is based on a combination of the points-based 'San Diego warrant' and the existing 2006 City of Ottawa warrant. It will apply to urban intersections and intersections within rural villages. The recommended criteria provides for the consideration of pedestrians and surrounding generators in the warranting process while still ensuring that basic required elements of many warrant systems continue to be considered, including collisions, traffic volume and intersection visibility.

This warrant will not apply to rural arterial intersections outside of villages, where the existing 2006 warrant will continue to be applied. Along rural arterials, pedestrian volumes are generally low, and if the recommended warrant criteria were to be applied at these locations, it is highly unlikely that the intersection would meet the new warrant criteria for AWSC.

Key elements of the new warrant are listed below with three main criteria that can warrant the installation of AWSC:

- **Collisions:**
 - Three or more preventable collisions over a three-year period had AWSC been in place. Preventable collisions are angled and turning type collisions; or

- **Visibility:**

- An AWSC is warranted at intersections where the sight distance from a point of 2.7 metres from the edge of the major street is less than the required distance set out in the Ministry of Transportations' *Geometric Design Standards for Ontario Highways*, Chapter E "At-Grade Intersections," and which cannot be improved by the removal of trees, hedges, etc.; or

- **Weighted Scoring:**

- Points for the new AWSC warrant will be awarded to each criteria. Criteria will be awarded a score between 0 to 5 for a maximum overall score of 25 points. Under the new AWSC warrant, an intersection will be deemed warranted if the total points meet or exceed 17.5 out of 25, which represents 70 per cent.

As part of the new warrant, points will be assigned for:

- Total intersection volume;
 - Minor street volume and pedestrians crossing the major roadway;
 - Directional split;
 - Pedestrian exposure; and,
 - Distance from Pedestrian Generator.
- The traffic volume criteria will still consider total vehicle volume on all approaches, total minor street volume including pedestrians crossing the major street and directional split. Two additional criteria will be added as part of the volume criteria including:
 - Proximity to pedestrian generators such as transit stations, schools and parks; and,
 - Pedestrian exposure which considers:
 - Pedestrian crossing distance;
 - Pedestrian walking speed;

- Pedestrians crossing the major roadway; and,
- Conflicting vehicle movements.

The traffic volume criteria is listed in the table below and reflects the highest eight (8) hours of an intersection traffic count:

Table 2 - 2020 Traffic Volume Criteria

Intersection type	Total vehicle volume for all approaches average per hour	Total minor street volume including pedestrians crossing major street average per hour
Rural Arterial	350	140
Urban Arterial	500	200
Urban Local-Collector	200	80

- **Synchro Analysis:** Synchro is a traffic simulation software program which can estimate delays and queue lengths. A Synchro Analysis will be required when the AWSC location being considered is within 250 metres of an established AWSC intersection, traffic signal or roundabout. The analysis will confirm the operational feasibility of the proposed AWSC to ensure that the new AWSC intersection does not result in queuing through adjacent controlled intersections. If the Synchro Analysis demonstrates operational impacts, regardless of the warrant criteria scoring, the AWSC measure will not be considered further.

As part of the recommended warrant process, an AWSC review will only consist of the collision record review and the field investigation for intersection sight lines at those intersections where both intersecting roadways are classified as 'local' in the Transportation Master Plan. This more streamlined approach, that does not include traffic volume review, is recommended as AWSC are typically not warranted at these types of intersections. Furthermore, according to a review of count data from approximately 150 local-local intersections counted between 2016 – 2018, staff determined that approximately 10 per cent of the locations met the volume criteria

required. Locations that did meet the criteria were near large traffic generators such as hospitals. As a result of this finding, moving forward, a traffic data review will only be completed at such intersections if a large traffic generator is in the immediate vicinity of the intersection and if it is likely to generate sufficient volume to meet the traffic volume criteria. Eliminating volume data collection at local to local intersections as part of the evaluation process will enable the reallocation of data capturing resources towards projects/locations where the volume data result has an increased likelihood of influencing the installation of a traffic engineering measure.

Staff have worked to reduce the number of unwarranted AWSC intersections that result from developers installing their own temporary signage during construction of subdivisions. Planning Services have included a requirement and conditions as part of subdivision approvals that signage plans are provided to Traffic Services for review and approval. These signage plans identify locations where stop signs will be placed both during construction and at full development. Occasionally, developers have still installed AWSC at locations that are not appropriate. Traffic Services and Planning Services will develop a new condition to be included in subdivision agreements that prohibits developers from installing any regulatory signage without the approval of Traffic Services. At locations within new subdivisions where the installation of AWSC has occurred, staff will apply the new warrant criteria when assessing whether the AWSC will remain in place or be removed. If the AWSC is found to be unwarranted, Staff will follow the procedure for removal of the AWSC outlined in OTM Book 5. The proposed new warrant process allows greater flexibility citywide for the implementation of AWSC. The warrant considers pedestrian exposure in addition to the proximity of pedestrian generators, which are often cited as concerns when residents request AWSC as traffic control measures at intersections within their communities. The new warrant approach aligns with existing regulations and best practices, and should allow Traffic Services to utilize their delegation of authority to install AWSC in a greater number of scenarios.

RURAL IMPLICATIONS

The proposed AWSC warrant does not propose any changes to the rural arterial traffic volume criteria. Within rural villages, the recommended all-way stop control warrant would apply, including only the review of the collision records and the field investigation for intersection sight lines at those intersections where both intersecting roadways are

classified as 'local' in the Transportation Master Plan. The collision warrant criteria is being lowered from four (4) or more collisions per year over a three-year period to three (3) or more collisions per year over a three-year period, to reflect the urban collision warrant criteria.

CONSULTATION

The recommended AWSC Warrant continues to support a transparent, fair and consistent process in the evaluation and implementation of AWSC citywide. The updated warrant meets *Highway Traffic Act (HTA)* requirements, aligns with best practices and will support the installation of AWSC in a greater number of locations given the inclusion of warrant criteria related to pedestrian exposure and proximity of pedestrian generators.

ADVISORY COMMITTEE(S) COMMENTS

This report has not been considered by Advisory Committees.

LEGAL IMPLICATIONS

There are no legal impediments to implementing the recommendation as outlined in this report.

RISK MANAGEMENT IMPLICATIONS

There are no risk implications associated to this report.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

ACCESSIBILITY IMPACTS

The 2006 warrant procedure provided little consideration for pedestrian activity when reviewing locations for AWSC. The new AWSC warrant will consider three traffic criteria and two pedestrian criteria when assessing the need for AWSC. The new AWSC provides for more flexibility in implementing AWSC and subsequently pedestrian crossings, which will reduce distances between controlled crossing points for persons with disabilities.

TERM OF COUNCIL PRIORITIES

The report aligns with the Integrated Transportation Priority of the 2019 to 2022 Council Plan.

SUPPORTING DOCUMENTATION

N/A

DISPOSITION

The Transportation Services Department will administer the Intersection All-Way Stop Control Warrants as supported and approved by Council.