STRATHCONA
COUNTY

Intersection Safety Device (ISD) Program

Guidelines for ISD use in Strathcona County

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1.0   Introduction

Intersection Safety Devices (ISDs) are an important and effective tool to enhance traffic safety when applied in appropriate circumstances. Intersection Safety Devices in the County are operated in accordance with the Province of Alberta's Automated Traffic Enforcement Technology Guidelines[1] and the Automated Traffic Enforcement Training Guidelines[2].

Above and beyond these guidelines, Strathcona County is committed to the fair, consistent and safety-focused use of ISDs in ways that align with best practice, our strategic direction and corporate priorities.

The purpose of this document is to:

a) Define roles and responsibilities in the use of ISDs in Strathcona County;
b) Explore how ISDs align with the County's strategic direction;
c) Present current best practice research for ISDs;
d) Define specific criteria for the selection of new ISD sites;
e) Define specific criteria for the evaluation of ISDs;
f) Define specific criteria for the removal of ISDs; and
g) Outline how public education and awareness of ISDs will be undertaken.

2.0   Definitions

a) Intersection Safety Device (ISD): Automated enforcement devices which record evidence related to both speed and red light infractions.
b) Strathcona County Traffic Safety Advisory Team (TSAT): The TSAT is an interdepartmental team comprised of representatives from the RCMP and Enforcement Services, Transportation and Agriculture Services and Transportation Planning and Engineering departments. This committee is chaired by the Transportation Integration and Safety Advisor and champions traffic safety decision-making in the County.

3.0   Roles and Responsibilities for the use of ISDs

The responsibility for the administration and operation of the Intersection Safety Device Program lies with the RCMP and Enforcement Services department. The Right of Way Management branch of Transportation and Agriculture Services is responsible for the operation and maintenance of traffic signal infrastructure in the

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[1] Technology guidelines are available at
https://www.solgps.alberta.ca/programs_and_services/public_security/law_enforcement_oversight/Publications/ATE%20Technology%20Guidelines%20Guidelines%20(Sept%202014).pdf

[2] Training guidelines are available at
https://www.solgps.alberta.ca/programs_and_services/public_security/peace_officers/Publications/Automated%20Traffic%20Enforcement%20Training%20Guidelines%20(Sept%202014).pdf

County. They provide operational support for the ISDs where they interface with signal hardware.

Placement of new ISDs and the evaluation of existing ISDs will be overseen by the Strathcona County Traffic Safety Advisory Team (TSAT), chaired by the County's Transportation Integration and Safety Advisor.

ISDs are one tool of many that can be used to improve intersection safety. The TSAT has the interdisciplinary expertise to determine where automated traffic enforcement technology can best be deployed to complement existing traffic safety initiatives and plans.

4.0   Alignment with Strathcona County's Strategic Direction

Use of ISDs is consistent with Strathcona County's strategic goals of creating a safe, caring and sustainable community. In keeping with these goals, the vision of the Traffic Safety Strategic Plan 2020 (TSSP) is that no one will be seriously injured or killed while travelling on Strathcona County's road network.

Strathcona County roadways experienced 6,919 collisions during the three year period 2013-2015. Intersection related collisions accounted for 3,209 (46%) of the overall collisions. During this time period, it is estimated that intersection related collisions cost our community approximately $121 million in direct costs alone.[3] For this reason, intersection safety has been identified as a top priority in the County.

Our TSSP 2020 is based on a Safer System philosophy, with a specific focus on eliminating the kinds of collisions that cause injury and death. Side impact collisions are the most dangerous type of collision, with the chance of serious injury or death increasing rapidly at speeds greater than 50 km/h (Corben et al., 2012). Side impact collisions occur when a driver runs a red light. Thus, it is important to manage vehicle speeds at intersections, as well as to deter red light running, to reduce the frequency and severity of side impact collisions.

These ISD program guidelines are being developed as part of an overarching Intersection Safety Action Plan and are only one tool that can be considered to improve intersection safety.

5.0   ISDs- Best practice research

Across North America (including Edmonton, Victoria, and Winnipeg) (Contini and El-Basyouny, 2016; Budd, Scully, and Newstead, 2011; Vanlaar, Robertson, and Marcoux, 2013), evaluations have consistently found ISDs reduce the incidence of side impact collisions.

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[3] Based on the Capital Region Collision Cost study available at http://drivetolive.ca/wp-content/uploads/2014/02/Collision_Cost_Study_Report_Summary_Mar_2010.pdf

There have been mixed results when evaluating the impact of ISDs on rear end collisions, with many studies finding an increase in rear end collisions with the installation of ISDs. However, even when an increase in rear end collisions was observed, most studies conclude that the ISDs still had a positive net effect on traffic safety and reducing injury collisions. Further, Cornu et al. (2014) found that this risk can be mitigated in part by the installation of red light camera warning signs.

A large study of collision statistics (2004-2008) in 14 American cities found red light camera enforcement programs were associated with a statistically significant reduction in the citywide rate of fatal red light running collisions and a smaller but still significant reduction in the rate of all fatal collisions at signalized intersections (Hu, McCart, and Teoh, 2011).

Recently, a study was undertaken to evaluate the safety performance of ISDs within the city of Edmonton, and further to identify factors that can lead to successful selection of future ISD sites (Contini and El-Basyouny, 2016).

The results showed significant reductions that ranged from 12% to 25% for total collisions, and from 33% to 43% for angle collisions.

Greater reductions were found at sites with a higher collision frequency. Additionally, the impact of intersection characteristics on collision reduction was investigated. Speed limits, the presence of a separated right turn lane, and the number of lanes were found to impact ISD collision reduction.

In 2012, Capital Region Intersection Safety Partnership supported a proof-of-concept study to explore the untapped potential of automated enforcement data (Topinka). The purpose of this study was to determine how data collected through automated enforcement (AE) technologies could be used to improve road safety in the Capital Region.

The study found a strong, positive relationship between the number of AE violations and collision involvement. Moreover, those drivers with 12 or more AE violations were involved in the highest proportion of injury collisions. The study also found that drivers with high numbers of AE violations were more likely than other drivers to be involved in criminal activities. These findings indicate that AE data can add to the general understanding of driver behaviour and can be used to identify at least some of the high-risk driving population.

In summary, there is significant evidence that ISDs are effective tools to directly decrease the incidence of death and injury at intersections when applied and operated under appropriate conditions. There is further evidence that data collected by ISDs can play an important role in the development of more effective intervention strategies that will make our roadways and communities safer for everyone.

6.0   Site Selection Process for ISDs

ISD sites will not be selected randomly. ISDs will only be installed where evidence-based violation and collision analysis indicates they are likely to be the most effective option to improve intersection safety.

The Province of Alberta's Automated Traffic Enforcement Technology Guidelines specifies that four basic criteria must be used to determine where automated traffic technology will be used:

1. **High-risk locations** are those where the safety of citizens or police officers would be at risk through conventional enforcement methods.
2. **High-frequency locations** are those where data indicates motorists are ignoring or breaking traffic laws on an ongoing basis.
3. **High-collision locations** are those where data indicates a greater frequency of property damage, injury or fatal collisions.
4. **High-pedestrian volume locations** are those where data indicates a high volume of pedestrian traffic.

Provincial guidelines further specify that one or more of the following must exist before automated traffic enforcement technology is used at a specific site:

- Areas or intersections where conventional enforcement is unsafe or ineffective;
- Areas or intersections with an identifiable, documented history of collisions;
- Areas or intersections with an identifiable, documented history of speeding problems;
- Intersections with an identifiable, documented history of offences;
- Intersections near schools, post-secondary institutions, other areas with high pedestrian volumes.
- High-speed or multi-lane roadways;
- School and play-ground zones or areas;
- Construction zones; or
- Areas where the public or a community has expressed concerns related to traffic safety issues.

It is also essential that automated traffic enforcement technology programs be used in conjunction with existing conventional enforcement and not be used as a replacement for officer contact. ISDs will not be operated on provincial highways in Strathcona County. Their use will only be considered for roads under County jurisdiction.

In keeping with provincial guidelines, and striving to incorporate rigour and our commitment to evidence-based practice, Strathcona County will use the following process to select new sites for the installation of ISDs.

Stage One: Preliminary identification of new ISD sites for consideration

Potential sites will be identified for consideration for the installation of an ISD(s) based on:

- Network Screening: Annual analysis of collision data identifies intersections of greatest concern.
- Enforcement Concern: Enforcement partners may identify a high-risk or high-frequency location.
- Public Concern: Intersections will be considered where the public or community has expressed a concern.
- Engineering Concern: Intersections may be considered in areas where an engineering concern, such as a high proportion of vulnerable road users has been identified.
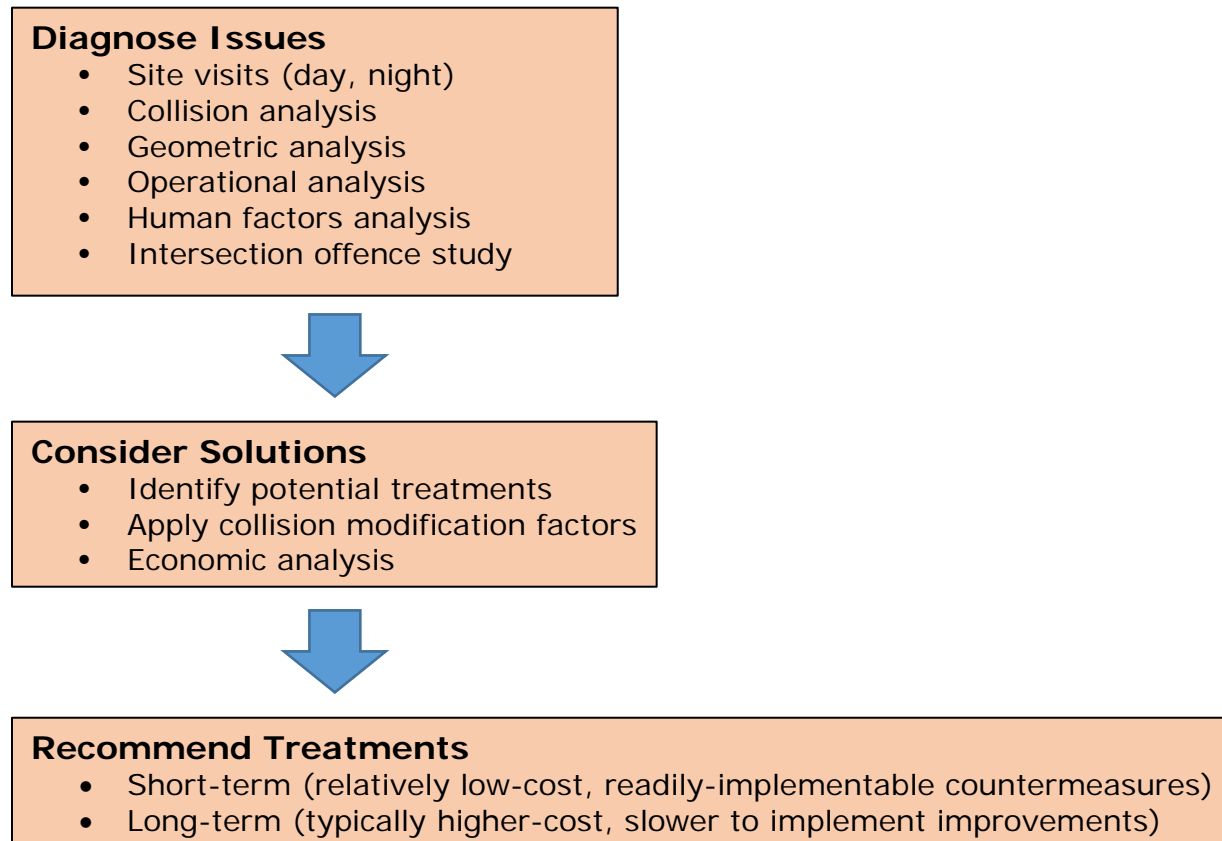
Stage Two: In-Service Road Safety Review (ISRSR)

Intersections under consideration for the installation of an ISD will undergo an ISRSR to determine the appropriate course of action. An ISRSR is an in-depth multi-disciplinary study of an existing road using road safety principles with the purpose of identifying cost-effective countermeasures to improve road safety and operations for all road users.

Detailed analysis of the collision history (in particular, the history of side impact collisions) and specific features of the intersections under consideration will be examined based on best practice.

As part of the ISRSR, intersection offence studies will be conducted to determine the frequency of speed and red light offences the intersection under consideration. The purpose of the survey is to identify locations where there is a high potential for serious collisions, even where there may not have been a high incidence of collisions. Utilizing this methodology in addition to collision history allows us to be proactive in preventing angle collisions.

Figure 1: The ISRSR Process

Diagnose Issues
- Site visits (day, night)
- Collision analysis
- Geometric analysis
- Operational analysis
- Human factors analysis
- Intersection offence study

Consider Solutions
- Identify potential treatments
- Apply collision modification factors
- Economic analysis

Recommend Treatments
- Short-term (relatively low-cost, readily-implementable countermeasures)
- Long-term (typically higher-cost, slower to implement improvements)

7.0   Evaluation of ISDs

In all cases, evaluation will take into account other contextual changes at the intersection, such as traffic volume change, signal timing changes, etc., as these changes may confound the results of the evaluation.

Evaluation of future ISD sites

ISDs installed going forward will be evaluated annually based on collision history (actual safety effects), offence and speed data (potential safety effects). Data collected during the ISRSR and the familiarization period will provide valuable baseline data for evaluation.

An ISD will be considered to be improving safety if there is a decrease in serious injury collision rate and/or a decrease in the offence ratio (#violations/volume of traffic) or driver speeds recorded at the intersection following the installation of the ISD.

Evaluation of ISD sites installed prior to 2016

As of January 1, 2016, there were 10 ISDs in operation at eight intersections in Strathcona County. Many of these locations have been operational for several years, some dating back as far as 1999.

For these sites, no baseline data is available. Collision history, offence ratio and speed data will still be tracked annually, but it will not be possible to measure the true extent of the safety benefit provided by their installation.

For these sites, the ISD will be considered to be improving safety if there is a decrease or no significant change in severe injury collision rate, offence ratio or driver speeds at the intersection.

Evaluation Reporting

These results will be made available for the public on the ISD webpage on the County website.

8.0   Removal of ISDs

Removal of an ISD may be considered if its evaluation reveals a decrease in safety or no actual or potential safety effects. Specifically, an ISD may be removed when

- An increase in serious injury collision rate is detected at an intersection for two consecutive years that can be clearly attributed to the installation of the ISD;
- No decrease is detected in the offence ratio (for either speed or red light infractions) or serious injury collision rate at an intersection for two consecutive years following the installation of a new ISD.

Evaluation results will be reviewed annually by the Traffic Safety Advisory Team (TSAT). The multidisciplinary expertise of the TSAT will be used in the analysis of any variances in ISD data and in the development of adjunct treatments to improve the effectiveness of the cameras. Should the decision be made to remove an ISD, the TSAT will recommend what should be done at the intersection to improve safety in lieu of the ISD.

9.0   Public education for ISDs

A key element to the success of any enforcement practice, including the use of ISDs, is the implementation of a strong public awareness campaign.

In accordance with the Province of Alberta's Automated Traffic Enforcement Technology Guidelines, the following criteria shall be met before ISDs are used:

- Permanent signs shall be posted on primary access roads entering Strathcona County alerting the public that automated traffic enforcement technology is used as a speed and red light enforcement tool in the municipality.

- Intersections where ISD(s) are in use will have signs posted in advance of the intersection, from all directions, to advise drivers that an intersection safety device may be in operation. As mentioned in section 5.0, this is also important to mitigate the potential for an increase in rear end collisions with the installation of ISDs.

Prior to the implementation of a new ISD site:

- Advertisement will be placed in the local media for a period of three months prior to enforcement taking place.

- A four-week familiarization period will be conducted with the equipment in regular use but issuing 'warning notices' to motorists.

Above and beyond provincial requirements for public awareness, Strathcona County will create and maintain an ISD webpage on the County website. This page will build awareness of ISD sites in the County and present best practice research regarding ISDs to help residents understand how they fit into our overall traffic safety vision. This webpage will also provide information on site selection criteria gathered for all ISDs installed after January 2018.

Appendix One - References

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