COUNTY OF WELLINGTON

COMMITTEE REPORT

To: Chair and Members of the Roads Committee
From: Don Kudo, County Engineer
Date: Tuesday, April 13, 2021
Subject: **Road MAP: Data Driven Safety Strategy**

Background:

Road safety was one of the items to be studied as part of the Road Master Action Plan (RMAP). The Data Driven Safety Strategy has now been developed and the strategy aligns with the Road Master Action Plan vision and goals:

"To connect people and goods across the County safely, conveniently, efficiently and sustainably."

- *Goal #1: Create a Transportation Network with a Focus on Safety*
- *Goal #7: Develop Transparent Policy Tools that Guide Investment Decisions in the Transportation Network.*

A data-driven safety strategy is different from a traditional safety review. This type of strategy and safety analysis relies on evidence-based data. It provides the ability to not only identify locations where there may be a safety problem but also to review causes and determine the overall impact to safety. This report summarizes the attached Data Driven Safety Strategy memo which provides guidelines for addressing public complaints, identifying problem areas, and evaluating mitigation alternatives.

Best Practices Review

A review of five local safety strategies was completed along with a review of the Transportation Association of Canada (TAC) 2004 Canadian Guide to In-Service Road Safety Reviews. The County's Safe Communities programme was also reviewed. The County's programme focuses on education and outreach and does not provide any engineering recommendations to improve safety. The development of a Data Driven Road Safety Strategy will help support the vision of the Safe Communities programme.

Process

The strategy's process is a data-driven approach that will be used to deliver a consistent road safety analysis for the County. The goal of the process is to determine whether a problem exists and to determine and implement appropriate mitigation measures and/or safety improvements.
The process is shown on the attached flow chart and the committee report provides a summary of the strategy process and the attached safety strategy memo.

Problem Identification – Collision: Analysis, Frequency Rating, Risk Determination

Collision analysis is critical to determine the validity of concerns and the analysis is the core of a road safety review. Reported collisions provide insight into the safety of an intersection or roadway segment through an analysis of collision types and causes.

Collision information was provided to the consultant from data compiled by County OPP. The strategy provides mapping of reported intersection related collisions on the County road network from 2011 to 2020.

Problem identification in the strategy consists of collision data being reviewed and evaluated for the frequency, rate, and severity of collisions to determine comparisons with industry standards and municipal experience, and determine the associated risk level. If a recurrence of a certain collision type is observed at an intersection or along a segment, it could be an indication of a certain design issue for the road or intersection in question. The methodology has been based on TAC's 2004 Canadian Guide to In-Service Road Safety Reviews.

The safety strategy provides thresholds for frequency and severity of collisions that conform to TAC's standards. Tables in the strategy provide the framework for determining the overall collision risk of an intersection or road segment, based on collision frequency and severity. The strategy's tables are similar to tables found in TAC's 2004 Canadian Guide to In-Service Road Safety Reviews. The analysis can be used to determine the overall collision risk to an intersection or roadway segment. The method allows for even rare collision areas to possibly merit closer review if a severe rating is applied.

A Collision Severity Rating table takes into account various collision types to determine severity. Primary causes of collisions can include a combination of design factors and human behavioural factors, which should be taken into account for proper engineering judgement, but do not factor into the Collision Risk determination laid out by TAC.

Once the frequency of collisions and the collision severity of the majority of collisions has been determined, the frequency rating and the severity rating is applied to the Collision Risk Determination table to determine the Collision Risk. The Collision Risk Determination table scores risks as follows:

A: Lowest Risk Level
B: Low-Risk Level
C: Low to Moderate Risk Level
D: Moderate to High-Risk Level
E: High-Risk Level
F: Highest Risk Level

After determining the Collision Risk, a location with a risk score of D, E or F indicates further analysis and screening, and if warranted, mitigation to be considered through the evaluation process.

Screening of Problem Area

Further screening of the problem area can include any or all of the following analyses. Each of these is laid out in detail within TAC's 2004 Canadian Guide to In-Service Road Safety Reviews and is summarized below:

- Geometric Analysis
- Operational Analysis
- Traffic Conflict Analysis
- Human Factors Analysis

Geometric Analysis

Collect or observe applicable geometric design standards or guidelines for the location in question. Characteristics considered include:

- Horizontal alignment
- Vertical alignment
- Cross-sectional elements
- Combinations (of otherwise low-risk geometric features)
- Design inconsistency

Operational Analysis

Assess travel demand / volume data to determine:

- Operational characteristics
- Operational efficiency
- Operation of traffic control devices

Traffic Conflict Analysis

- Prepare conflict diagram
- Evaluate conflict frequency, rate, severity, type and distribution

Human Factors Analysis

Human factors review utilizes knowledge of road user abilities and limitations:

- Review characteristic of road and the traffic control devices
- Minimize the potential for errors and collisions

Evaluation and Identification of Improvement Alternatives - Countermeasures

Tables in the strategy list some appropriate safety measures to be considered based on local context and engineering knowledge. TAC's 2004 Canadian Guide to In-Service Road Safety Reviews provides some effectiveness metrics for various measures. Possible mitigation measures applicable for road segments and intersections are noted below:

Intersection Countermeasures

- Change to Lanes or Traffic Control
- Cross-Section Modification
- Traffic Calming
- Education Campaign

Road Segment Countermeasures

- Speed Limit Modification
- School Zone
- Community Safety Zone
- Automated Speed Enforcement (ASE)
- Cross-Section Modification
- Traffic Calming
- Controlled Pedestrian Crossing
- Education Campaign

A number of these safety measures are detailed within the Speed Management Guidelines that are provided in a separate report and document.

Implementation Processes – Engineering, Funding, Engagement and Education

Once a preferred solution has been identified along a corridor or at an intersection, the following process can be followed for its implementation:

Engineering Process

Based on available safety measures, technical decisions will be needed if any modifications and/or educational campaigns should be undertaken. Should there be a need to change the geometry or traffic control at an intersection, technical warrants (i.e. traffic signal warrants, right turn / left turn auxiliary lane warrants) will help guide the decision-making process. Along corridors, warrants also exist for School Zones, Community Safety Zones or Controlled Pedestrian Crossings. A detailed process for determining modifications to address speeding issues along county road corridors is outlined in the Speed Management Guidelines.

Funding Process

An economic evaluation should be conducted as part of the road safety review to quantify the cost-effectiveness of the recommended mitigation measures. The evaluation considers the estimated capital and operating costs for each measure and compares this with the benefits of the actual modification. This requires a costing exercise considering capital and operating costs and social, property, and legal costs. The funding process will be used to inform priorities.

Engagement and Education Process

The development and implementation of effective education and communication strategies that inform stakeholders about the need and importance of mitigation measures are critical to the success of implementation. An overall engagement and education process has been outlined within the Speed Management Guidelines.

Next Steps

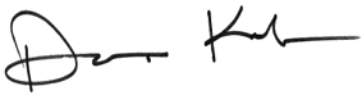
Should the Committee endorse Data Driven Safety Strategy, the following steps would be undertaken:

- Consultation with departments and OPP
- Confirmation of collision data programme
- Confirmation/prioritization of criteria and solutions
- Identification and prioritization of possible projects
- Alignment with ongoing initiatives/programs
- Recommendation of projects to Committee/Council as needed

Recommendation:

That the Road MAP: Data Driven Safety Strategy as outlined in the report and memo be endorsed as part of the Road Master Action Plan.

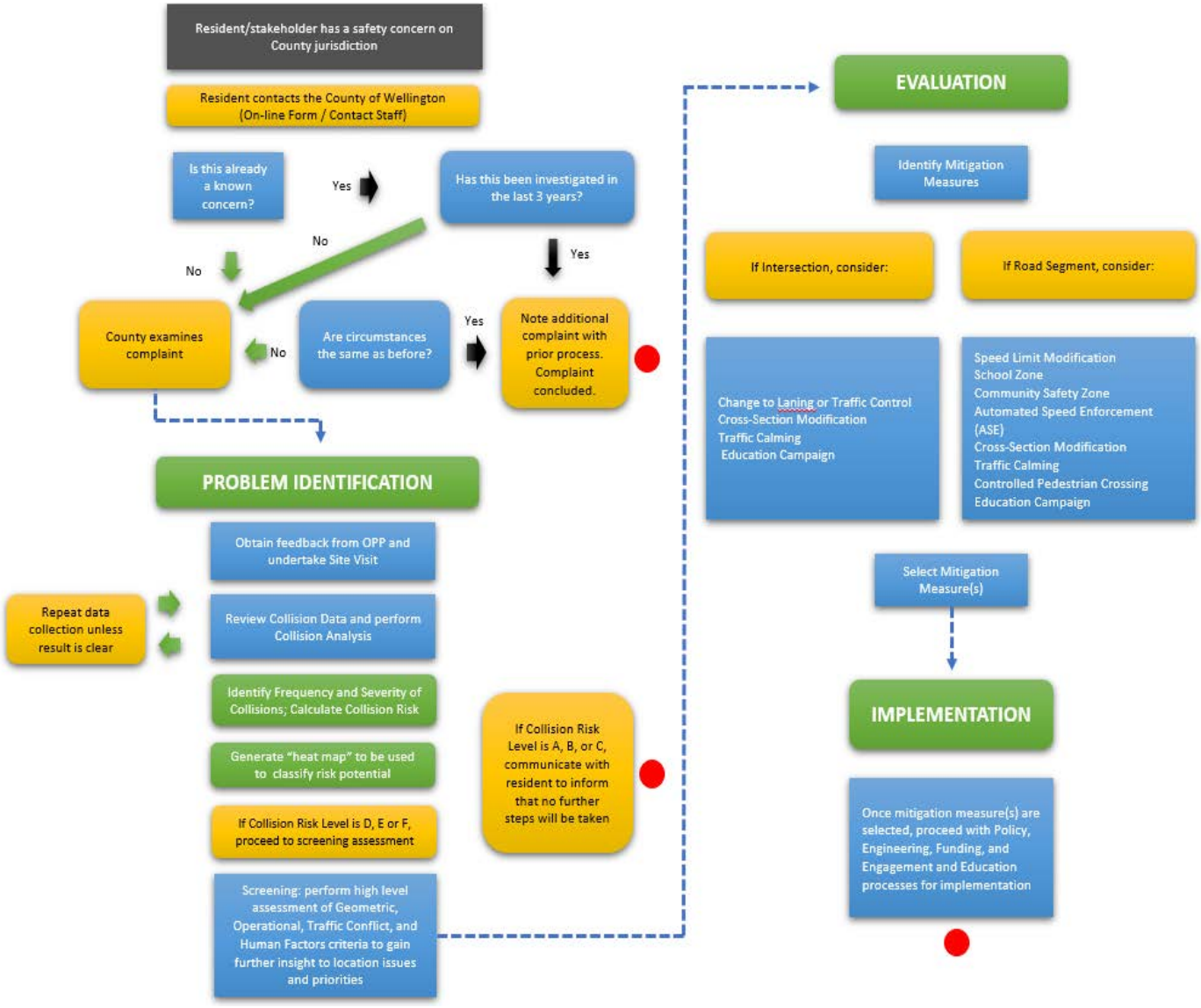
Respectfully submitted,



Don Kudo, P. Eng.
County Engineer

Attachment: Road Safety Process
Memo - Wellington County RMAP – Data-Driven Safety Strategy

Attachment 1: Road Safety Process


Resident/stakeholder has a safety concern on County jurisdiction
Resident contacts the County of Wellington (On-line Form / Contact Staff)
Is this already a known concern?
Yes
Has this been investigated in the last 3 years?
No
Yes
No
County examines complaint
No
Are circumstances the same as before?
Yes
Note additional complaint with prior process. Complaint concluded.
PROBLEM IDENTIFICATION
Obtain feedback from OPP and undertake Site Visit
Repeat data collection unless result is clear
Review Collision Data and perform Collision Analysis
Identify Frequency and Severity of Collisions; Calculate Collision Risk
Generate "heat map" to be used to classify risk potential
If Collision Risk Level is D, E or F, proceed to screening assessment
If Collision Risk Level is A, B, or C, communicate with resident to inform that no further steps will be taken
Screening: perform high level assessment of Geometric, Operational, Traffic Conflict, and Human Factors criteria to gain further insight to location issues and priorities
EVALUATION
Identify Mitigation Measures
If Intersection, consider:
If Road Segment, consider:
Change to Laning or Traffic Control
Cross-Section Modification
Traffic Calming
Education Campaign
Speed Limit Modification
School Zone
Community Safety Zone
Automated Speed Enforcement (ASE)
Cross-Section Modification
Traffic Calming
Controlled Pedestrian Crossing
Education Campaign
Select Mitigation Measure(s)
IMPLEMENTATION
Once mitigation measure(s) are selected, proceed with Policy, Engineering, Funding, and Engagement and Education processes for implementation