

Memo

Date: Wednesday, April 22, 2026

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Cc: Rob Hillis, Senior Manager of Engineering and Capital Projects, City of West Kelowna
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From: Bryan Tran, Transportation Planner, HDR Corporation

Subject: Vineyard Drive All-Way Stop Control Feasibility

1 Introduction

Background

HDR Corporation was retained by the City of West Kelowna to conduct an evaluation and provide recommendations for traffic calming on Vineyard Drive from Boundary Road to Pinot Gris Road. Residents along this site had previously observed and expressed concerns regarding excessive speeding, traffic volume, and safety risks in their neighbourhood. In 2025, HDR provided the *Vineyard Drive Traffic Calming Study* which verified the need for traffic calming and provided recommendations for traffic calming based on the observed traffic behaviour.

The study was presented to City Council in 2026, and the City requested that HDR assess the feasibility adding all-way stop control (AWSC) to the Ridge Boulevard intersection. The results are presented in this memorandum.

Existing Conditions

The Vineyard Drive & Ridge Boulevard intersection currently has a stop control for the Ridge Boulevard south approach, while Vineyard Drive east and west approaches are free-flow. Per the *Transportation Master Plan (2026, Draft)*, Ridge Boulevard and Vineyard Drive west of Ridge Boulevard are classified as major collector roads, which allow for higher degree of mobility, connecting communities such as South Boucherie to arterial and regional roads. The east approach of Vineyard Drive extending to Pinot Noir Drive is classified as a minor collector road, a road classification which balances providing more residential access with some mobility options that connect to the larger road network. Thus, based on the role and function of the existing road network, it is anticipated that the west approach of Vineyard Drive and Ridge Boulevard are intended to carry more traffic and the east approach of Vineyard Drive.

The surrounding land use context is largely low-density single-family homes. Vineyard Park is located at the southwest corner of the Vineyard Drive & Ridge Boulevard intersection. The park has a playground, picnic tables, and open green space. **Figure 1** shows the site and existing traffic control.

Figure 1: Study Site (Vineyard Drive & Ridge Boulevard Intersection)



References and Data

Upgrading the traffic control of an intersection to AWSC falls outside of the typical traffic calming treatments found in references and guidelines that were used in the *Vineyard Drive Traffic Calming Study*. Assessing the feasibility of AWSC at the Vineyard Drive & Ridge Boulevard intersection will refer to guidelines found in the following standards:

- 1) Transportation Association of Canada's ("TAC") *Manual of Uniform Traffic Control Devices for Canada* ("MUTCDC"), *Sixth Edition* (2021); and,
- 2) Ministry of Transportation and Transit's ("MoTT") *Manual of Standard Traffic Signs and Markings* (2000).

The City of West Kelowna collected traffic volume data for this intersection on April 8-10, 2026, and the 2020 to 2024 collision history for this intersection was provided from ICBC.

2 All-Way Stop Control Analysis

The TAC and MoTT manuals listed above provide guidelines for AWSC feasibility at Vineyard Drive & Ridge Boulevard.

The MUTCDC lists several reasons for why AWSC **should not** be considered at this intersection. An excerpted list of reasons that are relevant to this intersection's configuration is listed below:

- As a speed control device (i.e., traffic calming);
- As a means of deterring the movement of through traffic in a residential area (i.e., "shortcutting");
- On multi-lane approaches where a stopped or parked vehicle will obscure the stop sign;
- Where traffic would be required to stop on grades; and,
- Where the protection of pedestrians or other vulnerable road users is a prime concern and the concern would be more effectively addressed by other means.

The MoTT *Manual* also provides similar disqualifying reasons, stating that stop control should not create unnecessary delay, nor be used as a primary tool for traffic calming.

Both guides are explicit in that AWSC should not be used as speed control (i.e., traffic calming) devices. This is notable because both this memorandum and the *Traffic Calming Study* are engineering reports which were initiated by resident concerns involving high motorist speeds. However, both guides do provide other criteria which may potentially support AWSC installation at this intersection, listed below in **Table 1**. These evaluations largely pertain to installing AWSC to safely and efficiently operate the road. One or more of the conditions below should be met to consider AWSC. The conditions are excerpted from both manuals, but do not include complex conditions not relevant to this intersection (for instance, omitting the analysis of similar intersections' safety records due to unavailable data or omitting irrelevant conditions such as signalization).

Table 1: AWSC Thresholds for Vineyard Drive & Ridge Boulevard

Threshold for AWSC Consideration	Reference	Data & Analysis Required
Traffic volumes on intersection roads are approximately equal, and that multi-modal volumes on the minor road average 200 per hour over eight hours	MUTCDC	Traffic Volume Analysis
1) Traffic volumes on intersection roads are approximately equal, and that multi-modal volumes on the minor road exceed 500 per hour for any of the eight hours and, 2) Right-angle or turning collisions exceed 5 or more per year over a 3-year period	MoTT <i>Manual</i>	1) Traffic Volume Analysis 2) Collision History Review
For the existing configuration, the average delay of the minor road entering the intersection exceeds 30 seconds per vehicle in the peak hour	MUTCDC	Control Delay Estimation via Synchro 12
Collisions per year exceed 5 or more per year over a 3-year period	MUTCDC	Collision History Review

For this study, the Ridge Boulevard approach will be defined as the minor road at the intersection. Although the east approach (Vineyard Drive) of this intersection has a lower functional classification, the Ridge Boulevard approach has an existing stop control while east and west approaches of Vineyard Drive provide a continuous through movement.

Traffic Volume Analysis

The City of West Kelowna collected traffic volumes with Miovision cameras at this intersection between Wednesday, April 8, 2016 and Friday, April 10, 2016. Multi-modal (e.g., car, bike, pedestrian) volumes were collected for the AWSC analysis¹. The count took place during the following times:

- April 8, between 8:30am to 7:30pm;
- April 9, between 5:30am to 7:30pm; and,
- April 10, between 5:30am to 12:30pm.

The volumes collected on April 8 and April 9 satisfy the eight-hour count requirement specified in both the MUTCDC and MoTT *Manual*. **Table 2** shows the general characteristics of the approach entering volume data during the three peak periods identified.

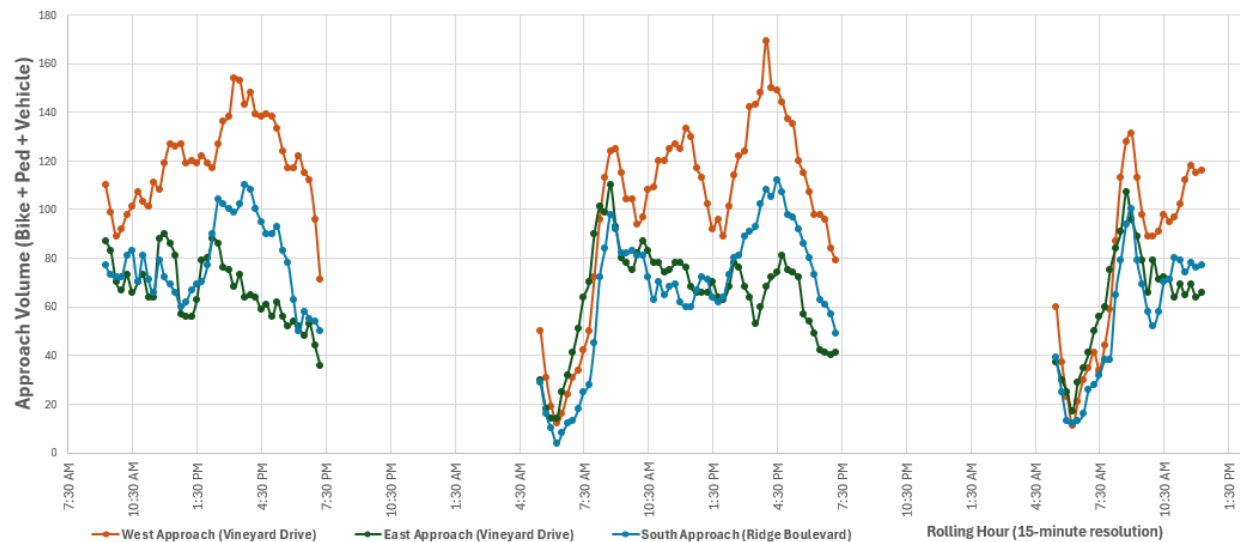
¹It is noted that Easter Monday fell on April 6, which may have affected data collection resulting in lower volumes (i.e., due to the possibility extended vacations taken by residents).

Table 2: Approach Entering Volumes (Pedestrian + Bike + Vehicle)

Count Start Time	West	East	South
AM Peak (April 9 @ 8am)	125	110	108
MD Peak (April 8 @ 11:30am)	127	86	71
PM Peak (April 9 @ 3:15pm)	169	68	111

When considering all three approaches, entering volumes vary throughout a typical weekday. Approach volumes are observed to be typically highest at the west approach. To consider AWSC, the approach volumes are required to be approximately equal. **Figure 2** compares the approach entering volumes at all rolling hours captured in the traffic volume data.

Figure 2: Approach Entering Volumes by Rolling Hour, Vineyard Drive & Ridge Boulevard, April 8-10



The figure illustrates that throughout the count days, the west approach of Vineyard Drive consistently serves the highest volumes and that traffic distribution at this intersection is non-uniform which furthermore does not meet the AWSC condition of approach volumes being approximately equal. From this, AWSC is not considered from an approach volume analysis perspective.

The traffic volume thresholds at this intersection that need to be met to consider AWSC are:

- 1) Minor approach (Ridge Boulevard) multi-modal volumes exceeding an average of 200 per hour, for eight hours of the count day; or,
- 2) Total entering volumes for the intersection exceeding 500 per hour, occurring once during the count day.

Table 3 shows the count hour intervals for each collection day and minor road (i.e., Ridge Boulevard) traffic volume for that hour.

Table 3: Rolling Hour Ridge Boulevard Approach Volumes (Pedestrian + Bike + Vehicle)

<i>Count Start Time</i>	Wed, Apr 8	Thurs, Apr 9	Fri, Apr 10
<i>5:30am</i>	x	4	12
<i>6:30am</i>	x	18	28
<i>7:30am</i>	x	72	65
<i>8:30am</i>	82	82	79
<i>9:30am</i>	88	81	58
<i>10:30am</i>	74	65	79
<i>11:30am</i>	71	60	77
<i>12:30pm</i>	67	71	x
<i>1:30pm</i>	91	73	x
<i>2:30pm</i>	102	91	x
<i>3:30pm</i>	102	105	x
<i>4:30pm</i>	96	97	x
<i>5:30pm</i>	56	73	x
<i>6:30pm</i>	52	49	x

Across the available count hours, there are no occurrences where 200 or more multi-modal volumes per hour were observed entering from the minor road approach. The threshold where eight count hours requires an exceedance of 200 volumes per hour failed to be met, and AWSC is not considered from a minor approach volume analysis perspective.

Table 4 shows the count hour intervals for each collection day and total entering intersection volumes for that hour.

Table 4: Total Entering Intersection Volumes (Pedestrian + Bike + Vehicle)

<i>Count Start Time</i>	Wed, Apr 8	Thurs, Apr 9	Fri, Apr 10
5:30am	x	30	41
6:30am	x	103	122
7:30am	x	278	242
8:30am	279	285	290
9:30am	259	271	221
10:30am	239	263	252
11:30am	284	273	264
12:30pm	243	242	x
1:30pm	296	246	x
2:30pm	324	297	x
3:30pm	305	330	x
4:30pm	291	308	x
5:30pm	230	224	x
6:30pm	159	173	x

Across the available count hours, there are no occurrences where 500 or more multi-modal volumes per hour were observed entering the Vineyard Drive & Ridge Boulevard intersection. The threshold where one count hour requires an exceedance of 500 volumes per hour failed to be met, and AWSC is not considered from a total entering intersection volume analysis perspective.

Minor Approach Control Delay Analysis

The criteria for AWSC consideration requires that the existing average peak-hour delay on the minor approach meets or exceeds 30 seconds per vehicle. The peak hour approach volumes were summarized earlier in **Table 2**. This analysis will proceed with the higher-volume PM peak hour by modelling the turning movement volumes in Synchro 12's two-way stop control analysis to determine the average control delay for vehicles entering the intersection from Ridge Boulevard.

The turning movement volumes used are shown in **Table 5**.

Table 5: PM Peak Hour Volumes at Vineyard Drive & Ridge Boulevard (3:15 PM on April 9, 2026)

<i>Turning Movement Volumes (veh/hr)</i>	Left	Through	Right
<i>West approach (EB)</i>	-	81	88
<i>East approach (WB)</i>	17	51	-
<i>South approach (NB)</i>	21	-	85

The control delay imposed by the two-way stop control on vehicles entering the intersection from Ridge Boulevard is expected to be 9.7 seconds per vehicle. The threshold where the control delay requires an exceedance of 30 seconds per vehicle fails to be met, and AWSC is not considered from an intersection capacity perspective.

Collision History Review

The threshold for AWSC consideration requires the observance of five or more collisions per year (over three years) of a type correctable by AWSC (e.g., turning movement or right-angle collisions).

The *Vineyard Drive Traffic Calming Study* overviewed the 5-year collision history on Vineyard Drive from 2020 through 2024. At Vineyard Drive & Ridge Boulevard, three property damage-only collisions were observed across the 5-year collision history. The collision frequency threshold is not met, and AWSC is not considered from a collision history perspective.

3 Summary of AWSC Evaluation

Through traffic volume analysis, control delay analysis, and a collision history review, the thresholds listed earlier for AWSC clarification were evaluated and all thresholds failed to be met. **Table 6** summarizes these findings.

Table 6: Summary of Findings for AWSC Thresholds at Vineyard Drive & Ridge Boulevard

Threshold for AWSC Consideration	Analysis Findings
Traffic volumes on intersection roads are approximately equal, and that multi-modal volumes on the minor road average 200 per hour over eight hours	Not Warranted Traffic volumes are approximately not equal, minor road volumes average approximately 80 vehicles per hour over the 8-hour count period.
1) Traffic volumes on intersection roads are approximately equal, and that multi-modal volumes on the minor road exceed 500 per hour for any of the eight hours and, 2) Right-angle or turning collisions exceed 5 or more per year over a 3-year period	Not Warranted Traffic volumes are approximately not equal, maximum total peak hour traffic volume at the intersection is 330. Collisions per year are 0.6 over a 5-year period.
For the existing configuration, the average delay of the minor road entering the intersection exceeds 30 seconds per vehicle in the peak hour	Not Warranted Minor road delay is approximately 9.7 seconds per vehicle in the peak hour.
Collisions per year exceed 5 or more per year over a 3-year period	Not Warranted Collisions per year are 0.6 over a 5-year period.

END OF MEMORANDUM