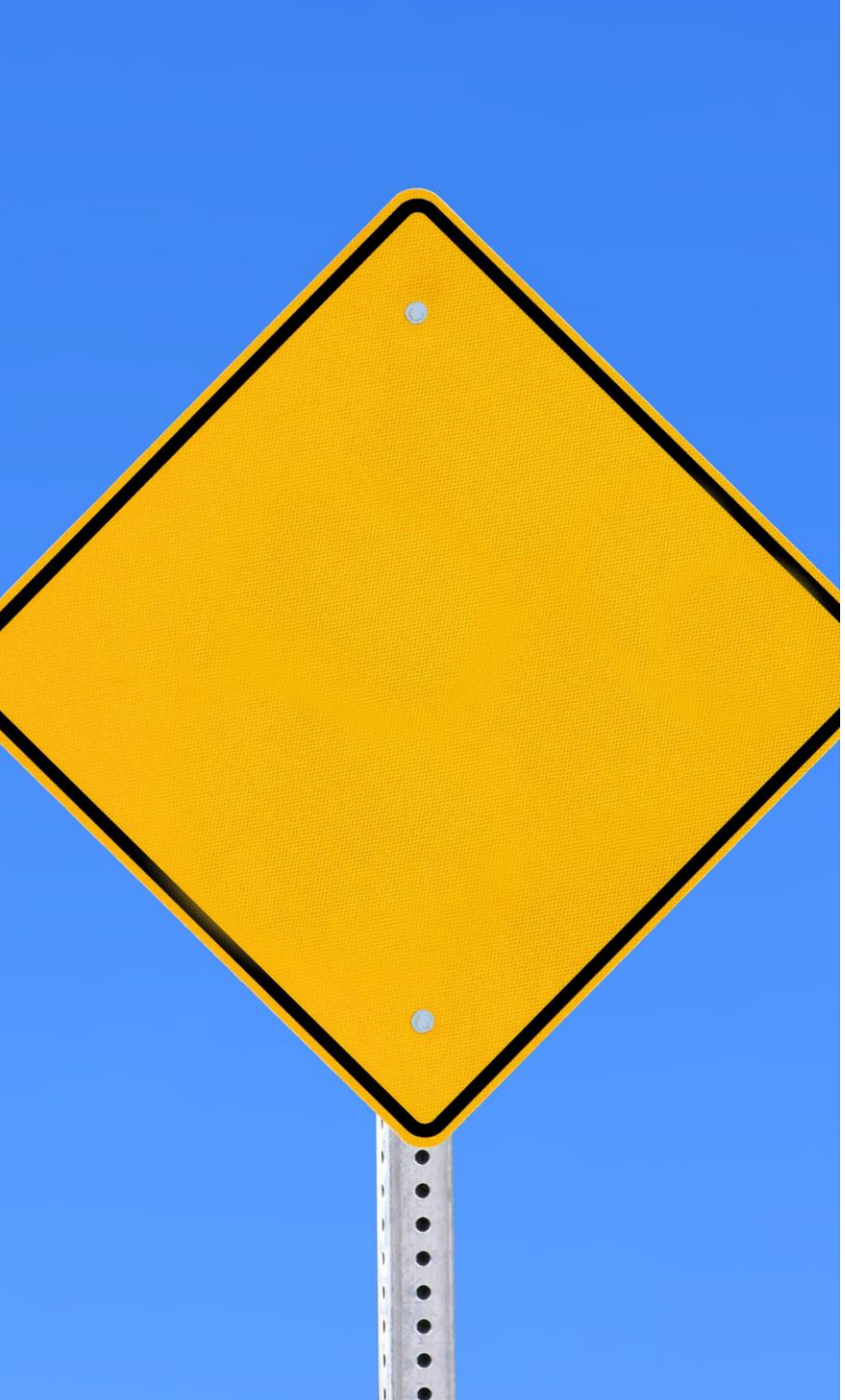
City of Kelowna

Adaptive Signal Timing Trial, Springfield Corridor

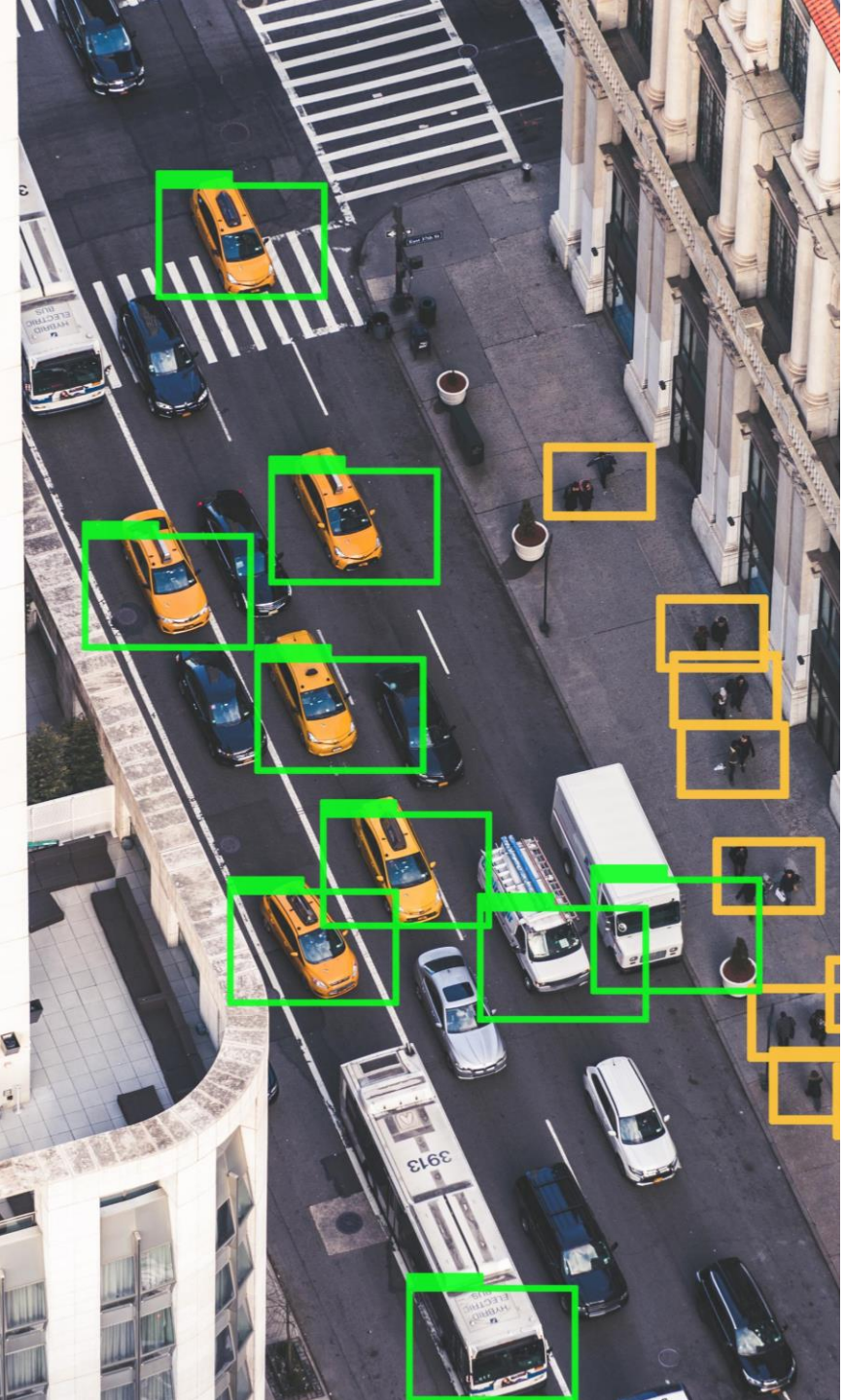
July 21, 2025

Introduction



Traditional vs Adaptive Signal Timing

- Traditional timing uses fixed schedules for traffic signals.
- Adaptive timing adjusts signal phases based on real-time traffic conditions.
- Fixed schedules often lead to inefficiencies during variable traffic.
- Adaptive systems improve flow by responding to congestion dynamically.
- Data-driven decisions enhance travel times in adaptive signal systems.



Methodology

Pilot Overview

The pilot lasted for 9 months, focusing on adaptive signal timing on the Springfield Road corridor. It aimed to enhance traffic flow using real-time data.

Key Intersections

Five key intersections were managed in real-time using the Adaptive System instead of fixed schedules, enhancing responsiveness to traffic conditions.

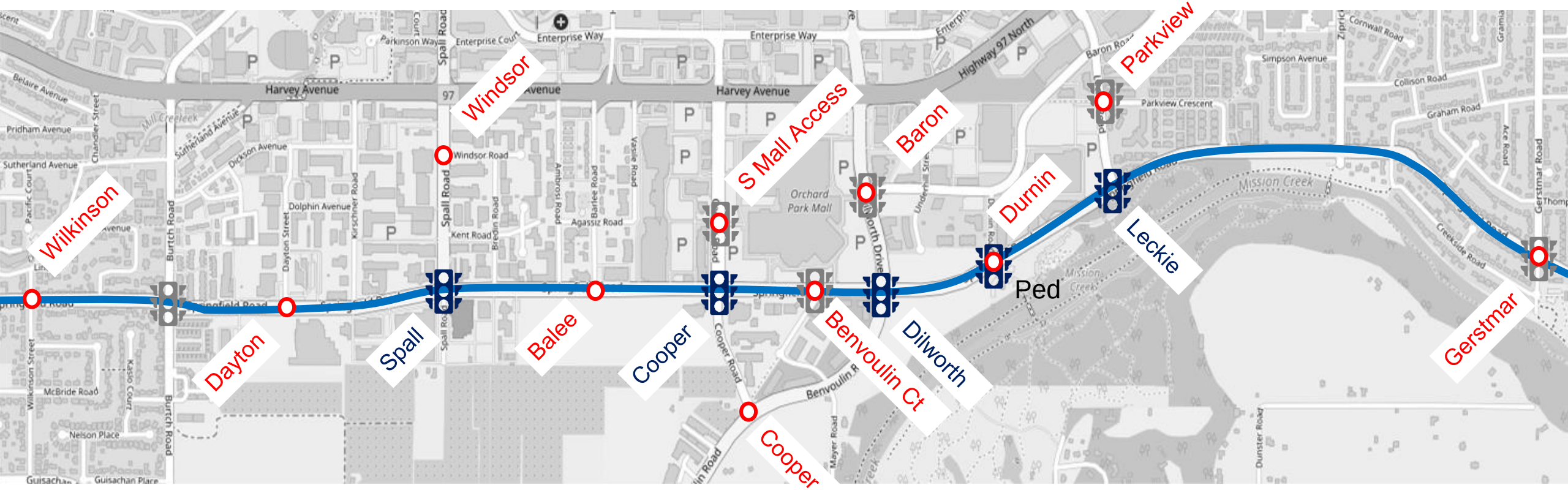
Data Evaluation

Performance was assessed by comparing travel data with adaptive systems against a baseline of standard timings, ensuring accurate results and a robust methodology was employed to ensure a fair before-and-after comparison of corridor performance.

Sample Collection

Travel times were collected using Google Maps data, with 4 samples taken per day between 6 AM and 10 PM for detailed analysis.

Corridor Placement & Data Points



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Observed Improvements in Traffic Flow

Faster Travel Times

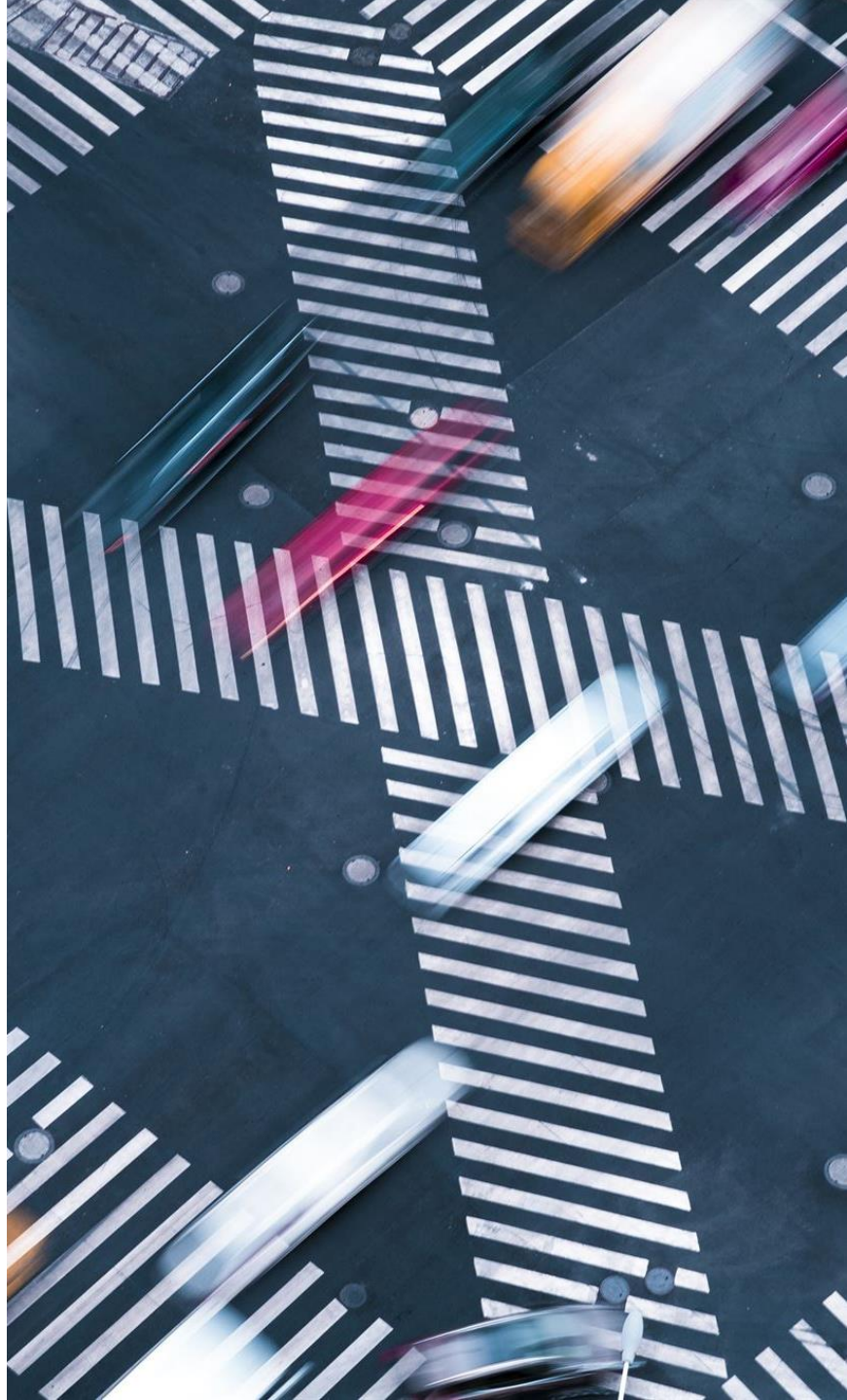
Drivers experienced quicker trips with an average reduction in eastbound travel times by about 20 seconds.

Peak Period Efficiency

During peak hours, the eastbound Springfield corridor became about 5% faster, yielding significant time savings.

Consistent Off-Peak Conditions

Overnight and early-morning travel times remain stable, indicating no negative impact on off-peak traffic flow.



Reduction in Delays and Stop-and-Go

Efficient Green Time Allocation

By optimizing green signal timing, the system significantly reduced traffic delays for Springfield drivers, enhancing overall flow.

Time Savings for Drivers

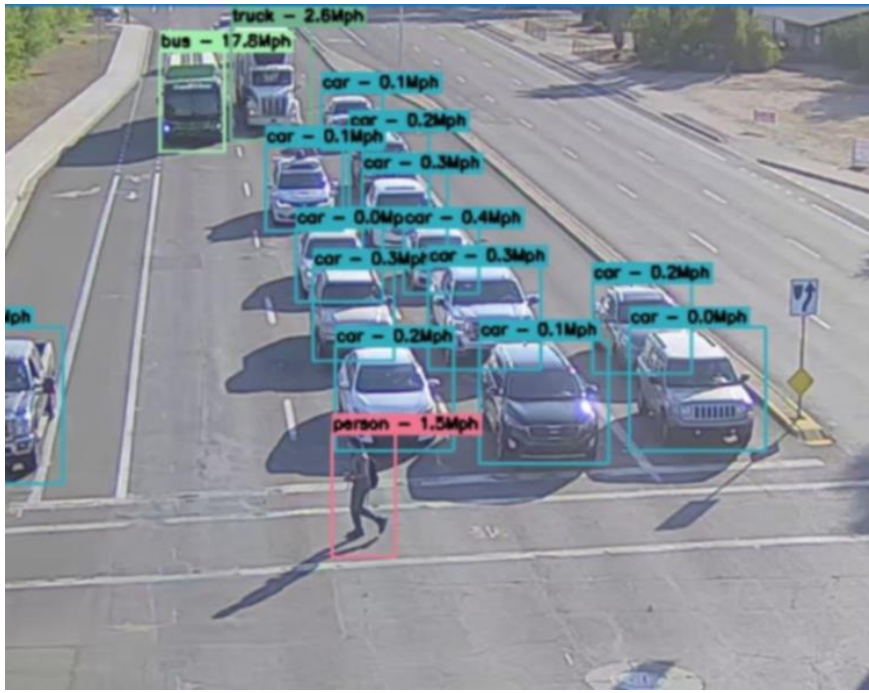
Springfield drivers now benefit from an estimated 39,000 hours of travel time saved annually, leading to improved travel efficiency.

Environmental Benefits

The reduction in delays results in lower emissions, with an estimated 131.5 tonnes of CO_2e reduced annually, contributing to a greener environment.

Improved Travel Predictability

With reduced stop-and-go traffic, drivers experience less frustration and more predictable travel times, enhancing overall satisfaction.



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Intersection Performance

Overall Delay Improvement

All five signalized intersections showed an overall improvement in delay, enhancing traffic flow and efficiency.

Significant Reductions

The largest reductions in delay occurred at Springfield & Dilworth/Benvoulin, with a 40% decrease in delays.

Minor Changes Observed

Some minor movements, like certain left turns, saw small increases, but these were limited and did not affect overall improvements.

Consistency of Results

Positive Trend Confirmation

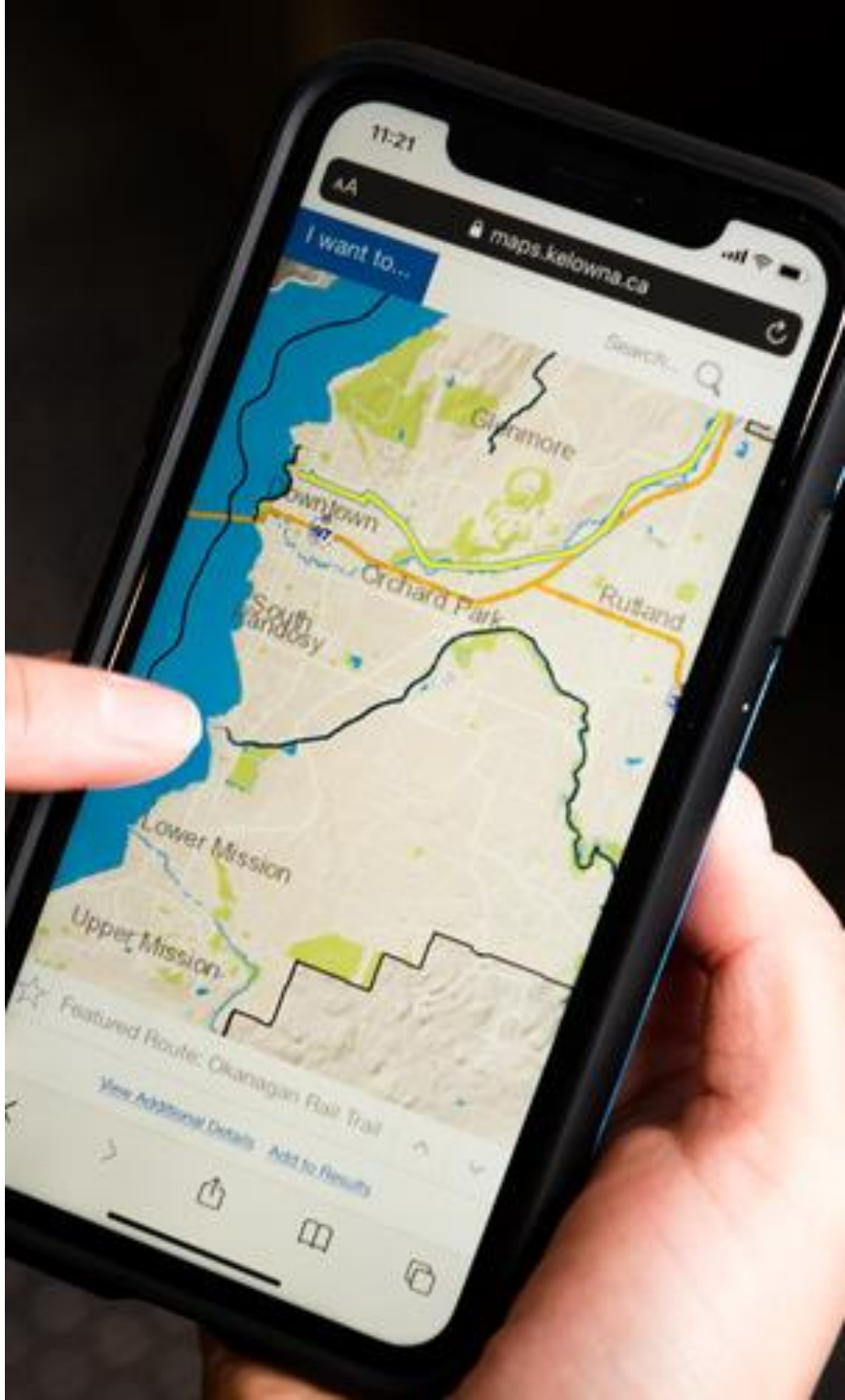
The pilot data showed consistent positive trends across both Google metrics and internal measurements, validating the findings.

Isolated Discrepancy

A minor discrepancy was noted with one specific movement, but this was an isolated case that did not affect overall results.

Overall Improvement

Both data sources confirmed that adaptive signals improved travel times significantly where it mattered most, enhancing efficiency.



Detailed Results

AM Peak

Intersection	MOS Delay (sec/veh)			Dashboard Delay (sec/veh)			
	After	Before	Change	After	Before	Change	
Spall	11	9	-22%	31.65	26.44	-20%	
Cooper	9	10	+10%	19.95	26.88	+26%	
Dilworth	16	17	+6%	28.21	31.66	+11%	
Durnin	2	2	0%	5.47	7.15	+23%	
Leckie	11	9	-22%	16.17	12.8	-26%	

PM Peak

Intersection	MOS Delay (sec/veh)			Dashboard Delay (sec/veh)			
	After	Before	Change	After	Before	Change	
Spall	15	13	-15%	39.95	38.91	-3%	
Cooper	15	17	+11%	38.32	57.01	+33%	
Dilworth	24	23	-4%	52.91	61.99	+15%	
Durnin	1	1	0%	3.59	3.8	+6%	
Leckie	12	15	+20%	17.9	21.47	+17%	

Comparing June 18 2025

All day (24-hr)

Intersection	MOS Delay (sec/veh)			Dashboard Delay (sec/veh)			
	After	Before	Change	After	Before	Change	
Spall	10	10	-0%	35.08	42.46	+17%	
Cooper	9	10	+10%	30.32	39.67	+24%	
Dilworth	15	15	0%	35.86	41.39	+13%	
Durnin	1	1	0%	3.88	5.3	+27%	
Leckie	9	9	0%	16.0	18.19	+12%	

MOS – Mobility Optimization Software

Summary of Results

Overall Travel Delay Reduction

The trial successfully reduced travel delays, significantly improving eastbound travel times and modestly for westbound traffic.

Improved Vehicle Flow

Major intersections experienced improved vehicle flow, contributing to a more efficient corridor for all motorists.

Community Benefits

The time savings of 20-25 seconds per vehicle eastbound, along with improved reliability, benefits the community significantly.

Minimal Impact on Side Streets

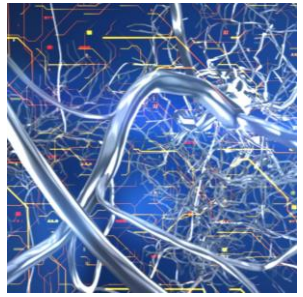
The pilot effectively improved traffic without compromising side streets or pedestrian service, ensuring minor delays were acceptable.

Recommendations for Expansion

Expansion Plan

Phased Rollout

The expansion will be conducted in a phased rollout to ensure smooth implementation and monitoring of adaptive signal technology.



Candidate Locations

Potential candidate corridors for the next phase focusing on high-congestion areas as well as single intersections and exploring opportunities for cross corridor coordination trials

Congestion Patterns

Priority will be given to areas with similar congestion patterns to maximize the effectiveness of the technology.

Review and Fine-Tuning

Reviewing Inconsistencies

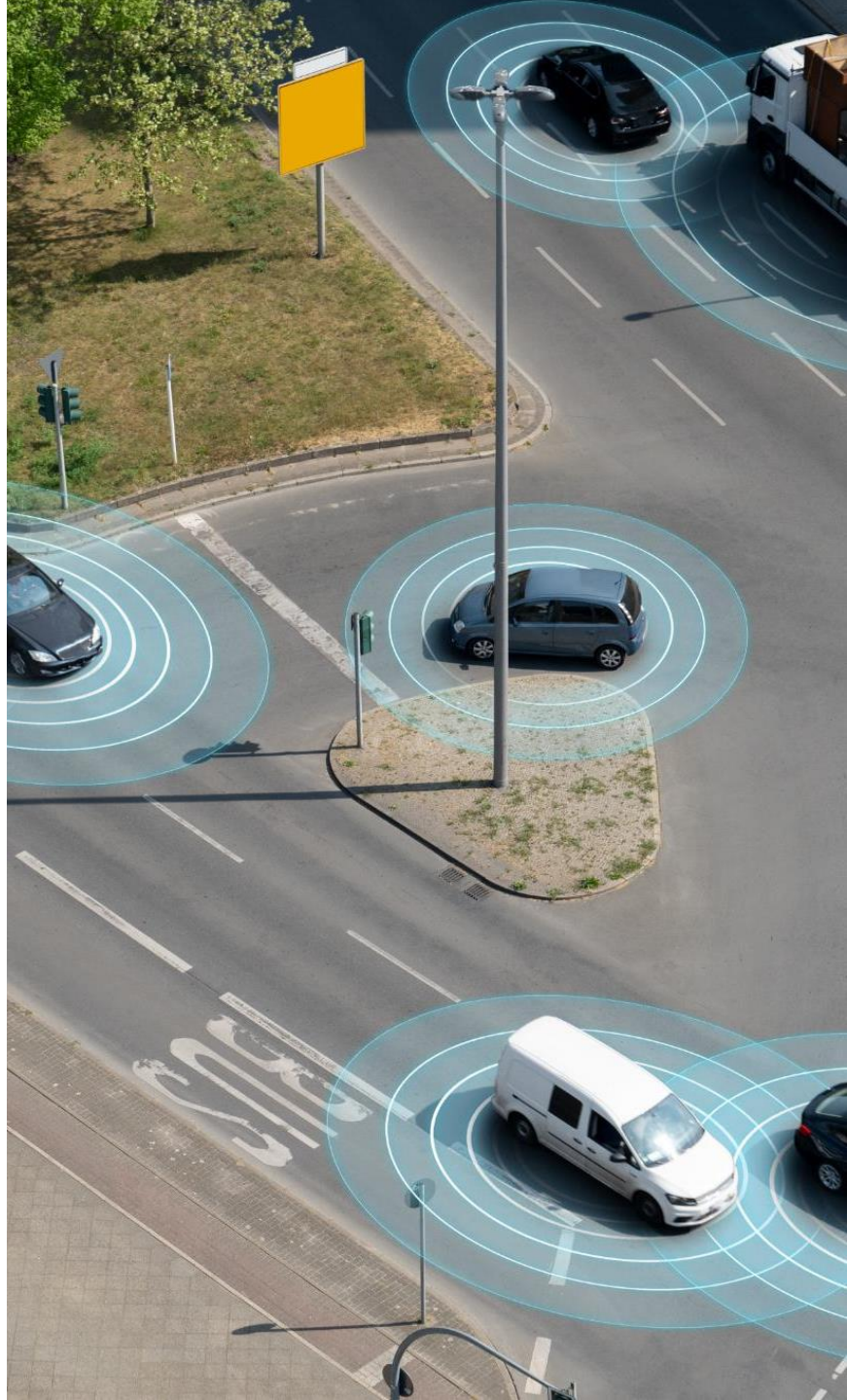
Minor inconsistencies in traffic flow will be critically analyzed and fine-tuned before further expansion.

Adaptive Signal Implementation

The adaptive signal pilot implementation is a cost-effective strategy for improving traffic flow and reducing delays and emissions.

Support for Smart Transportation

Continued council support for smart transportation will help scale improvements citywide, benefiting all residents.



Questions?

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