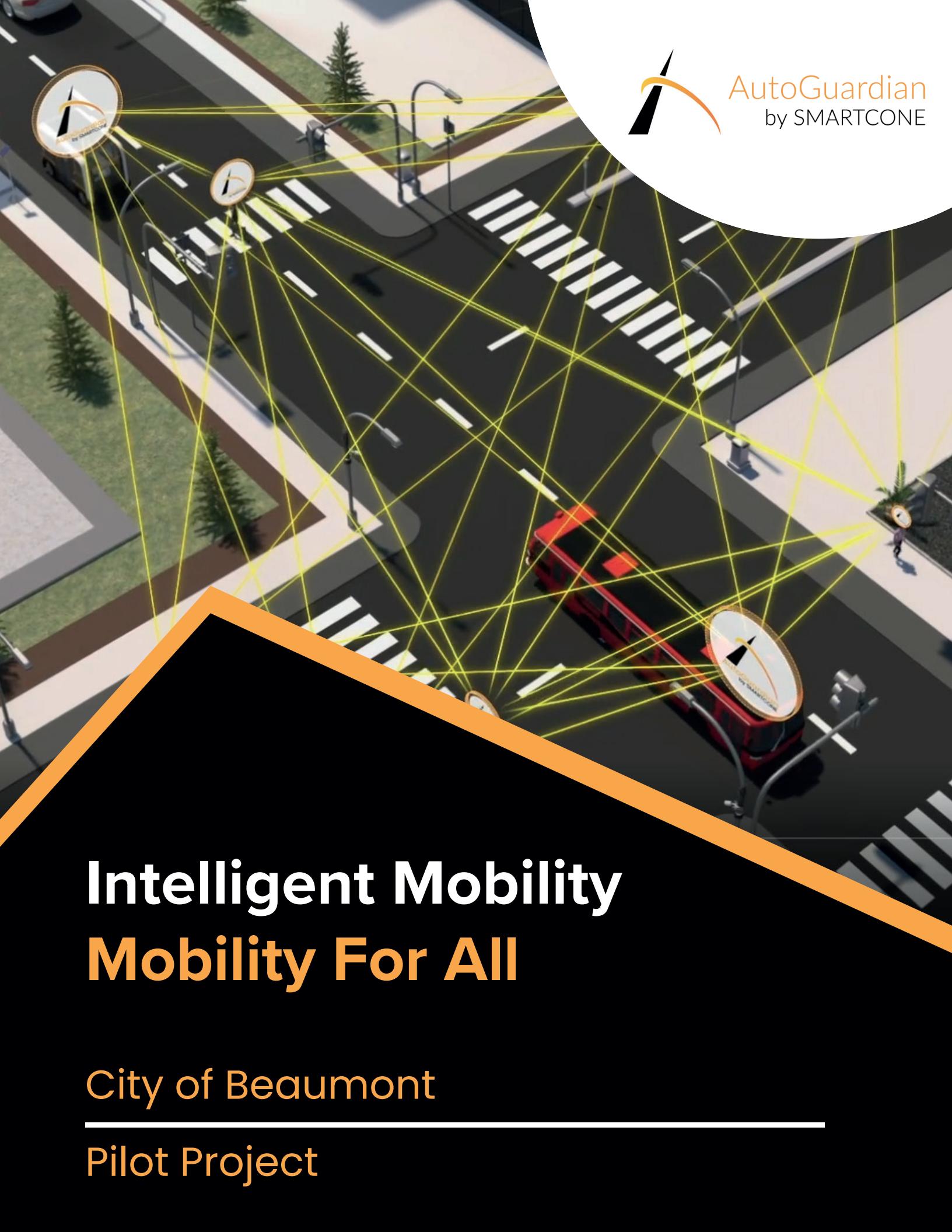




AutoGuardian  
by SMARTCONE



# Intelligent Mobility

## Mobility For All

City of Beaumont  
Pilot Project

# WHO ARE WE?

AutoGuardian provides intelligent mobility solutions to get people to their destination in a safer, smarter and more eco-friendly way.

From first and last mile AV shuttle operations, to intelligent infrastructure for safer bike lanes, crosswalks, and connected and autonomous vehicles (C/AV), we aim to increase mobility for all.



## THE MISSION

*To provide an intelligent warning system with advanced alerting of vulnerable road users.*

**“With distracted driving at an all time high, we need to increase situational awareness for cyclists, pedestrians and vehicles co-located in high traffic areas.”**



**Tenille Houston**  
Co-Founder & CEO

# THE STATUS QUO

Pedestrians and vehicles can become distracted

Unmonitored vehicle speeds

Can become faded and hard-to-see

No comparison of movement of traffic and pedestrians

Unable to give actionable insights of improvement



## THE PROBLEM

Every year, 1.6 million, or 25% of car accidents involve a distracted driver (25%) (National Safety Council, 2019).

Pedestrians only use push button on crosswalk systems 60% of time, other 40% is thus exposed to potential accidents (Light Guard Systems, n.d.).

**165000**

Canadian Pedestrians are injured each year (CACP, 2020)

18% of whom were a result of **distracted driving**

**300**  
Canadian Pedestrians  
are killed each year



# THE SOLUTION

By placing sensors high up on infrastructure, AutoGuardian can provide a birds eye view to detect vulnerable roads users (VRU) through artificial intelligence (AI). The AI detection system then wirelessly communicates with nearby Intelligent Torches on either side of the crossing, to automatically trigger flashing lights to actively alert nearby motorists of approaching VRUs, thereby safely coordinating movement.



## Infrastructure Sensors



### Tower Module

Computing and communications  
(Private LTE, 4G/5G, Wi-Fi)

### Cameras

Directional, thermal, PTZ

### Artificial Intelligence

Object classification & count of cars,  
people, cyclists, etc.

### RADAR

Detect speed and direction

## Roadside Sensors



### LED Light

Customizable colors per alarm length  
of flash, intensity of flash

### Portable

Bases can be moved

### Solar-powered

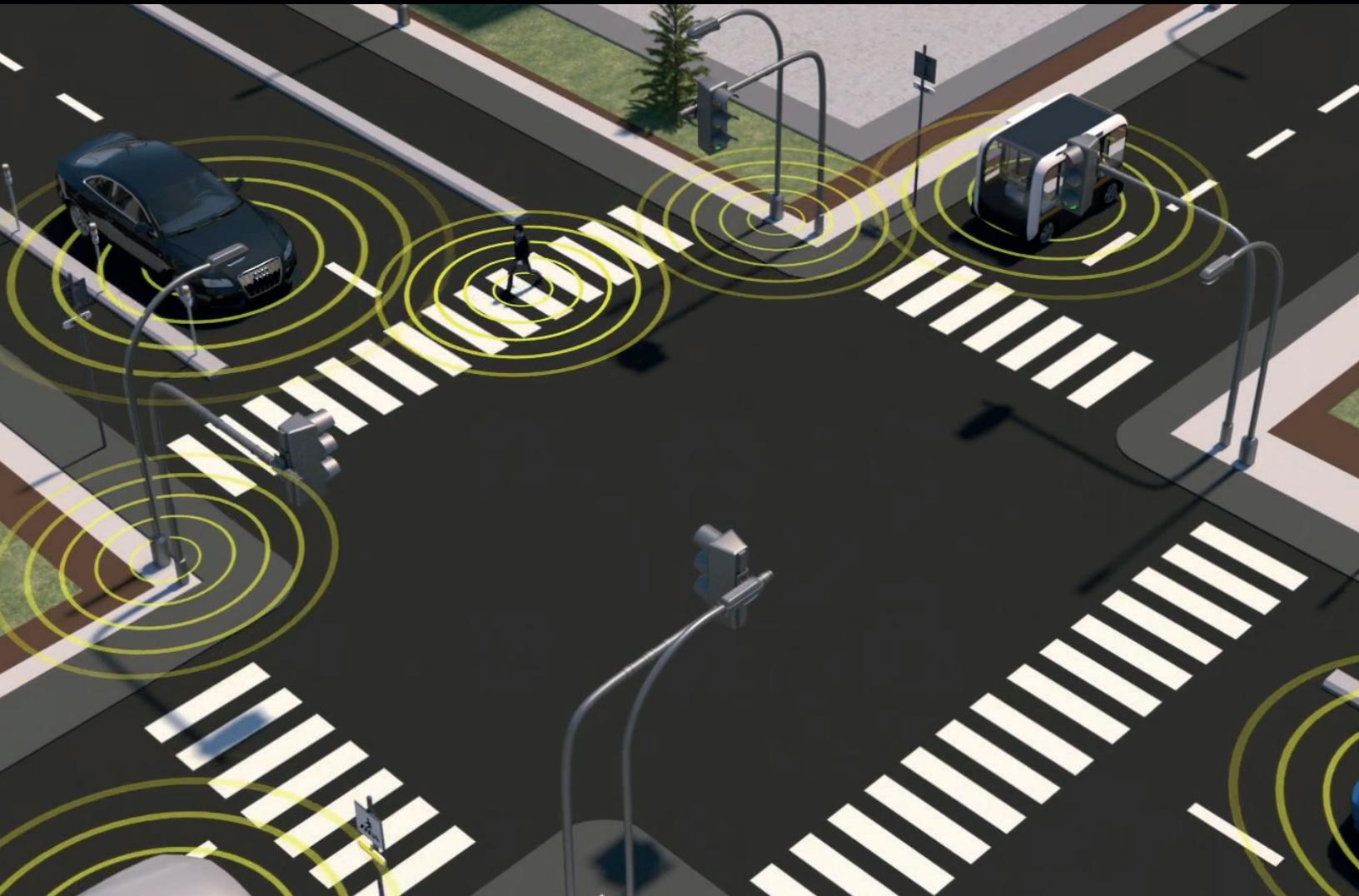
Optional solar panels to sustain itself in  
an eco-friendly way

### Speaker

Optional speaker for audio cues (not  
included here)

# THE VALUE

- Technology that offers multiple use cases:
  - Sensors capture valuable data to give cities actionable insights into the movement through specific corridor.
  - AI captures number of pedestrians, cyclists and motorists.
  - Radar captures speed of traffic.
- Determines traffic patterns before installation of advanced alerting systems.
- Once installed, sensors trigger the automated flashing of torches.
- A report is generated to show cities if an active transit solution would be a benefit to area studied.
- Cities can make informed decisions on where to install infrastructure.



# OUR COLLABORATORS



*"At Aviva, we're committed to making roads safer for Canadians through our social impact platform, Take Back Our Roads, leveraging our knowledge, data, partnerships and funding to invest directly in road safety initiatives. Working with AutoGuardian on this pilot will help create real change to improve road safety in Canada."*



**Hazel Tan**

Head of Corporate Responsibility



**Hussam Ayyad**

Chief Accelerator Officer



**Highline Beta**

*"We believe in building new ventures that matter and what matters more than the safety of a community? A truly powerful proposition has emerged with the overlap of Aviva's corporate smarts, AutoGuardian's innovative application of emerging tech and Beaumont's amazing forward thinking about their community."*



*"This pilot is a fantastic example of how Beaumont embraces bold, innovative approaches that improve safety and everyday living for people in our community."*



**Bill Daneluik**

Mayor of Beaumont AB

# 50 AVENUE, BEAUMONT AB

Near Eaglemont Church



Average of 43.7 km/h pre-installation



4 lanes, 2 in each direction



Speed limit of 50 km/h



Zebra pedestrian crossing



Side-mounted crossing signage



# 60 AVENUE, BEAUMONT AB

West of 64 Street



Average of 35.4 km/h pre-installation



2 lanes, 1 in each direction



Speed limit of 40 km/h



Zebra pedestrian crossing

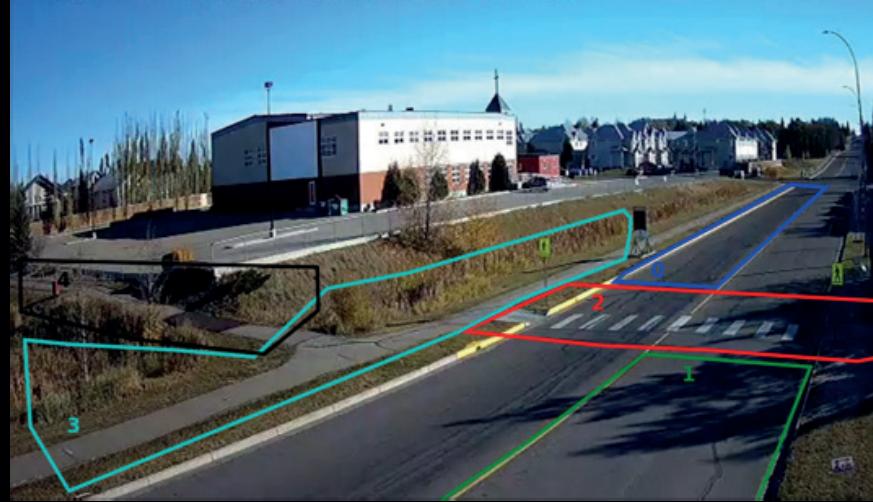


Side-mounted crossing signage

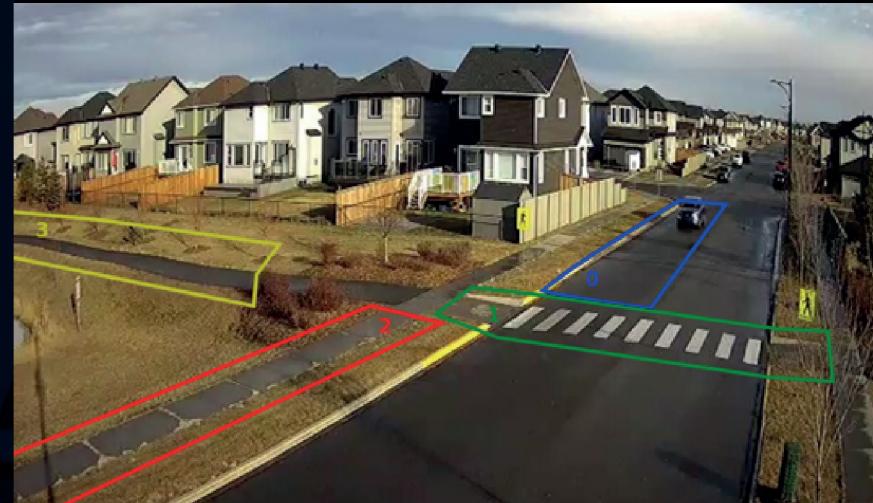


# THE PILOT

Sensors were installed at two zebra crossings in Beaumont, AB. They were placed on existing light poles approximately 10 meters up on the poles. Each device had two cameras with AI zones set to capture counts on both sidewalks, trail usage on either side of the street, the crossing itself and both directions of traffic. Additionally, the devices had radars to capture the speed of traffic.

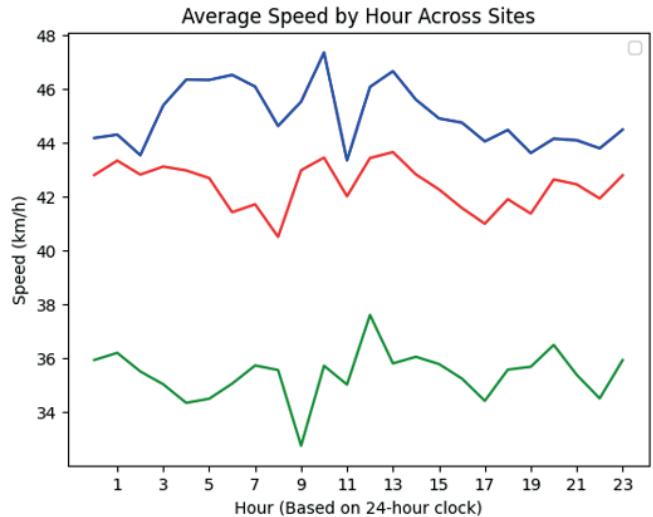


Data was collected for a two week period both before and after the installation of the intelligent torches. The collection period was during November and December in 2021.

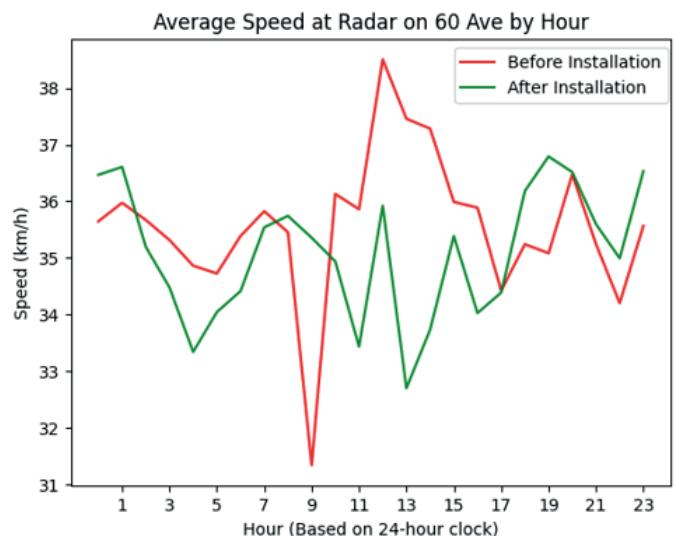
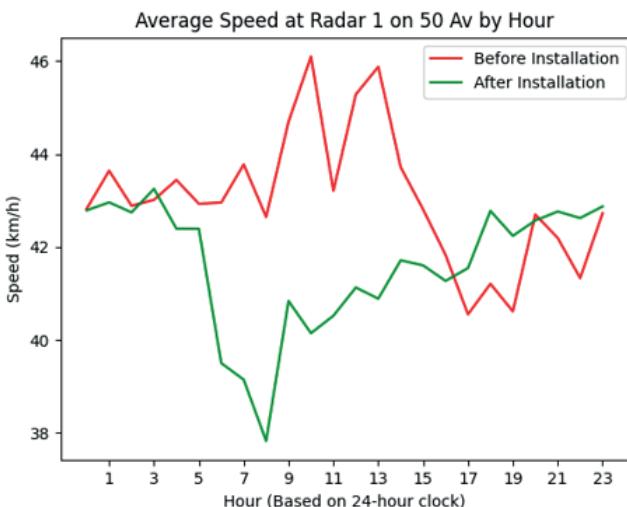


# THE FINDINGS

Initial findings indicate that both locations do not have excessive speed violations and see consistent average speeds below the designated speed limit. Additionally, the average speed declines throughout working hours. This drop is consistent across sites.



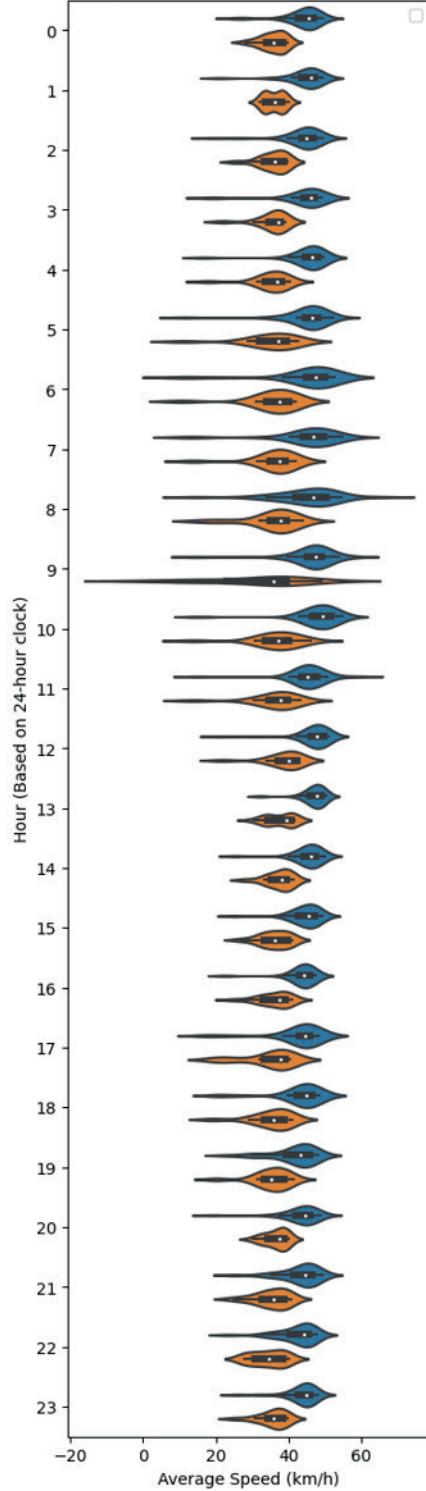
Upon reviewing speed data pre and post installation of the intelligent torches, the average speed has shown further reductions of 3-4 km/h during peak school/working hours.



The median speed in this area along with the spread of speeds can be seen by hour each day per site.

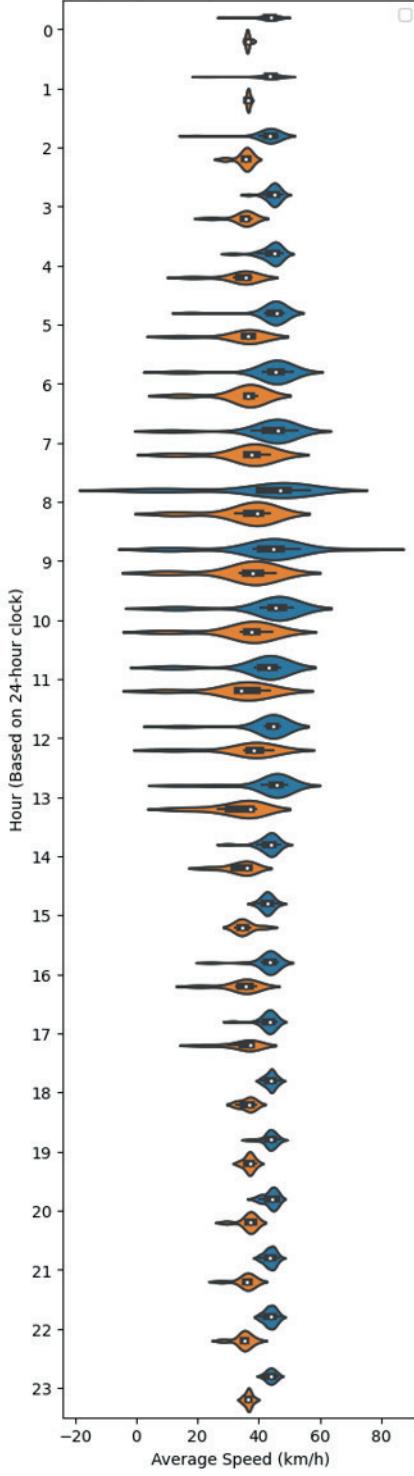
## PRELIMINARY SPEEDS

Violin Plot of Average Speeds By Hour Between Sites Pre-Installation

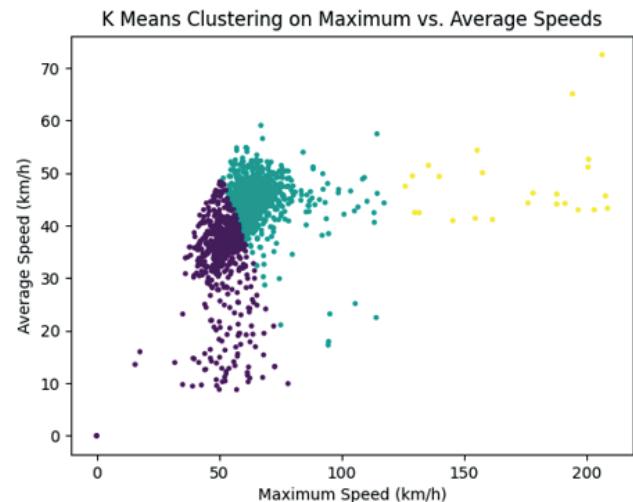
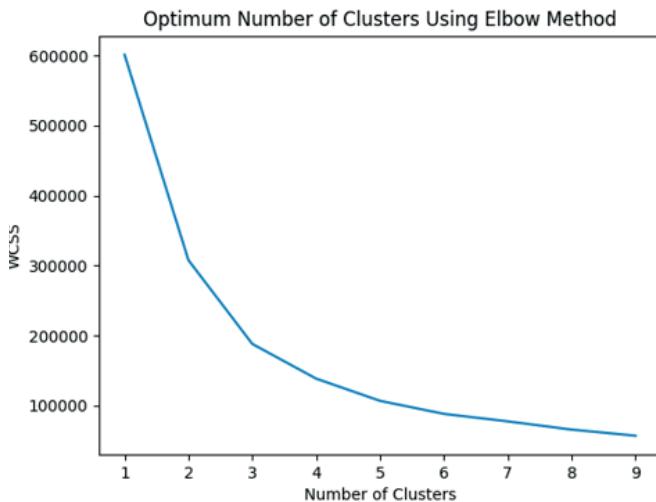


## POST INSTALLATION

Violin Plot of Average Speeds By Hour Between Sites Post-Installation



K-means clustering was used to determine adequate clustering criteria for various speed measurements. The Elbow Method was used to determine the optimal number of centroids (pictured on left). The “elbow” of the graph appears to be approximately 3. With k=3 centroids, the clusters describe three unique subsets of data points, which appear to align with direction of travel and site location (pictured on right).



## ADDITIONAL INSIGHTS

As previously noted these sensors not only provide intelligent alerting, but they collect valuable data to gain insights on movement throughout a corridor. The image on the right shows the zones set up to capture data at 60th Ave.



The following visualizations display the average number of pedestrians, cars and trucks per hour, over a 13-day period.

### North Side Sidewalk



6 People

0 Cars

0 Trucks

### North Side Trail



5 People

0 Cars

0 Trucks

### Crosswalk



### South Side Sidewalk



5 People

0 Cars

0 Trucks

### South Side Trail



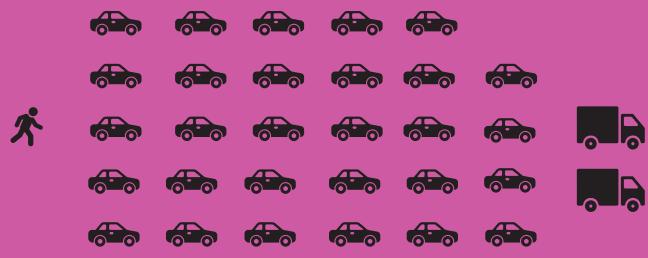
17 People

0 Cars

0 Trucks

3 People

### Westbound Traffic



1 People

29 Cars

2 Trucks

### Eastbound Traffic



1 People

37 Cars

0 Trucks

Data collected can be aggregated in various ways based on the cities needs. From busiest times of day to total crossings, trail usage, etc. these sensors can provide insight as use cases arise.

# CALLS TO ACTION

This pilot has been able to validate that adding flashing lights to these unsignaled crossings is of benefit as it does show a decrease in the average speeds of vehicles during school and working hours.

Intelligent Traffic Systems are an excellent idea for any city to implement and the findings of this pilot offer insight to the city that these two locations show data confirming no consistent speeding issues to be present and in fact shows consistent speeds below the indicated speed limit in the areas observed. Thereby suggesting the ability to prioritize higher speed intersections that are targeted for permanent upgrade before these, depending on budget.

Advanced warning systems come in many forms. From temporary, portable systems seen in this pilot to more permanent rapid flashing beacons, which can be similarly upfitted with this technology to automate flashing through artificial intelligence.

Decreases in average car speeds can greatly reduce the chance of accidents occurring and/or their severity.

It is now up to cities to use technology to help identify key areas to reduce risk and create safer roads for all.



# THE FUTURE

AutoGuardian's proposed Intelligent crosswalk system is only the first step in creating safer and more connected communities. With the rate of technological growth seen in merely the last few years, one can imagine what a potential future might look for cities all across the world. Traffic systems connected to oncoming traffic to give them heads-up alerts of pedestrian crossings and cover any blindspots the driver might have. Connected and autonomous vehicles which, with the combination of data collected from both vehicle and traffic sensors, will be able to make split-second decisions, preventing any potential collisions. Indeed, every day that passes, correlates to this positive trend towards safer cities.



**This...      Rather than      ...This**

# GET IN TOUCH



[sales@autoguardian.ca](mailto:sales@autoguardian.ca)  
+1 (343) 308 - 0555



©2022 by AutoGuardian by SmartCone.



AutoGuardian  
by SMARTCONE