

Modernizing Road Maintenance Using Artificial Intelligence



- Roy Tal has actively worked in the technology industry in for the past 15 years, serving in various technical roles.
- For the last 8 years, Roy has been the Chief Technology Officer of Visual Defence.
- Roy is absolutely delighted with his role today using artificial intelligence to solve real world problems in the public works space.



Roy Tal

Chief Technology Officer
Visual Defence Inc.

CityROVER

Artificial Intelligence App & Cloud Service



we want a world...

where citizens would not report any issues because they would be already fixed.



1

Road Maintenance

and the road to a good state of repair

To Repair Issues Cities Need to Find Them

Survey



Proactive
Slowest & Most Expensive
Most Detailed
Infrequent (every 2-8 years)

Inspection / Patrol



Proactive
Slow & Expensive
Some Details are Missed
Frequent (daily – quarterly)

Reactive (Complaint Driven)




Reactive
Cheapest but Riskiest
Few Details
Public Dissatisfaction

The road to a good state of repair

1 Issue is reported
by staff

3 Work request
opened

5 Deficiency is
fixed


Citizen
Reporting

2 Service request
opened

4 Staff show up with the
right tools at the right
place at the right time.

6 Good state of
repair



2

AI For Road Maintenance

A brief overview of how ROVER AI works

What if this process could be **automated**

AI could help if it is:

- Easy and safe to operate
- Accurate
- Supportive of current processes
- Affordable for all



Easy to use by design

All inclusive kit shipped

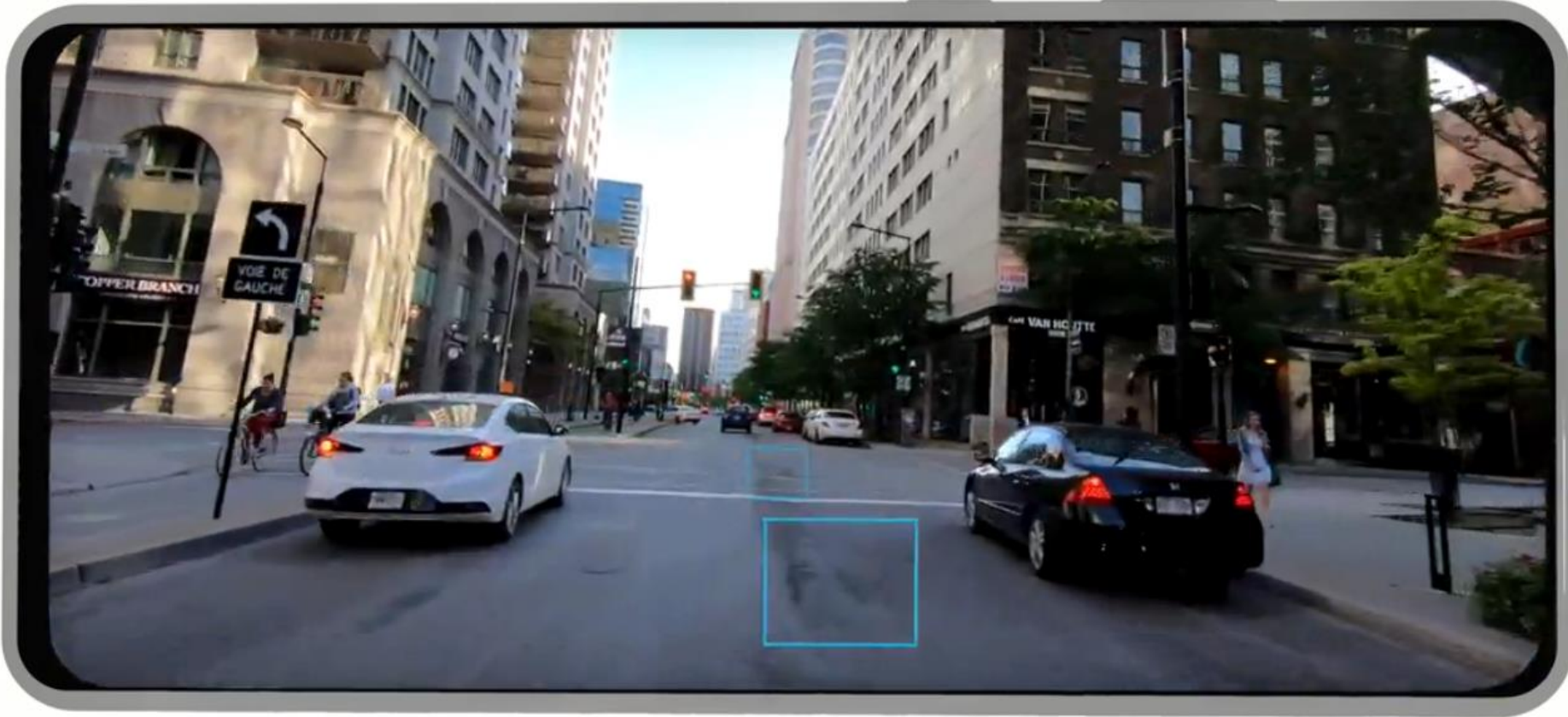


Installed by city staff



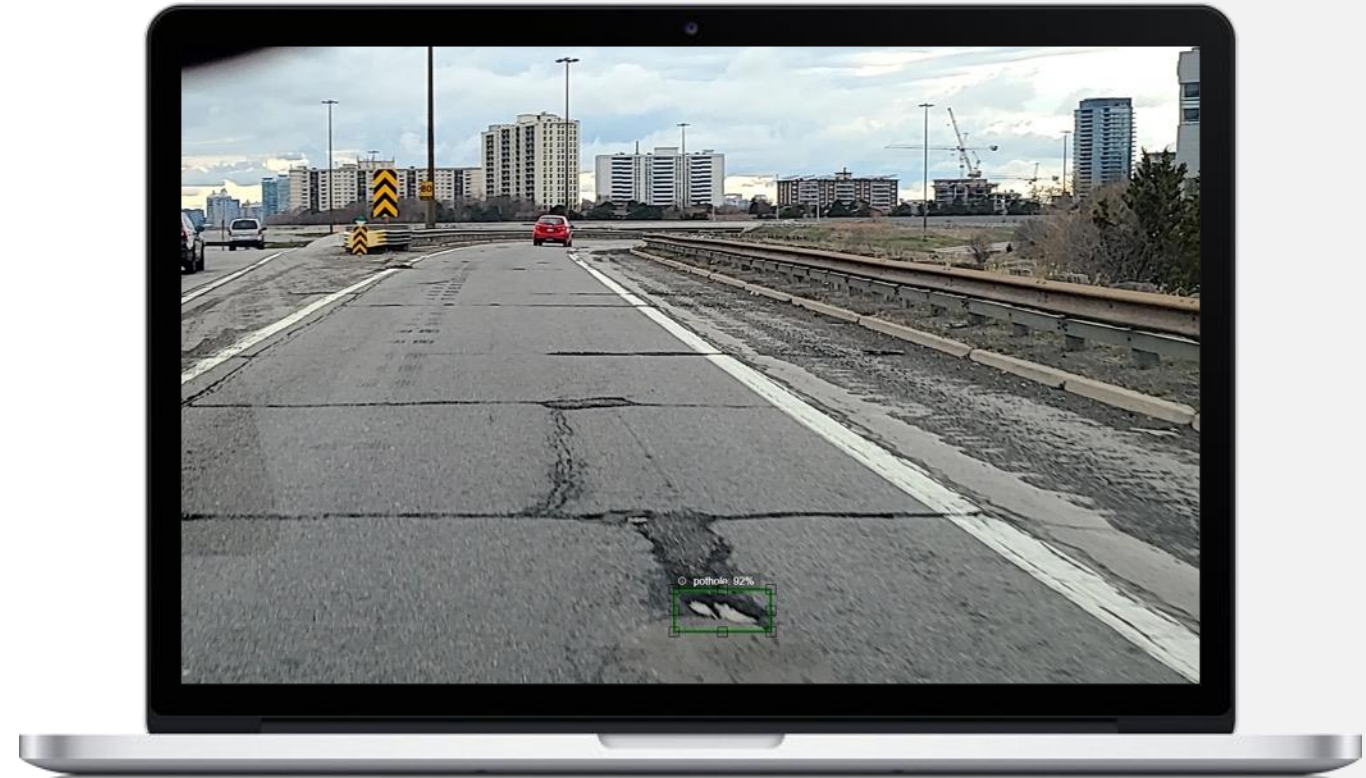
Then start driving





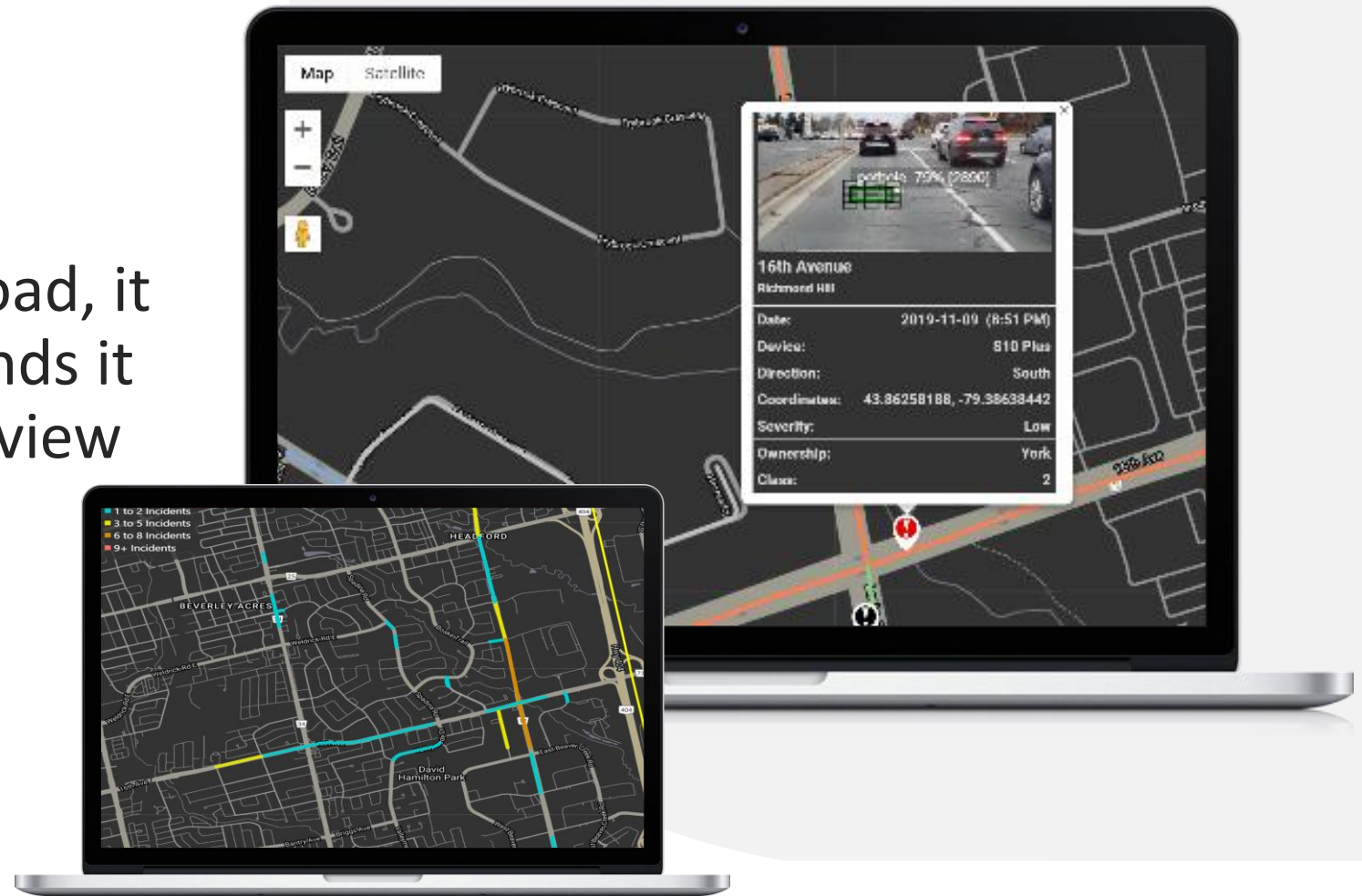
Your data includes:

- High resolution image
- GPS coordinates
- Nearest address
- Direction of travel
- Size and depth estimates
- Date and time



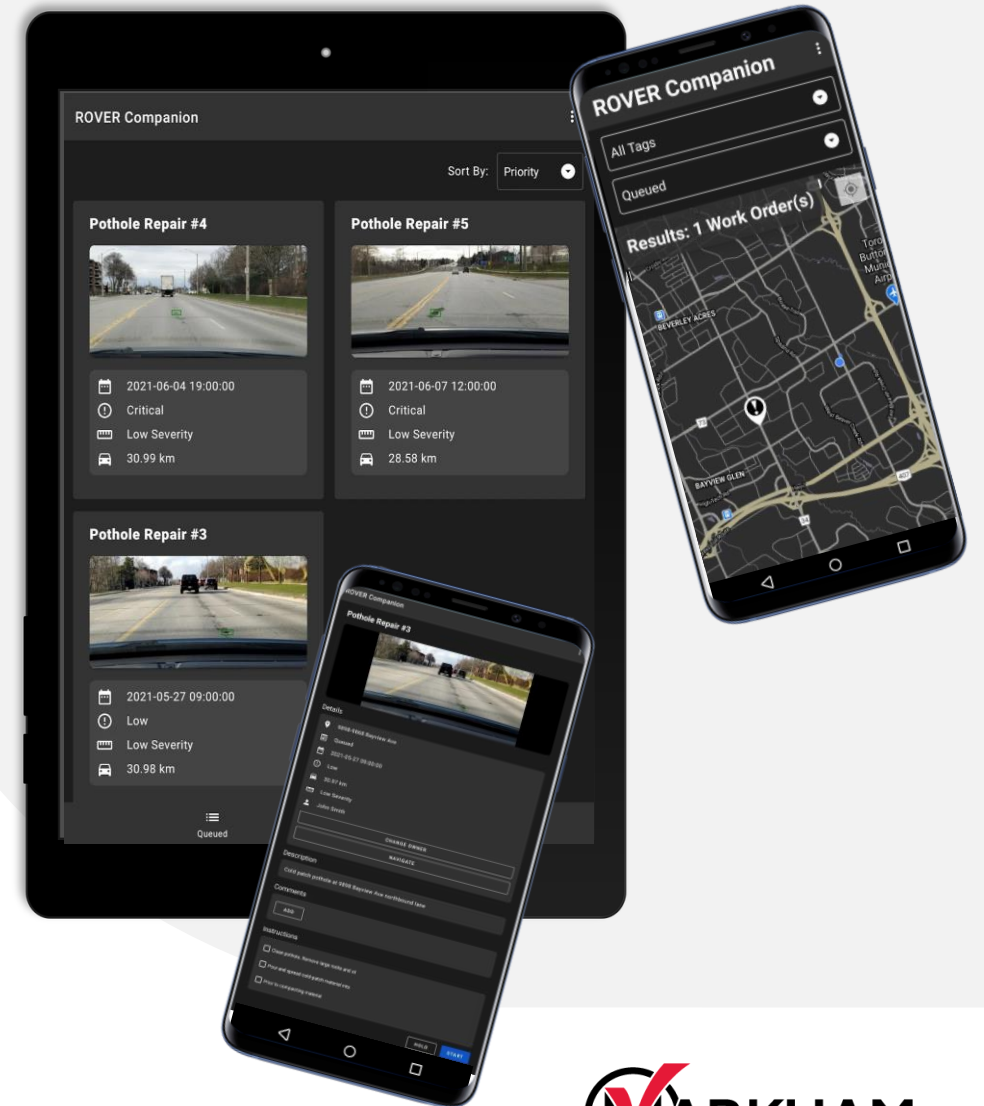
Simple access

Once the vehicle is on the road, it starts to collect data and sends it to the cloud where you can view it.



Actionable data

Service requests can be resolved within cloud system or through API integration to third party systems.



Deficiencies **per hour**

By focusing only roads which have deficiencies, cities can use their resources better.



The **optimized** road to a good state of repair



Data is collected while city vehicles drive their day to day routes



Work orders assigned in ROVER or third party system in seconds



Service levels are tracked and measured



Service requests are generated automatically



Staff can access high resolution images and point-by-point navigation



Decisions based on objective data measured through system



we want a world...

where citizens would not report any issues because they would be already fixed.



We have a world...

where citizens experience less
issues because they are already
fixed.



Alice Lam

Director of Operations

- Alice Lam has extensive experience in engineering, operation and maintenance of road transportation systems in highway and urban settings.
- Alice has been with the City of Markham since 2014, first as the Senior Manager of Roads, Survey and Utility and currently as the Director of Operations.

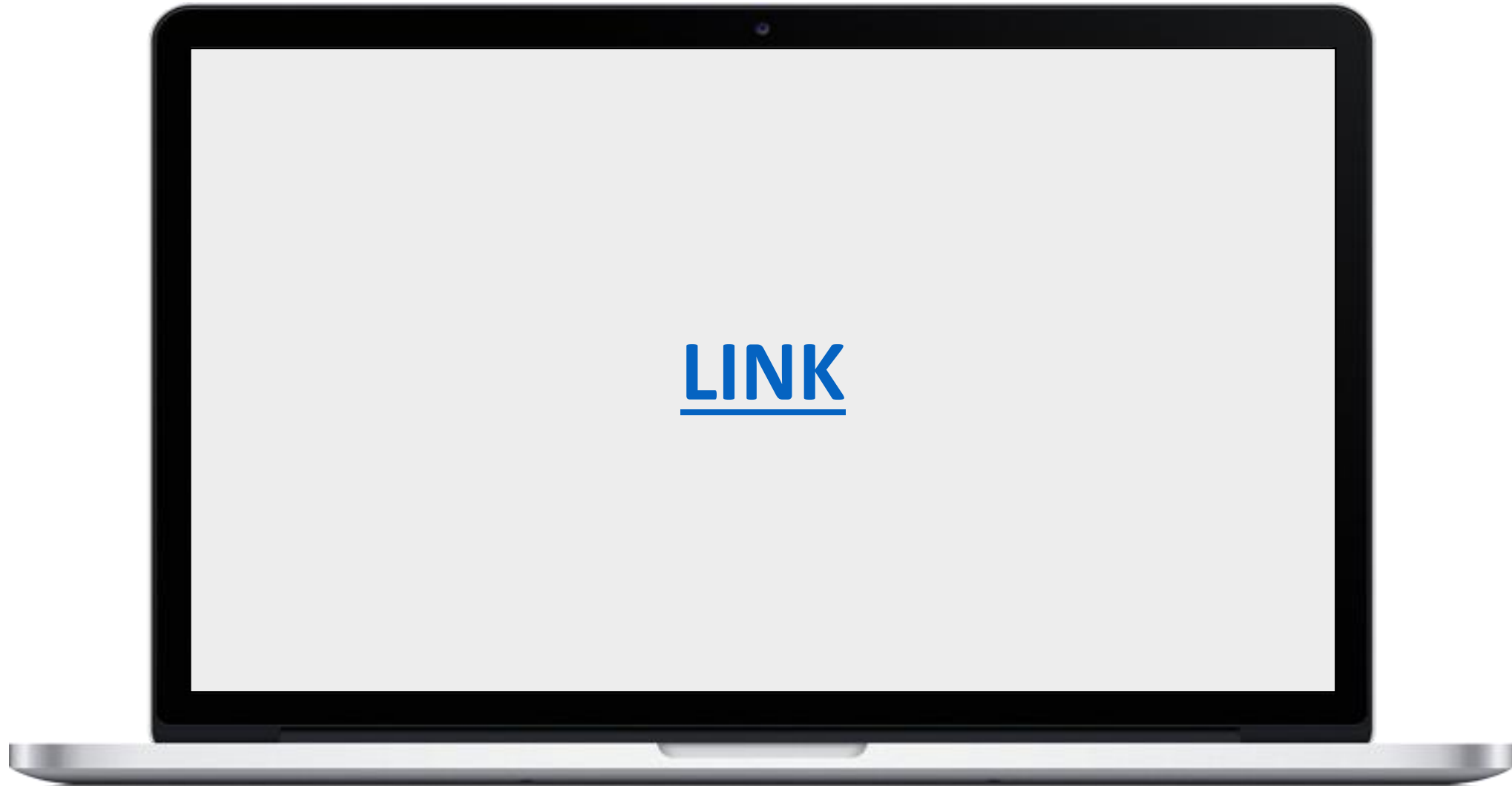


Alice Lam

Director | Operations
City of Markham

City of Markham

BBC Documentary – The Future with 5G



Minimum Maintenance Standard **O.Reg 239/02**

“**paved surface**” means a surface with a wearing layer or layers of asphalt, concrete or asphalt emulsion

“**pothole**” means a hole in the surface of a roadway caused by any means, including wear or subsidence of the road surface or subsurface

Maintenance Standards

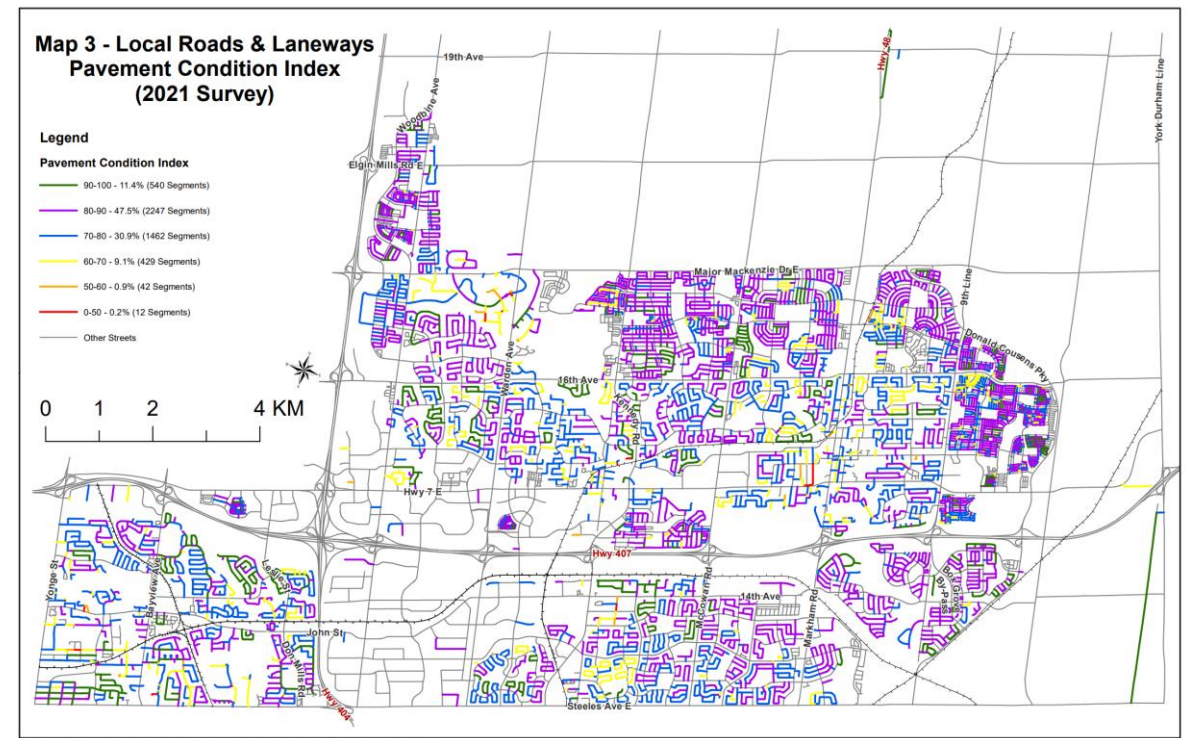
Patrolling : 3. (1) The standard for the frequency of patrolling of highways to check for conditions described in this Regulation is set out in the Table to this section. O. Reg. 23/10, s. 3 (1); O. Reg. 366/18, s. 3 (2).

Class of Highway	Patrolling Frequency
1	3 times every 7 days
2	2 times every 7 days
3	once every 7 days
4	once every 14 days
5	once every 30 days

Pavement Management – Asset Management

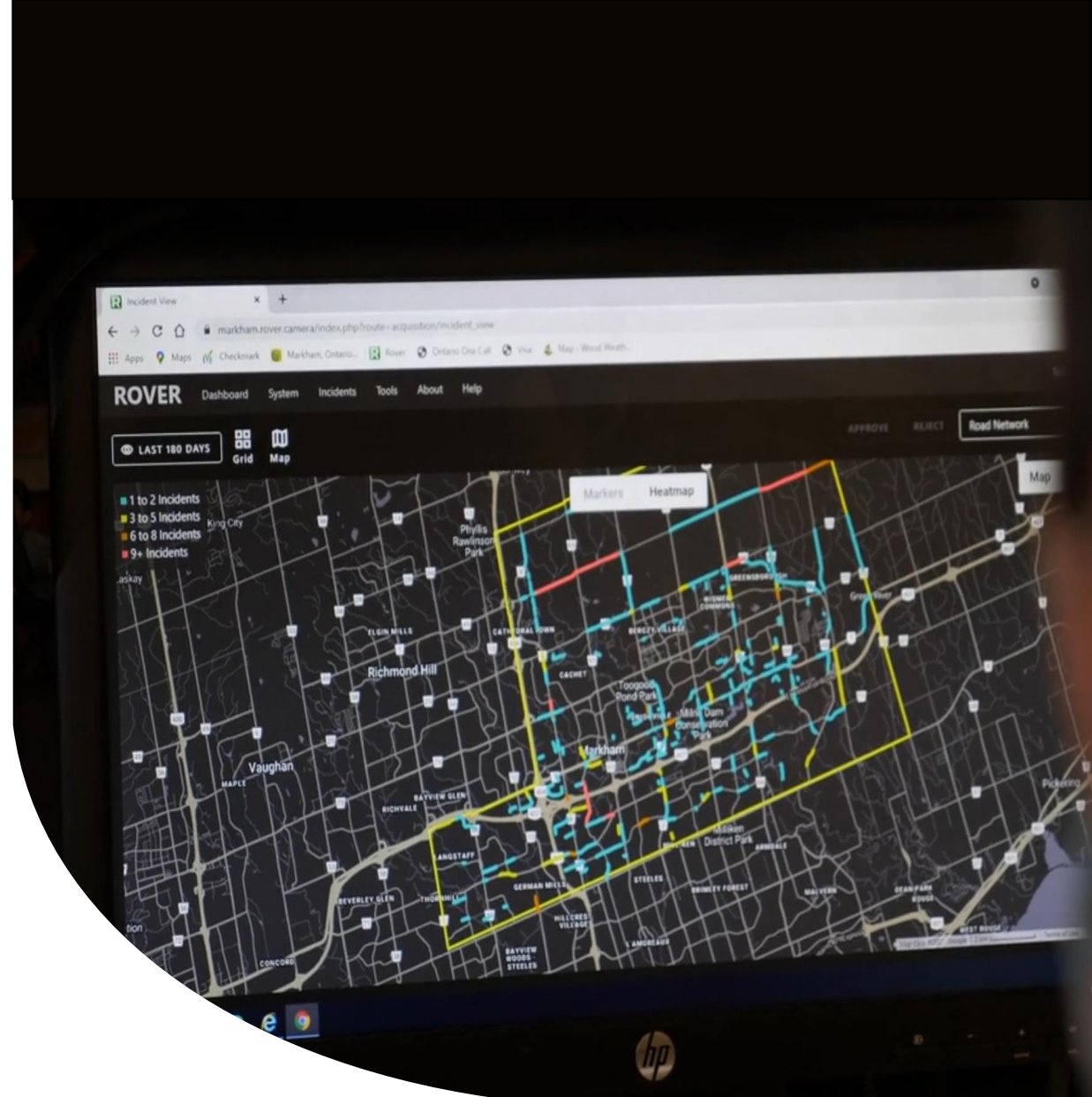
O. Reg. 588/17

- Right technique, at the right time, on the right road to extend the life of the roads and reduce the overall annual cost of ownership
- 2,200+ lane km paved road
- Annual road preservation
- Annual road rehabilitation



Collaboration Experience

- Collaboration – win win for Municipal Roads Operations and AI Industry
- Software Improvement through interactive response
- Record with photo and GPS location
- Staff/work scheduling
- Proactive repair -> long term saving



Innovative maintenance practices **awards**

IDC North America Smart Cities



Transportation - Connected & Autonomous Vehicles, Public Transit, Ride-Hailing/Ride-Sharing Category

OGRA John Niedra Better Practices Award



Innovative Management Practices

ROVER EXPANSION – BEYOND POTHOLES



PATROLLER



BYLAWS



WASTE MANAGEMENT



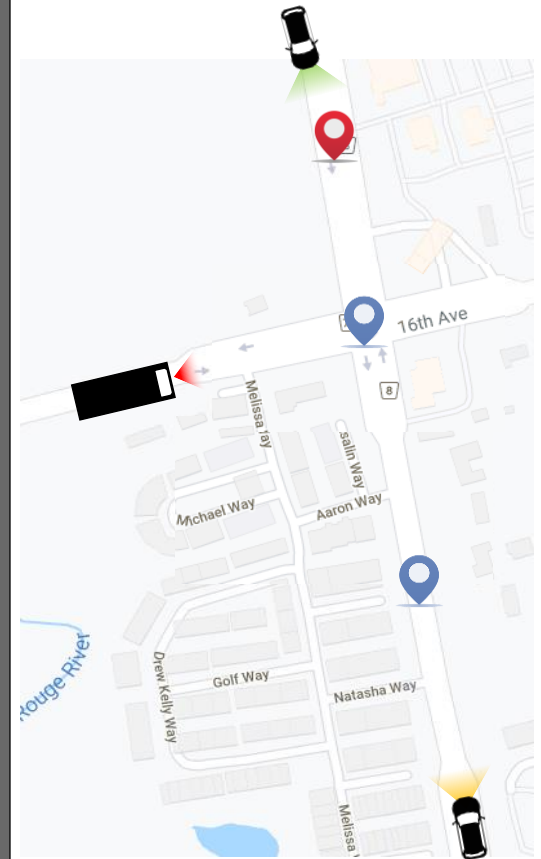
MANHOLE



SIGNAGE



POTHOLES



Questions?