

Markham, ON Case Study



Overview

- 1 The City maintains over 2,200 lane kilometers (1370 lane miles) of paved roads serving approximately 362,000 residents.
- 2 The City of Markham initiated a pilot program with CITYROVER focused specifically on automated pothole detection and patching support
- 3 Following demonstrated operational success, the program evolved into a multi-functional AI-powered roadway intelligence platform that manages 9 road related programs.
- 4 Today, the CITYROVER system supports inspection automation, digital twin development, pavement lifecycle planning, asset inventory generation, and compliance with maintenance standards.

Solution

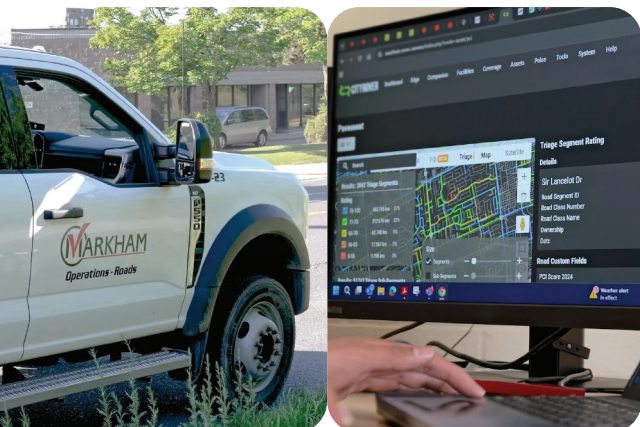
The City of Markham initiated a pilot project in partnership with CITYROVER to develop an artificial intelligence-powered roadway intelligence solution. The initiative began as a targeted pothole detection and patching optimization program aimed at improving road safety and enhancing compliance with Ontario's Minimum Maintenance Standards

Challenges

The City of Markham houses over 362,000 residents and includes a road network of approximately 2,200 lane km (1,370 miles). Due to the size of this infrastructure and traffic volume, roadway deficiencies occur regularly, including potholes, cracks, damaged signs, debris, and other hazards. The City sought to improve compliance with Ontario's Minimum Maintenance Standards (MMS) while strengthening long-term asset management practices.

Outcomes

- The City relied heavily on manual inspections and reactive public reporting to identify roadway hazards and deficiencies.
- Pavement condition assessments and road roughness data were collected through periodic, standalone survey programs, limiting continuous visibility into network condition.
- Inspection, maintenance, and asset management programs operated in silos, reducing coordination and delaying data-driven decision-making.
- Condition data was often outdated by the time rehabilitation planning and capital budgeting decisions were made, and required in-person verification.



The software is deployed through a smart camera running CITYROVER's intuitive AI, mounted to municipal patrol vehicles using a windshield mounted system. This configuration enables vehicles to collect roadway condition data during regular operations, embedding inspection directly into daily fleet activity without requiring dedicated survey efforts.

Once installed, CITYROVER AI automatically detects pavement hazards and road-related infrastructure deficiencies, including potholes and sunken manholes, as patrol vehicles operate. Detected events are processed locally using edge computing technology and securely transmitted to the cloud, providing City staff with near real-time operational visibility and continuous condition data.

Over multiple development phases, the use of the CITYROVER platform evolved into a multi-purpose roadway intelligence. The project streamlines 9 different road related programs with the use of cutting edge AI technology suite analyzing multi-sensor, multi-vehicle data.

The programs include

- Road Inspection
- Emergency Maintenance
- Work Management
- Pavement Condition Surveying
- Work Needs Assessment
- Project Management
- Pothole Patching
- Crack Sealing
- Road Rehabilitation

CITYROVER processes 99.9% of data locally, enabling secure and cost-effective deployment without additional IT infrastructure. Built-in privacy protections automatically blur licence plates and faces, ensuring responsible use of image data in public environments.

- A structured pilot program evaluated automated inspection, digital twin generation, and continuous pavement condition monitoring capabilities.
- AI cameras were installed on patrol vehicles, embedding continuous data collection into daily municipal operations.
- Through multi-year collaboration, the system evolved from a single-purpose detection tool into a comprehensive AI-powered roadway intelligence platform which supports 9 road related programs.
- Demonstrated operational and financial value led to expansion from one device to five and full integration into inspection, maintenance, and asset management programs.



The City of Markham has received recognition for its innovative use of AI-powered roadway intelligence, including



Ontario Good Roads Association
John Niedra Better
Practices Award



DC Smart Cities North America
Approach to road maintenance
and safety



IRF Global Award
Achievement Award for Asset
Preservation & Maintenance



Zoyeb Vahora, Supervisor of Contract Administration, City of Markham



Morgan Jones, Commissioner of Community Services, City of Markham



Alice Lam, Director of Operations, City of Markham

“...Every trip generates real time data, and every issue is automatically mapped and delivered through the CITYROVER dashboard. Markham now has the insights it needs to act faster, focus resources where they matter most, and accomplish more with less. Instead of waiting for complaints, Markham now sees problems as they happen, and respond proactively.”

“Safe, reliable and sustainable transportation infrastructure is a vision that any community can achieve with the power of AI solutions such as the CITYROVER AI platform.”

“Roads constantly face environmental stresses, and wear and tear, and road management often relies on outdated surveys, manual inspection, and reactive maintenance. To stay ahead, Markham turned to innovation”