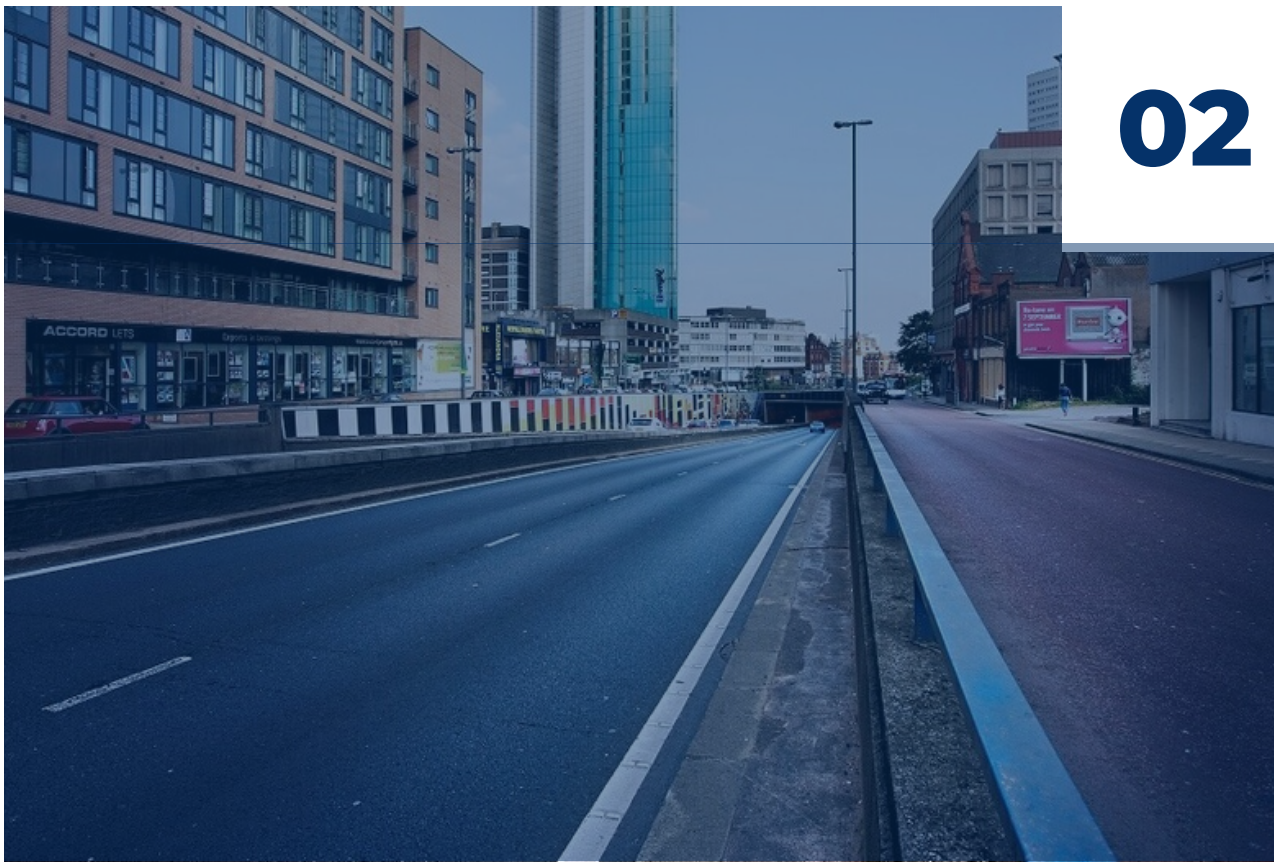
PROJECT REPORT

3rd July 2023

BIRMINGHAM CITY COUNCIL KIER HIGHWAYS

RoadMetrics

This report was made to summarise key findings from the innovation trial conducted by RoadMetrics AI in collaboration with Kier and BCC.



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ABOUT THE INNOVATION TRIAL

RoadMetrics AI in collaboration with Birmingham City Council performed an innovation trial, in May 2023, for an AI based road condition assessment. As part of Birmingham City Council's digital innovation strategy, the trial aimed to explore new methods for cost-effective condition assessments. The project involved conducting smartphone based video condition surveys over a stretch of 200 km. An additional 12 km of footway assessment was performed through a walked video survey. A condition assessment was derived using Artificial Intelligence (AI) techniques.

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OBJECTIVE

The objective of this innovation trial was to perform an assessment of select roads within BCC and showcase the capabilities of the RoadMetrics AI including the ease of use, system reliability and to improve AI model accuracy with Birmingham's road environment.

DELIVERABLES

- Provide a carriageway condition assessment for 200 km in network length and 10 km in footway length
- Ensure output compatibility for UKPMS (hmdif) and GIS integration (geojson)
- Develop a footway module and identify footway assessment classification criteria

DATA UPLOAD 04

Condition Surveys Using the RoadMetrics Data Collection App

The road condition surveys were performed by Kier Highways using the RoadMetrics Data Collection App, available on both Android and iOS platforms. The app enables users to capture video surveys along with GPS data, providing a scalable and flexible method for capturing condition surveys.

Route optimisation using the RoadMetrics RouteNav App

The Kier Highways trial project used the RoadMetrics RouteNav App, a user-friendly navigation tool for RoadMetrics data collection condition surveys. Participants easily followed predefined routes provided by the RoadMetrics team, ensuring seamless data collection. The RouteNav App, used alongside the RoadMetrics Data Collection App, provided a comprehensive and efficient solution for conducting surveys

Data Storage

All condition surveys once uploaded using the RoadMetrics Data Collection App were instantly uploaded to RoadMetrics' cloud servers hosted by Amazon Web Services (AWS) located in London. Once uploaded, smartphone storage space is optimised for the next survey.

THE RESULTS

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5 Level Road Condition Rating

The results from the assessment indicated that 65.4% of the roads are in excellent condition (level 0), 28.5% of the are roads are in good condition (level 1), 3.9% of the roads are in poor condition (level 2), 2.1% of the roads are in bad condition (level 3) and 0.2% of the roads are in very bad condition (level 4). Ratings are derived from international pavement guidelines.

AI Model

A total 7,274 digital image points were processed from the council's road network. A total of 83 potholes (for reactive maintenance) were identified from the assessment. In addition, close to 1,000 cases of ravelling and surface cracking were identified and over 5,000 cases of cracking (for planned maintenance).

The AI model performed with an accuracy rate of over 75%. The innovation trial resulted in an improvement of 5% in accuracy from training data specific to BCC's road environment. Subject to good lighting condition.

SUMMARY

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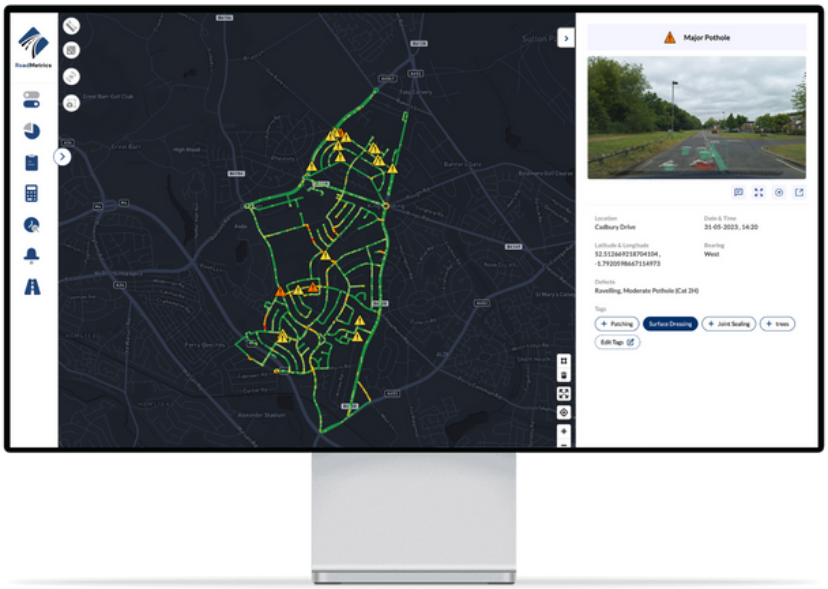


RoadMetrics Enterprise web-GIS platform

Data privacy

As a part of our efforts to comply with GDPR norms, all data was blurred and anonymised to remove any sensitive information such as faces and number plates.

Quick results

The entire project from condition survey to assessment was executed in less than 14 days time.

Output compatibility

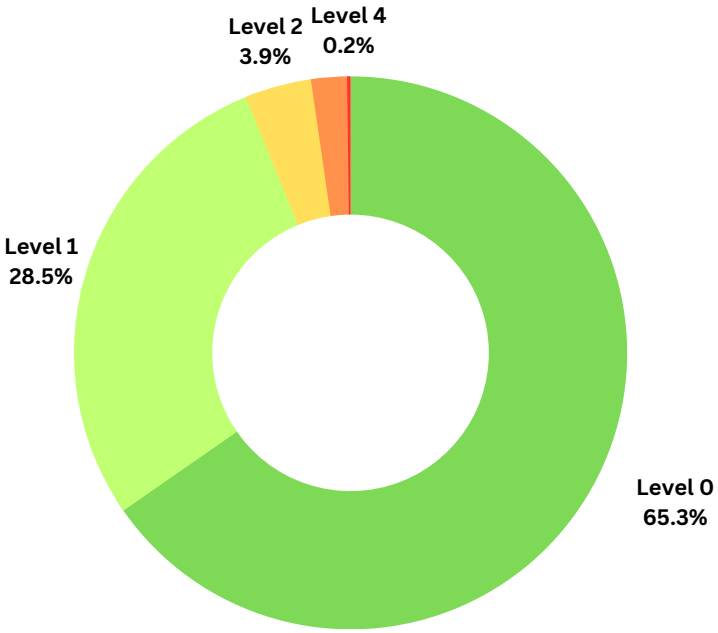
All condition data was supplied in UKPMS (.hmdif) and GEOJSON for integration to GIS systems. The platform supports output in standard CSV format for convenience.

Reporting

With the inbuilt reporting tools within RoadMetrics Enterprise, the BCC/Kier team are able to view the percentage of roads that require maintenance. In addition, 100m sections are assigned a condition rating based on PCI.

Analytics

Each road can be identified for further analytics and multiple surveys can enable for analytics on road performance over time.



Road condition analysis

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PHASED IMPLEMENTATION

Implementation of the RoadMetrics AI system for condition assessment for BCC's carriageway network will require a phase wise implementation.

With cost-efficiencies from a smartphone based infrastructure and AI, more frequent surveys are possible. Therefore, long-term strategy will involve identifying an ideal condition assessment frequency.

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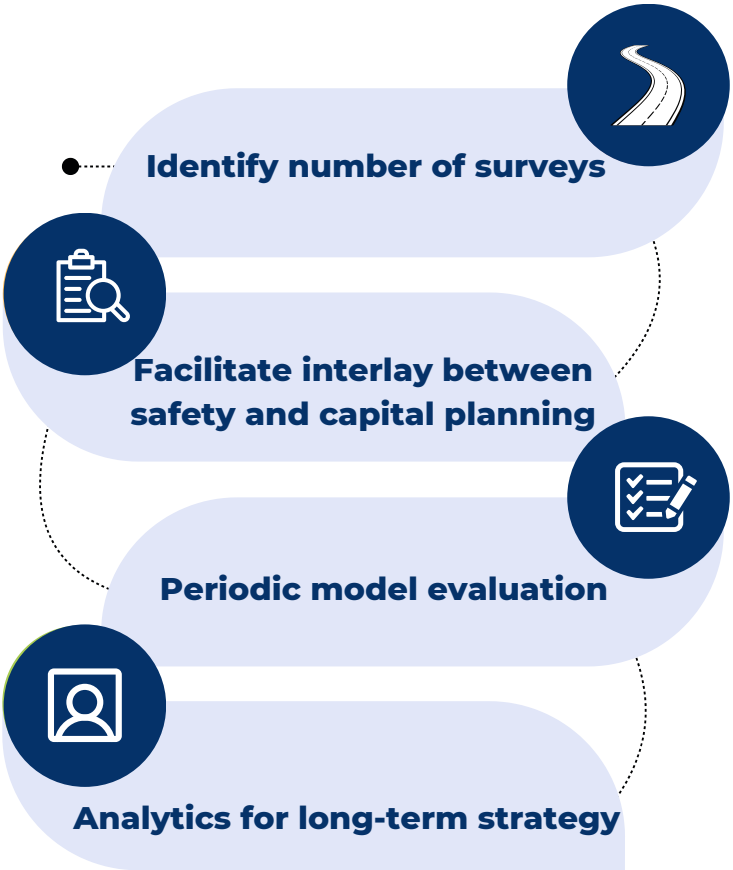
Rollout to Birmingham City Council's entire network

Birmingham City Council manages a road network of 2,500 km in carriageway length. With the innovation trial, the highways team are now familiar with the RoadMetrics AI system.

Rollout will involve identifying number of condition surveys, evaluating model accuracy and other performance factors for long-term road infrastructure strategic planning.

Proposed Rollout Plan



OUR TEAM

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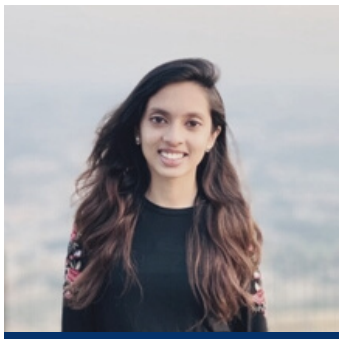
Shristi Sinha
Head, Partnerships



Irine Thayil
Head, Technology

The innovation trial performed using RoadMetrics AI in collaboration with Birmingham City Council and Kier Highways helped successfully identify the powerful capabilities of the RoadMetrics' end-to-end solution for condition assessment of highways assets.

RoadMetrics' AI system can help save up to 30% in costs by leveraging Artificial Intelligence, cloud computing and a smartphone based infrastructure.

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