



Compliance Monitoring & Reporting

Smart data collection

Mooven's infrastructure delivery platform is designed to leverage a wide range of datasets depending on the specific use case and requirements. This brochure outlines our datasets used in compliance reporting.



COMPLIANCE DATA USE AND MOOVEN DATA INPUTS

Mooven has successfully been providing reporting for Travel Time surveys and similar compliance requirements to customers in multiple markets.



UNDERSTAND HOW FLOATING VEHICLE DATA IS COLLECTED

Learn about the dataset most frequently used by Mooven's customers for TMR engagements. We talk about how this is used by Mooven.



LEARN HOW WE LEVERAGE A BROAD AND RELIABLE DATA SET

We help you understand if delays are caused by external factors. Some of the broad data inputs to Mooven's compliance reporting are explained.

CONTACT US



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Compliance made easy

Mooven provides an end-to-end solution for travel time compliance monitoring and reporting. We incorporate a wide range of datasets, with pre-built reporting in addition to customised reporting as required.

At Mooven, we have all your compliance needs covered. Approved to use for Travel Time Surveys and data agnostic, we have no hardware options or crowdsourced data + hardware options, backed with an intuitive software platform and deep expertise.

WHY MOOVEN?

Mooven is a leading provider of data-driven compliance reporting:

x10 higher visibility

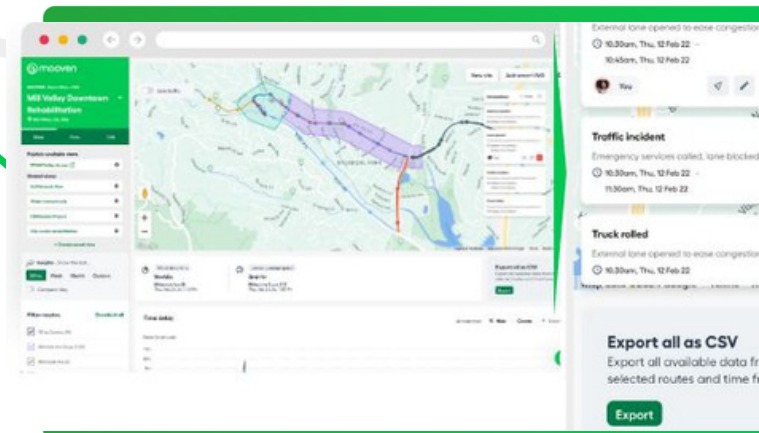
Easy cover of adjacent road networks, gain live visibility and add annotations to record what happened.

Affordable

When we use floating vehicle data the cost is significantly lower than hardware solutions

Less hassle and more reliable

Our no-hardware solution can be deployed in minutes, without the need to be on-site and doesn't require ongoing maintenance.



Gain an accurate understanding of conditions prior to starting and during road infrastructure delivery. Mooven supports you to create a baseline, inform planning, track live conditions and generate seamless reporting.

Continuous monitoring, at your fingertips

- Combine real-time insight with the power of built-up knowledge and experience to unlock future potential.
- Create and measure customer experience metrics like journey time reliability, site impact and delays. No need to rely on proxies like vehicle count to infer delays anymore.

Record what happened

- Capture what happened and how you responded with annotations.
- Create an audit trail, seamlessly share knowledge and simplify reporting.



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Mooven's compliance & reporting data inputs

Rich visibility of all projects, combined with a record of what happened, takes the work out of reporting and makes sure you don't miss anything, all in a more cost-effective solution.

VARIOUS DATA INPUTS TO MOOVEN

We incorporate the following:



Point in Space

Speed cameras, radar units, environmental sensors such as dust and noise, vehicle count, installed tubes etc.



Affected Area data points

Weather data, public holidays, local businesses, local transit peaks, events etc.



Road-specific “segment” data

A to B journey time from floating vehicle data providers like Google Maps, TomTom and HERE.



Connected Vehicles

Telematics providers can provide rich, vehicle specific data sources.

Context is king

Greater context only happens with the right data points. We provide context that helps customers understand anomalies, next best actions, and identify opportunities to improve operational efficiencies.

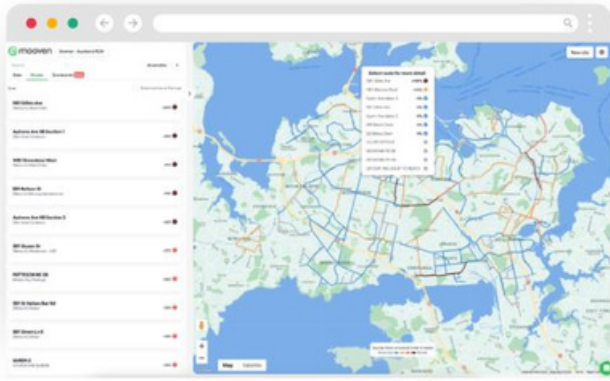
Starting with a wide data set

Our standard site monitoring packages use a combination of wide and contextual data sources to give a holistic view of site impact.

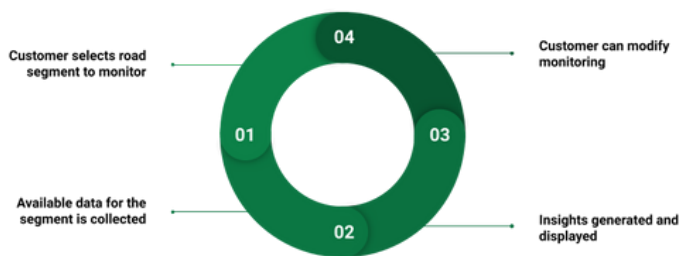
We recommend starting with our “Wide” approach, the data sources used in this are the best combination of detail and cost to support the majority of our client outcomes. This approach combines the most flexible sources of data in our tool kit; we find that they are particularly useful for compliance monitoring and adapting construction to current conditions. The benefit?

- Extremely flexible, no physical hardware required.
- Easily changed to suit project progress or mid-project problems.

We believe that measuring the site and affected areas holistically will provide the best outcomes.



Once a customer has defined the work site and road segments significant to their reporting needs, the data specific to these road segments is collected, aggregated and displayed in real time. It is important that our customers have a clear understanding of the situation surrounding disruption.



Mooven's methodology and data sources have been curated to prioritise live contextual insights, flexibility, and ability to scale to any size project. With the added functionality to propel insights from compliance reporting forward such as adding customized annotations and sharing tailored views with other stakeholders.

Travel time survey requirements

The contractual requirements stipulated by Queensland Transport and Main Roads (TMR) provide a good example of clauses we typically see; a copy is shared in the appendix of this document.

An improved and innovative approach

Bluetooth receivers are commonly specified, however low sample sizes and noisy data can lead to poor results. As technology has evolved it is now possible to collect floating vehicle data.

A review by TMR and GHD compared Bluetooth sensors to floating vehicle data provided by Mooven from Google and TomTom. It was deemed that travel time data collected via Google was a suitable alternative to Bluetooth, with both Bluetooth and TomTom suffering from data gaps during low-volume periods and noise introduced by erroneous data points that negatively impacted accuracy.

The use of Google floating vehicle data supplied by Mooven was approved by TMR and GHD in March 2020 for the reporting standard set in clause 3.7 of specification MRTS02.1.

Connected vehicle data via Google has been widely used by Mooven for compliance monitoring across NSW, VIC, QLD, WA, SA, ACT, New Zealand and the United States.

How is floating vehicle data collected?

Google analyses the GPS, cellular and wifi determined locations transmitted to it by mobile devices across Android and iOS platforms, in addition to connected vehicle data (where Google is used within car navigation) and third-party sources to provide accurate current live travel times. Google processes the incoming raw data about mobile phone device locations, then excludes anomalies and removes all personally identifiable information.

The travel times provided by Google are generally very accurate when compared to other forms of journey time monitoring. When insufficient data is being collected to provide live travel times, Google returns their static 'free flow travel time' making it easy to identify these situations. TomTom's live travel service operates in a similar manner.

What's the sample size of connected vehicle data?

Gaining information on sample size can be useful, however most providers do not include this information within their live traffic feeds.



Google does not provide information on market share, however, there are a range of industry reports available for different markets that consistently show Google (Google and Waze) is the most dominant mapping provider. See the [example here](#). Similar information can be found for TomTom, Here and Inrix.

Connected vehicle data is generally not an appropriate source of volume information. Where volume is required, Mooven's customers most frequently use telematics sites, signals data or dedicated hardware.

What about specific data requirements?

Sometimes, there are obligations that require specific data sources; we are more than happy to incorporate these.

Mooven is data agnostic and experienced at utilising a wide range of data sources. Our team can help you assess which data sets will be most suitable and explain the trade-off associated with each option.



Examples of specific data requirements:

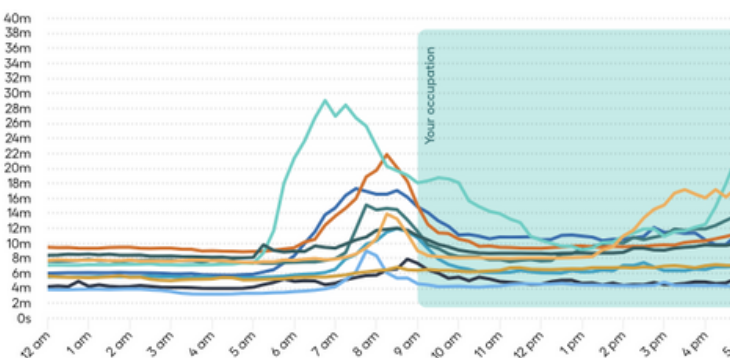
- Tube counters
- Piezo and Loop data
- Radar and Bluetooth
- Machine vision cameras
- Automatic number-plate recognition
- Telematics and weigh in motion

Common situations include the need to capture wait times of individual vehicles, individual vehicle speeds, queue monitoring, vehicle classification and lane level reporting. This is where Mooven can bring in more specific data from pre-existing sources near the site, partner data, customer data or Mooven's existing partner network.

Daily profile - aggregated view

Average from 1 Mar 24 to 18 Mar 24 - Monday, Tuesday, Wednesday, Thursday, Friday

Travel time (in minutes)



Percentile speeds and worst journey times

In areas with high-profile works, TMR often wants to understand worst journey times in addition to the usual journey experience. Our crowdsourced data can provide percentile speeds and sample size with samples that match Bluetooth sensors, but without the expense.

How is relative volume analysis achieved?

Depending on the use case, there are circumstances where volume data from floating vehicle data sources can be used successfully to infer traffic counts or inform decision-making.

In these circumstances, Mooven compares volume data from the floating vehicle data providers with known telematics slides in the area to ascertain appropriate scaling factors and estimate the potential margin of error.








With this secondary verification, it is then possible to infer the count and decision that may be impacted by vehicle count within the area.

Connected vehicle data & volumes

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How does Mooven compare?

	Mooven	Traditional monitoring alternatives
 Set up time	Minutes to hours	Weeks to months
 Cost	Simple subscription	<ul style="list-style-type: none">• Install cost• Maintenance• Hardware purchase• Ongoing Costs
 Speed to insights	Real-time, not hardware options	Hardware or manual collection required
 Ability to adjust monitoring	Easily achieved by your team or Mooven team	Requires moving infrastructure
 Baseline capture	Can be easily captured before getting access to site, Ability to required historical baselines if required. Including worst journey time percentile speeds.	Require access to site and installation of hardware, increasing lead times. Can't capture historical baselines.
 Reporting & shareability	<ul style="list-style-type: none">• Intuitive user friendly platform• Self-service• Access to data• Ability to share with stakeholders	<ul style="list-style-type: none">• Data file provided• Some have platforms• Manual analysis by engineers
 Data integrations	Mooven is data agnostics with pre-build integrations for: - floating vehicle data, bluetooth and radar, telematics and traffic signals, machine vision cameras, environmental monitors and batch file uploads for traffic counts.	Linked to the hardware option purchased only, most systems are closed to their datasets only.

APPENDIX: Sample compliance reporting requirement

One example of this is the Queensland Department of Transport and Main Roads (TMR) Travel Time Survey Requirement

3.7 Travel time surveys (Clause 5.7.3)

The following minimum requirements shall apply to the provision of traffic control devices and installation of ITS components:

The Contractor shall undertake travel time surveys

Yes



No

☐

Method and frequency at which travel time surveys will be carried out:

3.7.1 Travel Time Surveys Work Operations

- (a) The Contractor must implement a monitoring system on the affected road network to effectively monitor travel times for the duration of the Contractor's Work. This system must represent current technology (such as the use of Bluetooth capture technology) for travel times, thus providing continuous real-time data for the entire affected road network.
- (b) The Contractor must continuously monitor travel times for traffic over the routes and segments identified above from no later than four weeks after the Date of Acceptance of Tender to the Date of Practical Completion using current technology (such as the use of Bluetooth capture technology). This information must be captured and immediately made available to the Administrator on a real time basis.
- (c) The base line data must be collected by the abovementioned travel time devices over a period of not less than 60 days to provide average travel times over each 30 minute period of every day of the week prior to construction commencing. The data must not be affected by more than 2 weeks of school holiday or other Event Days and shall be referred to as the "pre-start" datum.
- (d) The Contractor must not commence any construction or other work on Site before the base line data has been captured as specified in clauses (a) to (c) above.
- (e) The Contractor must evaluate the effectiveness of its Traffic Management arrangements by comparing the actual travel times using current technology (such as the use of Bluetooth capture technology) against the base line data defined in clause (a) to (c) above and the delay times, and queue length requirements specified in the MTRS02.1 Annexure.

