Curves were identified using geospatial tools by calculating the 30 metre rolling average radius of the road, and extracting adjacent sections that fit within a radius threshold (500m) and curve direction (Ceneck et al., 2011). Road corridors were divided sequentially into straights (with known lengths) and curves (with known radii). Operating speeds were calculated for isolated curves, and sections with similar radius curves.

The speed behaviour along the road was modelled, including:
• Acceleration on straights, or curves where the approach speed is less than the operating speed;
• Speed maintenance on short straights or where approach speeds fell within operating speed ranges;
• Deceleration on curves where approach speed is higher than operating speed.

Using the Austroads (2009) methodology and curve approach speeds and radii, curves were classified as either out of context (‘unacceptable’ or ‘undesirable’) or within context (‘desirable’ or ‘no limit’). Curves were classified in both directions. The figure above shows two curves that display a clear relationship between the context of the curve and the incidence of loss of control crashes.

The curves identified using GIS were compared against an authenticated state highway out-of-context curve dataset. The new methodology identified 96.8% of curves with a high correlation between curve radii values.

Using ten years of crash history, the location of loss-of-control crashes was compared against the curve category. This demonstrated that ‘unacceptable’ and ‘undesirable’ curves present a higher risk of this type of crash.

Output
An interactive web viewer “SignatureNET” was created to display the speed and curve model outputs. The out of context curve analysis highlights those parts of the network where road and roadside interventions are likely to have the greatest benefit on safety outcomes.

Additional risk metrics and data including crash locations and demographic profiles were also mapped. This was provided to the many agencies involved in the Signature Project. Combining the speed and risk prediction models and related context data into a single mapping website has proved to be a cost-effective tool to enable the many Signature Project partners make well-informed road safety investment and decisions.

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References