FACT SHEET: Auckland System Management's Grafton Road bridge expansion joint replacement

NZGTTM-aligned practice, enabling safer, smarter TTM

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Overview

Auckland System Management (ASM) applied the New Zealand guide to temporary traffic management (NZGTTM) principles to replace a deteriorating bridge expansion joint on Grafton Road Bridge №. 2, part of Auckland's Central Motorway Junction. The project required careful planning to minimise disruption while delivering a durable, long-term solution for the state highway network.

This work demonstrates a mature, risk-based approach to temporary traffic management (TTM). Building on lessons from earlier pilots, the team integrated TTM into early design and construction planning to achieve safer, more efficient delivery with reduced impact for road users and the public.

Project summary — Grafton Road Bridge № 2 joint replacement

The project involved replacing a deteriorated bridge expansion joint that had suffered repeated sectional failures. During maintenance work, the existing joint was found to be unable to accommodate the full movement between the bridge deck and abutment. This contributed to repeated failures and ongoing maintenance. After exploring several options, the most effective long-term solution was to replace the system with a more robust steel finger spanning joint capable of accommodating the bridge's movement range.

Constructing the new joint presented significant challenges. Typically such a change would require a full closure of the corridor for around 72 hours. Early discussions between the design and TTM teams helped refine the design and construction sequence, identifying a joint position that balanced asset performance, constructability, and traffic management outcomes.

Coordinating the works with the Auckland Harbour Bridge summer programme further supported consistent public communication and network planning, allowing the project to proceed efficiently while minimising disruption.

Why a risk-based approach was needed

Grafton Bridge № 2 sits within one of the most heavily used sections of the state highway network—even short closures would cause significant disruption. A proactive, risk-based approach to temporary traffic management (TTM) was essential to manage this complexity safely and efficiently.

Applying NZGTTM principles early in the planning process enabled the team to take a whole-of-system view. By involving TTM specialists in design and scheduling discussions, the project team could test

construction options, identify potential risks, and refine the delivery plan to avoid a full continuous 72-hour closure while coordinating the works alongside other major summer projects.

This early collaboration meant the TTM approach directly shaped the design and construction methodology, helping to reduce disruption, maintain safety, and support clear communication with road users.

What was done

"We challenged ourselves to think outside the box during planning to try to optimise the project outcome. We were able to come up with TTM methodology that uses permanent design feel, just delivered temporarily."

— Andrew Sioson, ASM Closure Engineer

- **Early involvement of TTM in planning**
  TTM specialists were involved from the start of project planning. Their input helped shape the works methodology and identify design changes that would reduce traffic disruption. This included advising on joint alignment and sequencing to improve constructability and safety outcomes.
  TTM involvement also allowed the proposed TTM plans to be refined with early input from RCAs.
- **Coordinated timing**
  The works were scheduled to align with the Auckland Harbour Bridge summer programme. This timing allowed the team to take advantage of existing communications channels, traffic-dispersion strategies, and public awareness of summer works. It also helped manage overall network capacity by spreading closures across different corridors.
- **Collaborative design development**
  Design and construction teams worked together, arriving at a decision to place the new joint centrally on the bridge deck. This provided a balanced outcome for asset performance, constructability and traffic management.
- **Customer-centred TTM layout**
  The temporary road layout prioritised clarity and driver experience. Short-term realignments were created using removable road-marking tape and raised reflective pavement markers, supported by a full-width lane shift known as a "Ghostbuster." This arrangement maintained normal lane widths by using the shoulder space and avoided the need for temporary in-lane linemarking, reducing the risk of driver confusion.
- **Quality assurance and reinstatement**
  Professional services were engaged to review TTM plans before implementation. When traffic management was removed, nearby assets such as line marking were fully refreshed, leaving the corridor in better condition than before the works.

NZGTTM principles applied

- **Risk-based planning**
  A holistic, risk-based approach considered the asset needs, network impacts and construction methodology together.
- **Integration of TTM into design**
  TTM was embedded in the design process so that constructability and traffic management could be planned together, achieving the lowest overall risk through reasonably practicable controls.
- **Proportionate planning**
  The depth of planning was proportionate to the project's complexity and risk, with early involvement from all relevant parties to ensure the right level of detail and oversight.

- **Consultation, coordination and collaboration (the 3Cs)**
  The project demonstrated the 3Cs through consistent collaboration between ASM, the RCA, network operators, stakeholders and TTM operations teams from planning through to delivery.
- **Risk peer review**
  The TTM plan underwent a risk-focused peer review by external TTM experts. Feedback from that process was incorporated into the final approach, providing assurance and confidence to proceed with the works.

Benefits

"With TTM involvement, we were able to find a solution that maximised our working time on site and allowed us to deliver the job quicker."
— Gordon Coombes, ASM Structures Project Manager

- **Improved efficiency and delivery**
  Integrating TTM into the design and planning stages influenced the final construction methodology, allowing more productive work within each closure. The most disruptive stage was completed 10 hours earlier than expected.
- **Reduced disruption for road users and communities**
  Coordinating with other major summer works and applying live traffic monitoring helped manage congestion and maintain consistent travel times.
- **Simplified execution**
  The works were staged into two primary phases, making planning, execution and operations easier to manage.
- **Cost savings**
  Smarter sequencing and reduced downtime improved productivity and lowered resourcing needs, delivering measurable cost savings of around $50,000 in TTM expenditure.
- **Safer delivery**
  The refined TTM plan required fewer on-site personnel, reducing total exposure hours.
- **Transferable model**
  The planning approach is now being applied across other complex ASM projects. This provides a consistent framework for safer, more efficient delivery and reduces planning effort needed for future works.

"The project has shown us that through critical thinking and active team participation, we could develop innovative, practical solutions that led to improved outcomes. The most substantial savings came as the result of increased productivity, benefitting everyone, including TTM."

— Tim Emerson, ASM Delivery Optimisation Manager

Appendices

Joint replacement images

Image 1 Normal lane configuration of Grafton Bridge № 2. Image shows four lanes, a merge lane and a shoulder. This photo was taken after the completion of the works and shows the return to normal, with improved road marking.

Image 2 Lane configuration of Grafton Bridge № 2 during joint replacement. Image shows two lanes of live traffic with full width lanes.

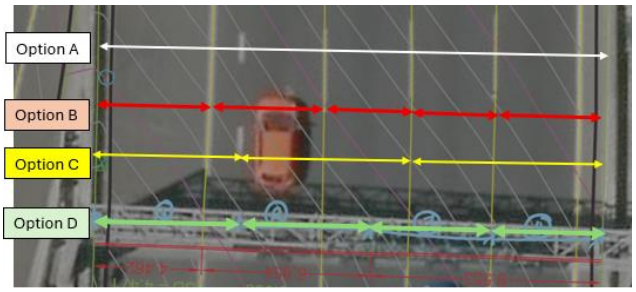

Image 3 Options A through D for joint replacement span configuration. Image shows the different options that were considered during design by having TTM involved early in the process. Option A, which is a full span across the bridge would have required a 72-hour closure of the road. Option D is the option that was implemented in a combination of three 9-hour road closures and two 13-hour lane restrictions.

Image 4 Crew installing the new joint with two lanes operating during the day with two lanes of live traffic.