DELIVERING FOR QUEENSLAND

Bruce Highway Targeted Safety Program (BHTSP)

Temporary Traffic Management (TTM)

June 2026

Queensland Government

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Contents

Definitions / Glossary of terms

Summary of abbreviations and unfamiliar words used in a publication.

Term	Definition
2L2W	Two-Lane Two-Way
BHFMS	Bruce Highway Fatigue Management Strategy
BHTSP	Bruce Highway Targeted Safety Program
CA	Contract Administrator
CMS	Changeable Message Sign
E&T	Engineering and Technology Branch within Transport and Main Roads
ED	Executive Director
GTMWOR	Guideline – Traffic Management for Works on Roads
INO	Integrated Network Operations Branch within Transport and Main Roads
KPI	Key Performance Indicator
May	Indicates the existence of an option. Where the word 'may' is used, it indicates that use of the device is conditional, or optional. Usually, no specific requirement for design or application is intended.
Must	Indicates that a statement is mandatory. Where certain requirements in the design or application of the device are described with the 'must' stipulation, it is mandatory that, when an installation is made, these requirements be met.
MMS	Multi-Message Sign
MUTCD	Manual of Uniform Traffic Control Devices
NTO	Nominated Traffic Officer
OSOM	Over Size Over Mass
PDO	Program Delivery and Operations Branch within Transport and Main Roads
PMO	Program Management Office
PN	Program Note
PTCD	Portable Traffic Control Device
QGTTM	Queensland Guide to Temporary Traffic Management
QPS	Queensland Police Service
RBMS	Roadway Behaviour Monitoring System
RPEQ	Registered Professional Engineer of Queensland
RTNM	Real Time Network Management team within the Integrated Network Operations Branch

Term	Definition
Shall	Indicates that a statement is mandatory. Where certain requirements in the design or application of the device are described with the ‘shall’ stipulation, it is mandatory that, when an installation is made, these requirements be met.
Should	Indicates a recommendation. Where the word 'should' is used, it is considered to be recommended use, but not mandatory. Any recommendation that is not applied must be based on sound traffic engineering judgement and documented.
SLSF	Single Lane Shuttle Flow
TC	Traffic Controller
TGS	Traffic Guidance Scheme
TMC	Traffic Management Centre
TMD	Traffic Management Designer
TMI	Traffic Management Implementer
TMP	Traffic Management Plan
TN	Technical Note
TRSB	Temporary Road Safety Barrier
TTM	Temporary Traffic Management
VMS	Variable Message Sign
VSS	Video Surveillance Systems

1 Preamble

1.1 Document purpose

The purpose of this Program Note (PN) is to provide a clear intent, scope guidance and limitations Program Delivery and Operations (PDO) shall use in planning, designing and implementing Temporary Traffic Management (TTM) for the Bruce Highway Targeted Safety Program (BHTSP). This will provide uniformity in TTM planning, design and implementation to support a consistent and safe experience for road users and workers on the Bruce Highway during construction.

This PN will detail the desired outcomes for TTM for works delivered under BHTSP. Other PNs will be issued to create a suite of PNs for the BHTSP. This PN will be reviewed periodically and updated to incorporate program learnings, innovation and emerging technology.

1.2 Rationale

This PN will not repeat or reference all the various technical documents to be used during the planning, design and implementation of TTM. Instead, it will note some specific technical requirements and reference documents to provide clarity in project development and to detail mandatory and desirable criteria for use under BHTSP.

These standards have been compiled with the intent to:

- provide a safe and consistent road user experience through BHTSP worksites on the Bruce Highway
- create a safe environment for workers delivering BHTSP projects, and
- specify the mandatory and desired standards for TTM to support the delivery of the BHTSP.

1.3 Application

This PN shall be used when planning, designing and implementing the TTM for the delivery of the BHTSP and should be read in conjunction with the BHTSP Design PN. The requirements of the TTM PN apply to all BHTSP projects on the Bruce Highway between Gympie and Cairns on Bruce Highway sections 10B to 10P, inclusive.

1.4 Alignment with specifications, standards and guidelines

This TTM PN shall be read in conjunction with the applicable technical specifications, standards and guidelines. This PN outlines the preferred approach to TTM for the BHTSP and will, at times, exceed the defined minimum requirements. The higher standards reflect the heightened safety focus of the BHTSP to ensure the successful delivery of this

program of works, balancing delivery efficiency with safety for road workers and road users.

TTM PN Annexure MRTS02.1 BHTSP Supplement has been prepared to provide guidance about how the outcomes included in this PN can be achieved and is included in **Appendix A**.

1.5 Questions, feedback or clarification

Where scope criteria are not included in this PN, clarification shall be sought from the BHTSP Program Management Office (PMO).

For any questions or feedback relating to this PN, please contact the BHTSP PMO via email at BHTSP@tmr.qld.gov.au in the first instance.

2 TTM vision standards

2.1 Strategic context

In addition to the Strategic Context detailed in the BHTSP Design PN, the following sections outline the strategic road designations that apply to the Bruce Highway from a TTM perspective.

2.1.1 Road user context

There are a wide range of road users on the Bruce Highway, each with their own characteristics that must be considered when designing and implementing TTM for the BHTSP. These characteristics include trip origin and destination, travel purpose, vehicle type and level of tolerance and acceptance for delays. Typical road users on the Bruce Highway include:

- local commuters who regularly travel between smaller towns and regional centres
- tourists undertaking road trips for recreation or leisure
- people within the freight and logistics industry responsible for the timely movement of essential goods or Over Size Over Mass (OSOM) loads with origin or destinations in major cities, industrial complexes and ports along the coast
- workers involved in delivering the large number of active roadworks projects, and
- vulnerable road users including pedestrians and cyclists in and near population centres.

The unique needs of the different road users must be identified and addressed when planning, designing and implementing TTM measures on the Bruce Highway.

2.1.2 Road network priority

The Bruce Highway is a Priority 1 (PRN1) under the department's *Priority Road Network Investment Guidelines* and a critical Key Freight Route and forms part of the National Land Transport Network.

2.1.3 Oversize heavy vehicle critical road designation

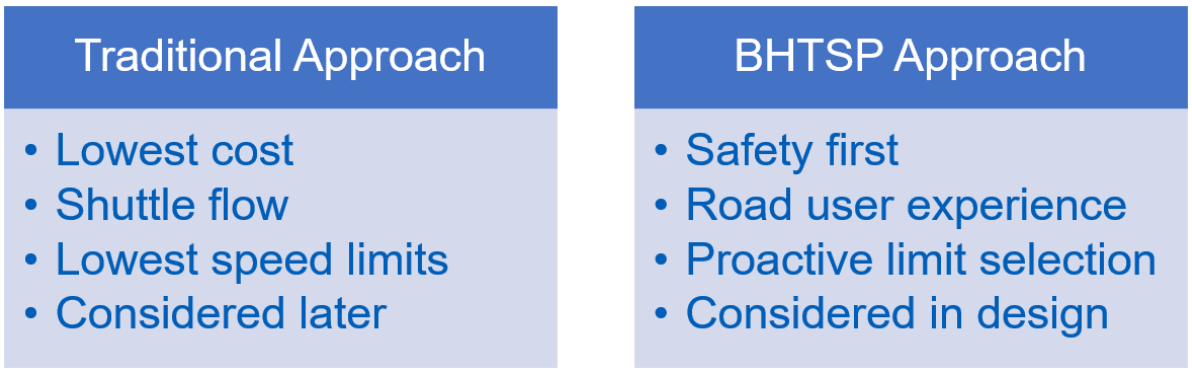
The Bruce Highway between Gympie and Cairns is defined as a Critical Road (also known as a 'red road') for oversize vehicle and vehicle combination movements. The movement of vehicles with a width exceeding 4.5 m but less than 6.5 m on the Bruce Highway, requires, as a minimum, the use of 1 police and 2 escort vehicles. Loads wider than 6.5 m requires 2 police and 2 escorts as a minimum and is reviewed using a non-prescriptive method by PDO District and Queensland Police Service (QPS) to determine the appropriate number of police, escort protocol and pilot arrangements depending on critical mass, powerline requirements and other considerations as applicable. Allowances shall be made for the above vehicles to navigate through worksites.

2.2 BHTSP TTM approach

Traditionally road projects focus on delivering the required work for the lowest cost with compliance to minimum requirements specified in the TTM guidelines. On rural Queensland roads, this often translates to establishing Single Lane Shuttle Flow (SLSF) operations with a 40 km/h speed limit.

It is recognised that the safe and efficient delivery of the BHTSP using the traditional approach will not be practical due to the expected number of concurrent projects on Bruce Highway. Therefore, the BHTSP will adopt a safety-first approach to TTM that balances the road user experience with safety and efficiency, as outlined in Figure 2.2.

Figure 2.2 – BHTSP TTM approach



2.2.1 Default TTM arrangement

Maintaining a continuous Two-Lane Two-Way (2L2W) traffic flow is the default TTM arrangement in the delivery of the BHTSP. It is accepted that maintaining 2L2W traffic flow will not be possible or necessary everywhere (as per Section 2.2.4 of this PN and **Appendix C**), however, it is to be the default position when establishing a TTM arrangement for each project site.

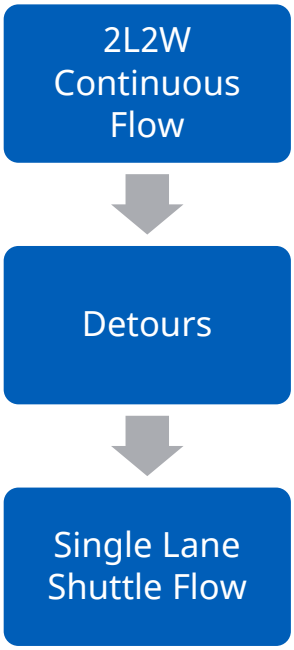
The default arrangement creates the following safety benefits when compared to adopting SLSF arrangements:

- reduced risk of introducing end-of-queue crashes when traffic is stopped at worksites
- reduced delays for motorists, creating fatigue management benefits
- reliable and consistent travel times and driver experience allowing for better alignment with road user expectations and reduction in driver frustration, and
- reduced exposure for road workers and traffic controllers.

2L2W traffic flow can be achieved through various methods including localised pavement widening, construction of sidetracks, or by establishing detours on existing alternative roads.

When 2L2W continuous flow is not possible, the arrangement selection process shown in Figure 2.2.1 is to be followed.

Figure 2.2.1 – BHTSP TTM arrangement selection



2.2.1.1 Sidetracks and local widening

It is acknowledged that sidetracks will require significant investment and time to construct, due to design certification requirements, environmental approvals, cultural heritage clearance and monitoring, and pavement requirements. Technical Note 199 *Guidance for the Design of Temporary Roads* may be considered for the design of temporary sidetracks. Consideration of sustainability measures include the reuse of materials used in sidetracks would be viewed favourably.

Where works, such as sidetracks or localised widening, are proposed to maintain 2L2W traffic flow, a value engineering assessment should be undertaken to determine whether these works should be made permanent to create other corridor benefits, such as stopping bays, enforcement areas, overtaking lanes or wider shoulders. Any works required for traffic management that will be retained for other corridor benefits shall be designed as permanent works. Refer to the *BHTSP Design PN* for more details.

2.2.2 Localised detours

If 2L2W traffic flow is unable to be achieved, options for localised detours should be explored, before considering a SLSF arrangement. This could involve detours for both directions of travel; or for one direction of travel with the other direction to remain on the Bruce Highway past the worksite. The approval process to request localised detours, and the factors to be considered in assessing their suitability, is explained in Section 2.2.4. Following Executive Director (ED) BHTSP approval for a localised detour, the Contractor will be responsible for obtaining the necessary approvals from the relevant road authority.

2.2.3 Lane closures

Lane closures and SLSF arrangements are only to be used where the default TTM arrangement or localised detours cannot be achieved due to physical or economical constraints.

It is recognised that SLSF may be required at different project stages, such as during site establishment when width needs to be added to allow 2L2W flow, or for specific work types including pavement construction. SLSF will also be suitable for projects that do not require widening beyond the existing road formation, e.g., for pavement strengthening only works.

SLSF may also be required on short-term basis to undertake specific work activities, including pavement sampling and investigation works.

Where SLSF will be used, the extent and timing of the closure should be informed by the *Bruce Highway General Access Times* tables provided in **Appendix B**. Projects could consider timings beyond **Appendix B**, subject to liaison and endorsement by the local PDO District.

The maximum length of shuttle flow permitted is based upon 2023 traffic data and guidance included in the *Queensland Guide to Temporary Traffic Management* (QGTTM). Extended lengths of shuttle flow will require a risk assessment as detailed in the Queensland TTM guidelines.

The approval process to request SLSF arrangements is explained in Section 2.2.4.

2.2.3.1 End-of-queue treatments

Where lane closures are to be implemented, end-of-queue risks must be managed proactively. A risk assessment shall be undertaken to identify all crash risks and treatments adopted to mitigate these risks.

The use of technology, best-practice and/or innovative treatments to address end-of-queue crash risks will be considered favourably. Treatments as an example, could include advanced digital warning signage, detectors to monitor queue lengths and automatically activate advanced signage, or the promotion of the use of hazard lights for vehicles stopped in the queue.

Temporary VMS placed in advance of the worksite can be used to encourage heavy vehicle drivers to contact the traffic controllers via UHF on approach to the worksite to allow them to change the temporary signals to green before they arrive. This approach can reduce delays and mitigate the risk on end-of-queue crashes. This method is particularly effective overnight, when traffic volumes are lower.

Where SLSF is adopted, CCTV shall be installed at both approaches to monitor the end of the queue, as well as the length of queued traffic. Access to the CCTV software system shall be provided to the department and the Contract Administration team. If CCTV cannot be used, approval from the PDO Program Director shall be obtained based on the outcomes of a risk assessment.

If works are undertaken at night-time, it is recommended that a risk assessment is undertaken and measures to mitigate identified risks are implemented. This could include the use of temporary lighting to illuminate end-of-queue warning signs on approach to the worksite.

Refer to QGTTM Part 3 for requirements and to the guideline *Traffic Management Works on Roads* (GTMWOR) for details about additional end-of-queue risk control measures.

Trialling innovative treatments not included in the Queensland TTM guidelines or approved products registers at BHTSP sites shall be referred to the BHTSP PMO via email (BHTSP@tmr.qld.gov.au) for consideration prior to use.

2.2.4 Departures and approvals

Any TTM arrangements other than the default 2L2W traffic flow detailed in Sections 2.2.1 and 2.2.1.1 of this PN, or the pre-approved, permitted scenarios included in **Appendix C**, is considered a departure that requires approval from the ED (BHTSP). The list of scenarios in **Appendix C** will be updated as the program progresses, and project learnings are captured.

When seeking approval to adopt a departure such as a local detour or a SLSF, justification to support the request must include:

- Demonstration of why 2L2W traffic flow cannot be physically or economically achieved within the existing road reserve, and a detour or SLSF must be used.

  Examples include:

  - Inadequate corridor footprint, major environmental or cultural heritage restrictions are examples of what could be considered as part of physical constraints.
  - Major structural, geotechnical, utility or drainage constraints are examples of what could be considered as part of economic feasibility assessment.
- How the use of SLSF is minimised and only used when necessary.
- How any additional fatigue impacts will be mitigated.
- How heavy vehicle movements (including OSOM) will be accommodated using TTM measures.
- What methods will be adopted to identify, monitor, communicate and mitigate queue lengths and the risk of end-of-queue crashes.
- If it is proposed to implement SLSF during daylight periods, why these works cannot be undertaken at night.
- For detours, details about the road ownership and suitability of the proposed route for the expected increase in traffic volumes and vehicle mix.

The exemption request is to be endorsed by the District Director and Regional Director before being submitted to the BHTSP PMO for the final approval by the ED (BHTSP). The form to use when seeking this approval from the BHTSP PMO is included in **Appendix D**. This will allow the PMO to capture any learnings or feedback that can be incorporated into future releases of the TTM PN.

Where recommended practices included in this PN are not followed, a risk assessment and decision record keeping process as per the Queensland TTM guidelines is required. Departure from the mandatory and recommended practices and requirements in the

Queensland TTM guidelines is as per the normal departure process detailed in those guidelines.

2.3 Design considerations

Designers shall demonstrate how the design achieves the required TTM objectives from this PN in the project design documentation. This shall be included in the Constructability Report certified by a Registered Professional Engineer Queensland (RPEQ) and could include a Traffic Management Plan (TMP) prepared by a Traffic Management Designer (TMD).

In addition to designing TTM provisions when works are occurring and after-hours, consideration of worker safety during bump-in and bump-out periods shall be included in the TMP and Traffic Guidance Schemes (TGS), as this represents the time with the highest risk for project personnel including traffic management workers and construction crew. This requires the preparation of separate TGS that clearly identifies and mitigates risks during this transition period.

Please refer to the BHTSP *Design Program Note* for design specifications relating to elements other than TTM.

2.3.1 Provision for people walking and cycling

Appropriate provision as per the QGTTM, should be made to allow for the movement of people walking and cycling past worksites, particularly in locations where there is existing provision for people walking and cycling. At locations where the Principal Cycle Network overlaps with project sites, then suitable facilities shall be provided for people cycling.

2.3.2 Public transport provision

Provision shall be made to accommodate public transport movements, when they exist within a worksite. Any impacts to the provision of public transport services and infrastructure shall be managed with the local public transport operator and/or Translink and minimised as much as possible.

The provision of new public transport services and infrastructure is out of scope for this Program.

2.3.3 Provision of data

To support and expedite the TTM design, the following information shall be provided to the project TMD from the PDO District team as early as possible:

- typical hourly traffic volumes and composition (light vehicles, heavy vehicles, caravans / trailers)

- crash history
- design vehicle, if it differs from what is outlined in the BHTSP *Design Program Note*.

2.3.4 Speed reductions

The design should be developed to minimise speed reductions for road users travelling past worksites. The cumulative impact of reduced speeds across the entire Bruce Highway will be significant and result in increased delays and fatigue management requirements for motorists.

The posted speed limits through worksites should be selected to minimise impact to road users as much as possible while maintaining a high level of worker safety. This includes considering the use of barriers to separate road workers from traffic to support the use of 60 km/h and 80 km/h speed limits where suitable.

For BHTSP sites, the default speed limit for worksites is 60 km/h, however 80 km/h is the desired speed limit where possible. The use of 40 km/h speed limits shall be minimised, and suitable barriers selected to physically separate workers from travel lanes to support the adopted traffic speeds. The application of 40 km/h speed limits shall be approved by the BHTSP PMO prior to implementation using the form included in **Appendix D**, justifying why higher speeds cannot be adopted.

If speeds are reduced during work hours, then suitable aftercare speeds shall be implemented when workers are not present on site.

The use of devices to modify speed limit signage remotely (e.g., temporary Variable Message Signs (VMS) displaying a Multi-Message Sign (MMS) or speed limit) is preferred to the use of static signage to reduce the risk to Traffic Controllers (TCs) and Traffic Management Implementers (TMIs) when changing signs manually.

2.3.5 TTM devices

Traffic control devices shall be used in place of TCs to reduce the risk of exposure to traffic in high-speed environments. Some typical devices and their preferred usage are detailed below; however, it is noted that the devices selected will depend on site-specific requirements.

2.3.5.1 Signage

Due to 2L2W traffic flow being the default TTM arrangement, it is expected that a minimal number of signs will be required. It is expected that these signs will require minimal changing as the works are behind the barriers and speed limits are not likely to regularly vary.

Due to the long-term nature of most sites, TTM signage shall be installed on posts for signs that do not require frequent changing. Signs that require frequent changing are to be installed as per the QGTTM guidance around duration and risk assessment.

To minimise the safety risk to TCs and TMIs, the use of technology to support the remote changing of signs is encouraged.

Refer to *Project Recognition Signs Guideline* for information on project-specific signage requirements.

2.3.5.2 Variable Message Signs (VMS)

Where appropriate, the use of permanent and temporary VMS should be considered to supplement the TTM arrangement and inform road users of changed conditions.

2.3.5.2.1 Temporary VMS

It is recommended that temporary VMS are used in place of static MMS with panels that require regular changing (e.g., worker symbolic panel, speed limits, etc.) to reduce worker exposure to traffic.

When VMS are used in lieu of MMS, the lateral positioning of the VMS should be as per the *QGTTM* guidance to ensure they maximise visibility for motorists and do not introduce new hazards for road users or workers on foot.

PDO District teams should consider the strategic use of temporary VMS to provide road users with information about long stretches of roadworks or extensive delays across multiple sites to support better journey planning and driver expectation management.

2.3.5.2.2 Permanent VMS

The use of permanent VMS shall be arranged with Realtime Network Management (RTNM) for actioning by Traffic Management Centres.

Requests are to be submitted in writing via email to StrategicNetworkManagement@tmr.qld.gov.au. This mailbox is monitored during business hours.

At a minimum, each request should include:

- geographical location of VMS
- name of VMS, where known
- departmental district including district of point of contact
- proposed category

- proposed messaging, and
- proposed start and end dates for publishing of messaging.

Messages displayed on permanent VMS are to align with required categories, prioritisation, conditions, content and format requirements. It is recommended that a project-specific messaging strategy is developed prior to seeking to use permanent VMS. The following references may guide the development of the messaging strategy:

- Road Network Management – Variable Message Signs
  - Provides a brief overview of message categories, priorities, decision makers and conditions of display.
  - The content that forms this overview is contained within the other documents listed below, but should a copy be required, please email StrategicNetworkManagement@tmr.qld.gov.au for assistance.
- *Display of Information on Variable Message Signs Organisational Policy*
  - Provides an overview of the department's policy position on categories, approach and rationale for display of information on VMS.
- *Queensland Guide to Traffic Management* Part 10: *Transport Control – Types of Devices*
  - The department has adopted and harmonised with Austroads *Guide to Traffic Management*. Where there is a departure for the harmonisation, such as Queensland specific variances, these are contained within this guide including Queensland specific VMS message statement bank.
- Austroads *Guide to Traffic Management* Part 10: *Transport Control – Types of Devices*
- The department has adopted and harmonised with Austroads *Guide to Traffic Management*. This guide outlines message formats and VMS message statement banks.

2.3.5.3 Temporary Road Safety Barriers (TRSBs)

To support the use of higher vehicle speeds past worksites, compliant crashworthy barriers are to be used to physically separate work areas from passing traffic. The barriers selected shall comply with the department's current barrier design and installation standards for the proposed vehicle speed and comply with the department's *Accepted products and suppliers* for Road safety barrier systems and devices available on the department's Approved products and registered suppliers webpage. Refer to **Appendix E** for details about the use of steel barriers on granular pavements. The minimum installation lengths are indicated in the department's *Accepted products and suppliers* for road safety barrier systems and devices.

Only TRSBs that have been tested and approved for use on the in situ pavement type(s) present can be used and they must be installed as per the requirements for that pavement type.

2.3.5.3.1 Considering in situ pavements when selecting TRSBs

It is preferable to use TRSBs that do not require the installation of posts, anchors or pins (herein referred to as 'pins') when practical and possible. Where TRSBs that require the installation of pins into the pavement are adopted, consideration of the impact of the pins on the pavement and underground infrastructure is required (e.g. see Section 2.3.5.3.3). Where such systems are used, all holes in the pavement shall be filled and sealed as per Section 2.3.5.3.2.

The pavement thickness shall be assessed to ensure it can accommodate the length of the pins required for the TRSBs. Not all existing pavements, particularly unbound granular pavements, may be as deep as some of the longer pins required.

Where lightly bound pavement layers exist, the installation criteria for unbound granular pavements shall be adopted when selecting and installing TRSBs.

2.3.5.3.2 Pavement rectification after removal of TRSBs

PSTS113 *Supply of Hot Poured Elastomeric Sealants for Pavements* and PSTS114 *Sealing of Cracks, Saw cuts, Joints and Holes in Flexible Pavements* are project-specific technical specifications (PSTSs) that shall be included in all BHTSP contracts along with:

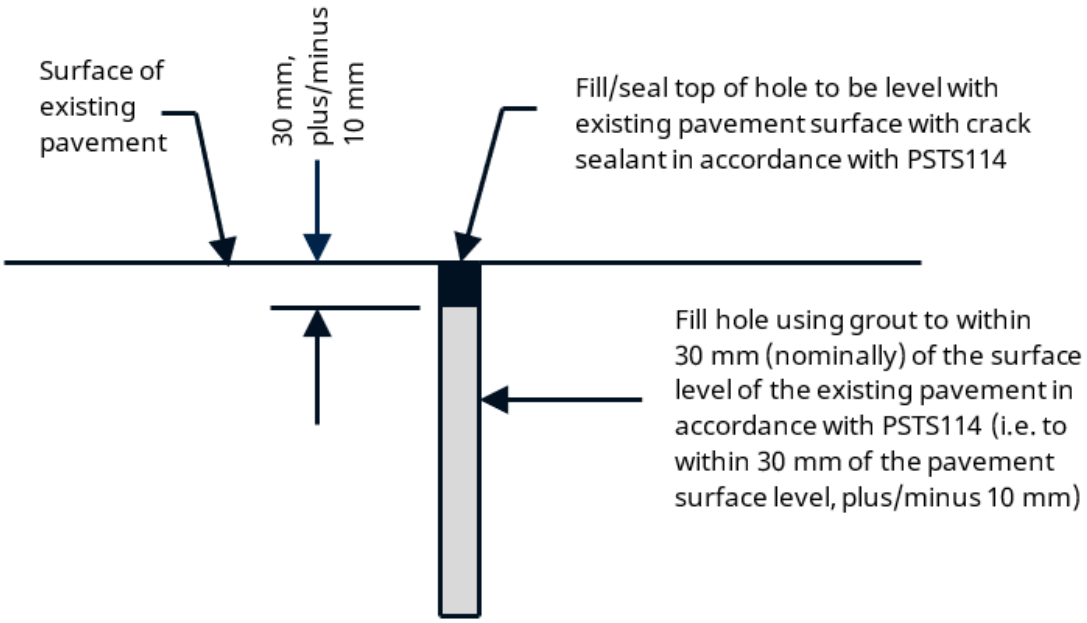
- PSS114 *Sealing of Cracks, Saw cuts, Joints and Holes in Flexible Pavements* which is a project-specific (measurement) specification (PSS)
- TTM Program Note *Annexure MRTS02.1 BHTSP Supplement*, and
- *Annexure PSTS113.1 Supply of Hot Poured Elastomeric Sealants for Pavements*.

The latest version of these PSTSs can be obtained from the PDO project teams or by emailing TMRRoadSurfacings@tmr.qld.gov.au.

When TRSBs that require the installation of pins are removed, all holes in the pavement along the length of the removed TRSB shall be promptly sealed in accordance with Figure 2.3.5.3.2 and PSTS114 to inhibit moisture ingress and minimise premature pavement failures. Unbound granular pavements are particularly susceptible when the moisture of the material becomes too high.

A lump sum amount shall be included with the estimated project cost based on the types and quantities of TRSBs expected to be used.

Figure 2.3.5.3.2 - Filling and sealing residual TRSB holes (diagrammatic – not to scale)



2.3.5.3.3 TRSBs and public utility plant (PUP), shallow culverts and other underground infrastructure

Where TRSBs require the installation of pins into the pavement, extreme care must be taken to ensure that no shallow underground infrastructure is present that could be affected by the installation. This includes, but is not limited to, public utility plant (PUP), shallow culverts, intelligent transport systems (ITS) cabling, street lighting conduits, and subsoil drainage infrastructure.

A clear distance (clearance zone) must be maintained between the maximum penetration depth (toe) of any pin and any underground installation. This clearance zone must comply with the minimum clearance requirements mandated by the relevant utility authority, as typically provided in response to a (Dial) Before You Dig Australia (BYDA) enquiry. Where the installation of TRSB pins are proposed, a BYDA enquiry must be lodged prior to installation.

Where underground structural infrastructure, including culverts, is present, a minimum clearance of 100 mm is to be maintained from TRSB pins.

Where underground installations are identified, it is prudent to confirm the exact depth and horizontal alignment of the infrastructure by potholing or other non-destructive investigation methods prior to installation, to verify that the required clearances can be achieved.

2.3.5.4 Portable Traffic Control Devices (PTCDs)

Where traffic is to be stopped to support construction activity on Bruce Highway, PTCDs shall be used in place of TCs to remove interactions between road workers and traffic movements. Use of TCs on side roads or for property accesses when not positioned on Bruce Highway, should be as per the requirements of the QGTTM.

Only PTCDs included on the current list of approved products in the department's *ITS and electrical approved products list* shall be used at roadworks sites in Queensland.

When using either Type 1 or Type 2 Portable Traffic Signal System (PTSS), for manually controlled shuttle flow arrangements, the PTSS shall be used in paired mode using a single Handheld Remote Control whenever possible. This prevents human errors by TCs releasing traffic from both directions at the same time.

2.3.6 Other design considerations

2.3.6.1 ITS infrastructure

If existing ITS infrastructure (i.e., Video Surveillance Systems (VSS), VMS, cabinets, signage, detectors, etc.) is to be relocated to accommodate works, identification of how this can be undertaken as ‘early works’ in advance of the construction is required. This will require consultation with BHTSP PMO and Engineering and Technology (E&T) to ensure that continuity of service is provided throughout the duration of the Program.

All existing infrastructure within the roadway, including loop detectors, Weigh in Motion sites and permanent traffic counters, is to be reinstated as part of the works unless otherwise advised by the BHTSP PMO.

The BHTSP provides an opportunity for the PDO District teams to install additional or maintain existing Wireless Traffic Survey (WTS, ‘Bluetooth’) detectors, where deemed necessary, to monitor project travel times, and install additional or maintain existing permanent count / classification sites where additional coverage would be beneficial. In both instances, the requirement for these devices should be identified during project planning and discussed with BHTSP PMO and E&T’s Transport Operational Technology section. Note: Funding for maintenance of new or existing devices beyond BHTSP will be the responsibility of existing operational budgets.

2.3.6.1.1 ITS device change notification

Projects are to contact RTNM via email StrategicNetworkManagement@tmr.qld.gov.au for communication protocols regarding ITS Device Change Notifications as part of project planning. Please note this inbox is only monitored during business hours. Upon receipt, RTNM will supply the project with communication protocols for use by the project only.

ITS Device Change Notifications shall be supplied with a minimum of 7 calendar days' notice by email or, where the taken offline due to unforeseen circumstances, via a dedicated, non-public telephone number, outlined in the provided communication protocols.

2.4 Implementation / operational considerations

To ensure credibility and encourage driver compliance, it will be critical that the implementation of TTM to a high standard is prioritised for BHTSP sites. Adopting a considered, fit-for-purpose approach to TTM, in conjunction with the use of high-quality signage and devices, will reassure drivers that the road user experience is a priority for the BHTSP.

2.4.1 Unplanned events

When the closure of one or more traffic lanes is required due to unplanned events including incident response, emergency works or natural disasters as defined in the Contract, the BHTSP PMO shall be advised as part of unplanned event reporting requirements.

2.4.2 Access restrictions

The use of SLSF should align with the access times and lane closures lengths detailed in **Appendix B**. Any closures outside of these times or that are longer than the specified distance shall liaise with PDO District.

Unless otherwise specified, works that disrupt traffic shall not take place during, or on the day immediately prior to, public holidays or long weekends to minimise road user disruptions during these busy periods.

The decision on work arrangements during regional public holidays and other events with significant traffic disruption potential will be made by PDO Districts and shall be included in Clause 5.7.2 of *Annexure MRTS02.1 BHTSP Supplement* (**Appendix A**) and contractors be advised in advance of work commencement.

Where lane closures are required, implementing these closures at night-time shall be considered to minimise the impact to road users. The additional risks associated with night works, including the higher proportion of heavy vehicles, shall be identified through a risk assessment and mitigation measures adopted including the use of additional lighting to illuminate signage and other traffic control devices.

2.4.2.1 Permits

For worksites that impact the local government road network, the appropriate traffic control permits shall be obtained from the relevant Council prior to commencing work.

Conflicts between BHTSP worksites will be identified by the PDO District when developing the program of works and minimised where possible. There may be times during the defects period where rectification works are required that may impact an adjacent site. Any conflicts shall be managed between contractors and escalated to the PDO District for support as needed.

Provision for the safe movement of OSOM vehicles shall be made at sites along the Bruce Highway. Many of these vehicles will be travelling with escort and/or pilot vehicles and will be required to contact the site prior to arrival, as part of their permitted conditions of operation.

Upon the advance notification by OSOM operator, where the operator complies with the permitted conditions of operation, arrangements shall be made by projects to facilitate the safe passage of the OSOM convoy.

In locations where available width is unable to accommodate the safe passage of OSOM through the site during designated work hours, an area where the OSOM vehicle convoy can pull over should be provided in advance of the site. These bays will provide a location for the OSOM convoy to stop clear of traffic while traffic management devices are removed, and approaching traffic held, before the OSOM convoy is released. The locations of these bays will be determined by PDO Districts in conjunction with the BHTSP PMO and E&T based on the expected OSOM demands, project locations and expected TTM arrangements.

OSOM convoys may be required to wait if advanced notification permit conditions are not complied with before arrival on site.

2.4.3 Speed monitoring, compliance and enforcement

Selecting and maintaining suitable speeds through worksites will be essential to balancing travel times and worker safety. This is particularly important for those road users who travel long distances along the Bruce Highway, as small delays at each site have a large cumulative impact on the driver's ability to manage and comply with mandated fatigue management measures. Section 2.3.4 of this PN details the speed limit setting considerations.

The Speed Management Plan process documented in Appendix A of Technical Specification MRTS02 *Provision for Traffic* shall be followed for BHTSP worksites.

Monitoring vehicle speeds and reporting on driver compliance will be a key performance metric for contractors as part of the project's monthly reporting requirements. The travel time management solution outlined in Section 2.5.2 of this PN shall be used to monitor and report on vehicle speeds through worksites once the solution has been established.

When works are not undertaken behind safety barriers, the preferred approach is to implement a speed limit that can remain consistent during both work hours and aftercare periods, to minimise the need for frequent sign changes by TCs and consequently reducing their exposure to live traffic. However, if speed limits are reduced during work hours due to proximity to workers, then a suitable aftercare speed limit is to be implemented to reduce road user delay, improve TTM credibility and increase driver compliance. If possible, the aftercare speed should be set as close as possible to the typically posted speed for that section of road.

Where speed compliance is low, the use of devices to monitor and display vehicle speeds is recommended, including the use of Speed Indicator Devices or temporary VMS with Automated Number Plate Recognition (ANPR) capability. The use of devices to encourage better driver compliance is required before formal enforcement can be requested. Refer to GTMWOR for further guidance on the use of these devices.

Pilot vehicles may be used to manage speeds in locations where SLSF is implemented to achieve compliance. Pilot vehicles may also be used to manage traffic speeds where site vehicles are entering and leaving worksites to ensure safety for workers and road users.

If enforcement is required to ensure driver compliance with posted speeds through worksite, then the Enforcement Request Procedure included in Appendix B of MRTS02 *Provision for Traffic* shall be followed. It is expected that Roadways Behaviour Monitoring System (RBMS) cameras will be made available for BHTSP worksites to support the safe program delivery from mid-2026. The use of RBMS will only be considered once other engineering remedial measures to address driver compliance have been applied. The use of RBMS for BHTSP sites will be prioritised in accordance with Section B2.2 of Appendix B in MRTS02 *Provision for Traffic* in consultation with the PDO District team.

If projects require QPS to undertake enforcement, the following shall be provided for each site:

- a site safety plan and traffic management plan which is compliant to enforcement
- a new site safety plan and traffic management plan must be created every time the site is modified with road signs / barriers etc., which may compromise minimum distances for enforcement
- proof of signage placement at the time of enforcement, and
- an area for interception and enforcement.

2.4.4 Site monitoring and auditing

The regular and ongoing monitoring of TTM implementation and its effectiveness shall be undertaken by the contractor's personnel as defined in the Contract and as required by the Contract Administrators (CAs). Areas to be considered include signage and device installation, speed management measures and aftercare arrangements. These inspections should be digitally recorded and saved as part of the project's records. It is recommended that daily inspections and checklists completed by the contractor's personnel are digitally recorded and saved centrally for completeness. If issues are identified, then measures to address these concerns shall be implemented as soon as possible.

The BHTSP PMO will engage independent TTM inspectors to provide support for PDO Districts and CAs as required. Should there be any issues identified that cannot be resolved locally, then CAs can request support from these inspectors via the BHTSP PMO.

These inspectors will also be responsible for undertaking proactive audits of worksites to ensure compliance with standards, this PN and *Annexure MRTS02.1 BHTSP Supplement* (**Appendix A**), and to ensure that the TTM solution is fit-for-purpose for the site. The outcomes of these audits will identify areas where CAs and/or contractor's personnel could benefit from improved education or knowledge sharing across projects.

2.4.5 Interaction with other sites

Because of the number of road users who travel long distances on the Bruce Highway, it is critical that reducing delays to motorists is prioritised for BHTSP works to manage both driver frustration and fatigue resulting from travelling slower past worksites. It is recognised that there will be other worksites along the Bruce Highway that are not associated with the BHTSP that are not required to follow the guidance included in this PN, however adoption of these principles is desirable for non-BHTSP sites, where suitable.

BHTSP works will be programmed to minimise interactions between adjacent sites, however there is a possibility that there will be sites in proximity to each other because of the delivery of other programs. In these situations, the PDO District shall consider and arrange all involved contractors to integrate the TTM for the two sites from a road user perspective regarding cumulative delays, speed limits, signage and devices, and potential queues.

There may also be situations where maintenance or rectification works are required in proximity to a BHTSP worksite. In this situation, it will be the responsibility of the PDO District, in conjunction with the relevant contractors, to manage and mitigate any conflicts, ensuring that impacts on road users are minimised.

2.4.5.1 Traffic Management Liaison Group

A Traffic Management Liaison Group will be established for each PDO District to allow for coordination and knowledge sharing for work sites along the Bruce Highway. This group will meet monthly and could involve representatives from PDO District, Integrated Network Operations (INO) Network Management (including the TMC), contractors, QPS, the BHTSP PMO, and local government. Relevant industry parties such as the Traffic Management Association of Australia or the Civil Contractors Federation, may be invited to attend as appropriate. The Traffic Management Liaison Group shall have a minimum of five people from the representative groups nominated above.

The Traffic Management Liaison Group shall be a forum for exchange of information, identification of program efficiencies and the discussion of issues associated with temporary traffic management and traffic impacts. These groups shall be responsible for considering the overall works program and adjusting project staging to manage and minimise travel time delays across worksites. This could include staggering the works program to ensure only one project is implementing SLSF at any given time.

The Traffic Management Liaison Group is not responsible for approving or accepting the Traffic Management Plan, Traffic Guidance Schemes, or any other traffic related documentation.

The BHTSP PMO shall develop a Terms of Reference outlining roles, responsibilities and remit of these groups. The PDO District shall be responsible for organising the meetings, taking minutes and all other aspects of managing the Traffic Management Liaison Group for their District.

2.4.6 Other considerations

2.4.6.1 Technology adoption

Adopting technology and innovation to support improved TTM outcomes is encouraged as part of the BHTSP. Implementing innovation and continuous improvement will be measured as part of contractor Key Performance Indicators (KPIs). This is a constantly evolving space, but some examples of innovative technology that can be adopted to support TTM include:

- real-time activation of sign deployment at worksites so it can be reported in QLD Traffic, or
- the use of connected devices to detect and automatically respond to traffic movements by activating a sign or other device to alert motorists of the specific condition. This can be used to mitigate the end-of-queue crash risk, as detailed in Section 2.2.3.1 of this PN.

Trialling innovative treatments not included in the Queensland TTM guidelines or approved products registers at BHTSP sites shall be referred to the BHTSP PMO via email (BHTSP@tmr.qld.gov.au) for consideration prior to use.

2.4.6.2 Line marking

Any existing line marking is to be removed from the road surface if vehicles are to cross it during construction.

No temporary line marking shall be installed on the final pavement surface.

All new line marking shall tie into existing line marking at the project extents and old line marking completely removed in this transition area.

The contractor shall program the work so that the final layer of seal or asphalt is line marked, and speed reductions removed, within 6 weeks, unless otherwise approved by the Principal. The requirements in this clause do not relieve the contractor of any requirements stated elsewhere in the contract.

2.4.6.3 Narrowcasting

The use of narrowcasting along the Bruce Highway will be explored for the BHTSP. Narrowcasting can provide motorists with general information about the works being delivered up to a 10 km radius via a dedicated radio frequency. In addition to general program information, tailored messaging for specific worksites or locations can be developed to provide more detailed information to road users that reflect the local conditions.

More information about narrowcasting including any guidance around technical requirements and messaging will be provided in future updates of this PN.

2.4.6.4 Nominated Traffic Officer (NTO) requirements

Due to the number of concurrent worksites that will be operating along the Bruce Highway, it will be important to align the required skills and experience of Nominated Traffic Officers (NTOs) with the level of complexity of the TTM required to support the individual projects. NTOs with high levels of skill and experience should be used at sites with high levels of complexity, while NTOs with less experience should be used at less complex sites. This will also provide opportunities for those NTOs with less experience to develop and increase their skills and knowledge over the life of the program. Refer to *Annexure MRTS02.1 BHTSP Supplement* in **Appendix A** for considerations.

2.4.6.5 Network management requirements

Projects are to engage with their local TMC and RTNM in accordance with standard protocols regarding project support, device changes, publishing information on QLDTraffic and incident management.

2.5 Travel time management

Reducing delays and travel time impacts to road users is a key focus of the BHTSP due to the cumulative impacts of numerous worksites between Gympie and Cairns. The BHTSP PMO will be taking a proactive approach to monitoring and reporting travel time impacts and delays.

Travel time data will also be shared with road users to inform their real-time and advanced journey planning. This will include sharing of information on permanent VMS along the highway and be made available for consumption by third-party journey planning systems.

2.5.1 Maximum allowable delays

Because of the number of sites that will be active on the Bruce Highway at any given time during the BHTSP, delays shall be minimised through the effective selection of TTM arrangements, suitable speed limits and management of the length of the worksite.

Unless otherwise advised by the BHTSP PMO, **the maximum allowable delay at each worksite is 5 minutes** regardless of the TTM arrangement adopted. While there is no maximum delay threshold that applies to each segment of the Bruce Highway, PDO District teams should monitor and manage project scheduling and coordination to minimise road user delays as much as possible. This includes managing the number, length and TTM arrangement at sites, as well as the number of SLSF sites operating at any given time within a road segment.

Baseline and project travel time data will be collected using a combination of data sources including permanent detectors along the Bruce Highway, supplemented with other available traffic data. More information about this will be provided as part of the development of the Travel Time Management Tool discussed in Section 2.5.2.

2.5.2 Travel time management tools

There are a range of tools that can be used to monitor and report on travel time, depending on the purpose and intended audience.

The BHTSP PMO is currently investigating opportunities for a single platform solution, known as the Real Time Traffic Monitoring Solution (RTTMS), to provide functionality for the BHTSP to provide information for all users including contractors, Contract

Administrators, PDO Districts, BHTSP PMO, E&T and INO. Access to and training for how to use the platform will be provided to users once it has been developed.

It is expected that this solution will be available for use from mid-2026. This solution will supplement existing departmental data (i.e., sourced from WTS / Bluetooth readers and loop detectors) with third-party data to produce a robust dataset that can be used to accurately monitor and predict travel time along the Bruce Highway.

2.5.2.1 Worksite monitoring

It will be the responsibility of the contractor, CAs and the PDO District to monitor the impact of each project on travel times for road users and ensure that the maximum targeted delay as detailed in Section 2.5.1 is not exceeded on a planned basis without BHTSP PMO approval. When there are unplanned incidents that result in delays on site, this shall be logged and reported to the BHTSP PMO via the PDO District. The monthly reporting of travel time impacts is a project requirement, and this information will be considered and assessed as part of project and Program KPIs.

Once the Real Time Traffic Monitoring Solution (RTTMS) is established, baseline travel times along Bruce Highway will be provided for the BHTSP extents with the data able to be segmented by District and project boundaries. This will cover typical historic travel times for times of day, days of the weeks and months of the year prior to the BHTSP works commencing.

Travel times through the work area captured prior to work commencing will be used as a baseline for the ongoing measurement of travel time during the construction. Travel times will then be monitored post-project activation to monitor compliance with the allowable increase at site, District and Program level.

Unless advised otherwise, contractors are required to provide WTS / Bluetooth sensors at the extents of their project sites, including any necessary power and communications equipment, to provide near real-time detection data to the RTTMS. The maintenance of these devices will be the responsibility of the contractor.

These devices must be capable of transmitting near real-time detections via the Addinsight Device Protocol v3 (ADPv3), to an internet-based Addinsight instance managed by the department. Connectivity and configuration details for contractor provided WTS hardware (to connect to this Addinsight instance) will be provided to the successful tenderers.

PDO Districts will be responsible for monitoring the travel time impacts of projects within their Districts and reporting any non-compliance to the BHTSP PMO.

BHTSP PMO will be responsible for monitoring and reporting on the cumulative travel time impacts of projects associated with the BHTSP.

2.5.2.2 Real-time travel times

The single platform solution will be used to monitor and report on real-time travel times along the Bruce Highway. This information will be displayed on permanent VMS that are installed along the Bruce Highway and provide information about the current travel time to key destinations. This information will allow motorists who are currently travelling along the Bruce Highway to make informed decisions about when to stop for breaks or continue their journey without stopping.

Opportunities to share real-time travel information with road users through other platforms will be investigated by the BHTSP PMO.

2.5.2.3 Predicted travel times

The single platform solution will also be able to predict expected travel times to support journey planning for different road users. This information will be integrated into existing departmental tools such as QLDTraffic to support road user journey planning. Opportunities to share predicted travel information with road users through other platforms will be investigated by the BHTSP PMO.

2.5.3 ITS infrastructure

During project delivery, contractors shall provide access to any ITS devices that are located within the project extents for on-going device maintenance, repair or replacement. Contractors shall provide maintenance providers with site induction and other site-specific requirements and access arranged as soon as practical once the request to access the device is made to the PDO District.

2.6 Fatigue management

2.6.1 Rest areas

The Bruce Highway Fatigue Management Strategy (FMS) and the BHTSP *Fatigue Management Infrastructure (FMI) Program Note* will cover the supply and functional requirements of rest areas.

Access to existing rest areas is to be maintained as much as possible if works are to be delivered in those locations. If access to an existing rest area is unable to be maintained, the BHTSP PMO shall be informed and mitigation measures to support fatigue management shall be identified and implemented.

If rest areas are to be closed or removed during the construction of BHTSP projects, then all signage relating to the stopping bay (including advance signage beyond the project extents) is to be covered or removed during construction. Unless otherwise informed, these rest areas are to be reinstated as part of the project.

2.6.2 Stopping bays

Regular, informal stopping areas are required for emergencies (flat tyres, checking loads, vehicle breakdown, etc.). The Bruce Highway FMS vision is to provide stopping bays every 5 mins, or at approximately 6 km spacing. PDO Districts should provide a suitable number of stopping bays along the Bruce Highway to complement formal rest areas in accordance with the *BHTSP Fatigue Management Infrastructure (FMI) PN*.

Stopping opportunities may utilise 1 on 6 batters (or flatter) for standard passenger vehicles, or stopping bays utilising local shoulder widening including at cut / fill interfaces.

Localised widening required to accommodate 2L2W traffic flow during construction can provide future opportunities for informal and formal stopping areas. Informal stopping can occur within a 3 m shoulder, while formal stopping bays require a minimum of 3.5 m shoulder for passenger vehicles and a 4.5 m wide shoulder for heavy vehicles.

If formal stopping bays are to be removed during the construction of BHTSP projects, then all signage relating to the stopping bay (including advance signage beyond the project extents) is to be covered or removed during construction. Unless otherwise informed, these stopping bays are to be reinstated as part of the project.

Appendix A: Temporary Traffic Management (TTM) Program Note Annexure MRTS02.1 BHTSP Supplement

Refer to separate Word document.

Appendix B: Bruce Highway General Access Times

Refer to separate PDF document.

Appendix C: List of pre-approved, permitted SLSF scenarios

The scenarios are where SLSF can be implemented for BHTSP projects without requiring approval from the BHTSP PMO are summarised below. The extent and duration of SLSF shall be minimised as much as possible to reduce travel time delays for road users. The maximum allowable delays for each site outlined in Section 2.5.1 of this PN still apply when SLSF is adopted.

PDO Districts are to maintain a record of the location, duration and reasons for SLSF implementation for the BHTSP.

This list will be updated regularly as Program learnings are captured.

Pre-approved, permitted SLSF scenarios:

1. When the scope of works does not require widening beyond the existing road formation, e.g., for projects only undertaking pavement strengthening activities.
2. When undertaking pavement sampling and investigation works.

Appendix D: TTM Departures – Approval Request Form

Refer to separate Word document.

Appendix E: Steel Temporary Barrier Systems on Granular Pavements

E.1 General

Proprietary temporary steel barrier systems have differing requirements for foundation pavements and anchorage, including pinning depth, spacing, and pavement type. These requirements are published in the Transport and Main Roads *Accepted Road Safety Barrier Systems and Devices* document, available on the departmental website under Traffic engineering, traffic management and road safety.

Designers shall refer to Section 4.2 of that document, which links to the relevant Austroads *Technical Conditions for Use* (TCU). The TCU Foundation Pavement Conditions table defines the pavement types and anchorage arrangements for which individual barrier configurations are approved.

E.2 Granular pavement limitations

A common constraint identified in the TCUs is that certain pre-approved modified pinning configurations of temporary steel barrier systems, namely the Minimum Deflection System (MDS) and Limited Deflection System (LDS), are generally not suitable for direct installation into granular pavements with sprayed seal surfacing. These MDS and LDS configurations are often selected on projects to achieve reduced barrier deflection and minimise the required clearance behind the barrier.

Where installation on granular pavement is proposed, these systems typically require a 100–150 mm thick asphalt concrete (AC) overlay to achieve compliant anchorage performance. In some regions, this pavement configuration is uncommon or impractical.

At present, there are no Normal Design Domain (NDD) compliant MDS or LDS installations for granular pavement conditions. However, the standard (non-modified) configurations of several temporary steel barrier systems have been tested on a range of soil types and foundation conditions and are approved by Transport and Main Roads for use on granular pavements. Consequently, standard configurations may represent a more appropriate and lower risk option where granular pavements dominate.

E.3 Design exceptions

Where use of MDS or LDS systems on granular pavements is proposed, a Design Exception (DE) assessment may be prepared to justify departure from the accepted conditions.

Such an assessment shall:

- clearly identify the non-compliances with the relevant Austroads TCUs

- assess the expected changes in barrier performance, including deflection, working width, and anchorage behaviour
- document residual safety risks and required controls, and
- provide justification for acceptance.

Design Exceptions should be considered a less preferred option and should only be pursued where compliant alternatives are not reasonably practicable.

E.4 Speed environment and test limitations

Most pinned temporary steel barrier systems, including Standard, MDS, and LDS configurations, have been full scale crash tested at 100 km/h only. There is no published crash test data in Transport and Main Roads or Austroads documentation for alternative impact speeds such as 60 km/h or 80 km/h, including corresponding deflection widths.

To address this gap, Transport and Main Roads has consulted individual system suppliers to obtain engineering-based deflection estimates for lower operating speeds. These values are derived from engineering analysis and extrapolation of test data and are provided for design guidance only.

For standard barrier configurations installed on granular pavement, the derived design values are summarised in Table E.4 below.

These values:

- shall not be treated as substitutes for full scale test results
- are intended to inform design in speed environments below 100 km/h
- require justification through an EDD report explaining why full-scale test results cannot be adopted, either on a project-by-project basis or via a conciliated list of projects/sites, including explanation of assumptions and limitations.

Table E.4 – Design deflection values for selected temporary steel barrier systems on granular pavement (25° impact angle)

Barrier type	Data source	Test level	Impact speed (km/h)	Anchorage type	Deflection (m)
BG800 Standard	Test result	TL3	100	Driven pile anchor	1.66
	Calculated	–	80	Driven pile anchor	1.03
	Calculated	–	60	Driven pile anchor	0.58

Barrier type	Data source	Test level	Impact speed (km/h)	Anchorage type	Deflection (m)
HighwayGuard Standard	Test result	TL3	100	Flat top pin	1.71
	Calculated	–	80	Flat top pin	1.06
	Calculated	–	60	Flat top pin	0.74
SafeZone Standard	Test result	TL3	100	Flat top pin	1.70
	Calculated	–	80	Flat top pin	1.36
	Calculated	–	60	Flat top pin	1.06
Defender 70	Test result	TL2	70	Freestanding	1.2
Defender 100 HC	Test result	TL3	100	Asphalt pin	1.96
	Calculated	-	80	Asphalt pin	1.52
	Calculated	-	60	Asphalt pin	1.14
Defender 100 FS	Test result	TL3	100	Freestanding	1.9
	Calculated	–	80	Freestanding	1.52
Ironman Hybrid	Test result	TL2	70	Freestanding	1.49
ZoneGuard Standard	Test result	TL3	100	Asphalt pin	1.9
	Calculated	-	80	Asphalt pin	1.22
	Calculated	-	60	Asphalt pin	0.68
HV2	Test result	TL3	100	Freestanding	1.47
	Test result	TL4	100	Freestanding	2.37
	Calculated	-	80	Freestanding	0.967
	Calculated	-	60	Freestanding	0.601

Note: For detailed test parameters, installation conditions, and limitations, refer to the Austroads TCU for each barrier system.

E.5 Anchorage and pavement damage considerations

The method of anchorage is a critical design consideration. While pinning barriers to the pavement reduces deflection and working width, it may also cause permanent pavement damage, particularly on thin or granular pavements.

Designers shall ensure that:

- the pin type, spacing, and embedment depth comply with the relevant Austroads TCU

- the anchor solution is compatible with the pavement structure and future maintenance requirements, and
- pavement damage risk is weighed against the safety performance benefits of reduced deflection.

Where feasible, alternative barrier systems should be evaluated.

E.6 Preference for freestanding systems

Practitioners should consider the use of freestanding temporary barriers that are accepted for use on granular pavements, as identified in the Austroads TCU. These systems can:

- eliminate pavement damage from pinning
- reduce reinstatement costs, and
- simplify installation and removal.

Freestanding systems may be particularly advantageous where pavement preservation is critical.

E.7 Hierarchy of guidance documents

The following hierarchy applies when selecting and designing temporary barrier systems:

1. *Bruce Highway Targeted Safety Program (BHTSP) Program Notes*
2. R*oad Planning and Design Manual* (RPDM)
3. Transport and Main Roads *Accepted Road Safety Barrier Systems and Devices*
4. Austroads *Technical Conditions for Use.*

Where conflicts occur, the higher order document shall take precedence unless otherwise approved.

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