# Guide to Temporary Traffic Management Part 2

## Traffic Management Planning

Austroads


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# Guide to Temporary Traffic Management
# Part 2: Traffic Management Planning


Sydney 2021

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# Guide to Temporary Traffic Management Part 2: Traffic Management Planning

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**Abstract**

Austroads' Guide to Temporary Traffic Management (AGTTM) details contemporary temporary traffic management practice for application in Australia and New Zealand. It provides guidance for the planning, design and implementation of safe, economical and efficient temporary traffic management designs. This Guide recognises the level of variability of the road environments for which guidance is provided. The guidance provided in AGTTM is intended to encourage a consistent level of planning that supports the streamlined safe progress of work. It applies to all works on roads and near roads, in addition to off road development and other activities that interact with and impact on the road environment.

AGTTM has been developed based on best practice temporary traffic management practice in Australia and New Zealand, to assist road authorities to meet their existing legislative responsibilities for workplace and public safety.

Part 2 has been specifically prepared to assist with the preparation of traffic management plans (TMPs), in accordance with Austroads best practice. It provides general information about the context, components and format of a TMP.

**Keywords**

Temporary traffic management, worksite traffic control, risk assessment, road safety

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Edition 1.1 contains additional information regarding the hierarchy of safety controls when designing a Traffic Guidance Scheme.

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Austroads

**About Austroads**

Austroads is the peak organisation of Australasian road transport and traffic agencies.

Austroads' purpose is to support our member organisations to deliver an improved Australasian road transport network. To succeed in this task, we undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure.

Austroads provides a collective approach that delivers value for money, encourages shared knowledge and drives consistency for road users.

Austroads is governed by a Board consisting of senior executive representatives from each of its eleven member organisations:

- Transport for NSW
- Department of Transport Victoria
- Queensland Department of Transport and Main Roads
- Main Roads Western Australia
- Department for Infrastructure and Transport South Australia
- Department of State Growth Tasmania
- Department of Infrastructure, Planning and Logistics Northern Territory
- Transport Canberra and City Services Directorate, Australian Capital Territory
- The Department of Infrastructure, Transport, Cities and Regional Development
- Australian Local Government Association
- New Zealand Transport Agency.

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# Contents



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# 1. Introduction to Traffic Management Planning

## 1.1 Purpose

Managing the risks associated with providing an optimal level of safety for persons working in or near traffic and the impact of road work on road users, road congestion and the general community, is a significant issue for road agencies and industry. Road agencies and industry have a legislative requirement as an employer of construction, operational and maintenance services to provide a safe work environment and to manage the risks of working in or near traffic through current jurisdictional Work Health and Safety (WHS) requirements, regulation, training and roadwork planning.

The Austroads Guide to Temporary Traffic Management (AGTTM) details the contemporary temporary traffic management practice of member organisations. In doing so, it provides guidance to designers in the production of safe, economical and efficient temporary traffic management designs. This Guide recognises the level of variability of the road environments for which guidance is provided. The guidance provided in AGTTM is intended to encourage the consistent planning, design and implementation of temporary traffic management across Australia and New Zealand while also supporting the streamlined safe progress of work. It applies to all works on roads and near roads, in addition to off road development and other activities that interact with and impact on the road environment.

The purpose of the AGTTM is to provide guidance and supporting material that:

- supports the ability of road agencies and industry to meet their WHS requirements and lead to improved safety outcomes at road worksites
- improves the standard of temporary traffic management in Australia and New Zealand through consistency of application which assists road users to recognise and understand temporary traffic management, thereby improving their behaviour and safety
- aims to reduce the rate of incidents occurring at worksites
- improves the ability of road authorities and industry to manage the increasing frequency and variety of activities that are being undertaken on and near the road
- allows continuous industry review to maintain best practice.

This purpose is achieved through:

- providing direction for all matters relating to the planning, design and implementation of temporary traffic management
- facilitating improved adaptation to changes in technology and practices through being reactive to changes and being able to readily include new innovations
- providing guidance focused on the users of this Guide
- providing road agencies and industry with uniform practices whilst carrying out works on or near roads.

The benefits associated with uniform guidance broadly accepted by jurisdictions and industry include:

- guidance and training that appropriately develop designers with the skills necessary to develop and deliver safe traffic management at road worksites
- reduced impost on industry working across jurisdictional borders
- improved harmonisation of road worksites across jurisdictions providing improved consistency for road users, including vulnerable road users such as pedestrians and cyclists. This is targeted at improving road user behaviour, safety of road worksites and reducing impact on road congestion and the general community.

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## 1.2 Structure of AGTTM

The structure and content of the Austroads Guide to Temporary Traffic Management is discussed in AGTTM Part 1: Introduction to Temporary Traffic Management Practice. Within the AGTTM, the terminology that applies is detailed in Table 1.1.

**Table 1.1: Guidance terminology**

| | |
|---|---|
| **Guide** | The description for the complete Austroads Guide to Temporary Traffic Management including all 10 Parts. |
| **Part** | The description for the individual documents within the Guide. This document is Part 2 of the Austroads Guide to Temporary Traffic Management. |
| **Section** | The description for a numbered section within each Part of the Guide. This is Table 1.1 placed within Section 1.2 of Part 2 of the Austroads Guide to Temporary Traffic Management. |

Within this Guide, reference may be made to other parts of the Austroads range of publications such as the *Guide to Road Design* and the *Guide to Traffic Management*.

In the context of the other guides within the Austroads range of publications, this Guide is restricted to matters relating to temporary traffic management practice, and refers only briefly to issues more appropriately addressed in other Austroads Guides. It is recognised it is difficult, if not impossible, to discuss many aspects of temporary traffic management practice without reference to traffic management, road design and/or safety issues. The view is taken that within the AGTTM, any such advice should be brief and be supported by references to other Guides for the appropriate guidance as required.

The scope of the AGTTM is broad, addressing requirements and recommendations for protecting road workers and all road users, including vulnerable road users, from hazards, road traffic and other impacts of road works across a range of situations that may include:

- urban and rural environments
- motorways, major arterial roads, local roads, roads in built-up areas, roads in open road areas and unsealed roads
- all variations of road use by cars, heavy vehicles, public transport, motorcycles, cyclists and pedestrians
- day and night works
- changing road and weather conditions.

The structure of the AGTTM is described in Figure 1.1 and in Table 1.2

**Figure 1.1: Structure of the Austroads Guide to Temporary Traffic Management**

| | | | |
|---|---|---|---|
| **Overview** | **Part 1: Introduction** | | |
| **Planning** | **Part 2: Traffic Management Planning** | | |
| **Design** | **Part 3: Static Worksites** | **Part 4: Mobile Works** | **Part 5: Short Term Low Impact Worksites** |
| **Field** | **Part 6: Field Staff – Implementation and Operation** | **Part 7: Traffic Controllers** | |
| **Support** | **Part 8: Processes and Procedures** | **Part 9: Sample Layouts** | **Part 10: Supporting Guidance** |

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**Table 1.2: Parts of the Austroads Guide to Temporary Traffic Management**

| Part | Title | Content |
|---|---|---|
| Part 1 | Introduction | • Introduction to the discipline of TTM practices<br>• Breadth of the subject and the relationship between the various Parts of the Guide<br>• Legislative relationships<br>• Links to related jurisdictional documentation<br>• Definitions |
| **Part 2** | **Traffic Management Planning** | • **Broad strategies and objectives to provide effective TTM to ensure the safety for all road users is maintained**<br>• **Guidance on the safety of workers and other road users**<br>• **Examples and key considerations for planning of TTM at road worksites**<br>• **Process for planning and documenting TTM** |
| Part 3 | Static Worksites | • Guidance on the design of temporary traffic guidance schemes at static worksites<br>• Process to decide what static worksite set up is appropriate to implement (including devices used) |
| Part 4 | Mobile Works | • Guidance on the design of temporary traffic guidance schemes at mobile works<br>• Process to decide what mobile works set up is appropriate to implement (including devices used) |
| Part 5 | Short Term Low Impact Worksites | • Guidance on the design of temporary traffic guidance schemes at short term low impact worksites<br>• Process to decide what short term low impact worksite set up is appropriate to implement (including devices used) |
| Part 6 | Field Staff – Implementation and Operation | • On site risk assessment<br>• Installation and removal of TTM schemes<br>• Operation and monitoring of TTM schemes<br>• Record keeping |
| Part 7 | Traffic Controllers | • Training competencies<br>• Instructions on practices<br>• Control devices that can be used |
| Part 8 | Processes and Procedures | • Road network classification<br>• Powers, roles and responsibilities<br>• Training competencies<br>• Forms and procedures<br>• Model contract specification |
| Part 9 | Sample Layouts | • Example layouts of static worksite conditions<br>• Example layouts of mobile works conditions<br>• Example layouts of short term, low impact conditions<br>• Example layouts for staging plans<br>• Worked example for a multi-stage project |
| Part 10 | Supporting Guidance | • Risk management processes<br>• Review, inspection and road safety audit of worksites<br>• Events<br>• Emergency works |

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## 1.3 Scope of Part 2

AGTTM Part 2 provides guidance to road authorities, road infrastructure managers, and any party conducting works on or near a road, in the planning and preparation of traffic management plans (TMPs) for temporary traffic management in accordance with Austroads best practice. It provides general information about the context, components and format of a TMP.

It does not provide technical information regarding the preparation of any traffic guidance schemes (TGSs) which are required by TMPs. This guidance can be found in AGTTM Parts 3, 4 and 5.

Traffic management planning is an essential activity to be undertaken prior to the conduct of any scale of works on roads that have an impact on traffic. This scope includes, but is not limited to:

- roadworks (including short term, low impact)
- maintenance work
- bridge works
- construction work
- emergency works
- works associated with public utilities and services
- crash site investigation
- any other works which may cause interference or obstruction to the normal use of a road by any road user.

The central purpose of traffic management planning is the management of public and occupational safety and network performance risks associated with work activities undertaken in a traffic environment. Risk management and the elements of the risk management process form the basis of this document.

## 1.4 Definitions

Please refer to AGTTM Part 1 for a full list of acronyms and definitions which apply to this Part.

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# 2. Objectives and Principles of Traffic Management Plans

## 2.1 Objectives

A TMP outlines how the works are integrated into the operation of the road network, providing for the safety of workers and road users while maintaining the service provided by the road network. Management of work on roads requires consideration of the safe accommodation of all road users including both vulnerable road users, and workers on roads, who require protection from traffic.

A TMP that aligns with this Guide will achieve the following objectives:

- provide the road infrastructure manager with confidence that all relevant issues have been identified and considered, and an approach to each has been developed
- provide the principal contractor with the means to do the job
- address the travel needs of the public
- integrate the works with the local community.

It is important to consider how all road users will perceive and understand the traffic management measures required by the TMP.

## 2.2 Contextualising Traffic Management Plans

Traffic management is one of the highest risk activities on a road work site. As such, a level of planning is required for every activity, to assist with meeting work health and safety requirements and to provide a safe work environment.

The level of planning required is dependent on the level of risk associated with the works. It is important to first conduct a risk assessment in accordance with the guidance provided in this Part, and identify risks associated with the works.

A TMP must be developed for every project to address the identified risks. The length and complexity of the TMP is proportionate to the level of risk associated with the works.

## 2.3 Risk

Management of risk is central to a TMP. A risk assessment must be conducted for every activity undertaken on a road work site and reflected in a TMP. This is essential to determine:

- the presence of risk
- the source of the risk (for example, from traffic, or from worksite activities)
- the subject and potential impact of the risk (for example, does the risk originate from traffic and potentially impact on workers)
- risk treatments required.

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This involves the identification and analysis of all risks likely to arise during works on roads including during the setting up, operating, changing and ultimate dismantling of traffic guidance schemes, followed by the determination of appropriate measures to mitigate those risks. The process is applicable at all levels of planning and operation, including the following:

- when preparing generic plans and work methods statements for the conduct of minor routine and mobile works
- when preparing traffic guidance schemes for more extensive or complex works where site specific risks will assume importance.

In each case, the process should be carried out by first identifying all the risks likely to arise, evaluating them in terms of likelihood of occurrence and adverse consequences using historical data, experience or other means. The traffic management plan and the traffic guidance scheme should then be checked in detail to ensure that adequate means of controlling or reducing those risks are in place.

To ensure that risks are managed appropriately, a TMP:

- outlines how the works are to be integrated into the operation of the road network
- identifies and considers all foreseeable risks
- stipulates mitigation measures
- assesses the impact on all categories of road users, adjacent property and business owners and other impacted stakeholders.

## 2.4 Hierarchy of Control

Traffic is to be managed at a work site according to a hierarchy of control. This ‘around, through and past’ hierarchy of traffic management is Austroads best practice and must be reflected in a TMP:

- Traffic **around** the work area – this is the preferred method where available. It requires traffic to be guided around a work area using a detour on other existing roads or on specially constructed sidetrack. Requirements and recommendations for the operation of sidetracks, detours and temporary crossovers (contraflow) on divided roads are given in AGTTM Part 3.
- Traffic **through** the work area – except as provided for by short term and low impact works, passage of traffic through a work area will only be permitted where both the traffic and the work can be adequately controlled. Traffic control through use of Portable Traffic Control Devices (PTCD) or manual traffic control are employed as necessary to slow traffic on the immediate approach to an active work area, to stop traffic for short periods when required for the movement of plant or other operations or to control single line shuttle working. A pilot vehicle may be required to lead traffic along the desired path and to control its speed.
- Traffic **past** the work area – this is the most complex method of traffic management at sites where complete elimination of traffic from the site is not practicable. Traffic paths past the work area involve a combination of lateral separation, clear warning and delineation. Requirements and recommendations for this method of hazard control is given in AGTTM Part 3.
- **Short Term / Low Impact -** the controls applied in these situations recognise that the nature of the works is of such low impact that implementing a complex traffic management scheme is likely to increase the overall risk for all workers at the site. Traffic management under the ‘through’ and ‘past’ categories can apply in a short term / low impact situation. For short term and low impact works, the works methods are set out in AGTTM Part 5 and for static worksites see AGTTM Part 3.

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## 2.5 Policy and Regulatory Context

Each jurisdiction has a range of legislation and regulation that requires or provides context for traffic management planning. These are listed in Table 2.1.

**Table 2.1: Policy and regulation**

| Jurisdiction | Title |
|---|---|
| **ACT** | • Public Unleased Land Act 2013 |
| **New South Wales** | • Road Transport Act 2013<br>• Road Regulation 2008<br>• Road Transport (General) Regulation 2013 |
| **New Zealand** | • Health and Safety at Work Act 2015<br>• Land Transport Act 1998<br>• Land Transport Management Act 2003<br>• Local Government Act 1974 and 2002<br>• Public Works Act 1981<br>• Resource Management Act 1991<br>• Transport Act 1962 |
| **Northern Territory** | No regulation related to a TMP, but requirements for a road permit is mandatory, Specifications for Roadworks 2017, which would be part of a TMP |
| **Queensland** | • Transport Operations (Road Use Management) Act 1995 (TORUM Act)<br>• Traffic Management for construction or maintenance work Code of Practice 2008 |
| **South Australia** | No regulation related to a TMP except to say that a permit is required when working on prescribed roads, which would be part of a TMP. |
| **Tasmania** | • Traffic Control for Works on Roads<br>• Traffic Management Guidance Safe Work Australia. |
| **Victoria** | • Road Management (Works and Infrastructure) Regulations 2015<br>• Road Management Act 2004<br>• Occupational Health and Safety Regulations 2017<br>• Road Safety Act (Traffic Management Regulations) 2009<br>• Additional Network Standards & Guidelines Part 2.2 Authorisation of Traffic control devices |
| **Western Australia** | • Road Traffic Code 2000<br>• Occupational Safety and Health Act 1984<br>• Occupational Safety and Health Regulations 1996 |

## 2.6 Review and Approval

### 2.6.1 Minimum requirements for Traffic Management Plan

The checklist outlined in Appendix A provides a list of minimum requirements for consideration in developing a TMP. Where a requirement is not discussed in a TMP, explanation should be provided as to why.

### 2.6.2 Principles for consideration in the preparation and review of a Traffic Management Plan

There are four guiding principles to be considered as part of the preparation and review of TMPs:

- safety
- accessibility
- amenity
- asset.

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Safety is of the highest priority.

These principles are to be incorporated into all traffic management plans at the outset of the traffic management planning process in consultation with the road infrastructure manager and considered when reviewing and providing the appropriate jurisdictional response to a TMP.

***Safety***

TMPs control the risks, for both workers and the general public, associated with work on or adjacent to the road. These plans need to be mindful that any feature placed within the road environment has the potential to be a risk for road users. This is particularly so for vulnerable road users such as cyclists, pedestrians and the mobility impaired. Legibility of the site is important and road users must be able to easily understand the traffic management measures in use. Particular attention to detail when locating signs, barriers and other traffic control devices is essential.

***Accessibility***

TMPs ensure access to the road and essential goods and services is maintained for all road users. Consider accommodating the needs of public transport users and the mobility and visually impaired and other vulnerable road users, including the provision of parking.

***Amenity***

TMPs minimise delays to traffic (including pedestrians, cyclists and other vulnerable road users), maximise network efficiency, and, where practical, maintain the most direct and convenient route between destinations. The first preference is to redirect traffic around the works, and any detour should be as short as possible and as close to the level of difficulty of the original route. Designers should consider adjoining or nearby developments when selecting detours as well as the impact of increased traffic on existing paths. Where it is not practical to send traffic safely around the works, sending traffic through the works is the next preference. Where possible, traffic lanes, footpaths, cycle paths, cycle lanes and shared paths should remain open for use. Footpath and cycle routes will be maintained on the same side of the street and additional road crossings will be minimised.

***Asset***

TMPs minimise damage and the risk of damage to the road asset including natural features such as landscaping and trees.

### 2.6.3 Timing of preparation

The TMP must be prepared in advance of the works being conducted by an appropriately competent and qualified person, according to relevant jurisdictional legislation and regulation. Refer to AGTTM Part 8 for further information regarding qualifications.

The person preparing the TMP should be aware of likely timeframes between submission and provision of the appropriate jurisdictional response to the TMP. Factors including site size, complexity and scale of the TMP, level of response and road infrastructure manager requirements should all be considered.

### 2.6.4 Submission to road infrastructure manager

The TMP must be reviewed by an appropriately competent and qualified person other than the person who prepared the TMP and submitted to the appropriate road infrastructure manager.

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## 2.7 Documentation

Consider the following:

- incorporating appropriate document control details specific to the TMP in accordance with the organisation's internal control procedures, including date of preparation and version control details. This ensures that approved documentation can be clearly identified and traced, providing information relating to who prepared the TMP, details of the initial site inspection, and the name, contact details and accreditation/qualification details of the person who prepared the TMP, specific to the relevant jurisdiction.
- any jurisdictional-specific response requirements in the TMP.

## 2.8 How the Traffic Management Plan is Used

### 2.8.1 Decision making

The approved TMP is the basis of traffic control on the worksite and is the basis of all traffic management decisions made on the worksite. It must therefore be available on the road worksite at all times during the works period. It must be used for regular inspections of the site.

Any update to the TMP including the TGSs it contains will be assessed based on a risk management process as set out in the TMP. Updates to the TMP can only be made by a suitably competent and qualified person.

### 2.8.2 Transparency

It is critical that the structure and contents of the TMP are sufficiently transparent to explain the assessed risks and the proposed treatments for the proposed work activities and work site.

As such, include all of the information contained in Section 3 of this document (Preparation of a TMP). Where any of these sections are not applicable, indicate this accordingly.

### 2.8.3 Duty of care

Include a commitment by the party responsible for implementation of the TMP to exercise duty of care to workers and all road users in the implementation of the TMP.

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# 3. Preparation of a Traffic Management Plan

## 3.1 Approach to Traffic Management Plan Preparation

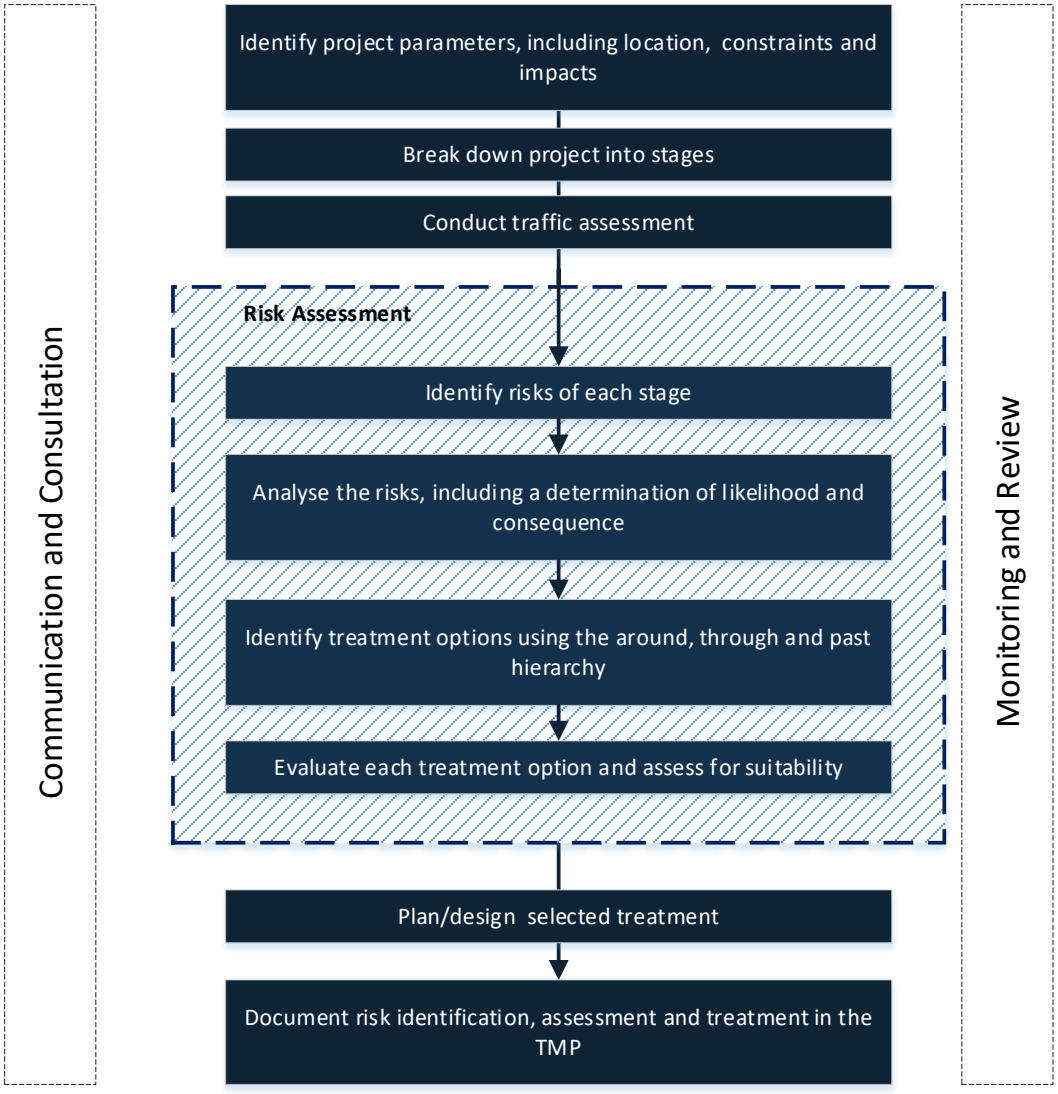
An individual TMP is needed for each site.

A TMP is a risk management plan and consists of:

- documentation of the risk assessment for the project including the procedures and practices that will be utilised to manage the risk exposure
- TGSs which outline the placement of temporary signs and devices to warn traffic and guide it around, through or past a worksite or temporary hazard. TGSs should be clear and unambiguous and indicate all traffic controls required for each stage of the works. TGSs may be in written or diagrammatical form, or a combination of both.

Figure 3.1 depicts the conceptual steps to be undertaken in preparing a TMP and associated TGS, which together comprise the requirements for temporary traffic management planning at road work sites. Parts 3, 4 and 5 of the AGTTM provide guidance for the preparation of TGS.

**Figure 3.1: Traffic management plan preparation flow chart**

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## 3.2 Introductory Activities

### 3.2.1 Identify project parameters

To ensure understanding of site specific conditions, the site should be inspected at least once prior to the preparation of the TMP. Inspections should be carried out during hours of the day similar to the proposed works scheduling to identify matters specific to the site.

It is important to understand site specific conditions before preparing a TMP. These conditions include:

- pavement condition
- road layout
- road geometry
- sight distance
- vulnerable road user facilities
- existing signs
- lighting
- abutting accesses
- adjoining road networks
- other possible constraints.

### 3.2.2 Break down project into stages

Identify each stage of the project. The traffic management stages may not necessarily align with construction stages or stages of the work for which traffic management is required. These stages are required for all situations where the fundamental management of traffic varies during the job, for example a left lane closure or a right lane closure. After the requirements of the TMP are finalised, TGSs will be prepared for each stage.

### 3.2.3 Conduct traffic assessment

***General***

For works on roads, it is important to conduct the works with minimum disruption and inconvenience to road users. Consider the following factors during the preparation of TMPs:

Display as drawings, with commentary if required for clarity:

- current traffic volumes, peak times and flows, vehicle types (consider heavy and permit vehicle routes, oversize vehicle routes, and other special needs)
- crash history
- posted and operating speed limits and any delays
- existing road features, geometry and capacity
- methods to guide road users through, around or past the site.

Display in tabular format, including commentary if required for clarity the methods of traffic control, including traffic controllers.

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Seek details of acceptable traffic flow volumes and lane dimension and configuration requirements from the relevant road infrastructure manager. Table 3.1 provides guidance for the desirable number of traffic lanes to be maintained mid-block and within 200 m of an intersection. Traffic volumes should be determined from traffic count information provided or should be calculated through a traffic count on site to ensure that the selected traffic management method is appropriate to the site.

The word 'intersection' applies where traffic into the considered direction is controlled by signals, roundabout, stop/give way controls or other control devices.

Traffic volumes may be available from road infrastructure managers but can also be estimated by manually counting vehicles in each direction for a few minutes, adding the vehicles counts together and determining the vehicles per hour (VPH) based on the count. For example, 40 vehicles in 3 minutes equates to 800 vehicles per hour.

If the road is busy or an arterial road, extend the counting period to 15 minutes to account for variances in traffic volumes.

**Table 3.1: Desirable number of lanes for each direction**

| Mid-block (one direction) (VPH) | Within 200m of intersection (one direction) (VPH) | Desirable number of open lanes for direction considered |
|---|---|---|
| ≤ 1000* | ≤ 500* | 1 |
| 1001 - 2000 | 501 - 1000 | 2 |
| 2001 - 3000 | 1001 - 1500 | 3 |
| 3001 - 4000 | 1501 - 2000 | 4 |

** Prohibit right turns out of a single lane if the proportion of heavy vehicles and the volume of opposing traffic is high. Seek further assistance from a traffic engineer if needed.*

Where the recommendations of this table cannot be achieved:

- consider measures requiring parking bans, lane reversal, detours, sidetracks and crossovers
- consider restricting works to hours of low traffic flow such as during nights and/or weekends
- weigh up the impacts to traffic against the impact to local residents and businesses.

Specify details of the number of traffic lanes available, when those lanes are available, and for how long.

Where queues are likely to occur, specify the likely queue lengths and indicate what contingency treatment to use if the queue lengths exceed acceptable limits. State at what stage the contingency treatment or other treatments will be implemented.

### *Speed zones*

Record details of existing speed zones in the TMP and ensure advice is provided in TGSs where existing signs are to be covered or completely obscured. Clearly state:

- existing speed limit
- the need to maintain a safe workplace with the introduction of lane closures and lower temporary speed limits.

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***Mid-block lane capacity***

Seek prior approval from the relevant road infrastructure manager if it is necessary to undertake work resulting in specified lane capacities being exceeded.

Obtain road infrastructure manager approval in writing and attach to the TMP.

***Intersection capacity***

Table 3.1 recommends traffic lane capacities within 200m of an intersection. If these cannot be achieved or there is a risk of a significant impact on performance of an intersection by the proposed activity, consider intersection performance analysis (SIDRA or other intersection analysis software and methods) to quantify the likely impact, before determining a suitable treatment. Note that this kind of small scale analysis may not provide a complete picture of traffic impacts, particularly those impacts made by a network change on a work zone.

If it is necessary to work outside these parameters, approval must be obtained from the relevant road infrastructure manager in writing and attach the approval to the TMP.

***Selecting hours of work***

Select proposed hours of work in high volume traffic areas to maintain through traffic volumes during peak hours.

Present this information as a separate section if it is very detailed.

## 3.3 Risk Assessment

### 3.3.1 General

The risk assessment process is the first step in the preparation of a TMP. The outcomes of the risk assessment are used to develop appropriate strategies for managing and mitigating risks.

The principles and guidance provided by AS/NZS/ISO 31000 are informative for the identification and assessment of risks. Further detail on undertaking risk assessment for Temporary Traffic Management is details in AGTTM Part 10. The context should be established first, followed by the identification, analysis, evaluation and treatment of risks. Communication and consultation throughout this process is important, as is monitoring and review.

### 3.3.2 Identify risks of each stage

The range of risks to be considered in preparing a TMP vary widely from site to site. Consider and balance measures that meet the needs of the road users, while accommodating construction requirements and the requirements of the road infrastructure manager.

As a starting point, the common issues and associated risks detailed in Table 3.2 must be considered, in addition to any site-specific categories of risk that will inform selection of a treatment option. A checklist is provided at Appendix B

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**Table 3.2: Common issues and associated risks**

| Issue | Potential risk | Example of site-specific impact of risk |
|---|---|---|
| **Vulnerable road users** | | |
| Pedestrians, cyclists, people with disabilities and other vulnerable road users such as children, parents with prams, users of small-wheeled vehicles and mobility aides and the elderly | • Unable to pass safely past the site using existing paths | • Unsafe crossing practices in unsigned locations<br>• Schools, clubs or other facilities that may generate high volumes of pedestrian or cycle traffic and facilities such as hotels or taverns where pedestrians may have their judgement impaired |
| Unacceptable length detour | • Detours have a much larger impact on people walking and cycling | • Detour created for pedestrians with significantly changed length or terrain |
| **Path users** | | |
| Clear direction for path users | • Unfamiliar and illegible paths which are not used by path users | • Pedestrians in the path of work site vehicles, equipment or other vehicles moving through the site |
| Surfacing of temporary paths | • Surface not appropriate for prams, strollers, wheelchairs and the visually impaired | • Trip hazards |
| Location of pedestrian crossings | • Crossing position unfamiliar to path users | • Unpredictable pedestrian behaviour when crossing roads |
| **School crossings** | | |
| Presence of school crossings within site area requiring relocation | • Safe school crossing practices compromised | • Children crossing the road in an unsafe and unpredictable manner in and around the site |
| **Site/location** | | |
| Site access | • Compromised safe access to worksite | • Worker injury due to unexpected vehicle entry to worksite |
| Length of worksite | • Excessive length of worksite, including rural areas | • Dangerous driver behaviour resulting from excessive length of queues because of time needed to manage reversible flow<br>• Infrequently used property access in the middle of the site may not be adequately monitored resulting in unsafe site entry<br>• End of queue collisions |
| **Traffic impacts** | | |
| Traffic queues and delays | • Unacceptably long delays to road users | • Aggressive driver behaviour and lack of community acceptance of worksite |
| End of queue collisions | • Inadequate warning of traffic queue results in collision | • Multiple vehicles in queue affected by collision resulting in injury and property damage |
| Detouring of traffic on a major or multi-lane road | • Volume of detoured traffic has unacceptable impact on surrounding areas<br>• Detoured traffic experiences unacceptable delays | • Property and business access is compromised<br>• Increased volume of traffic on residential streets leading to compromised safety outcomes for residents |
| Interference with the operation of permanent traffic signals | • Compromised legibility of traffic controls for road users | • Road user confusion leading to increased likelihood of traffic incidents |

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| Issue | Potential risk | Example of site-specific impact of risk |
|---|---|---|
| Complete closure of turning lanes | • Removal of option for road users<br>• Compromised legibility of road layout for road users | • Road user confusion leading to increased likelihood of traffic incidents<br>• Compromised property and business access leading to lack of community acceptance of worksite<br>• Increased congestion on other areas of the road network |
| Site in operation during times of low visibility | • Sight distance or vision of road user compromised on approach to worksite | • Road user unable to respond in a timely manner to the hazard ahead |
| Incorrect placement of devices | • Sight distance or vision of road user compromised on approach to worksite | • Injury to road users and roadworks as a consequence of reduced stopping distance |
| **Lane availability** | | |
| Need to maintain a minimum number of available lanes | • Traffic volume not adequately accommodated | • Extensive delays on road network leading to increased travel times<br>• Decreased community acceptance of worksite |
| Closure of high volume traffic lanes and impact on remaining trafficable lanes | • Inadequate provision made for high volume of traffic<br>• Volume of traffic in remaining lanes becomes unacceptably high | • Road structure being used above design capacity<br>• Extensive delays on road network leading to increased travel times |
| **Times of operation** | | |
| Periods in which work can and cannot occur | • Work occurs at inappropriate times of the day | • Disruption of residential areas<br>• Interference with known peak traffic times<br>• Frequent interference with usual business activity<br>• Dust and noise impacts on surrounding areas |
| Requirement to implement the TMP for more than 14 hours within a single shift | • Staff fatigue | • Decreased concentration of road workers leading to increased likelihood of incidents |
| **Speed choices** | | |
| Credible speed limits, considering the safety of workers and road users | • Road users travel at inappropriate speeds due to lack of understanding of applicable speed limits | • Increased likelihood and severity of incidents |
| **Specifications, standards, rules and policies** | | |
| Clarity of applicable specifications, standards, rules and policies. Some documents may change from project to project | • Application of incorrect or expired specifications, standards, rules and policies<br>• Older works may be governed by older standards, roles, specifications and/or policies | • Confusion regarding mandatory safety regulations leading to inconsistent application<br>• Worksite is not in line with required safety standards |
| **Stakeholders** | | |
| Stakeholders must be consulted regarding the project and its impacts | • Stakeholder opposition to project | • Delays as complaints are addressed and resolved |

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| Issue | Potential risk | Example of site-specific impact of risk |
|---|---|---|
| **Environmental risk** | | |
| Existing vegetation | • Obscured positioning of signs and devices | • Road user is unaware of approaching queue leading to collision |
| Shadowing, fog or glare on roads in east-west direction | • Impact on visibility of traffic control devices | • Road user collides with work equipment parked in the shoulder |
| Inclement weather or smoke | • Impact on visibility of traffic control devices<br>• Change in condition of road surface | • Traffic speed has not been reduced adequately resulting in loss of driver control of motor vehicle |
| Night conditions | • Reduced legibility of worksite or visual overload with retroreflective devices. | • Confusion as to intent of signage resulting in incidents |
| Conflict between existing signage or infrastructure and proposed temporary signage | • Compromised legibility of worksite | • Confusion as to intent of signage resulting in incidents |
| **Personnel access** | | |
| Requirement for construction traffic to exit and enter the traffic stream | • Use of inappropriate exit and entry points<br>• Unsafe site exit and entry to the traffic stream | • Shadow vehicle collides with general traffic leading to road user or road worker injury |
| Site constraints with no escape route for workers or traffic controllers | • Workers cannot escape traffic incidents on site | • Worker is injured as a result of traffic incident on site |
| **Emergency vehicle access** | | |
| Emergency vehicle access to site | • Delay to emergency services travelling through the site<br>• Delay to emergency services attending emergencies on site | • Emergency services unable to respond to emergencies in a timely manner |
| **Public transport** | | |
| Bus stops, tram stops, and railway crossings located within the traffic control zone | • Impact on provision of usual public transport services | • Negative community perception of impact of worksite<br>• Unpredictable public transport passenger movements near the worksite |
| **Access to adjoining development** | | |
| Adjoining properties with access near or at the site | • Compromised access to adjoining development for property owners and occupiers | • Decreased community acceptance of presence of worksite |
| **Rural area** | | |
| Presence of stock crossing routes | • Disruption of essential stock crossing times | • Disruption of local, rural economic activity |
| Low quality of road surfacing | • Existing road surface unsafe for worksite | • Damage to worksite equipment and vehicles |
| **Existing parking facilities** | | |
| Parking facilities exist within the proposed temporary worksite | • Reduction in available parking facilities for the local area | • Illegal or unsafe parking practices may occur if alternative parking and/or clear signage is not provided |

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| Issue | Potential risk | Example of site-specific impact of risk |
|---|---|---|
| **Impact on adjoining road work** | | |
| Change of traffic flow impacts on surrounding road network | • Excessive queue lengths<br>• Excessive delays | • Impact on road user travel time<br>• Congestion<br>• Frustration with presence of worksite leading to decreased community acceptance |
| **Heavy and oversize vehicles and loads** | | |
| Accommodation of truck traffic and over-sized loads | • Inadequate lane widths<br>• Inadequate provision for turning movements<br>• Inadequate vertical alignments | • Turning truck catches parked vehicles in shoulder |
| **Other issues as specified by road infrastructure manager** | | |
| Specific restrictions relating to dates or days, particularly around school holiday periods and other significant dates | • Impact on scheduled operation of the work site | • Delays to project completion |

### *Gather input data*

Gather input data to ensure that the TMP considers all relevant issues. As much data as necessary should be collected to ensure that traffic management and construction activities can be closely coordinated, and that traffic management personnel and workers on site are not surprised by any occurrences on site, negatively interacting with traffic.

Categories and sources of input data to be gathered and examples of types of data within each category are outlined in Table 3.3.

**Table 3.3: Categories and examples of types of data**

| Category | Information source | Indicative types of data |
|---|---|---|
| **Contractor** | Direct from contractor | • Works duration, and start and finish dates<br>• Project staging requirements<br>• Construction area requirements<br>• Traffic requirements within the site<br>• Materials storage<br>• Works procedures to comply with |
| **Community** | Direct from schools, local businesses, clubs, venues, residents, health facilities etc<br><br>Local Government may be of some assistance | • Schools - start and finish times, and out of hours events<br>• Local businesses – trading hours, and overall operations hours including hours of deliveries, maintenance and cleaning.<br>• Property access – property access that may be affected, whether permission to restrict access can be gained in the time available, visibility of alternative access points<br>• Special events – such as school fetes, sporting events and community events which may lead to road closures<br>• Cultural or sporting venues which can have high demands on weekends or evenings, or at irregular intervals<br>• Needs of various groups of people in the community – including nursing homes and aged care facilities that require more frequent emergency vehicle access, community facilities such as hospitals and emergency services that may require a guaranteed level of access to the network, and local government services such as rubbish collection<br>• Rural community needs – harvest times, stock movements periods, mining drive-in drive-out periods |

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| Category | Information source | Indicative types of data |
|---|---|---|
| **Road users** | Direct from road infrastructure manager and public transport operators | • Traffic – total amount of traffic and the patterns, including peak hours, unusual periods of high demand, mix of vehicle types including oversize and/or overmass vehicles and other permit-approved vehicles<br>• Public transport – impact on public transport stops, routes, and access to stations and stops. Buses, light rail and trams are the modes that require the most frequent consideration.<br>• Pedestrians – must be addressed on every job, including where a pedestrian presence is unlikely. Consider length and convenience of the route, as this is likely to affect practical use of the route.<br>• Cyclists – must be addressed on every job. Consider both experienced cyclists who may be happy to stay in a traffic lane, and less experienced cyclists and children who will need alternative routes.<br>• Emergency vehicles – generally will make their own way through the site, but critical to understand how the site staff will deal with them, and how they can be best accommodated<br>• Full range of road users – including for example the different needs of the elderly and disabled (including those who are blind or who use a wheelchair), tourists who may not be used to driving on the left side of the road |
| **Site** | Direct from road infrastructure manager<br>Local businesses and residents may be of some assistance in certain circumstances | • Weather – where the sun is at various times of day, and associated visibility of traffic controllers. Fog and rain can reduce visibility and may require suspension of works<br>• Crash history – diverting traffic along a road may be increasing the existing risks |

### 3.3.3 Analyse the risks

Analyse each identified risk in turn, and:

- consider what situations may arise that could cause a risk event to occur
- consult with affected stakeholders where required to determine any unknown risks and the magnitude of known risks
- undertake and document examination of all risks
- use historical data and experience to evaluate the risks in terms of likelihood of occurrence and adverse consequences.

For detailed guidance regarding risk management, including risk assessment tables refer to AGTTM Part 10. Key steps in the risk assessment process are:

- identify the possible risks
- consider the likelihood of each risk occurring
- consider the consequences if the risk were to eventuate
- create a plan to address each risk, consisting of measurable actions, rather than simply monitoring activities.

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### 3.3.4 Identify treatment options

After analysing all relevant risks, document all options considered for treatment of risks. Appendix C contains an example of how to document each option. All options should be considered and then documented. This is because:

- even on simple sites, there are multiple ways of providing traffic management at a worksite
- the most suitable option may not be evident until the risk assessment and option selection process is undertaken.
- When identifying treatment options for the movement of traffic, consider the hierarchy of control:
- **Around the work area** – this is the first preference and eliminates the risk to workers in the first instance by removing traffic from the worksite entirely by diverting it around the work. There are two primary options in this category:
  - *Detour* – diverting traffic by other roads in the road network, ensuring there is no traffic in the vicinity of the worksite, also considering impacts on pedestrians and cyclists. A detour may include a contraflow and the diversion of traffic onto the opposing carriageway where the median contains a barrier or is wider than 6 metres.
  - *Sidetrack* – a specially constructed section of road to divert traffic, eliminating the risk to workers.
- Requirements and recommendations for the operation of sidetracks and detours are given in AGTTM Part 3.
- **Through the work area** – this is the second highest level of control. This is achieved by temporarily closing a road allowing the workers to work in a safe environment without exposure to traffic. Traffic is periodically stopped by traffic controllers to allow the work to progress without exposure to traffic, and traffic is then released through the worksite when workers have vacated the works. A pilot vehicle may be required to lead traffic along the desired path and control its speed. For short term and low impact works, the works methods are set out in AGTTM Part 5 and for static worksites see AGTTM Part 3.
- **Past the work area** – this is the final level of control and the most common form of controls used at most worksites, where complete elimination of traffic is not practical. Although this form of control is the most common, it is important that the planning process justifies this treatment option due to the substantially higher risks that road workers are exposed to. In this form of traffic control, traffic is separated from workers either by a physical barrier or through the means of a separation space. This separation may be achieved by a combination of lateral separation, clean warning and delineation. Requirements and recommendations for this method of hazard control is given in AGTTM Part 3.
- **Short term / low impact** - the controls applied in these situations recognise that the nature of the works is of such low impact that implementing a complex traffic management scheme is likely to increase the overall risk for all workers at the site. Traffic management under the ‘through’ and ‘past’ categories can apply in a short term / low impact situation. For short term and low impact works, the works methods are set out in AGTTM Part 5 and for static worksites see AGTTM Part 3.
- The selection of final options will depend on many site-specific conditions, and the road infrastructure manager must be assured all factors have been thoroughly considered and addressed through the TMP.

When designing a TGS, there is a hierarchy of safety control which must be used to assess whether the highest practicable level of protection and safety is being applied. Recommendations on how to address safety hazard/risk factors are described in Table 3.4.

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**Table 3.4 Hierarchy of safety controls**

| Safety Hazard / Risk Factors | HIERARCHY OF SAFETY CONTROLS<br>Consider the practicability of control measures, from left to right<br>Select the most feasible given the circumstances and level of hazard<br>Record the reason if a higher-level control measure is not considered practical | | |
|---|---|---|---|
| | **Elimination** | **Substitution** | **Administrative (Behavioural)/PPE** |
| **Clearance to Traffic (clearance between the edge of a lane carrying traffic and the worksite, roadworks vehicles, equipment and pedestrians** | • Road closure<br>• Detour onto other roads<br>• Side-track past the works | • Safety barriers<br>• Lane closure adjacent to work area<br>• Vehicle-mounted attenuators | • Speed reduction<br>• Warning signs / VMS<br>• Delineation of travel path |
| **High speed through worksite** | • Road closure<br>• Detour onto other roads<br>• Side-track past the roadworks | • Safety barriers<br>• Lane closure adjacent to work area<br>• Portable traffic signals<br>• Vehicle mounted attenuators | • Speed reduction<br>• Warning signs / VMS<br>• Traffic controller<br>• Temporary road humps and rumble strips |
| **Poor advance sight distance to worksite (<200 metres)** | • Road closure<br>• Traffic diversion past the works | • Vehicle mounted attenuators<br>• Lead and/or tail vehicle(s) | • Extra advance warning signs / VMS<br>• Speed reduction<br>• Delineation of travel path |
| **Poor observance by motorists of directions / instructions** | • Road closure<br>• Traffic diversion past the works | • Lane closure adjacent to work area<br>• Portable traffic signals | • Speed reduction<br>• Police presence on site<br>• Extra signs / VMS<br>• Temporary road humps and rumble strips<br>• Re-assessment of information provided |
| **Narrow pavement width with no escape route (<2.9 metres width)** | • Road closure<br>• Traffic diversion past the works | • Portable Traffic Control Device | • Speed reduction<br>• Delineation of travel path |
| **Presence of workers at the worksite** | • Road closure<br>• Traffic diversion past the works | • Safety barriers<br>• Increased separation from vehicular traffic<br>• TMA | • Speed reduction<br>• Warning signs<br>• Delineation of travel path and worksite |
| **Excavation adjacent to traffic** | • Road closure<br>• Traffic diversion past works | • Different construction method<br>• Safety barriers | • Speed reduction<br>• Delineation of travel path |
| **Onsite vehicles/plant Movements** | | • Designated paths VMPs<br>• Exclusion Zones | • Limit Reversing<br>• Forward in/out VMPs only |

### *Traffic management principles*

Before options are identified, two principles for maintaining traffic flow must be understood. These are discussed below. Note that traffic volume information is required for both principles. If obtained manually via counting, ensure the location at which the count is taken is indicative of the conditions of the site.

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### *Length of single lane operation under reversible traffic flow*

On two-way roads, retain two-way flow wherever possible. This principle applies mainly to two-lane, two-way roads where it is not practical to avoid closing one lane for a period.

This length is determined according to the total traffic volume in both directions, per hour (vehicles per hour).

Once the traffic volume has been determined, use Table 3.5 to inform the allowable length of a single lane section.

**Table 3.5: Desirable maximum length of single lane operation under reversible flow**

| Traffic volume in both directions (VPH) | Length of single lane section (m) |
|---|---|
| 701 - 800 | 70 |
| 601 - 700 | 100 |
| 501 - 600 | 150 |
| 401 - 500 | 250 |
| 351 – 400 | 400 |
| 301 – 350 | 600 |
| ≤ 300 | 800 |

These volumes have been determined to allow a quick analysis without referring to a traffic engineering professional. Additional traffic engineering input is required to support a longer length of single lane operation.

In general, where traffic flows are within the recommended limits shown in Table 3.5, single-lane operation requires active control by portable traffic control devices or traffic controllers. In selecting the appropriate method of control, consider:

- traffic volumes
- duration of work
- site conditions and layout
- personnel available.

Traffic control may not be required if:

- there is clear visibility past the work area and beyond it for at least 75 m, or to the end of the road if less than 75 m away and the length of the shuttle lane does not exceed 60 m
- road users have clear visibility of the work area and the opposing approach for a distance greater than 150 m and either one of the following:
    - traffic volume in both directions is 40 vph or less, and the speed is 70 km/h or less, and the length of the single lane is 60 m or less
    - the length of the single lane is 100 m or less, and GIVE WAY and ONE LANE signs are provided at one end of the shuttle lane
    - it is a residential street and the length of the shuttle is 60 m or less.

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### *Desirable number of lanes for each direction*

This principle applies for multi-lane road scenarios.

The desirable number of lanes for each direction is determined according to the total traffic volume in one direction, per hour (vehicles per hour).

Once the traffic volume has been determined, use the information in Section 3.2.3 and Table 3.1 to determine the minimum number of lanes required.

Ensure that the correct traffic volume column is applied, according to whether the traffic count was conducted mid-block or very close to an intersection. As the traffic volumes increase, the number of lanes required increases.

These volumes have been determined to allow a quick analysis without referring to a traffic engineering professional. Additional traffic engineering input is required to support more traffic per hour.

Where the requirements of the Table 3.1 cannot be complied with, parking bans or lane reversal or both may be necessary. If in extreme circumstances one direction of travel must be detoured, plan safety arrangements in advance so that conditions can be improved on the detour route prior to opening. In congested built-up areas many works, especially mobile and maintenance works, are necessarily confined to nights and weekends.

Right turns may need to be banned at appropriate locations in the work site to maintain traffic flow. An additional distance allowance may also be required for the effects on traffic flow of rough or unsealed surfaces or altered geometry which markedly reduces speed.

Lane reversal requires special consideration of, and provision for pedestrians where the traffic flow is opposite to normal expectations, especially where traffic is diverted to the opposite side of a median. Every effort must be made to redirect pedestrian movements to locations beyond the work area or at least to marked crossings at signalised intersections.

## *Other traffic assessment elements*

### *Lane widths*

It is important to consider lane widths as a tool to maintaining traffic flow and controlling speed at a worksite. The minimum width for lanes carrying traffic to be provided around, through or past a worksite is shown in Table 3.6.

Consider accommodating the swept path of large vehicles navigating within the worksite.

**Table 3.6: Minimum lane widths**

| Criteria | Lane width (m) |
|---|---|
| ≤ 60 km/h | 3 |
| > 60 km/h | 3.5 |
| Curve with radius 100 – 250 m | Curve widening 0.5 per lane |
| Curve with radius < 100 m | Consider swept path of long vehicles (e.g. buses, trams) |
| Approach lane is < 3 m wide | Equal to approach lane* |
| Two-way residential street | 5.5 (sum both ways) |
| Residential street with shuttle flow | 3.5 |

**This does not apply to curves of radius 250 m or less, or locations where there are fixed vertical obstructions such as fences or safety barriers within 30 cm of the edge of the lane on one or both sides. Consider that on curves, widths larger than those listed above may be required to accommodate large vehicles.*

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Also consider:

- minimum edge clearances from a line of delineating devices to the edge of the lane, and ensure that this placement does not give the appearance of wider lanes, which can lead to an increase in vehicle speeds
- adequate accommodation of all approved vehicle types that will be using the route
- appropriate accommodation of cyclists and pedestrians.

#### *Residential areas*

In the case of residential areas, narrower lane widths and shorter tapers may be considered where there is reduced volume of traffic and lower speeds.

#### *Other matters*

Also consider the length of treatments such as mergers, buffers, and the approach side to a road worksite. These will determine the level of impact, and the impact on the available options.

### *Appropriate identification of options outside of the hierarchy of control*

The hierarchy of control is most suitable when considering linear traffic movements related to the work site but may not be appropriate when considering other impacted parties such as public transport providers and adjoining property owners and occupiers. In such instances, practical consideration and identification of the most appropriate, safe and cost-effective options for risk treatment is required. This may include, for example, payment for alternative accommodation for property owners or occupiers whose access is blocked for a period of time, or provision of shuttle buses when public transport access is compromised at a certain point.

### *Creating value*

Potential treatment options identified and considered during the planning stage of the works can be implemented more easily and at a lower cost than if an option is identified at TGS stage. An option considered at the TMP stage can create more value for the project than one developed at later stages or during project works.

### *Innovation*

Include consideration of new and innovative treatments, where appropriate. The types of innovations that are encouraged include those that:

- improve the safety of workers and the public
- improve the cost effectiveness of the works
- allow the works to be undertaken more efficiently.

### 3.3.5 Evaluate each treatment option

When evaluating treatment options, consider:

- severity of the risk/s mitigated by that option
- likelihood of the risk/s mitigated by that option
- knowledge of that risk
- perceived benefit of the option

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- the nature of the works
- additional risks which may be created by the treatment option
- the practicality of the option proposed
- the cost of removing or mitigating that risk.

Consideration must also be given to prioritising the safety of workers and road users, while minimising the delay to traffic and costs associated with treatments.

A key part of risk evaluation is the utilisation of the hierarchy of control, which can be used to ensure that the highest practicable level of protection and safety is selected. In evaluating the options, a key consideration is whether the option takes traffic around, through or past the worksite.

In addition to the hierarchy of control, some of the common evaluation considerations for minimising impacts on road users include:

- **Minimising the length of road and paths on which traffic management is placed** - Start the signs and speed limits at the right place, just prior to the actual worksite and end them immediately after the site. If the worksite is long, consider reducing speeds and delaying traffic only in those parts of the site where it is necessary. Long sites where it is not obvious why drivers are being delayed lead to drivers not complying and increases frustration.
- **Consider the right times to do the works -** When working on the road, choose times with less traffic to minimise impacts. Blocking lanes and paths during peak periods is not preferable. Base occupation on the road on the actual traffic situation, not the planned times. If an accident has occurred and traffic is still heavy later than normal, delay occupying the road until traffic has cleared.
- **Minimising the time the road and path is occupied** – Direct set up on the road immediately prior to the works starting and pack up immediately when the works are completed. Consider whether the road needs to be occupied for the entire duration of the job. For example, works on a footpath will require a lane to be blocked when the concrete truck arrives, but is it necessary to block the road for the entire day when most of the time there are only workers on the footpath?
- **Minimising blocked lanes and paths** – consider whether it is necessary to block a traffic lane to work on the footpath or verge. Can vehicles be positioned on the shoulder or verge rather than blocking a lane?
- **Having realistic alternatives for all modes of transport** - A pedestrian diversion which takes pedestrians a long way around a site is unlikely to be considered reasonable.
- **Coordination** - Consider coordinating with other works undertaken nearby.

Evaluation of all options for all stages and for all categories of impacted stakeholders must be undertaken. These categories include but are not limited to public transport, pedestrians, motorists, cyclists and local business owners.

Appendix C contains examples of how to document options evaluation.

### *Selection of a treatment options*

Ultimately, the options selected must be the highest practical level of protection and safety, while minimising impacts on road users.

Before selecting a treatment option, consult with those who will be implementing the measures or supervising the works.

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## 3.4 Plan and Design

### 3.4.1 Plan and design selected risk treatment

The selected risk treatment will be implemented through the creation and installation of TGS or multiple TGSs.

A TGS is an arrangement of temporary signs and devices to warn traffic and guide it around, through or past a worksite or temporary hazard. TGSs mitigate and treat the risks identified in the TMP and can be site-specific or generic. If a generic TGS is used, provide justification for its use. The TGS details all works necessary for the effective implementation of the traffic management scheme for each stage and may include text descriptions, diagrams and drawings.

Detail about what TGS information that must be contained in the TMP is provided in Section 4 of this Part. Ensure that each TGS:

- is consistent with the TMP
- is sufficiently detailed and clearly dimensioned to enable a third party to install the devices without constant referral for additional information or interpretation
- includes an itemised list of all required signs and devices, including type, size and quantity of devices
- clearly shows the work area and the proximity of workers to live traffic lanes
- is signed and dated by the person that designed it.

### 3.4.2 Document in the Traffic Management Plan

Appendix C contains a case study for the documentation of risk management in a TMP and Section 4 outlines additional requirements for TMPs. The use of tables and diagrams to clearly communicate options identification, analysis and selection is encouraged to ensure that the information is presented clearly and succinctly.

#### *Staging diagrams*

Risk management and options selection culminates in a staging diagram.

For any project there will be stages of construction. Within a single construction stage, there may be the need for multiple traffic management stages and within each traffic management stage there may be the need for multiple TGSs, as illustrated in Figure 3.2 and Figure 3.3 below.

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**Figure 3.2: Traffic management stages and TGSs- Complex project**

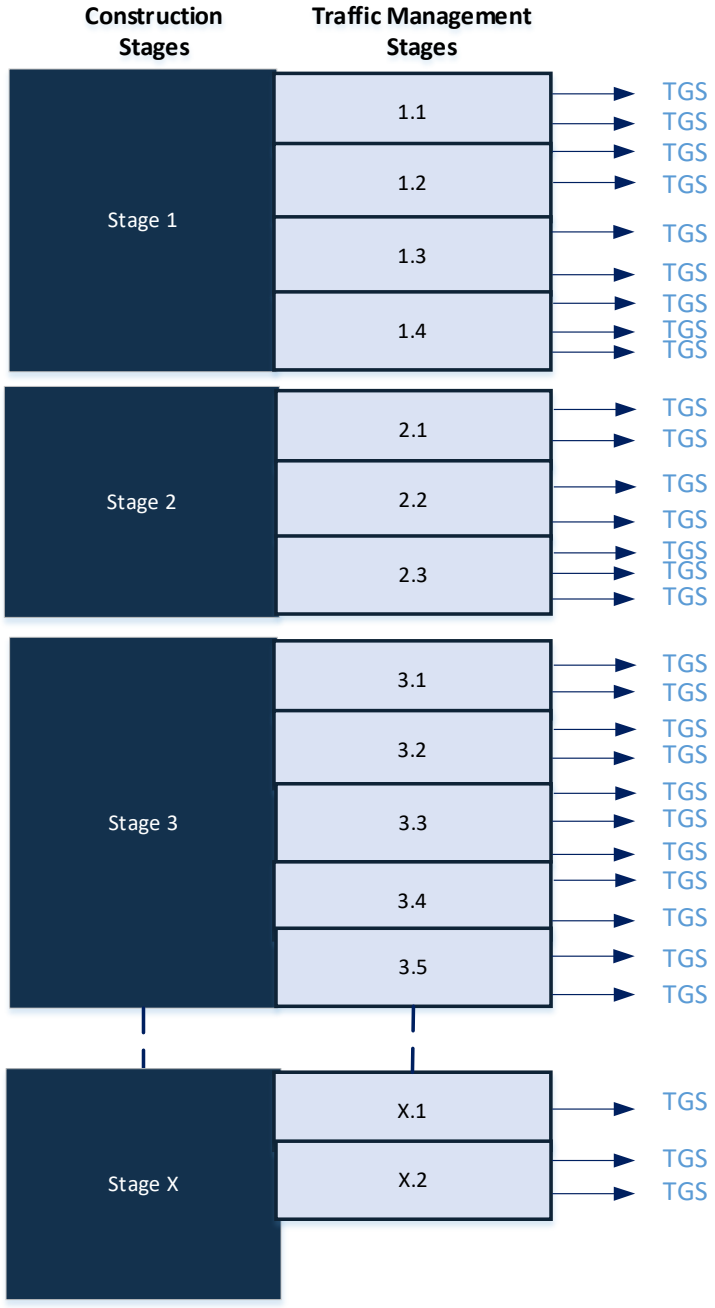
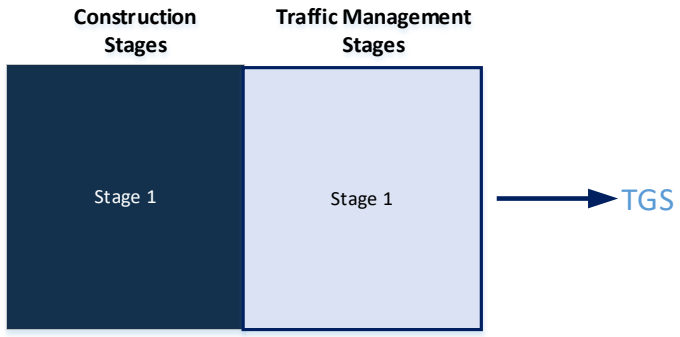



**Figure 3.3: Traffic management stages - Simple project**

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Document the selected options for each traffic management stage in the TMP in staging diagrams. A traffic management staging diagram shows all major elements of traffic management for a traffic management stage of the works. Every stage of the works impacting in a different way on traffic will require an individual traffic management staging diagram.

Where possible, show all traffic management issues on one diagram to make clear:

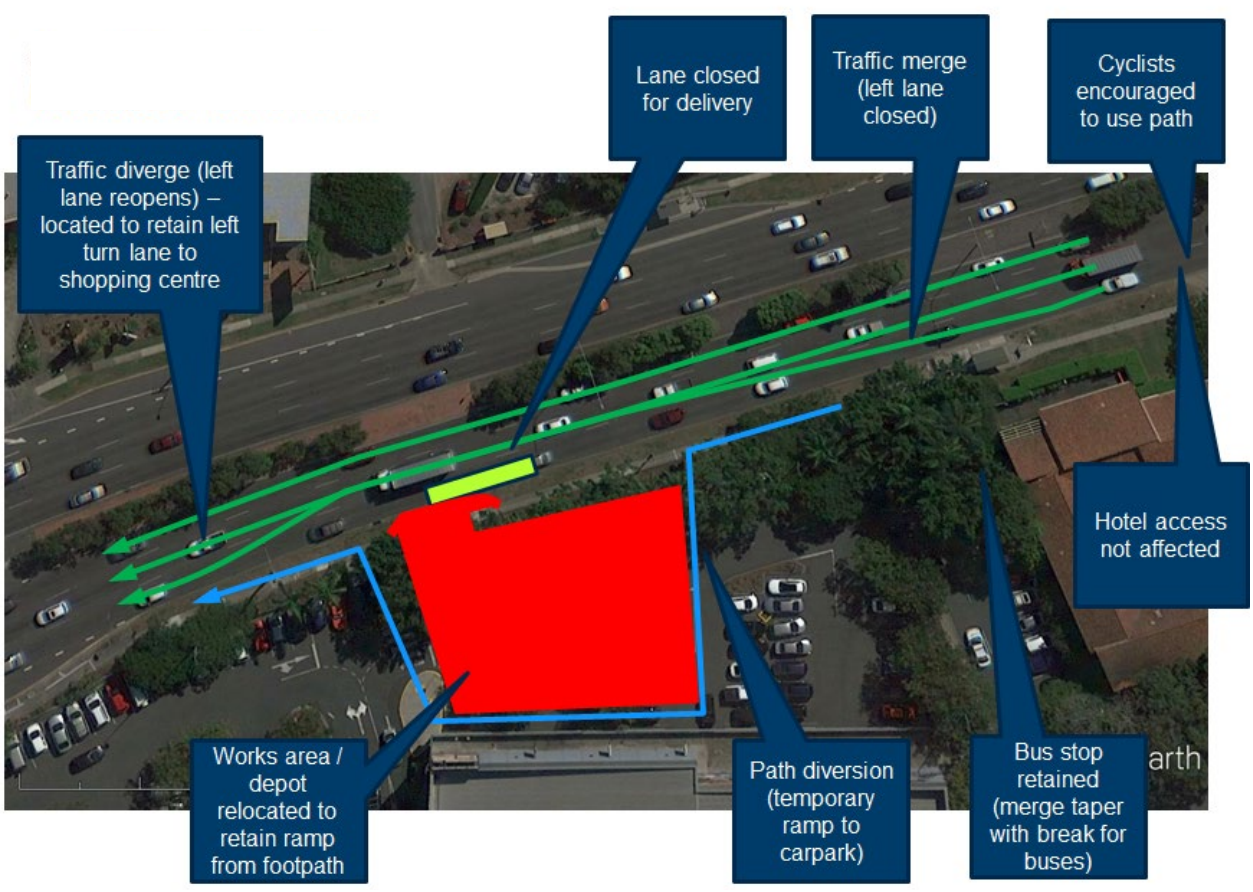
- conflicts and interactions between traffic management issues
- opportunities that each selected treatment provides.

A staging diagram may show:

- traffic treatments – including lane closures, merges, interactions with local amenities including public transport, points of lane re-opening, location of stationary vehicles, location of the worksite, location of any traffic controllers, and any other relevant information
- pedestrian treatments – including location of the sidetrack and footpath and key features of the route including the location of the temporary ramp to be constructed and the existing ramp to be used and any other relevant information
- cyclist treatments – including on-path options, sidetrack routes, and options for on and off-road cyclists
- public transport treatments – including merges, stop locations, and diagrammatic representation of any other impacts on public transport.

Figure 3.4 is an example of a staging diagram, taken from Appendix C:

**Figure 3.4: Traffic management staging diagram (Stage B1 – Eastern Pier Lane closed for deliveries)**

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In text accompanying the staging diagram, discuss issues including:

- all necessary commentary to describe all aspects of the plan
- support management elements required for implementation
- times the diagram is intended for use
- actions in the instance of an incident or excessive queue of vehicles
- explanation of construction, installation and use of traffic management features including merges, ramps, taper lengths and diverges.

If works are to be conducted in stages, outline each stage of the project and the work method statements and TGS relevant to each stage.

The information in this section needs to be sufficient for the reader to clearly understand the nature of the work activities and the associated likely risk exposure. The indicative staging provided in the TMP is the basis on which the TGSs are developed.

### 3.4.3 Identify Traffic Guidance Schemes required

Once the traffic management stages have been identified, the TMP must:

- specify dates when the works are to take place, establish the further actions to be completed and detail the reporting mechanisms
- identify the TGSs required for the project, how many, what overlaps between TGSs may exist
- identify the triggers and dates for each TGSs, including date and time of day
- identify actions to be undertaken to initiate and implement each TGS, or what 'triggers' a TGS. For example, a bus stop may need to be moved to allow for a lane closure to be implemented, or a side road closure may be required before a contraflow can be implemented
- detail any other actions associated with each stage of the job, including community liaison and project reporting.

## 3.5 Ongoing Activities

### 3.5.1 Communication and consultation

Consultation is an essential part of the preparation of a TMP, including consultation with the road infrastructure manager, which may be the State government, local government or other public or private entity. It is also important to consult with any stakeholders who have an understanding of site features and constraints, and who will be impacted by the implementation of the traffic management plan. Examples of stakeholders to be consulted include:

- the road infrastructure manager
- residents and land owners
- local businesses
- schools
- public transport providers.

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Project-specific information should also be sought from documents including the following plans:

- project management
- environmental management
- heritage management
- design plans
- work health and safety, quality plan, and construction management.

Undertaking consultation at the outset of traffic management planning will assist with raising the authority of the TMP, once implemented.

### 3.5.2 Monitoring and review

Monitoring and reviewing material is an important step throughout the TMP process (both preparation and implementation) to ensure that the TMP remains current and addresses all risks at the worksite. After the TMP has been implemented, a review should be undertaken to ensure that it is operating as expected. Schedule further reviews as the works progress, to ensure that the plan continues to operate as expected. If a variation is made to the TMP, specify the period within which a review should be undertaken.

Consider how regularly the site will be inspected and maintained and the most appropriate form of record keeping and document these expectations and processes in the TMP.

## 3.6 Summary

When this process contained in this section is completed, review the draft TMP and consider whether:

- all options have been identified and discussed, and the appropriate option selected
- all of the issues have been identified and addressed, with the intention of minimising impacts and public complaints
- the contractor has sufficient information to be assured of the cost effectiveness of the TMP
- all risks that may cause work to stop have been identified and addressed
- the community can continue to operate their business or access their property.

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# 4. Documenting Traffic Management Plans

## 4.1 General

This section outlines information to be contained in a TMP, in addition to the risk management process described in Section 3.

## 4.2 Introduction

### 4.2.1 Purpose of a Traffic Management Plan including risk management

Provide a broad overview of:

- the purpose of the specific TMP
- the physical scope that it covers
- the main kinds of risks it aims to mitigate.

### 4.2.2 Traffic management objectives for the project

Clearly state the objectives of the plan in a way that the achievement of the objectives is able to be measured through monitoring and surveillance activities.

Take into consideration principles for TMPs outlined in Section 2.6.2 of this document.

Common TMP objectives include:

- providing protection to workers and the road users from traffic hazards that may arise as a result of the activity
- managing potential adverse impacts on traffic flows to ensure network performance is maintained at an acceptable level
- minimising adverse impacts on users of the road reserve and adjacent properties and facilities.

Consider and include any other objectives that are specific to the location or work activities being undertaken.

### 4.2.3 Statement of duty of care

Include a statement of duty of care to workers and all road users in the implementation of the TMP.

### 4.2.4 Site inspection expectation

Undertake a site inspection prior to preparing the TMP to assist with identification of site specific conditions and risks. Include a statement on the plan confirming that a site visit was undertaken by the party responsible for preparing the TMP, or a competent person under the direction of the person responsible for preparing the TMP, prior to preparing the plan.

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### 4.2.5 Site induction and training plan

Consider the following:

- include a site induction and training plan to ensure that the relevant site personnel including subcontractors are aware of the requirements of the TMP
- identify personnel to be trained, training objectives and induction procedures
- outline how visitors to the site will receive suitable instruction and be provided with personal protective equipment
- outline how the requirements of the TMP and the associated procedures and practices will be communicated to personnel who will enter the site. This may be undertaken in conjunction with other site induction mechanisms.

## 4.3 Project Overview

### 4.3.1 Project location

Include a plan or sketch outlining the location of the worksite and its relationship to the surrounding street network. A text description may also be included.

### 4.3.2 Project details

Provide details of:

- project title
- road classification and existing speed limit
- road infrastructure manager
- local government
- client
- contractor
- scope of works
- staging of works
- project dates
- hours and days of work
- duration of work
- concurrent or adjacent works or projects.

If available, provide details of prior approvals granted by the road infrastructure manager with the relevant reference number or identifier.

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### 4.3.3 Site constraints/impacts

Describe:

- the proposed or existing section of road
- land-use frontage
- speed limit
- lane width(s)
- facilities for pedestrians and cyclists
- traffic volume
- traffic composition, including heavy vehicle component
- lane widths and number of traffic lanes to be retained at any time
- mid-block lane capacity
- intersection capacity
- allowable hours of work.

## 4.4 Project Administration

### 4.4.1 Pre-start meeting

Include a requirement for a pre-start meeting, to be attended by all on site traffic management personnel before commencing traffic management duties. The meeting is vital to ensure everyone on site understands activities that are occurring and the responsibilities and roles of people working on the site are made clear prior to work commencing. Matters to be covered in the pre-start meeting include:

- direct briefing of traffic controller's role
- details of TGS
- contact numbers and details of relevant people
- breaks
- traffic monitoring instructions
- incident management procedures.

### 4.4.2 Communication of administrative procedures

Present administrative information clearly in the TMP to ensure easy reference by personnel who may not be familiar with the site or the organisation conducting the works.

Outline the established protocol for communicating TMP requirements to the personnel responsible for implementing the TMP at each stage of the project.

### 4.4.3 Registers

Include appropriate registers to allow for implementation and effective maintenance of the TMP. Table 4.1 outlines common registers to be attached to a TMP. The selection of registers and the specific details that must be recorded in those registers should be tailored to, and depend on, the scale and needs of each individual project.

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**Table 4.1: Registers**

| Register type | Description |
|---|---|
| **Key personnel register** | Identify all key personnel and provide contact details for the relevant road infrastructure manager, the affected local government, the client, the main contractor (if relevant), the project manager, the site supervisor and any key subcontractors. |
| **Incident register** | Record all incidents that occur on site, including date and time of the incident, date-stamped photographs of signs and devices in the vicinity of the incident. |
| **Variations register** | Record any modifications to approved traffic management treatments, including reason for the modification and departure from this guide, date, time, modification made and residual risk. |
| **Daily inspection register** | Record the time and date at which traffic controls were erected at the start of the day, when changes to controls occurred and why the changes were made, and any observations associated with traffic controls and their impacts on road users or adjacent properties. |
| **Complaints register** | Record any complaints received including party making the complaint, contact details, nature of the complaint, and any follow up actions that have been identified and subsequently taken. |
| **Consultation register** | Identify and provide contact details for the stakeholders who have been consulted during the preparation of the TMP. Also provide an overview of the main issues raised during consultation. |

### 4.4.4 Responsibilities

Outline both general and specific responsibilities of all key personnel on the project including:

- role
- detailed responsibilities
- authority of key personnel
- management hierarchy for the specific project, including site representatives, to assist with clear role definition. This may be done in the form of a flow chart
- contact details of the responsible personnel.

Jurisdictional legislation and regulation and contract-specific requirements will largely dictate these roles and responsibilities, however roles and responsibilities that are considered to be best practice are provided in the table below.

**Table 4.2: Best practice roles and responsibilities**

| Generic role description | Responsibilities |
|---|---|
| **Project Manager** | • Ensure all traffic control measures of the TMP are placed and maintained in accordance with the TMP and the relevant Acts, Codes, Standards and Guidelines<br>• Ensure suitable communication and consultation with the affected stakeholders is maintained at all times<br>• Ensure inspections of the traffic controls are undertaken in accordance with the TMP, and results recorded. Detail any variations and reasons for variations<br>• Review feedback from field inspections, worksite personnel and members of the public, and take action to amend the traffic control measures as appropriate following approval from the road infrastructure manager<br>• Arrange and/or undertake any necessary audits and incident investigations. |

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| Generic role description | Responsibilities |
|---|---|
| **Site Supervisor** | Responsible for overseeing the day-to-day activities and has responsibility for practical application of the TMP. The Site Supervisor's responsibilities include:<br>• Instruct workers on the relevant safety standards, including the correct wearing of high visibility safety vests<br>• Ensure traffic control measures are implemented and maintained in accordance with the TMP<br>• Undertake and submit the required inspection and evaluation reports to management<br>• Render assistance to road users and stakeholders when incidences arising out of the works affect the network performance or the safety of road users and workers<br>• Take appropriate action to correct unsafe conditions, including any necessary modifications to the TMP. |
| **Traffic Management Personnel** | • Have available at least one person on site who is qualified to implement the TMP to ensure the traffic management devices are set out in accordance with the TMP<br>• Have at least one person who is qualified to amend the TMP available to attend the site at short notice at all times to manage variations, contingencies and emergencies, and to take overall responsibility for traffic management. |
| **Traffic Controllers** | Traffic Controllers control road users to avoid conflicts with plant, workers, traffic and vulnerable road users, and stop and direct traffic in emergency situations. Traffic controller responsibilities include:<br>• Operate in accordance with Part 7 of this Guide and any jurisdiction-specific legislation and regulation, including regarding operation and accreditation. |
| **Workers and Subcontractors** | • Correctly wear high visibility vests, in addition to other protective equipment required (e.g. footwear, eye protection, helmet sun protection), at all times whilst on the worksite<br>• Comply with the requirements of the TMP and ensure no activity is undertaken that will endanger the safety of other workers or the general public<br>• Enter and leave the site by approved routes and in accordance with safe work practices. |

### 4.4.5 Work Health and Safety and Occupational Health and Safety Arrangements

Where there is a Work Health and Safety (WHS) or an Occupational Health and Safety (OHS) Management Plan proposed for the project, refer to that document. Where there is no such document, include details related to the management of WHS/OHS risks in the traffic environment including:

- personal protective equipment (e.g. high visibility clothing, appropriate footwear, sun protection and possibly helmet, eye and respiratory devices)
- plant and equipment – ensure all equipment has suitable flashing lights and reversing alarms to warn motorists and personnel on foot of their presence. These are to be used in accordance with manufacturer's instructions. Reference any standards, legislation and regulation that plant and equipment must comply with and any jurisdictionally specific requirements for warning devices.
- safe work practices – list any jurisdictionally specific requirements for safe work practices
- communicating the TMP requirements – outline procedures in place to ensure all TMP and safety requirements are communicated to personnel.

Provide information about the relationship between the TMP and any project-level safety management plans.

### 4.4.6 Incident procedures

Detail all procedures to be undertaken in the event of an incident occurring including:

- first aid response
- emergency services contact
- clearing the site.

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Include requirements and procedures for reporting incidents, including traffic incidents that occur on the site. Common recording requirements include:

- date
- time
- date-stamped photographs of signs and devices present in the vicinity of the crash.

Outline how incidents will be communicated to the personnel responsible for implementation of the TMP and in what timeframe. Include an incident register for recording of all incidents that occur at the site.

### 4.4.7 Consultation

Consultation is an essential part of the preparation of a TMP. Consult with all stakeholders who will be impacted by the implementation of the TMP and associated TGSs to ensure that all risks are adequately identified, and all treatment options considered. Common categories of stakeholder to be consulted with include:

- road infrastructure managers
- emergency services
- public transport providers
- owners and occupiers of adjoining properties
- local business owners
- local schools
- parking facility operators
- management of adjoining road work sites
- any other stakeholders with an understanding of site features and constraints, and who will be impacted by the implementation of the traffic management plan.

Provide a summary of consultation undertaken with each stakeholder. Also provide contact details for key organisational contacts in a consultation register.

## 4.5 Risk Management

### 4.5.1 Risk management process

Traffic management planning is a risk management process, involving identification, assessment and consideration of means to control the risk exposure. For each site, document a full risk assessment, including identification of issues and associated risks, analysis of the risks, identification and evaluation of all treatment options. Documentation of these steps provides a comprehensive justification for selected risk treatments.

Carry out and document this process using the steps detailed in Section 3 of this part. Appendix C also provides an abridged example of how this process may be documented.

### 4.5.2 Future risks

Road worksites are dynamic environments, and risks may arise that are not foreseeable at the planning stage. Detail the mechanism that will be utilised to identify and assess future risks as they arise throughout the term of the work.

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## 4.6 Documenting the Traffic Assessment

The material discussed in section 3.2.3 of this document (Conduct traffic assessment) must be included in the TMP.

## 4.7 Traffic Management Planning and Design

### 4.7.1 Staging of work

If works are to be conducted in stages, outline each traffic management stage of the project and the work method statements and TGS relevant to each project stage. Traffic management stages are distinct from construction stages, or stages associated with the project for which traffic management is being undertaken. There may be more than one TGS per traffic management stage. Refer to Figure 3.2 and Figure 3.3.

Create separate TGSs for each scenario within a traffic management stage. For example, when traffic controls are in place, and when traffic controls are not in place, or when site deliveries are occurring, and when site deliveries are not occurring. Each work site speed limit will also have an individual TGS, and aftercare will also have an individual TGS.

The information in this section needs to be sufficient for the reader to clearly understand the nature of the work activities and the associated likely risk exposure. The indicative staging provided in the TMP is the basis on which the TGSs are developed.

### 4.7.2 Night work provisions

Make provision for night work traffic controls, where works are required during hours of darkness. Roadwork sites may be in operation or shutdown during the hours of darkness, however, the need to manage traffic during either of these situations is still required. Where required, TMPs should make provisions for night work traffic controls, in accordance with the requirements of AGTTM Part 3.

### 4.7.3 Traffic Guidance Schemes

A TGS is an arrangement of temporary signs and devices to warn traffic and guide it around, through or past a worksite or temporary hazard. They are site specific and mitigate and treat the risks identified in the TMP.

Include in the TMP:

- a schedule of TGSs required for the project
- triggers for the commencement of each TGS.
- dates and times for installation of temporary traffic management must be included on each TGS

Where the situation requires that there are several TGSs to be developed for different work activities, detail the sequence of work and provide the links to the respective TGS for each stage, in the TMP. The TGS details all works necessary for the effective implementation of each traffic management scheme for each stage.

The TGS may include detailed drawings depicting the layout and type of traffic control devices to be used for all situations likely to be encountered during the works. TGSs may also include written descriptions of the arrangements.

A TGS could be in the form of a work method statement for short term/low impact works (in accordance with Part 5 of this Guide) only. In all other circumstances, the TGS is to include detailed drawings.

Attach all relevant TGSs to the TMP.

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Ensure that each TGS:

- is consistent with the TMP
- is sufficiently detailed and clearly dimensioned to enable a third party to install the devices without constant referral for additional information or interpretation
- includes an itemised list of all required signs and devices, including type, size and quantity of devices.

Guidance on TGSs are detailed in AGTTM Parts 3, 4 and 5.

## 4.8 Emergency Arrangements and Contingency Planning

### 4.8.1 Emergency services access

Include provisions for priority for emergency services vehicles to travel through a roadworks site to another location, and also to access the site should an emergency situation arise on-site during the works. Any detours are to be detailed in a TGS and must be forwarded to each emergency service prior to the implementation of the scheme.

### 4.8.2 Emergency arrangements

Identify and record:

- any dangerous goods sites (e.g. fuel stations, public pools, generating plants)
- gas and electricity transmission features
- any other potentially dangerous facilities/situations in the vicinity of the worksite.

Risks associated with such hazardous facilities will form part of the TMP risk assessment.

Document contact details of the Police and Emergency Services in the area.

When contacting the Police and Emergency Services prior to preparation of the TMP, details that may need to be provided include:

- the nature of works
- location
- dates and duration
- site conditions
- access details
- contact details of responsible organisation/persons.

Detail all procedures to be undertaken in the event of an incident occurring (e.g. road crash or vehicle breakdown) including facilitation of passage past the incident, first aid response, emergency services contact and clearing the site. Particular attention should be given to managing the site should a serious injury or fatality occur. In these circumstances securing the site until emergency services and police arrive is essential.

Detail site-specific procedures for emergency events. Examples of emergent events and best practice responses are provided in the table below.

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**Table 4.3: Emergency arrangements**

| Emergent event | Best practice response |
|---|---|
| **Incident involving vehicle transporting dangerous goods** | • Cease all work immediately, turn machinery and vehicles off and clear the area of personnel as soon as possible<br>• Deploy Traffic Controllers (and other personnel if necessary) immediately to ensure no traffic or other road users approach the area<br>• Notify emergency services of the proposed works nature, location, date and times as well as contact details for the site supervisor<br>• Brief all site personnel on evacuation and control procedures |
| **Damage to services including gas** | • All work should be ceased immediately, machinery and vehicles turned off and the area cleared of personnel as soon as possible<br>• Deploy Traffic Controllers (and other personnel if necessary) immediately to ensure no traffic or other road users approach the area<br>• Call police and relevant supply authority immediately<br>• Treat all damage to any other services in a similar manner except machinery may remain operational and access may be maintained where it is safe to do so<br>• Brief all site personnel on evacuation and control procedures. |
| **Failure of traffic signals, street lighting or power** | • In the event that traffic signal infrastructure is damaged, and signals fail to operate or operate incorrectly:<br>- Cease all work immediately<br>- Traffic Controllers (and other personnel if necessary) will be deployed immediately to control traffic movements through the intersection<br>- Notify the relevant traffic signalling authority immediately<br>• In the event that power infrastructure is damaged and poses a risk through live current:<br>- Traffic Controllers (and other personnel if necessary) must be deployed immediately to secure the site and prevent entry to the area affected by live power<br>- Notify the relevant power authority immediately. |
| **Serious injury or fatality** | • Cease all work immediately, turn machinery and vehicles off and clear the area of personnel as soon as possible<br>• Deploy Traffic Controllers (and other personnel if necessary) immediately to ensure no traffic or other road users approach the area<br>• Notify emergency services of the incident and all road workers and traffic management personnel will preserve the scene leaving everything in situ, until direction is given by the relevant authority<br>• Where a fatal or serious injury has occurred, contamination of the site must only occur for the purpose of saving life or rendering assistance. The site must not be cleaned or tampered with (including all traffic management devices) and crash debris must be left in situ until police and/or Worksafe arrive. Preserving evidence takes precedence over traffic access and additional lane closures or complete road closure may need to be applied in order to achieve this. Guidance on partially or fully closing a site to traffic should be sought from the TMP closure/detour contingency plan specific to that site<br>• Traffic management personnel to determine, sign and control a site-specific detour route and/or road closure point, in a matter which caters for all types of vehicles required to use them<br>• Notify police, who will take charge of the site upon arrival<br>• Brief all site personnel on control procedures covering incidents and crashes that result in serious injury or fatalities. |

### 4.8.3 Contingency planning

Unforeseen risks may surface during the implementation of the TMP, which could not have been predicted at the time of preparation.

Include contingency plans to address all risks of high likelihood and serious consequence, should they eventuate. This includes risks that will impact on safety of both road users and workers. Include contingency plans to address this possibility which can be implemented immediately.

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This contingency plan may include restoration of the route in existence prior to implementation of the traffic route alteration until such time that alternative arrangements can be developed.

## 4.9 Variations

Obtain prior approval for variations from the relevant road infrastructure manager and jurisdictional road agencies where the recommendations of this guide, with respect to levels of service or safety, cannot be satisfied.

Consider the following when contemplating exceptions to this guide:

- what is the safety performance of the standard arrangement?
- what is the expected safety performance of the arrangement that incorporates the Exception?
- what should the safety performance of the temporary traffic arrangement be?
- is the difference acceptable?

### 4.9.1 Innovation

Innovation is encouraged in the design of TMPs and consideration of new treatments where appropriate and without compromising safety, is important.

Document any innovative treatments that will be adopted by the TMP and specify their benefits, particularly any benefits related to:

- improvement to the safety of workers and the public
- improvement of the cost effectiveness of the works
- allowance for the works to be undertaken more efficiently.

### 4.9.2 Evaluation of variations from this Guide and standards

Before seeking the road infrastructure manager and jurisdictional road authority approval of treatments that vary from this Guide, it is imperative that risk analyses are carried out by an appropriately qualified person where there are variations to this Guide.

Risks of a lower level of service resulting in traffic congestion and subsequent delays must be addressed.

An evaluation of the impacts of both the standard arrangement/s and that which incorporates the variation must be undertaken. The evaluation should consider (and document) at least the following for all options:

- safety impact
- environmental impact
- community impact
- network impact (traffic operation and level of service), and
- value for money.

Other factors may also be considered depending on the particular circumstances of the site/project.

Specify that levels of safety to workers and road users are continuously assessed where the variations compromise levels of safety and that work is to be ceased immediately where safety is compromised and make the work site safe for all road users. Work is not to recommence until the levels of safety are compliant with the requirements of this Guide.

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### 4.9.3 Variation from approved traffic management plan

Variations proposed to the guidance in this Guide must be risk assessed in accordance with this guide. Any variation from this Guide must be approved by the relevant jurisdictional road authority.

Clearly document the countermeasures (treatment) to address the lower service levels and the residual risk in a variation register. Any variations to this Guide which result in a lower level of safety must be similarly addressed and documented.

Record the reasons why compliance with the original TMP is not possible. Ensure variations are approved and recorded. Such variations should be approved and recorded.

## 4.10 Notification Requirements

All relevant jurisdictional requirements for notification of works must be complied with.

Depending upon the nature of the works and prevailing traffic conditions it may be necessary to provide advice to affected groups of proposed works and traffic management arrangements in advance of the works commencing.

Notice will generally take the form of on-site advance roadwork notification signs, state/local newspaper notices, online advertising, social media posts, radio and television announcements, and written notification to specific commercial or residential premises.

### 4.10.1 Public notification

Provide details for timely public notification of the community in advance of alterations to existing traffic conditions, in line with the project communications plan if there is one in place. The extent of notification required will be worksite-specific and depend on the scope, scale, impact and duration of the works.

Include matters in public notification advice including:

- the physical changes to the road
- expected delays and traffic impacts
- alternative route and transport mode options.

Community stakeholders requiring notification are site-specific but generally include groups such as local residents, local businesses, schools and general road users.

Specify that the public is to be made aware of the complaints process associated with the TMP, including contact details and complaints process.

### 4.10.2 Notification of other agencies

Provide details of the relevant government agencies who should be notified of the works. Relevant agencies requiring notification may include road authorities including local governments, public transport providers and utility providers. Consider whether local government should be notified regarding matters including noise management and other required permits.

### 4.10.3 Notification of emergency services

Provide details to allow notification of emergency services of:

- the proposed works
- site access arrangements in case of an emergency on the work site
- arrangements made by the TMP that may impact on route and travel times of emergency services.

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Consider when it is necessary to notify emergency services of works. Consider notification in instances of road closures, contraflows, expected traffic delays, traffic control on major roads and works involving speed reduction or lane closures for periods of longer than five days.

## 4.11 Monitoring

### 4.11.1 Specific monitoring requirements

Monitoring requirements will vary from site to site and are to be tailored to each individual job. Document all monitoring requirements including road infrastructure manager requirements, contract conditions and the form of monitoring to be used. The form of monitoring may be varied and include techniques ranging from regular video recording of site drive throughs and Closed-Circuit Television, to hard copy site registers.

### 4.11.2 Site inspections and record keeping

All temporary signs, devices and controls need to be maintained at all times.

Outline requirements for inspection immediately following set up of the site. If traffic speeds on the approaches to the work site are assessed as being above the speed zone for the work site, the suitably qualified person is to initiate action to modify the approach signage and tapers in accordance with the requirements of this Guide. All such actions are to be recorded in the inspection register.

***Inspections***

Inspections should be undertaken;

- at least daily, or more frequently depending on location and likelihood of traffic management being disturbed
- before work starts each day
- immediately following the installation of a TGS
- before the start of work activities on site
- during the hours of work
- closing down at the end of the shift period
- periodic inspections after work hours and at night, and at unattended sites
- after any change in the traffic management arrangement on site
- following any environmental or weather events.

Provide a template for a daily inspection register allowing indication of:

- when traffic controls were erected
- when changes to controls occurred and why the changes were undertaken
- any significant observations associated with the traffic controls and their impacts on road users or adjacent properties.

Collecting information is particularly important in the event of an incident, in case legal proceedings result.

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***Enforcement***

There are a number of factors for consideration during site assessment if police enforcement is required, including but not limited to:

- clear line of sight
- room for vehicles to pull over
- location of police officer
- escape route
- speed sign placement.

Provide relevant contact details to enable police to be contacted and requested to attend the site to enforce the temporary posted speed limit, in the case that road users are observed to continue to travel in excess of the posted speed limit. The method of enforcement will be determined by Police.

Note that if enforcement is requested the following should be discussed with the police to ensure site suitability for speed enforcement presence, and provided if requested:

- the TMP
- any relevant TGSs
- relevant information relating to the approved speed limit and signage
- confirmation that the speed zone will not be changed throughout the enforcement period
- confirmed location for enforcement activities that will not hinder the road work or Police activities.

**Incidents**

In the case of incidents (e.g. crashes, collisions), either witnessed or reported, involving the public or from which legal proceedings might arise, the actual type, size and location of signs and devices in use at the time of the accident should be recorded and the sign arrangement photographed for subsequent reporting. Details of the actual width and condition of the travelled path and weather conditions should also be recorded. See AGTTM Part 6, Section 7.6 for more details relating to incidents and record keeping.

***Complaints register***

It is important for the credibility of the TMP that the public has an avenue for input into its implementation. Prepare a register to record all complaints received and actions taken to address each complaint. Outline how the register will be regularly monitored by management and action taken where appropriate.

## 4.12 Management Review

### 4.12.1 Traffic Management Plan Review and Improvement

Consider continuous improvement where a TMP is to be used on more than one occasion or at a number of generic locations to ensure the quality of traffic management is maintained or improved where required. Outline a process to facilitate continuous improvement which may include debrief meetings to discuss any issues or risks associated with the plan.

Ensure the TMP is kept up to date taking into account changes in traffic volumes, vehicle types, the road environment, work practices, standards, and jurisdictionally specific legislation.

Require the review of the TMPs at least once in any 12-month period, and the endorsement of any on-site changes (with the exception of repositioning of traffic control devices within the allowable tolerances specified in this Guide) by a person appropriately qualified in the relevant jurisdiction.

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A copy of all documentation relating to the endorsement of the changes must be held on-site by the person managing the works.

### 4.12.2 Long term projects

Incorporate formal review procedures for long term projects (greater than 6 months) as part of a continuous improvement approach to ensure the continuing suitability, adequacy and effectiveness of the TMP. Ensure sufficient information is gathered in the review process to allow management to undertake an effective review.

## 4.13 Traffic Management Plan Auditing

### 4.13.1 Audit types

Make provision for the conduct of audits to ensure adherence to this Guide, if necessary. Formal auditing of TMPs takes two forms:

- Suitability reviews (pre-implementation)
- Compliance Audits (during works).

Make provision for internal audits by supervising personnel at the work site.

Suitability or Compliance Audits of the TMPs involving complex traffic arrangements are required to be carried out by a suitably qualified individual, in accordance with jurisdictional requirements.

Where there are non-compliances identified, the audit procedure should have a mechanism for the issuing of a formal corrective action. Corrective actions should be closed out and registered as such in accordance with the organisations normal practice.

### 4.13.2 Considerations for audits

When auditing compliance with a TMP, and having regard to the nature and complexity of the works and associated safety hazards, consideration should be given to the following:

- safety of workers on the worksite, road users and the public
- signs, road markings, temporary safety barriers, lighting, and facilities for pedestrians, cyclists and people with disabilities
- traffic compliance with the implemented traffic management plan
- public transport operation through the worksite
- access to abutting properties
- effect of the works on surrounding land use (e.g. residential, commercial/industrial, car parking)
- differences in weather conditions
- after-hours conditions
- traffic volumes (e.g. peak periods).

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## 4.14 Submission and Approval Process

### 4.14.1 Timeframes for review

The person preparing the TMP must be cognisant of likely timeframes between submission and provision of the appropriate jurisdictional response to the TMP. Factors including site size, complexity and scale of the TMP, level of response and road infrastructure manager requirements should all be considered. See AGTTM Part 8 for more information.

### 4.14.2 Review requirements

The person preparing the TMP must identify and understand the TMP approval process. The TMP generally must be approved or authorised by a road infrastructure manager (RIM) such as the State road authority or Council. As part of the approval process, the person preparing the TMP may need to consult and seek endorsement from other stakeholders such as asset owners, emergency services, public transport providers, local businesses and local schools.

Once the TMP is submitted to the RIM, it should be reviewed by an accredited person other than the person who prepared the TMP.

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# Appendix A Checklist of Traffic Management Plan Components

The table below is an indicative list of components to be included in a TMP. It is not intended to be exhaustive or an indication of minimum acceptable requirements. Project specific requirements must always be considered for every TMP.

**Table A 1: Indicative list of components to be included in a TMP**

| Component | Included (y/n) | If not included, reason for not including |
|---|---|---|
| **Introduction** | | |
| Purpose of this TMP | | |
| Traffic management objectives for this project | | |
| Statement of duty of care | | |
| Site inspection expectation | | |
| Site induction and training plan | | |
| **Project overview** | | |
| Project location | | |
| Project details | | |
| Traffic assessment | | |
| Site constraints/impacts | | |
| Facilities for pedestrians and cyclists | | |
| **Project administration** | | |
| Pre-start meeting | | |
| Communication of administrative procedures | | |
| Registers | | |
| Responsibilities | | |
| OH&S | | |
| Incident procedures | | |
| Consultation | | |
| **Risk management** | | |
| Risk management process | | |
| Future risks | | |
| **Traffic Management Implementation** | | |
| Staging of work | | |
| Night work provisions | | |
| Traffic guidance schemes | | |
| **Emergency arrangements and contingencies** | | |
| Emergency arrangements | | |
| Contingency planning | | |
| **Variations** | | |
| Innovation | | |
| Evaluation of variations | | |

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| Component | Included (y/n) | If not included, reason for not including |
|---|---|---|
| Variation from approved TMP | | |
| **Notification requirements** | | |
| Public notification | | |
| Notification of other agencies | | |
| Notification of emergency services | | |
| **Monitoring** | | |
| Site inspections and record keeping | | |
| **Management review** | | |
| TMP review and improvement | | |
| Long term projects | | |
| **Traffic Management Plan Auditing** | | |
| Consideration for Audits | | |
| **Submission and approval process** | | |
| Timeframes for review | | |
| Review requirements | | |

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# Appendix B Traffic Management Plan Risk Considerations Checklist

Table B 1 lists common issues and associated risks. It is indicative only, and not intended to be an exhaustive list or to prescribe minimum acceptable considerations. Site-specific issues and risks must always be identified and considered before selecting a treatment option.

**Table B 1 List of common issues and associated risks**

| Issue | Potential risk | Present at worksite (Y/N) | Treatment |
|---|---|---|---|
| **Vulnerable road users** | | | |
| Pedestrians, cyclists, people with disabilities and other vulnerable road users such as children, parents with prams, users of small-wheeled vehicles and mobility aides and the elderly. | Unable to pass safely past the site using existing paths | | |
| Unacceptable length detour | Detours have a much larger impact on people walking and cycling | | |
| **Path users** | | | |
| Clear direction for path users | Unfamiliar and illegible paths which are not used by path users | | |
| Surfacing of temporary paths | Surface not appropriate for prams, strollers, wheelchairs and the visually impaired | | |
| Location of pedestrian crossings | Crossing position unfamiliar to path users | | |
| **School crossings** | | | |
| Presence of school crossings within site area requiring relocation | Safe school crossing practices are compromised | | |
| **Site/location** | | | |
| Site access | Safe access to the worksite is compromised | | |
| Length of worksite | Excessive length of worksite, including in rural areas<br>Any additional work areas associated with the works and any associated risk. | | |
| **Traffic impacts** | | | |
| Traffic queues and delays | Unacceptably long delays to road users | | |

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| Issue | Potential risk | Present at worksite (Y/N) | Treatment |
|---|---|---|---|
| Detouring of traffic on a major or multi-lane road | Volume of detoured traffic has unacceptable impact on surrounding areas<br>Detoured traffic experiences unacceptable delays | | |
| Interference with the operation of permanent traffic signals | Compromised legibility of traffic controls for road users | | |
| Complete closure of turning lanes | Removal of option for road users<br>Compromised legibility of road layout for road users | | |
| Site in operation during times of low visibility | Sight distance or vision of road user compromised on approach to work area | | |
| Incorrect placement of devices | Sight distance or vision of road user compromised on approach to work area | | |
| **Lane availability** | | | |
| Need to maintain a minimum number of available lanes | Traffic volume not adequately accommodated | | |
| Closure of high volume traffic lanes and impact on remaining trafficable lanes | Inadequate provision made for high volume of traffic<br>Volume of traffic in remaining lanes becomes unacceptably high | | |
| **Times of operation** | | | |
| Periods in which work can and cannot occur | Work occurs at inappropriate times of the day | | |
| Requirement to implement the TMP for more than 14 hours within a single shift | Staff fatigue | | |
| **Speed choices** | | | |
| Credible speed limits, considering the safety of workers and road users | Road users travel at inappropriate speeds due to lack of understanding of applicable speed limits | | |
| **Specifications, standards, rules and policies** | | | |
| Clarity of applicable specifications, standards, rules and policies. Some documents may change from project to project | Application of incorrect or expired specifications, standards, rules and policies<br>Older works may be governed by older standards, roles, specifications and/or policies | | |

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| Issue | Potential risk | Present at worksite (Y/N) | Treatment |
|---|---|---|---|
| **Stakeholders** | | | |
| Stakeholders who must be approached for discussions regarding the project and its impacts | Stakeholder opposition to project | | |
| **Environmental risk** | | | |
| Existing vegetation | Obscured positioning of signs and devices | | |
| Shadowing, fog or glare on roads in east-west direction | Impact on visibility of traffic control devices | | |
| Inclement weather or smoke | Impact on visibility of traffic control devices<br>Change in condition of road surface | | |
| Conflict between existing signage or infrastructure and proposed temporary signage | Compromised legibility of work site | | |
| **Personnel access** | | | |
| Requirement for construction traffic to exit and enter the traffic stream | Use of inappropriate exit and entry points<br>Unsafe site exit and entry to the traffic stream | | |
| **Emergency vehicle access** | | | |
| Emergency vehicle access to site | Delay to emergency services travelling through the site<br>Delay to emergency services attending emergencies on site | | |
| **Public transport** | | | |
| Bus stops, tram stops and railway crossings located within the traffic control zone | Impact on provision of usual public transport services | | |
| **Access to adjoining development** | | | |
| Adjoining properties with access near or at the site | Compromised access to adjoining development for property owners and occupiers | | |
| **Rural area** | | | |
| Presence of stock crossing routes | Disruption of essential stock crossing times | | |
| Low quality of road surfacing | Existing road surface unsafe for worksite | | |

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| Issue | Potential risk | Present at worksite (Y/N) | Treatment |
|---|---|---|---|
| **Existing parking facilities** | | | |
| Parking facilities exist within the proposed temporary worksite | Reduction in available parking facilities for the local area | | |
| **Impact on adjoining road work** | | | |
| Change of traffic flow impacts on surrounding road network | Excessive queue lengths<br>Excessive delays | | |
| **Heavy and oversize vehicles and loads** | | | |
| Accommodation of truck traffic and over-sized loads | Inadequate lane widths<br>Inadequate provision for turning movements<br>Inadequate vertical alignments | | |
| **Other issues as specified by road infrastructure manager** | | | |
| Specific restrictions relating to dates or days, particularly around school holiday periods and other significant dates | Impact on scheduled operation of the work site | | |

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# Appendix C Identifying, Evaluating and Selecting an Option – Gympie Road (Queensland)

## C.1 General

Following is an example of the documentation of the risk management process in a Traffic Management Plan (TMP). This example was developed as a fictional case study for the purposes of training undertaken in Queensland.

This scenario is moderately complex and examines building a bridge over Gympie Road. The primary goal is to safely manage traffic in the area of the road works in a manner which minimises risk and maximises safety for both the public and the road workers. Simpler projects may require less detail.

Within this scenario, there are a number of stages, including works for the Eastern Pier. Works will extend through the day and the night and include periods when works are not occurring. The TMP will need to allow for deliveries to the site with vehicles parked in the leftmost lane on Gympie Road with deliveries unloaded to the footpath side of the vehicle. This means there are three sub-scenarios:

- works are underway, and deliveries are required
- works are underway, and deliveries are not occurring
- works are not underway.

There are four major stakeholder groups whose hypothetical input has been considered in the development of this scenario – road infrastructure manager, contractor, community and road users.

- In a full TMP, all options considered for traffic, pedestrians, cyclists and public transport for all sub-scenarios will need to be documented.
- In this example, options for traffic and pedestrians only have been documented, in relation to the first of the three sub-scenarios – when works are underway, and deliveries are required.

## C.2 Identification and Analysis of Issues and Risks

The following issues have been identified and are illustrated below:

- pedestrians on the footpath and the impacts on the path
- pedestrians on the ramp from the shopping centre
- the lack of any existing cyclist facilities
- the traffic requirements
- the location of the bus stop
- the location of the Chermside Green motel
- the location of the intersections either side of the site.

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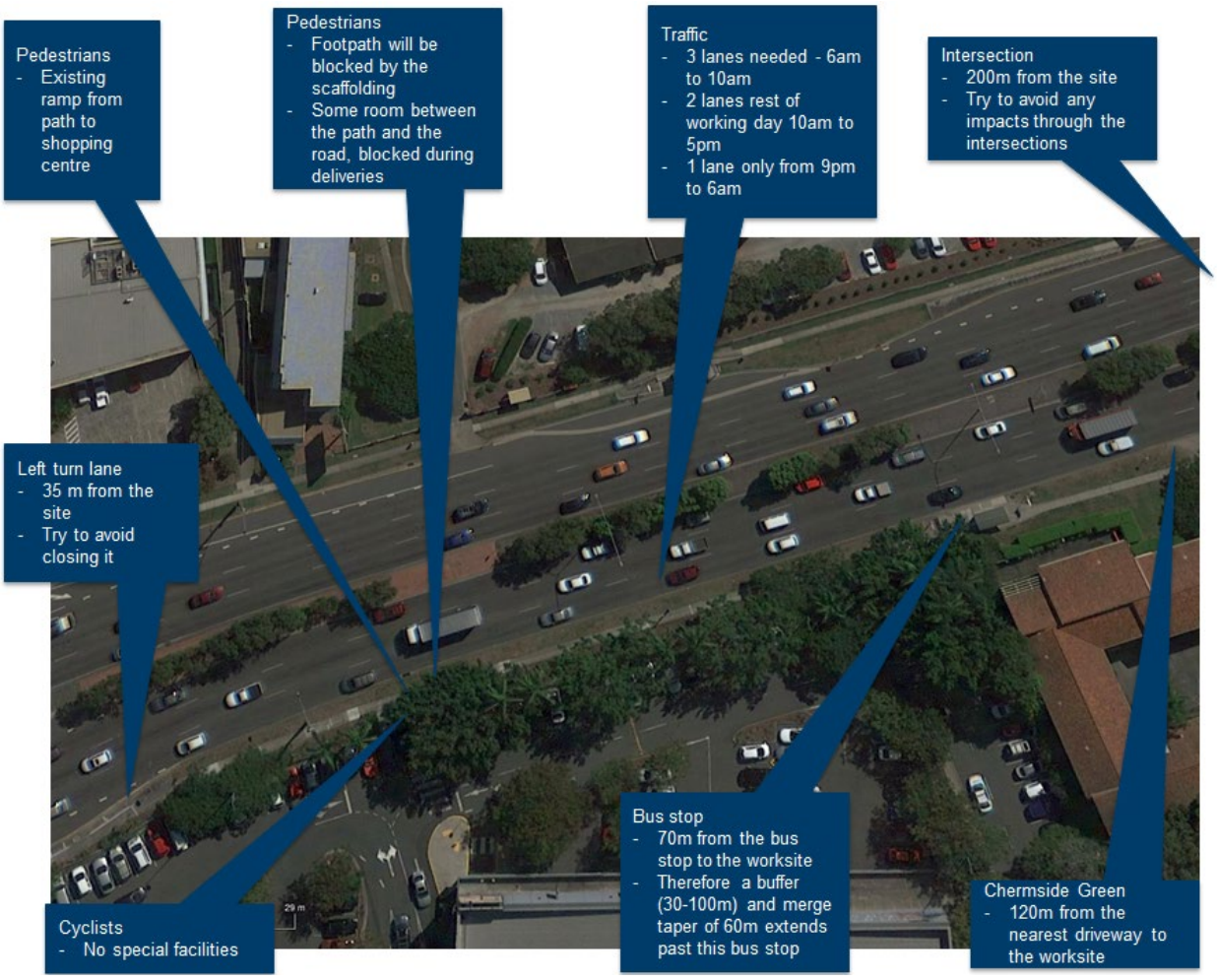
**Figure C 1: Gympie Road – what are the issues**




When identifying issues, it was shown that a preferred construction area at this pier conflicts with a ramp from the footpath to the shopping centre. Undertake negotiation with the contractor to establish if the construction area could be moved to eliminate the conflict.

## C.3 Identifying the Options

### C.3.1 Key site features

Key features of the Gympie Road site (pictured below) are as follows:

- The location of the site - shown in red on the diagram.
- Scaffolding is required around the pier to allow construction - shown in yellow.
- The remainder of the site depot / construction area - shown in blue.
- Temporary Road Safety Barrier protection is provided to prevent the risk of vehicle hits on scaffolding. This was not specified in the brief but was determined as a requirement in discussion with the contractor. A barrier has been selected that is pinned to the ground at this location so that it does not deflect. It can therefore be located on the verge of the road and does not intrude into the nearest lane.
- The contractor has confirmed that works will be undertaken between 7am and 5pm on weekdays.
- These works will take approximately 6 weeks to complete.
- Deliveries need to be unloaded while stopped in the lane nearest to the site – shown in green.

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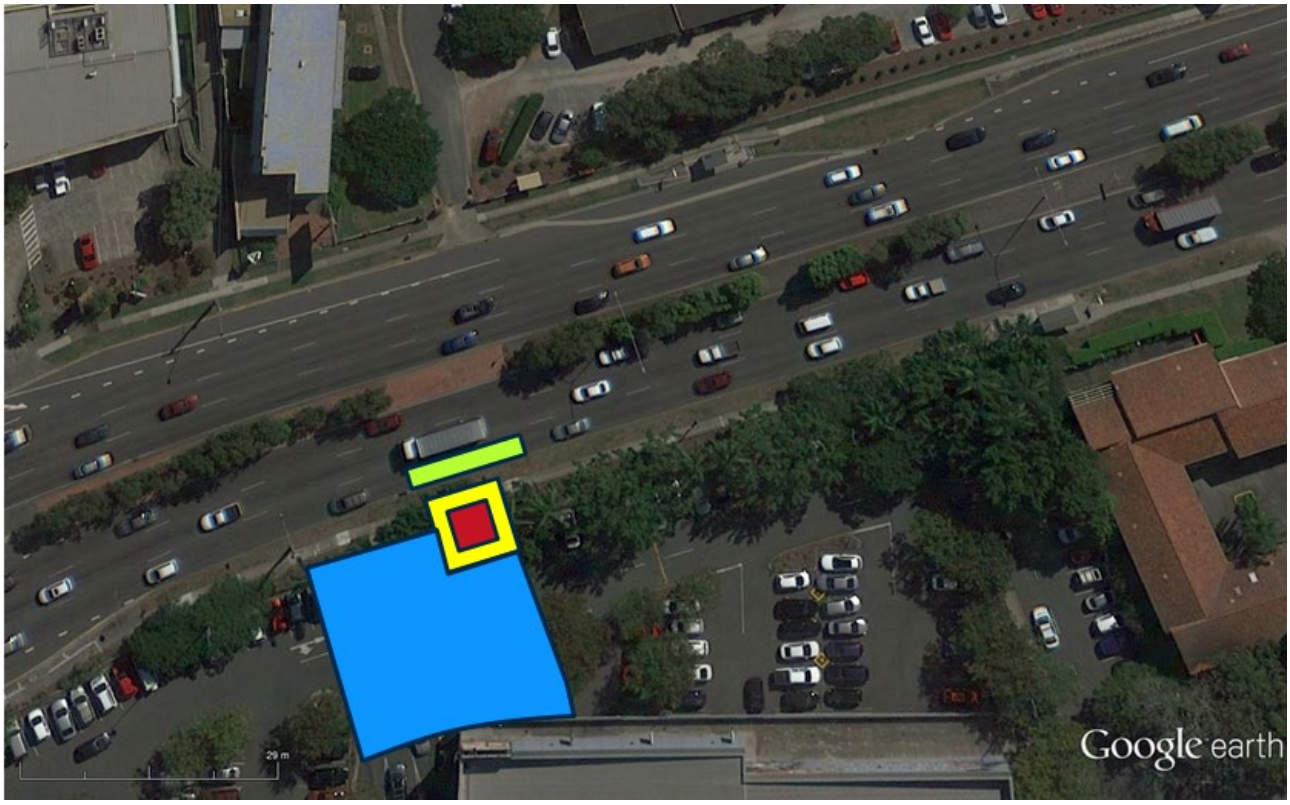
**Figure C 2: Gympie Road – what are the issues**




### C.3.2 Identify all options

***Road user options***

Options for motorised traffic around, through and past the site on Gympie Road have been identified as follows:

Options directing traffic around the worksite:

- via Hamilton Road and Webster Road, shown in yellow
- to the east of the site and is via Murphy Road, Kittyhawk Drive and Hamilton Road, shown in red.

Options directing traffic **through** the worksite:

- continue along Gympie Road, shown in blue.

Options directing traffic **past** the worksite:

- continue along Gympie Road, also shown in blue.

**Short term** options:

- not considered to be feasible for this task as the duration is up to 6 weeks.

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**Figure C 3: Gympie Road – Options for traffic**


The following table presents the above options for motorised traffic on Gympie Road when deliveries are required, and works are underway.

**Table C 1: Gympie Road – Options for traffic – Case 1 – When deliveries are required, and works are underway**

| Option | | Details |
|---|---|---|
| **Around** | Detour | Detour routes are available around the site via<br>1) Hamilton Road and Webster Road. This route is two lanes each way on Webster Road and a single lane each way on Hamilton Road. The route passes through a number of intersections.<br>2) Murphy road, Kittyhawk Drive and Hamilton Road. This route is only a single lane each direction and passes through a number of intersections. |
| | Sidetrack | Construction of a new road pavement to divert traffic around the worksite. |
| **Through** | | A temporary full closure of Gympie Road. |
| **Past** | Lane closure | A single lane closure is required for periods when larger deliveries are taking place. |
| **Short term** | | Works that can be undertaken in accordance with Clauses 4.3 to 4.6 of the MUTCD. |

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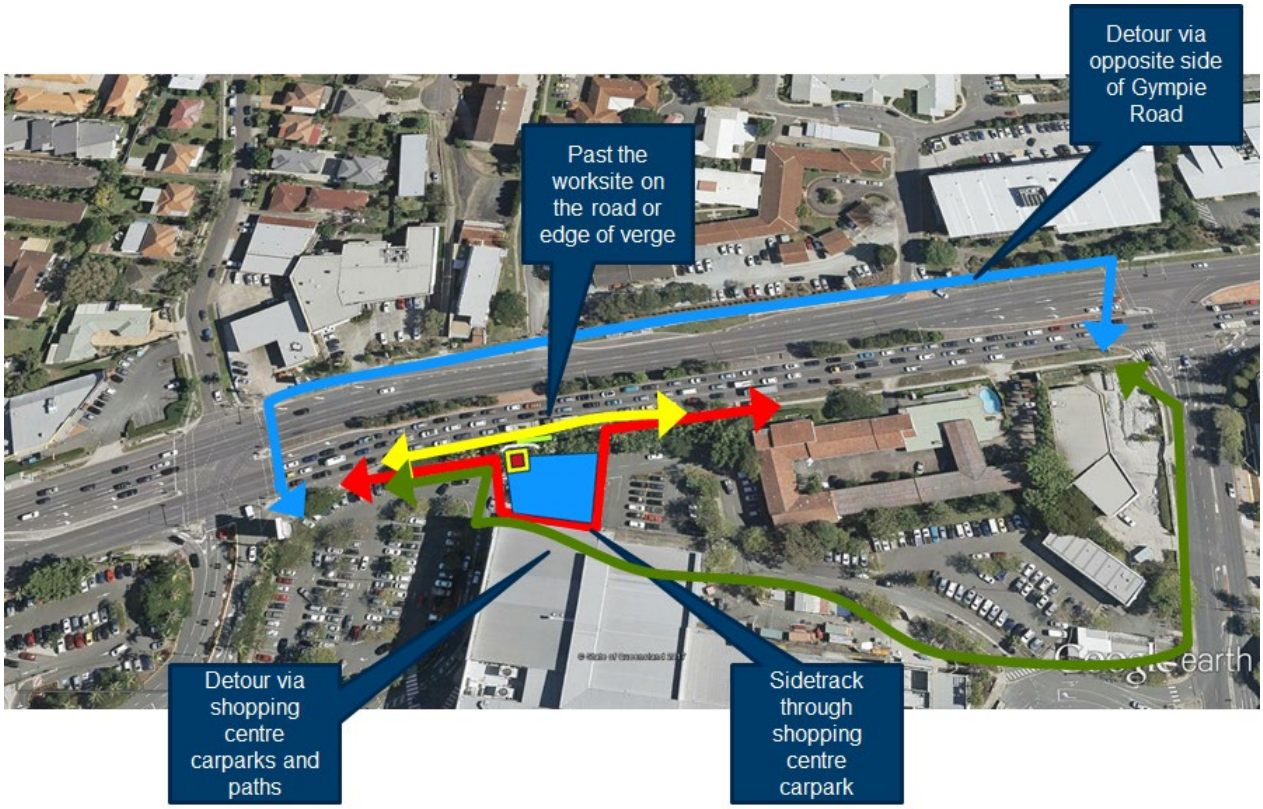
### *Pedestrian Options*

Options identified for pedestrians around, through and past the site on Gympie Road are as follows:

**Figure C 4: Gympie Road – Pedestrian options**




Options directing pedestrians **around the worksite** via a detour, grouped into two main categories:

- on the opposite side of Gympie road - shown in blue
- on the same side of Gympie road and travelling through the Chermside centre carpark - shown in green.

Options directing pedestrians **around the worksite** via a sidetrack:

- an existing ramp connects the footpath to the shopping centre carpark on the southern side of the worksite. To construct a side track there would be a need to construct a new ramp to the north side of the worksite – shown in red.

Options directing pedestrians **through** the worksite:

- continue along the existing path. This option is not feasible as the footpath will be blocked for a long period of time by scaffolding and barriers.

Options directing pedestrians **past** the worksite:

- locate a footpath on the verge or on the road itself – shown in yellow.

**Short term** options:

- not considered to be feasible for this task as the duration is up to 6 weeks.

The following table presents the above options for pedestrians on Gympie Road when deliveries are required, and works are underway.

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**Table C 2: Gympie Road – pedestrian options**

| Option | | Details |
|---|---|---|
| **Around** | Detour | Detour routes are available around the site via<br>1) On the western side of Gympie Road via the existing pedestrian crossings and footpath.<br>2) On the eastern side of Gympie Road via the pedestrian paths in the car parks of the Chermside Shopping Centre. |
| | Sidetrack | Construction of a new ramp to the north of the worksite connecting to the paths within the car park |
| **Through** | | A temporary full closure to the footpath |
| **Past** | Path closure | Via the minor deviation of the path to travel between the scaffolding and Gympie Road |
| **Short term** | | Works that can be undertaken in accordance with Clauses 4.3 to 4.6 of the MUTCD |

### C.3.3 Evaluating each option

***Options for traffic when deliveries are required, and works are underway***

Table C 3 duplicates Table C 2 above, but describes how each option has been evaluated.

**Table C 3: Gympie Road – Options for traffic – Case 1 – when deliveries are required, and works are underway**

| Option | | Details | Selected |
|---|---|---|---|
| **Around** | Detour | Detour routes are available around the site via<br>1. Hamilton Road and Webster Road. However, this route is only two lanes and passes through a number of intersections. It is therefore not suitable for long term (6 week) diversion of traffic. It may be suitable for short term detours where a full road closure is temporarily required. However, this is not the case for this stage.<br>2. Murphy road, Kittyhawk Drive and Hamilton Road. However, this route is only a single lane each direction and passes through a number of intersections | Detour noted as a contingency but not selected for this option |
| | Sidetrack | There is insufficient space to create a sidetrack around the site due to existing property constraints | Not appropriate due to impact on existing properties |
| **Through** | | A temporary full closure of Gympie Road would likely lead to extensive delays due to the traffic volumes | Not appropriate due to travel times impact and road amenity |
| **Past** | Lane closure | A single lane closure is required for periods when larger deliveries are taking place. The traffic volumes analysis established that this can occur at any time except between 6am and 10am when three lane capacity is required. | **Most appropriate option and is therefore selected** |
| **Short term** | | These works are 6 weeks in duration and hence the short-term clauses do not apply | Not applicable |

The staging diagram below shows the preferred option, determined in the above.

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**Figure C 5: Gympie Road – Preferred traffic (when deliveries are required, and works are underway)**

The key features of the selected solution are:

- left lane merges into the centre lane
- lane merge commences prior to the bus stop
- left lane is reopened prior to the left turn lane into the shopping centre.

This staging diagram for traffic shows the preferred option in more detail. This diagram shows the lanes and how they are expected to merge along the road. The left lane merges into the centre lane with the merge commencing prior to the bus stop location. The left lane is reopened immediately past the worksite so that vehicles can safely travel across into the left turn lane at the intersection. The diagram shows the location of the delivery vehicles stopped in the lane and location of the worksite.

This diagram is then the first part of the final traffic management staging diagram.

Options for pedestrians when deliveries are required, and works are underway

**Figure C 6: Gympie Road – Pedestrian solution**

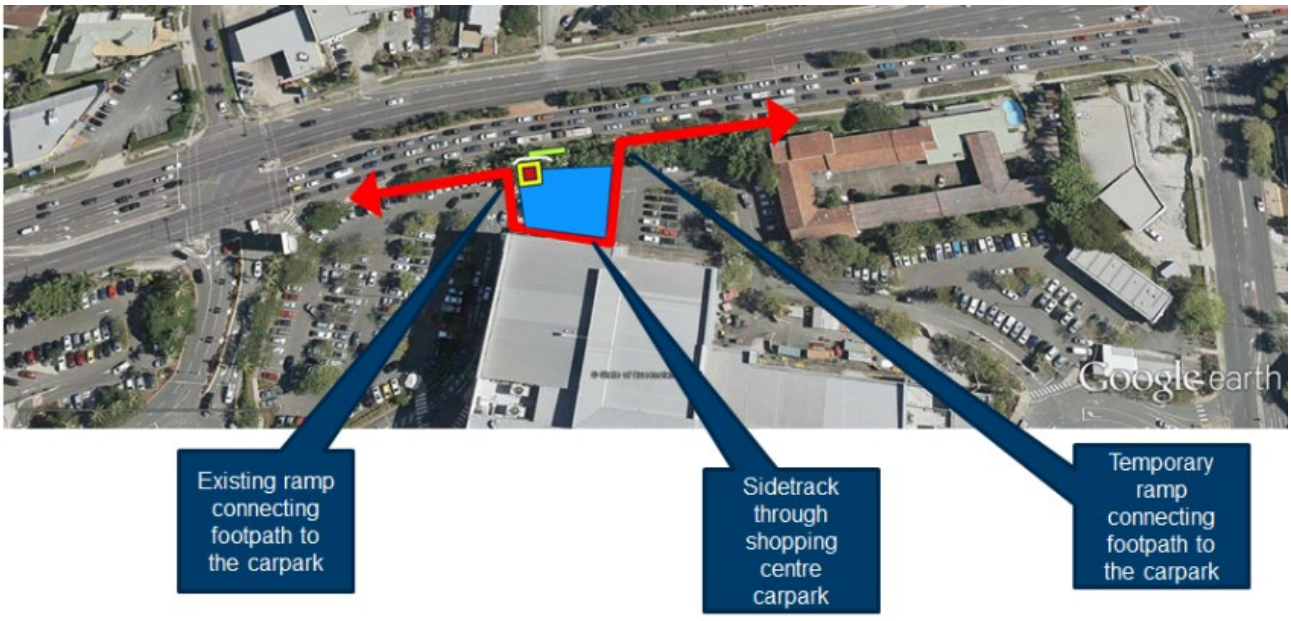


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**Table C 4: Gympie Road – Pedestrian Options**

| Option | | Details | Selected |
|---|---|---|---|
| **Around** | Detour | Detour routes are available around the site via:<br>1. Opposite side of Gympie Road. Detour would commence a long way from the site and may not appear reasonable to pedestrians. It also does not comply with the road infrastructure manager's requirements to provide a pedestrian path on both sides of Gympie Road at all times.<br>2. Along Banfield Road and Chermside Shopping Centre car park. This detour also would commence a long way from the site and may not appear reasonable. Also, this detour may not be used by pedestrians accessing the bus stop or the motel | No |
| | Sidetrack | There is already an existing ramp that connects the footpath to the shopping centre car park on the southern side of the worksite. To construct a side track there would be a need to be a new ramp constructed to the north side of the worksite. While there is some construction work involved, this option is attractive as it would be only a minor detour for pedestrians and appear reasonable. | **This is the most appropriate option and is therefore selected** |
| **Through** | | A temporary full closure of the path is not possible due to the scaffolding and barrier completely blocking the path for long periods of time. | No |
| **Past** | | The only way a footpath could continue past the worksite would be to be either located on the verge or on the road itself. The verge is blocked as well and locating the pedestrians on the road would require a long-term closure of a lane which does not comply with the traffic requirements as determined previously. | No |
| **Short term** | | These works are 6 weeks in duration and hence the short-term clauses do not apply. | Not applicable |

The staging diagram below shows the preferred option, determined in Table C 4 above.

This staging diagram for pedestrians shows the options in more detail. This diagram shows the location of the sidetrack route and the key features of the route including the location of the temporary ramp to be constructed, and the existing ramp to be used.

This diagram is another component of the final traffic management staging diagram.

## C.4 Final Staging Diagram

The final staging diagram below shows all major elements of traffic management for when deliveries are required, and works are underway. Note that this diagram contains elements relating to traffic, pedestrians, cyclists and public transport. Only traffic and pedestrians have been addressed in this case study.

The key features of this diagram in relation to traffic and pedestrians are as follows:

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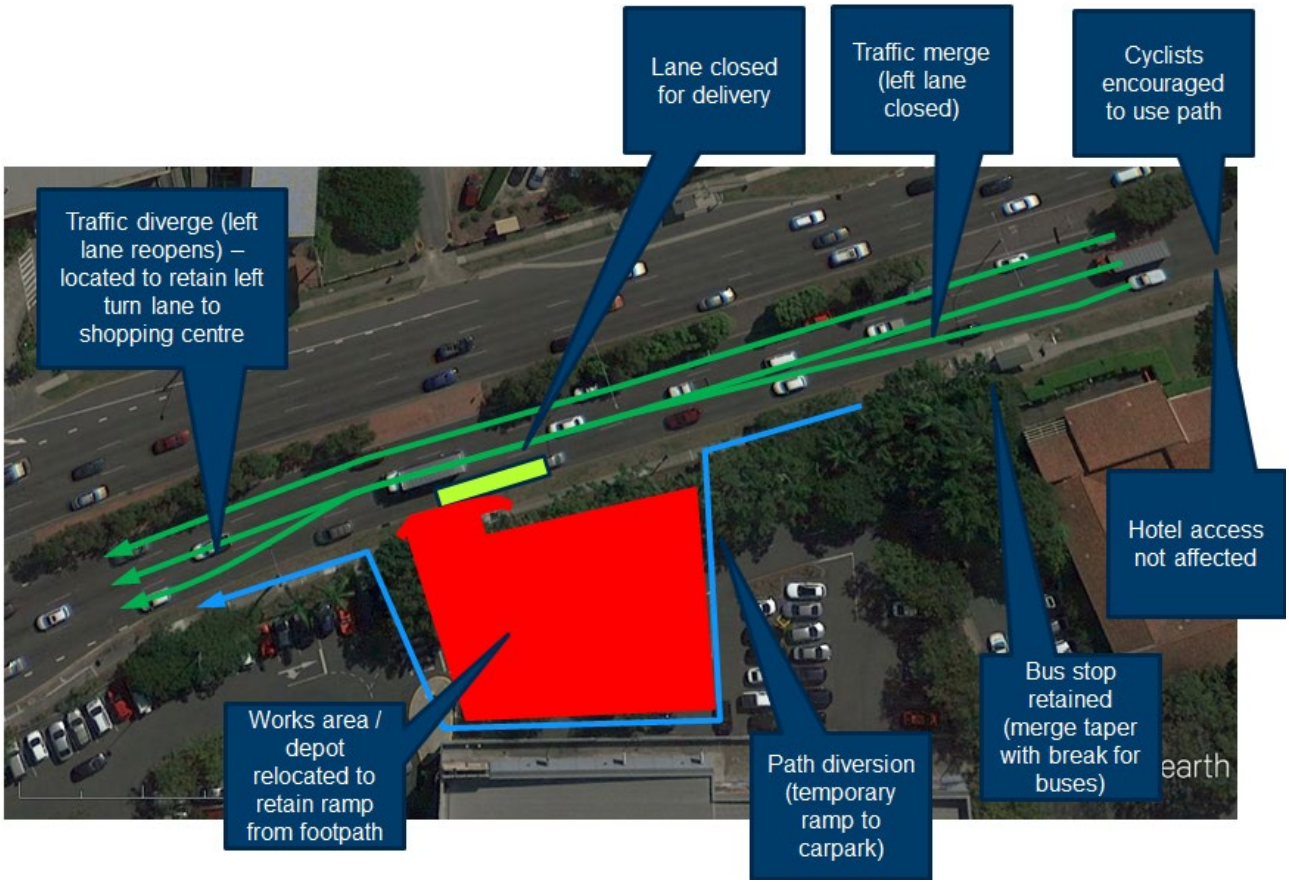
**Figure C 7: Traffic Management Staging Diagram (Stage B1 – Eastern Pier Lane closed for deliveries)**




***Traffic***

- The analysis has shown that the number of southbound lanes can be reduced down to two for much of the day. This then allows deliveries to occur as per the details in the brief. The traffic analysis accompanying the staging diagram should show traffic volumes and number of lanes required in accordance with Table 3.1.
- The number of southbound traffic lanes is required to be reduced from three lanes to two lanes on the approach to the worksite. Referring to the geometric requirements, a buffer of at least 30 metres is required. This buffer may be extended up to 100 metres on multi-lane roads. The merge taper for an approach speed of 60 kilometres per hour is 60 metres. Site information shows that the nearest hotel driveway is located 120 metres to the north of the worksite. It is therefore desirable that the merge taper does not extend across or up to the driveway. A minimum 30-metre-long buffer together with a 60 metre long merge has therefore been used. This then results in the merge extending across the bus bay but being located 30 metres from the driveway. The driveway from the hotel will therefore not be affected by the merge taper.
- The termination of my lane closure will be the minimum 15 metres from the worksite in order to have no effect on the left turn lane into the shopping centre. This then allows traffic after passing the lane closure to merge to the left and to enter the left turn lane as they would usually do.

***Pedestrians***

- Create a side track which passes directly around the back of the work area. This sidetrack can then utilise the existing ramp between the footpath and the Chermside shopping centre. The path would then extend behind the back of the work area and then reconnect to the path with a temporary ramp on the northern side of the worksite. This ramp would need to be constructed in compliance with the *Disability Discrimination Act 2005.*

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Austroads' Guide to Temporary Traffic Management (AGTTM) details contemporary temporary traffic management practice for application in Australia and New Zealand. It provides guidance for the planning, design and implementation of safe, economical and efficient temporary traffic management designs.

**Guide to Temporary Traffic Management Part 2: Traffic Management Planning** has been specifically prepared to assist with the preparation of traffic management plans (TMPs), in accordance with Austroads best practice. It provides general information about the context, components and format of a TMP.

## Guide to Temporary Traffic Management Part 2

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