Policy and Application Guidelines for Traffic Management at Roadworks on State Roads

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Authorisation

As Executive Director Road Network Services I authorise the issue and use of this Policy and Application Guidelines for Traffic Management on Main Roads.

EXECUTIVE DIRECTOR ROAD NETWORK SERVICES

Date: 16/6/2015

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<th>Date</th>
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Executive Director Road Network Services
# Policy and Application Guidelines for Traffic Management at Roadworks on State Roads

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1. POLICY STATEMENT

Main Roads Western Australia will administer traffic management for works on roads and reserves under its governance in accordance with these guidelines in order to ensure efficient traffic flow, in an environment ensuring safety for both road workers and road users alike.

For any roadwork on Main Roads infrastructure, traffic management will be implemented to a consistent standard.

2. DEFINITIONS

**Long term works** are static road construction or maintenance projects that exceed periods listed in table 1.

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Duration of Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freeways and Tonkin, Reid, Roe &amp; Leach Hwys</td>
<td>4 weeks</td>
</tr>
<tr>
<td>Other High Volume Highways &amp; Main Roads</td>
<td>6 weeks</td>
</tr>
</tbody>
</table>

Table 1: Long Term Work Periods

**Short term works** are static road construction or maintenance projects that do not exceed periods in Table 1

**High volume roads** are state roads with traffic volumes exceeding 4 000 vehicles per day per lane.

**Peak Periods** are recurring times of high traffic flow.

**Short periods** are short periods of time within long term works

**Exemptions** mean exemptions to this policy

**Variations** mean variations to AS 1742.3

3. BACKGROUND

3.1 INTRODUCTION

Traffic Management at road works is primarily controlled by Australian Standard 1742.3 *Manual for Uniform Traffic Control Devices – Traffic Control for Works on Roads*. This standard is supplemented in WA by Main Roads’ *Traffic Management for Works on Roads Code of Practice* (Code of Practice). This Code of Practice accommodates unique traffic arrangements and administrative controls particular to works on roads within WA.

As both the Australian Standard and the Code of Practice accommodate works at various levels, roads and complexities, interpretation of these standards can vary when developing Traffic Management Plans (TMP). This interpretation can lead to unnecessary delays to road users on high volume traffic routes.
Main Roads Speed Zoning Guidelines uses the 85th percentile speed as one of the main factors in establishing appropriate speed limits. This is the speed at which 85% of vehicles on that road are measured to be travelling at or below. Where a speed limit is set in accordance to the 85th percentile speed it is well observed by motorists because the operating speed and the speed limit are the same or similar. Speed limits set significantly below the 85th percentile can result in speed limits being disobeyed. It has been demonstrated the 85th percentile is the safest operating speed. With these principles in mind, achieving compliance with a temporary speed limit at a worksite can be attained by selection of appropriate speed limit and traffic management design.

To ensure continued road user compliance with traffic controls within roadworks, greater consistency, validity and scoping of traffic management schemes is required. Main Roads aspiration is to provide world class outcomes for the customer through a safe, reliable and sustainable road-based transport system. This policy will ensure long term roadworks on high capacity roads achieve our aspiration with a focus on customers, movement and safety.

3.2 PURPOSE
This document sets out variations and additional requirements over and above Main Roads’ “Traffic Management For Works On Roads Code Of Practice” and Australian Standard 1742.3 for traffic management at road works within Main Roads road reserves. It is to be followed by Main Roads, its contractors and authorised bodies (Western Power, Alinta Gas, Telstra, Water Corp. etc.) when planning, developing and implementing traffic management plans on state roads. Note, this policy does not replace AS1742.3, the Code of Practice or Specification 202, as these continue to apply.

4. APPLICABLE ROADS
This policy applies to all gazetted freeways, highways and main roads (State and National roads) under the control of Main Roads Western Australia. Maps of State roads can be obtained from Main Roads’ website https://www.mainroads.wa.gov.au/UsingRoads/TouringWAMaps/Pages/TouringWAMaps.aspx >Road Information Mapping System.

5. APPLICATION
Main Roads will apply this policy when works are undertaken within its road reserves to minimise traffic disruption without compromising the safety of road workers and road users. This will be applied by;

- specifying minimum temporary speed limits for work sites,
- applying limitations on closing lanes to traffic,
- specifying a safer angle of approach tapers,
- applying traffic management audit requirements,
- assigning responsibility to those involved in road works,
- requiring internal training requirements, and
- making recommendations for real-time traffic monitoring.

The requirements for minimum speed limits are described in sections 5.2 (Roadwork Speed Limits) and apply only to works conducted during daylight hours or peak periods at night, for the affected section of road.
5.1 GENERAL
Australian Standard 1742.3 applies nationally and provides a set of uniform practices for the signing and delineation of construction and maintenance works. It is intended for use in conjunction with the various state regulations and codes relating to works on roads. In WA the related code is Main Roads “Traffic Management for Works on Roads Code of Practice”. The Code of Practice requires traffic management to be based on AS1742.3 and specifies variations and improvements to AS1742.3.

This policy and application guideline forms part of a suite of documents relating to the control and management of traffic management at road works which include:

- MRWA Specification 202 “Traffic”
- Traffic Management for Works on Roads Code of Practice
- Australian Standard 1742.3-2009
- Austroads Guide To Road Design Part 6 Roadside Design, Safety and Barriers
- Road Traffic Code 2000
- Main Roads Act 1930
- Austroads Guide to Road Safety Part 6 Road Safety Audit (6.1 Audit of Roadwork Traffic Schemes)
- National Guidelines for the use of Truck and Trailer Mounted Attenuators
- Provision for Path Users Guidelines
- Guidelines for temporary speed humps at work sites

5.2 ROADWORK SPEED LIMITS
AS1742.3 specifies that “The temporary speed zone shall apply only while the relevant conditions exist. It shall be removed as soon as practical after the need for its imposition passes”. This typically means that if the speed limit has been implemented for road worker safety, a higher speed limit will be required when road workers are not present.

AS1742.3 provides guidance on the conditions warranting temporary speed limits at road works. Currently a wide range of temporary speed limits can be designed (in accordance with the standards) to undertake any specific roadwork activity. The speed selected may impact on the efficiency of traffic flows and driver compliance at the road work site. The following sets out Main Roads requirements for temporary speed limits.

Long Term Works:
As a component of planning the works, traffic management must be designed with due consideration to traffic efficiency and the amenity of road users and the community. For any long term works on high volume roads, the minimum road work speed zone shall be no greater than 20 km/h below the posted speed limit and must be in accordance with Table 2. Exemptions to this requirement are contained in Section 6.

<table>
<thead>
<tr>
<th>High volume roads</th>
<th>Posted Speed</th>
<th>Roadwork Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 km/h</td>
<td>≥ 80 km/h</td>
<td></td>
</tr>
<tr>
<td>100 km/h</td>
<td>≥ 80 km/h</td>
<td></td>
</tr>
<tr>
<td>90 km/h</td>
<td>≥ 80 km/h(or 70 km/h)</td>
<td></td>
</tr>
<tr>
<td>80 km/h</td>
<td>≥ 60 km/h</td>
<td></td>
</tr>
<tr>
<td>70 km/h</td>
<td>≥ 60 km/h(or 50 km/h)</td>
<td></td>
</tr>
<tr>
<td>60 km/h</td>
<td>≥ 40 km/h</td>
<td></td>
</tr>
<tr>
<td>50 km/h</td>
<td>≥ 40 km/h</td>
<td></td>
</tr>
<tr>
<td>40 km/h</td>
<td>≥ 40 km/h</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Minimum roadwork speed limits

(The available temporary speed limits for road works are 40, 60 and 80 km/h.)

1 Application to vary requirements of AS 1742.3 is required to request 50 km/h or 70 km/h speed limits.
When designing a TMP the allowable traffic speed will be determined by various factors including the distance of separation between workers and moving traffic. Site constraints will often limit the available distance which in turn necessitates the lowering of traffic speed limits. To assist in this regard Main Roads has reduced the minimum lane width and edge clearance requirements of AS1742.3 in this policy (see section 6.6). This can provide a greater separation between workers and moving traffic at constrained sites and allow the safe use of more efficient traffic speed.

NB. Where the speed limit for a project is increased in order to comply this policy, then all elements of the traffic management must be designed for the higher limit. The higher speed limit may for example necessitate a greater separation between workers and traffic or the installation of an appropriate roadworks road safety barrier system.

Short Term Activities at Long Term Works
Within a long term work project, it is accepted there will be short periods where speed limits lower than Table 2 may be required to carry out unavoidable high risk tasks. These circumstances include, but are not limited to, activities such as setting out/ removing barriers, setup/takedown of traffic management or work vehicles exiting the worksite into free flowing traffic. In these circumstances a temporarily reduced limit of 60 km/h or 40 km/h may be warranted where:

- The lower speed limit is only applied while the high risk task activity is taking place (e.g. where unprotected workers are required to be within 3m of traffic), and
- On Freeways and controlled access highways the speed signs are electronic and can be changed remotely.

*It is not necessary to apply to Main Roads for an exemption to this policy in these circumstances provided that efforts are made to ensure these temporary reductions are kept to a minimum and/or conducted outside of peak periods wherever possible.* (see section 6.3)

Speed Consistency
For work zones set up over an extended distance and across various speed zones, the temporary speed limit should remain as consistent as possible.

5.3 CLOSING LANE S TO TRAFFIC ON HIGH VOLUME ROADS
At all worksites on high volume roads, where a lane can be kept open and meet the requirements of AS1742.3 and the Code of Practice then the lane should be kept open. This may necessitate the use of suitable roadworks road safety barriers to enable the roadwork speed limits in section 5.2 to be implemented.

AS 1742.3 section 4.13.2 requires multilane roads to have the normal number of lanes in the direction of major flow to be available during peak periods. It also indicates the number of lanes to be kept open to traffic with respect to traffic volume (vehicles per hour). This policy sets lane requirements above the standard in order to minimise traffic disruption.

On multilane roads, lane/s adjacent to works being undertaken should be kept open whenever sufficient lane width, edge clearance and worksite offset is available. Similarly on rural single lane roads, where works are being carried out on the roadside only, the lane should be kept open whenever sufficient lane width, edge clearance and worksite offset is available. In these circumstances (where a lane can be kept open but it is desired to close it) a proposed lane closure will require an application for exemption to this policy. See section 6.2 for the application procedure.

To assist in keeping a lane open in situations where road width constraints exist, a variation to lane width and edge clearance requirements of AS 1742.3, has been made in section 6.12 of the Code of Practice (see section 6.6 of this document).
Where it is still not possible to keep a lane open due to site conditions limiting available lane width or edge clearance, it may be possible to further reduce these dimensions where the risks can be managed. The application procedure is contained in section 6.6.

5.4 APPROACH TAPERS
Roadworks that incorporate a lateral shift or merge taper have the potential for upstream phantom congestion due to cautionary braking at the lateral shift. For this reason, the taper lengths specified in Table 4.6 of AS 1742.3 are to be increased at long term works on high volume roads with a roadwork speed limit $\geq 80$ km/h. Lateral shift tapers should not be less than 1:40 and merge tapers no less than 1:50. For example a lane requiring a 3.2m lateral shift will require a taper length of at least 128m and 3.2m wide merged lanes will require a merge taper of at least 160m. Exemptions to this requirement are contained in Section 6.4.

6. VARIATIONS and EXEMPTIONS

Variations to AS 1742.3 (as provided in the Code of Practice) may be required to enable restricted sites to meet the requirements of this policy. Link to application form: https://www.mainroads.wa.gov.au/OurRoads/TrafficManagement/Pages/FormsPublications.aspx

Exemptions to this policy may be granted in circumstances where cost, time and site specific limitations prove prohibitive. See application guide in Appendix 1.

6.1 EXEMPTIONS TO MINIMUM ROADWORK SPEED LIMITS FOR LONG TERM WORKS
Where it is not possible to set roadwork speed limits in accordance with Table 2 at long term works then an application for exemption to section 5.2 (Roadwork Speed Limits) of this policy is required. Applications for exemption will require a formal assessment undertaken by a Roadworks Traffic Manager (RTM) to demonstrate why a higher speed limit cannot be achieved. The application will need to contain information as detailed in Appendix 1.

Applications for exemptions on high volume roads are sent to the Main Roads Traffic Manager and to the Project Director for endorsement, and approval by the Executive Director Road Network Services (EDRNS).

Alternatively, application can be made for a speed lower than that of Table 2 that will only be applied during periods of low traffic volume as described in section 6.3.

6.2 EXEMPTIONS FOR KEEPING LANES OPEN TO TRAFFIC
Where it is possible to keep a lane open to traffic in accordance with section 5.3, but it is desirable to close a lane/s, then an application for exemption to section 5.3 (Closing Lanes to Traffic on High Volume Roads) of this policy is required. The application will need to contain information as detailed in Appendix 1. Applications for exemption on long term works will require a formal assessment undertaken by a Roadworks Traffic Manager (RTM) to demonstrate why the lane should not be kept open to traffic.

Applications for exemptions are sent to the Main Roads Traffic Manager.

Alternatively, application can be made to close the lane/s only during periods of low traffic volume as described in section 6.3.
6.3 EXEMPTIONS DURING PERIODS OF LOW TRAFFIC VOLUME

Applications for exemption to the minimum speed limit (sections 6.1) or requirement to keep lane/s open (section 6.2) can be assessed on merit or traffic demand. Approval may be granted where it can be shown a reduced speed limit and/or lane closure will not cause traffic congestion. Lane closures and/or speed limits lower than that stated in Table 2 may be permissible during times when traffic volumes are sufficiently low. (It is during these periods that the high risk activities described in Short Term Activities at Long Term Works, section 5.2, would be safest and ideally undertaken).

A methodology has been developed for this assessment process. It entails using recorded hourly traffic counts for the road in question to determine the congestion impact of using various speed and/or lane closure scenarios. Detail of the methodology is contained in Appendix 4 along with an accompanying spreadsheet.

Applications for exemption (Appendix 1) are sent to the Main Roads Traffic Manager or Regional Manager. Applications which contain a favourable traffic assessment have improved potential for approval and can be assessed in a shorter period.

6.4 EXEMPTIONS TO APPROACH TAPERS

Where specific sites cannot provide sufficient space to meet the taper length requirement of section 5.4 then an exemption to this policy is required, see Appendix 1. Application can be made to the Main Roads Traffic Manager for assessment and approval.

6.5 VARIATION TO LANE CAPACITY REQUIREMENTS

AS 1742.3 requires a minimum of one lane for every 1000 VPH (vehicles per hour) traffic volume at mid-block and 500 VPH at intersections, irrespective of the temporary speed imposed. The standard provides this guidance for works up to 7 days duration. This lane capacity applies to the worst case scenario of traffic speed at 40 km/h. In recognition that a lane can carry a greater volume of traffic at a higher speed, this policy provides a variation to accommodate speeds of 60 km/h and 80 km/h. In this regard Table 3 applies as a variation to Table 4.10 of AS 1742.3 for short term works.

NOTE these volumes need to be reduced in accordance with AS 1742.3 where pavement surface, horizontal geometry or heavy vehicle access issues occur.

### Freeways and Controlled Access Highways

<table>
<thead>
<tr>
<th>Between ramps</th>
<th>Within 200m of ramps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum vehicles per hour per lane (one direction)</td>
<td>Maximum vehicles per hour per lane (one direction)</td>
</tr>
<tr>
<td>40 km/h</td>
<td>60 km/h</td>
</tr>
<tr>
<td>1200</td>
<td>1400</td>
</tr>
</tbody>
</table>

### Main Roads and Highways

<table>
<thead>
<tr>
<th>Mid-Block</th>
<th>Within 200m of an intersection&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum vehicles per hour per lane (one direction)</td>
<td>Maximum vehicles per hour per lane (one direction)</td>
</tr>
<tr>
<td>40 km/h</td>
<td>60 km/h</td>
</tr>
<tr>
<td>1000</td>
<td>1200</td>
</tr>
</tbody>
</table>

<sup>2</sup> Does not apply where:
- The intersection (or major driveway) is unsignalised and vehicles turning from the State road are provided with a dedicated storage pocket of sufficient length.
- Right turn access (as applicable) from the State road into an intersecting road is not permitted due to physical obstructions or permanently signed turn prohibitions being in place.
- The intersecting road is a minor road, deemed an Access Road as defined in the MRWA road hierarchy.

In these cases the traffic volumes applying to Mid-Block locations can be used.
Table 3 can be used for short term works and as a guide to long term works. Where these maximum volumes are present at long term work sites there will be a need to precisely calculate capacity to ensure that traffic demand can be met. Site specific calculations are needed to show the relationship between traffic density and the ability of motorists to maintain speed. Site specific variables need to be considered in the calculations such as lane width, alignment, surface condition and heavy vehicle mix etc. In part, this assessment is necessary to ensure traffic speed through the site is not constrained through the sheer traffic volume or heavy vehicle composition.

6.6 VARIATION TO LANE WIDTH AND EDGE CLEARANCE

Lane Width Variation

AS 1742.3 (section 4.13.3) requires lane widths of 3.0 m for speeds up to 60 km/h and 3.5 m for higher speeds. The Code of Practice provides a variance for a lane width of 3.2 m for speeds up to 80 km/h.

Edge Clearance Variation

The Code of Practice provides a variance to section 4.13.4 of AS1742.3 for clearance between the edge of traffic lane and delineating devices or road safety barrier systems:

(a) Edge of traffic lane to line of traffic cones, bollards or longitudinal channelizing barricades—
   (i) traffic speed up to 60 km/h—0.3 m; and
   (ii) traffic speed above 60 km/h—0.5 m.

(b) Edge of traffic lane to roadworks delineators or temporary hazard markers—
   (i) traffic speed up to 80 km/h—0.5 m; and
   (ii) traffic speed above 80 km/h—1.0m.

(c) Edge of traffic lane to road safety barrier system—
   (i) traffic speed 40 km/h or less—0.2 m;
   (ii) traffic speed 41 to 60 km/h—0.3 m;
   (iii) traffic speed 61 to 80 km/h—0.5 m; and
   (iv) traffic speed greater than 80 km/h—1.0 m.

Refer to Section 6.12 of the Code of Practice for further details.

Application for Additional Variation to Lane Width and Edge Clearance

Applications to further reduce lane width or edge clearance can be made according to section 5.6 of the Code of Practice and submitted to the Main Roads Traffic Manager.

Link to application form:

7. SUITABILITY & COMPLIANCE AUDIT REQUIREMENTS

All contracts other than routine or specific maintenance on long term works projects will require a suitability audit of the traffic management plan/s to be carried out prior to approval. Compliance Audits will need to be undertaken within 3 days of any traffic management scheme being established and shall reoccur at intervals no longer than 3 months. These audits must assess compliance with this policy, AS1742.3 and Main Roads’ Code of Practice.

For Metropolitan projects the Main Roads Traffic Manager or a nominated representative must be a member on the suitability and compliance audit teams. For regional projects the regional Network Operations Manager OR suitably experienced, AWTM qualified and independent regional officer must be a member on the audit team.

Any Contractor Performance Report (CPR) conducted on long term works projects must include an assessment of the traffic management performance and traffic flow/congestion associated with the works.

Further detail as to what each audit type entails can be found in Appendix 2.
8.   REALTIME TRAFFIC MONITORING

As part of the suitability audit, consideration should be applied to determine whether the project is suitable or would benefit from real time traffic monitoring. The intent of which is to provide a measuring tool to determine traffic demand, traffic management performance and compliance with speed limits.

The increasing availability of various technologies for real-time traffic monitoring provides new opportunities to monitor and respond to traffic congestion build up on road works sites as well as to provide traffic condition and travel time information to road users in near real time.

There are third party providers of travel time and speed data in both historical and real time. Although the accuracy and timeliness of such data can be variable, there is data of reasonable quality provided by some commercial providers particularly for urban roads with high traffic volumes, which may be adequate for purposes such as identifying build-up of congestion.

It is recommended that, where build-up of congestion particularly during peak periods is likely to be an issue, real time monitoring of traffic should be utilised if it helps to deploy an appropriate response. Besides, such continual data can be extremely useful for performance monitoring and reporting.

9.   REVIEW TYPES AND TRAINING REQUIREMENTS

There are a number of different review types that are required to ensure traffic management schemes are appropriately designed and implemented. The type of review is dependent on the stage of works, project complexity and duration. Review Types and responsibilities for undertaking internal inspections and checks are to be as per Appendix 2.

Internal Training requirements for regional Main Roads and Integrated Service Agreement (ISA) personnel are detailed in Main Roads Operational Guideline 102: http://trimwebdrawer/webdrawer/webdrawer.dll/webdrawer/rec/5266010/view. For head office and contract staff, refer to the Governance Structure document. (under development)

See Appendix 3 for the association between work and training requirements.

10.   TMP APPROVALS

Section 16.1 of the Delegation of Authority must be referred to when selecting the appropriate people to recommend and approve the implementation of the Traffic Management Plan on main roads.

It should be noted that a suitably endorsed Traffic Management Plan is a TMP that has been authored by a qualified person (for most TMP’s this is an AWTM) and endorsed by an RTM (where required), in accordance with Main Roads’ Code of Practice.
APPENDIX 1
SUBMISSION FOR EXEMPTION

The conventional risk assessment methodology synonymous with roadwork traffic management, while ideal for ensuring all associated risks are identified and treated, does not lend itself to supporting an application for an exemption to this policy. In preference, a written submission is more appropriate. A submission should contain detail on subjects 1-6 below. Exemption under section 6.3 (Exemptions during periods of low traffic volume) or 6.4 (Exemptions to Approach Taper) will usually require minimal detail, while submissions under section 6.1 (Exemptions to Minimum Roadwork Speed Limits for Long Term Works) or section 6.2 (Exemptions for Keeping Lanes Open to Traffic) on high volume roads will need to be more detailed.

Content of applications for exemption
An application to exempt a requirement of this policy will require a submission containing the following:

1. **Work Description** – provide a broad description of the worksite and the work activities being undertaken.

2. **Traffic Information** – provide a description of the general level-of-service conditions and operating environment, including posted and actual operating speeds, hourly traffic volumes, etc. for the particular section of road, prevailing prior to the commencement of any work activities.

3. **Exemption Details** – provide details of specific exemption/s sought including reference to the specific relevant section of the policy and guidelines.

4. **Reason for Exemption** – describe the physical and/or operational constraints at the worksite necessitating the exemption.

5. **Exemption Implications** – provide details of the implications of the exemption/s, if not granted, in terms of the following:
   a. Time – what will be the impact on time it takes to undertake the work activities?
   b. Cost – what additional project costs are likely to be incurred?
   c. Level-of-Service and traffic flow – what is the expected impact on level-of-service, traffic flow conditions, delays, etc. on approach and through the worksite? Note: This can be assessed by completing the excel spreadsheet in Appendix 4.
   d. Road User Safety – are there any anticipated impacts on the safety of road users?
   e. Worker Safety – are there any anticipated impacts on the safety of workers?

6. **Other Information** – provide any other information to support the application including a description of any particular measures that are proposed to be put into place to reduce the impacts of the exemption being granted.

Assessment panel
The assessment of an application for exemption to any requirement of this policy can be determined by an assessment panel where the Main Roads Traffic Manager or Regional Manager can approve exemptions.

Alternatively the Main Roads Traffic Manager or Regional Services Coordinator may call for an assessment panel to be established where additional advice is required.

The panel may consist of members with appropriate expertise from:
- **Traffic Services**
- **Project Manager / Director**
- **Road Safety**
- **Road Network Operations**
- **Road Reserve Access Manager**
APPENDIX 2

TMP REVIEW TYPES

This section defines and summarises the processes involved and TMP review types. i.e. suitability check, on-site inspection, operational check, suitability audit, and compliance audit.

The checklists for each review type can be found on: https://www.mainroads.wa.gov.au/OurRoads/TrafficManagement/Pages/PlanPrep.aspx

>Reviewing and Auditing Traffic Management.

**SUITABILITY “CHECK” (INTERNAL)**

*Definition:* A check of the traffic management plan to ensure it addresses the specified requirements of the works, all types of traffic and the road environment. This review includes a check of compliance with standards (particularly regulatory signs), accreditation of the author and the identification and mitigation of all site specific and operational risks.

*This check ensures the TMP is appropriate prior to being implemented.*

**ONSITE “INSPECTION” (INTERNAL)**

*Definition:* An inspection of the traffic management once it has been implemented onsite. This review entails checking the signs, devices, method statements, and workers accreditation have been correctly applied onsite.

*This check ensures the TMP has been correctly implemented as per the approved TMP / TCD’s.*

**OPERATIONAL “CHECK” (INTERNAL)**

*Definition:* An onsite drive through and assessment of the operation of the traffic management scheme, ensuring it is operating as intended at all times of the day.

This review focuses on road efficiency / delays, road user compliance / provisions and any incorrect visual cues. This check should be done regularly by the project team to ensure the TMP is operating safely and efficiently as intended. This is particularly important when the traffic management scheme changes (e.g. different stages and/or after care).

Aspects such as glare from lighting towers, improvements to traffic controller phases, worksite length, hours that particular works are taking place, additional delineation to increase speed limit compliance and travel path, must be considered.

*This check ensures the TMP is operating safely and efficiently as intended.*

**AUDIT’s**

*Definition:* A traffic management plan road safety audit is a formal examination of a proposed Traffic Management Plan or an existing Traffic Management Plan, in which an independent, qualified team reports on the project’s crash potential and safety performance. (Source Austroad’s, Road Safety Audit)

**SUITABILITY ‘AUDIT’ (pre implementation)**

A systematic and independent examination of the extent to which the proposed Traffic Management Plan addresses specified requirements and provides a measure of the Auditee’s capability in meeting those requirements.

**COMPLIANCE ‘AUDIT’ (post implementation)**

A systematic and independent examination of the extent to which an Auditee fulfils their traffic management requirements (including the Traffic Management Plan) and provides a measure of the Auditee’s performance in meeting specified requirements.
APPENDIX 3  TMP REVIEW PROCESS AND TRAINING REQUIREMENTS

Note: The above is a proposed framework and will vary depending on the type of works, scale of project and personnel / positions within the project.
APPENDIX 4  METHODOLOGY FOR DETERMINING CONGESTION

As indicated in Section 6.3, an exception may be granted during periods when the following formula applies:

\[ \text{Proposed}_{\text{SL}} \geq \frac{\text{Anticipated}_{\text{VHL}} \times \text{Existing}_{\text{SL}}}{\text{Max}_{\text{VHL}}} \]

Where:
- \( \text{Proposed}_{\text{SL}} \) is the Proposed Speed Limit (in km/h)
- \( \text{Anticipated}_{\text{VHL}} \) is the Anticipated Vehicle flow per Hour per Lane
- \( \text{Existing}_{\text{SL}} \) is the Existing Speed Limit
- \( \text{Max}_{\text{VHL}} \) is the Maximum recorded Vehicle flow per Hour per Lane

The purpose of the formula is to allow designers of traffic management plans to assess whether there are times of the day / week when they can either post a lower speed limit and/or close lanes to undertake higher risk activities.

The application of the above formula can be illustrated by the following example:

Supposing there is an existing road which has 3 lanes and a speed limit of 110 km/h. Traffic data from the site reveals that the maximum vehicle flow observed is 4500 vehicles per hour across the carriageway in the direction of the proposed works. Following the guidelines provided in this document, the desirable option is to keep all lanes open and maintain a speed limit greater than or equal to 80km/h. However, the designer of the Traffic Management Plan would like to know whether an application for a reduced speed limit of 60km/h will be looked on favourably during the early hours when the anticipated vehicle flow (across the carriageway) is 300 vehicles per hour.

As the road has three lanes the maximum vehicle flow per lane is 1500 (4500 divided by the number of lanes). Similarly, during the early hours, the vehicle flow per lane is 100 vehicles (300 divided by the number of lanes).

Therefore, \( \text{Proposed}_{\text{SL}} \geq \frac{\text{Anticipated}_{\text{VHL}} \times \text{Existing}_{\text{SL}}}{\text{Max}_{\text{VHL}}} \)

\[ 60 \geq \frac{100 \times 110}{1500} \]

\[ 60 \geq 7.3 \]

The value ‘7.3’ is less than the proposed speed limit of 60km/h, indicating this scenario would not cause congestion. Therefore the application would be looked upon favourably. Using the formula it can be calculated that a 60km/h speed limit would be looked on favourably up to an hourly vehicle flow of 818 vehicles per hour per lane or 2454 vehicles per hour across the carriageway.

The designer may then consider whether a lane could be closed. In this case, the anticipated vehicle flow per lane is 150 vehicles (as only 2 lanes will be open).

Therefore, \( \text{Anticipated}_{\text{VHL}} \times \text{Existing}_{\text{SL}} / \text{Max}_{\text{VHL}} = 150 \times 110 / 1500 = 11 \). This is less than 80, but also less than 60. This means that the designer can apply for an 80km/h or 60km/h speed limit, with one lane closed, during these times.

In order to simplify the application of the above an Excel workbook has been prepared. This workbook contains two worksheets; one for a typical weekday and the other for a typical weekend day. The spreadsheet is available on Main Roads Website www.mainroads.wa.gov.au > Building Roads > Standards and Technical > Road and Traffic Engineering > Traffic Management > Congestion Management at Roadworks > Congestion Calculator.

There are three inputs required in the worksheets:

- The existing number of lanes
- The existing speed limit
- The hourly vehicle flow at the site (for a typical weekday or typical weekend day as appropriate) This is for all lanes combined (i.e. the carriageway flow)
The hourly vehicle flow should be that recorded at the site and amalgamated over a number of days so that uncharacteristic daily variations are smoothed.

Note: The Maximum recorded Vehicle flow per Hour per Lane is derived from the traffic data, however it has a minimum value of 1400 built in.

This methodology determines whether reducing the speed limit and/or closing lanes has the effect of exceeding the maximum carrying capacity of the road in question.

The worksheet uses the data to indicate to the designer whether or not an application for a lower speed limit will be looked at favourably and whether a lane closure can be considered.

Speed reduction and lane closure applications which show that adverse traffic congestion would not occur may not necessarily result in approval. Other factors must be considered. Social, environmental and economic considerations such as travel time and whole of network impacts need to be weighed up in final determination.

Traffic Management on Main Roads - Speed

It was not possible to embed the spreadsheet into this document. The executable XL spreadsheet is available in the associated document “Congestion Calculator” on the same web page.
MRWA Code of Practice applies to roadworks on all roads and also requires compliance with AS 1742.3.

Establishes requirements over and above the CoP on Main Road’s roads and is applicable to Main Roads’ employees, its contractors and authorised bodies.

Works of duration less than 4 weeks on freeways and COA highways and 6 weeks for other roads.

A variation to AS1742.3 allows a higher traffic volume where speed limit is increased. This can have the effect of an incentive to design TM to safely allow a higher roadwork speed limit in preference to conducting works during low traffic volume (usually at night).

Requires lanes on high volume roads (4,000 VPD per lane) to be kept open wherever possible. Not mandatory on low capacity roads.

This spreadsheet assists project managers and designers of TMP’s in planning lane closures and extraneously reduced speed limits. The formula assesses recorded traffic flow per hour against speed and number of lanes available. This methodology is not based on travel time but focuses on the road’s (during roadworks) ability to cope with traffic.

To ensure consistency, applications for exemptions are sent to centralised points for assessment. Difficult or complex applications can be heard by an assessment panel if need be.

MRWA CoP

Is it on a Main Road?

NO

YES

MRWA TM Policy (this document) + MRWA CoP

Short term works

Size of project

Incentive for higher speed limit. Traffic volume/Lane

Requirement to keep lanes open where AS and CoP can be met.

Non compliant

Traffic capacity calculator

Speed : Lanes

Application for exemption

Rollout

Accepted

assessment

Accepted

rejected

rejected

Rethink and redesign for more efficient traffic flow

Long term works

Minimum speed limit table

Requirement to keep lanes open

meets

Non compliant

Longer approach taper

Auditing

Reviews and responsibilities

Internal training requirements

Real time traffic management

Rollout

Lateral shift or merge tapers at speeds >=80km/h are increased from requirement of AS1742.3 to 1:40 for lateral shift and 1:50 for merge tapers.

All long term works projects require a suitability audit prior to approval. Then compliance audit once commenced and repeated every 3 months. CPR’s conducted must include contractor’s traffic management performance.

The various review types and responsibilities are specified to ensure traffic management schemes are appropriately designed and implemented.

Internal training requirements for MRWA and ISA personnel are detailed in Operational Guideline 102 (under review).

The suitability audit should determine whether the project is suitable or would benefit from real-time traffic monitoring.