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# Smart Freeways

## Supplement to Victoria's Managed Freeways Handbook for Lane Use Management and Variable Speed Limits

D20#550483 and D21#259012 (PDF Version)
June 2025

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These guidelines are produced for the purpose of works to be carried out by Main Roads Western Australia or under contract with Main Roads. Although the guidelines are believed to be correct at the time of publication, Main Roads Western Australia does not accept the responsibility for any consequences arising from the use of the information in the guidelines by others. The users of these guidelines should rely on their own skill and judgment when applying the content of the guidelines.

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Keywords: Smart freeways, managed motorways, intelligent transport systems, ramp signals, ramp metering, lane use management system, variable speed limits, design guidelines

# Document control

| | |
|---|---|
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| **Document number** | D20#550483 and D21#259012 (PDF Version) |
| **Issue date** | June 2025 |
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# Revision

| Issue date | Description | Section / page no. |
|---|---|---|
| **July 2020** | Smart Freeways: Supplement to Victoria's Managed Freeways Handbook for Lane Use Management and Variable Speed Limits.<br>Initial release | All |
| **March 2021** | Title changed for VMS guidelines | Foreword |
| **August 2023** | Updated note on sign MR-RS-24 in Chapter 2, Table 2: Static signs associated with Main Roads LUMS designs | Chapter 2, Pg 6 |
| **June 2025** | Smart Freeways: Supplement to Victoria's Managed Freeways Handbook for Lane Use Management and Variable Speed Limits.<br>Updated version release | All |

# Preface

## Smart freeways policy and guidelines

Main Roads Western Australia (Main Roads) has established a Smart Freeways policy and series of guidelines to guide overall planning, project development, delivery and ongoing operation of Smart Freeways in Western Australia.

The Smart Freeways documents were originally developed as part of the Managed Freeways Policy Framework in 2012. At that time Main Roads used the term 'Managed Freeways', which has now changed to 'Smart Freeways' with the implementation of the first Smart Freeways project on Kwinana Freeway northbound in 2019-2020. Major revisions to the Smart Freeways documents were undertaken in 2020 and new versions of the Smart Freeways guidelines were issued in March 2021. After subsequent years of Smart Freeways projects and operations in Western Australia, further revisions to these guidelines were undertaken in 2024. These new versions of the guidelines were then issued in 2025.

While historically, the consideration of ITS on freeways was typically on a case-by-case basis, the current Main Roads approach as outlined in the Smart Freeways policy is that all freeways shall be considered for ITS provision at either Freeway Type F (Foundation) or Smart Freeway Type C, B or A standard according to the *Smart Freeways Provision Guidelines*.

The Main Roads Smart Freeways policy and guidelines providing direction and guidance include the documents listed in the table below. This document, *Smart Freeways Supplement to Victoria's Managed Freeways Handbook for Lane Use Management and Variable Speed Limits* is shown highlighted.

| Document | Description |
|---|---|
| Smart Freeways Policy | One-page high-level policy statement setting out Smart Freeways objectives and principles. |
| Smart Freeways Policy Framework Outline | Smart Freeways context, principles, corporate governance, processes and intended outcomes to achieve policy objectives. |
| Smart Freeways Provision Guidelines | Guidelines and warrants for application of Smart Freeways traffic management treatments and ITS devices. |
| Smart Freeways Operational Efficiency Audit Guidelines | Guidelines for formal examination of traffic analysis and design of all freeway projects. |
| Guidelines for Variable Message Signs | Guidelines for the design and use of variable message signs for traveller information for safe and efficient travel for road users. |
| Supplement to Victoria's Managed Motorway Design Guide, Volume 2: Design Practice, Parts 2 and 3 | Main Roads supplement relating to:<br>• network optimisation tools (benefits and operation of coordinated ramp signals)<br>• planning and design for mainline, entry ramps (including ramp signals), exit ramps and interchanges. |
| Supplement to Victoria's Managed Freeways Handbook for Lane Use Management and Variable Speed Limits | Main Roads supplement relating to:<br>• lane use management system (LUMS).<br>• variable speed limits (VSL). |

# Abbreviations

| | |
|---|---|
| ALR | All lane running |
| AID | Automated incident detection |
| CCTV | Closed circuit television |
| CMS | Changeable message sign |
| DMS | Dynamic message sign |
| ESL | Emergency stopping lane |
| ITS | Intelligent transport systems |
| LUMS | Lane use management system |
| LUMS sign | Integrated lane use and VSL sign used in the lane use management system |
| MMDG | Managed motorway design guide |
| RP | Repeater point (for wireless detectors) |
| STREAMS | ITS control system currently in use by Main Roads (refer Section 9.4) |
| TCS | Traffic control signal |
| VKT | Vehicle kilometres travelled |
| VMS | Variable message sign or signs. This generic term may include dynamic message signs (DMS) and changeable message signs (CMS). |
| VSL | Variable speed limits |
| WA | Western Australia |

# Main roads guidance summary

These comparison tables are provided for information only. The user of this supplement should ensure they make appropriate reference to the correct reference material.

**Legend**

✓ no additional Main Roads Smart Freeways guidance
+ additional Main Roads Smart Freeways guidance
× Main Roads supplement overrides this section in the Victoria's Guides

| Section # | **VicRoads**<br>**Managed freeways handbook for: lane use management, variable speed limits and traveller information**<br>Section headings | **Main Roads guidance** |
|---|---|---|
| 1.1 | Safe, reliable and efficient freeway operation | × |
| 1.2 | Managing traffic flow impacts | ✓ |
| 1.3 | Managing incidents | ✓ |
| 1.4 | Traffic flow impacts | ✓ |
| 1.5 | Effective incident management | + |
| 1.6 | Managing congestion | + |
| 1.7 | An integrated managed freeway system | × |
| 1.8 | Legal requirements for installation of devices | × |
| 1.9 | Maintenance regime and reliability of tools | ✓ |
| 2.1 | Lane use management | + |
| 2.2 | Integrated lane use and speed management | ✓ |
| 2.3 | Lane use signs | × |
| 2.3.1 | Lane use sign display components | ✓ |
| 2.3.2 | Sign size | × |
| 2.4 | Lane control signals in tunnels with limited headroom | ✓ |
| 2.4.1 | Displays | ✓ |
| 2.4.2. | Signal size | ✓ |
| 2.5 | Standards and design principles | × |
| 2.5.1 | Design sequence | × |
| 2.5.2 | Location and spacing of gantries near interchanges | × |
| 2.5.3 | Longitudinal gantry spacing between interchanges | × |

| Section # | **VicRoads Managed freeways handbook for: lane use management, variable speed limits and traveller information** Section headings | **Main Roads guidance** |
|---|---|---|
| 2.5.4 | Longitudinal position of lane control signals in tunnels | ✗ |
| 2.6 | Operational principles | ✓ |
| 2.6.1 | Fundamental rules preventing conflicting symbols | ✓ |
| 2.6.2 | Policy rules for managing traffic | ✓ |
| 2.7 | LUMS integration with other freeway devices | ✗ |
| 2.7.1 | Variable message signs | + |
| 2.7.2. | Real time information signs | ✓ |
| 2.8 | Operational integration with ramp signals | ✓ |
| 2.8.1 | Ramp signals response to a lane closure | ✓ |
| 2.8.2 | Ramp signals response to changing speed limits | ✓ |
| 2.8.3 | Ramp signals response to a freeway closure | ✓ |
| 2.8.4 | Emergency vehicle access when ramp signals are operating | ✓ |
| 2.9 | Incident management with CCTV cameras | + |
| 2.10 | Trafficking of emergency stopping lanes | ✗ |
| 2.10.1 | Part-time treatment | ✗ |
| 2.10.2 | Permanent treatment | ✗ |
| 2.10.3 | Issues to consider | ✗ |
| 2.10.4 | Emergency stopping bays | ✗ |
| 3.1 | General principles | + |
| 3.2 | VicRoads speed zoning guidelines | ✗ |
| 3.3 | Benefits of VSL | ✓ |
| 3.3.1 | Safety benefits | ✓ |
| 3.3.2 | Environmental benefits | ✓ |
| 3.3.3 | Capacity and traffic flow benefits | ✓ |
| 3.3.4 | Conclusions and summary of VSL benefits | ✓ |
| 3.4 | Overview of devices and standards | ✗ |
| 3.4.1 | Sign size | ✗ |
| 3.5 | Design and installation principles | ☒ |
| 3.5.1 | Longitudinal spacing | ✓ |

| Section # | **VicRoads**<br>**Managed freeways handbook for: lane use management, variable speed limits and traveller information**<br>Section headings | **Main Roads guidance** |
|---|---|---|
| 3.5.2 | Lateral position of signs | ✓ |
| 3.6 | Overview of VSL operation | ✓ |
| 3.6.1 | Speed limit operation during incident situations | ✓ |
| 3.6.2 | Sign failure | ☒ |
| 3.6.3 | Speed limit operation during congestion | ✓ |
| 3.6.4 | Speed limit operation during free-flow conditions | ✓ |
| 3.7 | Speed management for environmental reasons | ✗ |
| 3.7.1 | West gate bridge high winds response | ✗ |
| 3.8 | VSL integration with ramp signals | ✓ |
| 4 | Traveller information | ✗ |
| Appendix A | LUMS traffic management policy rules | ✓ |
| Appendix B | VMS pictogram and sign library | ✗ |
| Appendix C | M1 and M80 travel time destinations | ✗ |
| Appendix D | Real time information sign fonts | ✗ |
| Appendix E | References | ✗ |

# Overview

## Smart Freeways concept

Smart Freeways make the best use of the existing freeway network, particularly during times of high demand and traffic incidents. We use an ITS and operational strategies that enable dynamic network management and operation in real-time. Smart Freeways traffic management initiatives, complemented by appropriate mainline and ramp geometric improvements, work together as an integrated system to achieve and maintain optimal freeway traffic conditions, with minimal delays and congestion.

Over recent years, Victoria's approach to managed motorways in Melbourne has achieved unparalleled, sustainable benefits to freeway operations for safety, productivity, efficiency and reliability. We have applied the same holistic principles and learnings, while also working towards national consistency.

## Supplements to Victoria's managed motorways design guides

Main Roads has been authorised by the Department of Transport Victoria to use parts of the VicRoads *Managed Freeways Handbook for: Lane Use Management, Variable Speed Limits, and Traveller Information* (VicRoads, July 2013) as a primary reference for Smart Freeway understanding and design relating to lane use, incident management and variable speed limits for managing incidents and other events such as roadworks and periods of congestion.

Accordingly, this supplement has been developed to be read in conjunction with Victoria's handbook, which can be downloaded from the Main Roads website here. If unable to download Victoria's handbook, you can email Main Roads Senior Traffic Engineer, Raj Shah at raj.shah@mainroads.wa.gov.au to request a copy.

The traffic management tools and design principles in this handbook assist in improving safety, traffic operation and keeping motorists informed about travelling conditions. The tools combine with access control using coordinated freeway ramp signals to manage freeway flow and achieve high levels of safety, efficiency and reliability.

In relation to traveller information, Main Roads *Variable Message Signs Guidelines* shall be the primary reference for understanding and design.

The Main Roads *Supplement to Victoria's Managed Motorways Design Guide* (MMDG) Volume 2: Part 2 and Volume 2: Part 3 for Smart Freeways design and coordinated ramp signals is also available. Other parts of the MMDG are available as background relating to Smart Freeway traffic science, operation and reference but are not specifically endorsed for design in Western Australia.

In Western Australia, Main Roads policies, guidelines and standards take precedence over Austroads' guides and Australian standards.

## Supplement structure and terminology

This supplement has the same structure as Victoria's handbook and only additional requirements, clarifications, or practices different from the handbook appear. Where appropriate, this supplement may also contain additional sections and figures not covered by the handbook, but the numbering sequence found in the handbook remains. Where indicated, the figures and tables in this supplement replace those in the handbook. Information in the handbook shall also be read in the context of Main Roads information in the *Smart Freeways Policy Framework Overview*, *Provision Guidelines* and other design guidelines.

The Smart Freeway terminology used in this supplement is to have an equivalent meaning to managed freeway or managed motorway in Victoria's design guides and managed freeway in previous Main Roads guides.

References to VicRoads (now part of Department of Transport Victoria) shall be understood to have equivalent application to Main Roads Western Australia. Where specific aspects of design require endorsement or approval within VicRoads, reference shall be made to the Main Roads governance requirements provided in the *Smart Freeways Policy Framework Overview*.

# 1 Introduction and overview

## Section 1.1: Safe, reliable and efficient freeway operation

The efficient use of freeways is essential in providing a safe and reliable level of service that maximises the productivity of the arterial road infrastructure and provides optimum operation for safety, throughput and travel time.

The Main Roads outline of 'active traffic management' tools and ITS technologies and devices is provided in the *Smart Freeways Provision Guidelines* as well as in the other guides, summarised in xxx

The third paragraph information relating to Melbourne's freeway network and traffic use is replaced by the following information applicable to the Perth arterial road network:

*As of September 2024, freeways and high standard arterial roads comprised 27 per cent (or 233 km) of the metropolitan state road network (866 km), yet included 51 per cent of the total vehicle kilometres travelled (VKT) in the AM peak and 50 per cent of total VKT in the PM peak.*

## Section 1.5: Effective incident management

Additional information and Main Roads warrants relating to automated incident detection (AID) are provided in the Main Roads *Smart Freeways Provision Guidelines*.

## Section 1.6: Managing congestion

As additional information, variable speed limits can be used for safety and crash prevention by lowering the speed limit to match operating speeds during congestion, including back of queue protection (also see Section 3.6.3). Further Main Roads guidance relating to VSL in this situation is provided in the Main Roads *Smart Freeways Provision Guidelines*.

## Section 1.7: An integrated managed freeway system

This section shall be read in the context of Main Roads Smart Freeways ITS technologies as outlined in the *Smart Freeways Policy Framework Overview* and the *Smart Freeways Provision Guidelines*. Main Roads central control system also uses STREAMS.

## Section 1.8: Legal requirements for installation of devices

This section shall be replaced with the following information:

- In Western Australia lane use management system (LUMS) signs integrate lane control signals and variable speed limit (VSL) signs under the *Road Traffic Code 2000*. Various regulations define a driver's responsibilities when approaching these devices.
- Main Roads Executive Director Network Operations must give approval to erect, establish, display, maintain or remove these traffic management devices.

# 2 Lane use and incident management

## Section 2.1: Lane use management

Further principles relating to lane use management systems (LUMS) are in the Main Roads *Smart Freeways Provision Guidelines*. These guidelines also provide information relating to warrants and Smart Freeway applications, with and without all lane running (ALR).

In the context of freeway types with varying levels of ITS technologies (refer *Smart Freeways Provision Guidelines*), consideration also needs to be given to the design features below, including when designing for future retrofitting of LUMS, particularly if ALR is expected to be needed in a future upgrade.

Subject to Main Roads design brief requirements and the design circumstances, the following design features shall also be considered to facilitate the future retrofitting of LUMS:

- the formation, verge widths and location of future road safety barriers (including clearance from traffic lanes) to protect against crashes with the gantry legs, as well as gantry foundations and shared paths adjacent to the ramp or carriageway
- depth and positions of drainage pipes and pits
- communications and controller infrastructure, for example cabinets, power supply etc.
- provision for emergency stopping bays (ESB) and maintenance parking, physical access to the LUMS signs (for example when they are mounted on a bridge), provision of conduits or pit locations, ITS cabinet or power supply etc.

## Section 2.3: Lane use signs

As indicated in the *Smart Freeways Provision Guidelines* (Section 6.5), Main Roads uses the term 'LUMS signs' to allocate and manage lane use across the carriageway, rather than the term lane use signs (LUS) as in the VicRoads Handbook for LUMS Section 2.3, understood to be an earlier legacy and not current practice.

LUMS signs indicate the status of the lanes to road users, including lanes open (displaying the speed limit), change lane (downward arrow angled left = merge left; downward arrow angled right = merge right), use the exit ramp (upward arrow angled left) and lanes closed (red cross). Austroads (2016) defines LUMS signs as having the capability to display both a VSL sign and overhead traffic control signals (TCS).

However overhead traffic control signals (TCS) may be used for lane control when an overhead electronic sign does not need to have a VSL capability, for example over the dynamic storage lane when needed for ramp signals (refer Supplement to Victoria's MMDG Vol 2 Part 3 Section 6.6 and Guideline Drawing No. 201731-0028), or for use in tunnels with limited head room (refer Victoria's Handbook for LUMS Section 2.4).

The principles and road users' responsibilities relating to LUMS signs outlined in the handbook are the same in Western Australia. However, the relevant regulations in the *Road Traffic Code 2000* shall be used rather than the regulations in Road Rules – Victoria.

For Main Roads standards for VSL, refer to the supplement clauses under Section 3.4 in this guideline.

### Section 2.3: Static signs associated with LUMS (additional information)

The additional guidance in Table 1**Error! Reference source not found.** is provided for static signs associated with Main Roads LUMS designs. The guidance applies to all LUMS designs (that is it may, or may not, include an emergency stopping lane or shoulder).

For emergency stopping bay designs with all lane running, additional guidance is provided for Section 2.10.4.

*Table 1: Static signs associated with Main Roads' LUMS designs*

| Location | Sign |
|---|---|
| The MR-RS-24 sign is used to display the default speed limit during degraded or faulty operation of VSL signs.<br>The static sign with black numbers on a white background is installed on the gantry leg where LUMS or VSL signs are installed. If the gantry is a cantilever structure, then the sign may also be installed on the verge opposite the gantry leg, if appropriate. Signs shall be installed on every gantry.<br>The default speed limit is the same as what would be displayed on the VSL sign, if not displaying a reduced speed limit. For sections with all lane running (ALR), generally these signs show a speed limit of 80 km/h due to the constrained environment with no emergency stopping lane (ESL). In other LUMS applications (that is with ESL), the static signs would generally indicate the default 100 km/h speed limit. |  MR-RS-24<br>  |
| The MR-RS-25 black on white background sign is used to assist with degraded operation of VSL signs. It is installed on entry ramps where the ramp enters a LUMS or VSL environment, located beneath the Start of Freeway sign and VSL sign. |  MR-RS-25<br>  MR-GE-22B |

### Section 2.3.2: Sign size

The sign size guidance in this section of the handbook shall be replaced by:

- The size of all LUMS signs, that is applicable to all default speed limits, is 'C' size signs.

## Section 2.5: Standards and design principles

Additional guidance relates to the vertical clearance to LUMS gantries or cantilevers. The clearance to the underside of the lowest fixture on the structure shall be in accordance with the vertical clearance requirements of the map document D19#246647.

As the gantries or cantilever supports are considered non frangible roadside hazards, the installation shall include a safety barrier. The requirements of the Main Roads *Supplement to Austroads' Guide to Road Design* – Part 6 and Austroads' *Guide to Road Design* – Part 6: Roadside Design, Safety and Barriers must be met at all locations.

In positioning the gantries or cantilevers, appropriate allowances should be made for the deflection of the barrier, vehicle roll and the width of signs on the gantry leg. As a general guide, the following deflection distances should be adhered to:

- concrete barrier - zone of intrusion deflection from face of barrier as per Main Roads standards
- W-beam – 1.5 metres from the face of the barrier
- wire rope barrier – 2.0 metres from the face of the barrier.

The placement of a safety barrier should also consider accessibility to the gantry or cabinet for maintenance vehicles and other aspects of LUMS design (see Section 2.1).

### Section 2.5.3: Longitudinal gantry spacing between interchanges

Design spacings which are outside the minimum and maximum spacings in this section shall be considered as design departures as detailed in the *Policy Framework Overview*.

***Additional guidance:***

Between an exit ramp taper and a downstream entry ramp taper, there shall be at least one gantry providing LUMS signs over the mainline, even if the taper separation is minimal.

The first gantry at the start of a LUMS section is generally located upstream of an exit ramp to increase operational control. This ensures that during a full closure, road users can be directed to exit the freeway. Traffic management at the start of a system would also be facilitated with a strategic VMS prior to the LUMS environment (refer VMS Guidelines Section 2.5.2). There must be adequate manoeuvre distance from the furthest lane between the first gantry at the start of a LUMS section, and the first off-ramp within a LUMS section to allow sufficient notification of a full freeway closure requiring vehicles to exit the freeway.

Prior to a section with ALR, two LUMS gantries are provided to facilitate traffic management and control near the start of the ALR LUMS system.

In a LUMS environment, the spacing of LUMS signs relative to strategic VMS and direction signs is provided in the *Smart Freeway Guidelines for VMS* (Section 2.5.3), as well as circumstances for the co-location of signs due to design constraints. The principles for installation of tactical VMS within the LUMS layout are in the *Smart Freeway Guidelines for VMS* Section 3.

Where avoidable, LUMS and VMS should not be visible from residential properties adjacent to the road reserve.

## Section 2.7: LUMS integration with other freeway devices

Additional information relating to freeway and arterial road VMS is provided in the Main Roads *Variable Message Signs Guidelines*.

### Section 2.7.1: Variable message signs

Strategic VMS are permanent signs that provide real-time, integrated and consistent traffic condition information to road users. These VMS, sometimes referred to as dynamic message signs (DMS), are also used for incident or event management and to support a lane use management system operation where this is provided. They are installed adjacent to the freeway mainline but, unlike tactical VMS on freeways, they are not installed on LUMS gantries.

Tactical VMS on the mainline provide real-time warning and instruction to road users to support LUMS and incident management operations (see Figure 1).

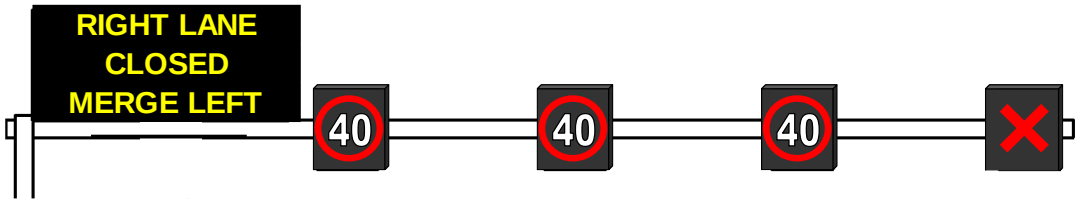



*Figure 1: Example of tactical VMS operating as part of a LUMS response*

Tactical VMS are generally installed on every second gantry to provide frequent messages relevant to the traffic situation, and in advance of emergency stopping bays in all lane running sections.

Additional information for provision and design of strategic VMS and tactical VMS is provided in the Main Roads' Smart Freeways Variable Message Signs Guidelines.

## Section 2.9: Incident management with CCTV cameras

Additional Main Roads' guidance relating to the design and use of CCTV cameras (full and overlapping coverage) is in Main Roads' Smart Freeways Provision Guidelines.

## Section 2.10: Trafficking of emergency stopping lanes (sub-sections)

The Victorian Road Safety Rules are not applicable. Western Australia's *Road Traffic Code 2000* Regulation 76 relates to not driving in an emergency stopping lane.

### Sub-sections 2.10.1 to 2.10.3: Part-time and permanent use of emergency stopping lane

These sections are not applicable to freeways in Western Australia.

Main Roads does not use part-time use of the emergency stopping lane or freeway shoulder.

Permanent use of the shoulder equates to all lane running (ALR) and shall be considered according to warrants and guidance in the Main Roads' Smart Freeways Provision Guidelines.

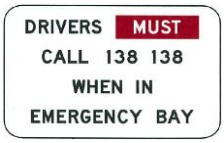
## Section 2.10.4: Emergency stopping bays

Comprehensive guidance and information on emergency stopping bays is provided in the Main Roads' Guideline for Emergency Stopping Bays and Roadside Help Phones. These guidelines include guidance for static signs where emergency stopping bays are provided.

The following additional guidance in Table 2 is provided for static signs on projects with all lane running (that is without ESL or shoulder).

*Table 2: Static signs associated with emergency stopping bays for all lane running designs*

| Location | Sign |
|---|---|
| Install adjacent to the mainline prior to the start of the all lane running section. |  <br>MR-SAD-15 |
| Install 300 m in advance of all emergency stopping bays (distance may vary as appropriate). |  <br>MR-SAD-16 |
| Install at all emergency stopping bays (see example in Figure 2). |  <br>MR-RPK-26<br>  <br>MR-RA-31 |
| Install at all emergency stopping bays (see example in Figure 2). |  <br>MR-RPK-27 |

| Location | Sign |
|---|---|
| Install at all emergency stopping bays (see example in Figure 2). |  <br>MR-SAD-18 |
| Install at all emergency stopping bays (see example in Figure 2). |  <br>MR-SAD-19 |
| Install at emergency stopping bays, where gated access is provided from an area adjacent to the freeway (see example in Figure 2). |  <br>MR-RM-23 |

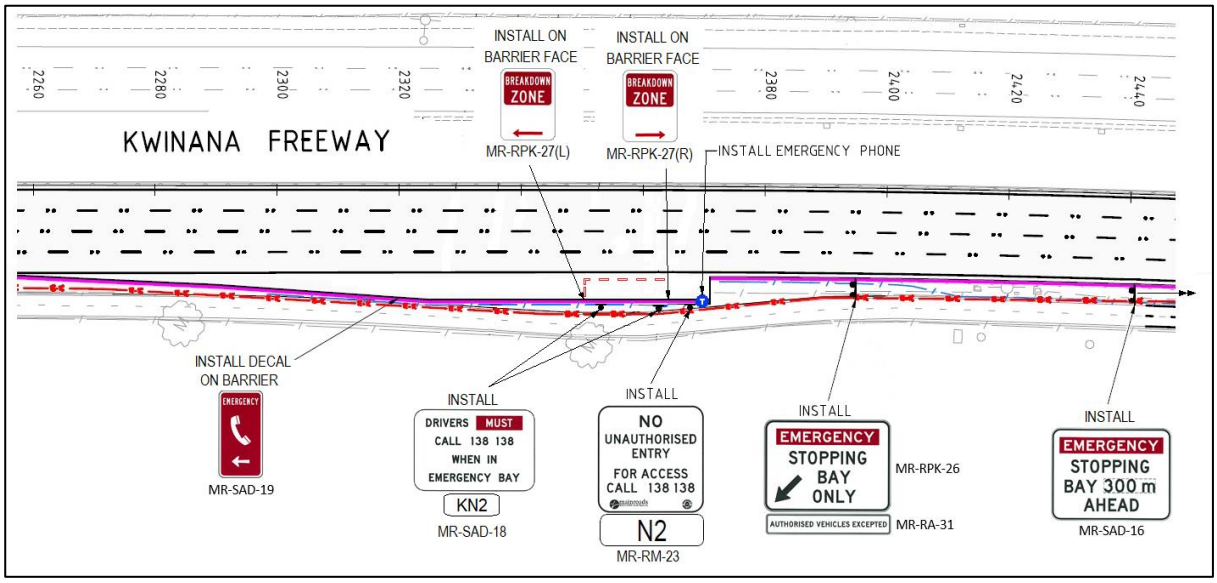



*Figure 2: Example of static signing at emergency stopping bay on a freeway with all lane running*

# 3 Variable speed limits

## Section 3.1: General principles

Further principles relating to variable speed limits (VSL) are in the Main Roads *Smart Freeways Provision Guidelines*. These guidelines also provide information relating to warrants and Smart Freeway applications.

## Section 3.2: VicRoads speed zoning guidelines

The VicRoads supplement to the Austroads guides and the *Traffic Engineering Manual* Volume 1: Traffic Management, Chapter 7, Speed Zoning Guidelines, are not applicable in Western Australia.

## Section 3.4: Overview of devices and standards

The relevant regulations in Western Australia relating to sign format are in the *Road Traffic Code 2000*, which shall be used rather than the Road Rules – Victoria.

Main Roads colours for Smart Freeways VSL signs are white numerals on black background within the red annulus, and with a black background outside the red annulus.

Main Roads have adopted a flashing part of the VSL signs annulus, or use of flashing yellow conspicuity lanterns for older signs, during operations when the signs display speeds are lower than the default speed limit. For guidance on flashing VSL, refer to Australian Standards AS 1742.4 and AS 5156. Also refer to Main Roads Specifications 700 series.

### Section 3.4.1 Sign size

The sign size guidance in this section of the handbook shall be replaced by:

- The size of all VSL signs, that is applicable to all default speed limits, is 'C' size signs, including signs on entry ramps entering a freeway with a LUMS or VSL system.

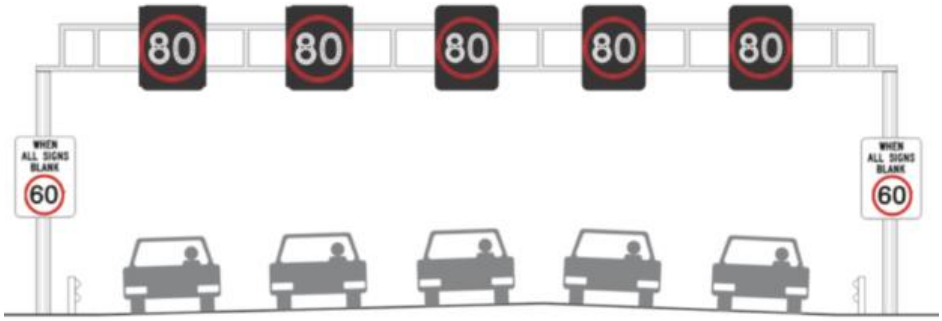
## Section 3.5 Design and installation principles

In the event of a sign 'black out' or VSL system failure, a 'When All Signs Blank' (MR-RS-24) or 'When Sign Blank' (MR-RS-25) sign should be placed next to each LUMS gantry or VSL sign.

### Section 3.6.2 Sign failure

If an entire gantry or set of pole mounted signs is blank, the speed limit shown on the 'When All Signs Blank' (MR-RS-24) or 'When Sign Blank' (MR-RS-25) next to the blank sign applies.

*Table 3: Static signs that show the speed limit when electronic VSL signs fail and are blank*

| | |
|---|---|
|  |  |
| 'When Sign Blank' sign (MR-RS-25) shown underneath electronic speed limit sign. | 'When All Signs Blank' signs (MR-RS-24) shown on gantry accompanying LUMS electronic signs.<br>The 80km/h speed limit is shown with 60 km/h speed limit when electronic signs are blank and freeway section is all lanes running. |

## Section 3.7: Speed management for environmental reasons

The specific application in the handbook relating to high winds on the West Gate Bridge is not applicable in Western Australia.

The general principles in this section may have future application on Western Australia's freeways where environmental factors are applicable.

# 4 Traveller information

This chapter is not applicable to Main Roads. It shall be replaced with guidance and information in the Main Roads *Smart Freeways Provision Guidelines* and *Smart Freeways Variable Message Signs Guidelines*.

# MMDG Appendix A: LUMS traffic management policy rules

This appendix shall be read as background information only.

# MMDG Appendix B: VMS pictogram and sign library

This appendix is not applicable to Main Roads.

Reference shall be made to the *Smart Freeways Variable Message Signs Guidelines*.

# MMDG Appendix C: M1 and M80 travel time destinations

This appendix is not applicable to Main Roads.

Reference shall be made to the *Smart Freeways Variable Message Signs Guidelines*.

# MMDG Appendix D: Real time information sign fonts

This appendix is not applicable to Main Roads.

Reference shall be made to the *Smart Freeways Variable Message Signs Guidelines.*

# MMDG Appendix E: References

This appendix shall be read as background information relating to Victoria's handbook.

Further references are provided in Appendix A in this supplement.

# 5 References

Austroads Guide to Traffic Management (various parts), Austroads, Sydney, NSW.

Austroads Guide to Road Design (various parts), Austroads, Sydney, NSW.

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