Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices

Part 2 - Code of Technical Requirements
## AMENDMENT RECORD

<table>
<thead>
<tr>
<th>Date</th>
<th>Section / Figure</th>
<th>Amendment Description</th>
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</thead>
<tbody>
<tr>
<td>August 2017</td>
<td>Section 4.2, 4.3, 8.4</td>
<td>Speed limits (School zones and buffers) deleted with content moved to Speed Limit Guideline for South Australia; clarify ramp grade requirements for wombat crossings</td>
</tr>
<tr>
<td>Feb 2018</td>
<td>Section 2.3, 3.2, 3.7, 8.1.1, 9.1, 9.3, Figures 8.5, 8.6, App A</td>
<td>Requirement for Stop / Slow bat sign when used at events added in accordance with the DPTI Guidelines for Events on SA Roads; Requirements for Give Way lines at slip lanes amended in accordance with the DPTI Pavement Marking Manual; Pavement marking on footpaths and shared paths added; Guidance on height of pedestrian fencing added; Reference to requirements of Austroads and AS 2890.5 added to parking zones established before Dec 1999; Requirements for reverse-in parking referred to Austroads; Correction to kerb extension reference on figures;</td>
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<tr>
<td>August 2018</td>
<td>Section 2.2, 2.3, 2.4.1, 2.8, 6.1.4, 8.4, 10.6.1.1, Figure 8.2, Figure 10.5, Figure 10.6, Figure 10.7, App A</td>
<td>R6-24 added to Signs not to be used list; Signs requiring separate approval list updated; Exception plate list updated; Signals Ahead (W3-3) sign and Event signs added to sign fluorescence list; U-turn permitted (R2-15) sign requirements added; 40 km/h at wombat crossing requirement amended; Road hump on side road (W3-SA4) sign requirements added; Note regarding use of W5-10 Road hump warning sign for raised pavement used in isolation added to raised pavement figures; Note regarding cyclist turning movements added to raised pavement figure</td>
</tr>
<tr>
<td>Dec 2019</td>
<td>Section 1.2, 1.6, 1.7.2, 1.7.3, 1.8, 2.2, 2.3, 2.5, 2.6, 6.1, 6.1.4, 6.1.5, 6.1.6, 7, 8.4, 8.6.1, 8.6.2, 8.7.1, 9.1, 10.1.1.2, 10.4, 10.5, 10.6, App A; App I</td>
<td>Content amended to relate specifically to traffic control devices and clarify road design decision approval; duplicated/obsolete content removed; references updated; R2-SA3 added; R2-SAA102 sign added; R2-15 criteria updated; R2-5 criteria for use at signals added; Roundabout design guidance moved to Appendix I; Mini-roundabout guidance added; optional use of flashing lights at wombat crossings which link to off-road paths added; children’s crossing Stop banner handle length amended; G9-SA134 sign added; guidance on zebra crossings in off-street areas amended; road mural guidance consolidated from Technical Note; raised pavement gradient criteria clarified, flat top road hump profile from AS 1742.13 added; W8-SA107 sign added</td>
</tr>
</tbody>
</table>

This document has been prepared by Traffic Engineering Standards, Traffic Services of the Department of Planning, Transport and Infrastructure (DPTI). It has been approved and authorised for use by Councils, DPTI and its authorised agents by:

Manager, Traffic Services
24 / 12 / 2019

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1. General

1.1. Scope

This Code of Technical Requirements (‘the Code’) sets out the mandatory requirements for the variations from the Australian Standards and Austroads Guides for the use of traffic control devices in South Australia. It forms Part 2 of the Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices (‘the Manual’). The Manual also contains Part 1: Legal Responsibilities (‘the Instruments’).

Traffic control devices shall be used only in accordance with this Code, the Australian Standards, Austroads Guides and the reference documents listed below. Where the Code varies from, or provides additional information to that contained in the Australian Standards and Austroads Guides, the Code shall take precedence.

The Code amends some aspects of the Australian Standards and Austroads Guides where South Australia’s practices differ. This Code specifies:

- selected values when a range is specified in Australian Standards;
- signs and devices which shall not be used in South Australia;
- signs and devices not covered in Australian Standards; and
- other variations from the Australian Standards and Austroads Guides.


1.2. Reference documents

The following documents contain information on or related to traffic control devices, or the design, construction and specification of materials or structures used in conjunction with traffic control devices. Where these documents specify requirements for traffic control devices, they shall be complied with in conjunction with this Code:

Australian Standards:
- AS/NZS 1158 Lighting for roads and public spaces
- AS 1428 Design for Access and Mobility
- AS 1742 Manual of uniform traffic control devices (MUTCD)
- AS 1743 Road signs - Specifications
- AS 1744 Forms of letters and numerals for road signs
- AS/NZS 1906 Retroreflective materials and devices for road traffic control purposes
- AS/NZS 1906.1 Retroreflective sheeting
- AS/NZS 1906.2 Retroreflective devices (non-pavement)
- AS 2353 Pedestrian push-button assemblies
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AS 2876 Concrete kerbs and channels (gutters) - Manually or machine placed
AS/NZS 2890.1 Parking facilities - Off-street car parking
AS/NZS 2890.5 Parking facilities - On-street car parking
AS/NZS 2890.6 Parking facilities - Off-street parking for people with disabilities
AS/NZS 3845 Road safety barrier systems
AS 4049 series Paint and related materials – Pavement marking materials
AS 5156 Electronic speed limit signs

Austroads Guides:
Austroads Guide to Traffic Management Series
Austroads Guide to Road Design Series
Austroads Guide to Road Safety Series

DPTI documents:
SA Standards for Workzone Traffic Management
Speed Limit Guideline for South Australia
Operational Instructions
Pavement Marking Manual
Standard Road Signs Specifications
Guidelines for Using Traffic Warning Devices – Stock on Road
Guidelines for Disability Access in the Pedestrian Environment
Guidelines for Events on SA Roads
Road Sign Guidelines – Guide to visitor and services road signs in South Australia
Artwork on Roads – Technical Note


1.3. Definitions

For the purpose of this Code, the following definitions apply:

Arterial road: A road that predominantly carries through traffic from one region to another, forming principal avenues of travel for traffic movements.

Council: A municipal or district council

Local street: A road or street used primarily for access to abutting properties.
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May: indicates an option.

Minister: The Minister responsible for the Road Traffic Act

Non-standard: A device which is not specifically included in the Australian Standards, Austroads guides or this Code, or any variation of a device or its use from its specification in these documents.

Off-street: Any area off the general road network commonly used by the driving public or to which the driving public are permitted to have access, for example shopping centres, caravan parks, schools, National parks.

Road authority: An authority, person or body that is responsible for the care, control or management of a road; or

Any person or body prescribed by the regulations for the purposes of this definition, in relation to specified roads or specified classes of roads.

Shall: indicates a mandatory requirement.

Should: indicates a recommendation.

Standard Design Envelope (SDE): A design tool consisting of two concentric arcs with an outer radius of 36 m and an inner radius of 34 m, used for local street roundabout, angled slow point and centre blister design.

Traffic Control Device: A sign, signal, marking, structure or other device or thing, to direct or warn traffic on, entering or leaving a road, and includes -

(a) a traffic cone, barrier, structure or other device or thing to wholly or partially close a road or part of a road; and

(b) a parking ticket-vending machine and parking meter.

In accordance with Section 6A of the Act, road includes road-related area.

1.4. Legal requirements

Traffic control devices shall be installed, maintained, altered, operated and removed with the proper approval. Without this approval the person may be guilty of an offence under section 21 of the Road Traffic Act 1961 (the Act) (http://www.legislation.sa.gov.au/LZ/C/A/ROAD%20TRAFFIC%20ACT%201961.aspx), which carries a maximum penalty of $5 000 or imprisonment for one year.

Under section 17 (1) and (2) of the Act, a road authority requires approval from the Minister to install, maintain, alter, operate or remove a traffic control device on, above or near a road.

Under section 17 (3) of the Act, any authority, body or person requires approval from the Minister to install, display, alter, operate or remove traffic control devices in relation to works on road, temporary road closures, or for any temporary purposes.
1.4.1. Ministerial delegation

The Minister has delegated powers and granted approvals by issuing Instruments to the following road authorities:

- Commissioner of Highways,
- Commissioner of Police,
- Councils,
- Adelaide Airport Limited,
- Railway owners accredited under the *Rail Safety Act 2007*, and
- Board of the Botanic Gardens and Herbarium.

Where a road authority has not been issued an Instrument, they should approach Council in the first instance.

The Minister has delegated to Council the power to specifically approve some traffic control devices for other road authorities as defined by the *Road Traffic Act 1961*. Other road authorities may include those responsible for:

- car parks,
- universities,
- national parks, or
- community titles.

The Commissioner of Highways’ delegation includes un-incorporated areas.

The Commissioner of Highways has authorised some positions in DPTI to undertake various functions or powers delegated from the Minister, subject to conditions. Details are contained in their specific written Instrument.

In another Instrument, the Commissioner has granted persons other than road authorities approval to temporarily install, maintain, alter, operate, display or remove traffic control devices.

All Instruments are contained in *Part 1: Legal Responsibilities* (‘the Instruments’) of the **Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices**.

These Instruments specify the conditions of approval or authorisation, and the devices requiring separate approval. These approvals, authorisations and devices may vary for each Instrument. Therefore it is important for all parties to refer to their relevant Instrument to ensure they are complying within their legal authority.

One of the conditions of approval or authorisation is that all traffic control devices shall conform to the requirements of the Act, associated Rules and Regulations, and the Code.
Not complying with the details and conditions specified in the Instrument may mean the traffic control device is installed without proper authority, which is an offence under section 21 of the Act.

1.4.2. Approval process

The process to install, maintain, alter, operate, display or remove a traffic control device is contained in the Instrument issued from the Minister or the Commissioner of Highways to each authority. This process may vary depending on the function and type of device. Complying with all the conditions stated in the relevant section of the Instrument fulfils the authority's obligation and completes the process.

If the conditions in the Instrument cannot be met then the authority needs separate approval. The Commissioner of Highways will consider such requests. An application to the Commissioner of Highways shall include plans, supporting documentation and a traffic impact statement.

The traffic control devices requiring separate approval of the Commissioner of Highways or authorised delegate are listed in Appendix A.

1.4.3. Traffic Impact Statement

A Traffic Impact Statement (TIS) shall be undertaken in accordance with the requirements of the relevant Instrument. Traffic control devices replaced or reinstated through general maintenance activities may be excluded from this requirement.

A TIS is a report indicating the traffic management and road safety effects for all road users, including cyclists and pedestrians, expected by the installation, operation, alteration or removal of a traffic control device.

Almost all traffic control devices have an impact on road users and the way the road and the surrounding area can be used. A TIS explains both the positive and negative effects expected on all road users by implementing the proposed devices.

A TIS is a source of information from which there should be a clear understanding of the proposal, the need for the proposal, the alternatives considered, any impacts that may occur and any measures to be taken to minimise those impacts.

A TIS provides a framework within which informed decision-makers may consider the traffic management aspects of the proposal in parallel with social, economic, technical and other factors.

All relevant details of the proposal shall be provided in the TIS. These include:

- background information detailing the intent of the proposed changes, and reasons for the installation, alteration or removal of the traffic control device;
General

- the impacts and the likely effects of the traffic control device in the immediate vicinity of the device and where necessary, the wider area or road network;
- identification and discussion of all the advantages and disadvantages;
- the options considered and the reasoning behind the selection of the proposed device, and rejection of other devices;
- details of traffic re-distribution and generation;
- identification of the risks associated with the proposal and an assessment of these risks;
- expected time frame for the implementation of the proposed changes to traffic control devices, including any staging and timing details.

When preparing a TIS every effort should be made to use plain English. Technical terms should be kept to a minimum as the TIS could be read by non-technical persons.

The TIS need not be a lengthy document and will depend on the complexity of the proposal.

The TIS template (http://www.dpti.sa.gov.au/?a=43141) should be used to assist in the preparation of a TIS. This template includes the certification and endorsement statements which reflect the requirements of the Instrument to Council.

1.4.4. Recordkeeping

The road authority shall keep records of the times and dates that traffic control devices are installed, altered or removed. The road authority shall also retain records of any approval documentation associated with traffic control devices.

1.5. Application of devices

Signs and other traffic control devices lose their effectiveness if used unnecessarily or too frequently. Their use shall be restricted to the minimum required to aid the safe and orderly movement of road users. Application of this Code ensures the consistent use of traffic control devices across the state.

1.6. Road design and traffic control devices

Many traffic management treatments comprise a combination of geometric road design and traffic control devices.

The geometric design decisions are the responsibility of the designer and the relevant road authority and do not require separate approval from the Commissioner of Highways or authorised delegate. The designer must use sound, professional judgement in developing the design and take into account the available guidance, such
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as the documents listed in Section 1.2, to assist in making those judgements. Decisions regarding the use of geometric design values outside of the Normal Design Domain, and the use of Extended Design Domain values is the responsibility of the relevant road authority.

The traffic control devices shall be used only in accordance with this Code, the Australian Standards, Austroads Guides and the reference documents in Section 1.2, and comply with the approval process listed in Section 1.4.2. Variations from the mandatory or ‘shall’ requirements for traffic control devices in these documents are considered to be non-standard and will require the approval of the Commissioner of Highways or authorised delegate. A variation from a ‘should’ requirement or a recommendation in these documents is not considered to be non-standard. Any ‘should’ requirements are recommendations which reflect the safe, consistent and recognised practices however variations are permitted where necessary. Any such variations need to be highlighted and addressed in the Traffic Impact Statement.

1.7. Road safety

Traffic control devices should assist in the creation of a safer road environment. The incorrect or inappropriate installation of any traffic control device has the potential to create a hazard to road users due to:

- misuse of the device;  
- incorrect installation;  
- inappropriate location of the device;  
- physical changes to the road environment;  
- driver’s perception; or  

It is important to select the most appropriate traffic control device(s) with consideration given to the likely impacts on all road users. Failure to do so may create potentially hazardous situations.

The preparation of a Traffic Impact Statement (refer to Section 1.4.3) should help to identify and address any potential safety implications of the proposed device.

The use of traffic control devices should incorporate the safe system approach to road safety. The safe system approach acknowledges that human error is inevitable, and that when errors occur, the risk of serious injury or death should be minimised. Applying the safe system approach should assist in the creation of a forgiving road environment which takes into account human error and the physical tolerances of humans, allowing road users to survive and avoid serious injury in the event of a crash. In a safe system, roads should be designed to reduce the incidence and severity of crashes through measures such as the provision of clear driver guidance, a forgiving roadside and management of speeds.
1.7.1. Road Safety Audits

A Road Safety Audit may be conducted to formally examine the crash potential and safety performance of a proposed traffic control device installation. A Road Safety Audit is a formal, defined process, conducted by an independent, qualified team with the appropriate experience and training.

A Road Safety Audit examines whether the road or treatment is fit for purpose and will perform safely for road users. It is not just a check for compliance with standards. A Road Safety Audit incorporates the safe system approach in ensuring that road elements which may contribute to crash occurrence or severity are identified and removed or treated.

It is up to individual road authorities to determine their own program of road safety audits. This should not necessarily be based on the scale of the project, rather the scale of the potential hazards which may be identified during the process. Projects should be audited earlier rather than later to enable the early elimination of potential safety problems. Austroads Guide to Road Safety Part 6: Road Safety Auditing provides further guidance on the Road Safety Audit process. A register of senior road safety auditors in South Australia is available on the DPTI Contracts & Tenders – Prequalification page under the Prequalification of Road Safety Auditors and Vehicle Route Assessors heading (http://www.dpti.sa.gov.au/contractor_documents/prequalification).

1.7.2. Vegetation and other roadside hazards

The installation of traffic control devices may sometimes form part of an overall traffic management treatment which also involves the use of landscaping and installation of roadside furniture. Landscaping and roadside furniture, including objects located on or near road-related areas such as rest areas, bicycle paths or car parks, shall not cause an unreasonable degree of hazard if struck by a vehicle.

Landscaping, vegetation, structures or other objects shall not:

(a) Diminish the sight distance to such an extent as to be a hazard, or

(b) Be placed in a position which would present an unreasonable degree of hazard if struck by an errant vehicle. This includes such items as:

(i) non-frangible trees and shrubs, ie trees greater than 100 mm in diameter at the base;

(ii) any structure, including fences that use horizontal rails with the potential to cause spearing type injuries; or

(iii) boulders, walls, monuments, or other substantial structures or objects.

Material such as loose gravel, stones or pebbles, bark, wood chips or sand shall not be placed where it would spill or be washed onto the road or footpath and create a hazard to road users, such as by producing slippery conditions or by obscuring pavement or kerb markings.
1.7.3. Integrity of devices

Devices shall be constructed with adequate strength and durability to withstand all conditions of installation and operation which may be reasonably expected. Devices used on a temporary or trial basis shall be constructed to the same standard as permanent installations.

Kerbs used for temporary raised traffic islands, medians or kerb extensions should use either a precast kerb in accordance with AS 2876 Concrete kerbs and channels (gutters) – manually or machine placed (2000) figure A3 or a semi-mountable cast-on-pavement kerb according to AS 2876 (2000) figure A4(b). Kerbs may be manufactured from products other than concrete. The kerb shall be securely fastened to the road pavement so that it is not easily dislodged.

Sand bags shall not be used.

1.8. Accessible facilities

Traffic management treatments involving facilities for pedestrians shall incorporate the provision of accessible facilities for people with mobility or vision impairments.

The Commonwealth Disability Discrimination Act 1992 (http://www.comlaw.gov.au/Current/C2011C00747) provides protection for everyone in Australia against discrimination based on disability. Disability discrimination happens when people with a disability are treated less fairly than people without a disability. A person with a disability has a right to access public places in the same way as a person without a disability. Denying or limiting access to public places by people with mobility or vision impairments is against the law.

Providing accessible facilities includes, but is not limited to, measures such as kerb ramps and cut-outs, holding rails, tactile ground surface indicators and audio tactile push buttons. DPTI’s Guidelines for Disability Access in the Pedestrian Environment (http://www.dpti.sa.gov.au/?a=40215), and the other reference documents listed in Section 1.2 provide further details on catering for people with mobility or vision impairments within the pedestrian environment.

1.9. Lighting

Where lighting is provided in accordance with the requirements of AS/NZS 1158 Lighting for roads and public spaces, it shall be provided before the installation of the traffic control device.
2. Signs

2.1. General

A list of all signs for use in South Australia, including sign specification details can be found in the DPTI Sign Index (http://www.dteiapps.com.au/signindx/). Signs shall only be installed with approval of the appropriate authority as detailed in the Code (refer to Section 1.4) and the relevant Instrument (refer to Part 1: Legal Responsibilities (‘the Instruments’) of the Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices). Where the DPTI Sign Index indicates that a sign requires the approval of the Manager, Traffic Services, the sign shall only be used once specific approval from DPTI's Manager, Traffic Services (as an authorised delegate of the Commissioner of Highways), has been granted.

Signs not included in the DPTI Sign Index shall not be used.

Authorities shall not vary or develop signs for their own particular use. Where no suitable sign exists, a new sign may be developed by contacting DPTI’s Traffic Engineering Standards (email DPTI.TASSAdminSupport@sa.gov.au).

2.2. Signs not to be used

The signs listed in this section, although contained in AS 1742 Manual of uniform traffic control devices, are not to be installed on or near a road in South Australia.

Where an alternative sign is permitted in the list below, that sign shall be used instead.

Unless included in the DPTI Sign Index, the signs shown in Schedule 3 of the Australian Road Rules (http://www.legislation.sa.gov.au/LZ/C/R/Australian%20Road%20Rules.aspx) shall not be used.

<table>
<thead>
<tr>
<th>Signs which shall not be used</th>
<th>Permitted sign with relevant Instrument</th>
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<tbody>
<tr>
<td><strong>Regulatory signs</strong></td>
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<tr>
<td>R2-10 Given Way to pedestrians</td>
<td>R2-SA102 (Left or Right) Turn Give Way to Pedestrians &amp; Cyclists (refer Section 6.1.4)</td>
</tr>
<tr>
<td>R3-4 Children Crossing 40 when lights flashing</td>
<td>R3-SA56 Koala Pedestrian Crossing Speed Limit when lights flashing (refer Section 8.6.2)</td>
</tr>
<tr>
<td>R4-8 School Zone</td>
<td>R3-SA58 School Zone Speed Limit when children present</td>
</tr>
<tr>
<td><strong>Warning Signs</strong></td>
<td></td>
</tr>
<tr>
<td>W1-8 Tilting truck with advisory speed</td>
<td>W1-SA50 Truck Tilting with Curve series</td>
</tr>
<tr>
<td>R6-24 Railway Crossing position for use by Rail Authority only</td>
<td>R6-25 Railway Crossing position (with target board) for use by Rail Authority only</td>
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Signs

<table>
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<tr>
<th>Signs which shall not be used</th>
<th>Permitted sign with relevant Instrument</th>
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<tbody>
<tr>
<td><strong>Temporary Signs</strong></td>
<td></td>
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<tr>
<td>T1-19 Stock Ahead (symbolic)</td>
<td>TES 6396 Stock on Road</td>
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2.3. Signs requiring separate approval

The following signs may only be used with separate approval from the Commissioner of Highways or authorised delegate:

**Regulatory Signs**

- R2-15 U-turn permitted
- R2-20 Left turn on red permitted after stopping
- R2-21 Right turn from left only
- R2-22 No hook turn by bicycles
- R2-SA61 Right turn from left lane only Adelaide Metro Buses
- R2-SA62 Right turn from left lane only Adelaide Metro Buses with times
- R3-2 Safety zone
- R3-5 Pedestrians may cross diagonally
- R4 series Speed limit signs except:
  - at works on roads (refer Section 12.2)
  - at events (refer Guidelines for Events on SA Roads)
  - School zones (refer Speed Limit Guideline for South Australia)
  - Wombat crossings (refer Section 8.4)
  - Koala crossings (refer Section 8.6.2)
- R5-50 Clearway (start)
- R5-51 End clearway
- R5-58 Emergency stopping lane
- R6-13 No pedestrians beyond this point
- R6-18 Buses must enter
- R6-19 Start freeway
- R6-20 Freeway entrance
- R6-21 End freeway
- R6-22 Trucks and buses must use low gear
- R6-23 End truck and bus low gear area
- R6-27 Trucks must enter
- R6-28 Trucks use left lane
- R6-29 Keep left unless overtaking
- R6-30 Median turning lane
- R6-32 End keep left unless overtaking
- R6-SA103 End no wheeled recreational devices (Skaters permitted)
- R6-SA104 No wheeled recreational devices (All skaters prohibited)
- R7-1-1 Bus Lane
- R7-1-3 Truck Lane
- R7-1-5 Tram Lane
- R7-1-6 Bus, bicycle lane
- R7-7 series Transit lane signs
- R7-9 series End transit lane signs
Signs

R7-8       Bus only
R7-10      Tram only
R9-SA106   over xx.x t
R9-SA107   On green arrow

Warning Signs
W5-50      Farm machinery

Guide Signs
G9-10      Slow vehicle lane ahead
G9-11      Slow vehicle lane 1km ahead
G9-12      Slow vehicles use left lane
G9-17      Winding road ends x km
G9-46      Very steep climb not suitable for ...
G9-47      Very steep climb next x kms
G9-67-2AA  Keep Tracks Clear (small size)
G9-79      Speed limit ahead
GE9-22-1   Lane ends merge right
GE6-9      End freeway
GE6-10     End freeway 1 km
GE9-3      Reduce speed now
GE6-2      Prohibited on freeway, pedestrians etc
GE2-3      Exit

Signs for temporary purposes
R6-8 / T7-1 Stop / Slow Bat when used for the purpose of an event under Clause E of the Instrument of General Approval to Council.
Stop / Slow Bat operators must carry a card or certificate certifying accreditation in a DPTI endorsed Workzone Traffic Management Training Program.

Other signs
Any signs listed as requiring approval of the Manager, Traffic Services on the DPTI Sign Index

2.4. Auxiliary regulatory series

2.4.1. Exception plates
The following signs, in addition to those contained in AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 2.8.10(b), shall be used with regulatory signs where those classes of vehicle are to be exempted from the control. The signs shall be mounted below the regulatory sign and match it in width.

R9-SA50    Police Vehicles Excepted
R9-SA51    Ambulance Excepted
R9-SA52    High Vehicles Excepted
R9-SA54    Emergency and Maintenance Vehicles Excepted
Signs

R9-SA101  Busway Buses Excepted
R9-SA102  Emergency Vehicles Excepted
R9-SA103  Fuel Tankers Excepted
R9-SA104  Trams Excepted
R9-SA105  Local Delivery or Pickup Excepted
R9-SA108  Bus Lane Vehicles Excepted
R9-SA111  Garbage Trucks Excepted

The specific details of these signs are contained in the DPTI Sign Index (http://www.dteiapps.com.au/signindx/).

2.4.2. Location plates

The following signs shall be used in conjunction with signs R2-5, R2-6, R2-7, and R2-9 where it is necessary to advise drivers of the road to which the sign applies. The sign shall be mounted below the regulatory signs specified above and match it in width.

R9-SA53-1  AT (two line name of road)
R9-SA53-2  AT (three line name of road)
R9-SA55-1  TO (two line name of road)
R9-SA55-2  TO (three line name of road)

If used, the ‘AT’ sign shall be placed in advance of the intersection, and the ‘TO’ sign shall be placed at the intersection.

The specific details of these signs are contained in the DPTI Sign Index (http://www.dteiapps.com.au/signindx/).

2.4.3. Times of operation module

The term ‘school days’ may only be used on the times of operation module (R9-SA57) to indicate a part time bicycle lane on roads other than those under the care, control and management of the Commissioner of Highways. The use of ‘Mon – Fri’ is preferred, and the term ‘school days’ should generally be avoided and limited to situations where weekday operation would cause unacceptable restrictions to parking.

‘School days’ shall only be used where a bicycle facility specifically caters for school traffic, and there is no demand for a bicycle facility at other times.

State school term dates are published on the South Australian Department for Education and Child Development web page (http://www.decd.sa.gov.au/). Where a bicycle facility is intended to specifically cater for private school traffic, variations from the published term dates may contribute to confusion about times of operation, particularly as the bicycle facility may be remote from the school and it may not be obvious to drivers whether the school is open.
2.5. Hazard markers

The provision of AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 4.6.7.1 to allow variations to the size of boards or the number and spacing of bands or chevrons is not permitted in South Australia. Hazard markers shall be in accordance with those included on the DPTI Sign Index. Two D4-SA1-1 Unidirectional Hazard Markers may be used to form an extended bi-directional marker.

2.6. Sign size

The size of the following signs may be reduced from an A size as stated in AS 1742 to AA size (previously S size in South Australia) and used only where raised traffic islands or medians are too narrow to accommodate the A size sign:

- R2-3L KEEP LEFT
- R2-5 No U-Turn
- R2-6R No Right Turn
- R2-9 Right Lane Must Turn Right sign
- R9-1-1 Time plate (one time)
- R9-1-2 Time plate (two times)

The R2-SA3 KEEP LEFT (vertical) shall only be used where back-to-back median is installed or at sites where R2-3 signs are frequently struck by vehicles.


2.7. Sign installation

Only one sign shall be installed on each post facing a particular direction, except where one sign supplements the other, or where route, directional or parking signs are grouped. A supplementary sign shall be placed below the main sign.

There shall be no overlap between any sign mounted on the same post.
Signs

It is acceptable to mount signs on existing utility service poles provided this will not detract from the proper function of the sign and the owner has given permission.

2.7.1. Duplicated signs

Where a warning sign is installed on both sides of the carriageway, and the symbol shown on the warning sign shows some form of direction, the sign shall be manufactured and installed so that the symbol is facing towards the road or carriageway, as shown in Figure 2.4.

![Figure 2.4 Duplicated pedestrian warning signs](image)

2.8. Sign retroreflectivity and illumination

Retroreflective material used on signs shall meet at least the requirement for Class 1 sheeting as specified in AS/NZS 1906.1 Retroreflective materials.

Bicycle / Pedestrian Series (R8) and Parking Series (R5) signs shall be non-reflective legend and background, except:

- **R5-50**  Clearway
- **R5-51**  End Clearway
- **R5-58**  Emergency Stopping Lane Only

For electronic presentation of signs, refer to AS 1742.1 MUTCD Part 1 General introduction and index of signs (2014) clause 1.6.6.2.

2.9. Sign fluorescence

Fluorescent yellow green retroreflective material shall be used for the following pedestrian related warning signs and associated supplementary plates:

- **R3-1**  Pedestrian Crossing
- **W3-3**  Signals Ahead (midblock PACs)
- **W6-1**  Pedestrians
- **W6-2**  Pedestrian crossing ahead
- **W6-3**  Children
- **W6-SA106**  School Zone
- **W8-13**  Playground
Signs

W8-14 School
W8-18 Aged
W8-19 Blind
W8-20 Disabled
W8-22 Crossing ahead
W8-24 Preschool
W8-25 Refuge island
W8-SA3 On side road
W8-SA5 Distance m
W8-SA56 School bus
T1-25-3M On side road
T1-25-4M On side road (square)
T1-28-3M Next 1, 2, 5, 10 km
T1-28-4M Next 1, 2, 5, 10 km (square)
T1-SA67-1M Event Ahead
T1-SA67-2M Event Ahead (square)
T1-SA67 End event
T2-SA104-1M End event
T2-SA104-2M End event (square)
T1-SA104 End event
T2-SA105-1M Event in progress
T2-SA105-2M Event in progress (square)
T2-SA107M(L) Event turn left
T2-SA107M(R) Event turn right
T2-SA108M Event parking
T1-SA109B-1M Speed limit changed
T1-SA125M Event on side road
T1-SA126M Event pedestrian
T1-SA127M Event bike
T1-SA128M Event runner
T1-SA133M Community event ahead

The fluorescent yellow green colour shall not be used for any other sign. Some sign specifications may still stipulate yellow for the above signs; however these signs shall be retroreflective fluorescent yellow green in South Australia.
3. Pavement markings and delineation

3.1. General

Subject to this Code, all pavement markings shall conform to the design, installation and justification requirements in the current DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257).

3.2. Pavement markings not to be used

The following markings, although contained in AS 1742 Manual of uniform traffic control devices or used previously in South Australia, are not to be installed on or near a road in South Australia:

(a) A Give-Way line to indicate the safe position for a vehicle to be held at a slip lane (AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 5.4.2). A Give-Way line at a slip lane may only be used in accordance with section 3.3.18.3 ‘For left turns at un-signalised intersections’ of the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257).

(b) A line across the right hand side of the approach to an intersection (AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 5.4.4(b) and figure 5.3 note 2).

(c) Sequential turn arrows (AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 5.5.2.3 and figure 5.10 (d)).

(d) Any speed limit marking on the pavement.


Lane change (merge) arrows (AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 5.5.2.4) shall only be used at termination of overtaking lanes and high speed multilane roads.

3.3. Pavement markings requiring separate approval

The following markings may only be used with separate approval from the Commissioner of Highways or authorised delegate:

(a) Bus lane markings.

(b) All skaters prohibited (No wheeled recreational devices).

(c) Wide dividing line treatment
3.4. Longitudinal lines

On undivided multilane roads in the urban environment, a dividing line shall be provided as either:

(a) A 200 mm wide single barrier line (referred to as an enhanced single barrier line in the DPTI Pavement Marking Manual) (http://www.dpti.sa.gov.au/?a=40257), or

(b) A 200 mm wide single broken dividing line (referred to as an enhanced broken (multi-lane) dividing line in the DPTI Pavement Marking Manual) (http://www.dpti.sa.gov.au/?a=40257).

The lines of double barrier lines (double one-way and double two-way) shall be 100 mm wide, with a nominal separation of 100 mm.

Double barrier lines shall not be placed on approaches to intersections unless a no overtaking zone is required in accordance with AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) section 5.3.3.

3.5. Transverse lines

Give Way lines and Stop lines on roads with a speed limit of 70 km/h or less shall be 450 mm wide. Where the speed limit is 80 km/h or more, Give Way lines and Stop lines shall be 600 mm wide.

Give Way lines and Stop lines shall be located in accordance with AS 1742.2 MUTCD Part 2: Traffic control devices for general use (2009) sections 5.4.2, 5.4.3 and 5.4.4. South Australian examples are shown in the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257).

3.6. Pavement bars

Pavement bars may be used on substandard curves on roads with a speed limit of 50 km/h or less.

3.7. Pavement markings on footpaths and shared paths

Pavement markings on footpaths and shared paths shall conform to AS 1742.9 MUTCD Part 9: Bicycle facilities and the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257). Pavement markings with an educational, advisory or promotional message intended to enhance users’ awareness of the road rules or path safety are not considered to be traffic control devices and may be used. Where used, these markings shall be skid and slip resistant to the requirements of AS 4049 Paint and related materials – Pavement marking materials and the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257) so as not to cause a hazard for path users.
4. **Speed control**

4.1. **General**

Speed limits shall comply with DPTI's [Speed Limit Guideline for South Australia](http://www.dpti.sa.gov.au/?a=338713).

Speed limit signs may only be used with separate approval from the Commissioner of Highways or authorised delegate (except for speed limits associated with school zones, koala crossings, wombat crossings and works on roads).
5. **Intersection control signs**

5.1. **GIVE WAY and STOP signs**

GIVE WAY and STOP signs shall conform to the design, installation and justification requirements specified in *AS 1742.2 MUTCD Part 2: Traffic control devices for general use* except that:

(a) GIVE WAY or STOP signs shall not be installed on adjacent approaches of a four-way intersection.

(b) Pavement markings used with GIVE WAY and STOP signs shall comply with Section 3.

(c) GIVE WAY and STOP signs shall not be installed on slip lanes and expressway type entrances.

*AS/NZS 2890.1 Parking facilities Part 1: Off-street car parking (2004)* clause 4.3.4(b) states that GIVE WAY and STOP signs are normally required where an access driveway meets a frontage roadway. GIVE WAY or STOP signs shall only be installed in accordance with *AS 1742.2 MUTCD Part 2: Traffic control devices for general use* and the variations and additions contained in this section. They shall not be installed where an access driveway meets a frontage roadway unless the requirements of *AS 1742.2* and this section are met.

5.2. **Requirements for installation of GIVE WAY signs**

GIVE WAY signs at 3-way intersections (eg T-intersections or Y-intersections) shall only be used where:

(a) the terminating road is an arterial road and a driver on this road may not be aware that they do not have priority,

(b) a STOP sign is not warranted but sight distance is restricted to less than Stopping Sight Distance (SSD), or

(c) the T-intersection rule does not operate satisfactorily due to irregular intersection geometry where it is unclear which are the terminating and continuing approaches. In situations where it is unclear as to how or whether the T-intersection rule operates, it is preferable to improve the intersection geometry or better define the terminating road rather than simply install a GIVE WAY sign.

Where an access driveway has been constructed in such a way that it may appear to road users to be an intersection of two roads rather than an access driveway meeting a road, a GIVE WAY sign may be installed to promote the priority for pedestrians crossing this driveway. This situation may occur where the driveway is at the same level as the road, is constructed from the same material as the adjoining road and has kerb ramps where the footpath meets the driveway. In this case, the GIVE WAY sign should be located before the kerb ramps as drivers exit the driveway, so that drivers give way to pedestrians at this point.
Intersection control signs

5.3. Requirements for installation of STOP signs

In addition to the requirements specified in AS 1742.2 MUTCD Part 2: Traffic control devices for general use, a STOP sign may be installed when the road to be controlled meets the other road at an angle of 40 degrees or less.
6. Traffic signals

6.1. Intersection signals

The design, installation and operating procedures of traffic signals at intersections shall conform to the requirements contained in AS 1742.2 MUTCD Part 2: Traffic control devices for general use, AS 1742.14 MUTCD Part 14: Traffic signals and Austroads Guide to Traffic Management and Guide to Road Design (various parts).

Key traffic management considerations for traffic signals at intersections (including numerical guidelines) are contained in Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings (2017) table 2.9.

A graphical representation of this table is shown in Figure 6.1. This figure may assist in assessing the demand for traffic signals. Movement A represents the vehicles per hour on both approaches on the major road, and Movement B represents the corresponding vehicles per hour on the higher volume minor road approach. For the four one-hour periods on an average day plotted on this graph, if all four points are either above the blue line (traffic volume criteria), or above the red line (continuous traffic criteria), traffic signals may be appropriate for the intersection.

The traffic volumes considered in relation to these guidelines shall exclude the left turning vehicles, unless the volume of left turning vehicles is such that it will adversely affect the other movements at the intersection.

Where Figure 6.1 indicates that traffic signals may be appropriate, detailed analysis of the intersection should then be undertaken with the aid of computer modelling programs, taking into account factors such as weekday morning and evening peaks, business peaks and any known special event peaks.
Traffic signals

The following factors should also be taken into consideration in assessing the need for traffic signals:

- Role and function of the road
- Speed environment
- Competing priority for traffic signal control at other locations
- Local road access issues
- Public transport access
- Crash history. While traffic signal control is likely to reduce the severity of certain types of crashes it is important to note that the number of crashes, particularly rear end crashes, may increase. As right turn crashes may continue to occur if filter right turns movement are permitted, new traffic signal installations shall not allow for filter right turns.

For traffic signals on roads under the care, control and management of the Commissioner of Highways, the modelling shall be scoped, defined and reviewed by DPTI's Network Management Services.

6.1.1. Pedestrian push buttons

Audio-tactile “push button” devices installed in conjunction with traffic signals shall comply with the requirements contained in AS 2353 Pedestrian push-button assemblies and Section 8.3.

6.1.2. Pedestrian countdown timers

Where used, pedestrian countdown timers shall comply with Operational Instruction 14.3 Pedestrian Countdown Timers.

6.1.3. Scramble pedestrian crossings

Scramble pedestrian crossings, as detailed in Operational Instruction 14.1 Scramble Pedestrian Crossings, shall only be used with separate approval of the Commissioner of Highways or his/her authorised delegate.

6.1.4. Give Way to Pedestrians

The Give Way to Pedestrians (R2-10) sign (AS 1742.14 MUTCD Part 14: Traffic signals (2014) clause 6.1.2 (b)) sign shall not be used. The (Left or Right) Turn Give Way to Pedestrians & Cyclists (R2-SA102) sign may be used as an alternative, in accordance with the guidance provided in AS 1742.14 MUTCD Part 14: Traffic signals (2014) clause 6.1.2 (b).

This sign may also be used at slip lanes at signalised intersections where there is limited sight distance or concentrations of vulnerable pedestrians.
6.1.5. **U-turn permitted**

The U-turn permitted (R2-15) sign (AS 1742.14 MUTCD Part 14: *Traffic signals* clause 6.1.2(c)) shall only be used with separate approval of the Commissioner of Highways or his/her authorised delegate. It shall be used only at intersections where:

- Geometry is sufficient to allow the U-turn to be made in one manoeuvre by all vehicles;
- There are no conflicts with the u-turning vehicle and other vehicle movements from the side road ie slip lanes;
- There is a fully controlled right turn phase;
- There are no conflicts with pedestrians crossing the road on a pedestrian phase; and
- The lane from which the u-turn is performed is an exclusive right-turn lane sheltered within a raised median.

Where used, the R2-15 sign shall be accompanied with the On Green Arrow (R9-SA107) sign.

Where there are multiple right turn lanes, the u-turn may only be performed from the furthest right lane. This shall be reinforced by the use of pavement marking arrows and lane status signs. In this situation, the R2-15 sign shall be installed on the additional primary signal post only (refer AS 1742.14 MUTCD Part 14: *Traffic signals* figure 4.1(b)) and a second R2-15 sign on the secondary post is not required. This is intended to limit the visibility of the sign to only the lane which it applies to.

6.1.6. **No U-turn**

The No U-turn (R2-5) sign (AS 1742.2 MUTCD Part 2: *Traffic control devices for general use* (2009) clause 2.8.5) is not used at signals as U-turns at signals are prohibited under the *Australian Road Rules*. However, where there is a change in traffic conditions upstream or downstream of the signals resulting in a loss of U-turn opportunities along the road (for example the installation of raised medians or continuous lane line for a tram lane), this may result in significant numbers of drivers breaching this rule. In the event that additional enforcement does not result in an improvement in driver compliance, the road authority may seek approval for the use of this sign at signals from the Manager, Traffic Services.

6.2. **Emergency services traffic signals**

Emergency services traffic signals shall be provided with flashing signals in accordance with AS 1742.14 MUTCD Part 14: *Traffic signals* (2014) clause 7.1(b). Dimensions for these signals are specified in Appendix C.

The Stop on Red Signal sign (R6-9), as distinct from the Stop Here on Red Signal sign (R6-6), shall be used in conjunction with these signals.
Traffic signals

6.3. Flashing yellow traffic lights

Flashing yellow traffic lights, including flashing yellow arrows, shall only be used as a temporary measure when there is a traffic signal malfunction.

Pelican crossings, as specified in AS 1742.14 MUTCD Part 14: Traffic signals and AS 1742.10 MUTCD Part 10: Pedestrian control and protection, shall not be used.
7. Roundabouts

7.1. General

A roundabout comprises a central island, with splitter islands, signs, pavement marking and kerb extensions designed to restrict drivers to a safe entry speed, and guide them through the roundabout. The signs and pavement markings associated with roundabouts shall be installed in accordance with Austroads Guide to Road Design Part 4B, AS 1742 MUTCD Part 2: Traffic control devices for general use and the DPTI Pavement Marking Manual, and AS 1742.13 MUTCD Part 13: Local Area Traffic Management for mini roundabouts or small diameter roundabouts.

A roundabout is a traffic control device and the use of a roundabout and the associated signs and pavement markings are included under Council's Instrument of General Approval and do not require separate approval from the Commissioner of Highways or authorised delegate when used in accordance with the relevant Australian Standards and Austroads guides, and the variations and additions contained in this section.

Geometric design guidance for roundabouts in low speed or local street environments is provided in Appendix I for reference purposes. This approach has historically been used as the basis for local roundabout design in South Australia.

Further guidance on roundabout design is provided in the Austroads Guide to Road Design Part 4B and Guide to Traffic Management Part 6. The geometric design decisions are the responsibility of the designer and the relevant road authority and do not require separate approval from the Commissioner of Highways or authorised delegate. The designer must use sound, professional judgement in developing the design and take into account the available guidance to assist in making those judgements.
Roundabouts

7.2. Construction

A roundabout shall not be installed unless the intersection is sealed and all approach roads are sealed for sufficient distance to ensure the roundabout operates safely.

The Roundabout sign (R1-3) shall be installed on every approach of a roundabout once construction of the central island has begun and vehicles are required to travel in a clockwise direction around the central island. All GIVE WAY, STOP and advance warning signs installed for the original intersection, if any, shall be immediately removed or covered.

7.3. Roundabouts on bus routes

Before a roundabout is installed on an existing or intended bus route, consultation shall take place with the DPTI’s Public Transport Operations and Planning section and bus operators.
8. Pedestrian crossings

8.1. General


Numerical guidelines for the various types of pedestrian crossing facilities contained in this section are provided in Appendix D. Judgement should be used when applying these numerical guidelines to ensure the best overall pedestrian safety and traffic management solution for the site.

8.1.1. Pedestrian fencing

AS 1742.10 MUTCD Part 10: Pedestrian control and protection (2009) clause 9.6 and Austroads Guide to Road Design Part 4: Intersections and Crossings (2017) Table 8.1 identify issues for consideration in relation to the selection of the height, type and location of pedestrian fencing. While a low fence height improves the visibility of small children at the crossing facility, it may not provide sufficient protection and channelisation to older children, particularly in situations where groups of children with heavy school bags may be present in congested areas such as on narrow footpaths or waiting at a pedestrian actuated crossing (PAC) adjacent to a school.

Where pedestrian fencing is used at children's crossings, wombat crossings and zebra crossings it is critical that drivers are able to clearly see pedestrians on or approaching the crossing in order to give way to them. A maximum fence height of 0.8 m is recommended. At these crossing types, speeds are generally lower and pedestrians have priority at the crossing and are less likely to be waiting in large groups.

At PACs, drivers are required to observe and react to the traffic signals, rather than the presence of pedestrians. The tubular loop 'Belmont' style of fencing is unlikely to completely obscure visibility of pedestrians when approaching the PAC, and drivers will be able to partially detect the presence of children through, rather than above, the fence. A pedestrian fence of 1.2 m in height is recommended at these locations.

On roads under the care, control and management of the Commissioner of Highways, pedestrian safety fencing shall be 1.2 m high, except:

(a) where used near intersections where it obstructs SISD, or

(b) at pedestrian crossings where drivers are required to give way to pedestrians on or approaching the crossing (i.e. children's crossings, wombat crossings or zebra crossings).

In these locations, it shall be a maximum of 0.8 m high.
Pedestrian crossings

8.2. Pedestrian actuated traffic signals (mid-block)

Installation of pedestrian actuated traffic signals may be appropriate where the conditions described in Appendix D and AS 1742.10 MUTCD Part 10: Pedestrian control and protection (2009) clause 8.2 are met.

Pelican crossings shall not be used.

8.2.1. Pedestrian countdown timers

Where used, pedestrian countdown timers shall comply with Operational Instruction 14.3 Pedestrian Countdown Timers.

8.3. Pedestrian push-buttons

Audio-tactile devices installed in conjunction with traffic signals shall comply with the requirements contained in AS 1742.14 MUTCD Part 14: Traffic Signals and AS 2353 Pedestrian push-button assemblies.

Pedestrian push buttons shall:

(a) be orientated parallel to the crosswalk (side mounted on the post) and facing towards pedestrians about to use the crosswalk;

(b) incorporate arrow legends (in the audio tactile display), oriented to guide vision impaired pedestrians in the same direction indicated by cross walk markings.

Figure 8.1 Pedestrian push button
8.4. Wombat crossing (Raised pedestrian crossing)

A wombat crossing is a raised pedestrian crossing (zebra) as detailed in AS 1742.10 MUTCD: Part 10: Pedestrian control and protection (2009) clauses 6.2 and 6.3, and figures 1 and 2, except that:

(a) The crossing shall only be installed on roads with a speed limit of 50 km/h or less.
(b) A low speed environment with mean speeds in the order of 40 km/h or less (based on engineering judgement) should occur 30 m to 50 m before the crossing on each approach. This may be achieved through the use of local area traffic management devices (refer Section 10). Where this requirement is not met, a full-time 40 km/h speed limit shall be signposted in accordance with Figure 8.2. Where used, 40 km/h speed limit (R4-1) signs shall be duplicated on each side of the road, on each approach to the crossing. The size of the R4-1 signs shall be ‘B’ size in accordance with AS 1742.4 MUTCD: Part 4: Speed controls (2008) table 3.2
(c) Wombat crossing ramps shall be positioned at right angles to the direction of approaching vehicles.
(d) Emergency services shall be consulted before installing a wombat crossing. If the crossing is located on an existing or intended bus route, DPTI’s Public Transport Operations and Planning section and bus operators shall also be consulted.
(e) The length of the platform, measured parallel to the centreline of the road, shall be no less than 6.6 m. The length of the zebra markings, measured parallel to the centreline of the road, shall be no less than 6.0 m.
(f) The length of the ramp, measured parallel to the centreline of the road, shall be no less than 1.2 m.
(g) On bus routes, the length of the ramp, measured parallel to the centreline of the road, shall be 2.0 m, and the length of the platform, measured parallel to the centreline of the road, shall be no less than 7.0 m.
(h) The platform and ramps shall be constructed in a material that contrasts in colour with the pavement markings.
(i) The leading and trailing edges of the ramps shall be flush with the adjacent pavement.
(j) Continuously operating twin alternating flashing yellow signals may supplement the Pedestrian Crossing (R3-1) signs where:
   (i) it is necessary to increase the visibility of the crossing,
   (ii) the AADT is greater than 5000 vehicles, or
   (iii) the crossing provides a direct link to an off-road shared path, such that crossing users may be approaching from an off-road path rather than the footpath adjacent to and parallel with the road, or
   (iv) the crossing is located near a school.
Pedestrian crossings

(k) The Pedestrian Crossing (R3-1) sign shall be placed either side of the carriageway on divided roads.

(l) The pedestrian crossing (zebra) markings shall continue across a median.

AS 1742.10 MUTCD: Part 10: Pedestrian control and protection (2009) clause 6.2 states that the ‘height of the platform shall be 75 mm to 100 mm and the ramp grade, 1 in 12 to 1 in 20’. The ramp grades specified in this clause are based on a longitudinal gradient of 0%, and will vary depending on the existing longitudinal grade of the pavement surface. The longitudinal grade of the platform will generally match the longitudinal grade of the road.

AS 1742.10 MUTCD: Part 10: Pedestrian control and protection (2009) clause 6.3 specifies the requirements for the installation of wombat crossings. The ‘Note’ under clause 6.3(a) states that road authorities may specify numerical warrants for wombat crossings. These South Australian guidelines are contained in Appendix D.

A wombat crossing shall be installed in accordance with Figure 8.2 and this section.
Pedestrian crossings

Notes:
1. Where used, speed restrictions (R4-1) signs shall be duplicated on each side of the road. They may be omitted where speeds are already low (refer Section 8.4(b)).
2. Speed restriction (R4-1) signs indicating the continuing speed limit along the road are provided where necessary to terminate a 40 km/h speed zone at the crossing.
3. R3-1 signs may be supplemented by flashing yellow signals (refer Section 8.4(j)).
4. Variations to no-stopping distances may be required, see Section 9.1 and AS1742.10 clause 6.2.
5. W6-2 (minimum size B) sign is used in advance of pedestrian crossings where visibility of R3-1 sign is obstructed. It may be supplemented with “Ped Xing” pavement marking (see DPTI Pavement Marking Manual).
6. For installation of markings at raised crossings, see AS 1742.10 figure 2 and DPTI Pavement Marking Manual.
7. A single barrier line should be provided on each approach to the crossing if the road has a dividing line.
8. Kerb extensions in accordance with Section 10.1.2 may be required, see AS 1742.10 clause 6.3(a)(ii).
9. Where the crossing is installed on a one-way road, the traffic control devices not applying to the direction of travel should be omitted.

Figure 8.2 Wombat crossing details
Pedestrian crossings

8.5. Zebra crossing (At-grade pedestrian crossing)

Where used, a pedestrian crossing (zebra) as detailed in AS 1742.10 MUTCD Part 10: Pedestrian control and protection shall comply with Operational Instruction 10.6 On-street zebra crossing. If the requirements of this Operational Instruction cannot be met, a wombat crossing in accordance with Section 8.4 may be a suitable alternative.

Zebra crossings in off-street areas shall comply with the requirements of Section 8.7.1.

8.6. Children’s crossings

The two types of children’s crossing permitted in South Australia are the emu and koala crossings.

Figure 8.3 Emu crossing

Figure 8.4 Koala crossing
Pedestrian crossings

8.6.1. Emu crossing

An emu crossing, as shown in Figure 8.3, shall be installed in accordance with Figure 8.5 and this section.

It is similar to a Type 1 children’s crossing in AS 1742.10 MUTCD Part 10: Pedestrian control and protection (2009) clause 7.2, except that:

(a) An emu crossing shall be located within a school zone (see DPTI’s Speed Limit Guideline for South Australia);

(b) An emu crossing shall have crosswalk lines and 1.2 m high red and white posts to channelise the pedestrians;

(c) All red and white posts shall be nominally 100 mm diameter and frangible.

(d) The CHILDREN CROSSING flag (R3-3) must be displayed to be legally effective. The flags shall be displayed only during periods when school children are likely to be proceeding to or from school within normal school hours and not at other times. Generally, these periods occur at the start and end of the normal school hours, but there may be a need for the crossing to operate during school hours (eg for times when students are required to cross the road as part of a school activity, to cater for students travelling between campuses, or for students travelling to and from facilities such as sports grounds during the day). An emu crossing operating outside of normal times may be confusing to drivers. If the flags are displayed when students are not likely to use the crossing, drivers may disregard them. This can lead to increased risk to the children at other crossings. Emu crossings are not intended to operate outside of daylight hours as the road lighting is likely to be insufficient for the safe operation of the crossing.

(e) The carriageway shall be constrained to only one lane in each direction at the crossing, each with a width no greater than 4 m, unless the carriageway incorporates a bicycle lane. Where the carriageway incorporates a bicycle lane, the width in each direction shall not exceed 4.5 m, comprising a 1.2 m to 1.5 m bicycle lane and a vehicle lane of 3.3 m to 3 m respectively. A bicycle stop line shall be provided in advance of the vehicular stop line in accordance with the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257) for the bicycle lane at the crossing.

(f) Kerb extensions (see Section 10.1.2) installed on one or both sides of the road may be required to reduce the road width. If this is impractical, a raised median or painted median supplemented with pavement bars, may be installed.
Pedestrian crossings

(g) A Children sign (W6-3) supplemented with a CROSSING AHEAD sign (W8-22) is used where sight distance to the crossing is substandard.

(h) An emu crossing shall not be installed on an unsealed road.

(i) A pedestrian survey in accordance with Appendix E shall be conducted to determine the most appropriate location of an emu crossing.

(j) If an emu crossing is to be monitored during periods of high concentration of use by children, it shall be operated by Police trained monitors. Refer to Appendix F for details.

(k) The double-sided hand-held stop banners (R6-7) used at monitored emu crossings shall be 375 mm in diameter and mounted on a handle 1.8 metres in length (measured to the underside of the R6-7 sign).
Pedestrian crossings

Figure 8.5 Emu crossing details

Notes:
1 Variations to no-stopping distances may be required, see Section 9.1 and AS 1742.10 Clause 6.2
2 The W6/W8-22 assembly is required if the sight distance to the crossing is substandard.
3 R5-35 (no time) School Days
4 Zig zag pavement marking, see DPTI’s Speed Limit Guideline for South Australia and DPTI’s Pavement Marking Manual
5 Kerb extensions in accordance with section 10.1.2 may be required, see AS 1742.10 Clause 7.3(b)
6 Where the crossing is installed on a one-way road, the traffic control devices not applying to the direction of travel should be omitted
8.6.2. Koala crossing

A koala crossing, as shown in Figure 8.4, shall be installed in accordance with Figure 8.6 and this section. It is similar to a Type 2 children’s crossing in AS 1742.10 MUTCD Part 10: Pedestrian control and protection (2009) clause 7.2, except that:

(a) A speed limit of 25 km/h is applied when the lights are flashing.

(b) A Speed Restriction sign indicating 25 km/h supplemented with a CHILDREN CROSSING / WHEN LIGHTS FLASHING sign (R3-SA56) shall be located 30 m to 50 m before the crosswalk lines on each approach.

(c) A Speed Restriction sign (R4-1) showing the speed limit applying beyond the koala crossing speed zone shall be placed on the opposite side of the road to the 25 km/h speed limit sign.

(d) A koala crossing shall not be installed on a road with a speed limit greater than 60 km/h.

(e) A koala crossing typically consists of a minimum of two signals. Each signal has two lanterns with two yellow alternating flashing aspects on a matt black backing plate. Operation of signals shall be in accordance with Appendix G.

(f) A Children sign (W6-3) supplemented with a CROSSING AHEAD sign (W8-22) is used where sight distance to the crossing is substandard.

(g) A Children crossing on side road sign (G9-SA134) should be installed on a side road where the crossing is present on an intersecting road and the intersection is located either within the 25 km/h zone, or within 40 m of the start of the 25 km/h zone. This is the preferred alternative to the common practice of installing an R3-SA56 sign on the side road as advance warning.

(h) Crosswalk lines, comprising two parallel lines, shall be marked 2.4 m to 6 m apart.

(i) Crosswalk posts painted in red and white alternate bands are optional.

(j) A koala crossing shall not be installed on an unsealed road.

(k) The carriageway shall be constrained to only one lane in each direction at the crossing, each with a width no greater than 4 m, unless the carriageway incorporates a bicycle lane. Where the carriageway incorporates a bicycle lane, the width in each direction shall not exceed 4.5 m, comprising a 1.2 m to 1.5 m bicycle lane...
Pedestrian crossings

and a vehicle lane of 3.3 m to 3 m respectively. A bicycle stop line shall be provided in advance of the vehicular stop line in accordance with the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257) for the bicycle lane at the crossing.

(l) Kerb extensions (see Section 10.1.2) installed on one or both sides of the road may be required to reduce the road width. If this is impractical, a raised median or painted median supplemented with pavement bars, may be installed.

(m) If a koala crossing is to be monitored during periods of high concentration of use by children, it shall be operated by police trained monitors. Refer to Appendix F for details.

(n) The double-sided hand-held stop banners (R6-7) used at monitored koala crossings shall be 375 mm in diameter and mounted on a handle 1.8 metres in length (measure to underside of the R6-7 sign).
Pedestrian crossings

1. The W6/W8-22 assembly is required if the sight distance to the crossing is substandard. It may be supplemented with the “School Xing” pavement message (refer DPTI’s Pavement Marking Manual).
2. Variations to no-stopping distances may be required, see Section 9.1 and AS 1742.10 Clause 6.2.
3. Speed restriction (R4-1) signs indicating the continuing speed limit applying beyond the Koala crossing speed zone.
5. Kerb extensions in accordance with Section 10.1.2 may be required, see AS 1742.10 Clause 7.3(b).
6. Where the crossing is installed on a one-way road, the traffic control devices not applying to the direction of travel should be omitted.

Figure 8.6 Koala crossing
Pedestrian crossings

8.7. Pedestrian crossings in off-street areas

The pedestrian crossings permitted by the Code may be installed in off-street areas. Where used, they shall be in accordance with the general principles of AS 1742.10 MUTCD Part 10: Pedestrian control and protection and the following:

(a) Pedestrian crossings should be located where approaching drivers are able to see pedestrians on or near the crossing and stop their vehicle before the crossing, when required.

(b) Pedestrian crossings shall connect areas where pedestrians are separated and protected from vehicles on the road. For example, installing a pedestrian crossing between a footpath alongside a building to a kerb extension on the opposite side of the road or car park circulating lane.

8.7.1. Off-street zebra crossing

Off-street areas, such as car parks, may need to cater for a high level of interaction between pedestrians, cyclists and vehicles, and where this occurs, off-street areas should be designed to create a speed environment of 20 km/h. If speeds within an off-street area exceed 20 km/h, pedestrian facilities need to compensate for the higher speed environment by offering a greater level of protection to pedestrians.

An off-street zebra crossing may be used where the speed environment is no greater than 20 km/h. Where used, an off-street zebra crossing shall be installed in accordance AS 1742.10 MUTCD Part 10: Pedestrian control and protection (2009) clause 6, except that the no-stopping zones may be reduced to 5 m on the approach side(s) and 2.5 m on the departure side(s) of the crossing.

Where the speed environment is greater than 20 km/h, the crossing type appropriate to the speed environment shall be used, for example, an on-street zebra crossing (appropriate for speed environments of 30 km/h, refer Section 8.5) or a wombat crossing (appropriate for speed environments of 40 km/h, refer Section 8.6).
9. Parking

9.1. General


The installation of parking zones shall conform to the minimum parking distances contained in the Australian Road Rules. These distances may be varied in accordance with the provisions of AS 2890.5 Parking facilities – On-street car parking clause 3.2, so long as the driver's sight distance to an entering vehicle or pedestrian about to cross is met (refer Austroads Guide to Road Design Part 4 and Part 4A).

Existing on-street parking zones lawfully established before the introduction of the Australian Road Rules (December 1999) may remain provided they comply with the requirements of Austroads Guide to Traffic Management Part 11 – Parking and AS 2890.5 Parking facilities – On-street car parking, particularly in relation to sight distance and protection of parking from through traffic, including cyclists.

Guidance on the design of the parking spaces, including the determination of parking bay dimensions and manoeuvring space is provided in the AS 2890 Parking facilities series, and the Austroads Guide to Traffic Management Part 11 – Parking. The use of the off-street car parking standard in on-street areas may be acceptable where the combination of vehicle volumes, speed and the road environment create an environment which makes it reasonable for through drivers to anticipate parking and un-parking manoeuvres. The geometric design decisions are the responsibility of the designer and the relevant road authority and do not require separate approval from the Commissioner of Highways or authorised delegate. The designer must use sound, professional judgement in developing the design and take into account the available guidance to assist in making those judgements.

The pavement markings and signs associated with the parking controls shall be installed only in accordance with AS 1742.11 MUTCD Part 11: Parking controls, Austroads Guide to Traffic Management Part 11: Parking, the DPTI Pavement Marking Manual, and the variations and additions contained in this section.

9.2. Parking control signs requiring separate approval

Clearway (R5-50) and End Clearway (R5-51) signs may only be used with separate approval from the Commissioner of Highways or authorised delegate.

9.3. Angle parking

Austroads Guide to Traffic Management Part 11 – Parking provides guidance on the relative merits of front-in versus rear-in (or reverse-in) parking. Where 90 degree parking is to be restricted to front-in only, it shall be signed 'FRONT IN', as Rule 210 (3)
of the *Australian Road Rules* permits either front-in or rear-in parking in 90 degree parking spaces unless otherwise signed. Figure 9.1 shows an example of a typical sign for 90 degree parking where pavement marking of the parking spaces is provided. Figure 9.2 shows an example of a typical sign for 90 degree parking without pavement marking.

9.4. **Centre-of-road parking**

Parking on a central portion of a road is only permitted within a road-related area which is physically separated from the road. The access to and egress from individual parking spaces shall not be directly from or to a road.

9.5. **Temporary parking**

Temporary parking signs may be used where changes to the existing parking conditions are required for a limited period, such as during an event.

The signs shall conform to *AS 1742.11 MUTCD Part 11: Parking controls* and include the words ‘TEMPORARY PARKING CONTROL’.

Signs shall be mounted and positioned in accordance with *AS 1742.11 MUTCD Part 11: Parking controls*, except in the following situations:

(a) Temporary No Stopping signs may be positioned within angled or indented parking bays or on the footpath. The sign shall be clearly visible to drivers at all times, and existing parking control signs shall be covered; or

(b) Temporary No Stopping signs shall be securely placed over existing parking control signs.

Under (a) and (b) above, temporary parking signs shall not create a hazard to road users, including pedestrians.
10. Local Area Traffic Management

10.1. General

The devices contained in this section are generally used as part of a local area traffic management (LATM) scheme. LATM schemes involve the use of physical devices, landscaping treatments and other measures to influence behaviours with the objective to reduce traffic volumes and speeds in local streets to increase liveability and improve safety.

LATM devices shall be installed only in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management, Austroads Guide to Traffic Management Part 8: Local Area Traffic Management, and the variations and additions contained in this section.

LATM devices shall only be installed on sealed roads.

Before LATM devices are installed, consultation shall take place with emergency services. Where an LATM device is proposed on an existing or intended bus route, consultation shall take place with the DPTI Public Transport Operations and Planning section and bus service operators. The needs of heavy vehicle operators should also be considered.

LATM devices shall accommodate the needs of pedestrians and cyclists, with cyclist bypasses provided where appropriate.

Modified T-intersections without change in priority (T-intersection re-arrangements) may only be used with separate approval from the Commissioner of Highways or authorised delegate.

10.1.1. Devices used in series

Devices such as slow points, road humps and road cushions are generally used in series along a road to maintain low vehicular speeds occurring at the entrance to the treated road and to discourage use by through traffic. These devices may be used in isolation on short sections of road.

Figure 10.1 Single lane slow points
10.1.1.1. Entry to treated roads

Vehicles entering the road or section of road treated with road humps, road cushions or slow points must be restricted to low speeds. The following are examples of treatments which would achieve this:

(a) All vehicles are forced to make a low speed turn such as at a roundabout, or 90º bend or turn.
(b) Vehicles are controlled by a STOP sign (in accordance with Section 5.3).
(c) Vehicles are controlled by a GIVE WAY sign, provided:
   (i) the uncontrolled road to be crossed is an arterial road; or
   (ii) all vehicles entering the treated road are constrained to 20km/h or less by permanent physical site features.
(d) Another low speed geometric arrangement for example, a driveway entry or driveway link.

Traffic signals do not restrict vehicles to low speeds in all cases. Therefore, they shall not be considered as a means to control the speed of vehicles entering a treated road.

10.1.1.2. Location and siting of devices

The requirements listed in AS 1742.13 MUTCD Part 13: Local area traffic management (2009) Appendix C for location and siting of road humps shall also apply to road cushions and slow points, except that the first road hump, road cushion or slow point should be located within 50 m of the start of the road. Spacing road humps or angled slow points at 90 m to 100 m has been shown to produce a fairly uniform speed along the road, minimising the repeated acceleration and braking, with the associated noise, which occurs with longer spacings.

Road humps, road cushions and slow points should not be installed on arterial roads, or roads with a speed limit greater than 50 km/h. They should not be installed on roads with a gradient exceeding 10% unless, in accordance with Austroads Guide to Traffic Management Part 8: Local Area Traffic Management (2016) 'a comprehensive risk management assessment process is conducted and all necessary requirements are appropriately addressed'.

10.1.2. Kerb extensions

A kerb extension is formed by the construction of a raised island adjacent to the kerb, or by extending the kerb to create a localised narrowing of the road.

Other methods of narrowing the road include the use of pavement marking, pavement bars and RRPMs as described in the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257), however these are not ‘kerb extensions’.
Kerb extensions may form part of an LATM device. They may also be used at pedestrian crossing facilities to minimise crossing distances.

The pavement markings for kerb extensions may be augmented by frangible or flexible posts with retroreflective devices permanently attached. Unidirectional hazard markers may be used as an alternative where additional delineation is required, however the associated reduction in visual amenity of the streetscape should be taken into consideration. Excessive use of signs should be avoided.

Ideally, a kerb extension should be incorporated in the road verge or nature strip with drainage diverted, channelled underground or incorporated into landscaping to remove the need for a drainage channel between the kerb extension and the existing kerb. Such a channel has the potential to be a hazard to pedestrians. Pedestrians should be prevented from inadvertently stepping into this channel with the use of landscaping, or by physically covering the channel. This requirement does not apply if the channel forms part of a bypass of the device for cyclists.

Kerb extensions should be constructed using precast or semi-mountable type kerbs in AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed.

10.2. Perimeter thresholds

Perimeter thresholds shall be installed only in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management, Austroads Guide to Traffic Management Part 8 and the variations and additions contained in this section.

Perimeter thresholds should incorporate a combination of kerb extensions, raised medians and contrasting pavement. Where contrasting pavement is used at a perimeter threshold, it shall be either at grade in accordance with Section 10.3, or raised in accordance with a mid-block raised pavement as per Austroads Guide to Traffic Management Part 8 section 7.2.5 and flat-top road hump of minimum 6 m length (refer Section 10.6).

10.2.1. One lane perimeter thresholds

A perimeter threshold as described in AS 1742.13 MUTCD Part 13: Local area traffic management and Austroads Guide to Traffic Management Part 8 may be combined with a single-lane slow point to provide for one lane, two-way traffic operation. The lane may either be located centrally between kerb extensions or offset to one side of the road between a kerb extension and the existing kerb. The offset shall favour the vehicle exiting from the treated road (see Figure 10.2).
A one lane perimeter threshold shall be installed at a sufficient distance from an intersection to allow vehicles from the major road to wait in the treated road for vehicles leaving the perimeter threshold. For an offset perimeter threshold the minimum setback is 8 m and the maximum setback should equal the likely queue length of vehicles entering from the major road.

It shall be signed as a single lane slow point. The need for a Road Hump sign (W5-10) with One Lane supplementary plate (W8-16) should be considered in lieu of the Slow Point sign (W5-33) for a raised perimeter threshold. A Give Way sign (R1-2) shall not be erected to assign priority to a one lane perimeter threshold.

10.3. Contrasting pavements

Pavement that is clearly different in appearance from the surrounding road is called ‘contrasting pavement’.

Pedestrians may perceive a strip of contrasting pavement across a road as a type of crossing which gives them priority over vehicles. To prevent this potentially hazardous
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situation, contrasting pavements shall be a minimum length or pedestrians shall be prevented from crossing there.

10.3.1. Mid-block
Contrasting pavement shall extend at grade across the full width of the road and shall either be:

(a) at least 12 m in length; or

(b) where less than 12 m in length, pedestrians shall be discouraged from crossing the road at that point with treatments such as landscaping or a low fence. These treatments shall extend along the full length and on each side of the contrasting pavement and adjacent to or on the footpath. Refer to Section 1.7 on Pedestrian related hazards. Contrasting pavement shall not be less than 6 m in length.

10.3.2. Intersection
Where contrasting pavement is installed at an intersection, the paving shall extend into the approach roads by a minimum length of 8 m.

This length is measured from point of intersection of the prolonged edge of the adjacent road closest to the particular approach road (see Figure 10.4).

![Figure 10.4 Contrasting pavement](image)

Where contrasting pavement is installed on only a single approach i.e. not including the intersection or T-intersection it shall be at least 12 m in length.
10.4. Road murals

A road mural is any piece of ‘artwork’ painted or applied directly to a road surface. It may be used for street beautification, urban design or place-making purposes to highlight to drivers that they are entering a different environment, which may encourage them to be more alert to the surroundings and slow down.

A road mural shall be located and designed to not adversely affect the safety of road users and to ensure that road user guidance is not compromised. Road murals should not create a significant distraction to road users and should be designed to be easily understood by glance appreciation.

Where the Department is involved in the funding of the artwork, endorsement of the design and conformance with the paint specification and application process is required from the relevant technical areas of the Department.

10.4.1. Mural design requirements

The following requirements and recommendations apply to the design of road murals:

(a) Artwork must not create a significant distraction to road users.

(b) The size and orientation of the design shall be such that pedestrian viewing of the road mural is undertaken from the footpath, where one is available.

(c) Road murals shall not contain any features that could be confused with a traffic control device. To assist with this, colours defined in the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257) or the Australian Standards for traffic control devices should not be used in a way which may be confused with their standard traffic control devices usage, and road murals should not incorporate colours schemes that may interfere with traffic signals. Any lines within the road mural should not be of a width similar to that of a standard road marking and shall not be aligned in such a way as to infer a path of travel for drivers, cyclists and pedestrians. Shapes commonly used on regulatory traffic control devices such as equilateral triangles and octagons, or shapes such as arrows, diagonal stripes or chevrons should not be used, particularly in isolation, to avoid drivers interpreting the artwork as having a formal meaning. The use of geometric shapes in an irregular pattern present less of a risk of misinterpretation by drivers.

(d) Where possible, the artwork should be associated with the land use adjacent to the road on which the artwork is being applied. There may be opportunities to involve the local community in the project and encourage their interest and involvement in local road safety issues.

(e) Road murals shall not include any commercial or company logo, or advertising.
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(f) Road murals shall not contain messages or content of a salacious, illegal or controversial nature.

(g) The road mural design shall be certified by an experienced traffic engineering practitioner to ensure that the installation complies with the requirements of this section and is not a potential traffic control device or facsimile.

10.4.2. Mural location requirements

The following requirements and recommendations apply to the location of the road murals:

(a) Road murals shall not be installed on or near roads under the care, control and management of the Commissioner of Highways.

(b) Road murals shall only be used on roads with a speed environment of 60 km/h or less.

(c) Road murals shall not be used as or with a traffic control device. There must be adequate separation between a road mural and a traffic control device to avoid any association between the two features.

(d) A road mural shall be positioned and designed such that is does not resemble a pedestrian crossing and could not be confused as such.

(e) A road mural installation should meet the requirements for contrasting pavements as set out in Section 10.3 to assist in avoiding being perceived as a pedestrian crossing, and to be of sufficient size to allow glance appreciation.

(f) Road murals should be located so as to not interfere or cause confusion with the safe operation of intersections or median openings.

(g) Road murals should not be located on or near sharp bends or crests.

(h) On-street parking should be considered when locating the mural as parked vehicles may impact on the visual appeal and effectiveness of the design.

(i) Road murals in areas where heavy acceleration and braking occur will exhibit a higher degree of wear and this should be taken into account when locating the mural.

(j) Lighting shall not be installed to specifically illuminate the road mural.

(k) Road murals shall not be reflectorized, however the addition of quartz for its skid resistance properties is recommended.

(l) Any crash history at the site of a proposed road mural should be taken into consideration to avoid the potential perpetuation of a crash risk.
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10.4.3. Skid resistance

Road murals shall be skid and slip resistant to the requirements of AS 4049 Paint and related materials – Pavement marking materials and the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257) so as not to cause a hazard for road users.

Prior to installation of an artwork, the road surface shall be tested to determine its skid resistance. If testing indicates that the pavement is due for maintenance, which when undertaken would cover or remove the artwork, it is recommended that the artwork be postponed until the maintenance work was completed.

The road with new artwork must be tested for skid resistance within seven (7) days of application. If the skid resistance does not satisfy the skid resistance investigatory levels recommended in DPTI Technical Note 24 – Road Surface Friction (Skid Resistance & Pavement Texture) Recommended Investigatory Levels (http://www.dpti.sa.gov.au/?a=47525), then measures must be put in place to reduce further risk, such as warning signage, traffic calming devices or removal of non-compliant artwork.

Skid resistance testing can be arranged by contacting DPTI's Technical Services on 8260 0588.

For further information and guidance, refer to Austroads Guide to Asset Management Part 5F: Skid Resistance.

10.4.4. Paint specification

Road murals shall not be reflectorized. The specification and application of the paint shall be in accordance with DPTI's TP915 – Use of a Certified Road-Marking Paint for Murals on a Vehicular Road Surface (currently draft version – contact DPTI's Technical Services)

10.5. Raised pavements

Raised pavements shall be installed only in accordance with Austroads Guide to Traffic Management Part 8: Local Area Traffic Management and the variations and additions contained in this section.

The ramp grades specified for raised pavements in the Austroads Guide to Traffic Management Part 8: Local Area Traffic Management are relative to a longitudinal road gradient of 0%, and will vary depending on the existing longitudinal grade of the pavement surface. The longitudinal grade of the platform will generally match the longitudinal grade of the road.

Where unusual road geometry makes it difficult to achieve the geometry requirements of the Austroads Guide to Traffic Management Part 8: Local Area Traffic Management, the designer should ensure that clearance for the B99 vehicle is achieved.
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To control vehicle speeds along a length of road, raised pavements may be used at intersections in conjunction with a series of flat-top road humps.

Raised pavements may also be used as a standalone device to control vehicle speeds at intersections as part of a local area traffic management scheme.

The requirements for road hump markings in AS 1742.13 MUTCD Part 13: Local area traffic management shall also apply to raised pavements. Where ‘inverted piano key’ markings for road humps are provided on the approach and exit ramps of the raised pavement, they shall be in accordance with the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257).

The Road Hump sign (W5-10) with a 20 km/h advisory speed (W8-2) shall be provided at raised pavements in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management. It may be located in advance of the raised pavement in order to avoid obstructing or detracting from the intersection control signs.

For sections of raised contrasting pavement in other situations refer to perimeter thresholds (Section 10.2) and flat-top road humps (Section 10.6).

At T-intersections where no stop or give-way lines are required (refer Section 5), the raised pavement should either be confined to the intersection (see example in Figure 10.5), or extend into the approaches of the intersection (see Figure 10.6). Where the raised pavement is confined to the intersection, it should be bounded by the prolongation of kerbs of the approaches, however to cater for various intersection geometry it may extend beyond this in order to ensure that any gap between the kerb and the start of the ramp is minimised.

Notes:
1 Raised pavements may be used as part of a series of flat-top road humps
2 Road hump sign (W5-10) shall be used on the side approach road which does not contain the series of flat-top road humps. Where the raised pavement is used in isolation, the Road hump sign (W5-10) shall be used on all approaches.
3 Pavement markings shall be provided in accordance with the requirements for road hump markings in AS 1742.13. ‘Inverted piano key’ markings shall be in accordance with DPTI Pavement Marking Manual
4 Where the raised pavement is confined to the prolongation of kerb, consideration must be given to the impact of the ramp on cyclist turning manoeuvres.

Figure 10.5 Raised pavement at a T-intersection (area bounded by prolongation of kerb)
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Notes:
1. Raised pavements may be used as part of a series of flat-top road humps.
2. Consideration shall be given to drainage issues. If stormwater is diverted or channelled underground, the loss of delineation due to the absence of kerb and channel shall be addressed.
3. Extent of raised paving may need to be adjusted to locate the ramp for the raised pavement clear of pedestrian desire lines. If it is impractical to extend the raised pavement into the approaches of the intersection for a minimum of 8 m, the design should include measures to prevent pedestrians from incorrectly perceiving the raised pavement as a form of pedestrian crossing.
4. Provisions for pedestrian access shall cater for the needs of people with disabilities. Consideration shall be given to the impact of the change in grade between the footpath and the raised pavement on accessibility for all pedestrians.
5. Road hump sign (W5-10) shall be used on the side approach road which does not contain the series of flat-top road humps. Where the raised pavement is used in isolation, the Road hump sign (W5-10) shall be used on all approaches.
6. Pavement markings shall be provided in accordance with the requirements for road hump markings in AS 1742.13. ‘Inverted piano key’ markings shall be in accordance with the DPTI Pavement Marking Manual.

Figure 10.6 Raised pavement at a T-intersection (extending into approaches)

At intersections where stop or give-way lines are required, the raised pavement should extend into the approaches of the intersection (see Figure 10.8). This requirement aims to avoid confusion between the stop or give-way line marking and the ‘inverted piano key’ markings for the raised pavement. Otherwise, stop or give-way lines must be clearly separate from the ‘inverted piano key’ markings.

Figure 10.7 Raised pavement at an intersection
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Notes:

1. Raised pavements may be used as part of a series of flat-top road humps
2. Consideration shall be given to drainage issues. If stormwater is diverted or channelled underground, the loss of delineation due to the absence of kerb and channel shall be addressed
3. Extent of raised paving may need to be adjusted to locate the ramp for the raised pavement clear of pedestrian desire lines. If it is impractical to extend the raised pavement into the approaches of the intersection for a minimum of 8 m, the design should include measures to prevent pedestrians from incorrectly perceiving the raised pavement as a form of pedestrian crossing.
4. Provisions for pedestrian access shall cater for the needs of people with disabilities. Consideration shall be given to the impact of the change in grade between the footpath and the raised pavement on accessibility for all pedestrians
5. Road hump sign (W5-10) may be located in advance of the raised pavement in order to avoid obstructing or detracting from the intersection control sign. Where the raised pavement is used in isolation, the Road hump sign (W5-10) shall be used on all approaches.
6. Pavement markings shall be provided in accordance with the requirements for road hump markings in AS 1742.13. ‘Inverted piano key’ markings shall be in accordance with the DPTI Pavement Marking Manual

Figure 10.8 Raised pavement at a four way intersection

Where raised pavements extend into the approaches of the intersection, they should extend a minimum length of 8 metres (measured from the prolongation of the kerb) into the approach of the intersection. Successful implementation of this treatment requires that the following issues are also addressed:
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(a) Extending the raised pavement into the approaches of the intersection may result in the ramps being positioned on or adjacent to the pedestrian desire lines. This has the potential for the raised pavement to be mistaken as a form of pedestrian crossing. In these situations, the raised pavement may need to be further extended into the approaches of the intersection. Where it is impractical to extend the raised pavement into the approaches of the intersection for 8 m, the design should include measures to prevent pedestrians from incorrectly perceiving the raised pavement as a form of pedestrian crossing. This may be achieved by physically separating pedestrian footpaths from the device by landscaping or other means.

(b) The raised pavement may be tapered flush to the existing kerb and channel for drainage purposes, however pedestrian access issues will need to be addressed. If kerb ramps are provided for pedestrian access, but pedestrians are then required to travel from the invert level of the channel, up the tapered section of raised pavement and onto the raised pavement, the accessibility requirements of the *Disability Discrimination Act 1992* need to be met. Stormwater may be diverted or channelled underground to remove the need for a drainage channel along the kerb line, and assist in providing a more consistent grade for pedestrian movements.

(c) If the raised pavement is provided without ramping down to a drainage channel along the kerb line, there may only be a small difference in the level of the raised pavement and the adjacent kerb. This may reduce the delineation of the intersection previously provided by the kerb and additional delineation may be required.

(d) Raised pavements should not be installed across driveways. Where the raised pavement needs to be installed across driveways, ensure that drivers can negotiate the change in grade between the raised pavement and the driveway without damaging the vehicle.

(e) Raised pavements shall contrast with the adjacent footpath or shared path/bicycle path pavement to avoid any similarity between the two and avoid the risk of mistaking the raised pavement treatment as a form of pedestrian crossing. Contrast between the raised pavement and the adjacent path may also assist in delineation of the intersection.

10.6 Road humps

Road humps shall be:
- Watt’s profile in accordance with *AS 1742.13 MUTCD Part 13: Local area traffic management*,
- flat-top in accordance with *AS 1742.13 MUTCD Part 13: Local area traffic management* and Austroads *Guide to Traffic Management Part 8: Local Area Traffic Management* and the variations and additions contained in Section 10.6.2.1,
- sinusoidal profile in accordance with Austroads *Guide to Traffic Management Part 8: Local Area Traffic Management* and *Austroads Guide to Traffic Management Part 8: Local Area Traffic Management* and the variations and additions contained in Section 10.6.3,
Local Area Traffic Management

10.6.1. Location and siting
Road humps and road cushions shall be positioned in accordance with the requirements of Section 10.1.1.2. The entry to the treated road shall conform to the requirements of Section 10.1.1.1.

10.6.1.1. Signing of road humps on side road
Where a road hump is located on a side road at or directly after an intersection and there is insufficient room to provide drivers with warning of the hump once they have completed their turning manoeuvre, the W3-SA4 ‘Road hump on side road’ with the Advisory Speed sign (W8-2) may be used on the through road to provide advance warning to turning drivers.
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Where a road hump is located on an intersecting road in both directions at or directly after the intersection and there is insufficient room to provide drivers with warning of the hump once they have completed their turning manoeuvre, the ‘Road Hump’ (W5-10) with the ‘On side road’ (W8-SA107) supplementary plate with the may be used on the through road to provide advance warning to turning drivers.

10.6.2. Road hump profiles

The cross-sectional dimension of a road hump shall be uniform across its width. In the absence of kerb extensions, the last 600 mm at each end should be tapered flush to the edge of the kerb and channel to provide for drainage.

Where a one lane road hump needs to provide for centre of road drainage, the hump should taper to either side of the channel for a length of 300 mm.

The leading and trailing edges of a road hump shall be flush with the adjacent pavement.

Where the road is wide enough, it is preferable to construct the road hump between kerb extensions formed with semi-mountable kerb. This eliminates the undesirable practice of drivers aligning the vehicle’s left wheels close to the kerb so that only the right wheels have to traverse the road hump to reduce the effect of the road hump. This may increase the risk of the vehicle striking the kerb and losing control.

10.6.2.1. Profile of flat top road hump

The cross section of a flat top road hump shall be in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management, Austroads Guide to Traffic Management Part 8: Local Area Traffic Management Section 7.2.3, or Section 7.2.5 for mid-block raised pavements.
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The ramp grades specified for road humps in these documents are based on a longitudinal road gradient of 0%, and will vary depending on the existing longitudinal grade of the pavement surface. The longitudinal grade of the platform will generally match the longitudinal grade of the road.

Where unusual road geometry makes it difficult to achieve the geometry requirements of these documents, the designer should ensure that clearance for the B99 vehicle is achieved.

If the flat top road hump is located on a bus route, the ramps shall be extended to 2.0 m, and the minimum length of the platform shall be extended to 7.0 m.

10.6.3. Road cushions

Road cushions shall be used only in accordance with Austroads Guide to Traffic Management Part 8: Local Area Traffic Management and the variations and additions contained in this section.

The dimensions of each road cushion shall be:

- Width: 1.6 m to 1.9 m
- Height: 70 mm to 80 mm
- Length: 2 m to 3 m
- Maximum front and back grade: 1:7.5

Road cushions shall be spaced across the road to ensure that they are effective in reducing the speed of cars while allowing bus wheels to travel on either side of the cushion. The gap between kerb and cushion, or adjacent cushions (measured across the road) should not be less than 0.7 m or exceed 1.3 m. Three cushions, or two cushions in combination with kerb extensions or a
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median may be used to achieve this spacing. Where three cushions are used, the central cushion is not intended to be traversed and a cushion wider than 1.9 m may be used.

The impact on the travel path of cyclists shall be considered when designing the layout of the cushions. Consideration shall also be given to managing the drainage for the road.

The requirements specified in AS 1742.13 MUTCD Part 13: Local area traffic management for signing of road humps using the Road Humps Ahead (W3-4) and Road Hump (W5-10) signs shall also apply to road cushions. An Advisory Speed (W8-2) of 30 km/h shall be posted for road cushions.

Contrasting markings shall be provided on the face of the road cushions such that the cushions are clearly visible under all conditions. As these markings are generally formed by inlaying non-reflectorised white rubber, road cushions shall be illuminated by street lighting.

10.6.4. Road humps and road cushions in off-street areas

Road humps in off-street areas shall be:

- flat-top in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management and Austroads Guide to Traffic Management Part 8: Local Area Traffic Management and the variations and additions contained in Section 10.6.2.1,

- road cushions only in accordance with Austroads Guide to Traffic Management Part 8: Local Area Traffic Management and the variations and additions contained in Section 10.6.3, or

- off-street area Watt’s profile road humps in accordance with Section 10.6.4.2.

The Type 1 and 2 road humps and associated pavement markings specified in AS 2890.1 Parking facilities – Off-street car parking shall not be used.

Speed control is best achieved by eliminating features such as long straight roads that enable drivers to travel at unacceptable speeds. Off-street area road humps may be used to assist in further reducing speeds to achieve a 20 km/h speed environment.

The requirements listed in Section 10.1.1 for devices used in series shall also apply to road humps and cushions in off-street areas except that the first hump or cushion should be within 30 m from the start of the circulation roadway with subsequent humps or cushions spaced as uniformly as practicable to a maximum of 50 m.

Off-street areas with a speed environment similar to the general urban road network (i.e. with 85th percentile speeds in the order of 50 km/h), may be treated with the types of road humps or cushions specified in Section 10.6, with humps or cushions located and spaced in accordance with Section 10.6.1.
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The installation of road humps may create an obstacle to people with a disability or people with shopping trolleys or prams, and may present problems with drainage. Road humps should not be located on pedestrian desire lines.

10.6.4.1. Road hump warning signs in off-street areas

The Road Hump Ahead sign (W3-4), supplemented with the Advisory Speed sign (W8-2) indicating the appropriate speed for the type of hump or road cushion shall be used at the start of the circulation roadway treated. If an entire off-street area or physically separated section of an off-street area is treated with road humps or road cushions, these signs are required at the entry points only.

10.6.4.2. Off-street area Watt's profile road humps

The cross-section of the off-street area Watt's profile road hump is a segment of a circle with length 1200 mm and height 75 mm (see Figure 10.13). The cross-sectional dimensions shall be uniform across the width of the road hump except where:

(a) in the absence of kerb extensions, the last 450 mm at each end is tapered flush to the edge of the kerb and channel to provide for drainage; or

(b) a one lane road hump needs to provide for centre of road drainage. In this case, 300 mm of the road hump is tapered flush to the edge of the channel.

![Figure 10.13 Off-street area Watt’s profile road hump cross section](image)

The W8-2 Advisory Speed sign shall indicate an advisory speed of 10 km/h for off-street area Watt’s profile road humps.

Pavement markings for off-street area Watt’s profile road humps shall be in accordance with the DPTI Pavement Marking Manual (http://www.dpti.sa.gov.au/?a=40257).
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10.7. Road closures

Road closures shall be installed only in accordance with AS 1742 Manual of uniform traffic control devices, Austroads Guide to Traffic Management Part 8 and the variations and additions contained in this section.

10.7.1. Full closure

A full road closure should create the appearance of a cul-de-sac, rather than a continuing road with a barrier across it. Care should be taken to create this appearance when selecting the type of barrier to physically close the road, while ensuring that the barrier does not itself form a hazard (refer to Section 1.6). Landscaping at the road closure will play a significant part in creating the appearance of a cul-de-sac.

As with any LATM device, the use of signs on full road closures should be kept to a minimum. Post mounted delineators, consisting of frangible or flexible posts with retroreflective devices permanently attached may be provided at the barrier to improve night time delineation of the closure. An Obstruction board (D4-SA5) may be used if additional delineation is required. The ROAD CLOSED sign specified in AS 1742.2 MUTCD Part 2: Traffic control devices for general use should not be used for the installation of full road closures in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management.

10.7.2. Part-time closure

A part-time closure may be used where traffic is to be prevented from entering a road, or part of a road at particular times. A part-time closure consists of a barrier, generally in the form of a gate, across the road. The barrier shall not cause an unreasonable degree of hazard if struck by a vehicle (refer to Section 1.6).

The ROAD CLOSED sign (G9-20) shall be placed at the centre of the barrier. An Obstruction board (D4-SA5) may also be used if additional visibility of the barrier is required to ensure it is visible to approaching drivers under all reasonably expected weather conditions.

Operation of the part-time barrier shall be in accordance with Section 1.4.2.
Local Area Traffic Management

10.7.3. Vehicle exempt closure

A vehicle exempt road closure permits, by the use of signs, only vehicles of a particular class such as a bus or bicycle to have access through the road closure (see Figure 10.15). They are easily violated and should be used only where other treatments would be inappropriate.

The road through a vehicle exempt closure should be narrowed to one lane and be located centrally within the width of the road.

The NO ENTRY sign (R2-4) and a supplementary sign showing the exempt class or classes of vehicle shall be located on each side of the entry point to the road closure.

![Figure 10.15 Vehicle (bus) exempt closure](image)

10.8. Slow points

Slow points shall be installed only in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management, Austroads Guide to Traffic Management Part 8 and the variations and additions contained in this section.

10.8.1. Location and siting

Slow points shall be positioned in accordance with the requirements of Section 10.1.1.2. The entry to the treated road shall conform to the requirements of Section 10.1.1.1.

10.8.2. Design of angled slow points

Angled slow points shall be installed centrally within the overall width of the road.
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The speed of vehicles negotiating an angled slow point is governed by its geometric design. The speed of traffic is reduced by forcing vehicles to travel through them along an elongated ‘S’ path (see Figures 10.16 and 10.18).

Drivers travelling through an angled slow point tend to use all of the available road and select as large a radius as possible for their vehicle path, to maintain as high a speed as possible through the device.

To assist the designer in producing safe, consistent and effective geometric angled slow point designs, the Standard Design Envelope (SDE) is used. A 1:200 scale SDE is included in Appendix I. The function of the SDE is to assist in the lateral placement of the critical control points of the angled slow point in relation to other components of the angled slow point.

There shall be no ‘daylight’ (defined in Sections 10.8.2.1 and 10.8.2.2) through the angled slow point.

10.8.2.1. One lane angled slow point

Angled slow points installed to provide for one lane operation shall have the entry located to the right of centre of the road (see Figure 10.16).

As shown on Figure 10.16, the SDE shall contact or overlap control point 1 (an area 2 m wide and parallel to the right-hand kerb), contact control point 2 (the approach kerb extension) and contact control point 3 (the exit kerb extension) on each approach. No ‘daylight’ is achieved when an imaginary line parallel to the centre-line of the road touches or overlaps both kerb extensions.
Local Area Traffic Management

Notes:
1) SDE must touch or overlap the shaded area at control point 1
2) SDE must touch control points 2 and 3
3) There must be no ‘daylight’ through the slow point
4) The entry must be within the right-hand lane
5) The design requirements must be met for both directions of travel through the slow point

Figure 10.16 One lane angled slow point design

10.8.2.2. Two lane angled slow point

Angled slow points installed to provide for two lane operation shall use a raised central median not less than 300 mm wide to separate each lane (see Figure 10.18).

Pavement bar medians and dividing lines shall be installed on a curvilinear alignment for sufficient distance on approaches to the raised central median, to guide the driver into the two lane angled slow point. The raised central median may be extended into the curvilinear approaches, with a corresponding reduction in the length of the pavement bar median. Pavement bars shall be placed at a maximum of 1.5 m centres.

Figure 10.17 Two lane angled slow point

As shown on Figure 10.18, the SDE shall contact control point 1 (the pavement bar median), control point 2 (the kerb extension) and control
Local Area Traffic Management

point 3 (the exit end of the central median) on each approach. No ‘daylight’ is achieved when an imaginary line parallel to the centre-line of the road touches or overlaps the kerb extension and pavement bar median.

Notes:
1) SDE touches control points 1, 2 and 3
2) There must be no ‘daylight’ through the slow point between the kerb extension and median
3) The design requirements must be met for both directions of travel through the slow point

Figure 10.18 Two lane angled slow point design

10.9. Centre blister

Centre blisters shall be installed only in accordance with Austroads Guide to Traffic Management Part 8 and the variations and additions contained in this section.

Figure 10.19 Centre blister
Local Area Traffic Management

A ‘centre blister’ is comprised primarily of an elliptical, curved, circular or diamond shaped median to create a short section of divided road. Kerb extensions, signs and pavement marking may be required on approaches (see Figure 10.19).

The centre blister is a horizontal displacement ‘slow point’ type traffic control device for use on local streets in mid-block locations away from intersections.

Noise levels may be increased due to braking and acceleration and the horizontal displacement effects of vehicles.

10.9.1. Design requirements

Some of the design principles and features of centre blisters are similar to the local street roundabout insofar as the design of the centre blister utilises the Standard Design Envelope (SDE) to determine the vehicle paths on the approaches and through the device while minimising the width of the vehicle lanes. Refer to Section 10.9.4.

Centre blisters may be used in a series along a road in accordance with Section 10.1.1 or alone to reduce vehicular speeds and to discourage use by through traffic.

The location of a centre blister should not restrict access to adjacent properties, or require drivers to perform unavoidable illegal movements when accessing these properties.

The road at a centre blister must be kerbed for sufficient distance on the approaches to prevent corner cutting, and to provide adequate visual guidance into the centre blister. A barrier kerb as defined in AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed shall be used.

Semi-mountable kerb, as defined in AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed, shall be used in the construction of the median and any kerb extensions. A painted median or painted kerb extension is not permitted.

Where occasional travel over the central island by a heavy vehicle may need to be accommodated, this shall be facilitated by paving that portion of the median and providing a 40 mm high mountable kerb in accordance with AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed. If a long vehicle such as a bus will regularly use the centre blister, it shall be designed so that the vehicle does not ride over the median or kerb extensions.

10.9.2. Construction

Once construction of the median has begun a SLOW POINT warning sign (W5-33) shall be installed on each approach.
Local Area Traffic Management

10.9.3. Signs

A KEEP LEFT sign (R2-3L) may be installed within the median on each approach to a centre blister if it is not readily apparent under all normal driving conditions that drivers should keep to the left.

Although not generally necessary, unidirectional hazard markers (D4-1-2) may be used to increase the visibility of the median.

10.9.4. Speed control

The speed of traffic entering and negotiating a centre blister is controlled by the geometric design of the centre blister. The slow-in-faster-out performance aim is necessary in its design to ensure it will operate safely and ensure that the speed of traffic using it is kept low.

The Standard Design Envelope (SDE) in Appendix I, is used to assist the designer in producing safe and consistent geometric centre blister designs.

The function of the SDE is to position the outer edge of the median relative to the approach and exit kerbs of the centre blister to achieve a design speed of approximately 35 km/h.

For each approach the outer arc of the SDE must contact the approach and exit kerbs or kerb extensions. The inner arc must contact the median (see Figure 10.20 and 10.21). The SDE must contact only at a single point, no overlap is permitted.

![Figure 10.20 Centre blister on narrow roadway](image)

**NOTE:**
1. The SDE contacts on approach kerb, centre blister median kerb and exit kerb.
2. Signs are only necessary if the centre blister and its width are not readily apparent.

Figure 10.20 Centre blister on narrow roadway
Local Area Traffic Management

10.9.4.1. Approaching traffic

A centre blister design must also reduce the speed of approaching traffic prior to the entry. The design shall prevent any portion of the vehicle path, approaching the centre blister on a straight trajectory, to pass the median without deflection. Otherwise, vehicles can enter at unacceptably high speeds, which endangers other road users and increases the risk of the driver losing control as the vehicle must reduce speed within the centre blister to exit safely.

10.9.4.2. Straight roads

For a centre blister placed on a straight section of road, the requirement in Section 10.8.4.1 is met when there is no gap between the outer edge of the median and the prolongation of the left-hand ‘approach’ kerb to the ‘exit’ kerb. A kerb extension may be required on an approach to cover up any gap (see Figure 10.21).

10.9.4.3. Curved roads

Centre blisters placed on curved roads require special attention to prevent vehicles from being able to enter the centre blister without deflecting and not having to reduce speeds. Figure 10.22 shows how the inadequate design of a centre blister on a curved road produces a gap allowing approaching vehicles to enter at potentially high speed.
Local Area Traffic Management

10.9.5. Swept path

Centre blisters frequently used by long vehicles should be designed so that the vehicle’s overhang does not present a hazard to pedestrians and roadside furniture on the footpath. To achieve this, the swept path of the vehicle should be completely contained within the road.

10.9.6. Entry width

The entry width is the shortest distance measured between the ‘nose’ of the median and the left-hand kerbline or kerb extension. The entry width should not exceed 3.5 m but may be increased for the passage of buses or large vehicles to a maximum of 4 m.

10.10. Driveway entries and links

Driveway entries and links shall be installed only in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management, Austroads Guide to Traffic Management Part 8 and the variations and additions contained in this section.

10.10.1. General

The aim of driveway entries and links is to give the appearance of a closed portion of road. A driveway entry is located at an intersection or T-intersection (see Figures 10.24, 10.25 and 10.26) while a driveway link is located mid-block along a road (see Figure 10.23).

A driveway entry shall only be located at an intersection of local streets. For treatment of entrances to a local area from an arterial or sub-arterial road, refer to Section 10.2 for perimeter thresholds, or Section 10.3 for contrasting pavements.

Figure 10.22 Incorrect design of centre blister on curved approach
Local Area Traffic Management

The combination of landscaping, installing kerbs, and using contrasting pavement alters the road to give the appearance that the road does not continue. A semi-concealed ‘driveway’ located off to the side allows local access through the treatment.

A heavy reliance is placed on the form and depth of the landscaping to control traffic by redefining the general streetscape. This also serves to enhance the quality of the residential area.

The design principles and features between driveway entries and driveway links are similar, with the difference being where they are located.

10.10.2 Essential design elements

The design principles and features of driveway entries and driveway links are similar.

Visual impact and low vehicle speeds are the main factors that shall be present to produce an effective driveway treatment. From a distance, the treatment should look to the driver as though the road is closed, but when approached the way through should be readily discernible.

To achieve the desired visual impact and reduce speeds, the following design elements shall be present:

(a) extensive landscaping,
(b) a vehicle path resembling a private driveway, which is narrow, meandering, and raised above the general road level, and
(c) an entry to the driveway treatment located on the right-hand side of the road.
Local Area Traffic Management

10.10.3. Appearance of driveway entries

An intersection treated with a driveway entry should give the appearance of a T-intersection with a ‘private driveway’ located opposite the terminating leg of the new intersection (see Figure 10.24).

![Figure 10.24 Driveway entry at an intersection](image)

The geometric design of a driveway entry located on a continuing leg of a T-intersection makes the T-intersection appear as a single road with a bend in it. The driveway entry gives the appearance of a ‘private driveway’ entering on the outer edge of the new bend formed (see Figure 10.25).

![Figure 10.25 Driveway entry at a T intersection – continuing leg](image)
Local Area Traffic Management

A driveway entry constructed on a terminating leg of a T-intersection should give the appearance of a single straight road with a ‘private driveway’ where the terminating road previously existed (see Figure 10.26).

Figure 10.26 Driveway entry at the stem of a T intersection

10.10.4. Urban design elements

The effect sought from the design of a driveway treatment is to create, using suitable landscaping, an environment that visually prevents approaching drivers from having a long distance view of the road beyond the treatment. When approaching the treatment, the landscaping should be visually and physically restrictive and uninviting to deter drivers who are not local residents of the road from entering.

Landscaping may consist of other roadside furniture items such as planter boxes, seating or artwork so long as they meet the objectives of this section.

The major role of the landscaping is achieved by selecting trees that will grow with high level foliage and slender trunks to break the long distance view of the road. While shrubs and bushes provide low level screening, it shall still allow drivers to see oncoming vehicles within or about to enter the treatment. Regular pruning to maintain the screening effect and visibility requirements may be necessary. The selection and placement of plants shall not present an unreasonable degree of hazard if struck by an errant vehicle.

The visual impact of the landscaping in a driveway treatment is an important element and plays a vital part in determining the success of the treatment. The effect sought from the planting should be achieved within 12 months and be maintained all year. Deciduous plants may not achieve this.

The total area of landscaping, excluding the adjacent footpath, should be approximately twice as much as the area of the vehicle path.
Local Area Traffic Management

The effectiveness of the landscaping is affected by the overall length of the driveway treatment, provisions for drainage, and access to private property.

10.10.4.1. Length of treatment

The length of the treatment to achieve the landscaping requirements is determined by the width of the road, the number and location of private driveways, inclusion of on-street parking and the width of the vehicle path.

Longer treatments will more readily achieve the design aims for a driveway treatment, particularly as the trafficked areas minimise the area for landscaping.

The length of a driveway link shall be greater than 30 m while a driveway entry shall be greater than 20 m.

10.10.4.2. Drainage

To remove the visual continuity of the road produced by the original kerb and allow maximum use of the road reserve for landscaping, the existing kerb and channel on the treated section of road should be removed. Stormwater may be channelled into an underground system or drainage facilities may be incorporated into the landscaping, in accordance the principles of water sensitive urban design.

Figure 10.27 Example of drainage treatment at driveway entry

Where this is impracticable, a covered drainage channel such as a box culvert in place of the original kerb and channel, at least at each end of the treatment, is preferable to an open channel for the full length of the treatment.
Local Area Traffic Management

10.10.4.3. Private property access
The driveway treatment should be free from private driveways to maximise the area for landscaping. If a private driveway must be integrated into a driveway treatment, an increase in both the length of the treatment and the width of the vehicle path opposite the private driveway may be required (see Figures 10.28 and 10.32).

![Figure 10.28 Passing areas](image)

10.10.5. Design requirements
The function of the vehicle path is to allow vehicles through the treatment at a low speed. The design speed is 10 km/h and is achieved by a narrow, tightly meandering path over its entire length.

The design of the entrance to a driveway treatment shall ensure that the speed of traffic using it is kept low. The slow-in slow-out performance aim is necessary in the design of the entrance to ensure it will operate safely.

To maintain low vehicle speeds, driveway entries or links shall not be installed on roads with a gradient exceeding 10%, unless, in accordance with Austroads Guide to Traffic Management Part 8: Local Area Traffic Management (2016) ‘a comprehensive risk management assessment process is conducted and all necessary requirements are appropriately addressed’.

10.10.5.1. Entrance
An entrance should not exceed a width of 3.5 m. This may be increased where it is necessary to provide for the swept path of a large vehicle turning into or out of a driveway treatment, but shall be less than 5 m.
Local Area Traffic Management

To achieve the design requirements, the entrance shall:

(a) be located as close as possible to the right-hand edge of the road;

(b) be located completely within the right-hand side of the road;

(c) be perpendicular to the centre line of the road so that vehicles cross it at right angles; and

(d) have a mountable kerb and tray where the vehicle path is raised (see Section 10.10.6).

Figure 10.29 Driveway entry on stem of T-intersection
Local Area Traffic Management

The location of the entrance to a driveway entry located on a continuing leg of a T-intersection shall, besides that stated previously, be:

(a) within the former T-intersection; and

(b) on the outer boundary of the new bend formed (see Figure 10.30).

Figure 10.30 Driveway entry on continuing leg of T-intersection
A driveway link, or end of a driveway entry, should be located away from side roads to avoid queued vehicles blocking the side road. A minimum setback from a side road should be equivalent to the longest queue length likely to be encountered or a minimum of 8 m which ever is greater (see Figure 10.31).

NOTES:
1. Mounding and advanced specimens of shrubs and trees.
2. Not to scale.

Figure 10.31 Driveway link
Local Area Traffic Management

Figure 10.32 Driveway entry at an intersection

10.10.5.2. Width of vehicle path

An important aspect to consider when deciding the width of the vehicle path is that commercial vehicles are generally no wider than 2.5 m. Therefore the vehicle path need not be much wider than the largest vehicle likely to regularly use the road such as the council garbage truck. The maximum width is 3 m unless the length of the treatment, generally greater than 80 m, requires a passing area (see Figures 10.28 and 10.32).

A minimum width is deliberately not prescribed as it is conceivable that in some situations where all commercial vehicles are prohibited from

NOTES:
1. A passing area in the vehicle path is incorporated with the private driveway.
2. Mounding and advanced specimens of shrubs and trees.
3. Not to scale.
Local Area Traffic Management

the road, a vehicle path of less than 2.5 m is permitted and indeed preferred.

10.10.6. Construction

The vehicle path surface shall be constructed in a material contrasting in colour and texture with that of the road, (e.g. concrete block paving) and should be raised 100 mm above the existing road surface. This height may be reduced or eliminated, where the 85th percentile speed of vehicles on approach to the driveway treatment, is less than 40 km/h.

The driveway treatment shall extend across the full width of the road using barrier or semi-mountable kerb as specified in figures A1 and A2 of AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed (2000).

Entrances may be constructed with a mountable kerb and tray as shown in Figure 10.33. Another kerb may be used provided its effect on vehicles is not greater than the kerb specified.

Notes:
1) For vehicle path heights less than 65 mm the gradient of the kerb is reduced so that the top of kerb is level with the top of the vehicle path.
2) Not to scale

Figure 10.33 Mountable kerb detail

10.10.7. Signs and delineation

A GIVE WAY sign (R1-2) or STOP sign (R1-1) shall not be used at a driveway link or driveway entry unless at an intersection (see Figures 10.30 and 10.32).

The aesthetics of a driveway treatment are an important aspect in creating a low speed environment. The intention of the narrow vehicle path and extensive landscaping is to create the appearance of a private driveway, and the use of warning signs and hazard markers may counteract this effect.

The SLOW POINT (W5-33) sign with ONE LANE (W8-16) supplementary sign shown in AS 1742.13 MUTCD Part 13: Local area traffic management should only be used where the device may not be visible to approaching drivers at prevailing traffic speeds.
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Post mounted delineators, consisting of frangible or flexible posts with retroreflective devices permanently attached may be provided at the entrances to driveway links or driveway entries to improve night time delineation of the device (see Figures 10.29, 10.30, 10.31 and 10.32). Unidirectional hazard markers may be used if additional delineation is required.

10.10.8. Pavement markings

At a driveway entry located on a continuing leg of a T-intersection, a continuous dividing line or pavement bar median shall be marked around the new bend formed (see Figure 10.30). A gap in the pavement bar median shall be provided opposite the entrance to allow for turning vehicles.
11. Off-street traffic control

11.1. General

Requirements for the following devices in off-street areas are specified in this Code:

- Roundabouts in off-street areas (See Appendix I4 for requirements for roundabouts in off-street areas).
- Pedestrian crossings in off-street areas (See Section 8.7 for requirements for pedestrian crossings in off-street areas).
- Road humps and road cushions in off-street areas (See Section 10.6.4 for requirements for road humps and road cushions in off-street areas).

Other traffic control devices specified in the Australian Standards, except those prohibited by the Code, may be used in off-street areas.

All traffic control devices in off-street areas shall comply with the requirements of the Code, including the requirement to obtain separate approval from the Commissioner of Highways or authorised delegate for the use of any of the devices listed in Appendix A. In particular, speed limits in off-street areas may only be used with separate approval from the Commissioner of Highways or authorised delegate.
12. **Traffic control at works on roads**

12.1. **General**

Traffic control devices at works on roads shall comply with DPTI's *SA Standards for Workzone Traffic Management*.

12.2. **Speed limits at works on roads**

Speed controls at works on roads shall comply with DPTI’s *SA Standards for Workzone Traffic Management*. 
Appendix A: Traffic control devices requiring separate approval

The devices listed below require approval from the Commissioner of Highways or his / her authorised delegate for their use.

Section 1.4 of this Code contains further details on the legal framework, approval process for traffic control devices in accordance with the Instruments, and the preparation of Traffic Impact Statements.

A1. Signs

Regulatory Signs
R2-15 U-turn permitted
R2-20 Left turn on red permitted after stopping
R2-21 Right turn from left only
R2-22 No hook turn by bicycles
R2-SA61 Right turn from left lane only Adelaide Metro Buses
R2-SA62 Right turn from left lane only Adelaide Metro Buses with times
R3-2 Safety zone
R3-5 Pedestrians may cross diagonally
R4 series Speed limit signs except:
  • at works on roads (refer Section 12.2)
  • School zones (refer Speed Limit Guideline for South Australia)
  • Wombat crossings (refer Section 8.4)
  • Koala crossings (refer Section 8.6.2)
R5-58 Emergency stopping lane
R5-50 Clearway (start)
R5-51 End clearway
R6-13 No pedestrians beyond this point
R6-18 Buses must enter
R6-19 Start freeway
R6-20 Freeway entrance
R6-21 End freeway
R6-27 Trucks must enter
R6-28 Trucks use left lane
R6-29 Keep left unless overtaking
R6-30 Median turning lane
R6-32 End keep left unless overtaking
R6-SA103 End no wheeled recreational devices (Skaters permitted)
R6-SA104 No wheeled recreational devices (All skaters prohibited)
R7-1-1 Bus Lane
R7-1-3 Truck Lane
R7-1-5 Tram Lane
R7-1-6 Bus, bicycle lane
R7-7 series Transit lane signs
R7-9 series End transit lane signs
R7-8 Bus only
R7-10 Tram only
R9-SA106 over xx.x t
R9-SA107 On green arrow
Appendix A

Warning Signs
W5-50 Farm machinery

Guide Signs
G9-10 Slow vehicle lane ahead
G9-11 Slow vehicle lane 1km ahead
G9-12 Slow vehicles use left lane
G9-46 Very steep climb not suitable for …
G9-47 Very steep climb next x kms
G9-17 Winding road ends x km
G9-67-2AA Keep Tracks Clear (small size)
G9-79 Speed limit ahead
GE9-22-1 Lane ends merge right
GE6-9 End freeway
GE6-10 End freeway 1 km
GE9-3 Reduce speed now
GE6-2 Prohibited on freeway, pedestrians etc
GE2-3 Exit

Signs for temporary purposes
R6-8 / T7-1 Stop / Slow Bat when used for the purpose of an event under Clause E of the Instrument of General Approval to Council.
Stop / Slow Bat operators must carry a card or certificate certifying accreditation in a DPTI endorsed Workzone Traffic Management Training Program.

Other signs
Any signs listed as requiring approval of the Manager, Traffic Services on the DPTI Sign Index

A2. Pavement markings

Bus lane markings
All skaters prohibited (No wheeled recreational devices)
Wide dividing line treatment

A3. Traffic signals

Scramble pedestrian crossings

A4. LATM devices

Modified T-intersection without change in priority (T-intersection re-arrangement)
Type 1 and 2 road humps and associated pavement markings specified in AS 2890.1
Appendix B: School zone sign

Figure B1 School zone sign R3-SA58

- Red class 1
- White class 1
- Black
- Fluorescent Orange 4084


Formerly R4-SA58

REGULATORY SIGN
'School Zone Speed'

Not to scale
Appendix C: Emergency services traffic signal details

NOTES:
All aspects use standard louvres
Appendix D: Guidelines for pedestrian crossings

The following numerical guidelines may assist in assessing the demand for pedestrian facilities.

D1. Pedestrian actuated traffic signals (mid-block)

Installation of pedestrian actuated traffic signals may be appropriate where the conditions described below are met:

(a) a pedestrian survey, undertaken in accordance with Appendix E, shows that:
   In two separate one hour periods of a typical weekday:
   (i) 60 or more pedestrians per hour actually cross the road and could reasonably be expected to use the crossing; and
   (ii) 600 or more vehicles per hour pass the site during the same two hours where the pedestrians cross; and
   (iii) the product of the number of pedestrians per hour and vehicles in the same hour exceeds 90,000

or

(b) a koala crossing is justified (see D3 below) and:
   (i) children frequently cross the road between two sections of a school at other times;
   (ii) there is a steady demand for the crossing by adult pedestrians; or
   (iii) it is considered desirable to link the crossing with other nearby traffic signals.

D2. Wombat crossing (Raised pedestrian crossing)

An on-street wombat crossing may be provided on a local street where a pedestrian survey undertaken according to Appendix E shows that:

(a) In two separate one hour periods of any day (including Saturday and Sunday):
   (i) 40 or more pedestrians per hour actually cross the road and could reasonably be expected to use the crossing; and
   (ii) 200 or more vehicles per hour pass the site where the pedestrians cross during the same two hours;

or

(b) During eight hours of any day:
   (i) An average of 20 or more pedestrians per hour, cross the road (a total of 160 or more in eight hours) and could be reasonably be expected to use the crossing; and
Appendix D

(ii) An average of 200 or more vehicles per hour pass the site during the same eight hours (a total of 1600 or more in eight hours).

D3. Children’s crossing (koala)

A koala crossing may be installed if a pedestrian survey undertaken according to Appendix E shows that:

In two separate one hour periods of a typical school day:

(a) 50 or more children actually cross the road and could reasonably be expected to use the crossing; and

(b) 200 or more vehicles per hour pass the site where the children will cross during the same two hours.

D4. Children’s crossing (emu)

An emu crossing has no minimum child/vehicle guide, however a pedestrian survey in accordance with Appendix E should assist in determining the crossing location.
Appendix E: Pedestrian and traffic surveys

A detailed survey of pedestrian and vehicle movements shall be undertaken to justify the installation and to determine the optimum location of a pedestrian crossing.

These surveys are usually conducted for the continuous period from 8.00am to 6.00pm on a typical weekday, but may be extended if the time of peak pedestrian movement is outside that period.

The section of road under consideration is divided into zones of approximately 30 m in length.

The numbers of pedestrians categorised according to type such as ‘Adult’, ‘Adult with bike’, ‘Child’, ‘Child with Bike’, older people (see (b) below), and people with a disability crossing the road in each zone are counted and the totals recorded for each 15 minute period (it may be sufficient to record in 30 minute periods at other than times of peak pedestrian movements). When the category includes a ‘bike’, only those who cross the road are counted; not those riding along the road as part of the traffic stream.

Young children, the elderly, and people with a disability should be given greater recognition in the pedestrian surveys by weighting their numbers. The observed numbers of:

(a) children under 10 years old who are not accompanied by an adult;
(b) older people who may exhibit a degree of frailty or difficulty in crossing the road in a timely manner; and
(c) people recognised as having a disability

should be weighted by being multiplied by a factor of 1.5.

Note: the weighting of children does not apply in the case of surveys undertaken for proposed koala crossings.

The number of vehicles travelling along the road is also recorded, by direction of travel, for each period.

In assessing the survey to decide whether a pedestrian crossing is justified and to determine its location, the numbers of pedestrians crossing the road in the same three adjacent zones in each of two separate hours are totalled. The combined two-way vehicle volume in each corresponding hour is used on roads without a median. If there is a median then, subject to engineering judgement, the highest flow in one direction is used.
Appendix F: Children’s crossing monitors

Children’s crossings shall, except where it is not reasonably practicable, be supervised by monitors during periods of greatest concentration of use by children.

Factors which may render supervision by monitors impracticable include:

(a) Where a crossing is not within reasonable walking distance of the school, taking into account the need for the monitors to collect hand STOP banners and safety vests from the school.
(b) Where a primary school has no grade higher than year five.
(c) Where a crossing is used only by high school children, and not by primary school children.

Although a children’s crossing which is not monitored provides assistance for children crossing a road, the risk is further reduced when the crossing is supervised by properly trained monitors. The presence of monitors also inhibits the particularly risky behaviour of children crossing the road near a crossing but not actually on it. A relatively brief period of supervision by monitors can provide additional protection for most of the children using the crossing.

Pedestrians of any age shall obey the directions of a monitor. Clause C of the Minister’s Notice to the Commissioner of Police grants approval for the Commissioner to authorise School Crossing Monitors to use STOP banners, barrier devices and CHILDREN CROSSING flags.

Monitors shall be trained by the SA Police Department and shall wear appropriate safety clothing designed to make them conspicuous and to warn road users of their presence.
Appendix G: Operation of koala crossings

G1. Automatic operation

The times of automatic operation of a koala crossing are tailored to the normal pattern of demand for children crossing the road. Koala crossings shall only operate on school days.

G1.1. Morning operating period

The morning operating period should commence approximately ten minutes earlier than either:

(a) the earliest arrival time permitted by the school; or
(b) the normal first arrivals of children wishing to cross.

Operation should cease approximately five minutes after the school starting time but may cease earlier if the crossing is some distance from the school.

G1.2. Afternoon operating period

The afternoon operating period should commence approximately five minutes before the school finishing time (later if the crossing is some distance away).

Operation should cease approximately ten minutes after the time when sustained use of the crossing by children is normally over.

G1.3. Additional operating periods

Additional operating periods may be justified if different times apply to some parts of the school and there is a significant demand for children to cross the road.

Only rarely will a koala crossing need to operate at lunchtime.

G2. Manual operation

Each koala crossing has a two-position key switch, marked AUTO and MANUAL, for which the school’s Principal has a key. With this key, the crossing can be switched from the automatic times preset on the time clock to manual operation. This allows a crossing to be used occasionally such as early dismissal for hot weather or end of term.

A koala crossing operating outside normal times may be confusing to drivers. Consequently, crossings operating at unexpected times are generally less safe than normal, and the following conditions shall be strictly observed whenever a crossing is operated manually:

(a) The period of manual operation shall be within normal school hours.
(b) The period of manual operation shall be as short as is practicable while catering adequately for the crossing needs of the children.
(c) During the entire duration of manual operation, a member of the school staff or other adult person, authorised by and under the direction of the Principal, shall be responsible.
Appendix H: Koala crossing sign details

Figure H1 Koala pedestrian crossing sign R3-SA56

Not to scale
Appendix I: Local Street Roundabouts

Local street roundabouts are generally used on low speed non-arterial roads. They are usually located in areas which are primarily residential, but may also be used within commercial or business precincts.

I1. General design requirements

The central island should, where practicable, be circular in plan. Where the central island is not circular, ideally the ratio between the longer and shorter dimensions should be 4:3 or less with the smaller radius being 3.5 m or greater.

Splitter islands should be provided on each approach to deter wrong way movements by right turning vehicles. Fully kerbed splitter islands are preferred, but if this is impracticable due to essential property access requirements or it is in a narrow road, a painted splitter island may be used. Where the speed environment is 60 km/h or less, a painted splitter island should be supplemented with pavement bars.

The circulating lane of a roundabout and its immediate approaches and exits should be free from driveways accessing properties where their presence would, under normal operation, result in unavoidable illegal movements within the roundabout.

I1.1. Design vehicle considerations

If there is a possibility of long vehicles riding over the central island, that portion of the central island should be paved. If the roundabout is located on a bus route, or subject to regular use by long vehicles, it should be designed so the vehicle does not ride over the central island. Emergency services requirements should also be considered.

Roundabouts frequently used by long vehicles should be designed so that the vehicle's swept path does not present a hazard to pedestrians or road furniture. To achieve this, the swept path of the vehicle should be completely contained within the road. Where occasional travel over the central island by a heavy vehicle may need to be accommodated, this shall be facilitated by a 40 mm high mountable kerb. Any necessary signs shall be located clear of this area.

I1.2. Entry width

The entry width is the shortest distance between the outer edge of the splitter island to the corner kerb or kerb extension prior to the give way line. It should not exceed 3.5 m but may be increased for the passage of buses or large vehicles to a maximum of 4 m.

I1.3. Kerb

The full length of each corner curve at a roundabout should be kerbed for sufficient distance on the approach to each corner to prevent corner cutting and to provide adequate visual guidance into the roundabout. A barrier kerb as defined in AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed should be used.
Appendix I

Barrier kerb as defined in AS 2876 Concrete kerbs and channels (gutters) – Manually or machine placed should not be used in the construction of central islands, raised splitter islands and kerb extensions.

I2. Speed control

The speed of traffic entering and within a roundabout is controlled by the geometric design of the roundabout. A design tool referred to as a Standard Design Envelope (SDE) has been developed to assist the designer in producing safe and consistent geometric roundabout designs. The SDE consists of two concentric arcs with an outer radius of 36 m and an inner radius of 34 m. The function of the SDE is to position the central island relative to the other components of the roundabout for a design speed of approximately 35 km/h. A 1:200 scale SDE is included in Appendix J.

I2.1. Through traffic

For each approach to a roundabout, the outer arc of the SDE shall contact the corner kerbs or kerb extensions and the inner arc shall contact the central island (see Figure I1). The SDE shall contact at a single point at each location.

![Figure I1 Local street roundabout design for through traffic](image)

NOTE:
1. The SDE touches the corner kerbs and central island for all approaches.

For geometrically constrained intersections such as Y-intersections or where roads meet obliquely, it is acceptable to use the SDE by an alternative method. In these circumstances the outer arc of the SDE contacts the leading edge of the splitter island and the central island, and the inner arc contacts the kerb extension (see Figure I2).
The only exception where the SDE can overlap the central island is when an existing intersection is large enough to meet all other conditions of this section without altering any corner kerbs. In these cases, the amount of overlap shall be minimised, be not greater than 1 m and be approximately the same for all approaches to the roundabout to produce a consistent degree of speed control for each approach.

12.2. **Left turn traffic**

Speed control at roundabouts is also important for traffic turning left. Generally, left turning vehicles are constrained to low speeds due to the geometric design of the roundabout. Higher speeds can occur where there is a large corner radius, or where roads meet obliquely such as at Y-intersections. At these sites, left turn speeds shall be limited by restricting the maximum turn radius. The SDE, when oriented as a left-hand curve (see Figure I3), defines the maximum turn radius when:

- the outer arc contacts the splitter island, median or dividing line at the approach and exit of the roundabout at a single point; and
- the inner arc contacts the kerb or kerb extension at a single point.

Contact with the central island is not a necessary requirement for this component of the design.
I2.3. Approaching traffic

A roundabout design shall also reduce the speed of approaching traffic prior to the entry. The design shall prevent any portion of the vehicle path, approaching the roundabout on a straight or near straight trajectory, to pass the central island without deflection. Otherwise, vehicles can enter the circulating lane at unacceptably high speeds, requiring them to reduce their speed within the roundabout to exit safely. This endangers other users of the roundabout and increases the risk of the vehicle losing control.

On straight approaches, the above requirement is met when there is no gap between the central island and the prolongation of the approach kerb across the side road. A kerb extension may be used on an approach to bridge this gap (see Figure I4).
Appendix I

Figure I4 Local street roundabout design – use of kerb extensions

On curved approaches special attention is required to prevent vehicles from entering the roundabout without having to reduce speeds. Figure I5 shows how the inadequate design of the roundabout produces a gap allowing approaching vehicles to enter at high speed.

Figure I5 Inadequate design for a curved approach

I3. Mini roundabouts

A mini roundabout (or small diameter roundabout as referred to in AS 1742.13 MUTCD Part 13: Local area traffic management) should have a circular central island with a diameter of between 4 metres and 6 metres. Smaller diameter roundabouts may lack the physical presence and visual impact to achieve appropriate driver behaviour and compliance with the road rules.

I3.1. General design requirements

The Standard Design Envelope (see Appendix J) should also be applied to mini roundabout design in the same way as a local street roundabout.
Alternatively, the SDE may be applied to the entry geometry of the roundabout by the outer arc of the SDE contacting the splitter island and central island, and the inner arc contacting the corner kerb or kerb extension.

There should be no clear line of sight between the left kerb alignment and the central island. A gap of not more than 1 metre is generally permissible providing it is kept to a minimum and consistent on all approaches.

The wheel path of passenger vehicles should be contained within the carriageway of the circulating lane, particularly for turning vehicles. The entry width to the circulating lane should be in accordance with the local street roundabout design requirements.

### I3.2. Kerb type and construction

All splitter islands and the central island should be constructed in a mountable kerb. Kerb extensions and corner kerbs should be constructed in 150 mm high barrier kerb. The central island and splitter islands should be fully paved.

### I3.3. Signs

Signs shall be installed in accordance with AS 1742.13 MUTCD Part 13: Local area traffic management and Section 7 of this document. The 'roundabout ahead' (W2 7) warning sign should not be used unless visibility of the roundabout is poor.

### I4. Off-street roundabouts

A roundabout in an off-street area should be designed to suit the speed environment, with consideration to the principles in this Appendix.
Appendix J: Standard Design Envelope

Scale 1: 200