Operational Instruction

Overtaking Lanes
Overtaking Lanes - 2.15

AMENDMENT RECORD

<table>
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<tr>
<th>Version</th>
<th>Page(s)</th>
<th>Date</th>
<th>Amendment Description</th>
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<tr>
<td>Ed1/Rev3</td>
<td>5-9</td>
<td>08/2001</td>
<td>Updating Section 2 to 6</td>
<td>BZ</td>
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<td>11/2001</td>
<td>Signing</td>
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<td>08/07</td>
<td>Merge Arrows &amp; Sign Change</td>
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<tr>
<td>6</td>
<td>5 &amp; 13</td>
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<td>Reference to GRD Part 3 Table 9.2</td>
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Manager, Traffic Services
29 / 9 / 2017

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1. Scope/Introduction

This Operational Instruction provides guidance to DPTI personnel and contractors for the design, construction, signing and operation of overtaking lanes. It should be read in conjunction with Austroads Guide to Road Design Part 3 – Geometric Design (GRD) and the Australian Standard AS1742.2 Manual of Uniform Traffic Control Devices Part 2 – Traffic Control Devices for General Use (2009).

The selection of appropriate locations for overtaking lanes in terms of the strategic importance to improving overtaking opportunities along a particular route is not covered in this document. Slow vehicle turnouts are also not covered.

The Department is committed to the national harmonisation of standards and guidelines wherever possible and actively promotes this with Austroads and Australian Standards.

2. Background

Overtaking lanes are being increasingly used in South Australia to improve overtaking opportunities on rural roads. Lanes are being constructed in flat terrain and on high speed roads, with often little speed differential between an overtaking vehicle and the vehicle being overtaken.

The Austroads GRD and AS1742.2 discusses the use of overtaking lanes, but primarily addresses the situation where the overtaking lane is in a hilly environment and is being used to facilitate the overtaking of vehicles at higher speed differences. As a result some of the recommendations in the Austroads GRD have been found unsuitable for some overtaking lanes installed in South Australia.

In addition, as overtaking lanes are being constructed where overtaking manoeuvres are occurring between vehicles travelling at similar speeds, the safety of the merge area is very important.

The guidelines and recommendations of this document result from field experience and trials on existing overtaking lanes.

3. Location and Design Features of Overtaking Lanes

The location of an overtaking lane should be chosen to improve the overtaking opportunities, or make safer existing opportunities, along a particular route. Ideally sites that do not currently provide overtaking opportunities should be chosen. Traffic platoon data may be used to assist in locating overtaking lanes or to validate the desired positioning of overtaking lanes.

Locations where overtaking lanes are likely to be inappropriate include sites:

- On the approach to a town or a section of road where a lower speed limit applies. Overtaking lanes may be placed on the departure side of a town and if they are, they should be located clear of any low speed zones, including “buffer” speed zones. Ideally they should be placed at locations where drivers have had the opportunity to resume travelling at free speeds.
- Near bridges.
The following situations should be carefully considered and be properly managed or avoided where possible:

- Unprotected drop-offs adjacent to overtaking lanes.
- Hazards from drainage culverts which may be installed as part of the works, particularly adjacent to merge or diverge areas.
- The presence of access points along the overtaking lane.
- Insufficient sight distance at start and end of the lane.
- The potential for significant environmental damage exists.
- The road condition 2km before and after a proposed overtaking lane.

Overtaking lane sites should, if possible be chosen so that right turns are not required. The use of a sheltered right turn area in conjunction with the overtaking lane may need to be considered, or alternatively a flush median may be provided to offer some protection to the turning road users. Generally side roads or driveways should not be accommodated where suitable sight distance is not available.

### 3.1 Lane Length

Overtaking lanes in South Australia cater for overtaking manoeuvres for which there is often a small speed differential between vehicles. Wherever possible the Austroads Guide to Road Design Part 3 Geometric Design will be adopted, with the exception of minimum lane lengths that should be taken from Table 3.1 of this document. Any future overtaking lane proposals will be assessed on a site by site basis.

For road train routes (equivalent vehicle or greater), desirable lengths shall be taken from Table 9.2 of the Guide to Road Design Part 3: Geometric Design and multiplied by 1.5.

The length of an overtaking lane should be established by selecting suitable merge and diverge areas, taking into account crests, curves and vehicle types which will provide a length of lane equal, or greater, than those shown in Table 3.1.

#### Table 3.1 Minimum Length of Overtaking Lanes

<table>
<thead>
<tr>
<th>Design Speed (km/h)</th>
<th>Minimum Length of Lane* (i.e. including merge and diverge tapers), m</th>
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<td>HILLY</td>
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<td>80</td>
<td>450</td>
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<td>90</td>
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<tr>
<td>100</td>
<td>700</td>
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*For Road Train routes (equivalent or greater) refer to GRD Part 3 Table 9.2

Lanes of up to 2 km in length have been observed to operate efficiently where platoon volumes are high or overtaking is severely limited. Locations with tight alignments and restricted overtaking manoeuvres may be better serviced with shorter closer spaced overtaking lanes.

### 3.2 Diverge Area Considerations

The diverge taper length should be calculated as follows:
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\[ T_D = \frac{VW}{3.6} \]

where:  
- \( T_D \) = diverge taper length (m)  
- \( V \) = Operating speed (km/h)  
- \( W \) = amount of pavement widening (m)

The use of excessively long tapers at the start of an overtaking lane should be avoided as drivers may assume that there is sufficient overtaking width prior to the overtaking lane being fully developed.

3.3 Merge Area Considerations

3.3.1 Continuation Sight Distances

Drivers travelling in the overtaking lane should be able to see the full length of the merge area, with a driver in the centre (or overtaking) lane being able to make a decision whether to complete or abandon an overtaking manoeuvre prior to the merge area ending. To achieve this, continuation of sight distance should be provided to the start and to the end of the merge taper (refer Austroads Guide To Road Design Part 3 Geometric Design). Merges should be located away from junctions.

![Figure 3.1: Sight Distance Required at Merge End](image)

Important Note: The merge area shall not be located in left-hand curves regardless of available sight distance.

The merge taper length should be calculated as follows:

\[ T_M = \frac{VW}{2.16} \]

where:  
- \( T_M \) = merge taper length (m)  
- \( V \) = Operating speed (km/h)  
- \( W \) = amount of pavement widening (m)

The use of excessively long tapers at the end of an overtaking lane should be avoided to discourage drivers from attempting to continue or commence an overtaking manoeuvre within the taper.

3.3.2 Shoulder Treatment at the Merge Area

Construction techniques may result in a full width widening of the trafficable shoulder along the merge area, which may be sealed. The sealed shoulder widening along a merge taper should not be made
readily available to drivers for use as a continuation of the left lane (refer to Drawing TES12408). Guide posts (refer Section 4.3) should be placed through the merge area showing the lane termination, even if this requires installing posts within the sealed portion of shoulder.

3.4 Lane Width and Cross Fall

The recommended minimum centre lane (used by overtaking vehicles) width is 3.5 m. The lane width of the left-most lanes in either direction should be consistent with the lane width provided on the adjoining sections of road.

The cross fall of both lanes in the dual lane direction shall be uniform.

3.5 Treatment near a Junction or Intersection

If an overtaking lane develops immediately after a junction or access and that junction or access has an exclusive acceleration lane leading into the overtaking lane, then a continuous 50m line shall be used at the start of these lanes to separate the acceleration lane and through lane. The Keep Left Unless Overtaking (R6-29C) signs shall be installed where the continuous line terminates, and the OVERTAKING LANE 300m AHEAD sign (G9-38) [300] must not be installed as this may cause confusion to some motorists who believe that the junction or access forms part of the taper of the overtaking lane.

4. Signing and Delineation

The signing detailed in this section is based on Australian Standard AS1742.2 – “Manual of Uniform Traffic Control Devices, Part 2: Traffic Control Devices for General Use” with additional signs and delineation introduced for application in South Australia.

4.1 Advance Warning Signs

Advance warning of an overtaking lane is given through the use of the G9-38 ‘OVERTAKING LANE x km AHEAD’ and G9-37 ‘OVERTAKING LANE x m AHEAD’ signs, as shown in Figure 4.2.

The G9-38 sign is used to encourage drivers not to “push” to overtake but wait for the opportunity provided by the overtaking lane and should be placed in advance of a section of road prior to an overtaking lane which does not provide adequate safe overtaking opportunities. This may be as close as 3 km or as far as 5 km prior to the overtaking lane, depending on the road alignment and traffic conditions. Typically 5 km (3.5 minutes at 90 km/h) should be used where overtaking opportunity is not significantly restricted prior to the lane.

Installing a G9-38 sign more than 5 km in advance should be avoided as approximately 3.5 minutes of travel at 90 km/h may not be considered acceptable and drivers are likely to continue looking for other overtaking opportunities.

Advance warning of overtaking lanes should not be given in advance of a town or significant commercial roadside facility where a change in speed limit and
interaction with other traffic may remove the need to overtake. In this instance a G9-38 sign should be placed shortly after the town.

An OVERTAKING LANES NEXT X KMS sign may be used where at least 4 overtaking lanes accommodating traffic travelling in the same direction are located within an average spacing of 10 km of each other. If used, the sign should be placed at approximately 5 km in advance of the first overtaking lane.

A G9-37 (300) sign shall be placed nominally 300 m in advance of the start of the diverge taper. Although where the sign cannot be accommodated at this location the sign may be placed further in advance of the lane and the legend changed accordingly.

Figure 4.2: Typical Arrangement for Diverge Area
4.2 Overtaking Lane Direction Approach (Diverge area)

A R6-29 ‘KEEP LEFT UNLESS OVERTAKING’ sign shall be placed at the start of the diverge area, as shown in Figure 4.2.

The edge lines and continuity line at the diverge area should be marked to give the appearance of a smooth transition to the left, possibly using large radius curves rather than a sudden direction change on the line marking.

Retro Reflective Pavement Markers (RRPMs) shall not be installed on the continuity line on the diverge taper.

Where RRPMs are not provided on the approach to an overtaking lane additional markers shall be installed on the dividing line and edge line for a distance of 300 m prior to the start of the diverge taper.

4.3 Overtaking (Dual) Lane Direction Termination (Merge Area)

Signs for the advance warning of the end of an overtaking lane shall be provided as per Figure 4.3

![Figure 4.3: Typical Arrangement for Merge Area](image-url)
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A W4-9 (C size) 'LEFT LANE ENDS' sign supplemented with a W8-5 (500m, C size) distance plate on the left side of the road placed 500m prior to the start of the merge taper;

*Duplicate* W4-9 (C size) 'LEFT LANE ENDS' sign supplemented with a W8-5 (250m, C size) distance plate on the right side of the road and a W8-15 (C size) 'MERGE RIGHT' plate on the left side of the road placed 250m prior to the start of the merge taper;

A G9-73 (B size) 'MERGE RIGHT' sign installed on the left side of the road at the start of the merge taper.

Through the merge area a continuity line shall extend from the lane line to meet the edge line where the road width returns to normal (Figure 4.3).

RRPMs shall not be installed on the continuity line in the merge taper.

Where RRPMs are not installed on the adjoining section of road leading away from an overtaking lane they shall be continued for a minimum of 300 m from the end of the merge taper on the edge line and dividing line.

4.3.1 Guide Posts at the Merge Taper

Guide posts shall be installed at 15m spacing on the left side of the road through the merge area commencing 60m prior to the start of the merge taper and terminating 60m after the end of the taper and 30m spacing on the right side of the road through the merge area commencing 60m prior to the start of the merge taper and termination 60m after the end of the taper (refer to TES 12408).

Guide posts shall be a flexible type capable of self-recovery.

The guide posts should be installed at a consistent offset from the edge line through the full length of the overtaking lane and, with the exception of the merge area, at a spacing in accordance with Australian Standard AS1742.2 – "Manual of Uniform Traffic Control Devices, Part 2: Traffic Control Devices for General Use".

4.3.2 Merge Pavement Arrows

Merge pavement arrows shall be installed at the merge area.

Figure 4.3.2: Typical Pavement Arrow Arrangement for Merge Area
4.4 Non Overtaking (single) Lane Direction Approach

Where overtaking is not permitted, a standard lane allocation sign (W4-10C) shall be installed at the end of the merge taper on the non-overtaking lane direction approach (refer to Figure 4.4).

![Figure 4.4: Typical Arrangement for Approach against Overtaking Lane Direction](image)

However, on overtaking lanes in high-speed level terrain environments where overtaking is permitted in the non-overtaking (or single) lane direction, the lane allocation sign (W4-10C) shall not be used. Instead, the special lane allocation sign (W4-SA52) shall be installed approximately 100 m after the end of double barrier lines wherever they terminate on the overtaking lanes (refer to Figure 4.4.1).

![Figure 4.4.1: Typical Arrangement for Approach against Overtaking Lane Direction](image)

4.5 Dividing Line Treatment

Generally, separation between the overtaking (dual) lane and non-overtaking (single) lane direction shall be provided with a dividing line consisting of 2 parallel lines. The dividing line on the dual lane side shall be continuous for the full length of the overtaking lane.

Where necessary due to vertical or horizontal site restrictions overtaking may be prohibited from the non-overtaking lane direction by the provision of a continuous lines along the full or partial length of the lane. To determine the need for this restriction it will be necessary to conduct a “barrier line survey” immediately after construction of the overtaking lane.
In any case, a dividing line consisting of parallel continuous lines (double two-way barrier) should be marked at each merge and diverge taper in accordance with Australian Standard AS1742.2 – “Manual of Uniform Traffic Control Devices, Part 2: Traffic Control Devices for General Use” and as shown in Figure 4.5.

If safe overtaking opportunities in the single lane direction have been severely restricted due to the parallel continuous dividing line at the merge or diverge taper at a location where:

- overtaking sight distance is available; and
- if overtaking in the single lane direction could occur across the parallel dividing lines an overtaking opportunity would be created (rather than extended);

consideration may be given to replacing all (or a portion) of the continuous line with a broken line on the single lane side of the dividing line. This can only be undertaken with the approval of the Manager, Technical Services.

Figure 4.5: Dividing Line Treatments at Merge and Diverge Tapers
5. Construction

Overtaking lanes which visually look like “add-ons” may result in drivers preferring not to drive over construction joints or on the different pavement surface, thereby not moving to the left lane. There is also potential to confuse drivers of the status of each lane if both lanes in the dual lane direction appear to be different, particularly at night.

Therefore, the physical bounds of an overtaking lane should be taken as extending 50 m either side of the diverge and merge tapers and across the full width of the dual lanes, as shown in Figure 5.1. A continuous surface treatment, consistent in rideability and appearance in this area is required. Ideally, the same surface treatment and appearance should extend across the whole carriageway.

![Figure 5.1: Reseal/Rehabilitation of Overtaking Lanes](image)

For ease of construction and future resealing, the pavement layers and surface treatment for the additional lane may be extended beyond the proposed overtaking edge line boundaries as shown in Figure 5.1.

### 5.1 Additional Shoulder Widening

A sealed run out should be provided at the end of the merge taper, in accordance with Austroads (2009).

To prevent accelerated edge break and shoulder wear at the start and end of the overtaking lanes, the shoulders should be sealed to at least 1.5 m for a distance of 50 m on the approach to a diverge taper and on the departure side of a merge taper, as shown in Figure 5.2.

![Figure 5.2: Minimum Shoulder Sealing at Tapers](image)
5.2 Installation of Signs and Pavement Markings

During construction permanent overtaking lane signs should remain covered using techniques approved by the manufacturer until the final surface treatment and associated line marking is completed.

If at any stage during construction both lanes in the dual lane direction are opened to traffic the guide post and RRPM treatment (temporary reflective markers are suitable for the short term) at the merge area shall be installed.

Care must be taken to ensure that:
- new edge lines of the overtaking lane meet and are continuous with the existing edge lines approaching and leaving the overtaking lane; and
- there is no off-set with the new dividing line and the existing dividing line of the joining road section.

6. Maintenance Activities on Overtaking Lanes

The line marking and delineation provided at overtaking lanes, particularly at the merge and diverge taper, provide important cues to drivers about when it is safe to commence overtaking and where merging is required. Therefore all line marking and guide posts, particularly the associated reflective devices, must be regularly maintained. It may be necessary to undertake inspection and/or reinstatement or replacement of delineation devices on a more regular basis than would normally be expected for a standard section of road.

6.1 Reseal and Rehabilitation

Reseal or pavement rehabilitation shall be undertaken across the full width of the dual lanes, as shown in Figure 5.1, as a minimum.

Overtaking lanes shall not be left open to traffic in an unmarked state. As a minimum, temporary reflective raised pavement markers shall be installed:
- at 12 m spacing through the diverge and merge and for at least 36 m either side of these areas; and
- at a nominal 50 m to 100 m spacing (depending on road alignment) along the lane line and barrier line for the full length of the overtaking lane.

A minimum of two consecutive markers shall be clearly visible both during the day and at night under low-beam conditions. Where night time delineation cannot be effectively achieved prior to the installation of permanent markings, the overtaking lane signs should remain covered and the separation/barrier line clearly marked with white temporary reflective markers.

At the completion of any major works on an overtaking lane, the end guide post treatment shall be fully reinstated (if they have been disturbed) before the overtaking lane signs are uncovered.
7. Bibliography


