

# Master Specification

## Part RD-GM-D1

### Road Design

September 2024



**Government of South Australia**  
Department for Infrastructure  
and Transport

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## Contents

Contents	3
RD-GM-D1 Road Design	4
1 General	4
2 Objectives of road design (AGRD Part 1)	4
3 Network wide design (AGRD Part 2)	7
4 Geometric design (AGRD Part 3)	7
5 Intersections and crossings: general (AGRD Part 4)	14
6 Unsignalised and signalised intersections (AGRD Part 4A)	17
7 Roundabouts (AGRD Part 4B)	20
8 Interchanges (AGRD Part 4C)	22
9 Roadside design, safety and barriers (AGRD Part 6)	23
10 Paths for walking and cycling (AGRD Part 6A)	24
11 New and emerging treatments (AGRD Part 7)	25
12 Hold Points	26

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## RD-GM-D1 Road Design

### 1 General

- a) This Master Specification Part sets out the requirements for the design of roads including:
  - i) the objectives of road design, as set out in section 2;
  - ii) the network wide design requirements, as set out in section 3;
  - iii) the geometric design requirements, as set out in section 4;
  - iv) the intersection and crossing requirements, as set out in section 5;
  - v) the unsignalised and signalised intersection requirements, as set out in section 6;
  - vi) the roundabout requirements, as set out in section 7;
  - vii) the interchange requirements, as set out in section 8;
  - viii) the roadside design, safety and barrier requirements, as set out in section 9;
  - ix) the paths for walking and cycling requirements, as set out in section 10;
  - x) the new and emerging treatment requirements as set out in section 11; and
  - xi) the Hold Point requirements, as set out in section 12.
- b) This Master Specification Part has been developed to clarify and supplement Austroads Guide to Road Design (AGRD), and to improve consistency of interpretation for State maintained roads in South Australia.
- c) The design of roads must comply with the Reference Documents, including:
  - i) Austroads Guide to Road Design (AGRD);
  - ii) Austroads Guide to Traffic Management (AGTM); and
  - iii) Austroads Guide to Road Tunnels (AGRT).
- d) For the purposes of AGRD:
  - i) where a road location is designated as 'inner urban' or 'CBD' in the Contract Documents, the road location should be considered an 'urban' road;
  - ii) where a road location is designated as 'outer urban' in the Contract Documents, the road location should be considered a 'rural' road; and
  - iii) where a road classification is designated as a 'motorway' in the Contract Documents, the road classification should be considered to be both a 'freeway' and a 'motorway'.

## 2 Objectives of road design (AGRD Part 1)

### 2.1 Jurisdictional supplements (section 1.6 of AGRD Part 1)

#### 2.1.1 General

- a) This Master Specification Part is the South Australian jurisdictional supplement to AGRD.
- b) The Department's Reference Documents for road design are available from: <https://dit.sa.gov.au/standards>.

### 2.1.2 Traffic control devices

- a) The South Australian Commissioner of Highways' Manual of Legal Responsibilities and Technical Requirements for Traffic Control Devices (known as "The Instruments") sets out the mandatory requirements for the use of traffic control devices in South Australia, including:
  - i) Instrument from the Commissioner of Highways to Grant General Approval for the temporary use of Traffic Control Devices by Persons other than Road Authorities;
  - ii) Instrument of General Approval and Delegation to Council for the Use of Traffic Control Devices, Road Closures and Granting of Exemptions for Events; and
  - iii) Part 2 - Code of Technical Requirements.
- b) The design of traffic control devices must comply with the Reference Documents, including:
  - i) AS 1742 Parts 1 to 15;
  - ii) Department Code of Technical Requirements; and
  - iii) Department Operational Instructions (available from: [https://www.dit.sa.gov.au/standards/standards\\_and\\_guidelines](https://www.dit.sa.gov.au/standards/standards_and_guidelines)).
- c) The design of all pavement markings must comply with the Department Pavement Marking Manual (available from: [https://www.dit.sa.gov.au/standards/standards\\_and\\_guidelines](https://www.dit.sa.gov.au/standards/standards_and_guidelines)).
- d) Where the road design incorporates traffic control devices, (such as traffic signs and traffic signals), traffic control devices must comply with RD-LM-D1 "Traffic Control Device Design".

### 2.1.3 Maintenance agreements

The standard management and maintenance agreements between the Department and councils are detailed in Department Operational Instruction 20.1 - Care, Control and Management of Roads by the Commissioner of Highways.

## 2.2 Road design across the transport management system (section 2 of AGRD Part 1)

### 2.2.1 Road safety audits (section 2.2.3 of AGRD Part 1)

Road safety audits must be carried out in accordance with the requirements of RD-GM-D2 "Road Safety Audits".

### 2.2.2 Safe system assessment (section 2.2.3 of AGRD Part 1)

Safe system assessments must be carried out in accordance with the requirements of RD-GM-D2 "Road Safety Audits".

## 2.3 Principles and objectives of road design (section 3 of AGRD Part 1)

The Department has no supplementary requirements for section 3 of AGRD Part 1.

## 2.4 Road design application (section 4 of AGRD Part 1)

### 2.4.1 Phases of design (section 4.2 of AGRD Part 1)

- a) The requirements of sections 4.2.1 and 4.2.2 of AGRD Part 1 (phase 1 - establish the preferred solution and phase 2 - further develop the solution) are supplemented by the following Master Specification Parts:
  - i) PC-PL3 "Concept Design Development"; and
  - ii) PC-PL4 "Constructability Assessments".
- b) The requirements of section 4.2.3 of AGRD Part 1 (phase 3 - detailed design: the design for construction) are supplemented by the following Master Specification Parts:

- i) PC-EDM1 “Design Management”;
- ii) PC-EDM2 “Safety Management in Design”; and
- iii) PC-EDM3 “Independent Design Certification”.

#### 2.4.2 Normal design domain (NDD) (section 4.4.1 of AGRD Part 1)

- a) Unless otherwise specified in the Contract Documents, where an item, approach or option is referred to in AGRD or this Master Specification Part and it is expressed in terms such as ‘should’, ‘may be’, ‘recommended’, ‘suggested’, ‘desirable’, ‘advisable’ or a range of values, for each item, approach or option the Contractor must demonstrate, to the satisfaction of the Principal, as part of the relevant Design Documentation submission and in accordance with this section 2.4.2, that the Contractor has:
  - i) selected parameters in compliance with normal design domain and has developed value for money designs that manage the inherent risk so far as is reasonably practicable whilst providing the Principal’s desired operational and community benefit; and
  - ii) incorporated values within the upper bound and lower bound of NDD (i.e. minimum to desirable) which have been selected based on the road classification, functional hierarchy, location, traffic volumes and topography.
- b) The selection of design parameters must be documented in the Design Basis and the Design Report(s) in accordance with PC-EDM1 “Design Management”.
- c) Acceptance of the Design Basis by the Principal must be in accordance with either:
  - i) for the planning and pre-delivery phases, in accordance with PC-PL3 “Concept Design Development”; or
  - ii) PC-EDM1 “Design Management”.

#### 2.4.3 Extended design domain (section 4.4.2 of AGRD Part 1)

- a) The principles of extended design domain (EDD) must not be applied to the design of the Works, unless otherwise specified in the Contract Documents or agreed by the Principal as an Accepted Design Departure at site specific locations in accordance with PC-EDM1 “Design Management”.
- b) Values within EDD may be considered by the Principal on modifications or upgrades to existing roadways in a constrained location or environment, subject to an Accepted Design Departure.

#### 2.4.4 Design exception process (section 4.5 of AGRD Part 1)

The adoption of road design parameters and elements outside extended design domain must not be applied to the design of the Works, unless otherwise agreed by the Principal as an Accepted Design Departure at site specific locations in accordance with PC-EDM1 “Design Management”.

#### 2.4.5 Design and legal liability (section 4.6.1 of AGRD Part 1)

- a) The Principal owes no duty to the Contractor, including the Designer (where applicable) to review or examine any of the calculations, assessments or documents for compliance to the Contract Documents, including the Reference Documents (such as AGRD), PC-EDM1 “Design Management” and any applicable Laws.
- b) Regardless of any endorsement, approval, acceptance of the Design Documentation or release of Hold Point, by (or on behalf of) the Principal:
  - i) the Contractor, including the Designer (where applicable) is not relieved of its legal liabilities; and
  - ii) the Principal has no liability whatsoever to the Contractor, including the Designer (where applicable) by reason of any errors, deficiencies, defects or omissions in the Design Documentation.

## 2.5 The road design process (section 5 of AGRD Part 1)

The requirements of section 5 of AGRD Part 1 are supplemented by the following Master Specification Parts:

- a) PC-EDM1 “Design Management”;
- b) PC-EDM2 “Safety Management in Design”; and
- c) PC-EDM3 “Independent Design Certification”.

## 3 Network wide design (AGRD Part 2)

- a) Austroads is developing an update to AGRD Part 2 to provide guidance on network wide design.
- b) The Contractor must consider the individual design element in the context of the wider network, location, topography, and crash history.

## 4 Geometric design (AGRD Part 3)

### 4.1 Introduction (section 1 of AGRD Part 3)

The Department has no supplementary requirements for section 1 of AGRD Part 3.

### 4.2 Fundamental considerations (section 2 of AGRD Part 3)

#### 4.2.1 Location (section 2.2.1 of AGRD Part 3)

- a) The Department has locational classes for each State maintained roads for the following location classes: CBD, inner urban, outer urban and rural.
- b) Where not specified in the Contract Documents, the Contractor must confirm the road location classification with the Principal, which must be included as part of the Design Basis in accordance with PC-EDM1 “Design Management”.
- c) The design of the Works for rural roads through built-up areas (townships) must adopt an area class of either inner urban or outer urban based on the adjacent land use.

#### 4.2.2 Road classification (section 2.2.2 of AGRD Part 3)

- a) The Department has classified State maintained roads (available from <https://location.sa.gov.au/viewer/>) in the following categories: motorway, arterial, collector and local access.
- b) Where not specified in the Contract Documents, the Contractor must confirm the road classification with the Principal, which must be included as part of the Design Basis in accordance with PC-EDM1 “Design Management”.
- c) The functional hierarchy of State maintained roads within South Australia is on Location SA interactive online map (available from <https://location.sa.gov.au/viewer/>).
- d) Roads classified as freight routes are nominated in Location SA interactive online map (available from <https://location.sa.gov.au/viewer/>).

#### 4.2.3 Traffic volume and composition (section 2.2.3 of AGRD Part 3)

- a) The traffic volume and composition of State maintained roads within South Australia is included in the Location SA interactive online map (available from: <https://location.sa.gov.au/viewer/>).
- b) The Contractor must request from the Principal information on existing traffic volumes, composition and turn movements where such information is not specified in the Contract Documents.

- c) The Works must comply with the traffic analysis and traffic modelling requirements set out in RD-GM-D4 “Traffic Analysis and Modelling”.

#### 4.2.4 Design vehicle (section 2.2.7 of AGRD Part 3)

- a) Where not specified in the Contract Documents, the design of the Works must accommodate the design vehicles that are in accordance with:
- i) for intersections, the requirements as set out in section 5.5; and
  - ii) for midblock locations (lane widening on curves) the largest vehicle as specified for the route networks in South Australia, available on RAVnet (an interactive online map system available from <https://maps.sa.gov.au/ravnet/>).
- b) The design of the Works must include the South Australia routes identified as over dimensional routes (available from: [https://www.sa.gov.au/data/assets/pdf\\_file/0010/369082/Freight\\_class\\_oversize\\_oversize\\_book.pdf](https://www.sa.gov.au/data/assets/pdf_file/0010/369082/Freight_class_oversize_oversize_book.pdf)).
- c) For planning phases, the Contractor must include the over dimensional routes as part of the Concept Design Basis in accordance with PC-PL3 “Concept Design Development”.
- d) The Contractor must include the over dimensional routes as part of the Design Basis in accordance with PC-EDM1 “Design Management”.
- e) Where not specified in the Contract Documents, the Contractor must confirm with the Principal (Network Management Services) if the roadway operates under a permit system which will require additional design and checking vehicles, which must be included as part of the Design Basis in accordance with PC-EDM1 “Design Management”.
- f) Where a road is required to accommodate over-dimensional vehicles, the design of the Works must include:
- i) a clear pavement width to cater for a prime mover and trailer, which must be no less than 4.5 m;
  - ii) a clear width allowance of 9.0 m measured from 900 mm above the pavement to cater for the over-dimensional load on the trailer; and
  - iii) vertical clearance in accordance with section 4.8.1.
- g) The design of the Works must enable safe and efficient emergency access for all Emergency Service vehicles to adjacent buildings and facilities, including ambulance (SAAS), police (SAPOL), fire (SAMFS / CFS) and state emergency services (SES).

#### 4.2.5 Access management (section 2.2.10 of AGRD Part 3)

Where not specified in the Contract Documents, the Contractor must consult with the Principal (Network Management Services) to confirm if the roadway is a “controlled-access road” (restricting access to adjacent properties) or a “local-access road”, which must be included as part of the Design Basis in accordance with PC-EDM1 “Design Management”.

#### 4.2.6 Drainage (section 2.2.11 of AGRD Part 3)

Road drainage must be carried out in accordance with RD-DK-D1 “Road Drainage Design”.

#### 4.2.7 Utility Services (section 2.2.12 of AGRD Part 3)

The Contractor must ensure that the design of the Works assesses and coordinates the road design with Utility Services in accordance with PC-US1 “Utility Services”.

#### 4.2.8 Topography / geology (section 2.2.13 of AGRD Part 3)

- a) The Department has classified the terrain for each State maintained road with following types: flat, undulating, hilly or mountainous.



- b) Where not specified in the Contract Documents, the Contractor must confirm the terrain type with the Principal (road design), which must be included as part of the Design Basis in accordance with PC-EDM1 "Design Management".

### 4.3 Speed parameters (section 3 of AGRD Part 3)

#### 4.3.1 Operating speed (85<sup>th</sup> percentile speed) (section 3.2.2 of AGRD Part 3)

- a) The geometric design speed must be determined from the 85<sup>th</sup> percentile speed in accordance with section 3.2.2 and commentary 1 of AGRD Part 3.
- b) The geometric design speed for individual elements must be documented in the Design Basis.

#### 4.3.2 Inner urban roads (section 3.3 of AGRD Part 3)

- a) Where not specified in the Contract Documents, for inner urban roads with a posted speed limit greater than 60 km/h the design of the Works must utilise the geometric design speeds determined in accordance with section 3.3.2 of AGRD Part 3.
- b) Where not specified in the Contract Documents, for inner urban roads with a posted speed limit of 50 km/h or 60 km/h the design of the Works may adopt the geometric design speed equivalent to the posted speed limit, which is considered within the normal design domain.

#### 4.3.3 High speed - outer urban or rural roads and motorways (sections 3.4.1 and 3.4.2 of AGRD Part 3)

- a) Where not specified in the Contract Documents, the design speed for high speed outer urban and rural roads and motorways must be in accordance with section 3.5.2 (new rural roads) of AGRD Part 3.
- b) Where not specified in the Contract Documents, the design speed for existing high standard outer urban and high-speed rural roads must be in accordance with the observed 85<sup>th</sup> percentile operational speed data. When existing data is not available the design speed must be determined in accordance with sections 3.3.2 and 3.4 of AGRD Part 3.
- c) Where not specified in the Contract Documents, for high speed outer urban and rural roads and motorways the design speed for all road design elements (such as corners and deceleration lanes) must be included as part of the Design Basis in accordance with PC-EDM1 "Design Management".

#### 4.3.4 Intermediate and low speed - outer urban and rural roads (sections 3.4.2 and 3.4.3 of AGRD Part 3)

- a) Where not specified in the Contract Documents, in addition to the description in section 3.4.3 of AGRD Part 3, outer urban and rural roads with speed advisory signs on horizontal curves, may be considered as intermediate or low speed roads.
- b) Where not specified in the Contract Documents, for roads classified as outer urban or rural, and either intermediate speed or low speed, the Contractor must determine the 85<sup>th</sup> percentile operating speed for each element of the road using the operating speed model in accordance with section 3.4 and appendix E of AGRD Part 3 or observed traffic data (where available).
- c) Where not specified in the Contract Documents, for roads classified as outer urban or rural, and either intermediate speed or low speed the design speed for all road design elements (such as corners and deceleration lanes) must be included as part of the Design Basis in accordance with PC-EDM1 "Design Management".

### 4.4 Cross-section (section 4 of AGRD Part 3)

#### 4.4.1 General

- a) Where not specified in the Contract Documents, cross sections selection must be aligned with the iRAP star rating nominated by the Principal for the roadway and road stereotype, in

accordance with the Reference Documents, including AP-R619-20, Network Design for Road Safety, Users Guide.

- b) The selection of cross section elements must accommodate the nominated over-dimensional design vehicle in accordance with section 4.2.4.

#### 4.4.2 Traffic lane widths (section 4.2.4 of AGRD Part 3)

Where kerbs are present, shoulder and traffic lane widths must be measured from the centre of the adjacent lane line marking to:

- a) the “kerb line” as shown in figure 4.8 of AGRD Part 3; and  
 b) the “line of kerb” as shown in figure 4.20 of AGRD Part 3 for the different kerb profiles shown.

#### 4.4.3 Inner urban road widths (sections 4.2.5 and 4.4 AGRD Part 3)

- a) State maintained roads within the inner urban area vary from strategic freight routes to urban connector roads through shopping precincts with high pedestrian activity. The selection of road cross sectional elements must balance the safety risk to all road users and be commensurate with the:
- i) location and adjacent land use;
  - ii) pedestrian and cyclist activity; and
  - iii) traffic volumes and vehicle mix.
- b) Where not specified in the Contract Documents, provision for cyclist (either on road or off-road facility) must be included for all inner urban roads.
- c) For inner urban roads with a posted speed limit greater than 60 km/h, an off road bicycle facility (shared path or separated bike path) must be provided wherever practicable.
- d) Where not specified in the Contract Documents, the Works must comply with the width of cross section elements within the normal design domain as detailed in Table RD-GM-D1 4-1.

**Table RD-GM-D1 4-1 Inner urban road lane widths within normal design domain**

Cross section element	Freight routes and inner urban roads >60 km/h	Inner urban arterial roads ≤60 km/h (non-freight routes)	Inner urban collector or local roads (non-freight routes)
Urban border (nature strip and footpath)	3.0 - 5.0 m	3.0 - 5.0 m	3.0 - 5.0 m
Bicycle lanes	1.5 - 1.8 m	1.2 - 1.5 m	1.2 - 1.5 m
Kerbside (nearside) lanes <sup>(1)</sup> with an adjacent bicycle lane	3.5 m	3.4 m	3.3 m
Kerbside (nearside) lanes <sup>(1)</sup> without an adjacent bicycle lane	3.7 m	3.5 m	3.5 m
Auxiliary through lanes	3.2 - 3.3 m	3.0 - 3.3 m	3.0 - 3.3 m
Exclusive turn lanes	3.1 - 3.3 m	3.0 - 3.3 m	3.0 - 3.1 m
Bus lane / bus only lane	3.3 - 3.5 m	3.3 - 3.5 m	3.3 - 3.5 m

**Table notes:**

(1) Intersections with auxiliary through lanes or deceleration lanes must maintain the kerbside (nearside) lane width through the intersection.

#### 4.4.4 Outer urban and rural roads and urban motorways (sections 4.2.5 and 4.2.6 of AGRD Part 3)

- a) For outer urban and rural roads, cross section elements for single carriageways and divided carriageways must be in accordance with section 4.2.6 and tables 4.5 and 4.6 of AGRD Part 3.

- b) For urban motorways, cross section elements must be in accordance with section 4.2.5 and table 4.4 of AGRD Part 3.
- c) Managed motorways must include a minimum shoulder of 1.0 m, unless otherwise specified in the Contract Documents.
- d) Upgrades to existing outer urban or rural arterial road must select the road cross section based on the road stereotypes in accordance with AP-R619-20 Network Design for Road Safety (Stereotypes for Cross-sections and Intersections): User Guide.
- e) Rural roads with AADT > 4,000 vpd, must include a wide centre line treatment (WCLT) including audio tactile line marking (ATLM).
- f) Dual carriageway or duplicated roads (4 lanes / two-way), must mitigate the safety risk at intersections for right turning (from the minor road) and cross carriageway movements:
  - i) dual carriageways (4 lanes with narrow median or wide centre line treatments) may be adopted in constrained locations with the following conditions:
    - A. the road is in mountainous or hilly terrain;
    - B. bridges and bridge approaches; and
    - C. right turns (from the minor road) and cross carriageway movements incorporate:
      - I. two-stage crossings; and
      - II. low volume local rural roads (AADT < 150 vpd); and
  - ii) duplication (4 lanes with a wide median) must be provided at all other locations, unless agreed otherwise by the Principal.
- g) Physical separation by median barrier must be provided for dual carriageway or duplicated roads:
  - i) with AADT > 10,000 vpd and a posted speed limit of 80 kph or greater, or
  - ii) as required to achieve the NRRIT score in accordance with section 9.3.
- h) Audio tactile line marking (ALTM) must be provided in accordance with the Reference Documents, including Department Operational Instruction 2.13 - Audio-Tactile Line Marking.
- i) Cross sections for outer urban and rural roads with a narrow median or wide centre line treatment must be in accordance with Table RD-GM-D1 4-2.

**Table RD-GM-D1 4-2 Roads with narrow median or wide centre lines - normal design domain**

Cross section element	Width
Narrow median with wire rope safety barrier (WRSB)	2.2 m (plus sight distance widening)
Wide centre line treatment (WCLT)	1.4 m
Traffic lanes adjacent to a WCLT or WRSB	3.3 - 3.5 m
Nearside (left) or auxiliary lanes (e.g. overtaking lanes)	3.5 m
Shoulders	Refer to AGRD Part 3, tables 4.5 and 4.7

#### 4.4.5 Table drains (section 4.6 of AGRD Part 3)

- a) Where the table drain cross section complies with figure 4.19 of AGRD Part 3, the minimum bottom width of table drains (refer to figure 4.16 of AGRD Part 3) may be reduced to 1.2 m.
- b) 'V' drains must not be used but may be considered by the Principal as a Design Departure where appropriate scour protection is provided.

#### 4.4.6 Kerb and channel (section 4.6.4 of AGRD Part 3)

Kerb profiles on State maintained roads must be in accordance with the Reference Documents.

#### 4.4.7 Batters (section 4.5 of AGRD Part 3)

- a) Batter slopes greater than the maximum may be considered by the Principal in constrained locations where:
  - i) the Contractor demonstrates that a steeper batter slope is acceptable based on an appropriate geotechnical assessment;
  - ii) a network road risk intervention threshold (NRRIT) has been nominated, the NRRIT has not been exceeded; and
  - iii) the steeper batter slope is accepted by the Principal as an Accepted Design Departure.
- b) The design of batters must be integrated with the landscape design to ensure vegetation is suitable for the environment and the effective management of erosion.
- c) The government architect (ODASA) has developed a guideline “Principles of Good Batter Design” to assist in the design of batters (available from: <https://www.odasa.sa.gov.au/>).

#### 4.4.8 Medians (section 4.7 of AGRD Part 3)

Where an outer urban or rural road intersection includes a two-stage crossing, the median must provide vehicle storage to accommodate the nominated design vehicle in the storage length (S), in accordance with figure 7.2 of AGRD Part 4A.

#### 4.4.9 Bicycle lanes (section 4.9.1 of AGRD Part 3)

Refer to section 10 for further guidance on paths and connectivity with bicycle lanes.

#### 4.4.10 Urban border and verge (section 4.12.3 of AGRD Part 3)

The location of footpaths within the urban border (verge) must be located as close as practical to the property boundary (refer to figure 4.58 of AGRD Part 3) whilst meeting the objectives of crime prevention through environmental design (CPTED) and visibility of driveways for pedestrians.

#### 4.4.11 Bus stops (section 4.13 of AGRD Part 3)

The design of the Works must be in accordance with the bus stop requirements set out in RD-PT-D1 “Bus Infrastructure Design”.

### 4.5 Sight distance (section 5 of AGRD Part 3)

#### 4.5.1 Driver reaction time (section 5.2.2 of AGRD Part 3)

The design of the Works must adopt driver reaction time parameters in accordance with Table RD-GM-D1 4-3.

**Table RD-GM-D1 4-3 Driver reaction times**

Reaction time	Application
1.5	Must not be used in South Australia, except within Tunnels.
2.0	Inner urban and outer urban roads.
2.5	Rural roads with a posted speed limit of 100 km/h or greater.

#### 4.5.2 Longitudinal deceleration (section 5.2.3 of AGRD Part 3)

Unless otherwise specified in the Contract Documents, a coefficient of deceleration of 0.46 or greater for cars on surface roads may only be adopted where accepted by the Principal.

#### 4.5.3 Sight distance on horizontal curves (section 5.5 of AGRD Part 3)

- a) The Contractor must follow the process for assessment of sight distance on horizontal curves in accordance with appendix H of AGRD Part 3.

- b) Where not specified in the Contract Documents, for upgrades to existing roads, where the assessment outcome (in accordance with appendix H of AGRD Part 3) is to “change geometry”, the Contractor must make a recommendation to the Principal on the “value for money” options available to change the existing alignment to achieve compliant sight distances.

## 4.6 Coordination of horizontal and vertical alignment (section 6 of AGRD Part 3)

The Department has no supplementary requirements for section 6 of AGRD Part 3.

## 4.7 Horizontal alignment (section 7 of AGRD Part 3)

### 4.7.1 Transitional curves (section 7.5.4 of AGRD Part 3)

The design of the Works must not use transition curves in horizontal design.

### 4.7.2 Side friction and maximum curve size (section 7.6 of AGRD Part 3)

- a) The desirable maximum values of side friction in table 7.5 of AGRD Part 3 for cars must be adopted.
- b) Subject to section 2.4.2, either the desirable maximum or absolute maximum values of side friction in table 7.5 of AGRD Part 3 for trucks must be considered normal design domain.

### 4.7.3 Maximum superelevation (section 7.7.3 of AGRD Part 3)

- a) The Contractor must consider the types of vehicles using the road and speed profile in determining the maximum super elevation.
- b) The maximum superelevation (emax) for motorways (excluding Tunnels) must be 5%.

### 4.7.4 Pavement widening on horizontal curves (section 7.9 of AGRD Part 3)

Pavement widening in accordance with table 7.13 of AGRD Part 3 does not apply to widening of less than 0.2 m.

## 4.8 Vertical alignment (section 8 of AGRD Part 3)

### 4.8.1 Vertical clearances (section 8.2.4 and table 8.1 of AGRD Part 3)

- a) Over-dimensional routes must incorporate additional vertical clearances than included in table 8.1 of AGRD Part 3. Guidance on over dimensional routes is provided in sections 4.2.4b) and 4.2.4e).
- b) The measurement of vertical clearance is from the pavement surface to a bridge soffit or vertical obstruction (e.g. gantry or sign).
- c) Vertical clearance must be provided for the full road carriageway.

### 4.8.2 Minimum grades (section 8.5.6 of AGRD Part 3)

The minimum grade for roads with kerb and gutter in flat terrain that may be adopted is 0.3%. Refer to RD-DK-D1 “Road Drainage Design” for drainage requirements resulting from minimum grades.

## 4.9 Auxiliary lanes (section 9 of AGRD Part 3)

### 4.9.1 Overtaking lanes (section 9.4 of AGRD Part 3)

- a) The requirements of this section 4.9.1 only apply to rural roads.
- b) Overtaking provisions and sight distances for PBS level 3 and 4 routes must comply with the Reference Documents, including section 2.3 of PBS Scheme - Network Classification Guidelines (available from: <https://www.nhvr.gov.au/>).

- c) The normal design domain for overtaking lanes is to incorporate widening on the left-hand side of the direction of travel with the road crown between directions of travel.
- d) Overtaking lanes must incorporate a wide centre line treatment (WCLT) as the minimum treatment between carriageways within the normal design domain.
- e) Merge and diverge tapers for overtaking lanes must be in accordance with figure 9.4 of AGRD Part 3.
- f) Signs and pavement marking for overtaking lanes must be in accordance with the Reference Documents, including Department Operational Instruction 2.15 - Overtaking Lanes.

#### 4.9.2 Rest areas

The Department has developed a guideline supplement for rest areas (Knet # 16023127, available on request), which provides guidance on auxiliary lanes for rest areas.

### 4.10 Bridge considerations (section 10 of AGRD Part 3)

The Department has no supplementary requirements for section 10 of AGRD Part 3.

## 5 Intersections and crossings: general (AGRD Part 4)

### 5.1 Introduction (section 1 of AGRD Part 4)

The Department has no supplementary requirements for section 1 of AGRD Part 4.

### 5.2 Types of intersection (section 2 of AGRD Part 4)

The Department has no supplementary requirements for section 2 of AGRD Part 4.

### 5.3 Road design considerations for intersections (Section 3 of AGRD Part 4)

The Department has no supplementary requirements for section 3 of AGRD Part 4.

### 5.4 Design process (section 4 of AGRD Part 4)

#### 5.4.1 General

- a) The Department (Network Management Services) must be consulted on the intersection types and function layout in the short list Concept Design phase of projects and must endorse the preferred Concept Design layout.
- b) For the planning phase, acceptance of the intersection type and function layout prior to the Preliminary Design submission for inner urban and outer urban intersections by the Principal (Network Management Services), will constitute a **Hold Point**. The Contractor must not submit the relevant Preliminary Design until this Hold Point is released.

#### 5.4.2 Road cross-section (section 4.5 of AGRD Part 4)

Cross-section elements are to be in accordance with section 4.4.

### 5.5 Design vehicles (section 5 of AGRD Part 4)

#### 5.5.1 General (section 5.1 of AGRD Part 4)

- a) The design of the Works must cater for the South Australian approved heavy vehicle route network, available on RAVnet (an interactive online map system <https://maps.sa.gov.au/ravnet/>).
- b) The Design Basis must identify the design vehicle and checking vehicle for individual turn movements at intersections in accordance with PC-EDM1 "Design Management".

- c) PBS vehicle parameters for the assessment of design and checking vehicles must be in accordance with Table RD-GM-D1 5-1.

**Table RD-GM-D1 5-1 PBS vehicle parameters**

PBS Classification	Vehicle length L (m)		Vehicle used for turn-path assessment
	Class A	Class B	
Level 1	$L \leq 20.0$	$L \leq 20.0$	19 m Prime mover and semi-trailer
Level 2	$L \leq 26.0$	$26.0 < L \leq 30.0$	26 m B Double
Level 3	$L \leq 36.5$	$36.5 < L \leq 42.0$	36.5 m Type 1 Road train
Level 4	$L \leq 56.5$	$53.5 < L \leq 60.0$	53.5 m Type 2 Road train

### 5.5.2 Design vehicles (section 5.2 of AGRD Part 4)

- a) The design vehicle for roads and corresponding intersection turn movements must be determined from:
- i) the design vehicle identified in the Contract Documents;
  - ii) where not identified in the Contract Documents, the largest vehicle nominated within RAVnet (an interactive online map system: <https://maps.sa.gov.au/ravnet/>) under 'GML Routes' and 'PBS Routes'; or
  - iii) where not identified in the Contract Documents or RAVnet, the design vehicle identified in table 5.1 of AGRD Part 4.
- b) The design vehicles for roundabouts must be in accordance with section 7.4.5.
- c) Local rural roads with annual average daily traffic (AADT) < 500 vehicles per day (vpd) or commercial vehicles (CV) < 50 vpd may adopt single articulated (19.0 m) vehicle as the design vehicle.

### 5.5.3 Checking vehicles (section 5.3 of AGRD Part 4)

The checking vehicle for road and corresponding intersection turn movements must be based on the larger vehicle of:

- a) the checking vehicle identified in the Contract Documents;
- b) where not identified in the Contract Documents, the largest vehicle nominated in RAVnet (an interactive online map system: <https://maps.sa.gov.au/ravnet/>), including 'Commodity Routes' and 'OSM Routes' (in addition to 'GML Routes' and 'PBS Routes');
- c) where not identified in the Contract Documents or RAVnet, the checking vehicle identified in table 5.1 of AGRD Part 4; or
- d) the largest vehicle that may access the roadway under permit confirmed by the Principal (Network Management Services).

### 5.5.4 Restricted access vehicles (section 5.4 of AGRD Part 4)

- a) The Department refers to restricted access vehicles as over-dimensional vehicles.
- b) Guidance on over-dimensional routes on South Australia is provided in sections 4.2.4b) and 4.2.4f).

### 5.5.5 Design vehicle swept path (section 5.6 of AGRD Part 4)

- a) The Department considers the swept path to be the dynamic envelope traversed by the outer extremities of the vehicle body. Mirrors and other devices fitted to vehicle bodies or wheels are assumed to be accommodated in the swept path offset.
- b) The Contractor must undertake turn path analysis in accordance with Austroads AP-G34-23 Design Vehicles and Turn Path Templates.

- c) Computer analysis (such as Autoturn) of the design and check vehicle swept paths must be undertaken with sketches included within the Design Report.
- d) Requirements for design vehicle swept path at roundabouts are detailed in section 7.4.5.
- e) Turn movements from a single turn lane (including high entry angle left turn slip lanes) into a multilane carriageway, may allow the design vehicle to enter the adjacent lane (on the departure side).
- f) The design of the Works must ensure that for right turn movements from a main road to a minor (side) road:
  - i) the design vehicle must not encroach over the centre line of the side road (oversteer to avoid crossing the side road centreline);
  - ii) the checking vehicle may straddle the lane marking to be able to perform a manoeuvre as allowed by the road rules;
  - iii) it is desirable that checking vehicles do not cross the centreline of the minor road; and
  - iv) on low volume local rural roads with AADT < 200 vpd, the checking vehicle, may encroach over the centre line of low volume side roads.

#### 5.5.6 Radius of turn (section 5.6.2 of AGRD Part 4)

The minimum turning radii used must not be less than the recommended turning radii in table 5.1 of AGRD Part 4.

#### 5.5.7 Clearance to swept paths of turning vehicles (section 5.6.3 of AGRD Part 4)

- a) At intersections with double right or left turns:
  - i) the design vehicle must be adopted in the nearside (left) lane; and
  - ii) the Contractor must undertake an assessment of the turning volumes to determine the vehicle to use in the offside (right) lane in accordance with Main Roads WA Technical Note Probability of 2 heavy vehicles turning simultaneously at dual turn lanes. (available from: <https://www.mainroads.wa.gov.au/>).
- b) At intersections with 3 simultaneous right or left turns, the turn vehicles adopted must comprise the specified design vehicle for the nearside (left) lane, a rigid 14.5 m in the centre lane, and car in the offside (right) lane.

### 5.6 Public transport at intersections (section 6 of AGRD Part 4)

#### 5.6.1 General

The design of public transport must comply with the RD-PT-D1 “Bus Infrastructure Design” and Reference Documents, including the Department Pavement Marking Manual.

#### 5.6.2 Design vehicle (section 6.2 of AGRD Part 4)

- a) All intersections on existing or proposed South Australian Public Transport Authority bus routes must include a bus (in accordance with section 5.6.2b)) in the design vehicle swept path assessment.
- b) The Contractor must confirm with the South Australian Public Transport Authority the bus type to be used in the design vehicle swept path assessment.
- c) The Department notes the dimensions of the South Australian Public Transport Authority buses vary from Austroads standard turn paths. Information on SAPTA bus dimensions are available on request (refer KNet # 1678866).

#### 5.6.3 Bus facilities (section 6.3 of AGRD Part 4)

Bus facilities must be in accordance with the Reference Documents, including the Department Pavement Marking Manual.



## 5.7 Property access and median openings (section 7 of AGRD Part 4)

The Department has no supplementary requirements for section 7 of AGRD Part 4.

## 5.8 Pedestrian crossings (section 8 of AGRD Part 4)

### 5.8.1 General

- a) Pedestrian crossing facilities must be provided at all signalised intersections in the inner urban and outer urban areas.
- b) Pedestrian crossings must be in accordance with the Reference Documents, including the Code of Technical Requirements and the Department Pavement Marking Manual.
- c) Pedestrian crossings must be in accordance with PR-PF-D1 “Designing for Accessibility”.

### 5.8.2 Continuous footpath treatments (section 8.1.2 of AGRD Part 4)

Guidance on best practice for the design of continuous footpath treatments on minor access roads and left turn slip lanes is included VicRoads Road Design Note 03-07 Raised Safety Platforms (RSP).

### 5.8.3 Mid-block crossings on roads (section 8.2 of AGRD Part 4)

Mid-block pedestrian crossings must be in accordance with the Reference Documents, including the Department Pavement Marking Manual.

## 5.9 Cyclists crossing (section 9 of AGRD Part 4)

- a) Cycling crossing facilities (bike lanes or separate paths) must be provided at all signalised intersections in the inner urban and outer urban areas.
- b) Cyclist crossing details must be in accordance with the Department Pavement Marking Manual and the Department Standard Drawings.
- c) The adoption of a cyclists crossing treatment that has not previously been installed by the Department or accepted as a traffic control device by the Department (Traffic Engineering and Standards, located at Norwood) will be deemed a “New and Emerging Treatment” and subject to the **Hold Point** in accordance with section 11b).

## 5.10 Railway crossings (section 10 of AGRD Part 4)

The Department has no supplementary requirements for section 10 of AGRD Part 4.

# 6 Unsignalised and signalised intersections (AGRD Part 4A)

## 6.1 Introduction (section 1 of AGRD Part 4A)

The Principal has no supplementary requirements for section 1 of AGRD Part 4A.

## 6.2 Layout design process (section 2 of AGRD 4A)

### 6.2.1 Superelevation at or near intersections (section 2.2.4 of AGRD Part 4A)

- a) The Contractor must undertake a review of superelevation of turn movements at or near intersections in accordance with appendix B of AGRD Part 4A (to assess heavy vehicle instability risk).
- b) The results of the review must be included in the Design Report for the relevant Preliminary Design Documentation submission.

## 6.3 Sight distance (section 3 of AGRD Part 4A)

### 6.3.1 Safe intersection sight distance (SISD) (section 3.2.2 of AGRD Part 4A)

- a) SISD must be calculated based on the driver of the vehicle being 3.0 m from the stop or give way line.
- b) The Contractor must include the impact of existing and proposed trees (at full maturity) and other vegetation (existing and proposed) within the SISD assessment.

### 6.3.2 Pedestrian sight distance requirements (section 3.3 of AGRD Part 4A)

- a) The Contractor must assess the pedestrian sight distances, approach sight distance (ASD) and crossing sight distance (CSD) - for every pedestrian crossing (including those at signalised intersections) forming part of the Works. The results of the assessment must be included in the Design Report for the relevant Preliminary Design Documentation submission.
- b) Where pedestrian crossings are located adjacent to primary schools, retirement villages or hospitals the average walking speed must be reduced to 1.0 m/s.

### 6.3.3 Sight distance at property entrances (section 3.4 of AGRD Part 4A)

- a) The Contractor must assess sight distances on new and existing property entrances on roads impacted by the Works.
- b) Where the existing property access does not currently achieve extended design domain SISD (reference tables A9 to A14 of appendix A of AGRD Part 4A), the Contractor must assess the movements and crash history at the existing property entrance and recommend to the Principal potential treatments to reduce the inherent risk.

## 6.4 Types of intersections and their selection (section 4 of AGRD Part 4)

### 6.4.1 General (section 4.1 of AGRD Part 4A)

Traffic modelling of intersections must be in accordance with RD-GM-D4 "Traffic Analysis and Modelling".

### 6.4.2 Intersection types (section 4.2 of AGRD Part 4A)

Warrants for BA, AU and CH turn treatments at outer urban and rural un-signalised intersections must be assessed in accordance with section 3.3.6 of AGTM Part 6.

## 6.5 Auxiliary lanes (section 5 of AGRD 4A)

### 6.5.1 General

Diverge and merge tapers (excluding overtaking lanes) for auxiliary lanes must be in accordance with equations 27 and 28 of section 9.9.2 of AGRD Part 3.

### 6.5.2 Determination of deceleration turn lane lengths (section 5.2.2 of AGRD Part 4A)

For auxiliary turn lanes at inner urban intersection, the total length of deceleration turning lane must be the greater of (reference figure 5.1 of AGRD Part 4A):

- a) the storage length required for the future year design traffic volumes (S) plus the physical taper length (T) = (S+T); or
- b) length of deceleration (D) using comfortable deceleration (including taper length (T)).

### 6.5.3 Auxiliary through lanes (section 5.5 of AGRD 4A)

- a) The length of auxiliary through lanes at intersections must be determined from the length required to achieve the specified operational performance.

- b) The length of auxiliary through lane on departure side of an intersection must be the greater value of either:
  - i) the length required to achieve the specified operational performance; or
  - ii) 4 sec of travel time on the departure side of the intersection, plus the taper.

## 6.6 Traffic islands and medians (section 6 of AGRD Part 4A)

### 6.6.1 Raised high entry left turns (HELT) and free flow left turn islands (section 6.1.3 of AGRD Part 4A)

- a) Raised high entry left turn treatments (HELT) at signalised intersections must be in accordance with sheets 1 and 2 of the Department Standard Drawing S-4076, which replaces figures 6.3, 6.4 and 6.5 of AGRD Part 4A.
- b) Free flow left turn islands must allow for cyclists to travel across the island and cross the acceleration lane at a 90 degree angle in accordance with figure 8.8 of AGRD Part 4A and the Department Pavement Marking Manual.

### 6.6.2 Painted medians (section 6.2 of AGRD Part 4A)

Painted medians must be in accordance with the Department Pavement Marking Manual.

## 6.7 Right-turn treatments (section 7 of AGRD Part 4A)

### 6.7.1 Rural right-turn treatments (section 7.3 of AGRD Part 4A)

- a) Unless otherwise specified in the Contract Documents, for rural right-turn treatments, hold lines (including give way and stop) must be located within 3.0 m of the through lane and in accordance with the Department Pavement Marking Manual unless otherwise accepted by the Principal as an Accepted Design Departure.
- b) Low volume local roads may adopt a simple right turn (SR) in accordance with Queensland TMR Supplement to Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections. (available from: <https://www.tmr.qld.gov.au/>).

## 6.8 Left - turn treatments (section 8 of AGRD Part 4A)

- a) Selection of left turn treatments (such as kerb return, high entry left turn treatments or free-flow left turn) must be in accordance with AGTM Part 6. The selection of the treatment must be based on site specific features and risks, cognisant of:
  - i) pedestrian demand, adjacent sensitive users and potential for crowding;
  - ii) sight distances;
  - iii) cyclist facilities; and
  - iv) traffic operational benefit.
- b) High entry left turn treatments must be in accordance with the Department Pavement Marking Manual and sheets 1 and 2 of the Department Standard Drawing S-4076.

## 6.9 Signalised intersections (section 9 of AGRD Part 4A)

### 6.9.1 General

The design of signalised intersections must be in accordance with the Reference Documents, including AGRD Part 4A and appendix B of AGRD Part 4.

### 6.9.2 Traffic lanes (section B.4 of AGRD Part 4)

- a) A minimum of 2 lanes must be provided at all signalised intersection approaches. A left turn slip lane may be counted as 1 lane of the 2 lanes.

- b) Unless otherwise specified in the Contract Documents, shared lanes (through and turn lanes) at intersections must not be used, unless otherwise accepted by the Principal.

### 6.9.3 Pedestrian treatments (section B.5 of AGRD Part 4)

Pedestrian crossing facilities must be provided in accordance with the requirements of section 5.8.

### 6.9.4 Pedestrian facilities - mid block (section B.5 of AGRD Part 4)

- a) Mid-block pedestrian (or cyclists) crossing facilities must be in accordance with the Department Pavement Marking Manual and Department Standard Drawings.
- b) Pedestrian crossings must comply with the PR-PF-D1 "Designing for Accessibility".

### 6.9.5 Cyclist facilities at signalised intersections (section B.6 of AGRD Part 4)

Cyclist facilities must be provided in accordance with the requirements of section 5.9.

## 7 Roundabouts (AGRD Part 4B)

### 7.1 Introduction (section 1 of AGRD Part 4B)

The Department has no supplementary requirements for section 1 of AGRD Part 4B.

### 7.2 Design principles and procedures (section 2 of AGRD Part 4B)

The Department has no supplementary requirements for section 2 of AGRD Part 4B.

### 7.3 Sight distances (section 3 Part 4B)

The Department has no supplementary requirements for section 3 of AGRD Part 4B.

### 7.4 Geometric design (section 4 of AGRD Part 4B)

#### 7.4.1 Left-turn slip lanes (section 4.3.5 of AGRD Part 4B)

High entry angle left-turn lanes at roundabouts must be in accordance with figure 3.3 of AGTM Part 6 and have a minimum offset of 20m from the circulating carriageway.

#### 7.4.2 Central island radius (section 4.4.3 of AGRD Part 4B)

In addition to the requirements of section 4.4.3 of AGRD Part 4B, the central island radius for roundabouts on State maintained roads must be in accordance with Table RD-GM-D1 7-1.

**Table RD-GM-D1 7-1 Recommended central island radii**

Largest operational vehicle	Single lane roundabout		Dual lane roundabout (on at least 2 approaches)	
PBS Level 1A	Refer to table 4.1 of section 4 of AGRD Part 4B.		Refer to table 4.1 of section 4 of AGRD Part 4B.	
PBS Level 2A	Refer Section 4 and Table 4.1		Refer Section 4 and Table 4.1	
PBS Level 2B	14 m minimum	15 - 25 m desirable	18 m minimum	19 - 30 m desirable
PBS Level 3A and 3B	20 m minimum	21 - 30 m desirable	26 m minimum	27 - 35 m desirable
PBS Level 4A	26 m minimum	27 - 35 m desirable	30 m minimum	31 - 40 m desirable

#### 7.4.3 Approach and entry treatments - approach treatments for high speed areas (section 4.5.2 of AGRD Part 4B)

- a) Reverse curves may be adopted on roundabouts with a posted speed limit greater than 80 km/h prior to the roundabout approach (to encourage drivers to reduce speed prior to the roundabout).
- b) Where reverse curves are adopted on approaches to roundabouts, a short straight must be provided to transition superelevation between the curves to reduce the risk of instability to high centre of gravity vehicles.
- c) In constrained locations where reverse curves on approaches to roundabouts are not practical, alternative approach treatments as detailed in section 4.5.2 of AGRD Part 4B may be adopted.

#### 7.4.4 Maximum entry path radius (section 4.5.3 of AGRD Part 4B)

Where the circulating carriageway is wider than 5.0 m, the determination of the entry path radii as detailed in figures 4.5 and 4.6 of AGRD Part 4B must be based on a maximum value of 2.5 m for M2.

#### 7.4.5 Design vehicle and vehicle swept path (section 4.6.1 of AGRD Part 4B)

- a) The design vehicle for each roundabout turn movement must be determined in accordance with section 5.5.
- b) Roundabouts must be designed for the design vehicle within the circulating carriageway for each turn and through movement at each intersection approach.
- c) On single lane roundabouts, design vehicles larger than a PBS level 1A may utilise the roundabout annulus for the swept path of the vehicles, where required to achieve compliance of the entry radii and lane width requirements.
- d) Checking vehicles may utilise the roundabout annulus or additional encroachment area to undertake the intersection movement.

#### 7.4.6 Circulating carriageway (section 4.6.2 of AGRD Part 4B)

- a) Circulating carriageway width for single lane roundabouts must not exceed 7.0 m.
- b) Multi lane roundabouts must be designed for the lane compliance of the design vehicle for each turn and through movement and the concurrent movement of a passenger vehicle(s) alongside the design vehicle.
- c) Multi lane roundabouts must limit lane widths to a maximum individual lane width of 5.5 m.

#### 7.4.7 Encroachment areas (section 4.6.3 of AGRD Part 4B)

- a) Type A encroachment areas as detailed in figure 4.11 of AGRD Part 4B must be adopted for roundabouts on State maintained roads.
- b) Encroachment areas may be used on the kerb side to maintain roundabout entry curvature, whilst still enabling access for the largest operational vehicle.
- c) For roundabouts where kerbside encroachment is adopted pedestrian crossing facilities must be offset a minimum of 2.0 m from encroachment areas.

#### 7.4.8 Superelevation, gradient and drainage (section 4.10 of AGRD Part 4B)

- a) Adverse crossfall through the roundabout circulating carriageway must be provided.
- b) Subject to achieving all relevant drainage requirements, adverse crossfall of 2% on single lane roundabouts and 2.5% on multi-lane roundabouts may be adopted to reduce the risk of truck instability.
- c) Rates of rotation for superelevation must not exceed the maximum as vehicles travel through the roundabout.

- d) The Contractor must ensure the design of roundabouts does not cause instability issues for heavy vehicles including high centre of gravity vehicles.
- e) Roundabouts that meet the following criteria must be assessed using appropriate simulation software (such as TruckSim, HVE or UM Truck) to review the risk of truck instability:
  - i) for roundabouts with an approach speed prior to the roundabout of 80 km/h or greater;
  - ii) for roundabouts on nominated freight routes; and
  - iii) for roundabouts with the largest operational vehicle being a PBS 2A or greater.
- f) For further guidance on vehicle stability assessment, the Contractor may reference the Main Roads WA, Guidelines for Vehicle Stability Analysis - Main Roads Internal Process (available from: <https://www.mainroads.wa.gov.au/>)

#### 7.4.9 Pedestrian and cyclist treatments (section 5 of AGRD Part 4B)

- a) Bicycle lane treatments at roundabouts must be in accordance with the Department Pavement Marking Manual.
- b) Multilane roundabouts must include an alternate off-road pathway for cyclists to navigate the roundabout within the normal design domain, and in accordance with the Department Pavement Marking Manual and figure 5.4 of AGRD Part 4B.

### 7.5 Pavement marking and signing (section 6 of AGRD Part 4B)

Pavement marking and signage must be in accordance with the Department Pavement Marking Manual.

### 7.6 Landscaping and street furniture (section 7 of AGRD Part 4B)

#### 7.6.1 Maintenance (section 7.4 of AGRD Part 4B)

The design of roundabouts must include maintenance access provisions for people and vehicles to access landscaping, street furniture (including lighting) within the roundabout which must be:

- a) agreed with the Principal (maintenance personnel); and
- b) included as part of the Preliminary Design Documentation submission in accordance with PC-EDM1 "Design Management".

## 8 Interchanges (AGRD Part 4C)

#### 8.1.1 Types of structures (section 4.1.1 of AGRD Part 4C)

- a) The Contractor must adopt spill through abutments for overbridges consistent in aesthetics with other adjacent projects.
- b) The Contractor must review the project specific urban design framework to coordinate the type of structure with the desired project amenity.

#### 8.1.2 Safety screens (section 4.9 of AGRD Part 4C)

In relation to safety screens, the Contractor must comply with ST-SD-D1 "Design of Structures".

#### 8.1.3 Ramp terminal at minor road (section 8.3.4 of AGRD Part 4C)

The Contractor must adopt either a roundabout or signalised intersection at service interchange ramp terminals with minor roads.

#### 8.1.4 Exit ramps (section 11.2 of AGRD Part 4C)

Excluding motorways, single lane exit ramps as detailed in figure 11.1(b) of AGRD Part 4C may be adopted for exit ramps with lower traffic volumes within the normal design domain.

### 8.1.5 Entry ramps (section 11.3 of AGRD Part 4C)

Unless otherwise specified in the Contract Documents, the use of simple merge as detailed in figure 11.6 of AGRD Part 4C or ramp details from other State Road Authorities must not be used, unless otherwise accepted by the Principal.

## 9 Roadside design, safety and barriers (AGRD Part 6)

### 9.1 Methodology

- a) The AGRD Part 6 methodology must be adopted for projects within the following criteria:
  - i) rural areas with Works of 1 km or greater in length;
  - ii) inner urban and outer urban areas with Works of 500 m or greater in length; or
  - iii) roadway Works in flat or rolling terrain.
- b) Projects that do not meet the criterion in accordance with section 9.1a) must be assessed using the previous methodology of AGRD Part 6 (2010).
- c) Projects in the urban environment must comply with Department Operational Instruction 19.8 - Trees in Medians and Roadsides in the Urban Environment.

### 9.2 Introduction to roadside design (section 1 of AGRD Part 6)

#### 9.2.1 Roadside safety design (section 1.6 of AGRD Part 6)

- a) This section 9.2 applies regardless of either AGRD Part 6 or AGRD Part 6 (2010) being adopted in accordance with section 9.1.
- b) The Contractor must use engineering judgement to reduce the residual risk to road users so far as is reasonably practicable through designing a road network that:
  - i) reduces the probability a driver loses control of a vehicle;
  - ii) reduces the probability a road user (pedestrian, cyclist or driver) miscalculating a movement at a crossing or intersection;
  - iii) removes or reduces (where practical) the hazards in the road environment; and
  - iv) minimises the severity of any crash that may occur to all road users.

### 9.3 Network risk assessment (section 2 of AGRD Part 6)

#### 9.3.1 General (section 2.1 of AGRD Part 6)

This section 9.3 does not apply where AGRD Part 6 (2010) is adopted in accordance with section 9.1b).

#### 9.3.2 Network Roadside Risk Intervention Threshold (NRRIT) (section 2.4 of AGRD Part 6)

- a) The NRRIT must be determined in the planning or pre-delivery phase for each individual project, based on the targeted iRAP star rating proposed for the corridor.
- b) Where not nominated in the Contract Documents, the NRRIT for new road corridor greenfield sites must be 1.0.
- c) Where not nominated in the Contract Documents, the NRRIT for modified, changed or upgraded existing roadways is as detailed in Table RD-GM-D1 9-1.
- d) The selection of the corridor and projects NRRIT target score rating must be agreed with the Principal prior to commencing development of the relevant Detailed Design Documentation.

- e) The determination of the NRRIT will constitute a **Hold Point**. The relevant Detailed Design Documentation must not be submitted in accordance with PC-EDM1 “Design Management” until this Hold Point is released.
- f) The Department has created a risk score calculation spreadsheet which must be used based on AGRD Part 6 (2020). (available from: [https://www.dit.sa.gov.au/documents-20220802/road\\_design\\_outputs](https://www.dit.sa.gov.au/documents-20220802/road_design_outputs))

**Table RD-GM-D1 9-1 Nominal NRRIT, upgrades to existing roads**

Largest operational vehicle	Classification	Nominal NRRIT
Rural road	Arterial / highway	1.25
	Collector	1.5
Inner urban or outer urban road speed limit >60 km/h	Arterial or collector	1.5
Inner urban or outer urban roads speed limit ≤60 km/h	Arterial / highway	1.5
	Collector and local	1.75

### 9.3.3 Detailed risk evaluation procedure (appendix B of AGRD Part 6)

Oncoming vehicle risk for a divided road or road with a wide centre line treatment must be calculated by assuming the oncoming vehicle as an isolated hazard with a lateral distance to the isolated hazard of the median or wide centre line treatment width plus a 0.5 m allowance for a vehicle located within the lane.

## 10 Paths for walking and cycling (AGRD Part 6A)

### 10.1 Path user considerations (section 3 of AGRD Part 6A)

The Department has no supplementary requirements for section 3 of AGRD Part 6A.

### 10.2 Design considerations (section 4 of AGRD Part 6A)

The Department has no supplementary requirements for section 4 of AGRD Part 6A.

### 10.3 Design criteria (section 5 of AGRD Part 6A)

#### 10.3.1 General

- a) Cyclists can legally ride on footpaths in South Australia.
- b) Paths must only be marked as shared paths where they provide a link to an adjacent shared path network, form part of a shared path route, or as requested by Council or the Principal (Network Management Services).
- c) The design and signage of an off-road bicycle facility (bike only path, separated path, shared path or footpath) must be cognisant of the connectivity to the adjacent path network and location of the pathway within the urban border or road verge.
- d) Where access is provided for cyclists to utilise a footpath from an on-road bike lane, the footpath must be appropriately designed and sized to cater for the anticipated pedestrian and cyclist mix and traffic volumes.
- e) Marking and signage of paths must be agreed with the Principal (Network Management Services), and included in the relevant Preliminary Design Documentation submission in accordance with PC-EDM1 “Design Management”.

#### 10.3.2 Pedestrian paths (section 5.1.2 of AGRD Part 6A)

- a) Pedestrian paths must have a minimum width of 1.8 m.
- b) Pedestrian paths must comply with PR-PF-D1 “Designing for Accessibility”.



- c) In constrained locations the Principal may consider reduced pedestrian path widths, which will be subject to an Accepted Design Departure.

#### 10.3.3 Batters and fences (section 5.5.3 of AGRD Part 6A)

- a) Where a fence provides a smooth surface and does not create a risk of cyclist handlebars being caught in the vertical component of the fence, no cyclist deflection rail is required.
- b) Cyclist deflection rails must be at a height of 1.0 m (minimum) to 1.2 m (maximum) to reduce the risk of hazard to both adult and junior cyclists.

#### 10.3.4 Crossfall and drainage (section 5.6 of AGRD Part 6A)

Shared sealed paths must ensure the finished surface is free draining (without ponding) with a minimum crossfall of 2%.

#### 10.3.5 Lighting (section 5.11 of AGRD Part 6A)

- a) In general, the Department does not provide lighting for paths away from roads unless site specific conditions warrant their inclusion.
- b) The Contractor must assess project specific conditions and potential warrants for lighting of pathway away from road, based on number and type of intended users, site specific features whole of life cost, risk and confirm with the Principal if the path is to incorporate lighting, which must be included as part of the Design Basis in accordance with PC-EDM1 "Design Management".

### 10.4 Intersections of paths with paths and roads (sections 6 and 7 of AGRD Part 6A)

The Department has no supplementary requirements for sections 6 and 7 of AGRD Part 6A.

### 10.5 Paths at structures (section 8 of AGRD Part 6A)

#### 10.5.1 Underpasses (section 8.3 of AGRD Part 6A)

- a) For underpasses, the design of the Works must ensure that clear line of sight (vertically and horizontally) for users through the underpass and on approaches is provided to align with the principles of CPTED.
- b) Underpasses must have a minimum height of 2.5 m and clear width of 3.6 m.

## 11 New and emerging treatments (AGRD Part 7)

- a) The adoption of new or emerging treatment in the short list of options within the project planning phase or as part of detailed design development will be subject to approval of the Principal (Network Management Services for Traffic Control Devices, and Technical Services).
- b) The adoption of new and emerging treatments will constitute a **Hold Point**. The submission of the relevant Preliminary Design Documentation in accordance with PC-EDM1 "Design Management" must not occur until this Hold Point is released.

## 12 Hold Points

Table RD-GM-D1 12-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.

**Table RD-GM-D1 12-1 Hold Points**

<b>Section reference</b>	<b>Hold Point</b>	<b>Documentation or construction quality</b>	<b>Review period or notification period</b>
5.4.1b)	Intersection type and function layout	Documentation	10 Business Days review
9.3.2e)	Determination of the Network Roadside Risk Intervention Threshold (NRRIT)	Documentation	10 Business Days review
11b)	Adoption of new and emerging treatments	Documentation	10 Business Days review