VicRoads Supplement to the Austroads Guide to Road Design

Part 5 – Drainage: General & Hydrology Considerations

Part 5A – Drainage: Road Surface, Networks, Basins & Subsurface

Part 5B – Drainage: Open Channels, Culverts & Floodways

Note 1: Superseded documents & New Supplement
VicRoads RDG Part 7 and the Austroads GRD Part 5: Drainage Design have now been superseded by AGRD Part 5: Drainage (Parts 5, Part 5A & Part 5B) released in May 2013.

VicRoads has developed this single Supplement for all three parts.

Note 2: Important Preliminary Information
VicRoads did not adopt the Austroads Guide to Road Design (AGRD) – Part 5: Drainage Design (2010). The VicRoads Road Design Guidelines (RDG) – Part 7: Drainage was retained and supported by additional information provided in VicRoads Supplement to AGRD Part 5: Drainage Design.

Note 3: Use of VicRoads Supplement to AGRD
This VicRoads Supplement must be read in conjunction with the Austroads Guide to Road Design. Reference to any VicRoads or other documentation refers to the latest version as publicly available on the VicRoads website or other external source.

VicRoads Supplement to the Austroads Guide to Road Design Updates Record

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This VicRoads Supplement has been developed by VicRoads Technical Consulting and authorised by the Executive Director – Network and Asset Planning.

The VicRoads Supplement to the Austroads Guide to Road Design provides additional information, clarification or jurisdiction specific design information and procedures which may be used on works financed wholly or in part by funds from VicRoads beyond that outlined in the Austroads Guide to Road Design guides.

Although this publication is believed to be correct at the time of printing, VicRoads does not accept responsibility for any consequences arising from the information contained in it. People using the information should apply, and rely upon, their own skill and judgement to the particular issue which they are considering. The procedures set out will be amended from time to time as found necessary.

References

AGRD – Austroads Guide to Road Design

AGTM – Austroads Guide to Traffic Management

Australian Standard (2010). AS1597.1 – Precast reinforced concrete box culverts. Part 1: Small culverts (not exceeding 1200mm span and 1200mm height).

VicRoads Standard Specification Section 701

VicRoads Standard Specification Section 619

Part 5 – Drainage: General & Hydrology Considerations

Note:

Multiple references in AGRD
Where multiple references are provided, the primary reference consulted shall be the Victorian source (if available). Otherwise the reference most relevant to the conditions shall be used.

1.0 Introduction

VicRoads has no supplementary comments for this section.

2.0 Safety in Design

2.5 On-road Safety

2.5.2 Floodways

Additional Information (p10)
Any proposal for adoption of a floodway on a VicRoads controlled asset shall be subject to approval of the relevant Regional Director.

3.0 Environment

3.6 Erosion and Sediment

3.6.3 Erosion Estimates

Additional Information
The Revised Universal Soil Loss Equation (RUSLE) calculates annual erosion rates (A_s tonne/ha/year) based on:

$$A_s = R \times K \times LS \times C \times P$$

4.0 Drainage Considerations

4.10 Waterway Structures

4.10.1 Factors Affecting Selection of Waterway Structures

Additional Information
Culvert/Bridge structures with a minimum span or diameter of 1.8m, or a minimum waterway area of $3m^2$ per cell (for multi cell culverts), shall be classified as a structure subject to VicRoads' requirements for structural design and proof engineering by appropriate prequalified structural engineers.

5.0 Operations & Maintenance

VicRoads has no supplementary comments for this section.

6.0 Hydrology

VicRoads has no supplementary comments for this section.

References

VicRoads has no supplementary comments for this section.

Tables and Figures

VicRoads has no supplementary comments for this section.

Appendices

Appendix B – Table B1: Drainage Construction Material Considerations

Fibre Reinforced Concrete (FRC) Pipes

Additional Information
Refer to VicRoads Specification Standard Section 701 for further details.

Nominal Sizes for Culverts

Additional information
Box culverts should comply with the requirements of AS1597.1 (2010) - Table 2.5, as follows:

Preferred Internal Dimensions – Culvert Units (from Table 2.5: AS1597.1 (2010)

Size class mm	Nominal Span mm	Nominal height mm
300 x 225	300	225
450 x 300	450	300
600 x 300	600	300
600 x 450	600	450
900 x 300	900	300
900 x 600	900	600
1200 x 300	1200	300
1200 x 600	1200	600
1200 x 900	1200	900
1200 x 1200	1200	1200

Notes:

1. The size class is designated as 'the nominal span' x 'the nominal height' in millimetres, for example '450 x 200'.

2. Other size culverts may be made to a specific order.
3. Actual size should be checked with the manufacturer.

Refer to VicRoads Specification Standard Section 619 for further details.

Part 5A – Drainage: Road Surface, Networks, Basins & Subsurface

Note:

Multiple references in AGRD
Where multiple references are provided, the primary reference consulted shall be the Victorian source (if available). Otherwise the reference most relevant to the conditions shall be used.

1.0 Introduction

VicRoads has no supplementary comments for this section.

2.0 Major/Minor Drainage Concept

VicRoads has no supplementary comments for this section.

3.0 Road Surface Drainage

VicRoads has no supplementary comments for this section.

4.0 Aquaplaning

VicRoads has no supplementary comments for this section.

5.0 Kerbed Drainage

5.3 Kerbed Drainage Elements

5.3.4 Inlet Locations

Additional Information (p64)
For VicRoads project an extra pit near the lowest point with a separate pipeline to an alternative outlet shall be provided at land locked sags.

For freeways and ramps an additional pit near the low point with a separate pipeline to an alternative outlet capable of carrying the entire 50 ARI storm event shall be provided.

5.4 Design Criteria

5.4.2 Pavement Spread and Gutter Flow Limits

Additional Information (p66)
For freeways and ramps where reduced or narrow shoulders are proposed the following additional surface flow criteria is appropriate at 10 year ARI.

- Where no shoulders on freeway ramps provided – 1.5m maximum flow width.
- Where 1.0m to 3.0m shoulder width provided and posted speed limit is greater than 80km/h – flow width within shoulder width.
- Where shoulder width 1.0m or less provided and posted speed limit is 80km/h or less – 1.5m maximum flow width.

6.0 Underground Piped Networks

VicRoads has no supplementary comments for this section.

7.0 Basins

VicRoads has no supplementary comments for this section.

8.0 Subsurface Drainage

8.6 Location of Subsurface Drainage

8.6.5 Locations of Subsurface Drains on Rural Roads

Clarification (p166)
Subsurface drains shall be provided on all VicRoads class M, A, B and C roads unless approved otherwise by the relevant VicRoads Regional Director.

References

VicRoads has no supplementary comments for this section.

Tables and Figures

VicRoads has no supplementary comments for this section.

Appendices

VicRoads has no supplementary comments for this section.

Part 5B – Drainage: Open Channels, Culverts & Floodways

Note:

Multiple references in AGRD
Where multiple references are provided, the primary reference consulted shall be the Victorian source (if available). Otherwise the reference most relevant to the conditions shall be used.

1.0 Introduction

VicRoads has no supplementary comments for this section.

2.0 Open Drains and Channels

VicRoads has no supplementary comments for this section.

2.14 Batter Drains and Chutes

Additional Information (p53)
Stormwater drainage network culvert outlets on batters shall discharge at the base of the batter, in preference to the use of batter drains and chutes, where batters are steeper than 6:1 or where excessive scour is likely to occur in the batter.

3.0 Culverts

3.4 Culvert Type

3.4.2 Materials

Clarification (p166)
Materials used for major culverts shall provide for a minimum design life of 100 years.

4.0 Floodways

VicRoads has no supplementary comments for this section.

References

VicRoads has no supplementary comments for this section.

Tables and Figures

VicRoads has no supplementary comments for this section.

Appendices

VicRoads has no supplementary comments for this section.