# SNOWY RIVER SHIRE COUNCIL

# DEVELOPMENT DESIGN SPECIFICATION

## D3

# STRUCTURES BRIDGE DESIGN

## DEVELOPMENT DESIGN SPECIFICATION D3 STRUCTURES/BRIDGE DESIGN

#### GENERAL

#### D3.01 SCOPE

1. This section sets out design considerations to be adopted in the design of structural engineering elements for land subdivisions. Such activities will include:

- Road traffic bridges
- Pedestrian bridges
- Structures other than bridges, but associated with roads (eg major culverts, arches, retaining walls, earth-retaining structures and major sign support structures)
- Small earth dams, detention basins
- Structures used for public safety (road safety barriers, pedestrian safety rails, street lighting)
- Temporary works

Such structures may be of concrete, timber or steel constructions, but with emphasis placed on low maintenance.

#### D3.02 OBJECTIVE

1. The aim of design shall be the achievement of acceptable probabilities that the structure being designed will not become unfit for use during its design life, having regard to economic, physical, aesthetic and other relevant constraints.

Design Life

Safety Quality

Qualifications

#### D3.03 BASIS OF DESIGN

1. The design shall be based on scientific theories, experimental data and experience, interpreted statistically as far as possible. The safety and service performance of a structure depends also on the quality control exercised in fabrication, supervision on site, the control of unavoidable imperfections and the qualifications, experience and skill of all personnel involved. Adequate attention shall therefore be given to these factors. In addition, adequate management control and supervision by experienced engineers shall be required at all stages of design and construction to prevent the occurrence of gross errors.

2. Specifications shall be notated on the Drawings with sufficient detail to ensure that the above described strategies are able to be effectively implemented at the construction stage.

#### D3.04 REFERENCE AND SOURCE DOCUMENTS

#### (a) Council Specifications

- D1 Geometric Road Design D5 - Stormwater Drainage Design
- D7 Erosion Control and Stormwater Management

#### (b) Australian Standards

AS 1158	-	The lighting of urban roads and other public thoroughfares (SAA Public Lighting Code)	
AS 1170	-	Minimum design loads on structures (SAA Loading Code)	
AS 1684	-	National Timber Framing Code	
AS 2041	-	Buried corrugated metal structures	
AS 3600	-	Concrete structures	
AS 3700	-	Masonry in buildings (SAA Masonry Code)	
AS/NZS 3845	-	Road safety barrier systems	
AS 4100	-	Steel structures	
AS 4678	-	Earth retaining structures	
Other relevant	code	es and guidelines with the above.	

(c) Other

AUSTROADS	-	Bridge Design Code
Inst. of Eng.	-	Australian Rainfall and Runoff
KD Nelson	-	Design and Construction of Small Earth Dams

#### D3.05 ROAD TRAFFIC AND PEDESTRIAN BRIDGES

1. Bridge design shall only be carried out by properly qualified persons whose Association of Consulting Engineers Australia (ACEA) listing includes structural design of bridges in its claimed area of competency. Such designers shall submit evidence of these qualifications to Council prior to approval of any bridge design.

2. However, this does not preclude submissions by other qualified persons in which cases Council reserves the right to call for evidence of the qualifications and experience of the responsible designer; or to seek referral of the design calculations to an appropriate A.C.E.A. firm for checking. The latter requirement will be at the Developer's cost, if directed.

3. The AUSTROADS Bridge Design Code shall be used for all bridge design.

4. Bridges shall have low maintenance finishes. Adequate precautions shall be taken for protection of the materials used in the bridge design; for example, timber and	Finishes
steel require special consideration. Heavy debris and bed loads may be characteristic of some streams so that large spans with slender piers are encouraged. If overtopping is permitted, pedestrian safety rails and road safety barriers are usually omitted. Flood depth indicators and appropriate signposting will be provided in such cases.	Debris, Overtopping
5. Preventative maintenance is a key issue affecting the design life of the structure. The Drawings shall specify the design life of the structure together with the relevant maintenance programs to be adopted upon which the design life is based. Parameters used in the design shall also be shown on the Drawings.	Design Life Maintenance
6. Hydraulic design of bridges shall be in accordance with the requirements for major structures in the Specification for STORMWATER DRAINAGE DESIGN.	Hydraulic Design
7. Where structures are designed to be inundated, the effect of the backwater gradient on upstream property shall be identified on the Drawings.	Inundation
8. Where no inundation is permitted, appropriate afflux shall be adopted together with a 500mm freeboard to the underside of the bridge deck.	Freeboard
9. Designers should enquire regarding current or likely provision for public utilities in bridges. These should be concealed for aesthetic reasons.	Public Utilities

Disabled Access

Lighting

#### D3.06 PROVISION FOR PEDESTRIANS ON ROAD BRIDGES

1. Provision for pedestrians on bridges is required in rural residential as well as **Minimum** urban areas. The minimum provision is a 1.5m footpath with kerb at the road traffic edge **Minimum Provision** and pedestrian safety rails at the external edge.

2. Council may require the provision of separate pedestrian footpaths in other **Separate** situations should the anticipated traffic warrant it. **Footpaths** 

3. Disabled access shall be considered in the design.

4. Urban bridge approaches should be lit in accordance with AS1158.

#### D3.07 STRUCTURES OTHER THAN BRIDGES, ASSOCIATED WITH ROADS

1. Public utility structures, major culverts, arches, major sign support structures, retaining walls, earth-retaining structures, and the like, shall be designed by a competent person who has acquired through training, qualification, experience, or a combination of these, the knowledge and skill enabling that person to correctly perform the required task.

2. The design shall be in accordance with the AUSTROADS code, all relevant Australian Standards, and any relevant requirements of any utility owners. Where applicable, buried corrugated metal structures shall be designed in accordance with AS 2041 and earth-retaining structures in accordance with AS 4678

#### D3.08 SMALL EARTH DAMS/DETENTION BASINS

1. Small earth dams shall be designed following the guidelines in "Design and Construction of Small Earth Dams" by K D Nelson together with relevant geotechnical recommendations. The structural design of weir outlets to resist failure shall be considered in design. Refer also to the Retarding Basin and Stormwater Detention sections in the Specification for STORMWATER DRAINAGE DESIGN.

2.	Childproof fe	ncing shall b	e nominate	d where	it is a	requiremen	t of re	levant	Fencing	
statutory	y regulations	, Australian	Standards	or Cour	ncil Spe	ecifications	and	where		
unaccep	otable risk ex	ists due to th	e location o	of the dar	n/basin	in relation	to the	urban		
nature c	of the area.									

3. The Designer shall carry out the design with recognition of the potential risk on existing and planned infrastructure downstream, assuming the probability of dam/basin failure.

4. The Designer shall be a qualified civil or structural engineer having accreditation *Qualification* in the design of such structures.

5. The Designer shall be required to certify the design and ultimately certify the work-as-executed Drawings for compliance with the design. All relevant details shall be shown on the Drawings.

#### D3.09 STRUCTURES USED FOR PUBLIC SAFETY

1. Since the requirement of road safety barriers and pedestrian safety rails on bridges are different, the design engineer shall consider whether separate traffic and pedestrian barriers can be detailed to satisfy the major functional requirements.

2. The AUSTROADS Bridge Design Code and AS/NZS 3845 are recommended references in this regard.

3. It is essential that all safety barriers and rails have been fully tested and accredited for the intended use under quality assurance provisions.

4. Bridge crossings in urban and rural residential areas shall be provided with **Lig** streetlighting in accordance with AS 1158. Such requirements will be noted accordingly on the Drawings.

#### D3.10 TEMPORARY WORKS

1. Structures which are proposed for the temporary support of roads, services and the like shall be designed by a qualified Engineer experienced and accredited in the design of such structures and designed in accordance with the AUSTROADS Bridge Design Code. A construction programme, indicating the sequence of events leading to the implementation and removal of the temporary structures shall be specified on the Drawings.

## SPECIAL REQUIREMENTS

- D3.11 RESERVED
- D3.12 RESERVED
- D3.13 RESERVED

Lighting

Programme of Temporary Provisions

## CONTENTS

CLAUS	E	PAGE
GENER	RAL	1
D3.01	SCOPE	1
D3.02	OBJECTIVE	1
D3.03	BASIS OF DESIGN	1
D3.04	REFERENCE AND SOURCE DOCUMENTS	1
D3.05	ROAD TRAFFIC AND PEDESTRIAN BRIDGES	2
D3.06	PROVISION FOR PEDESTRIANS ON ROAD BRIDGES	3
D3.07	STRUCTURES OTHER THAN BRIDGES, ASSOCIATED WITH ROADS	3
D3.08	SMALL EARTH DAMS/DETENTION BASINS	3
D3.09	STRUCTURES USED FOR PUBLIC SAFETY	3
D3.10	TEMPORARY WORKS	4
SPECIA	AL REQUIREMENTS	4
D3.11	RESERVED	4
D3.12	RESERVED	4
D3.13	RESERVED	4

