DEVELOPMENT DESIGN SPECIFICATION

D3

STRUCTURES BRIDGE DESIGN

Amendment Record for this Specification Part

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirement clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

Amendment Sequence No.	Key Topic addressed in amendment	Clause No.	Amendment Code	Author Initials	Amendment Date
1	IPWEA Mid North Coast Working Party Review of D2 15/9/2000	D03	AMO	HC	16/1/01

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 elements will include:

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

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

D3.02 OBJECTIVE

Design Life

1. The objective 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.

D3.03 BASES OF DESIGN

Safety Quality Qualifications

1. The design shall be based on .current standards, best practice and provide for innovative solutions. .Management control and supervision by experienced and qualified engineers shall be required at all stages of the design.

2. Specifications shall be cross referenced on the design plans. 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

D3.04 REFERENCE AND SOURCE DOCUMENTS

(a) Council Specifications

D1	-	Geometric Road Design
D5	-	Stormwater Drainage Design
D8	-	Water Front development

(b) Australian Standards

AS1170 - Minimum design loads on structures (SAA Loading Code)
AS1684 - National Timber Framing Code
AS3600 - Concrete structures
AS3700 - Masonry in buildings (SAA Masonry Code)
AS4100 - Steel structures
Other relevant codes 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
DLWC - NSW Flood Plain Manual

D3.05 ROAD TRAFFIC BRIDGES

A.C.E.A. Listing

1. Structural design of large bridges is a complex matter generally falling outside the scope of many small civil engineering consultancies. If the design of these structures cannot be completed in house, council would generally prefer this work to be referred to a firm whose A.C.E.A. listing includes structural design of bridges in its claimed area of competency.

Checking

2. Submissions are not precluded from 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 proponents cost, if directed.

3. The AUSTROADS Bridge Design Code is the appropriate general reference for bridge proposals.

Debris

Overtopping

4. Council requires bridges to have low maintenance finishes; therefore timber and steel are not usually acceptable construction materials, unless suitable precautions are adopted. Heavy debris and bed loads may be characteristic of some streams so that large spans with slender piers are encouraged. If overtopping is permitted, handrails and guardrails are usually omitted. Flood depth indicators will be required in such cases.

Design Life Maintenance

5. Preventative maintenance is a key issue affecting the design life of the structure. The design plans 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 design plans.

Small Bridges

Design Storm Event

6. Unless otherwise indicated on the Development Consent, Where inundation of small Bridges is permitted by Council, the Bridge shall be designed to Convey at least the 20 year ARI storm event with certification stating that the bridge is capable of withstanding the inundation loadings for up to the 100 year ARI storm event. If in the opinion of the designer, such certification is impractical, the structure shall be designed to convey the 100 year ARI storm event without inundation.

7. Where structures are designed to be inundated, shall be limited to ensure that the degree hazard, as specified in the NSW Governments Flood Plain development manual 2001 is not exceeded, for the stability and safety of pedestrians and vehicles` the effect of the backwater gradient on upstream property shall be identified on the design plans.

Freeboard

8. Bridges located in roadways which are to be dedicated as public roads shall be designed to convey the stormwater event identified in the drainage design specification. Where no inundation is permitted, appropriate afflux shall be adopted together with a 500mm freeboard to the underside of the bridge deck.

9. Designers shall provide for public utilities, including the provision of conduits..in bridges. ***Public Utilities***

10. Bridge carriage way widths shall comply with tables D1.5 and D1.8 of "Geometric Road Design- D1" ***Carriageway Widths***

D3.06 PEDESTRIAN FACILITIES

1. Provision for pedestrians on bridges is required in rural residential andurban areas. The minimum provision is a 2.0m footpath with kerb at the road traffic edge and handrail. Traffic seperation barrier may be required where traffic speeds or volumes warrant. ***Pedestrians***

2. Council may require the provision of separate pedestrian carriageways in other situations should the anticipated traffic warrant it. Urban bridge approaches shall be lit. ***Carriage of Utilities***

3. Pedestrian access and Carriage ways shall be designed in accordance with Austroads Part 13 and 14 "Pedestrians and bicycles"

4. Designs for separate pedestrian bridges shall be based on current standards, best practice, and provide for innovative solutions. Pedestrian bridge width shall be in accordance with pathway requirements of AUSTROADS, PART 13

D3.07 STRUCTURES OTHER THAN BRIDGES, ASSOCIATED WITH ROADS

1. Public utility structures, retaining walls, and the like will be designed by a competent, practicing engineer, accredited in the design of such structures. The consultant shall refer to the AUSTROADS code and any other Australian standards to execute the design.

D3.08 SMALL EARTH DAMS

1. Small earth dams may 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. 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. ***Fencing***

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

4. The designer shall be required to certify the design and ultimately certify the work-as-executed plans for compliance with the design. In doing so, the designer is expected to conduct sufficient site inspections to justify the certification of the structure. All relevant details shall be shown on the design plans.

D3.09 STRUCTURES USED FOR PUBLIC SAFETY

1. The requirement of traffic barriers and pedestrian safety rails on bridges is to be determined. The design Engineer shall consider whether separate traffic and pedestrian barriers are required to satisfy the major functional requirements. The AUSTROADS Bridge Design Code is the recommended reference in this regard. ***Barriers***

2. It is essential that all barriers have been fully certified for each design and accredited for the intended use under quality assurance provisions.

3. Urban bridges shall be provided with adequate streetlighting to comply with relevant Australian Standards. Such requirements will be noted accordingly on the design plans.

Lighting

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. A construction programme, indicating the sequence of events leading to the implementation and removal of the temporary structures shall be specified.

Programme of Temporary Provisions

SPECIAL REQUIREMENTS

D3.11 CERTIFICATION

1. The designer shall be required to certify the design and ultimately certify the work-as-executed plans for compliance with the design. In doing so, the designer is expected to conduct sufficient site inspections to justify the certification of the structure. All relevant details shall be shown on the design plans.

2. It is essential that all barriers have been fully certified for each design and accredited for the intended use under quality assurance provisions.

D3.12 RESERVED

D3.13 RESERVED

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