

DESIGN STANDARDS for URBAN INFRASTRUCTURE

Introduction and Contents



DESIGN STANDARDS for URBAN INFRASTRUCTURE INTRODUCTION and CONTENTS

1	PRELIMINARY	1
2	INTRODUCTION	1
3	INTERPRETATION AND USE	1
3.1	GENERAL	1
3.2	STANDARD DRAWINGS	2
4	SCOPE	2
5	PRINCIPLES OF DESIGN FOR URBAN INFRASTRUCTURE	2
6	REVISION HISTORY	3
7	CONTENTS LIST	4
8	STANDARD DRAWINGS	12

DESIGN STANDARDS for URBAN INFRASTRUCTURE

INTRODUCTION and CONTENTS

1 PRELIMINARY

This document has been prepared in response to the need to update Guidelines on Engineering and Environmental Practices Roads and Bridges (GEEP R&B), GEEP Public Lighting the Urban Stormwater Design Manual and the ACT Landscape Design Guidelines. The update has been necessitated by several developments over the past few years including:-

- Issue of a number of new and revised National Standards and Guides.
- Wider acceptance of performance based rather than prescriptive codes
- Adoption of an ACT Code for Residential Development
- Adoption of new working procedures and reallocation of responsibilities within the ACT Government.
- Introduction of the Territory Plan

In planning for the revision of these documents, the decision was taken to separate the technical requirements which apply to all works from the procedural requirements which vary dependant on who is carrying out the works.

This introductory chapter also contains the Tables of Contents for all subsequent chapters.

2 INTRODUCTION

These Design Standards are intended for use by professionals involved in the planning, design and construction of Urban Infrastructure in the ACT. They are intended to complement the appropriate National Standards and Guides and a detailed knowledge of those documents is assumed.

Detailed information from established national standards is generally only given where necessary to draw attention to differences between ACT practice and those standards and the reasons for those differences or for the purpose of establishing ACT inputs to the more detailed requirements of the national documents.

3 INTERPRETATION AND USE

3.1 General

These Standards have been drawn up on the basis of “what we want to achieve” rather than “how you must achieve it”. Any solutions presented therefore represent “possible solutions” rather than “best and only solutions”. This is a major difference from the old “Standard Drawing” approach as it does require more creative input from both applicants and approving officers.

It is considered that this “performance” approach allows more imaginative solutions which may incorporate technology which was unknown at the time the standards were drafted.

The old compliance approach could lead to the rejection of a solution which met performance requirements but which did not align exactly with the standard drawings. The necessity for a prescribed solution to be capable of operating in all conditions also led to very conservative designs.

It has been necessary to include some absolute prohibitions which are non negotiable because they present a hazard to public safety and have, in the past, led to large liability claims against the ACT Government. As far as possible however, we have tried to avoid an absolute prohibition and have

given a list of problems which need to be overcome before a particular product or design can be used.

3.2 Standard Drawings

The number of Standard Drawings has been reduced compared to what was contained in the documents superseded by these standards. In many cases, there is no equivalent drawing. This does not mean that the old standard drawing is still current. All the old standard drawings have been superseded and are not to be used whether or not there is a direct equivalent new standard. Many of the old standard drawings are no longer relevant because we tend to use the wide range of products which can be bought off the shelf for our projects rather than a “standard” solution. These products include non safety critical items such as bollards as well as critical safety items such as terminal ends for traffic barriers.

In some cases, new Australian Standards include all the drawings which are needed and in other cases, a simple sketch or photograph is sufficient to show the concept without going to the extreme of a Standard Drawing.

Some consultants and contractors have produced their own “Standard Drawings” for particular cases and this can be acceptable as a “standard solution”. However, the existence of a “Standard Drawing”, which is not included in these Design Standards, does NOT mean that it is approved by Territory and Municipal Services for use nor does approval by Territory and Municipal Services of those Drawings for use on a particular project mean that they will be approved for use on any other project.

4 SCOPE

The *Design Standards for Urban Infrastructure* document the technical standards applicable to all infrastructure works constructed by, on behalf of, or for ultimate management by the Department of Territory and Municipal Services of the ACT Government.

5 PRINCIPLES OF DESIGN FOR URBAN INFRASTRUCTURE

The ACT Government is committed to high quality design and sustainability for developments within the ACT. Designs need to be in harmony not conflict with the environment. This will include a balancing of environmental, social and economic interests in all projects in order to support a healthy prosperous society.

Consistent with a commitment to achieve sustainable living environments in the Australian Capital Territory, high quality landscape development, enhancement and protection should be pursued as an integral part of development of Canberra and its environs.

Generally these standards have been developed on performance rather than prescription so that designers are free to develop innovative solutions to design problems rather than to simply tick the boxes to achieve a standard solution.

In developing a design solution, designers should keep in mind the ACT Government’s policies on sustainable development, reduction of greenhouse gas emissions, tree retention, accessibility, and no waste 2010.

Designers should aim for low maintenance solutions while minimising the whole of life cost of proposals. They should consider community safety aspects as well as road safety aspects of designs. Recycling and reuse of materials and resources such as stormwater are important contributors to sustainable designs.

6 REVISION HISTORY

Design Standard	Current Edition	Current Revision	Changes from Previous Revision
Introduction and List of Contents	1	4	DS 13 Revised
1 - Stormwater	1	0	
2 - Road Planning	1	0	
3 - Road Design	1	0	
4 - Road Verges	1	0	
5 - Driveways	1	0	
6 - Pavement Design	1	0	
7 - Bridges and Related Structures	1	1	ACT Government Policy and Warrants for use of Bridge Safety screens added.
8 – Guide Signs	na	na	Not yet issued
9 - Traffic Control Devices	1	0	
10 - Parking Areas	1	0	
11 - Guardrails, Fences and Barriers	1	0	
12 - Public Lighting	1	0	
13 - Pedestrian and Cycle Facilities	1	1	References to NSW Bicycle Guidelines and VicRoads Cyclenotes added. Updated Legislation, Industry standards and Policy and Guidelines TCDs, treatment at intersections and roundabouts updated. Coloured pavement treatment added. Tactile Surface Indicators added. Signage added. Standard drawings revised and added.
14 - Urban Open Space	1	0	
15 – Playgrounds and Playground Equipment	1	0	
16 – Urban Wetlands Lakes and Ponds	1	0	
17 – Shopping centres and other public urban spaces	1	0	
18 - Public Toilets	1	0	
19 – Street and Park Furniture and Barbecues	1	0	
20 – Urban Edge Management Zones	1	0	
21 – Irrigation	1	1	Includes special requirements for Sportsgrounds
22 – Soft Landscape Design	1	0	
23 - Plant Species For Urban Landscape Projects	1	0	
24 – Sportsground Design	1	0	Original Issue
25 – Urban Park And Open Space Signage	1	0	Original Issue
26 – Canberra Central Guidelines	na	na	Not yet issued
27 – Gungahlin Town Centre - Landscape	na	na	Not yet issued

7 CONTENTS LIST

This following list includes the Section headings from all published chapters of the Design Standards for Urban Infrastructure

Introduction and List of Contents

1	Preliminary	1
2	Introduction.....	1
3	Interpretation and Use.....	1
4	Scope.....	2
5	Principles of Design for Urban Infrastructure.....	2
6	Revision History.....	3
7	Contents List	4
8	Standard Drawings.....	11

Design Standard 1 - Stormwater

1.1	Introduction.....	1-1
1.2	Hydrology	1-8
1.3	Road Drainage	1-20
1.4	Pipelines.....	1-23
1.5	Sumps	1-37
1.6	Manholes.....	1-55
1.7	Engineered Waterways	1-59
1.8	Cut-off Drains	1-79
1.9	Retarding Basins	1-82
1.10	Gross Pollutant Traps.....	1-86
1.11	Further reading.....	1-99
1.12	Standard Drawings.....	1-100

Design Standard 2 -Road Planning

2.1	General.....	2-1
2.2	Related codes of practice and guidelines.....	2-2
2.3	Performance statement.....	2-3
2.4	Road planning standards	2-3
2.5	Glossary	2-15

Design Standard 3 - Road Design

3.1	General.....	3-1
3.2	Related codes of practice and guidelines.....	3-1
3.3	Road design	3-2
3.4	Glossary	3-13
3.5	Standard Drawings.....	3-18

Design Standard 4 - Road Verges

4.1	Introduction.....	4-1
4.2	Application and Use	4-1
4.3	Verge Design - General Principles	4-1
4.4	Underground Service Reservations.....	4-3
4.5	Paths, Landscaping and Above Ground Services Reservations	4-5
4.6	Laneways	4-9
4.7	Grassing.....	4-9
4.8	References.....	4-9
4.9	Glossary	4-10
4.10	Road Verge Drawings	4-10

Design Standard 5 - Driveways

5.1	Introduction.....	5-1
5.2	Related codes of practice and guidelines.....	5-2
5.3	General Principles	5-2
5.4	Materials and Pavement Design.....	5-2
5.5	Dimensions and Grades.....	5-3
5.6	Restriction on Location.....	5-6
5.7	Summary	5-9
5.8	Driveway Design Checklist	5-10
5.9	Standard drawings	5-12

Design Standard 6 - Pavement Design

6.1	General.....	6-1
6.2	Related codes of practice and guidelines.....	6-1
6.3	Pavement materials.....	6-2
6.4	Pavement design.....	6-6
6.5	Glossary	6-12
6.6	Standard Drawings.....	6-13

Design Standard 7 - Bridges and Related Structures

7.1	Introduction.....	7-1
7.2	Bridge Design	7-1
7.3	Bridge Roadway Geometry	7-3
7.4	Materials.....	7-6
7.5	Aesthetics.....	7-8
7.6	Drainage.....	7-9
7.7	Construction and maintenance provisions.....	7-9
7.8	Approaches	7-10
7.9	Pedestrian, Cyclist and Equestrian Underpasses	7-10

7.10	Bridge Barriers	7-11
7.11	Pedestrian and Cycle Barriers on Bridges.....	7-12
7.12	Bridge Safety Screens.....	7-12
7.13	Retaining Walls	7-13
7.14	Boardwalks & Jetties	7-13
7.15	Standard Drawings.....	7-15
	APPENDIX 1 – Bridge Safety Screen Warrant	7-16
	APPENDIX 2 - Bridge Safety Screen Warrant System – Explanation Tables Methodology.....	7-17

Design Standard 8 – Guide Signs

Not yet Issued

Design Standard 9 - Traffic Control Devices*

9.1	Introduction.....	9-1
9.2	Related codes of practice and guidelines.....	9-1
9.3	Traffic control device design.....	9-1
9.4	Standard drawings	9-13

Design Standard 10 - Parking Areas*

10.1	Introduction.....	10-1
10.2	Related codes of practice and guidelines.....	10-1
10.3	Car parks.....	10-1
10.4	Disabled parking.....	10-3
10.5	Landscape elements for car parks	10-3
10.6	Trees in car parks.....	10-7
10.7	Maintenance.....	10-7
10.8	Further reading.....	10-8

Design Standard 11 - Guardrails, Fences and Barriers

11.1	Introduction.....	11-1
11.2	Related codes of practice and guidelines.....	11-1
11.3	General requirements for barriers and fences.....	11-1
11.4	Common Problems.....	11-1
11.5	Vehicle Barriers	11-2
11.6	Cycle and Pedestrian Barriers.....	11-5
11.7	Fences and gates.....	11-5
11.8	Further reading.....	11-6
11.9	Standard drawings	11-6

Design Standard 12 - Public Lighting

12.1	Introduction.....	12-1
12.2	Related standards and guidelines	12-1
12.3	Public lighting design – general principles.....	12-2
12.4	Lighting for traffic routes (Category V lighting)	12-5
12.5	Lighting for pedestrian area (Category P)	12-5
12.6	Lighting of pedestrian crossings	12-7
12.7	Lamps used in the ACT	12-7
12.8	Glossary	12-8

Design Standard 13 - Pedestrian and Cycle Facilities

13.1	Introduction	13-1
13.2	Related codes of practice and guidelines.....	13-3
13.3	Objectives	13-4
13.4	Pedestrian and cycle network.....	13-5
13.5	Planning of pedestrian and cycling facilities	13-7
13.6	Design of pedestrian and cycle facilities.....	13-10
13.7	Signage	13-28
13.8	Glossary	13-34
13.9	Standard Drawings	13-36

Design Standard 14 - Urban Open Space*

14.1	Introduction.....	14-1
14.2	Related codes of practice and guidelines.....	14-1
14.3	Provisions for parks and open space	14-2
14.4	Water and sewer infrastructure	14-3
14.5	Heritage places	14-4
14.6	Urban wildlife and nature conservation	14-4
14.7	Other policies affecting urban open space	14-8
14.8	Further reading	14-9

Design Standard 15 – Playgrounds and Playground Equipment*

15.1	Introduction.....	15-1
15.2	Related codes of practice and guidelines.....	15-1
15.3	Legal obligations	15-2
15.4	Philosophy of play and playgrounds.....	15-2
15.5	Planning open space playgrounds	15-7
15.6	Siting, layout and design of play equipment areas	15-9
15.7	Safety clearance zones, impact absorbing materials and drainage	15-11
15.8	General guidelines for equipment	15-14

15.9	Equipment items suitable for open space playgrounds	15-20
15.10	Items not suitable for open space playgrounds	15-25
15.11	Fitness tracks	15-25
15.12	Further reading	15-26

Design Standard 16 – Urban Wetlands Lakes and Ponds*

16.1	Introduction.....	16-1
16.2	Related codes of practice and guidelines.....	16-1
16.3	Functions.....	16-1
16.4	Design Requirements	16-2
16.5	Water plants	16-5
16.6	Water Reuse	16-8
16.7	Public safety	16-8
16.8	Further reading.....	16-8

Design Standard 17 – Shopping centres and other public urban spaces*

17.1	Introduction.....	17-1
17.2	Related codes of practice and guidelines.....	17-1
17.3	Objectives for landscape design in shopping centres and other public urban spaces.....	17-2
17.4	Shopping centre landscape design policy	17-2
17.5	Design principles	17-3
17.6	Consultation and design process	17-5
17.7	Public art and culture.....	17-5
17.8	Accessibility	17-6
17.9	Safety and lighting.....	17-7
17.10	Services and waste management	17-7
17.11	Traffic and parking.....	17-8
17.12	Pedestrian movement	17-9
17.13	Pavements	17-9
17.14	Retaining and freestanding walls.....	17-10
17.15	Planting	17-10
17.16	Street furniture.....	17-10
17.17	Signage	17-11
17.18	Public toilets	17-11
17.19	Approvals	17-11
17.20	Further reading.....	17-11

Design Standard 18 - Public Toilets*

18.1	Provision policy.....	18-1
18.2	Related codes of practice and guidelines.....	18-1
18.3	Public toilet design	18-2
18.4	Further reading.....	18-3

Design Standard 19 – Street and Park Furniture and Barbecues*

19.1	Introduction.....	19-1
19.2	Related codes of practice and guidelines.....	19-1
19.3	General requirements for street furniture	19-1
19.4	Guide to street furniture numbers.....	19-2
19.5	Siting principles	19-2
19.6	Seats	19-3
19.7	Table/seats.....	19-5
19.8	Litter bins.....	19-5
19.9	Bicycle racks	19-5
19.10	Lights.....	19-6
19.11	Tree grates	19-6
19.12	Tree guards	19-6
19.13	Planter boxes	19-6
19.14	Vehicle barriers	19-7
19.15	Trolley Return Bays.....	19-7
19.16	Pergolas and awnings.....	19-8
19.17	Drinking fountains.....	19-8
19.18	Fences and gates.....	19-8
19.19	Sculpture and artworks.....	19-8
19.20	Signs	19-8
19.21	Paving	19-11
19.22	Flagpoles.....	19-11
19.23	Barbecues	19-11
19.24	Further reading.....	19-15

Design Standard 20 – Urban Edge Management Zones*

20.1	Introduction.....	20-1
20.2	Related codes of practice and guidelines.....	20-1
20.3	Planning and design objectives.....	20-1
20.4	General design requirements	20-2
20.5	Maintenance tracks	20-2
20.6	Fencing.....	20-5

20.7	Slashed grassed areas.....	20-5
20.8	Fire management zone	20-6
20.9	Catch and cut-off drains design.....	20-6
20.10	Overhead powerlines.....	20-7
20.11	Service easements.....	20-7
20.12	Equestrian trails.....	20-7
20.13	Further reading.....	20-9

Design Standard 21 - IRRIGATION

21.1	Introduction.....	21-4
21.2	Related codes of practice and guidelines.....	21-4
21.3	Types of system	21-5
21.4	Guidelines for high volume sprinkler systems	21-6
21.5	System capacity	21-7
21.6	Draw-off rates and operating times	21-7
21.7	Precipitation rates.....	21-8
21.8	System layout.....	21-8
21.9	Meter pit equipment.....	21-9
21.10	Pipes and fittings	21-10
21.11	Valves.....	21-11
21.12	Automatic controllers.....	21-12
21.13	Sprinklers/emitters.....	21-14
21.14	Special requirements for second class and grey water systems	21-15
21.15	Documentation	21-18
21.16	Further reading.....	21-20
21.17	Standard drawings	21-21
	Appendix A.....	21-22
	Appendix B Low Volume Valve Box Equipment.....	21-25
	Appendix C Free-standing Controller Housing.....	21-26
	Appendix D Second Class Water Systems	21-27
	Appendix E Typical Irrigation of Sports Field	21-31

Design Standard 22 – Soft Landscape Design*

22.1	Introduction.....	22-1
22.2	Related codes of practice and guidelines.....	22-1
22.3	Selection of species	22-1
22.4	Public safety	22-2
22.5	Design to reduce maintenance.....	22-2
22.6	Soils.....	22-2

22.7	Permeable paving	22-3
22.8	Root barriers.....	22-3
22.9	Mulching materials	22-4
22.10	Protecting existing trees	22-4
22.11	Tree planting	22-8
22.12	Shrub beds	22-13
22.13	Grassing.....	22-16
22.14	Further reading.....	22-18

Design Standard 23 - Plant Species for Urban Landscape Projects*

23.1	Introduction.....	23-2
23.2	Related codes of practice and guidelines.....	23-2
23.3	Additions to the plant list	23-2
23.4	Trees and shrubs	23-3
23.5	Grasses	23-71
23.6	Water plants	23-76
23.7	Deleted plants list.....	23-81
23.8	Name changes from previous list	23-84
23.9	Pest plants in the ACT.....	23-86
23.10	Further reading.....	23-87
23.11	Index.....	23-88

Design Standard 24 – Sportsgrounds

24.1	Introduction.....	24-2
24.2	Related codes of practice and guidelines.....	24-2
24.3	Definitions.....	24-3
24.4	Performance Statement	24-4
24.5	Standards	24-5
24.6	Further reading.....	24-39
	Standard drawings	24-40

Design Standard 25 – Urban Park and Open Space Signage

25.1	Introduction.....	25-1
25.2	Relevant codes of practice and guidelines	25-1
25.3	Park and Open Space Types	25-2
25.4	Sign Types	25-2
25.5	Sign Designs	25-3
25.6	Sign Graphics.....	25-12
25.7	Planning and Locating Signs.....	25-15
25.8	Standard Drawings.....	25-17

Design Standard 26 – Canberra Central Guidelines

Not yet Issued

Design Standard 27 – Gungahlin Town Centre - Landscape

Not yet Issued

8 STANDARD DRAWINGS**DS1 Stormwater**

Pipe Junctions	ST-0001	02	March 1998
Pipe Details	ST-0002	02	March 1998
Sump Inlets on Kerbs and Gutters	ST-0011	04	March 1998
Type R and QS Sumps	ST-0012	02	March 1998
Plantation and Grated Sumps	ST-0013	02	March 1998
1050 ND Manholes	ST-0014	02	March 1998
Special Chambered Manholes	ST-0015	02	March 1998
Surcharge Structures	ST-0016	02	March 1998
Structures - Miscellaneous Details	ST-0017	02	March 1998
Pipe Connections to Structures	ST-0018	02	March 1998
Multiple Type R Sumps	ST-0019	01	March 2002
Pipe Culverts 300 - 675 Dia - Endwalls	ST-0021	02	March 1998
Pipe Culverts 750 - 1200 Dia - Headwalls	ST-0022	02	March 1998
Precast Box Culverts - Endwalls	ST-0023	02	March 1998
Precast Box Culverts - Headwalls	ST-0024	02	March 1998
Floodway Low Flow Provisions	ST-0025	02	March 1998
At-Grade Floodway Crossings	ST-0026	02	March 1998
Minor GPT Layout - Parallel to Floodway	ST-0031	02	March 1998
Minor GPT Layout - Perpendicular to Floodway	ST-0032	02	March 1998
Major GPT Layout	ST-0033	02	March 1998
GPT Trash Racks	ST-0034	02	March 1998
Floodway Advisory Sign	ST-0041	02	March 1998

DS3 Road Design

Kerb and Gutter Standard Details Sheet 1	DS3-01
Kerb and Gutter Standard Details Sheet 2	DS3-02

DS4 Road Verges

Service Modules Sheet 1 of 2	DS4 - 01
Service Modules Sheet 2 of 2	DS4 - 02
Verge Gradients and Access requirements	DS4 - 03
Footpath Modules	DS4 - 04

DS5 Driveways

Domestic Driveways	DS5-01
Heavy Duty Driveways	DS5-02
Driveway Levels for 1 and 2 Metre Vertical Curves	DS5-03

DS6 Pavement Design

Subsoil Drainage Standard Details Sheet 1	DS6-01
Subsoil Drainage Standard Details Sheet 2	DS6-02

DS7 Bridges and Associated Structures

Gravity retaining walls – stone and clay brick	DS7-01
Reinforced concrete block walls up to 2100	DS7-02
Stone pitched retaining walls	DS7-03
Retaining walls general notes	DS7-04
Bridge identification plate	DS7-05
Pedestrian bridge barrier railings	DS7-06

DS9 Traffic Control Devices

Linemarking types	DS9-01
Pavement messages	DS9-02
Miscellaneous details	DS9-03
Vertical & lateral sign locations	DS9-11
Sign systems endorsed for high risk areas	DS9-12

Special signs	DS9-13
Finger boards	DS9-14
Signpost & footing details	DS9-15
Tcd's at traffic lights	DS9-21
Cable and loop layout	DS9-22
Hardware layout	DS9-23
Tcd's for arterial road roundabouts	DS9-24
Tcd's for local street roundabouts	DS9-25
Miscellaneous typical details 1	DS9-26
Typical civil details	DS9-27
Typical linemarking details	DS9-28
ACT Standard Parking Signs	DS9-40/1-5

DS11 FENCES, GUARDRAILS AND BARRIERS

Standard Ranger Gate	DS11-01
Vehicle Access Gate (Heavy Duty)	DS11-02

DS13 Pedestrian and Cycle Facilities

Path Standard Details	DS13-01
Vehicle Restriction Detail	DS13-02
Bus Stop Standard Details	DS13-03-1
Bus Stop Standard Details	DS13-03-2
Cycle Rest Rail Details	DS13-04
Onto Off Road Path Connection Details	DS13-05
Main Community Route Driveway Crossing	DS13-06
Main Routes Network (Proposed and Existing)	DS13-11
Main Routes Guide Signs Standard Details	DS13-12
Sign Location Layouts - 1 of 2	DS13-13
Sign Location Layouts - 2 of 2	DS13-14
Coloured Pavement Treatment	DS13-21
Coloured Pavement Treatment at Exit Ramps.	DS13-22
Signage Extent of Influence - Belconnen	DS13-31
Signage Extent of Influence - City	DS13-32
Signage Extent of Influence - Gungahlin	DS13-33
Signage Extent of Influence - Queanbeyan	DS13-34
Signage Extent of Influence - Tuggeranong	DS13-35
Signage Extent of Influence - Weston Creek	DS13-36
Signage Extent of Influence - Woden	DS13-37

DS25 Urban Park and Open Space Signage

Town Park Identification and Information Sign	DS25-01
Town Park Direction Sign	DS25-02
District Park Major & Secondary Identification Sign	DS25-03
District Park & Urban Open Space Minor Identification Sign	DS25-04
District Park & Urban Open Space Information & Direction Sign	DS25-05
Neighbourhood Park Identification & Information Sign	DS25-06