

PINE RIVERS SHIRE COUNCIL

DESIGN MANUAL

CIVIL INFRASTRUCTURE DESIGN



DESIGN STANDARDS

Part 1 Design Standards for Roadworks

Part 2 Design Standards for Stormwater Drainage Works

Part 3 Design Standards for Water Supply Works

Part 4 Design Standards for Sewerage Works



PART 1

DESIGN STANDARDS FOR ROADWORKS

Section 1 Introduction

Section 2 The Residential Street

Section 3 The Street System

Section 4 The Major Urban Road System

Section 5 Industrial Roads

Section 6 Non-Urban Roads

Section 7 General Requirements

PINE RIVERS SHIRE COUNCIL

PART 1 - DESIGN STANDARDS FOR ROADWORKS



SECTION 1 INTRODUCTION

1.1.0	INTRODUCTION TO ROADS STANDARDS	1
1.1.1	Background	1
1.2.0	FORMAT OF THE ROADS STANDARDS	2
1.3.0	PERFORMANCE ORIENTATION.....	4
1.3.1	Prescriptive Standards	4
1.3.2	Performance Standards.....	4
1.3.3	Designer Opportunities and Obligations	4
1.3.4	The Pine Rivers Shire Council Approach	4
1.4.0	GOAL AND OBJECTIVES.....	6
1.4.1	Goal.....	6
1.4.2	Objectives.....	6
1.4.3	Compromises	7
1.5.0	RESIDENTIAL STREETS PROVISIONS.....	8
1.5.1	Origin.....	8
1.5.2	Variations From "Queensland Streets"	8
1.5.3	Philosophy	8

**1.1.0****INTRODUCTION TO ROADS STANDARDS****1.1.1****BACKGROUND**

The original Pine Rivers Shire Council “Design Manual - Volume 1 Roads & Drainage” was adopted by the Pine Rivers Shire Council in 1980 and at that time was representative of the most up-to-date current design and construction practice.

Revised standards were adopted by Council in 1993 to cover changes in the field of residential street design and design philosophy and practice following the publication of the Australian Model Code for Residential Development (AMCORD) and Queensland Streets texts.

Continuing with Councils practice of constantly revising standards where necessary, this edition of the Design Manual includes a number of revisions to the previously published standards. There has not been any change to the philosophy for the design and layout of development and the road network.

1.2.0 FORMAT OF THE ROADS STANDARDS

The format of these standards has not changed significantly from the previously published version Design Manual. The previous manual was distributed in smaller components as these were produced, leading to an add-on feeling to the final manual. As the Standards are now a more substantially complete document, revisions have been made to improve the integration of the sections.

The major components of the Design Standards for Roadworks are therefore:-

Section 1	-	Introduction
Section 2	-	Residential Streets
Section 3	-	The Street System
Section 4	-	Major Urban Roads
Section 5	-	Industrial Roads
Section 6	-	Non-Urban Roads
Section 7	-	General Requirements

This format continues to permit the modification of each section, and the addition of new sections where necessary.

For convenient reference, the relevant road and street classifications referenced in the above sections of the Design Standards are:-

Section 2 - Residential Streets

Access Place
Access Street
Collector Street
Introduces the Trunk Collector Street

Section 3 - The Street System

Defines the Trunk Collector Street

Section 4 - Major Urban Roads

Freeway
Arterial Road
Sub-Arterial Road

Section 5 - Industrial Roads

Industrial Road
Industrial Collector Road

Section 6 - Non-Urban Roads

Rural Residential Access Place
Rural Residential Access Road
Rural Residential Collector Road
Rural Access Road
Rural Collector Road
Rural Sub-Arterial Road
Rural Arterial Road

Section 7 - General Requirements

Applies to all road and street classifications

1.3.0 PERFORMANCE ORIENTATION

1.3.1 PRESCRIPTIVE STANDARDS

Most traditional codes and standards are “prescriptive”, specifying definite criteria, numerical or otherwise, which must be complied with.

Such standards are simple to use for design and for reviewing submitted designs for compliance. The bases for the design criteria, however, are generally not stated. In many cases their origin may be historical and of doubtful current validity or the criteria may not be appropriate to the specific circumstance.

1.3.2 PERFORMANCE STANDARDS

On the other hand, these Design Standards, together with AMCORD and several other recent codes, is “performance oriented”, identifying the **objectives** sought to be achieved and the **performance criteria** required to be satisfied in respect of each design element, but allowing the designer the choice of method to achieve the required results.

As a guide, however, for the less experienced designer, and also to provide a “common ground” between designer and the Pine Rivers Shire Council, “Probable Solutions” are also provided for each design element.

By using **only** these criteria the design standards would become a “prescriptive standard”.

1.3.3 DESIGNER OPPORTUNITIES AND OBLIGATIONS

The extent to which design flexibility can be exercised in practice varies with the type of road. In the case of major roads, for example, standards are necessarily largely “prescriptive” in nature. In the case of residential streets, however, performance orientation provides **great opportunities** for the designer to apply an innovative and cost-effective approach to streetworks design, without the “straitjacket” of older prescriptive standards.

While the approach of using only mandatory or compliance criteria may be valid for minor, straightforward developments, it is hoped that it will **NOT** be the general means of applying the design standards.

More preferable is a true understanding of the intent of the **performance criteria** and the satisfaction of these criteria by application of a design solution appropriate to specific circumstances. This places an **obligation** on the designer to exercise good professional judgement at all times, with the added onus of having to justify all decisions.

1.3.4 THE PINE RIVERS SHIRE COUNCIL APPROACH

The Pine Rivers Shire Council recognises that application of “performance oriented” standards requires a flexible approach by the Pine Rivers Shire Council staff in reviewing designs submitted by consultants and a greater exercising of engineering judgement than is generally the case with “prescriptive” standards.

Reviewing staff have been advised to appreciate that the essential requirement is observance of the **spirit** of the performance criteria, and that “probable solutions” are **NOT** necessarily absolutes.

On the other hand, nothing in these design standards are to be construed as limiting in any way the Pine Rivers Shire Council rights to impose differing conditions when approving development proposals, or limiting the discretion of a Pine Rivers Shire Council engineer to vary as he considers necessary the engineering requirements in respect of a particular development, having regard to good engineering practice.

It is strongly recommended that consultants have initial discussions with the Pine Rivers Shire Council staff to agree design concepts in the case of major or unusual projects.

1.4.0 GOAL AND OBJECTIVES

1.4.1 GOAL

The identified **goal** of the design standards are to promote and encourage subdivisional road and streetworks design and construction practices which will provide an **optimum combination** of:-

- ❖ safety
- ❖ amenity
- ❖ convenience
- ❖ economy
- ❖ environment

for subdivision residents, road and street users and the community generally.

1.4.2 OBJECTIVES

The five major considerations stated in the Goal of the Guidelines, i.e.:-

safety, amenity, convenience, economy and environment

are the **primary objectives**.

These are the yardsticks against which all proposed design criteria are to be assessed.

Each of these **primary objectives** has a number of components e.g.:-

❖ SAFETY

- ❖ road accident prevention (obviously the major component in the case of streetworks design)
- ❖ emergency vehicle access (fire and ambulance)
- ❖ crime prevention ("neighbourhood" planning; safe pedestrian routes)

❖ AMENITY

- ❖ traffic noise reduction
- ❖ visual amenity
- ❖ social planning

❖ CONVENIENCE

- ❖ minimum travel distances to major destinations
- ❖ minimum travel times in low-speed environment
- ❖ legible street layout

❖ ECONOMY

- ❖ capital cost of subdivision construction
- ❖ maintenance costs
- ❖ user costs

❖ ENVIRONMENT

- ❖ minimum adverse impact on ecosystems
- ❖ minimum earthworks and disturbance to natural landforms
- ❖ conservation of historical and archaeological sites

1.4.3 COMPROMISES

While the primary objectives are to a large degree compatible, there is often a potential conflict between the ideals of the primary objectives themselves, or even within each of the primary objectives e.g.:-

- ❖ street layout excluding through traffic
 - ❖ safety and amenity v. user convenience
- ❖ verge width
 - ❖ amenity v. economy

The relative emphasis placed on these objectives will vary with the category of road or street under consideration e.g. amenity may be considered as more important than convenience in the case of a residential street, while the opposite may apply for a major road.

The achievement of an **optimum** design lies in the judicious balancing of the ideals of each objective to obtain the best overall solution - not just a science, but an art!

1.5.0 RESIDENTIAL STREETS PROVISIONS

1.5.1 ORIGIN

The provisions of these design standards in regard to residential streets closely follow those of “**Queensland Streets - Design Guidelines for Subdivisional Streetworks**”.

In turn, “Queensland Streets” is based on the streetworks recommendations of **AMCORD** (Australian Model Code for Residential Development) prepared by the Model Code Task Force of The Joint Venture for More Affordable Housing, a Federal Government initiative.

1.5.2 VARIATIONS FROM “QUEENSLAND STREETS”

These design standards incorporate a number of variations from “Queensland Streets”, to meet the specific requirements of the Pine Rivers Shire Council.

1.5.3 PHILOSOPHY

Philosophical variations include:-

❖ Residential Street Vs. Traffic Route

The standards make a definite distinction between:-

- ❖ the **residential street**, whose major function is to provide access to the allotments which front it and
- ❖ the **traffic route**, whose function is to provide for the movement of traffic.

This is a marked departure from the “traditional” idea of a graduated road/street hierarchy.

❖ Reduced Vehicle Speed

In the interests of safety, amenity and economy, the residential street, with the emphasis now placed on its access function, is designed for consistently lower vehicle speeds. This is achieved by tight geometric design e.g. reduced carriageway widths, reduced length of straight alignment, sharp curve radii and the necessity to pause occasionally to give way to opposing traffic.

❖ Reduced Traffic Volume

The road design standards places a definite upper limit on the acceptable maximum traffic volume on a residential street, requiring that if that volume is exceeded, frontage of residential allotments to the street is denied.

These changes in philosophical approach tend to result in the following physical variations to the subdivisional form:-

- ❖ Limitation of the maximum traffic volume on a residential street results in the need for a new class of **no-access Collector street**, designated as a “trunk collector street”.
- Good design can eliminate or reduce to a minimum the need for such streets and the **total** cost of streets and roads can still be less than at present, due to savings in construction costs which can result from amended standards in the majority of streets in the system.
- ❖ Maximum number of **cul-de-sac streets**, rather than through or loop streets, for positive control of traffic volume.
 - ❖ Creation of “**cells**”, of approximately 300 allotments, to minimise need for trunk collectors.
 - ❖ **Ample connections** for pedestrian and cycle routes e.g. between heads of cul-de-sacs, to compensate for reduction in street connectivity.
 - ❖ Characteristics of the individual street are:-
 - ❖ typically a cul-de-sac
 - ❖ minimum lengths of straight alignment
 - ❖ narrow street carriageway
 - ❖ meandering, non formal alignment
 - ❖ possible provision for off-carriageway parking
 - ❖ alternative forms of cul-de-sac heads
 - ❖ In the case of arterial and sub-arterial roads, no approvals for direct frontage of residential allotments to these roads will be given by the Pine Rivers Shire Council, other than in special circumstances.