

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

PINE RIVERS SHIRE COUNCIL
DESIGN STANDARDS



PART 2
DESIGN STANDARDS FOR
STORMWATER DRAINAGE WORKS

Section 1 Introduction

- Section 2 Strategy Plan
- Section 3 Best Management Practices
- Section 4 Design Standards
- Section 5 Summary Document

PINE RIVERS SHIRE COUNCIL

PART 2 - DESIGN STANDARDS FOR STORMWATER DRAINAGE WORKS



SECTION 1 INTRODUCTION

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1.1.0 INTRODUCTION

1.1.1 BACKGROUND

Pine Rivers Shire Council's original stormwater drainage design standards focussed on the management of a stormwater runoff quantity with limited recognition of the issues relation to degradation of water quality through the processes of catchment development.

The publication of the Queensland Urban Drainage Manual provided a basis for continued development of appropriate design standards while the Environmental Protection Legislation established legislative requirements of the management of stormwater quality.

The Pine Rivers Shire has a substantial rural area which is rapidly being developed for rural residential purposes together with strong urban growth. This mix of development has led to the adoption of a drainage philosophy involving the improvement of the effectiveness of natural systems rather than replacing, upgrading or ignoring them. The impact of development, and particularly urban development, on flow regimes, erosion, silting and flooding is to be controlled by adoption stormwater management techniques that maintain the function of natural drainage systems as far as possible.

In 1996, in recognition of changes in the field of stormwater drainage design, the Pine Rivers Shire Council released revised stormwater drainage design standards for water quality protection, flood control devices and drainage systems which provide protection for the natural character and environment of watercourses. Council was assisted in this work by Gutteridge Haskins and Davey Pty Ltd

Continuing with Councils practice of constantly revising standards where necessary, the adaptation of the Design Manual into a format suitable for inclusion with the Integrated Planning Act has led to the inclusion of a number of revisions to the previously published standards. There has not been any change to the Pine Rivers Shire Council philosophy for the design of Stormwater drainage systems or the requirements for discharge quality.

1.2.0 FORMAT OF PART TWO

In recognition of the importance of strategic planning and best management practices, these sections have been included with relevant design standards as a specific section of Part Two of the Design Standards.

It is considered necessary for a designer to have a thorough understanding of the strategic elements of the Pine Rivers Shire Council philosophy for stormwater drainage design and the specific design requirements.

The major components of this part of the Stormwater section of the Design Standards are: -

| | | |
|-----------|---|---------------------------|
| Section 1 | - | Introduction |
| Section 2 | - | Strategy Plan |
| Section 3 | - | Best Management Practices |
| Section 4 | - | Design Standards |
| Section 5 | - | Summary Document |

For convenient reference, the relevant topics covered in the above sections are:-

Section 2 - Strategy Plan

- Introduction
- EPA Requirements
- Stormwater Managements Goals and Strategies
- Strategy Details
- Conclusion

Section 3 - Best Management Practices

- Introduction
- Stormwater Management and the Environmental Protection Act
- The Nature of Stormwater Runoff
- Stormwater Quality Management
- Stormwater Quality Best Management Practices
- Summary of Uses and Limitations of Best Management Practices
- Environmental Impacts of Stormwater Treatment Measures
- Recommendations

Section 4 - Design Standards

- Introduction
- Design Documents
- Definitions
- General Requirements
- Legal and Town Planning Aspects
- Planning of the Drainage System
- Q.U.D.M Modifications
- Detention Basins
- Open Channel Design and Analysis
- Development Related Issues
- Environmental Requirements
- Miscellaneous Design Requirements
- Commercial and Industrial Developments
- Design Charts and Tables
- Plan Presentation

Section 5 - Summary Document

- Introduction
- Design Documents
- Definitions
- General Requirements
- QUDM Modifications
- Environmental Requirements
- Miscellaneous Design Requirements

1.3.0 PERFORMANCE ORIENTATION

1.3.1 PRESCRIPTIVE STANDARDS

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

Such standards are simple to use for design, and for reviewing submitted design for compliance. However, the basis for the design criteria are often not stated, and in many cases their origin may be historical or the criteria may not be appropriate to the specific circumstance.

1.3.2 PERFORMANCE STANDARDS

On the other hand, these standards together with other recent codes, are “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 for the less experienced designer, however, and also to provide a “common ground” between the designer and the Pine Rivers Shire Council, “Probable Solutions” are also provided for each design element.

By using **only** these criteria the manual 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 development, or stormwater design element being considered. Opportunities exist for the designer to apply an innovative and cost-effective approach to stormwater design, without the “strait-jacket” of older prescriptive standards.

While the approach of using only the “specific design criteria” provided may be valid for minor, straight forward developments, it is hoped that it will NOT be the general means of applying the standards.

Much preferable is a true understanding of the intent of the performance criteria and satisfaction of these criteria by application of a design solution appropriate to the specific circumstances. This places the obligation on the designer to exercise good professional judgement at all times, and the onus of being able to justify their decision.

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 exercise 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 standards is to be construed as limiting in any way the Pine Rivers Shire Council rights to impose differing conditions when approving development proposals, nor 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 discussion 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 this part of the design manual is to promote and encourage subdivisional stormwater drainage and construction practices which will provide an optimum combination of:-

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

for subdivision residents, road, and open space 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**
 - ❖ safe conveyance of flooding events to receiving waters
 - ❖ control of development to appropriate areas
 - ❖ adequate drainage of roadway pavements
- ❖ **AMENITY**
 - ❖ control of flood damage
 - ❖ visual amenity
 - ❖ social planning
- ❖ **CONVENIENCE**
 - ❖ flood free access
 - ❖ runoff conveyance and storage
 - ❖ immunity from inundation
- ❖ **ECONOMY**
 - ❖ capital costs for subdivision construction
 - ❖ maintenance
 - ❖ user costs
- ❖ **ENVIRONMENT**
 - ❖ minimum adverse impact on ecosystems
 - ❖ control of pollutants at source
 - ❖ minimum disturbance of natural features