

# FOREWORD

## Purpose

The purpose of this guide is to promote uniformity for highway design in Alberta and to encourage the provision of safe and efficient roads for the well-being of the travelling public and society in general. The guide establishes uniform geometric design standards and procedures to carry out the highway design functions of Alberta Transportation (AT). It is neither intended as, nor does it establish, a legal standard for these functions.

This guide was prepared by Technical Standards Branch, Safety and Technical Services Division, AT.

## Scope

This guide is not a textbook or a substitute for engineering knowledge, experience or judgement. It includes techniques as well as graphs and tables not ordinarily found in textbooks to aid in the quick solution of design problems. No attempt is made to detail basic engineering techniques found in standard textbooks.

Standards in this manual are general since they cannot cover all site-specific conditions. The standards are based on prevailing and anticipated future conditions of vehicle dimensions and performance, driver characteristics and transportation demands. These conditions vary with time and therefore it is normal that standards be revised and updated periodically. New design standards do not imply that roads designed to former standards are unsafe. New values will provide more satisfactory design for new facilities as well as for major reconstruction projects on existing facilities where new horizontal alignments are used.

For evaluation of the engineering quality of existing roads, the standards in this manual should not be used as a simple checklist without reference to the constraints and circumstances prevailing at the time of design. The "standards of the day" based on the year of construction should be considered when evaluating the appropriateness of standards on existing paved roads.

It is intended that this guide will be used differently, depending on the nature of the facility. For new construction on new alignment, it is expected that the standards in the manual will be treated as a minimum, and usually will be exceeded except where constraints, for

example physical, financial or environmental, are particularly severe.

Resurfacing, restoration, rehabilitation (3R) and reconstruction projects (4R) on existing paved roads are sometimes subject to severe constraints and controls. Consequently, Chapter G entitled 3R/4R Geometric Design Guidelines has been developed for assessment of existing paved roads. This chapter is to be used as a supplement to the rest of the manual. It provides more emphasis on safety, cost-effectiveness, and greater flexibility in geometric controls, which is appropriate in the assessment of existing infrastructure. However, the design standards shown elsewhere in the manual are more appropriate for design of new roadways.

## Format

A loose-leaf binder was chosen to facilitate change and expansion. The date of original issue (APRIL 1995) or update version is shown in the upper corner of each sheet. New information, and/or updates for substitution, will be issued in this format as required. A new page date will be used to identify any subject matter i.e. text, tables, figures etc., that has been updated. The revised information will be further identified by shading; in the case of text, the new words will be shaded and in the case of tables and figures, the title will be shaded. Where the content of a page is new due to the addition of information earlier in the chapter (with no technical revision on that page), the date will not be revised. Manual holders should insert new pages promptly when they are received. Revised Tables of Contents will be issued as the need arises.

Each chapter in the guide has a reference letter that is used in all section titles, tables and figures. Table numbers begin with the same number as the relevant section to allow easy reference to text.

## Geometric Design, Guides, Standards, Design Exceptions

Geometric Design is defined as the selection of the visible elements of the road.

Design Guides are not, and cannot be, a substitute for decision-making on the selection of geometric design parameters. This document represents customary practice that is generally recognized by AT to be sound. The contents of this guide are not to be regarded as requirements or in any sense obligatory.

The terms standard, minimum standard and desirable standard as used in this guide are defined below:

A standard is a value for a specific feature, which practice or theory has shown to be appropriate, where the prevailing circumstances are normal and general, and where no unusual constraints influence the design. The lowest value that would normally be applied in these circumstances is the minimum standard.

Where constraints are severe and the requirement to meet the minimum standard would impose significant property or environmental damage, or would incur excessive cost, values below minimum standard may be acceptable. The degree of deviation below the minimum value that is acceptable is a matter of judgement, and depends on the nature of the standard and the severity of the constraints. A few standards are inviolate while others have latitude, and are applied with discretion. Financial consideration is often a constraint that needs to be addressed in the design process. In urban areas, for example, severe physical constraints are commonplace and the use of values below standard is often the consequence. In these cases, the most suitable design is the one that places appropriate emphasis on the various features. Urban roads designed to below-minimum values can, and in many cases do, operate reasonably well. This does not suggest that sub-standard design is always appropriate, but rather that standards are not to be applied rigidly.

In situations where conditions allow standards to be exceeded without significant cost, property or environmental damage, the minimum values are normally avoided in favour of higher values. In such cases, the desirable standards, where shown, represent a target for which to aim.

Design Exceptions are defined as instances where values lower than the minimum standard are used. Design exceptions may be approved at either the planning or detailed design stage. The approval of all exceptions

should be documented and filed according to highway project number for future reference.

## Related Alberta Transportation Publications

- Highway Standard Plates (CB6)
- Traffic Control Standards
- Engineering Consultant Guidelines for Primary Highway Projects
- Suggested Engineering Consultant Guidelines for Secondary Highway Projects
- Road/Railway Crossing Guidelines for At-Grade Crossing and Grade Separations
- Pavement Design Manual
- Guidelines for Bridge Structures, Standards, Approvals and Design
- Drafting Guidelines

## Related Publications by Others

- Manual of Geometric Design Standards for Canadian Roads, 1986, Transportation Association of Canada (TAC)
- Uniform Traffic Control Devices for Canada, September 1998, TAC
- A Policy on Geometric Design of Highways and Streets, 1994, American Association of State Highway and Transportation Officials (AASHTO)
- Roadside Design Guide, AASHTO (1996)
- Highway Capacity Manual, Special Report 209, Transportation Research Board, USA (1994)