

Development of the NZ Supplement to Austroads Guide to Traffic Engineering Practice Part 14 – Bicycles

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Abstract

The NZ Supplement (the Supplement) to Guide to Traffic Engineering Practice Part 14: Bicycles¹ (GTEP Part 14) is expected to be released as a working draft by Transit New Zealand on Transit's website shortly.

Both GTEP Part 14 and New Zealand's Manual of Traffic Signs and Markings (MOTSAM) are widely used in New Zealand to provide guidance for the design of cycling facilities. However, these documents provide conflicting advice in a number of areas. The Supplement attempts to reconcile these issues and provide "best practice" design guidance for New Zealand conditions.

This paper will provide an understanding of how the Supplement is structured and how it relates to GTEP Part 14 and MOTSAM. It also explains some of the key components of the Supplement, giving a feel for the content and some of the reasoning behind the changes.

About the Authors

- David McGonigal B.Eng (Hons) has over 10 years experience in a wide range of traffic and transportation projects. David has gained extensive experience in the design and implementation of cycling facilities in the UK.
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This paper represents the views of the authors and does not necessarily represent the views of Transit New Zealand or MWH New Zealand Ltd.

¹ Guide to Traffic Engineering Practice Part 14 – Bicycles, Austroads, 1999

1 Introduction

In August 1985, the National Roads Board and Urban Transport Council (NRB/UTC) published a document titled "Guide to Cycle Facilities". This document was the key reference document for the design of cycle facilities in New Zealand and the signs and road markings referenced in it were prescribed in the National Roads Board's "Manual of Traffic Signs and Markings". With the introduction of symbol based traffic signing, some signs were revised in the early 90's and these have remained broadly the same up to the present time.

In 1993 Austroads published the "Guide to Traffic Engineering Practice, Part 14 – Bicycles". This publication provided more up to date design information than the NRB/UTC publication and has therefore been widely adopted as a reference document, effectively superseding the NRB/UTC publication. The current edition of Austroads "Guide to Traffic Engineering Practice, Part 14 – Bicycles" (GTEP Part 14) was published in 1999.

Whilst GTEP Part 14 has generally been adopted for the design of cycling facilities, some of its content is not applicable to New Zealand, particularly due to differences in signing and road marking practices and regulations between Australia and New Zealand. These differences mean that a general adoption of GTEP Part 14 is not appropriate. Accordingly, the Supplement to GTEP Part 14 has been developed specifically for New Zealand.

It has been necessary to review and update MOTSAM to reflect the proposed signs and markings that were identified through the development of the Supplement.

2 Project Background

Following discussions at the Road Controlling Authorities Forum on the issues surrounding GTEP Part 14, Transit New Zealand initiated a project to develop the Supplement in June 2002. Tenders were requested from consultants to assist with the development of the project and MWH New Zealand Ltd was commissioned for this role in August 2002.

The project has been carried out in three stages, as follows:

- Stage 1 broadly involved a review of GTEP Part 14 to establish the extent of any changes and development of the content of the Supplement;
- Stage 2 involved preparing a consultative draft² of the Supplement that was circulated during July 2003.
- Stage 3 involves finalising the Supplement and publishing it for use.

At the time of writing, Stage 3 is well underway with the Supplement expected to be available on Transit New Zealand's website in November 2003.

The content of the Supplement is still subject to finalisation and readers should not assume that the material contained in this paper will be the same as the guidance ultimately provided in the Supplement.

3 Structure of Supplement

The Supplement to GTEP Part 14 is intended as the "first port of call" for cycling facility design and designers should consult it before referring to GTEP Part 14. The organisational structure and numbering system of GTEP Part 14 has been followed throughout the Supplement.

The Supplement comments on each section of GTEP Part 14 and:

- Refers the reader to GTEP Part 14;
- Provides supplementary text to expand on the advice given in GTEP Part 14; or
- Provides text to replace the text in GTEP Part 14.

4 Overview of Supplement

Sections 1 through 3 are generally introductory chapters providing information on planning issues and bicycle rider requirements and as a result these sections have required only minor changes.

² NZ Cycling Design Guide, Transit New Zealand, June 2003

Section 4, which deals with on-road cycle facilities, has been modified with the introduction of new terminology in a number of areas. In addition, the design guidance for cycle lanes has been reviewed.

Section 5 (intersections) has a number of changes, while Sections 6 through 8 generally remain the same.

Section 9, which relates to markings and signs, remains broadly the same since the signs and marking regime used in Australia and discussed in GTEP Part 14 is being adopted for New Zealand. This, however, requires a number of changes to MOTSAM.

Section 10 and the appendices remain relatively unchanged.

The key changes are discussed in more detail in the following sections.

5 Facility Selection Tools

GTEP Part 14 has three cycling facility selection tools to help designers decide which type of cycling facility is appropriate in different circumstances. Each is a flow chart with a series of decision boxes. By providing answers to the yes/no questions, a designer can determine which type of facility is needed.

The first is Figure 2-4 entitled Guide to Choice of Type of Facility for Cyclists (reproduced in the Appendix as Appendix Figure A). This has three possible outcomes:

- path treatments;
- road treatments; or
- “ensure satisfactory local conditions” and carry out a “detailed review of routes for inexperienced cyclists, for strategic bicycle routes and where high bicycle volumes exist”.

If a road treatment is required by Figure 2-4, then Figure 4-1 Guide to Choice of Road Treatments for Cyclists (Appendix Figure B) is used to determine which specific type of road treatment is needed. The possible outcomes from this flow chart are:

- exclusive bicycle lanes;
- provide space on road e.g. sealed shoulder(s) or develop alternative route;

- bicycle/car parking lane(s) or edge line treatment;
- part time exclusive bicycle lane(s);
- wide kerbside lane(s);
- mark widest lane possible and develop alternative route; and
- ensure satisfactory local conditions.

Path treatments are selected using Figure 6-15 Guide to Choice of Path Treatments for Cyclists (Appendix Figure C). Possible outcomes are:

- exclusive bicycle path;
- shared use path; and
- separated path.

The Supplement replaces all three of these figures. The first two have been rejected for technical reasons. The third (Figure 6-15 for path treatments) has been replaced because of typographical errors in GTEP Part 14 (the yes/no labels for the arrows leading out of each decision box are missing, so a designer is not sure which direction to follow through the flow chart).

There are a number of concerns with Figure 2-4, the initial tool used to determine whether off-road or on-road solutions are required. For example, if a road carries more than 3,000 motor vehicles per day or is used by commuting motorists, then cycle lanes or other on-road solutions are not appropriate. There are numerous examples in New Zealand and overseas where cycle lanes have been very satisfactorily deployed on roads with traffic volumes of up to 20,000 motor vehicles per day or more.

Two decision boxes ask “Is route used for commuting by motor traffic?/Is motor traffic volume (AADT) greater than 3000 vpd?” There are two problems with this. The question is ambiguous (because there are two questions in the box) if the answer to one question is “yes” while the answer to the other is “no”. And how does one determine whether the route is used by commuting motor traffic. Is this every urban road?

A third concern with Figure 2-4 is the decision box asking “Where route follows a road, is speed limit greater than 80 km/h?” (and a similar box using 70 km/h as a threshold). If the route does not follow a road, then no guidance is provided.

Initially, two facility selection tools to replace Figures 2-4 and 4-1 were developed and were published in the consultation draft of the Supplement (the NZ Cycling Design Guide, or CDG). They used the flow chart concept to try to remain consistent with GTEP. A number of commentators on the draft found the charts difficult to use. Subsequently, new facility selection tools have been developed. They are based on the concept of Dutch³ and UK⁴ manuals, using a graph with speed limits on one axis and motor vehicle traffic volumes on the other. They are reproduced as Figures 1 and 2.

They are felt to be much easier to use than the flow chart style of facility selection tool and should greatly simplify the facility selection task, while recommending more appropriate solutions in some cases than GTEP. The new Figure 2-4 (included in this paper as Figure 1) divides all combinations of traffic volume and speed limit into five areas. Different portions of the speed/volume graph are identified with different treatments as follows:

- off-road (cycle path)
- off-road or on-road or both
- on-road (cycle lane, sealed shoulder or wide kerb lane)
- shared quiet street
- situation unlikely to exist (speed limits below 30 km/h and high traffic volumes).

The facility selection tool for on-road treatments (the new Figure 4-1, included in this paper as Figure 2) is much the same graph, but with the on-road area being further subdivided into four areas, as follows:

- cycle lane
- cycle lane or sealed shoulder
- cycle lane or wide kerb lane
- wide kerb lane

This facility selection tool (the Supplement's new Figure 4-1) effectively replaces both Figures 2-4 and 4-1 in GTEP Part 14, although both new figures are to be included in the Supplement to assist readers familiar with the organisation of GTEP Part 14.

³ Sign Up for the Bike: Design Manual for a Cycle Friendly Infrastructure, CROW (Netherlands), 1993

⁴ Guidelines for Cycle Audit and Cycle Review, Institution of Highways and Transportation (UK), 1998

6 Kinds of Cycle Lanes

GTEP Part 14 uses a rather clumsy nomenclature for the two most common types of cycle lanes. These are "exclusive cycle lanes" and "bicycle/car parking lanes" in GTEP. It also has separate sections (4.4.1 and 4.4.2) describing the characteristics and use of these. In the Supplement, they are combined into a single section (4.4.1), reinforcing that cycle lanes have similar properties and functions whether they are next to parking or the kerb.

Different design dimensions apply between the two types, but the common principles are stressed. This has resulted in more than 7 pages of GTEP being re-written in the Supplement. (Various other less common types of cycle lanes are also discussed in subsequent sections, including contra-flow cycle lanes, sealed shoulders and protected two-way lanes.)

7 Cycle Lane Dimensions

Considerable work has gone into refining various tables in GTEP related to the widths of cycle lanes, road shoulders and wide kerb lanes in different circumstances. For example, Table 4-1 specifies the widths of cycle lanes on roads without parking. The GTEP table is shown in Table 1 below:

Table 1: Table 4-1 from GTEP Part 14

Road Speed (km/h)	Lane Width (m)		
	60	80	100
Desirable	1.5	2.0	2.5
Acceptable Range	1.2-2.5	1.8-2.7	2.0-3.0

It was felt that the table needed to be modified for a number of reasons. The term "speed limit" has replaced "road speed" as the first column label, to be a little more explicit. As the default urban speed limit (the speed limit where speed limit signs are not displayed) is 50 km/h in New Zealand, the first column of lane widths should be for 50 km/h, not 60 km/h. Similarly, the second column now shows widths for a 70 km/h speed limit, the upper limit for urban roads in New Zealand. The lane widths in the table have been reviewed in light of these changes to speed limits and to align with current best practice.

Table 2: Table 4-1 from the Supplement

Speed Limit (km/h)	Lane width (m)		
	≤50	70	100
Desirable Minimum	1.5	1.9	2.5
Acceptable Range	1.2-2.2	1.6-2.5	2.0-2.5

A number of detailed notes accompany both these tables and should be read in conjunction with them.

8 Clearance to Cycle Paths

GTEP Part 14 recommends that cycle paths next to road boundaries where a “boundary fence is high and driveways exist” should be spaced a desirable minimum of 1.5 m from the boundary. The Supplement highlights that in this circumstance 1.5 m may not be sufficient clearance.

9 Signs and Pavement Markings

One of the main reasons for preparing the Supplement was to ensure that a full range of appropriate and legal signs and markings was available to practitioners in New Zealand. At time of writing, these are still in development, with on-going work and discussions between Transit and the Land Transport Safety Authority (LTSA). Many of the signs and markings in GTEP Part 14 will be adapted for use in New Zealand. These are generally considered to be more appropriate than comparable signs (where they exist) in the Manual of Traffic Signs and Markings (MOTSAM).

A number of decisions have already been made, however. The familiar circular blue cycle route sign, the RG-26 in MOTSAM, will be superseded. This sign is described as a regulatory sign in MOTSAM, yet it has no regulatory authority. It is used indiscriminately in New Zealand for a variety of purposes. It appears alongside motorways, identifying cycle paths. It is also used as a cycle lane sign. The RG-26 is also used on cycle paths in parks, where the rules of the road are generally not enforceable.

The RG-26 will be replaced by a black and white regulatory sign, similar to that contained in GTEP Part 14. It will lend regulatory force to cycle lanes. Cycle lanes will be defined by a white cycle pavement

marking symbol, again derived from GTEP Part 14. The MOTSAM symbol is almost unrecognisable as a bicycle from a car at 50 km/h, let alone at 100 km/h.

Another change to the cycle lane marking regime will be the use of a solid white edge line to delineate the lane on either or both sides. This is also in accordance with Australian (and international) best practice.

The Supplement recommends the use of coloured surfacing for cycle lanes in areas of high stress for cyclists, such as where a straight through cycle lane is crossed by a left turn general traffic lane at an intersection. In addition, the Supplement recommends the standardisation of colour across the country in the interests of conformity and to assist in recognition of these types of facility across the country by drivers.

In most parts of New Zealand, green is used for this purpose. In Christchurch, however, red surfacing is used extensively, and because of the significant number of cycle lanes in that city, possibly as much red surfacing of cycle lanes exists in New Zealand as green. Nevertheless, as many road controlling authorities in New Zealand are already using green, it has been decided to adopt green as the colour for use nationally.

10 Summary

The Supplement does not replace GTEP Part 14 but is complementary to it, providing more up to date advice in a number of areas. The guidance provided in the Supplement with regard to signs and markings reflects current policy in New Zealand.

In addition, MOTSAM, which should always be followed when implementing any signs or road markings, is being updated to reflect the changes to current policy on signs and road markings that have been identified through the development of the Supplement.

The Supplement should be considered a “live” document with any suggested amendments welcome by Transit at any time.

The Supplement is expected to be available for download from Transit New Zealand’s website (www.transit.govt.nz) in November.

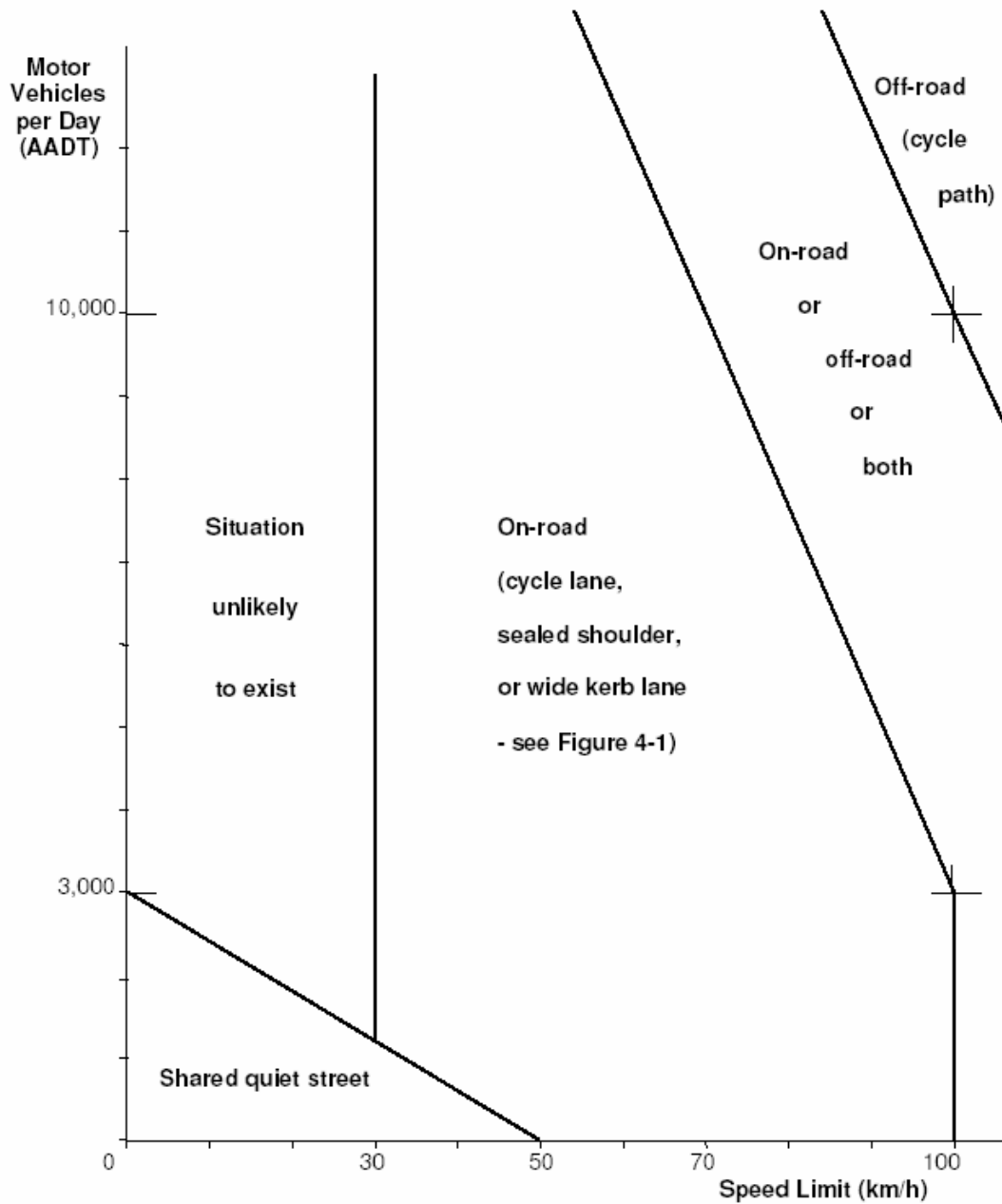


Figure 2-4: Guide to Choice of Type of Facility for Cyclists – Overview
(See accompanying notes)

Figure 1: Supplement Figure 2-4

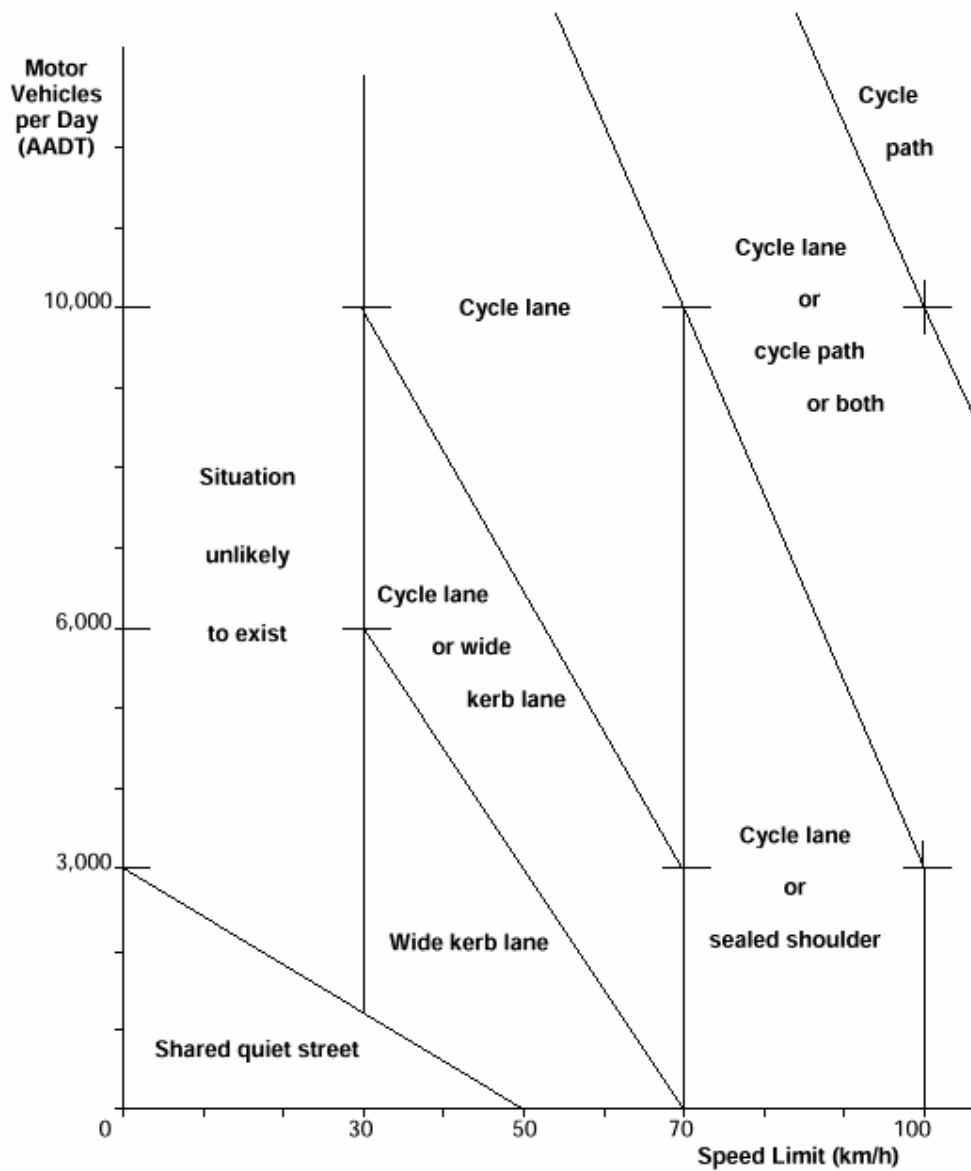


Figure 4-1: Guide to Choice of Type of Facility for Cyclists – Detailed
(See accompanying notes)

Figure 2: Supplement Figure 4-1

Appendix

Appendix Figure A – GTEP Figure 2-4

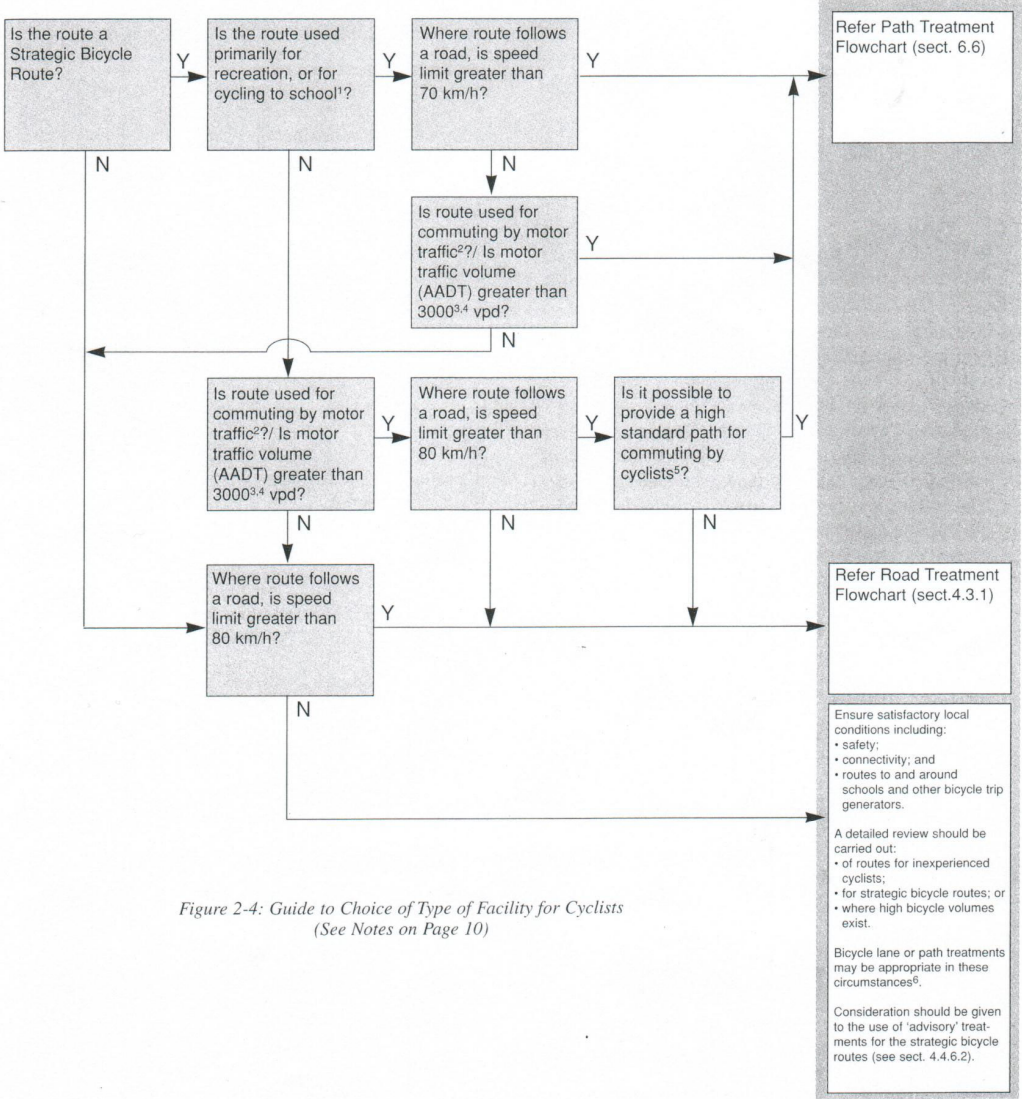


Figure 2-4: Guide to Choice of Type of Facility for Cyclists
(See Notes on Page 10)

Appendix

Appendix Figure B – GTEP Figure 4-1

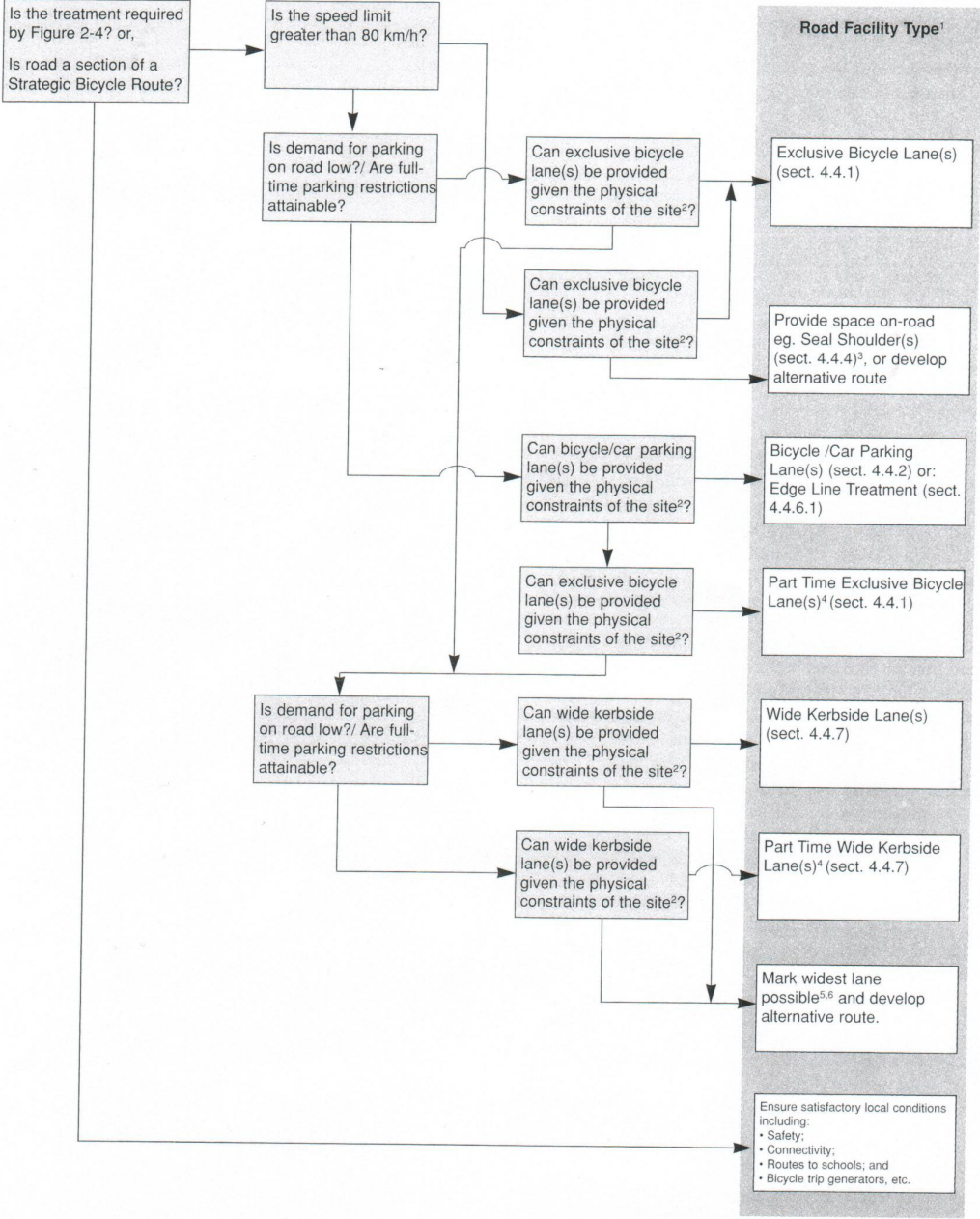


Figure 4-1: Guide to Choice of Road Treatment for Cyclists (See Notes on pages 17 & 19)

Appendix

Appendix Figure C – GTEP Figure 6-15

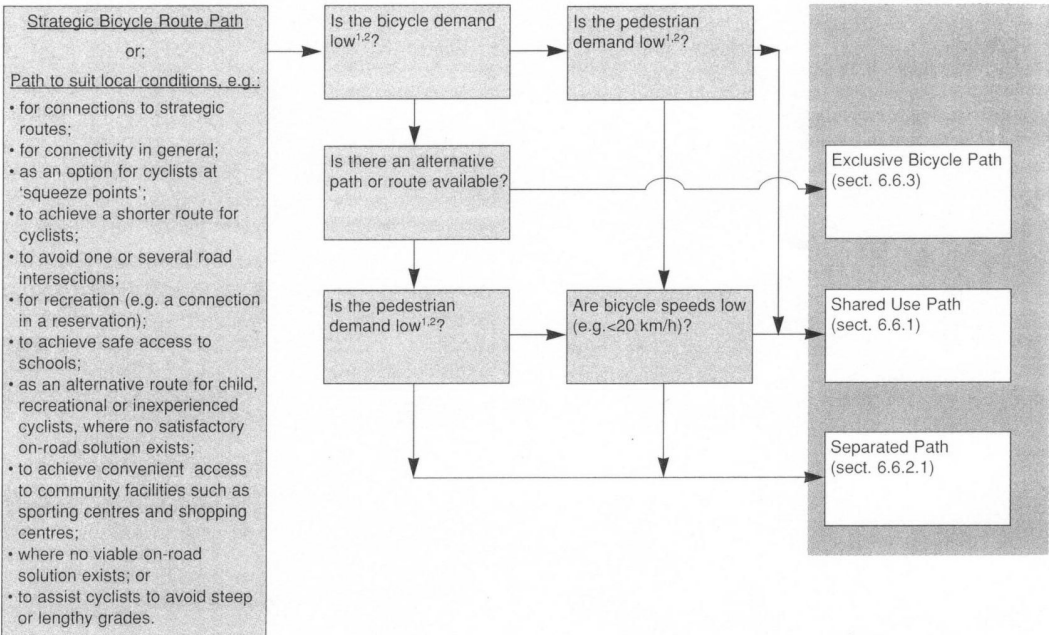


Figure 6-15: Guide to Choice of Path Treatment for Cyclists
(See Notes on page 81)

Appendix

Appendix Figure F – CDG Figure 6-15

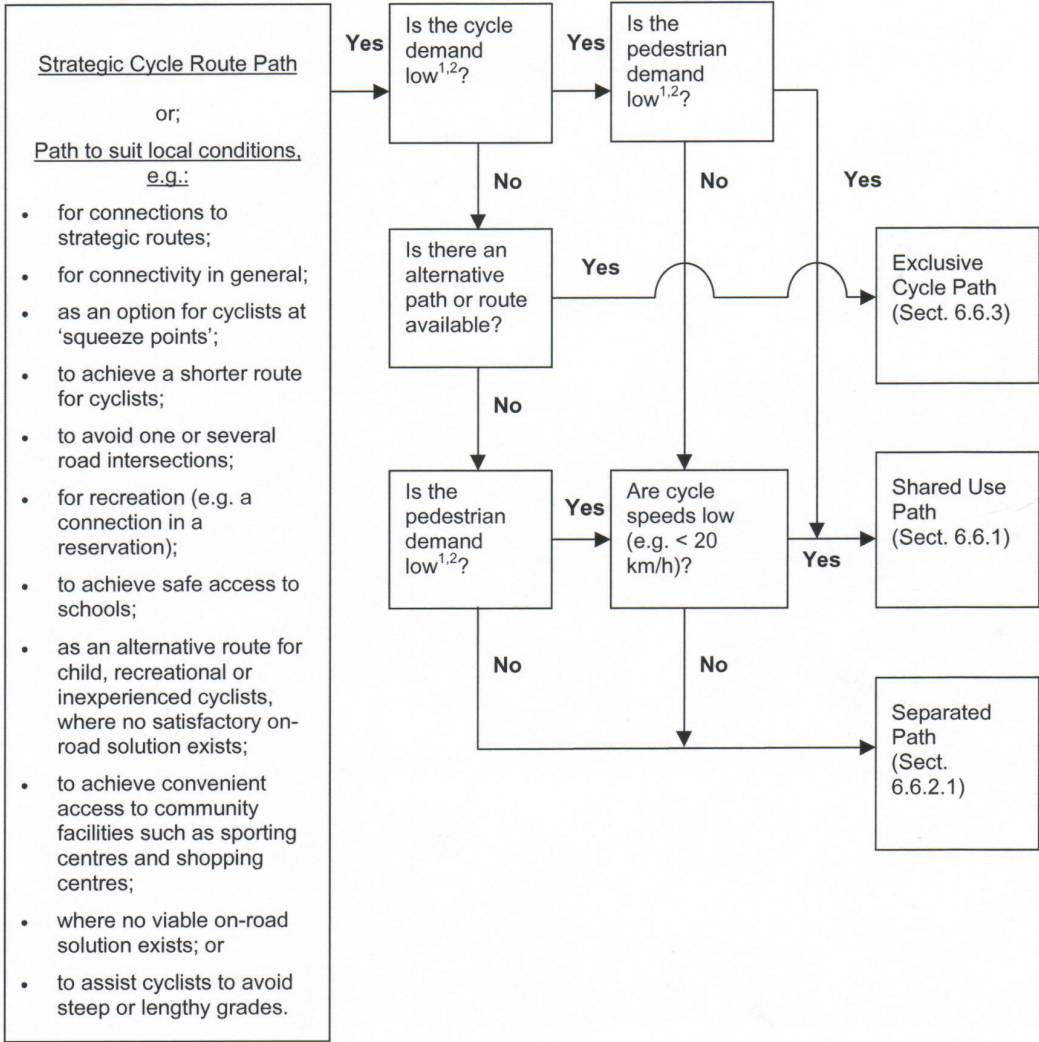


Figure 6-15: Guide to Choice of Path Treatment for Cyclists

(See accompanying notes in Austroads Part 14 – page 81)