

D1 Designing good quality pedestrian facilities

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Purpose

This module provides best practice guidelines on designing good quality walking facilities and shared facilities.

Introduction

The users of most infrastructure projects include pedestrians. Good, pedestrian-friendly design (see Figure D1-1) is required not only for pedestrian-specific projects, but should be incorporated into all relevant infrastructure design practice.



Figure D1-1
South Bank, Brisbane, provides a pleasant walking experience for a wide range of users

Before starting to design a new facility, key stakeholders should be consulted to provide a functional specification. This specification may include a range of required outcomes, such as:

- ▶ the primary role of the facility in regard to meeting strategic, network and local needs (e.g. purpose, pedestrian types, expected volumes of pedestrians)

- ▶ the desired levels of service to be achieved and maintained during design, construction and operational phases of the facility
- ▶ consideration of key performance indicators for the project (outcome-focused and project-focused) and the need for any evaluation or data collection (see D5.3 *Evaluation principles*)
- ▶ accessibility for all users, including connectivity to and within the proposed facility
- ▶ the desired layout and design characteristics of the facility itself
- ▶ existing infrastructure that may affect the design
- ▶ safety and personal security requirements for users of the facility
- ▶ whole-of-life cost considerations, including desired maintenance strategies.

Once developed, the functional specification can then be used to guide the entire project and ensure that the investment meets current and future needs.

D1.1 Designing good quality walking facilities

Key design requirements vary depending on the type of facility being considered. All pedestrian facilities should be designed for easy maintenance in the future. For example, the pavement surface selected, the choice and placement of vegetation, and the positioning of street furniture all affect future maintenance. The following tables outline the key principles and reference documents to consider when designing different types of facilities for pedestrians (a detailed list of resource and design documents is provided in D1.3 *Relevant design standards and guidelines*). Facility types include:

- ▶ pedestrian malls and high-volume pedestrian locations (see Table D1-1)
- ▶ footpaths in road reservations (see Table D1-2)
- ▶ pedestrian road crossings (see Table D1-3)
- ▶ paths in parks and other public places (see Table D1-4)
- ▶ integrated treatments (see Table D1-5)
- ▶ grade separations (see Table D1-6).



Table D1-1
Pedestrian malls and high-volume pedestrian locations

Pedestrian malls completely separate pedestrians and vehicles. They are open spaces specifically designed to support commercial activity, and provide a pleasant environment in which people can conduct business, relax or be entertained. These spaces must provide for convenient and safe travel for all pedestrians.

Other high-volume pedestrian locations may include entertainment or sporting venues, major shopping centres, and footpaths and crossings in the CBD and other busy shopping areas.

Key design elements	Important design features	Design reference
Capacity (or level of service)	All footways, stairs, ramps, escalators, and travelators must provide a satisfactory level of service.	Austrroads 1995, Part 13, Section 1.6 Taylor & Damen 2001
Accessibility	Walkways should be free of obstructions for pedestrians with vision impairments. This is especially important along building lines. Ramps and/or lifts should be provided in convenient locations for all changes in level.	AS 1428.1
Safety	Surfaces should be firm and slip-resistant in all weather conditions.	AS/NZS 4663 AS/NZS 4586
	Tactile ground surface indicators (TGSIs) should be installed at all hazards, including stairs. Location and orientation at intersections is important. (See Figure D1-2 and Figure D1-12.)	Main Roads, <i>Guidelines for facilities for blind and vision-impaired pedestrians</i> Main Roads 2003, MUTCD, Part 10, Section 12.4 AS 1428.4
	Bollards can be injurious obstructions in high-flow pedestrian areas and should not be in place at times of peak pedestrian flow (see Figure D1-3).	Austrroads 1995, Part 13, Section 4.3.1
	Bins, bus stops and other street furniture can impede pedestrian access.	
	Good public lighting is essential for personal security and for safe navigation.	AS/NZS 1158



Figure D1-2
Tactile ground surface indicators (TGSIs) are essential near hazards



Figure D1-3
Pedestrians can collide with bollards and fence posts, especially when pedestrian volumes are high

Table D1-2
Footpaths in road reservations

Footpaths should be provided in all urban road reservations except for low-speed shared zones. Failure to provide footpaths in local residential streets may form a barrier to walking and place pedestrians at unnecessary risk.

Key design elements	Important design features	Design reference
Width	Depending on pedestrian demand, widths in commercial areas vary from 3 m to 5 m. Minimum width for wheelchair use is 1.5 m. Paths may be shared (considerations for both pedestrians and cyclists important) or separated.	Austrroads 1995, Part 13, Section 2, and 1999, Part 14 Main Roads 2003, MUTCD, Parts 9, 10 AS 1742.9 Queensland Transport n.d., <i>Cycle notes</i> (B2, B3, B4, C1, C2)
Height clearance	Preferred minimum is 2.4 m vertical clearance above path. Absolute minimum is 2 m.	Austrroads 1995, Part 13, Section 2.1.2 AS 1428.1 AS 1742.2 Appendix C (in relation to signs)
Setbacks	Wide setbacks are preferred, as they provide a perception of safety and convenience. Footpaths too close to high-speed traffic discourage walking.	Austrroads 1995, Part 13, Section 2.1.5
Obstructions	Footpaths should be free of obstructions. Any utility poles and street furniture should be placed in consistent locations (usually behind the kerb). Width adjacent to building line should be clear to help pedestrians with vision impairments. (See Figure D1-4.)	Austrroads 1995, Part 13, Section 2.1.3 Main Roads, <i>Guidelines for facilities for blind and vision-impaired pedestrians</i>
Gradients (longitudinal and ramps)	Gradients should be flat, but this is often not possible because of topography. Wheelchairs may tip backwards on steep slopes. Absolute maximum gradient is 1 in 8 (preferred is 1 in 10). Provide flat rest areas on ramps or steep grades >1:33, with interval depending on grade.	Austrroads 1995, Part 13, Sections 2.2.2, 2.2.3 AS 1428.1
Crossfall	For pedestrian comfort, cross slope should be as flat as practicable to achieve an adequately drained surface. Maximum slope is 1 in 40.	Austrroads 1995, Part 13, Section 2.2.4 AS 1428.1
Surfaces	Surfaces should be stable, firm, even, and relatively smooth but slip-resistant. They should not deviate more than 5 mm from a 500-mm-long straight edge. Joints between slabs or pavers should be flush.	Austrroads 1995, Part 13, Section 2.3 AS/NZS 4663
Driveways	Adequate sight lines should be provided between pedestrians and vehicles leaving driveways. This is particularly important at the accesses to car parks and commercial premises where vehicle flows may be high.	Austrroads 1995, Part 13, Section 2.4 AS/NZS 1428.4 AS 1428.4



Figure D1-4
Street furniture and street dining can restrict pedestrian flows and affect the walking experience

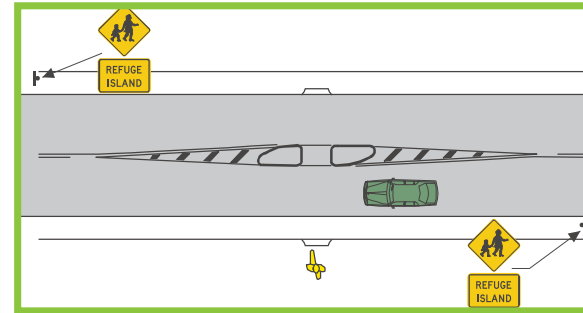


Table D1-3
Pedestrian road crossings

Design considerations include crossing width, crossing length (and time), surfaces, sight distance, stop-line location, turning vehicles, access to roadway crossings, orientation and provision of tactile paving. The Main Roads Traffic and road use manual (TRUM) Part 3.13 (draft September 2004) gives advice on where and where not to provide the different pedestrian crossings, and the advantages and disadvantages of each option. The manual also provides a point system for pedestrian facility prioritisation to help with the selection of appropriate treatments.

In designing crossings, attention to detail is very important. Issues include the micro-texture of the surface, the presence of signal or other pit lids within footpaths, abrupt bumps in the surface, insufficient width of ramps, and tactile markers.

Key design elements	Important design features	Design reference
Physical pedestrian aids		
Refuge island and medians	The central island in four-lane roads enables pedestrians to stage crossings. At least 10 m long and 2 m (1.6 m minimum) wide (to fit bicycle or person with pram), it should have a walk-through at pavement level for people with mobility impairments. Sight distance is important. Ensure that tactile ground surface indicators (TGSIs) are provided if required. (See Figures D1-5 and D1-6.)	Main Roads 2003, MUTCD, Part 10, Section 7.2.3 Austroads 1995, Part 13, Section 3.4.1 AS 1742.10 Main Roads, Guidelines for facilities for blind and vision-impaired pedestrians Main Roads 2002, TRUM, Part 3.13
Footpath (kerb) extensions	Provided mid-block or at intersections to the edge of the travelled lane, these reduce crossing distance and improve sight distance past parked cars (see Figure D1-7).	Main Roads 2003, MUTCD, Part 10, Section 7.3 Main Roads 2002, TRUM, Part 3.13
Loading islands and safety zones	Used to load public transport passengers at locations other than the kerbside, these should be at least 2 m wide. They should include fencing to protect pedestrians/passengers from through-traffic if required.	Main Roads 2003, MUTCD, Part 10, Section 7.4
Pedestrian fencing	Used at kerbside or in medians to restrict pedestrians to safer crossing points (e.g. outside hotels and schools), fencing must not restrict sight distance. Select fencing type to minimise roadside hazard potential (e.g. no horizontal members that may spear a vehicle).	Main Roads 2003, MUTCD, Part 10, Section 7.5 Main Roads 2002, TRUM, Part 3.4 Austroads 1995, Part 13, Sections 3.4.1, 4.3
Lighting	Good lighting is essential for the safety of pedestrians crossing roads at night.	AS/NZS 1158 Austroads 2004, Part 12



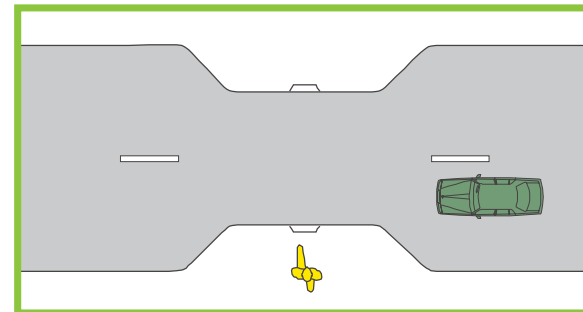
Source: Main Roads 2002, TRUM, Part 3.13, Section 6.1

Figure D1-5
Pedestrian refuge



Source: ARRB

Figure D1-6
Example of a pedestrian refuge (note the insufficient width of the tactile indicator)



Source: Main Roads 2002, TRUM, Part 3.13, Section 6.2

Figure D1-7
Kerb extension



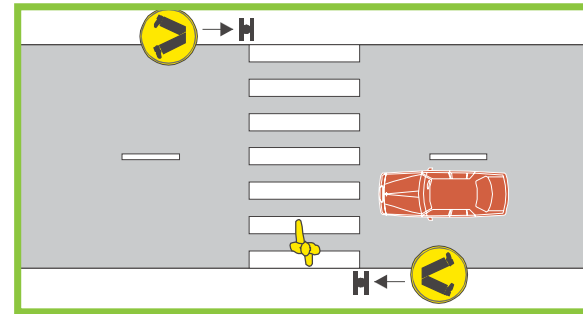
Table D1-3 Continued

Pedestrian road crossings

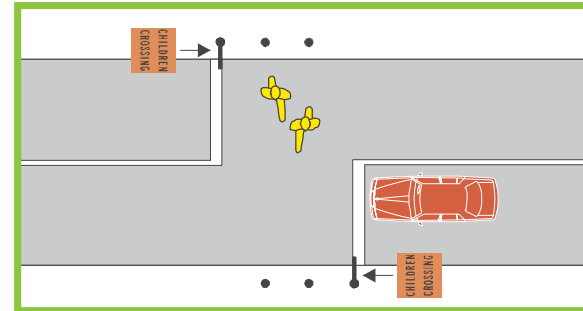
Key design elements	Important design features	Design reference
Formal mid-block crossings		
Pedestrian crossing (zebra)	The crossing consists of pedestrian crossing signs ('walking legs') and pavement markings. Zigzag approach markings should not be used. (See Figures D1-8 and D1-9.)	Main Roads 2003, MUTCD, Part 10, Sections 6.2, 11.2 Main Roads 2002, TRUM, Parts 1.23, 3.13 AS 1742.10
Children's crossing	'Children crossing' flags and stop lines must be 6 m in advance of crossing. (See Figure D1-10.)	Main Roads 2003, MUTCD, Part 10, Section 6.3.1 AS 1742.10 Main Roads 2002, TRUM, Part 3.13
Pedestrian crossing (school)	This is a zebra crossing with 'children crossing' flags and hand-held 'stop' banner.	Main Roads 2003, MUTCD, Part 10, Section 6.3.2
Pedestrian-activated signals	Pedestrians activate traffic signals with push button. Audio-tactile signals may be required for pedestrians with vision impairments. (See Figure D1-11.)	Main Roads 2003, MUTCD, Part 10, Sections 6.4, 12.3 Main Roads 2002, TRUM, Part 3.13
Pelican crossing	Signalised crossing that includes a flashing amber period when motorists are allowed to proceed with caution if the crossing is clear. This type of crossing is NOT APPROVED for use in Queensland.	Main Roads 2003, MUTCD, Part 10, Section 6.6
Pedestrian detector crossings (puffin)	Pedestrians are monitored by detectors (e.g. infra-red detectors) to ensure that they have cleared the crossing before traffic is allowed to flow. This helps slower moving pedestrians, and can reduce vehicle delays where pedestrians cross quickly.	Main Roads 2002, TRUM, Part 2.6 Austroads 1995, Part 13, Section 3.5.4



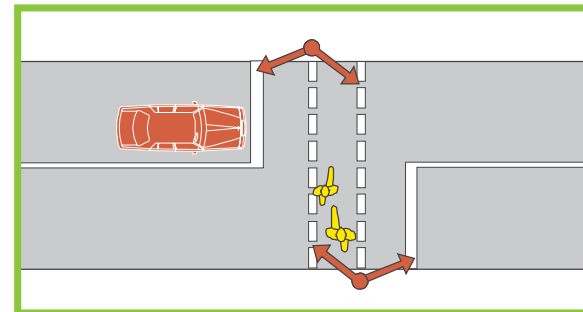
Figure D1-8
Ensure that pedestrians are clearly visible to motorists at pedestrian crossings. (Note how pedestrian is partially obscured by vegetation and utility poles in this photograph.)



Source: Main Roads 2002, TRUM, Part 3.13, Section 6.3
Figure D1-9
Zebra crossing



Source: Main Roads 2002, TRUM, Part 3.13, Section 6.6
Figure D1-10
Children's crossing



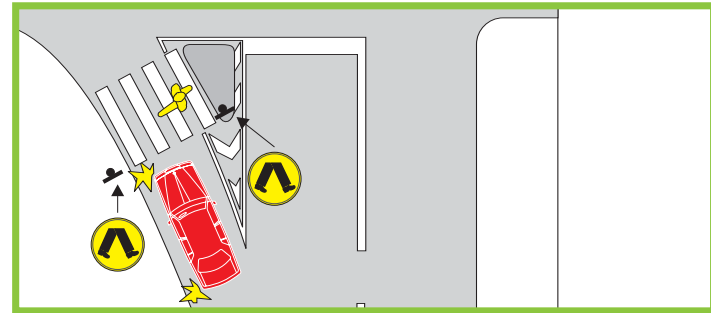
Source: Main Roads 2002, TRUM, Part 3.13, Section 6.7
Figure D1-11
Mid-block pedestrian-activated crossing

Table D1-3 Continued
Pedestrian road crossings

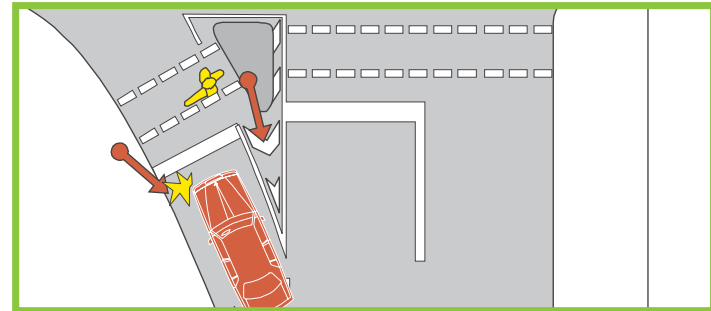
Key design elements	Important design features	Design reference
Intersections		
Marked foot crossings	Avoid 'dogleg' crossings that may mislead pedestrians with vision impairments. Place push buttons so that they are accessible for everyone. Consider the need for audio-tactile devices. An exclusively pedestrian phase can be provided where warranted. (See Figures D1-13, D1-14 and D1-15.)	Main Roads 2003, MUTCD, Part 10, Section 12.3 Austroads 1995, Part 13, Sections 3.5.6, 3.3.8 Austroads 2003, Part 7, Sections 8.4, 11.3.3, Appendix C5 Main Roads 2002, TRUM, Part 3.13
Kerb ramps	Ramps must be oriented in the direction of travel, not to the centre of the intersection. Absolute maximum slope is 1 in 8 (1 in 10 or flatter preferred). Provide TGSIs for people with vision impairments (see Figure D1-12).	Austroads 1995, Part 13, Sections 2.2.1, 3.3.7 Main Roads 2003, MUTCD, Part 10, Sections 12.2, 12.4 Main Roads Standard Drawings 1446 and 1447 AS 1428.1 AS 1428.4
Traffic islands and medians	Left-turn islands and medians should be large enough to accommodate pedestrian demand. Provide cut-through paths at pavement level on small islands. There must be no poles in travel paths, and there must be adequate vertical clearance to signals and signs. Low-level landscaping can also be used to control pedestrian movements. Larger left turn islands are better receptive to cut-through treatments for pedestrians. Median islands where pedestrians cross the median should be cut through or have compliant kerb ramps and 1.2 m level area between for wheelchair manoeuvrability.	Austroads 1991, Part 5 Austroads 2003, Part 7, Section 6.5 Austroads 1995, Part 13, Figure 3.4 AS 1428.4
Two-aspect signal control on slip lanes	Use where signals are required for pedestrian movement, and delays to left-turning traffic need to be minimised.	Main Roads 2002, TRUM, Part 2.5
Railway crossings	Provide signs to warn pedestrians, and mazes, gates or booms to control them. Illuminate the crossing. Provide treatments to help people with visual impairments, and to prevent wheelchairs from becoming trapped in tracks. (See also Table D1-6 'Grade separations'.)	Main Roads 2003, MUTCD, Part 7, Sections 9, 10 AS 1742.7 Department of Infrastructure 2003



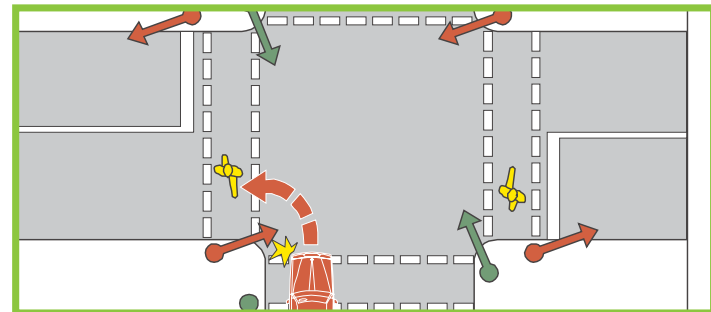
Source: Main Roads
Figure D1-12
Kerb ramp with tactile ground surface indicators (TGSIs) provided



Source: Main Roads 2002, TRUM, Part 3.13, Section 6.4
Figure D1-13
Zebra crossings on slip lanes



Source: Main Roads 2002, TRUM, Part 3.13, Section 6.5
Figure D1-14
Pedestrian-activated signals on slip lanes



Source: Main Roads 2002, TRUM, Part 3.13, Section 6.8
Figure D1-15
Signalised intersections with pedestrian facilities



Table D1-4
Paths in parks and other public places

Paths may be provided as part of a recreational experience, in which case the standard may be based on visual design requirements and the desired walking experience. However, paths in parks may also have a transport function, providing efficient links to shops, bus stops, railway stations or other destinations.

Key design elements	Important design features	Design reference
Walking tracks	The track design should match the intended purpose and the types of pedestrians likely to use the facility (see Figure D1-16). Key issues include providing access and controlling the impact of users. AS 2156 provides guidelines on track classification and the design of any track infrastructure (e.g. boardwalks, galleries, bridges, platforms, stairways, ladders and stiles). The provision of a track suitable for pedestrians with vision impairments or mobility impairments in accessible parts of parks and reserves should be considered.	AS 2156.2 Council guidelines
Public paths	The role of the path as a transport connector needs to be considered. Design and operational considerations for shared facilities are covered in D1.2.	Austroroads 1995, Part 13, Table 3 Austroroads 1999, Part 14 Queensland Transport n.d., Cycle notes (B3, C1) Council guidelines
Public paths	The role of the path as a transport connector needs to be considered. Design and operational considerations for shared facilities are covered in D1.2.	Austroroads 1995, Part 13, Table 3 Austroroads 1995, Part 14 Queensland Transport n.d., Cycle notes (B3, C1) Council guidelines



Figure D1-16
Design should match the walking experience desired (e.g. natural materials match the natural bushwalking experience)



Table D1-5
Integrated treatments

Integrated treatments control the speed and flow of motor vehicles by means of physical treatments and/or regulatory signing to enhance amenity and safety for pedestrians.

Treatment	Important design features	Design reference
Warning signs	Use where pedestrian volumes and the likelihood of pedestrians crossing the carriageway are significant, but a specific pedestrian facility is not justified. Supplementary sign plates may be required to reinforce the need for additional driver caution (e.g. for aged, school etc.). (See Figure D1-17.)	Main Roads 2003, MUTCD, Part 10, Sections 9.1, 10 Main Roads 2002, TRUM, Part 1.10 AS 1742.10
Shared zones	Provide these zones in areas used by vehicles, but where complete pedestrian mobility and a high level of safety are required. A speed limit of 10 km/h is usually appropriate. (See Figure D1-18.)	Queensland Transport 1999, Australian road rules Main Roads 2003, MUTCD, Part 10, Section 9.2 Austroroads 1995, Part 13, Section 8.4
School zones	These may be used to regulate the speed limit near schools.	Main Roads 2003, MUTCD, Part 10, Section 9.3
Local area traffic management (LATM) schemes	Modification of the street environment achieves outcomes such as reduced speeds, reduced through-traffic, fewer crashes and improved amenity. Perimeter and internal treatments are generally used.	Main Roads 2003, MUTCD Part 10, Section 9.4; Part 13 AS 1742.13 Austroroads 2004, Part 10
Streetscape improvements	Design streetscape to allow sharing of main streets so that traffic speeds and flow are managed to improve amenity and safety for pedestrians. Treatments include speed zones, intersection and mid-block treatments.	Austroroads 1988, Part 9, Chapter 4 (new edition in print) RTA 1999 Main Roads 2003, MUTCD, Part 4



Figure D1-17
Warning signs to increase awareness of pedestrian traffic



Source: ARRB

Figure D1-18
Example of shared zone area



Table D1-6
Grade separations

Grade-separated pedestrian crossings (i.e. bridges or tunnels) over roadways or rail lines are provided where interruptions to motor traffic or train flows are unacceptable, or where pedestrian patronage is high and at-grade solutions are not acceptable. On roads where traffic is interrupted, pedestrians will use the most convenient route rather than a grade separation that may involve additional distance and difficulty. Due to cost considerations, grade-separated solutions are recommended only as a last resort.

Key design elements	Important design features	Design reference
Overpasses	Evaluate carefully. Provide adequate width: minimum is 2.5 m for shared path. Pedestrian overpasses should minimise the additional walk distance, while complying with the requirements for disability access (generally, maximum grade is 1:14 with rests every 9 m).	Austrroads 1995, Part 13, Section 3.6, Part 14, Section 7.4 AS 1428.1 HB 77 Australian Bridge Design Code Main Roads 2002, TRUM, Part 3.13 AS 2156.2
Underpasses	Evaluate carefully. When the underpass is on a uniform grade, ensure that users can see through it, and that there are good sight lines at entry and exit. Provide generous width and lighting.	Austrroads 1995, Part 13, Section 3.6, Part 14, Section 7.4 AS 1428.1 HB 77 Australian Bridge Design Code AS/NZS 1158 Main Roads 2002, TRUM, Part 3.13

D1.2 Designing good quality shared facilities

Taking into account the interaction of pedestrian movements with other transport modes and facilities is critical to good design practice and to enhancing the safety and amenity of the walking environment. The most common interaction on paths is between pedestrians and cyclists, but conflict can occur between a wide range of other users and uses, including:

- ▶ users of wheeled recreational devices, such as skateboards and in-line skates
- ▶ people seeking access across a path to adjoining activities
- ▶ other activities that take place on the paths, such as outdoor dining and retail displays
- ▶ street furniture (e.g. poles, seats, bins), bus shelters, signs, driveways and entrances.

Pedestrians and cyclists

In Queensland, cyclists are allowed to ride on any footpath unless specifically prohibited by local laws. Where both cyclist and pedestrian volumes are low,

sharing is often not a problem, although the design of the path is critical. Poor design, especially in terms of width and sight distances, will increase conflict, even at low levels of usage.

Areas of high pedestrian usage, such as shopping centres and central business districts, present particular difficulties. However, encouraging cycling to retail and activity centres is important, as it can increase the potential catchment area and patronage of businesses. Cycling may also provide an alternative to car trips, reducing demand for parking spaces, including on-street parking, which can improve residential amenity in the area.

A range of techniques can improve amenity for pedestrians. The use of local laws to ban cycling on footpaths in these areas should always be a last resort (see Queensland Transport *Cycle notes* B2, B3, B4, C1). Prohibitions have the potential to send vulnerable and inexperienced riders out into the complex and dangerous road environment. Prohibitions also require the provision of resources for ongoing enforcement. For signing requirements in areas where there is no alternative to banning cyclists and wheeled recreational devices, see Main Roads 2002 (TRUM, Part 1.11).

Options for improving amenity for pedestrians include:

- ▶ education
- ▶ encouragement of desired behaviours, often through signage (e.g. 'Cyclists dismount')
- ▶ engineering and design, especially to make the roadway more cyclist-friendly when it is used as an alternative to the footpath
- ▶ enforcement, including selective bans (e.g. by time of day/week).

Further details on these options are provided in the Queensland Transport *Cycle notes* C2.

Reduction of conflict between pedestrians and cyclists

The needs of bicycle riders should be considered in all local centre improvement programs and main street redevelopments. Incorporating bicycle facilities into streetscape and centre improvements from the early planning and design phases can significantly reduce conflicts between, and improve amenity for, both pedestrians and bicycle riders (see the box 'Minimising pedestrian and cyclist conflict').

More generally, conflict can be reduced by (Queensland Transport *Cycle notes* C2):

- ▶ identification, at the planning stage, of locations with high potential pedestrian or cyclist use (see Part C of *Easy Steps*, especially C2 *Walking and urban design* and C3 *Developing walking networks*) and, where appropriate, making the roadway more cyclist-friendly, as an alternative to the footpath
- ▶ appropriate design of footpaths and other shared facilities, including path geometry and access (to the standards of Austrroads (1999, Part 14) and Main Roads (2003, MUTCD, Part 9) where there is significant cyclist and pedestrian usage)
- ▶ clear signs showing rules of use (see Figure D1-19)
- ▶ pavement marking and symbols
- ▶ consistent design standards and facilities
- ▶ physical separation, which is necessary when the combined volume of bicycle and pedestrian traffic exceeds 300 per hour on a path (Queensland Transport *Cycle notes* B3)
- ▶ quality maintenance to ensure that effective width and capacity are not compromised
- ▶ behaviour management (education and enforcement initiatives).



Figure D1-19
Signage relating to shared use of paths by pedestrians and cyclists



Minimising pedestrian and cyclist conflict

A national study to develop means of minimising pedestrian and cyclist conflict on paths is being undertaken for the Australian Bicycle Council (ABC), and reports will be posted on the ABC website (<http://www.abc.dotars.gov.au>). The initial report (ARRB 2004) has identified concerns relating to:

- ▶ users and usage, including awareness, behaviour, non-transport aspects of walking (e.g. walking as a social activity), speed, and special interests of young and inexperienced users
- ▶ footpath and shared path planning, including network continuity and path location
- ▶ path design, including issues of capacity, access, geometry, surface quality, signage/information and the need for safety audits
- ▶ path maintenance, including path surface and structure, management of extraneous material (such as lateral vegetation and blown sand) and public utilities.

Further stages of the project will develop a series of information notes to help address pedestrian and cyclist conflicts on paths. These notes will complement the *Easy Steps* package.

Pedestrians and other users

Other legal (and illegal) users of footpaths may come into conflict with pedestrians. In Queensland, most legal users (other than pedestrians and cyclists) are classified as using 'wheeled recreational devices' (rollerblades, roller skates and skateboards) or 'wheeled toys' (such as a pedal car, scooter or tricycle of a child under 12 years).

When using a footpath or shared path, these other users must:

- ▶ keep to the far left side of the path
- ▶ give way to pedestrians and cyclists (Queensland Transport 1999).

It cannot be taken for granted, however, that such users will do these things, especially given the young age of some. Education and signage may be desirable in areas of heavy usage.

Pedestrians and non-movement uses

Fixed and moveable objects on or next to the footpath will narrow the effective width of a path and, in the case of moveable objects, create uncertainty and unpredictability for pedestrians.

The kerbside of a path is often cluttered with a mixture of bins, poles, meters and signs.



Figure D1-20
Unobstructed access paths are required on footpaths, preferably next to the property boundary (in this case, next to the shopfronts)

In addition, pedestrians face the potential opening of car doors when cars are parked at the kerbside.

The property side of a path, particularly in centres of activity, is the focus of interactivity between the business/property and passing potential customers. It is becoming increasingly common for businesses to expand onto the footpath, either with displays (e.g. flowers) or outdoor dining (see Figure D1-20).

Where such activities take place on the footpath, the following measures should be taken:

- ▶ Maintain an unobstructed access path, desirably 1.8 metres wide.
- ▶ Make sure that the unobstructed access path is, wherever possible, between the activity and the property, as people with visual impairments often use the property boundary as a visual or tactile clue.
- ▶ Where the path is between the activity and the kerb, locate street furniture and other items so that they provide a consistent orientation clue for people with visual impairments.

Street furniture of all kinds should be located within a consistent band along the kerbside, to avoid intrusion into the continuous access path.

Bus stops and associated furniture, such as shelters, seats and information signs, are a problem on footpaths and on shared paths. Bus shelters, in particular, can obstruct sight lines along a path and can significantly reduce the width of the access path for all users (see Figure D1-21). Wherever possible, bus shelters should be located to one side of the path, not directly in the line of pedestrian travel.



Figure D1-21
Bus stops and shelters can reduce sightlines and narrow the effective path width

Even less bulky bus stop furniture, such as seats and information stands, can intrude into the access path or the lateral clearance of such a path. This can be especially important in the case of a shared path, or a path commonly used by people with disabilities.

D1.3 Relevant design standards and guidelines

The following standards should be consulted when planning and designing pedestrian facilities.

Standards Australia

AS 1428.1 – Part 1: General requirements for access – new building work

AS/NZS 1158 – SAA public lighting code

AS/NZS 1428.4 – Design for access and mobility, Part 4: tactile indicators

Australian Standards, *Manual of uniform traffic control devices*, Standards Australia, Sydney:

- ▶ AS 1742.2 – Traffic control devices for general use
- ▶ AS 1742.7 – Railway crossings
- ▶ AS 1742.9 – Bicycle facilities
- ▶ AS 1742.10 – Pedestrian control and protection
- ▶ AS 1742.13 – Local area traffic management

AS 2156.2 – Walking tracks, Part 2: Infrastructure design

AS 2353 – Pedestrian push-button assemblies

AS/NZS 4586 – Slip resistance classification of new pedestrian surface materials

AS/NZS 4663 – Slip resistance measurement of existing pedestrian surfaces

HB 77 – Australian bridge design code

HB 197 – An introductory guide to the slip resistance of pedestrian surface materials

National guidelines

Austrroads, *Guide to traffic engineering practice*, Austrroads, Sydney:

- ▶ Part 3: Traffic studies (2004)
- ▶ Part 5: Intersections at grade (1991)
- ▶ Part 7: Traffic signals (2003)
- ▶ Part 9: Arterial road traffic management (1988) (new edition in print)
- ▶ Part 10: Local area traffic management (2004)
- ▶ Part 12: Roadway lighting (2004)
- ▶ Part 13: Pedestrians (1995)
- ▶ Part 14: Bicycles (1999)

(Note: The guidelines are being redesigned (2004–08) as part of the Austrroads publications series being developed by ARRB. Further details can be obtained by contacting the ARRB Queensland office on (07) 3260 3500.

Austrroads 2001, *Potential improvements for non-motorised and vulnerable (unprotected) users in the road system*, Publication No AP-R195/01, Austrroads, Sydney, Australia.

Austrroads 2002a, AP-R198/02 *Bridge management systems – the state of the art*, Austrroads, Sydney.

Austrroads 2002b, *Road safety audit*, Austrroads, Sydney.

Queensland manuals and guidelines

Main Roads n.d., *Guidelines for facilities for blind and vision-impaired pedestrians* (Note: document under development. Check with Queensland Department of Main Roads, Brisbane, for current status.)

Main Roads 2002a, *Asset maintenance guidelines*, Queensland Department of Main Roads, Brisbane.

Main Roads 2002b, *Traffic and road use management manual (TRUM)*, 1st edn (September), Queensland Department of Main Roads, Brisbane.



Main Roads 2003, *Manual of uniform traffic control devices (MUTCD)*, Queensland Department of Main Roads, Brisbane.

Queensland Transport 1999, *Australian road rules*, Queensland Transport, Brisbane, viewed 23 November 2004, <[http://www.transport.qld.gov.au/qt/driver.nsf/files/images/\\$file/RoadRules.pdf](http://www.transport.qld.gov.au/qt/driver.nsf/files/images/$file/RoadRules.pdf)>.

Queensland Transport n.d., *Cycle notes*, Queensland Transport, Brisbane, viewed 23 November 2004, <http://www.transport.qld.gov.au/qt/driver.nsf/index/cyc_res_cyclenotes>:

- ▶ B2: *Selecting appropriate cycling facilities*
- ▶ B3: *Designing good quality off-road cycling facilities*
- ▶ B4: *Designing good quality on-road cycling facilities*
- ▶ C1: *Assessing footpaths for shared use*
- ▶ C2: *Reducing conflict between bicycle riders and pedestrians*

Note: Further details on Queensland Department of Main Roads reference materials can be obtained from www.mainroads.qld.gov.au. Many references are available for free download or can be purchased from the Technical Reference Centre by contacting (07) 3834 2011.

Queensland standard drawings

Main Roads (ongoing), *Standard drawings roads manual*; see <www.mainroads.qld.gov.au> for full contents.

References

ARRB 2004, *Pedestrian/cyclist conflict minimisation on shared paths and footpaths: working paper 1 – issues*, ARRB Transport Research for Australian Bicycle Council, Canberra, ACT, <http://www.abc.dotars.gov.au/pedestrian_bicycle_interactions.htm>.

Department of Infrastructure 2003, *Disability access at rail crossings – final report*, Melbourne, Victoria, <www.doi.vic.gov.au>.

RTA 1999, *Sharing the main street*, 2nd edn, Roads and Traffic Authority, New South Wales, <www.rta.nsw.gov.au>.

Setter, M & Stewart, D 2002, *Pedestrian crossing facility guidelines and prioritisation point system user guide*, Proceedings of the Australian Institute of Traffic Planning and Management (AITPM) conference, August 2002. (Now provided as Draft Part 3.13 in the Main Roads TRUM Manual).

Taylor, S and Damen, P 2001, *Traffic flow models allowing for pedestrians and cyclists*, Report AP-R193 Austroads, Sydney.

Transport WA 1999, *Sharing the path*, Office of Road Safety, Perth, Western Australia.

