0044 PATHWAYS AND CYCLEWAYS

1. General

1.1. Introduction

1.1.1. Worksection application

Description: This worksection is applicable to design and documentation requirements for cycleways and pathways. It is not applicable to paths and cycleways in complex intersections, roundabouts or railway crossings.

1.2. Responsibilities

1.2.1. General

Requirement: Provide design and documentation for cycleways and pathways that are connected, accessible and easy to maintain.

1.3. Standards

1.3.1. Design

General: To Austroads AGRD06A and AS 3727.1.

Cycleways: To Austroads AP-G88.

Walking tracks: To AS 2156.1 and AS 2156.2.

1.4. Interpretation

1.4.1. Abbreviations

General: For the purposes of this worksection the following abbreviations apply:

- ARRB: Australian Road Research Board;
- CBR: California Bearing Ratio.

1.4.2. Definitions

General: For the purposes of this worksection the following definitions apply:

- Bicycle path (cycleway): A path or path section intended for the exclusive use of cyclists, generally referred to as an exclusive bicycle path;
- Footpath (pathway): A public way reserved for the movement of pedestrians, motorised wheelchairs and personal mobility devices;
- Gradient: The longitudinal slope of a road or path, usually represented as a ratio of one metre rise to the horizontal distance (e.g. 1:50) or expressed as a percentage (e.g.2%);
- Ramp: An inclined access way that has a constant gradient anywhere between 1:14 and 1:20;
- Separated path: A path divided into separated sections one of which is designated for the exclusive use of cyclists and an alternate section for other path users;
- Shared path: A paved area particularly designed (with appropriate dimensions, alignment and signing) for the movement of cyclists and pedestrians.

2. Pre-Design Planning

2.1. Planning

2.1.1. Scheme and planning development

Initial appraisal: Determine the scheme requirements in compliance with the Council's objectives, strategy/policy and planning documents. Factors to consider in the appraisal include the following:

- The urban structure of the development;
- Population density;
- Terrain;
- Provision hierarchy of roads, paths, cycleways (shared or segregated) and links;
- Existing transport/infrastructure routes/network and location of centres;
- Existing levels of use, public demand and user profile;
- Community priorities.

Site assessment: Examine the physical conditions along potential routes and their surrounds to test, inform and prioritise options under consideration. Record the assessment information for the following:

- Record of baseline information;
- Identifying potential problems, especially those that may affect the scheme viability;
- Identifying key design issues for pedestrians and cyclists;
- For future auditing and justification of the scheme.

Existing physical conditions: Physical conditions to consider in the site assessment include:

- Gradient;
- User flows and frontage activity (development activity adjacent to the path, e.g. commercial buildings);
- Route continuity which may affect length of route corridor and path/road transitioning requirements;
- Surface type and condition, level of lighting, vegetation and stormwater drainage;
- Identify possible conflicts with services such as sewer, water and optical fibre for vibration problems;
- Width of routes and clearances to other services.

2.2. Environmental Investigation and Planning

2.2.1. Existing building structures

Records: Obtain drawings of existing structures along and adjacent to the planned routes in the development area/precinct.

Dilapidation reports: Inspect existing structures along and adjacent to the planned routes in the development area/precinct. Prepare a report on the condition of the structures affected by the development, including photographic records of any defects.

2.2.2. Existing vegetation

Requirement: Assess existing vegetation, to establish the following:

- Vegetation for retention;
- Vegetation for relocation;
- Vegetation for removal.

2.2.3. Potential environmental impacts

Requirement: Check the development area/precinct for potential environmental impacts such as the following:

- Heritage items;
- Preservation of visual values;
- Endangered species requiring protection;
- Wildlife habitat.

Details of potential impacts: If there are potential impacts, provide details of the issues and proposed control measures for minimising the impact and protecting the surrounding environment before starting design. This may be in the form of an Environmental Impact Statement (EIS), to be included in the design report.

2.2.4. Heritage items

General: List heritage items of Aboriginal or non-Aboriginal significance, including natural and man-made features. Verify details with the state heritage register, national parks and wildlife services and other local, state or federal heritage authorities.

2.3. Consultation

2.3.1. Council and other authorities

Council consultation: Liaise with the Council's staff for the following:

- Roads and traffic management;
- Landscaping;
- Water and sewer services;
- Stormwater drainage.

Other authorities: Consult with and seek approval for the scheme development from the following state government authorities:

- Service authorities such as gas, electricity and communications using Dial Before You Dig;
- Fisheries (where crossing of or adjacent to a designated waterway);
- Wildlife authorities;
- Roads and Maritime Services.

2.3.2. Other stakeholders

Stakeholder involvement: Engage with interested parties such as local community groups early in the design. As appropriate for the scheme, consult the following parties:

- The police, via the Local Traffic Committee;
- Local residents and businesses;
- Current users of the land;
- Disability/access officers within the local authority;
- Cycle and pedestrian user groups;
- Local environmental and amenity groups.

2.3.3. Public consultation

Public engagement: Once a basic scheme has been developed, undertake public consultation.

2.3.4. Utilities services plans

Existing services in the development area/precinct: Liaise with the utility authorities affected by the proposed development and if required, obtain service plans from the authorities of the proposed development area for above ground and below ground services.

Utility services location: Contact DIAL BEFORE YOU DIG and Council to identify the locations of underground utility services pipes and cables.

3. Design Criteria

3.1. General

3.1.1. Statutory requirements

General: Identify any known specific requirements of utility or other regulatory bodies. Seek concurrence with the State Road Authority if the cycleway fronts a State road.

3.2. Location of Paths

3.2.1. Required path properties

Requirement: Locate the pathways and cycleways to meet the following criteria for the development:

- Connectivity: Including measures such as accessibility (for people with disabilities to programs, services and activities), distance and directness, reliability, and connection to infrastructure and key destinations;
- Comfort and perception of safety: Compliance with regulations and codes, and minimisation/elimination of potential threats;
- Convenience: Easy and safe access without delay and barriers;
- Demand and level of service: Travel patterns, current and potential future walking and bicycling activity. Observe worn desire line tracks for existing pedestrian traffic;
- Environmental impact minimisation: Including impact on air quality, water, wetlands, noise and wildlife habitat;
- Equity: Accessibility without discrimination;
- Safety: To minimise potential accidents and maximise security;
- Visibility: If paths can be easily identified or located.

3.2.2. Possible path locations

Requirement: Consider the following locations in the development:

- Along river frontages;
- Within foreshore areas;
- Through parklands;
- Along railway reservations;
- Connections to public transport;
- Abutting bridges;
- Within the reservations of public roads which have direct access to property.

3.2.3. Design considerations

Factors for determining path locations: Consider the following when locating pathways and cycleways:

- Horizontal alignment and sight lines: Locate paths to provide good sight lines along the whole length of the path for safe travel, including adequate sight distance across the inside of curves and under overhead obstructions;
- Vertical alignment: The gradient along paths (especially for cyclists) should be as flat as possible, as steep downgrades are potential hazards for cyclists travelling at high speeds;
- Align paths to allow cyclists to travel safely at their chosen speed in the cyclists designated reserve;
- Horizontal curvature: Avoid sharp horizontal curves at the bottom of steep downgrades;
- Crossfalls and drainage: To minimise ponding;
- Adequate clearances: For example, between opposing traffic, between the cyclist operating spaces and potential hazards such as pedestrian conflicts;
- Access for emergency service and maintenance vehicles at path entrances;
- Landscaping and planting.

Location of pathways and cycleways: Select from the following:

- Adjacent to property boundary;
- Adjacent to the kerb;
- At any intermediate point, e.g. 1.5 m behind the kerb.

Austroads AGRD06A Table 5.1 provides further guidance on the choice of path alignment in road reserves.

3.3. Path and Cycleway Features

3.3.1. General

Path Design Life: Adopt a design life in excess of conventional periods to reduce future maintenance costs. If this is adopted, consider the effect on the capital cost.

3.3.2. Maintenance factors which may affect the path design:

- Assess whether pathways need to be cut for future services or crack control;
- Assess whether the path needs reinforcing steel including dowelling between shrinkage sawcuts;
- Assess compliance with standard Council drawings for Kerb ramp details, crossover kerb details and similar interface with road carriageways.

3.3.3. Cycleway types

General: Select the cycleway from the following types:

- On-road cycleways: Includes wide kerbside lanes, shared traffic lanes, exclusive bicycle lane or sealed shoulder;
- Off-road cycleways: Include shared use bicycle/pedestrian pathway, separated pathway or exclusive cycleway.

3.3.4. Common pathway types

General: Select the pathway from the following types:

- Exclusive pedestrian pathways;
- Shared use bicycle/pedestrian pathways.

Table 1: Pathway/Cycleway Features

Feature	Shared path	Separated paths	
		Pathway	Cycleway
Minimum path width	2.5 m	1.35 m	2.0 m
Minimum vertical clearance*	2.5 m	2.5 m	2.5 m
Crossfall	≤ 2.5%**	≤ 2.5%**	Sealed surfaces: 2 to 4% Unsealed surfaces: 5 %
Gradient	1:14 – 1:20 to AS 1428.1	1:14 – 1:20 AS 1428.1	≤ 5%
* Including tree branches, underpasses, doorways, signs and other overhead structures ** It is assumed that the surfaces for these paths will be sealed to accommodate wheelchair access.			

3.3.5. Other pathway/cycleway features

Minimum radius for horizontal curves for cycleways and shared pathways: Allow for the following:

- Without superelevation: To Austroads AGRD06A Tables 5.6;
- With superelevation: To Austroads AGRD06A Table 5.7.

Stopping sight distance for cycleways and shared pathways: To Austroads AGRD06A Section 5.7.

Provision at road crossings: Design road crossings with appropriate grades, width adjustment for waiting areas and kerb ramps.

Minimum lateral clearances for cycleways: Allow for the following clearances between opposing bicycle operating spaces and between bicycle operating spaces and potential hazards:

- Relatively flat paths: 0.5 m between the edge of cycle path and obstacle;
- Recreation paths with speed ≤ 20 km/hr: 0.4 m between opposing bicycle operating spaces;
- Paths for commuting and major recreational activity: 1.0 m between opposing bicycle operating spaces.

3.3.6. Landscaping and stormwater drainage

Requirement: Locate, design and construct path and associated stormwater drainage measures to minimise future maintenance. Design considerations include the following:

- Measures to minimise debris washing onto paths;
- Locating paths adjacent to watercourses to prevent inundation, to minimise slippery surfaces.

3.3.7. Water sensitive urban design (WSUD)

Requirement: Include WSUD into the project, this provides for preventing pollutants/sediments draining into waterways.

3.3.8. Safety

Safety measures: Include the following in the development scheme:

- For safety issues such as bollards, handrails, grab rails, tactile indicators or kerb ramps: To Austroads AP-R287;
- For terminal design: Consider speed restrictions for busy, shared paths for pedestrian safety to Austroads AGRD06A Section 7.5;
- For maximum operating speed recommendations for bicycles: To Austroads AGRD06A Section 5.2.

Pedestrian walking speed: Allow for walking speed of 1.0 to 1.2 m/s.

Table 2: Ramp and Footpath Landings

Type of path	Longitudinal gradient	Landing requirement
Ramp and footpaths	1:14	Every 9 m
	1:20	Every 15 m
Footpath[1]	1:20	Every 15 m
	1:33	Every 25 m
	Flatter than 1:33	No landing required
[1] Ground level adjacent to footpaths: ≤ 25 mm of the footpath level.		

3.3.9. Disabled access

Compliance: To AS 1428.1, Council's policy on access and mobility and the AUS Gov Act No. 135 - Disability Discrimination Act 1992.

Warning tactile ground surface indicators (TGSIs): Provide at the top and bottom of ramps and stairs and to AS/NZS 1428.4.1.

3.3.10. Provision at structures

Uninterrupted movement: Facilitate continuous cyclist and pedestrian movement at proposed and existing structures, including at bridges and underpasses, roads or railways.

3.3.11. Signage and pavement marking

Signposting: Provide signposting to indicate destinations and potential hazards.

Signs and pavement marking: To AS 1742.9 and AS 1742.10.

3.3.12. Pavement design

Structural design: To Austroads AGPT02, Section 12.

Control of cracks: To CIA Z15.

Grates and covers: Flush with the adjacent path.

3.4. Path facilities

3.4.1. Facilities

Requirement: Consult with Council, to include in the development scheme, design proposals for the following facilities, including at common cyclist and pedestrian destinations:

- Street furniture including seats, bins, drinking fountains and telephones;
- Information stands/direction signs;
- Bicycle wheeling ramps.

3.4.2. Lighting and lighting support structures

Generally: To AS/NZS 1158.3.1 and AS 1798.

Underpasses: To AS/NZS 1158.5.

3.5. Materials

3.5.1. Environmental considerations

Trees policy: When designing and selecting the path and surrounding materials, consider the Council's existing or planned tree planting requirements to minimise future maintenance and environmental impact. Factors to consider include the following:

- Location of vegetation, distance from the path;
- Type of vegetation and their root system requirements to minimise branch trimming and pavement deformation and cracking, e.g. loose materials may be used to allow root system expansion;
- Path surface slip resistance.

3.5.2. Subgrade

CBR value for the subgrade: To the geotechnical investigation report.

3.5.3. Pavement

Pavement type: Select the pavement type from impermeable, permeable or a combination of those.

3.5.4. Maintenance considerations

Requirement: Nominate low maintenance materials for path surface, pavements and street furniture to suit the exposure conditions and durability requirements of the development.

3.5.5. Other criteria

Requirement: Include other material requirements for other associated structures such as retaining walls, fences, safety barriers, signposts, traffic poles and light poles. Consider the Council's maintenance policy and the ecological footprint of the materials selected. If using plantation timber or certified hardwood, see www.responsiblewood.org.au for information on AFS certification to AS/NZS 4708.

4. Documentation

4.1. Statutory documentation requirements

4.1.1. Approvals

Requirement: Document any prerequisite for approval of the development advised by the following authorities:

- State Road Authority: Gain concurrence from the State Road Authority where the path is in the pedestrian way adjacent to a State highway carriageway;
- Relevant transport authority where pathway/cycleway connects and/or intersects with a public transport facility;
- Utilities authority by information from Dial before you Dig.

4.2. Drawings

4.2.1. Drawing content

Requirement: Provide the following drawings to describe the development:

- Locality plan;
- Site plans showing cycleways and pathways at 1:500 scale;
- Part plans at 1:200 scale, showing merging details of new cycleways and pathways with existing roads;
- Longitudinal sections at the following scales:
    - Horizontal scale: 1:500;
    - Vertical scale: 1:100.
- Cross sections at 1:100 scale. Provide transition tables if crossfalls vary;
- Design traffic loading and design CBR value for the natural subgrade material;
- Details of typical cross sections including pavement materials, pavement layer depths, edge details and details of any retaining walls, batters, fences and drainage works at 1:20 scale;
- Typical details of expansion joints, contraction joints and joints to existing pavements. Show details of additional joints at drainage pits, light poles and bollards;
- Details of handrails, bollards, street furniture, light poles and traffic signalling posts at 1:10 scale;
- Traffic management plan for the construction stages.

4.3. Supporting design documents

4.3.1. Design reports

Requirement: Provide a design report covering the following:

- Design criteria adopted for the development design;
- Site investigation reports supporting the design;
- Any additional requirements, including Traffic Management Plan not covered by drawings.

4.3.2. Specifications

Construction documentation: Prepare technical specifications using the AUS-SPEC Construction worksection templates from the National Classification System workgroups 02, 03, 11 and 13.

4.3.3. Design certification

Certificate: Provide a signed and dated design certificate as evidence that a suitably qualified professional has reviewed all the design documents, including program and plans for the development, and can verify that the designed cycleways and pathways for the development site meet the Council and statutory requirements.

4.4. Work as Executed

4.4.1. Work as Executed documents

Work as Executed drawings: Provide an additional set of final construction drawings for the purpose of recording the work completed by the Contractor.

Drawing/Data format: Request digital information conforming to the ADAC (Asset Design and As Constructed) standard for describing asset design and Work as Executed plans (see www.ipweaq.com/adac).

4.4.2. Final certification of completed works

Completed works: Provide one copy of the plans for final certification and inspections specified by the designer.

5. Annexure

5.1. Annexure – Referenced Documents

The following documents are incorporated into this worksection by reference:

AS/NZS 1158		Lighting for roads and public spaces
AS/NZS 1158.3.1	2020	Pedestrian area (Category P) lighting - Performance and design requirements
AS/NZS 1158.5	2014	Tunnels and underpasses
AS 1428		Design for access and mobility
AS 1428.1	2009	General requirements for access - New building work
AS/NZS 1428.4.1	2009	Means to assist the orientation of people with vision impairment - Tactile ground surface indicators
AS 1742		Manual of uniform traffic control devices
AS 1742.9	2018	Bicycle facilities
AS 1742.10	2009	Pedestrian control and protection
AS 1798	2014	Lighting poles and bracket arms - Recommended dimensions
AS 2156		Walking tracks
AS 2156.1	2001	Classification and signage
AS 2156.2	2001	Infrastructure design
AS 3727		Pavements
AS 3727.1	2016	Residential
AS/NZS 4708	2021	Sustainable forest management – requirements
Austroads AGPT		Guide to pavement technology
Austroads AGPT02	2017	Pavement Structural Design
Austroads AGRD		Guide to Road Design
Austroads AGRD06A	2017	Paths for Walking and Cycling
Austroads AP-G88	2017	Cycling Aspects of Austroads Guides
Austroads AP-R287	2006	Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths
CIA Z15	2011	Cracking in concrete slabs on ground and pavements
AUS Gov Act No. 135	1992	Disability Discrimination Act