

DESIGN STANDARDS
for
URBAN INFRASTRUCTURE
4 - ROAD VERGES



4 ROAD VERGES

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4.1 Introduction

4.1.1 Purpose

The purpose of this Design Standard is to provide the basis for verge design associated with all new roadworks in the ACT. It is to act as the technical support for ACT Code for Residential Development (ACTCODE) to provide the more detailed design necessary for the design of verges, particularly in residential developments, in accordance with ACTCODE principles.

The Standard can also be used for roads outside the scope of ACTCODE such as traffic routes and roads servicing industrial, commercial and other public areas.

4.2 Application and Use

4.2.1 Performance Orientation

It has been traditional for Road and Services Authorities to split up verges into standard alignments for individual services on different classes of road. This practice is not considered to be compatible with the performance approach now being adopted for subdivision design and can lead to verges, which are unnecessarily wide or sometimes too narrow, when non-standard utility installations are required.

The approach specified in this document provides designers and developers with the opportunities to apply innovative, flexible and cost effective solutions to the verge design while ensuring that the verge maintains its functionality.

At an early stage in the design process, there will be a need to demonstrate that all services; plantings and paths can be accommodated within the verge area.

4.2.2 Verge Modules

To assist designers, the service authorities have defined modules for each of their services. The modules specify both width of reservation and the limitations on the location of the module. The attached standard drawings and following sections fully describe each of these modules.

The minimum width of verge required for each particular street within a development can be determined by adding up all the modules for services and landscaping elements contained in that street.

4.2.3 Related Codes of Practice, Guidelines and Legislation

ACT Code for Residential Development (ACTCODE).

Water Supply and Sewerage Standards, ACTEW.

Joint Trenching Standards, AGL / Telecom / ACTEW.

Guide to Traffic Engineering Practices; Part 13 - Pedestrians - AUSTRROADS.

Guide to Traffic Engineering Practices; Part 14 - Bicycles - AUSTRROADS.

Development Control Code for Best Practice Waste Management in the ACT, Department of Urban Services, September 1999.

Utility Networks (Public Safety) Regulations 2001, ACT

4.3 Verge Design - General Principles

4.3.1 The Verge Function

The verge performs a number of important functions including:

- providing space for the provision of underground and above ground services including plant and equipment, bus stops etc
- providing space for landscaping to improve the appearance of the street environment
- providing a drainage function for overland flows
- providing for the movement of pedestrians and cyclists
- providing adequate sight distances for traffic on the road (including cyclists and pedestrians on a path) to see vehicles pedestrians or cyclists entering the roadway from blocks.
- providing a buffer area for reduction in traffic noise level at dwellings
- providing for level differences between carriageway and blocks
- providing areas for parking off the carriageway if the road pavement is narrow.

The verge should be of sufficient width to allow space for all relevant services, landscaping, indented parking, future carriageway widening, cyclepaths and swale drains.

4.3.2 Co-location of Public Facilities

The co-location of public telephones, post boxes, bus stops and drop-off bays to create activity nodes is encouraged.

4.3.3 Verge Crossfall

Factors requiring consideration in the selection of verge crossfall are:

(a) Drainage

- The minimum desirable verge crossfall should be 1 in 100 (1%).
- There should be sufficient rise from the top of the kerb to ensure that the 1 in 100 year stormwater flow does not encroach onto blocks.
- The maximum depth of flow shall not exceed the requirements of *Design Standard 1-Stormwater*.

(b) Verge Crossfall

- Changes of grade across the verge should not be so severe that vehicles cannot easily enter block driveways without scraping. In general, because driveways can be located at any location along the verge, the whole verge needs to be designed to suit vehicle access.
- The maximum desirable verge crossfall, commensurate with providing a safe working platform for construction and maintenance operations, and adequate block access is 1 in 6 (17%).
- The maximum mowable slope is 1 in 4. However this is not a suitable crossfall if trenching operations for installation of underground services are necessary.
- Where the verge is free of utilities or other services and there is no requirement for block access, grades steeper than 1 in 4 may be acceptable with appropriate landscape treatment.

- Driveway gradients within blocks should be limited to a maximum of 1 in 5 (20%) as gradients in excess of this can mean that the driveway is dangerous or unusable in wet or frosty conditions.
- For access requirements for commercial vehicles, Designers should refer to AS 2890.2.

(c) Crossfall Adjacent to Kerb

An area of approximately 2.5 metres at 2% grade towards the kerb is required adjacent to the kerb for the following reasons:

- to enable driveway access to blocks without vehicles scraping.
- to provide freeboard for stormwater gutter flows.
- for wheeled bin placement.
- for pedestrian and cycle refuge.

(d) Crossfall at paths

Paths should be sloped at 2% in the same direction of the general verge crossfall. Paths sloped adverse to the general verge crossfall act as levies collecting and concentrating stormwater runoff. These concentrated flows can cause considerable nuisance and damage.

A 2% shoulder of minimum width 500mm should be provided to all paths.

4.3.4 Waste Collection Truck Operations

(a) Turning Provision

All streets should be designed to accommodate garbage truck turning manoeuvres. This may mean that, in some streets, verge landscaping and hardware will need to be set back sufficiently to accommodate the overhang of the truck during turning movements. In these cases, the minimum set back should be 1.5 metres.

(b) Wheeled Bin Collection

In locations where individual household bin pickup is not possible, provision must be made for a common collection area as per requirements specified in *Development Control Code for Best Practice Waste Management in the ACT*.

4.4 Underground Service Reservations

4.4.1 Stormwater Drainage

Preferably stormwater pipelines should be located on the high side of the road to permit relatively short service ties to adjacent blocks.

The maximum reservation width required is 1.4 m which includes the full sump width and allows for additional 150 mm setback required for sumps located on modified layback kerb (MLBK). The reservation width therefore can be reduced to 1.2 m where located on kerbs other than MLBK.

Stormwater drains from 225mm diameter to 675mm diameter should be laid behind the kerb. Larger pipes should be laid within the median or on the centreline of the carriageway.

4.4.2 Sewer

Preferably sewers should be located on the high side of the road reserve, which permits relatively short connections from adjacent high side blocks.

In some streets, it may be necessary to provide sewers adjacent to both road reserve boundaries. Where this occurs the verge requirements should be addressed and the width increased as necessary.

The modules indicate the space taken up by the sewer manhole including the vertical drop structure. Designers should be aware of the structure dimensions when allocating space particularly with clearance to other underground services.

Since sewer manholes are located intermittently along the verge corridor, overlap with other intermittent modules may occur provided that appropriate clearances are maintained.

4.4.3 Watermains

Watermains should be located on the high side of the road reserve to ensure that in the event of a burst watermain flooding of property is minimal.

They should be sufficiently clear of the stormwater pipeline to avoid deflection around sumps and to allow adequate clearance to branch valves.

Watermains should preferably not be located below paths.

4.4.4 Shared Trench Services

Shared trenching in the ACT takes two forms:

- Three-way trench containing gas, telephone and broadband communications.
- Four-way trench containing gas, telephone, broadband communications and electricity.

Preferably the trench should be located adjacent to the property line. The trench centreline should be offset 600 mm from the property boundary to allow trench excavation clearance to boundary pegs.

The reservation width allows for the full trench width required. Additional width outside the module is required intermittently to accommodate ActewAGL service structures such as pad-mount substations and service pillars. The module indicates the requirements needed for these structures.

As these structures are intermittent, they are able to overlap with other reservations insofar as appropriate clearances are maintained.

4.4.5 Overhead Electricity

This module is required where the shared trench arrangement is not suitable or the reticulation is to be provided by overhead means for industrial areas such as Fyshwick, Hume and Mitchell.

In some areas a separate streetlighting module may be required. Designers should liaise with ActewAGL regarding this matter before finalising the verge width.

4.4.6 Telecommunication Duct Run

These are required by telecommunication carriers for linking exchanges or exchange to development areas. The reservation width provided allows for manholes that are offset to the duct run.

Trunk gas main can share the trench with telecommunication if the route required is the same and future upgrading of the gas main is not required. Otherwise the gas main should be located in the trunk main reservation.

4.4.7 Trunk Services

This module is set-aside for bulk supply water mains, high pressure gas mains, trunk stormwater, major Telecommunication duct runs, high voltage electricity cables additional to normal capacity.

Designers should liaise with the relevant service authorities to determine trunk service reservation requirements.

4.4.8 Future Services

Recent amendments to the telecommunications act have seen the arrival of new players in this industry providing telephone, pay-TV and information services.

At this stage a reservation module for services is considered premature, as it is uncertain just how many of the new carriers will be requiring allocation within the verge and what will be their exact space requirements. It is also possible that one, if not all, of the new carriers will arrange a shared trenching agreement with an existing service provider or between themselves.

CUPP has also indicated that future service trenches could be placed within the alignment of the tree corridor providing boring under the entire area of the drip line of the tree occurs and that approval of any such works is obtained from CUPP.

4.4.9 Subsoil Drains

The preferable location for the subsoil drain is in front of the kerb.

An alternative acceptable location is directly beneath the kerb.

4.4.10 Curved Service Alignments

The space allocations provided on the accompanying drawings are the minimum required for a straight street alignment. Services on a curved alignment particularly those, which need to be laid as a series of straights may require additional space, and the road reserve should be widened if necessary.

This will be dependent upon a number of factors including:

- (i) affect the widening has on adjoining services
- (ii) length of verge affected
- (iii) the minimum radius to which the service can be laid.

Factor (iii) varies considerably for each service and designers should refer to the relevant codes of practice for guidance.

4.4.11 Set-Out

Service locations would normally be set out from either the property line or kerb line. Where special and irregular verge widths are designed for landscape or urban design reasons a nominal setout line should be adopted.

4.5 Paths, Landscaping and Other Above Ground Services Reservations

4.5.1 Paths

(a) General

The criteria for provision and width of paths in residential areas are detailed in ACTCODE. For additional design advice refer to *AUSTROADS Part 13 - Pedestrians* and *Part 14 - Bicycles*.

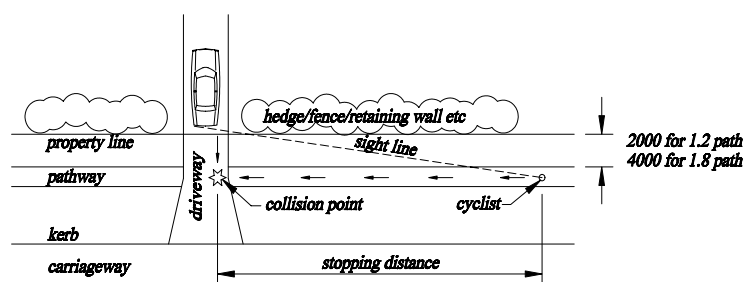
(b) Clearance from carriageway

The accompanying drawings show acceptable minimum distances to provides clearance from:

- kerbside placement of wheeled bins for collections of household garbage and recycling waste
- opening car doors when cars are parked at the kerb
- vehicles parking partially on the verge and partially on the carriageway.

(c) Clearance from property line

Sufficient clearance should be provided between the edge of all paths intended for use by



cyclists (1.8 metre and wider) and the property line to ensure a cyclist using the path has a clear sight line of sufficient distance to avoid collision with a vehicle reversing from a driveway. Figure 4.5.1.(b) indicates criteria to be considered and shows acceptable minimum clearances for paths fronting residential blocks.

Although clean trunk trees are permitted within the sight distance zone, other objects such as substations or low branching trees are not.

For multi-unit developments with off street parking, designers should refer to AS 2890.1.

1. car reversing at 4Km/hr
2. a) recreational cyclist at 15Km/hr
b) commuter cyclist at 25Km/hr
3. stopping distance based on Austroads Part 14 Bicycles

FIGURE 4.5.1(c) Pathway sight distance

(d) Location

The following additional factors should be considered when determining the path location:

- locate paths away from underground services, especially deeper trenches in order to avoid path repairs related to trench settlement;
- future service repairs to services under paths;
- avoidance of manholes and sumps to avert potential trip hazards.

(e) Personal Safety and Access

The relationship between landscaping, lighting and other fixtures should be considered to promote both personal and physical safety.

For safety reasons the path should be well lit. Where trees and streetlighting are located on similar alignments, adequate space should be allowed between them to allow for tree canopy development.

Access for people with disabilities should be considered especially in relation to the placement of street signs, parking meters and other objects in commercial or shopping centre verges. For further design advice, Designers should refer to AUSTRROADS - Part 13.

4.5.2 Trees

(a) General

The most important role of trees is to provide streetscape which is the major element in the design of suburban Canberra and the primary visual role of the verge.

The tree growth characteristics (including the root zone) should be considered in the overall design of the street space and the species should be nominated at the first stage of the approval process.

Tree planting closer to the kerb than to the property line can be used to create a continuous avenue effect with the canopy over the street.

(b) Clearance to Paths and Streets

For clearance of trees in relation to kerbs and paths in residential streets Designers should refer to Design Standard 235.

This chapter categorises trees into four types based on growing characteristics and sets out minimum planting distances to each category of paths and to the street kerb.

The nominated clearances to paths in the schedule include an allowance for the clearance between the cyclist envelope and slow growing immature trees where appropriate.

For clearances on traffic routes Designers should refer to AUSTRROADS.

(c) Reservation Width and Clearance to Services

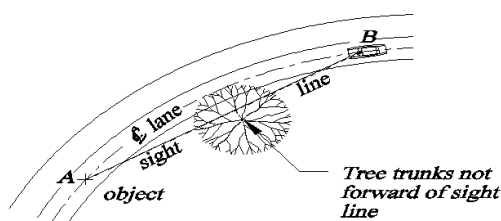
Tree root intrusion can be a problem to most underground services. The planting reservation width of 1200mm shown in the tree module includes allowances for separation to other underground services, and for planting/ service alignment error.

The 1200mm reservation width has been determined following extensive consultation with the relevant operating authorities and has been set at the absolute minimum level. It provides sufficient width to allow for the planting of advanced stock.

Service ties are particularly susceptible to tree root intrusion and should be located as far a practical from the root zone. Grouping service ties provides more space for planting and tree development.

(d) Sight Lines

Design proposals should ensure that placement of trees will maintain vehicle sightlines in accordance with the AUSTRROADS Guide to Traffic Engineering Practice Part 5 for residential streets, roundabouts and traffic routes. Sight distances for residential streets around curves should be no less than that given by Figure 4.5.2(d).



Design speed	AB
30 Km/hr	20m
40 Km/hr	30m
50 Km/hr	40m
60 Km/hr	55m

Note: These are absolute Minima.

Source: AUSTRROADS
 Guide to Traffic Engineering Practice
 Part 5 Table 5.1

FIGURE 4.5.2(d) Sightline around curved residential streets

(e) Root Barriers

Designers should refer to Design Standard 23 for details on root barriers.

4.5.3 Above Ground Electrical Plant and Equipment

Designers need to accommodate, within the verge space, the placement of streetlight columns, pad-mount substations and mini-pillars and power poles in overhead power areas.

This should be arranged early in the design process with ActewAGL to allow for the efficient integration of this equipment etc into the verge space.

Streetlight columns should be placed a minimum of 1.7 m from the kerb or 3.0 m for roads without kerb and gutter in accordance with ActewAGL guidelines.

Streetlights, substations and mini-pillars or power poles should be placed clear of future driveways. Restricted vehicular access should be designated at these locations on the Lease and Development Conditions. Substations shall be kept clear of the driveway sight distance envelope.

4.5.4 Indented Carparking

The verge shall be of sufficient width to accommodate indented parking where required within the verge area. The geometric design shall be in accordance with AS 2890.1, AUSTRROADS or ACTCODE as applicable.

4.5.5 Driveways

With more usage of small block housing in residential developments, the driveway location has become a critical factor during the design of engineering services due to the narrow frontages of these blocks and the restricted space available to locate service structures to avoid driveways.

The positioning of the driveways to small blocks is dependent upon the final car accommodation location in relation to design and siting requirements and other factors such as building cost.

Therefore the Designer should, early in the design process, endeavour to determine in conjunction with the Developer likely car accommodation locations.

Structures that must be located clear of possible driveways include:

- trees
- streetlight poles
- power poles
- drainage sumps
- pad-mount substations
- mini-pillars
- traffic and street signs
- bus stops and shelters
- fire hydrants
- other road furniture

Where possible, manholes, service ties, water meters and junction pits should also be kept clear of driveways.

Design Standard 5 lists the clearances required from driveways to different structures.

The location of driveways opposite the terminating road of a T-junction should also be avoided, and the block layout should be planned accordingly.

Block access gradients are discussed in Part 4.3.4 'Verge Crossfall'.

4.5.6 High Capacity Hydrants

High capacity hydrants where required should be located within the tree corridor and shall be no further from the kerb than 6 m (ACT Fire Brigade requirement).

4.5.7 Bus Stops and Shelters

These shall be located in accordance with ACTION requirements after satisfying other criteria within this guideline, especially sight distance requirements at driveways and intersections. There may be a need to locally widen verges to ensure that adequate visibility is available. Bus stops and shelters should always be located on the departure side of paths.

4.5.8 Traffic Signs

Traffic signs shall be located in accordance with AS 1742.2 and their placement shall take precedence over other verge structures and landscaping.

The shared use of signs and the use of street furniture (eg. light poles) for the placement of signs should be adopted whenever possible.

4.6 Laneways

4.6.1 Laneway Width

Laneways vary in width but should be 3 metres minimum to allow sufficient room for pedestrian/cyclist movement, including clearance to overhanging vegetation from within adjoining blocks. This may be increased to 6 metres to accommodate additional services or large overland flows. Where the retention of existing trees within laneways is possible an increase in the width of the laneway may be appropriate.

The landscape treatment of laneways must take account of the future maintenance costs. For the 3 metre width a total hard paved surface is the most functional unless this conflicts with the requirements of service authorities. Generally the laneways are no longer than two standard residential blocks and an adequate softening effect can be achieved from the landscaping within the adjacent residential blocks and from the street tree planting at each end of the laneway.

4.7 Grassing

All non paved surfaces of verges and laneways are to be topsoiled to a depth of 75mm and grassed with an approved dryland grass mix.

4.8 References

In addition to the Related Codes of Practice and Guidelines listed in Section 4.2.3, the following references may be used to assist in the achievement of a good design outcome.

Road Verge Design Standards, Review of Australia Wide Practice, Bill Guy & Partners Pty Ltd, April 1995.

Review of Existing Verge Design Standards, Bill Guy & Partners Pty Ltd, April 1995.

Queensland Streets - Design Guidelines for Subdivisional Streetworks, Institute of Municipal Engineering Australia Queensland Division, May 1993.

The Streets Where We Live, Department of the Environment Land and Planning (NSW), Traffic Authority (NSW) and Land Commission (NSW), 1984.

Residential Streetscapes, Department of the Environment Land and Planning (South Australia).

4.9 Glossary

The following explanations are not provided for statutory purposes, but as a guide to terms that may not be readily clear to readers.

ActewAGL	the providers of electricity and natural gas reticulation in the ACT and the managers on behalf of ACTEW Corporation Ltd of the Water Supply and Sewerage Systems in the ACT.
AUSTROADS	the national association of road and traffic authorities in Australia.
Block	a parcel of land, whether or not the subject of a <i>lease</i> .
Carriageway	the area of street reserve provided for the movement or parking of vehicles and is measured from nominal face of kerb to nominal face of kerb. Note a flush kerb is not included in the carriageway width.
Developer	any person and or organisation responsible for the development irrespective of their private or government nature and includes new, infill and redevelopment works.
Landscaping	any element or feature of the street, either man-made or natural.
Path	a Footpath, Cyclepath or Shared Path.
Property Line	the street frontage of an block and defines the boundary between public and private property.
Residential Streets	all types of streets in residential areas.
Road Reserve	land gazetted for the purpose of a road or street, and incorporating the full width from property line to property line.
Services	systems which provide customers with electricity, natural gas telecommunications, water and sewerage.
Shared Trench	a trench which is used to accommodate two or more reticulated services.
Street	street, lane, square, court, alley etc, whose primary purpose is providing access to residential buildings.
Traffic Route	a road or street that has a major traffic function, and includes sub-arterial roads, arterial roads, major arterial roads, major roads and distributor roads.
Verge	that part of the street reserve between the carriageway and the boundary of adjacent blocks (or other limit to street reserve). It may accommodate public utilities, footpaths, stormwater flows, street lighting poles and planting.

4.10 Road Verge Drawings

TITLE	NO
Service Modules Sheet 1 of 2	DS4 - 01
Service Modules Sheet 2 of 2	DS4 - 02
Verge Gradients and Access requirements	DS4 - 03
Footpath Modules	DS4 - 04