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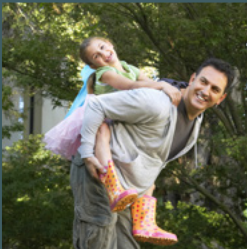
Department of Planning



Western Australian Planning Commission



Liveable Neighbourhoods





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Published by the
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140 William Street
Perth WA 6000

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Perth WA 6001

Published September 2015

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Chairman's Foreword

Liveable Neighbourhoods is the Western Australian Planning Commission's operational policy for the design and assessment of structure plans and subdivision to guide the future development of Perth and Peel and the State's regional centres.

Since the first edition was published in 1997 *Liveable Neighbourhoods* has successfully influenced the integration of the strategic and operational aspects of structure planning and subdivision development.

In its latest form the policy has undergone a format restructure based on six elements to improve the application of its objectives and requirements. It also resolves policy conflict and duplication particularly with the key provisions of existing WAPC development control policies related to road planning, school sites and public open space. The remaining information has been significantly updated to reflect current best practice and terminology.

This updated draft continues to promote a robust urban structure and site-responsive design for sustainable, safe and 'liveable' communities; and walkable, accessible, attractive mixed-use neighbourhoods with interconnected street layouts supported by an efficient movement network.

There is also greater focus on local community needs being accessed by walking and cycling networks and local public transport, rather than over-reliance on the private car. As well, employment opportunities and economic sustainability are initiated through a well-developed hierarchy of activity centres.

The review process has involved targeted stakeholder engagement across State and local governments and industry. I am pleased to now open the draft *Liveable Neighbourhoods* (2015) for broader review and look forward to your comments on this policy that will shape how our future communities will look and function.

A handwritten signature in black ink, which appears to read 'Eric Lumsden', is located below the main text of the foreword.

Eric Lumsden, PSM
Chairman, Western Australian Planning
Commission



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Introduction

The Western Australian Planning Commission (WAPC) has a central coordination role in regional, strategic and statutory planning throughout Western Australia; and administers subdivision approval under the *Planning and Development Act 2005*.

Liveable Neighbourhoods is the WAPC's primary policy for the design and assessment of structure plans (regional, district and local) and subdivision for new urban (predominantly residential) areas in Perth metropolitan and Peel regions and major regional centres, on greenfield and large infill sites.

Liveable Neighbourhoods is aligned to the *State Planning Strategy 2050* (WAPC, 2014), which aims to guide the sustainable development of Western Australia for the next four decades. It supports *Perth and Peel@3.5million* (WAPC, 2015), *Directions 2031 and Beyond* (WAPC, 2010), *State Planning Policy 3: Urban Growth and Settlement* (WAPC, 2006) and various planning reform initiatives of the WAPC. It is also supported by a local planning framework comprising local planning strategies (LPS), local planning schemes (local scheme), local planning policies (LPP) and local development plans (LDP).

Liveable Neighbourhoods promotes an urban structure of walkable neighbourhoods. Community facilities and services are accessed by walking, cycling and public transport through an efficient, interconnected movement network. Employment opportunities and economic sustainability are facilitated through a coherent hierarchy of activity centres.

Liveable Neighbourhoods – principal objectives

- [To achieve a sustainable urban structure that balances the provision of urban development through site-responsive design.](#)
- [To develop a coherent urban system of compact walkable neighbourhoods which cluster around activity centres capable of facilitating a broad range of land uses, employment and social opportunities.](#)
- [Provide a network of interconnected streets based on function within attractive, safe and pedestrian friendly streetscapes, which facilitates accessibility for all users to, within and between neighbourhoods and activity centres.](#)
- [Promote mixed use development and activity centres that optimise commercial opportunities, access to public transport and efficient street network connections.](#)
- [Plan for public open space that meets the recreational, social and health needs of existing and future communities.](#)
- [Ensure that water is protected and managed to maximise efficiency by incorporation of urban water management techniques into the urban design.](#)
- [Facilitate housing diversity, responsive built form, local employment and amenity within a coherent and efficient urban structure of compact walkable neighbourhoods.](#)
- [Provide education sites and other community infrastructure to meet the needs of existing and future communities.](#)
- [Provide utility services in a land efficient, environmentally responsible and sustainable manner.](#)



Liveable Neighbourhoods – design principles

- [Create a permeable street network that prioritises pedestrians, cyclists and public transport and is integrated with surrounding land use.](#)
- [Create a safe street environment for all users by applying appropriate street geometry design and traffic management.](#)
- [Ensure all streets provide space for utility services, stormwater drainage, street trees and lighting.](#)
- [Ensure urban form and lot design facilitate safe and convenient access to services, facilities and employment in mixed land use, 'main-street format' activity centres.](#)
- [Create a site responsive street and lot layout that provides local amenity, safe and efficient access and promotes a sense of place.](#)
- [Provide housing density and diversity to meet the changing community needs.](#)
- [Provide sustainable utility services to each new lot in a timely, cost-effective, coordinated and visually acceptable manner.](#)
- [Coordinate the design and delivery of an integrated network of public open space that provides communities with access to nature, sport and recreation.](#)
- [Optimise the siting and design of public open space to promote accessible and efficient use of land.](#)
- [Ensure that education sites are developable, serviceable and accessible; promoting safe, adaptable and efficient use of land and other community infrastructure including public open space.](#)
- [Ensure a servicing movement network that facilitates safe and efficient access to education sites by all users.](#)

Approach

Liveable Neighbourhoods promotes a planning and urban design approach that encompasses:

- government commitment to the principles of sustainability;
- a thorough analysis of the site and its context to inform structure planning and subdivision design and graphically illustrate the basis of the design;
- the use of structure plans to coordinate the planning of communities;
- neighbourhood and activity centre design that aims to achieve compact, well-defined and sustainable walkable urban communities; and
- performance-based policy that encourages innovation in response to community needs and economic drivers.



Application

Liveable Neighbourhoods (2015) replaces all previous editions. The Policy is applied throughout state and local government planning decision-making in conjunction with state planning policies for the preparation and assessment of all structure plans, activity centre plans and subdivision applications that are the subject of a structure plan or activity centre plan. The principles of Liveable Neighbourhoods would also apply to the subdivision or survey strata of large sites into multiple lots that may not be subject to a structure plan such as where internal street/s and/or public open space are proposed.

The application, referral and determination processes for structure plans are not addressed under Liveable Neighbourhoods. Currently these are outlined in the relevant local planning scheme or the subdivision process set out in *Planning and Development Act 2005* and associated regulations. The *Planning and Development (Local Planning Schemes) Regulations 2015* outlines the application, referral and determination process for structure plans and activity centre plans.

Liveable Neighbourhoods replaces existing WAPC development control policies but should there be conflict, Liveable Neighbourhoods prevails unless the proponent can demonstrate why it cannot or should not apply.

Structure planning may be reliant on sub-regional structure plans and, where applicable, region schemes. Through the process of context analysis, preliminary design proposals for structure plans may suggest adjustments to existing structure planning, committed subdivision, or to a region scheme beyond the site itself. This should enable responsive urban forms to be developed through Liveable Neighbourhoods.

There are circumstances where particular Liveable Neighbourhoods requirements may be varied to accommodate regional servicing requirements, climate-responsive design and/or settlement conditions of regional urban zoned areas, particularly for temperate and tropical areas. Requests for variation should be substantiated through the provision of relevant documentation requested by the relevant decision-maker.

Liveable neighbourhoods proposals and scale of application

The scale of structure plan and subdivision proposals assessed under Liveable Neighbourhoods will vary. Some will comprise whole new suburbs with all of the components of a complex urban area. Others will comprise one or more neighbourhoods, while others will be smaller still, forming just part of a neighbourhood/and or activity centre. Liveable Neighbourhoods has application across many jurisdictions administering public policy for urban areas.

The broad scales and types of proposals include:

District structure plan: high-level, strategic documents prepared by a number of landowners, local government or the WAPC. Provides guidance on future land use, employment, density targets and the coordination and provision of major community and service infrastructure. This level of structure plan provides the basis for subsequent more detailed levels of local structure planning.



Local structure plan: a document prepared by local government, a landowner or landowner representative, consistent with a district structure plan (where exists) and approved under the provisions of a local planning scheme. A local structure plan coordinates the provision and planning for land use, density, infrastructure and community facilities at the neighbourhood scale generally applying to areas of land generally comprising three neighbourhoods or less, to facilitate future subdivision and development.

Activity centre plan: a document required by *State Planning Policy 4.2 Activity Centres for Perth and Peel* (SPP 4.2) (WAPC, 2010) for strategic metropolitan centres, secondary centres, specialised and district centres, prepared by local government, a landowner, landowner's representative or a government agency in accordance with SPP 4.2. Activity centre plans outlines land use, density and development, infrastructure and community facilities at a local scale to facilitate future subdivision and development. Activity centre plans may be required by the WAPC for orderly and proper planning purposes for new centres in structure planned areas outside Perth and Peel regions.

Subdivision: the WAPC determines all freehold, vacant and survey strata subdivisions in Western Australia with the exception of certain classes of built strata subdivisions which are determined by Local Government. Application to the WAPC for subdivision approval is initiated by a landowner and/or applicant. In its consideration of a subdivision application, the WAPC will regard any relevant local planning scheme and statutory region scheme in addition to any endorsed structure plan applying to the proposal.



How to use liveable neighbourhoods

Liveable Neighbourhoods is a performance-based policy that sets high-level objectives, design principles and requirements to address both strategic and operational aspects of structure planning and subdivision. The document is a compilation of six interrelated design elements as follows:

[Element 1: Community design](#)

[Element 2: Movement network](#)

[Element 3: Activity centres](#)

[Element 4: Lot design](#)

[Element 5: Public open space](#)

[Element 6: Education](#)

Objectives, design principles and requirements

Element 1 consists of objectives that describe the desired outcomes of Liveable Neighbourhoods to be addressed at the highest strategic planning level.

Elements 2–6 contain more detailed and technical design principles, which are heavily interrelated with the strategic planning objectives and requirements of Element 1, as well as each other; however, they are generally applied through structure plans, activity centre plans and subdivision.

Design requirements are provided to help meet the objectives and design principles of each element. The objectives and design principles under each element are as important as any design requirements through which urban development may be undertaken. In cases where objectives, design principles and requirements may be difficult to achieve together, the WAPC will assess the merits of a proposal against the overall objectives and specific site circumstances.

The objectives, design principles and requirements in Liveable Neighbourhoods may be satisfied in a number of ways. For example, Element 1: Community Design requirements are more strategic and aimed at high level strategic planning of districts and are written to provide a greater level of flexibility to accommodate the differences in scale of application. The requirements in Elements 2-6 are a range of qualitative and quantitative responses to address the design principles; and the level of flexibility to planning outcomes will apply more at the local area level of application.

Each element includes guidance and best practice examples to assist the design, preparation, interpretation and assessment of proposals to be fulfilled at the relevant stage of structure planning and/or subdivision.

Related sections and tables are cross-referenced via [hyperlinks](#) to aid navigation throughout the document.

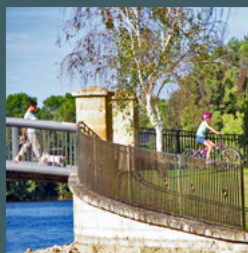
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ELEMENT 1 COMMUNITY DESIGN

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Introduction

Community design sets out urban structuring in a site-responsive way. The objectives and requirements of this element guide the broad planning of new urban areas. Planning will need to be further refined once more detailed investigations and design is undertaken through the preparation of structure plans, activity centre plans and subdivision by applying Elements 2–6.

The scale of proposals will vary with some comprising whole new suburbs with all of the components of a complex urban area; while others will be smaller with one or more neighbourhoods or simply forming just part of a neighbourhood or activity centre.

Central to community design is the clustering of walkable neighbourhoods whose urban character and design fosters a sense of community, local identity and place. Neighbourhoods are clustered around main street-based mix-use centres that provide a local economic base, employment opportunities and encourage greater employment self-containment. The urban structure must facilitate walking, cycling and public transport - providing access to facilities for all users, opportunities for social interaction and promoting more active living. Active communities have healthier residents, are more connected, safer, cohesive and productive; and reduce the environmental impact of car dependence (Heart Foundation, 2012).

The urban structure is further developed and refined through street networks that influence the built form by activating street and land use interaction with building frontages, access and windows facing streets to improve safety through increased surveillance and activity. Density and mix-use urban development is distributed within and near centres and public transport to provide a mix of housing, employment and locally accessible services and facilities to cater for residents' needs.

Community design provides guidance on the coordination and provision of major infrastructure, including the location and distribution of movement networks, schools, public open space, water management, infrastructure provision and environmental assets. Liveable Neighbourhoods aims to provide educational, cultural and recreational opportunities capable of adapting over time as the community changes, encouraging a more integrated

approach, while maximising land efficiency and achieving a balance between urban development and environmental outcomes.

Scope and vision setting

A critical starting point to inform community design is the setting of a clear scope and vision. This will help to define:

- the study area;
- relevant stakeholders, local government and the community;
- guiding principles for urban design and resourcing;
- development of the proposal; and
- reviewing and monitoring procedures.

Proponents should consider the likely timeframes associated with precursor planning such as region scheme amendments and local planning scheme re-zonings; budget and financial implications; and the necessary resources and technical expertise required to deliver the proposal.

It is important to engage with relevant stakeholders as part of the design process prior to preparing a structure plan in order to clearly define the matters to be addressed and the level of detail required. Different design methods - such as enquiry-by-design, charrette, design studio and other consultative approaches - can be used, depending on the proposal type. Multiple and varying techniques may be employed throughout the project or on particular components of the plan, such as an activity centre, for example.

The integrative and collaborative design-based planning processes of design workshops and charrettes are encouraged to resolve the competing challenges of achieving optimal outcomes; as is the use of scenario planning to test and evaluate options to help resolve complex issues. A design enquiry focus seeks sustainable, safe, healthy and liveable communities; and achieves activity centres with a strong site-responsive identity supportive of local community, which in turn promotes better community, employment and environmental outcomes.

Site and context analysis

Objective 1: To achieve a sustainable urban structure that balances the provision of urban development through site-responsive design

Site and context analysis facilitates the efficient provision of infrastructure through good design; and identifies features which add value to urban development. A detailed assessment of the site and its immediate surrounds assists planning and urban design options and decisions.

Site analysis enables cost effective and environmentally responsive design that balances constraints and natural and cultural assets to create a unique identity and sense of place which is integrated with neighbouring areas.

Where areas have unique environmental, cultural and historical features, urban development may be precluded if it leads to a highly dispersed, poorly-connected urban structure that is over-reliant on motor vehicles as the only viable means of transport to access day-to-day services and facilities.

Appropriate urban design and planning solutions can ensure environmental buffers, easements, foreshores, setbacks, acoustic barriers and streets are integrated in a way that maximises land efficiency and minimises the overall cost and impact of urban development.

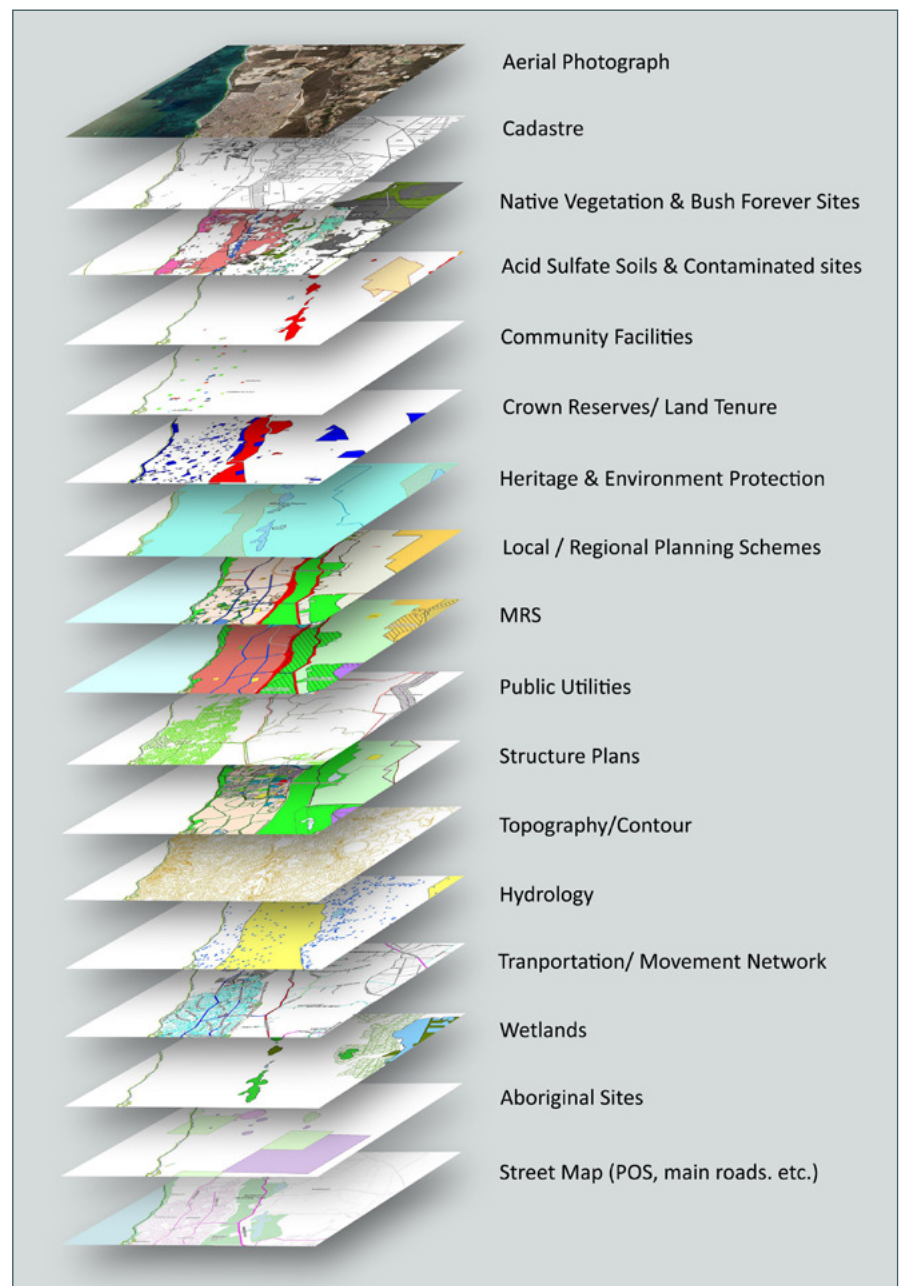


Figure 1: Multi-layered approach to site and context analysis

As part of the structure planning process, a site and context analysis must be undertaken to:

- widely investigate and determine the opportunities and constraints of the site and its context;
- identify opportunities for integrating surrounding natural and developed areas, including planned development of adjacent sites; and
- consider any development opportunities and constraints such as existing street connections, operational buffers, natural hazards, infrastructure requirements, environmental assets, landscape values, public open space networks, topography and urban water management.

A site and context analysis informs the urban design process and assists in:

- integrating topography, natural features, heritage and environmental assets to create unique spaces that reflect the local character and enhance sense of place and identity;
- preventing unforeseen consequences that could have financial and community implications;
- allowing for an integrated design approach;
- mitigating the need for complex engineered solutions;

- reducing whole-of-life maintenance and management costs for utilities, infrastructure, community facilities, parks and landscaping;
- identifying hazards, buffers and impacts from surrounding uses and facilities;
- supporting active transport modes such as walking, cycling and public transport;
- minimising disruption to natural cycles including urban water management and habitats for flora and fauna;
- identifying opportunities for a continuous network of public space open (existing public open space, water ways, areas of remnant vegetation, existing national and regional parks);
- identifying co-location opportunities;
- maximise energy efficiency by assessing microclimatic effects; and
- integrating with relevant regional networks.

[Appendix 1](#) provides a preferred methodology to identify key opportunities and constraints and the range of information to be addressed when undertaking a site and context analysis.

SITE AND CONTEXT ANALYSIS REQUIREMENTS

- | | |
|-----|--|
| 1.1 | Achieve sustainable, balanced urban development by making appropriate trade-offs to ensure core urban areas and public transport catchments are not compromised by environmental areas; and significant environmental attributes are not compromised by urban development. |
| 1.2 | Identify and respond to significant environmental assets such as landform, geology, areas of landscape significance, Environmental Protection Policy areas, bushland, wetlands and foreshore reserves in the proposed urban structure. |
| 1.3 | Enhance local identity by recognising and incorporating local character values, landmarks, heritage, views and any other significant natural and cultural assets. |
| 1.4 | Where existing or proposed land uses are required to be separated from other land uses, compatible land uses such as commercial and public open space acting as buffers, are to be investigated before easements, setbacks, barriers or similar buffers are considered. |
| 1.5 | Facilitate climate-responsive design where topography and other site conditions allow; and avoid the need for major earth works, which increase demand for basic raw materials and reduce loss of remnant vegetation. |

Urban structure

Objective 2: To develop a coherent urban structure of compact walkable neighbourhoods which cluster around activity centres capable of facilitating a broad range of land uses, employment and social opportunities

Planning of an urban structure is focused on clusters of compact and well-defined walkable neighbourhoods and activity centres.

Neighbourhoods are initially identified as circles of 400 metre radius (approximately 50 hectares in area) showing the theoretical distance a pedestrian walks in five minutes from the centre to its perimeter (Figure 2). Most people will consider walking up to 400 metres to access services and facilities, or 800 metres to a train station or higher-order centre. The target is for 60 per cent of the area within a 400 metre radius of the destination to be within a 400 metre walk, using the pedestrian network.

Once indicative catchments have been identified each neighbourhood cell is connected through a network of highly interconnected streets, which allows the optimal integration of land uses to maximise local access to services and facilities contributing to urban vitality and activity.

Integrator arterials and neighbourhood connectors are drawn through the neighbourhoods so that points of intersection are potential new activity centres (Figure 3).

Neighbourhood or local centres are located centrally within the neighbourhood catchment. The design

of the activity centre will vary in size depending on community needs, transport connections, residential densities, demographics and proximity to other centres.

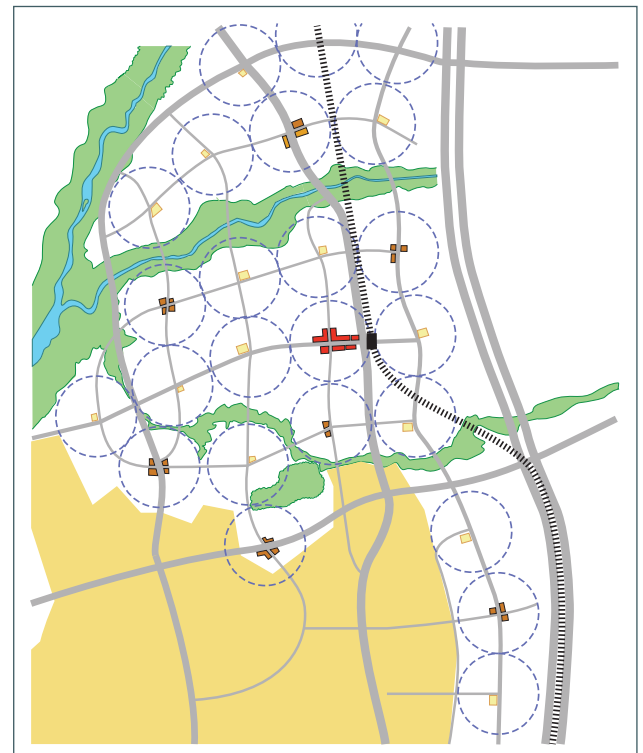


Figure 2: Clustering of neighbourhoods

URBAN STRUCTURE REQUIREMENTS

- 2.1 Cluster six to nine neighbourhoods to provide an adequate population to sustain a centrally located large district and/or secondary centre.
- 2.2 Connect new urban areas to existing, or proposed urban areas ensuring permeability and synergies of land uses.
- 2.3 At least 60 per cent of dwellings to be in a 400 metre walk from an activity centre or an existing or future public transit stop or station.

Movement network

Objective 3: Provide a network of interconnected streets based on function within attractive, safe and pedestrian friendly streetscapes, which facilitates accessibility for all users to, within and between neighbourhoods and activity centres

The Liveable Neighbourhoods street types form the basis of a highly interconnected movement network, where by streets are broadly differentiated based on their function, either as 'arterials' or 'local streets'.

The function, forecast traffic volume, parking, land use, development density, built form and through traffic requirements all need to be considered when designing the movement network. The level of detail of the network to be shown on structure plans will depend upon the size and scale of the proposal. At a minimum, all arterials and high-order local streets (neighbourhood connectors), railway lines and major freight routes must be shown.

A transport assessment is required to support all structure plan proposals to determine projected traffic volumes at full development capacity to ensure safe and efficient operation and appropriate forms of control (e.g. priority, roundabout or traffic signals). The assessment must consider not only vehicles, but also demonstrate pedestrians and cyclists can safely cross the intersection with minimal delay and include analysis demonstrating operational efficiency.

Integrator arterials are primarily designed to facilitate efficient and safe regional and local traffic movement while maximising community integration via fronting development.

Integrator arterials need to be planned so the points of intersection with other busy streets – such as neighbourhood connectors – are potential new activity centre locations, with integrator B arterials and neighbourhood connectors forming the central spines of centres and neighbourhoods. These streets are appropriate for higher density, mixed land use, shopping, schools and community services and help to integrate land uses. It is at this stage that the planning of future public transport services can be undertaken to support the proposed density, mix and distribution of land uses.

The design of integrator arterials should avoid the division of communities, and ensure integration particularly as high traffic volumes and speeds form barriers to pedestrian movement and public transport access and patronage. On the other hand, integrator arterials designed and located with close intersection spacing, narrow reservation widths and inadequate access control can also lead to reduced capacity by limiting the ability for through traffic to flow freely. In either case, the ability for pedestrians to safely and conveniently cross integrator arterials from one neighbourhood to another, and to access public transport, is a key consideration when developing the movement network.

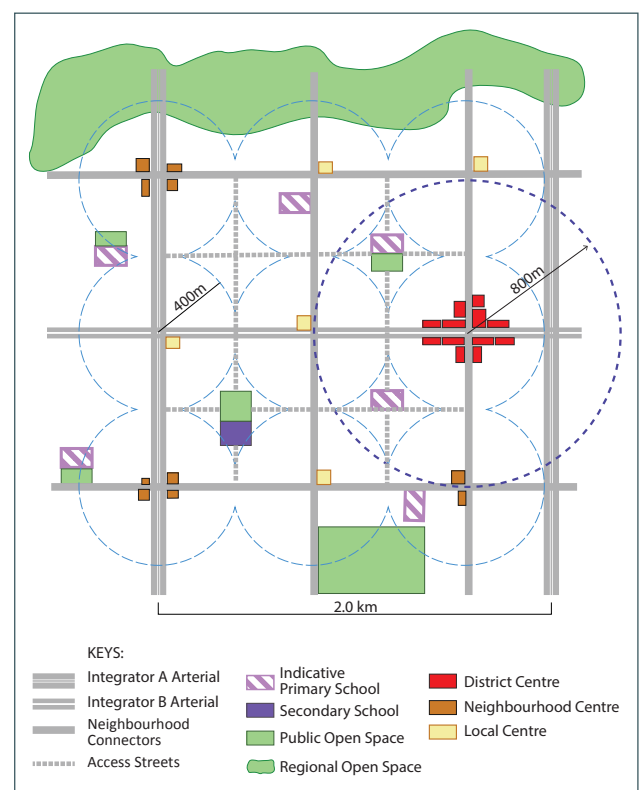


Figure 3: Street hierarchy at a district scale

Integrator arterial spacing must respond to site conditions, movement directions, land use, density and development intensity to balance connectivity between land uses on either side of the street and to minimise severance/barrier effects. Connections to existing areas should be maximised to facilitate interconnection between the new and existing communities.

Safe crossing facilities are generally signalised pedestrian crossings, either as part of a traffic signal intersection or as a stand-alone signalised pedestrian crossing. The provision of grade-separated crossings (including low clearance underpasses in residential areas) – typically at around 400 metre spacings – taking advantage of topography and/or depression of rail lines to reduce noise, can be considered to improve visual amenity and facilitate grade-separated crossings. Pedestrian underpasses or overpasses as an alternative to grade signalised pedestrian crossings may be considered only where adequate levels of passive surveillance can be demonstrated, in accordance with *Designing out Crime Planning Guidelines* (WAPC, 2006).

Once neighbourhoods have been identified the movement network may need to be adjusted to enable neighbourhoods to be clustered to support activity centres with a compatible mix of uses including retail, community facilities and non-retail employment. This will assist retail exposure and accessibility and overall liveability by integrating all modes of travel. Neighbourhood and centre positions should be adjusted to avoid extensive overlap of walkable catchment areas and ensure neighbourhoods are linked to centres in the most direct way possible.

Design solutions that utilise appropriate street layout and facilitate development/land use to act as a natural buffer – such as a continuous wall of business/commercial buildings, parking areas and residential building design and construction – is preferred to solutions that include large setback (buffer) distances, noise mounds and noise attenuation walls which tend to sterilise land and reduce mixed-use development opportunities and so should be used only as a last resort.

Design solutions should be documented in noise management and mitigation strategies as identified in *State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning* (WAPC, 2009); and *State Planning Policy 5.1: Land Use planning in the Vicinity of Perth Airport* (WAPC, 2004) and *State Planning Policy 5.3: Jandakot Airport Vicinity* (WAPC, 2006). Notice may be required to be placed on the certificate(s) of title of the proposed lot(s) and on the deposited plan, advising of the existence of a noise nuisance or other factor, where relevant.

Refer to [ELEMENT 2](#) for further information on the planning of the movement network.

[Table 8](#) in Appendix 3 sets out the recommended maximum spacing between safe crossing facilities to provide an acceptable level of amenity for pedestrians and influence bus-stop locations.

MOVEMENT NETWORK REQUIREMENTS

- 3.1 The urban structure comprised of a highly interconnected movement network with route choice for pedestrians, cyclists and vehicles, to and between key destinations such as neighbouring centres, community facilities, schools and public open space.
- 3.2 The operation of all major intersections assessed at full traffic capacity to ensure suitability of control proposed.
- 3.3 Integrator arterials spaced between 1.6-2 kilometres apart, linked by neighbourhood connectors spaced between 800 metres–1 kilometre.

Continued on page 17

MOVEMENT NETWORK REQUIREMENTS (Continued)

- 3.4 Integrator arterials located and designed to:
- maximise through traffic, rather than local traffic movement;
 - maintain efficiency levels during peak periods;
 - enable development to front the street;
 - consider the changing urban context (land uses, densities and development types) along their length, while maintaining appropriate safety standards and efficiency for all users; and
 - ensure safe and efficient crossing points for pedestrians and cyclists.
- 3.5 High-frequency public transport services located along integrator streets or neighbourhood connectors to provide highly accessible and direct routes.
- 3.6 Ensure measures are in place to manage noise and visual impact for noise sensitive land uses abutting arterial streets, rail lines and major freight routes.
- 3.7 Provide a safe, convenient, permeable and legible pedestrian and bicycle network.
- 3.8 Pedestrian and cyclist crossings of arterials streets and railways to be provided at-grade wherever practical to integrate development on both sides. Grade-separated pedestrian crossings can be considered where topography is suitable.

Location of activity centres and employment

Objective 4: Promote mixed-use development and activity centres that optimise commercial opportunities, access to public transport and efficient street network connections

Adequate and appropriate land needs to be identified in structure plans for the wide range of non-residential uses needed to produce a self-sufficient urban area where car travel and related congestion, greenhouse gas emissions and air pollution can be minimised.

Achieving high levels of local employment requires planning for a diverse range of business and employment generating land uses as part of the planning of new residential areas. Short term land uses and development should not prejudice future long term development intentions, however should adapt to the future growth of the centre and surrounding catchment over time as circumstances change.

The establishment of well-located activity centres is necessary to serve local community needs; facilitate local employment opportunities; and provide custom to support public transport services.

Activity centres should be linked by high-frequency public transport along activity corridors. These activity corridors include higher-density residential and mixed use development to capitalise on public transport availability.

Employment is best generated by vibrant, attractive mixed-use street-based centres with appropriate sites and precincts to suit different needs; and a development form that is responsive to change as the centre and its surrounding catchment matures.

Providing a mixed-use centre delivers improved environmental, economic and social outcomes and place-making opportunities. Sufficient retail should be located and designed to act as a strong catalyst to generate other (non-retail) employment creation. To capitalise on passing trade, district-sized centres are best located adjoining and visible from (but not on) integrator A arterials.

State Planning Policy 4.2 (SPP 4.2) is the primary policy for the hierarchy, distribution, function, broad land use and urban design of activity centres and should be referred to for the detailed planning of district and higher-order centres in the metropolitan Perth and Peel region. Structure plans should indicate the location and general spatial extent of activity centres, consistent with the activity centre hierarchy in SPP 4.2. Centres in regional areas must consider any relevant region scheme, WAPC endorsed strategy or policy for guidance and consider the principles in SPP 4.2.

Achieving successful lower-order local and neighbourhood centres requires careful consideration of many factors. A one-size-fits-all approach applying a 400 metre radius catchment across an entire residential area is unlikely to lead to successful outcomes. It may be appropriate, especially for relatively low density and low resident population catchments, to have fewer centres with resultant improved viability. Too few centres however, also result in them not being within optimal walking distance to residents. In some circumstances, neighbourhood centres can be located on the edge of a residential area and a local industrial estate, for increased catchment patronage, range of retail offer and resultant viability.

Access to activity centres is more appropriate via integrator B arterials, rather than integrator A arterials particularly where lower traffic volumes exist and pedestrian-based retail (main) streets are required. The planned land use and density should be considered in relation to traffic function. In some instances certain land use activities and densities may generate large volumes of traffic either all day or in distinct peaks. Examples could include regional sports facilities or higher order centres. Integrator B arterials may not provide sufficient capacity and therefore an integrator A arterial may be required.

Activity centres require land use and transport integration, taking into account their place making and transportation functions, land uses and site

constraints in order to deliver pedestrian priority, followed by cycling, public transport and finally motor vehicles. Typical locational relationships between integrator A arterials and successful retail main street centres are shown in Figure 4.

Structure plans proposing activity centres must include an economic, retail and employment strategy and retail needs assessment prepared by a specialised

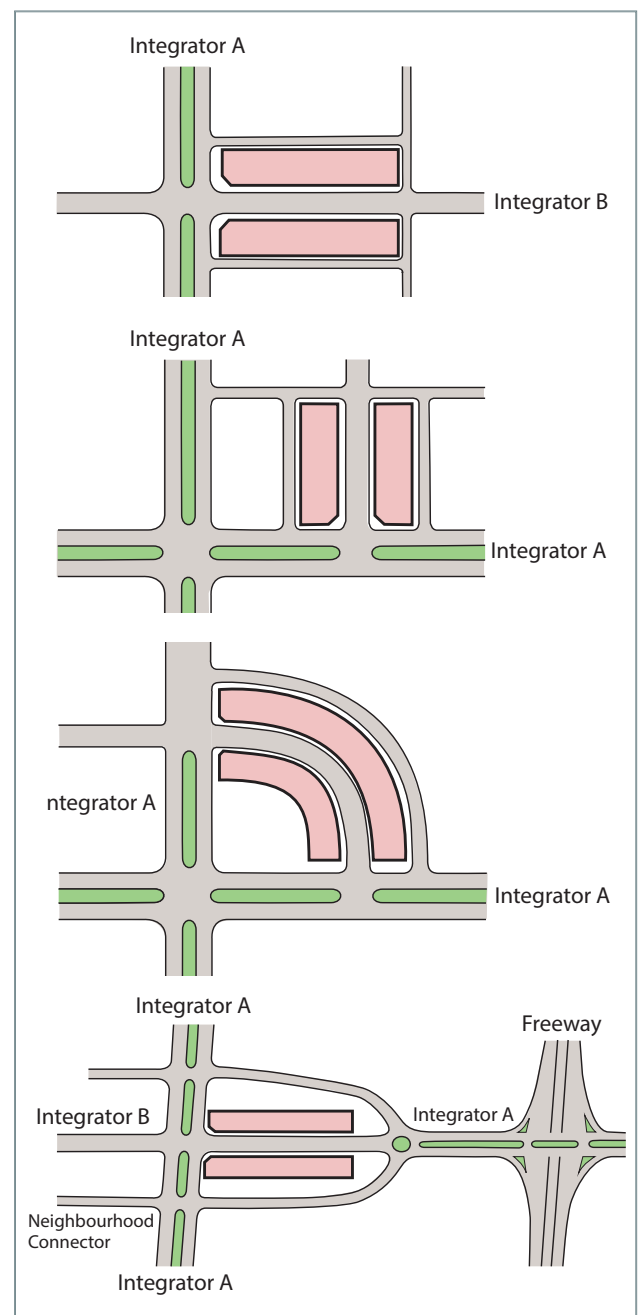


Figure 4: Typical locational relationships of main street centres and integrator arterials

consultant, with reference made to compliance (or otherwise) with any relevant local planning strategy, economic strategy or similar relating to centres, and community services and facilities.

Local development plans may be required to outline development standards for activity centres, other employment areas or super lots, to coordinate future development.

For further information on the planning of centres refer to [ELEMENT 3: Activity Centres - Design Principle 4](#)

LOCATION OF ACTIVITY CENTRES AND EMPLOYMENT REQUIREMENTS

- 4.1 Neighbourhoods serviced by a distribution of activity centres that support and enhance existing centres and linked by activity corridors and high-frequency public transport.
- 4.2 Higher-order activity centres located adjacent to the intersection of integrator arterials and within 800 metres of high-frequency public transport to maximise residential densities and passenger movement use. Major new public transport services are based on activity centre location.
- 4.3 Neighbourhood and local activity centres located centrally within a 400 metre walkable catchment area, located on or at the intersection of local streets.
- 4.4 Provide sufficient and appropriately located non-residential sites suitable for a wide variety of business development opportunities including:
 - Land fronting integrator arterials in, or close to high-order centres and public transport; and
 - Potential strategic business sites excluded from residential use such as freeway interchanges and frontages, integrator arterial intersections, or sites with strategic resources.
- 4.5 Locate lifestyle, retirement or other special-interest development close to activity centres and located and designed to form the core of the neighbourhood centre not provided in gated communities or campus-style layouts.

Public open space network

Objective 5: Provide public open space that meets the recreational, social and health needs of existing and future communities

The urban structure should create legible and well-distributed public open space (POS) networks to encourage walking and create a strong sense of place while responding to local character and environmental values. A variety of POS sizes can be utilised to create a multifunctional, integrated network which is responsive to community needs.

Large district and regional spaces are best placed at the edge of urban areas rather than cutting through or dividing neighbourhoods, as illustrated in [Figure 5](#),

to serve a group of neighbourhoods and the whole district. Large POS sites act as major nodes, similar to activity centres at the intersection of major streets. Small, local and neighbourhood parks are designed to serve and be accessed by a majority of local residents via walking or cycling.

The POS network should be connected to existing or proposed future district POS to create a continuous network of key destinations. Connections are usually made with linear POS (e.g. foreshore reserves) and

cycle and walking routes, to destinations such as schools, community facilities and activity centres.

The POS network should be designed to give all residents access to a diverse range of POS that varies in size and function, in response to community needs. The walking distance – using the pedestrian network – between residents and the nearest POS (of any size) should be no more than 300 metres over the neighbourhood as a whole. This is assessed on a catchment basis, taking into account major barriers to POS access (e.g. major roads, railway line etc). Where there are barriers and safe access cannot be easily attained within 300 metres, a walkable catchment analysis may be required.

Liveable Neighbourhoods uses three terms: *sport*, *nature* and *recreation* to identify the primary functions of POS based on the *Classification Framework for Public Open Space* (Department of Sport and Recreation, 2012). The POS network should be designed so that all residents are within the catchment of POS sites providing opportunities for sport, nature and recreation. Where a local government has a POS strategy/plan this can be used to guide function to respond to local area requirements; however; where this is not available, proponents should aim to provide residents with access to all three functions to meet local community needs.

Table 1 provides guidance to POS size and distance residents would generally be prepared to travel to use the POS. Larger district-scale sites generally accommodate multiple functions and have larger facilities that attract residents further away. The size and shape should be site-responsive and in-keeping with proposed function. Apply the accessibility catchment size as described in Table 1 to ensure all residents have access to opportunities for sport, nature and recreation.

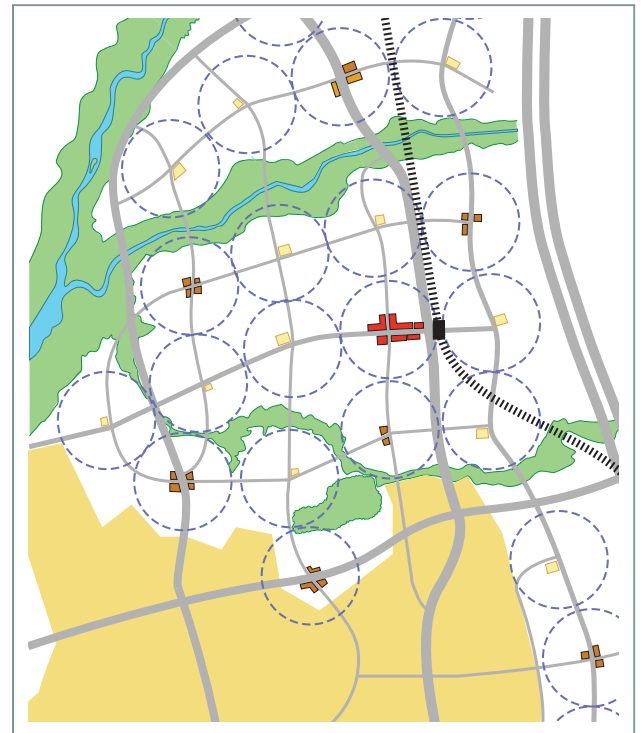


Figure 5: Public Open Space and the urban structure

Where regional open space (ROS) adjoins the site it should be considered as a major component of the POS network to provide function at a neighbourhood scale. The design of ROS and its facilities; and how it is integrated with communities living close by, should be carefully thought out to avoid issues such as impact on pedestrian access, passive surveillance and noise, and traffic management issues from large car-parking areas.

Table 1: Public open space size hierarchy and catchment area for accessibility

	Small	Local	Neighbourhood	District
Size	Up to 4000m ² (0.4ha)	0.4-1ha	1ha – 5ha	5ha and above
Accessibility catchment	300m	300m	800m	2km

Regional open space identified in a region planning scheme that is not a foreshore reserve or as part of the subdivider's 10 per cent POS contribution, as determined by the WAPC, should be shown as a separate lot, pending acquisition. All ROS should be listed in the POS Schedule and be included in the POS Management Plan - even if ongoing management is the responsibility of a different land manager.

Liveable Neighbourhoods advocates co-locating schools with public open space, enabling joint use and shared maintenance.

Refer to [Element 6: Education - Design Principle 10](#) for more information on shared use of public open space.

All regional (+15ha) and district (5-15ha) open spaces, foreshore reserves; and POS that are co-located with a school or have a shared use, community purpose sites and/or POS that serve a water management function are to be determined through sub-regional or district structure plans. This includes arrangement, connectivity and functions of POS to be provided, identification of environmental and natural assets,

buffers and linkages. Water requirements are to be accommodated within a District Water Management Strategy (DWMS) to ensure adequate water supply and the right balance of conventional (groundwater) and alternative sources of water for irrigation are available for POS to meet its intended purpose.

Refer to [Element 5: Public open space](#) for more information on public open space.

PUBLIC OPEN SPACE NETWORK REQUIREMENTS

5.1 Public open space to be provided within 300 metres (of safe walking distance) to all residential lots.

5.2 Design a site-responsive public open space network to enhance community wellbeing, facilitate a sense of place and one that encourages physical activity and community interaction by:

- providing all residents with access to opportunities for sport, nature and recreation;
- connecting existing or proposed public open space to destinations such as schools, community facilities and activity centres by locating each within walking distance of each other;
- connecting these sites with linear public open space and/or legible shaded walking routes and cycle networks; and
- co-locating public open space with activity centres, schools and community facilities where possible.

5.3 Major linear, district or regional open spaces and regional or arterial drainage should be located to define the boundaries of neighbourhoods rather than dissect them.

Urban water management

Objective 6: Ensure that water is protected and managed to maximise efficiency by incorporation of urban water management techniques into the urban design

Water resources in Liveable Neighbourhoods should be integrated seamlessly into the urban form, with infrastructure not impacted upon by major rainfall events, limited water resources are used sustainably and efficiently and water quality is protected. The public open space network, urban form and street network provide opportunities for integrated water management and water sensitive urban design.

Urban water management systems are designed to apply the principles of water sensitive urban design adapted from the *Stormwater Management Manual for Western Australia* (Department of Water, 2004 - 2007) and *Better Urban Water Management* (WAPC, 2008) to:

- protect and enhance natural water systems and their hydrological regimes in urban developments;
- integrate stormwater treatment into the landscape by incorporating multi-use corridors that maximise visual and recreational amenity;
- protect water quality from urban development and minimise outputs of phosphorous, nitrogen and other pollutants;
- manage runoff and reduce peak flows from urban developments by using local retention measures and minimising impervious areas;
- add value while minimising drainage infrastructure costs;
- minimise disturbance to park functionality and amenity, existing landform, natural watercourses and native vegetation; and
- enhance streetscape visual and recreational amenity.

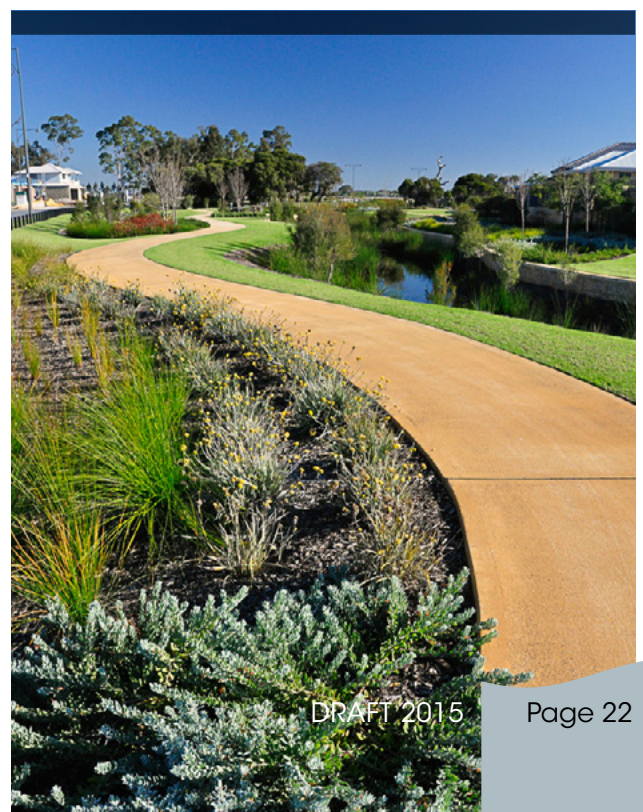
District and local water management strategies prepared in accordance with *Better Urban Water Management* (WAPC 2008) are required to accompany district and local structure plans respectively. A Water Balance Assessment (as provided by Water Corporation) is also required to be completed and provided with local structure plans.

Where offsite drainage flows are required, the proponent must liaise with the regional catchment drainage service provider regarding arrangements for the drainage flows from the development area to the regional drainage system at a district or local structure planning stage, or at subdivision if prior structure planning has not been undertaken.

Generally, the Department of Water prepares district scale drainage and water management plans in areas of high development pressures. The drainage water management plan may provide proponents with guidance on the management of drainage in and from development areas based on a consultation and agreement process with the regional catchment drainage service provider.

The connection into the regional drainage system is to be addressed by proponents through a Drainage and Water Management Plan, District Water Management Strategy, and/or Local Water Management Strategy. These are required and approved simultaneously at the relevant structure planning stage or subdivision.

Better urban water management



Stormwater management in a public drinking water source area (PDWSA) may require additional consideration and advice from the Department of Water to ensure the water quality of the drinking water source is protected from any potential contamination risks.

Refer to [ELEMENT 2: Movement network - Design Principle 3](#) for more information on the integration of stormwater management techniques within the street network.

Water use efficiency

Water, particularly scheme water, undergoes an intensive process of collection, processing and distribution to be made available for public consumption. As such, it should be used as efficiently as possible to avoid wastage or inefficient application. Water efficiency measures are used in urban developments to ensure water is fit for purpose by:

- minimising use of scheme water to minimise import costs and subsequent need to process wastewater;

- promoting the use of rainwater for domestic and commercial application;
- promoting the re-use and recycling of wastewater;
- applying efficient landscaping practices; and
- promoting opportunities for localised supply to minimise import costs.

The design of urban water management systems should include a range of solutions and measures to manage water quantity and quality and be based on recognised and locally accepted hydrological, hydro-geological, geological, hydraulic and residential parameter data, and water demand data, including the provisions contained in *Australian Rainfall and Run-off (IE Australia, 2001) (as amended)*, *Decision process for stormwater management in WA* (Department of Water, 2014), and the *Stormwater Management Manual for Western Australia* (Department of Water, 2004-2007), and referenced supporting documents.

URBAN WATER MANAGEMENT REQUIREMENTS

- | | |
|-----|--|
| 6.1 | Water sensitive urban design to be incorporated into all new urban areas in accordance with the Better Urban Water Management (WAPC, 2008) framework. |
| 6.2 | Surface water and groundwater quality is to be maintained at pre-development levels (summer and winter concentration) and where possible, improve the quality of water leaving the urban area to maintain and restore ecological systems in the sub-catchment in which the land is located. |
| 6.3 | The design of the urban stormwater management system to provide for the removal of potential pollutants using a treatment train before it enters surface or ground water sources. |
| 6.4 | Maintain pre-development flood heights, peak flow rates and runoff discharge volume, unless otherwise established in an approved water management strategy or plan that includes determination of ecological water requirements for sensitive receiving environments, risks to life and infrastructure, and asset manager/owner requirements. |
| 6.5 | All urban development is to be protected from flooding by being located above the one per cent annual exceedance probability. Where overland flow paths exist, the design of urban water management systems should take into consideration volume and speed of water during a flood event due to the potential risk to adjoining property and public safety. |
| 6.6 | Design the street network to assist in providing for effective stormwater management including the retention, detention, low velocity flows and treatment of stormwater through the use of landscaping, swales and/or gravel filters, vegetated filter strips, retention devices, permeable surfaces or other appropriate source controls. |
| 6.7 | The distribution and design of the public open space network is to be integrated with urban water management systems in accordance with water sensitive urban design principles. |

Housing choice and residential densities

Objective 7: Facilitate housing diversity, responsive built form, local employment and amenity within a legible and efficient urban structure of compact walkable neighbourhoods

To support activity centres and public transport use, the urban structure requires higher residential densities in areas close to activity centres, high frequency public transport routes and stations and public open space. Mixed use buildings, generally with residential at upper levels are expected within and surrounding activity centres. Lower residential densities may

be appropriate in areas such as on the edge of neighbourhoods or in physically constrained areas. Typically, the density will reduce further away from the activity centre, corridor or high-frequency public transport route/station, as demonstrated in Figures 6 and 7.

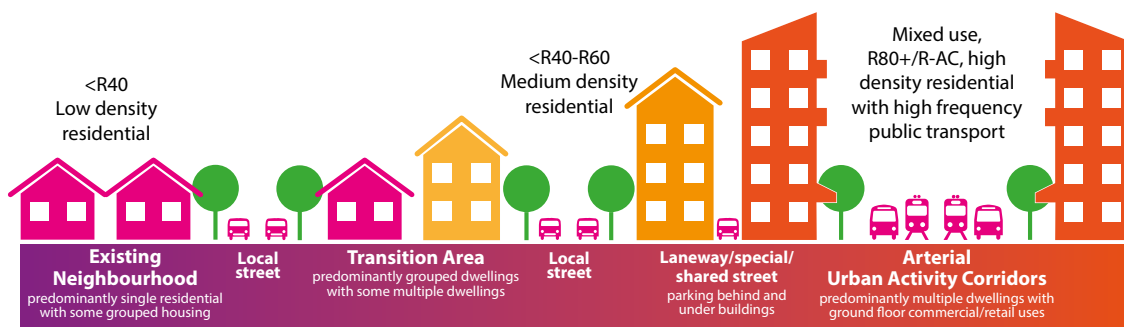


Figure 6: Typical urban morphology transect incorporating an activity corridor

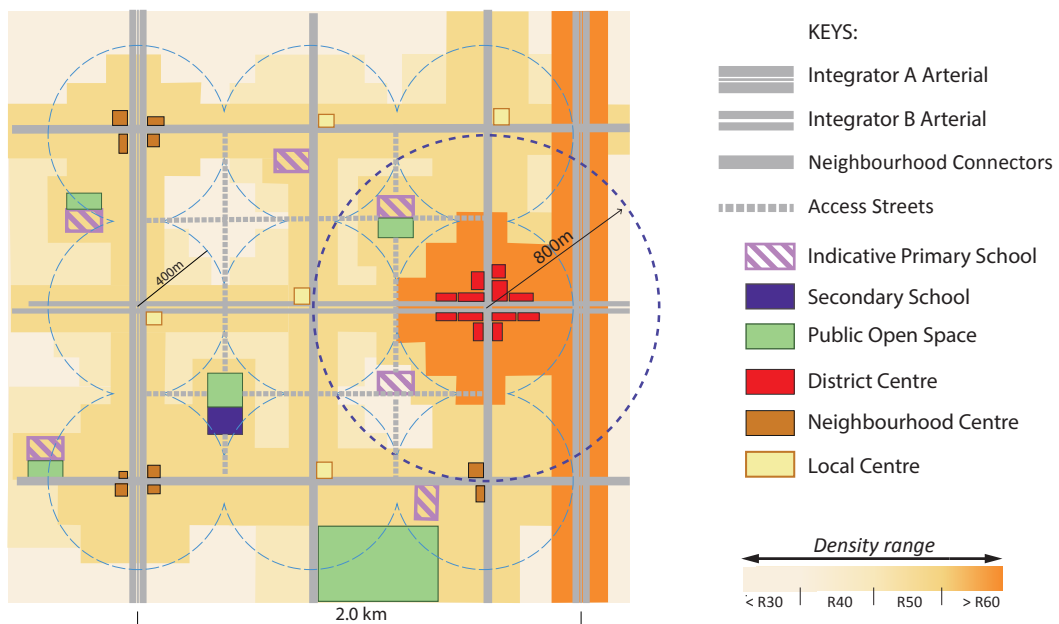


Figure 7: Typical densities in and around activity centres, public open space and movement network

Residential density is achieved through average density targets, which may vary depending on the locational requirements, including areas within 400 metres of a local or neighbourhood activity centres and 800 metres of a railway station or higher-order activity centres. The current dwelling targets in greenfield areas for the Perth and Peel region is 15 dwellings per gross urban hectare and 26 dwellings per site hectare, as outlined in *Directions 2031 and Beyond* (WAPC, 2010).

Gross urban zoned density: is used in the structure planning process to determine the number of dwellings on land that is zoned urban and city centre under the Perth and Peel region schemes, excluding all regional reservations and other non-urban zoned land.

Gross subdivisible area: is used to calculate public open space contribution at the subdivision stage, and excludes non-urban zoned land as per the region schemes and non-residential land uses under any applicable local planning scheme (such as commercial and industrial) that do not generate the need for a contribution to POS.

Residential site area density: is the number of dwellings on land that is zoned residential under a local planning scheme, excluding all non-urban regional reservations in a region scheme and non-residential zones in a local planning scheme, such as local street reserves, primary schools, industrial or commercial centres and offices. It should be applied at a district and local structure plan level and used uniformly to determine the greenfield density achieved.

For district structure planning, determination of overall urban densities is necessary to assist in traffic modelling and determine regional and sub-regional infrastructure requirements. In the Perth and Peel region these would, for example, be based on urban and urban-deferred zones.

As a guide, the dwellings per hectare and relevant R-Code (site area density) surrounding centres and high-frequency public transport routes are:

- 30 to 50 (R30 to R50) within 400 metres of local or neighbourhood centres, and 250 metres of any high frequency transit route;
- 40 to 60 (R40 to R60) within 800 metres of district centres;
- 50 to 80 (R50 to R80) within 800 metres of a secondary centre and railway stations; and
- 80+ (R80/R-AC) within 800 metres of a strategic regional centre.

To enable density and diversity in the right locations residential density codes ranges are encouraged.

Where density ranges are proposed, the proponent will need to outline the criteria for:

- determining density - such as density code plans to be prepared at the time of subdivision;
- how the layout satisfies the relevant residential density and infill targets set by higher-level plans and adopted strategies such as a regional/sub-regional planning strategies; and
- how the structure plan relates to the R-Codes.

Local structure plans must specify the residential site area density in dwellings per site hectare to deliver a variety of lot sizes or dwelling types.

Refer to [Element 4: Lot Design- Design Principle 6](#) for more information on provision of lot density at neighbourhood scale.

HOUSING CHOICE AND RESIDENTIAL DENSITIES REQUIREMENTS

- 7.1 Provide higher-density housing in areas close to activity centres (neighbourhood and above), high-frequency public transport, and public open space through a mix of housing types and lot sizes to support self-contained activity centres and facilitate an increase in the use of public transport, walking and cycling.

Education facilities

Objective 8: Provide education sites and other community infrastructure to meet the needs of existing and future communities

Identifying suitable and highly accessible education sites in Liveable Neighbourhoods is critical in urban structuring, represents a significant land use, co-location and place making opportunity and assists in creating robust and walkable neighbourhoods. The location and distribution of education sites is based largely on the need to maximise accessibility to their respective catchments by all modes of public and private transport. Planned facilities (i.e. TAFEs, secondary schools, colleges and non-government schools) should be identified in sub-regional, district and local structure plans and activity centre plans and reflect existing region scheme and/or local scheme reservations. Government primary schools and any committed non-government school sites should be shown in local structure plans reflecting purchased or ceded school sites. Where an approved sub-regional or district structure plan outlines the broad requirement for and/or preferred location of education facilities, these facilities must be shown in the local structure plan.

Early consultation with relevant service providers including Department of Education, Department of Training and Workforce Development and non-

government school providers, during the preparation of sub-regional and district structure plans is crucial. Securing suitably sized and located sites, at the earliest opportunity, should take advantage of co-location with other community facilities and access opportunities which meet existing and future community needs. As non-government school providers now account for a growing proportion of student (primary and secondary) enrolments in the State, consideration needs to be given at all levels of structure planning to facilitate better planning outcomes for the provision of education facilities for both government and non-government providers.

The number of existing and proposed dwellings sets out the broad need for certain types of education facilities. It is necessary in each particular case to assess that need against new or existing education facilities, rate and type of residential development (including the consideration of demographic profiles and lot pricing policies), and the opportunities for co-location with other community facilities. The provisions in Table 2 are broad benchmarks to be applied to determine the type and number of education facilities to be provided.

Table 2: Typical number of educational facilities per number of dwellings/or persons* *

Number of education facilities	Primary	Secondary (years 7-12)	Education support centre/special education facility	Tertiary Education Facility
Government	One school site per 1,500 dwellings or portion thereof.	One school site per 6,500-7,000 dwellings or portion thereof.	One per 3–5 high schools school facility co-located per 3–5 primary and high schools	60,000 to 70,000 persons**
Non-Government	*One for every three primary government school sites	*One for every two government secondary schools sites	*Subject to non-government school provider requirements.	

* Variable subject to non-government school provider requirements.

** This may vary in densely populated urban areas, where the viable population for a TAFE college can be as high as 250,000 persons because of the particular demographic characteristics of the area. TAFE sites should be determined based on specific needs of the region in consultation with Department of Education and/or Department of Training and Workforce Development.

Tertiary education facilities such as TAFE and universities are ideally located within secondary activity centres (or higher) or specialised activity centres rather than in a stand-alone campus setting and generally located on the edge of an 800 metre activity centre walkable catchment in accordance with the principles of transit-orientated development. Detailed planning for these sites should be considered as part of an activity centre plan and in accordance with the provisions of SPP 4.2.

Secondary schools, senior colleges and non-government schools (K-12yrs) generally service large (e.g. sub-regional or district) enrolment catchments which are more reliant on public transport services. While centrality within the servicing catchment is important, ease of access is also an important locational consideration, not only for those students using public transport and car, but those travelling to/from school by local cycle and pedestrian networks.

Government primary schools, and to a lesser extent non-government primary schools, service more localised catchments comprising two to three neighbourhoods. Accessibility to these education facilities and any co-located community facilities are dependent on safe and efficient local street, cycle and pedestrian networks and local public transport (Figure 8). Subsequent, more detailed planning at local structure plan/subdivision stage may identify the need for primary school sites to be relocated or reconfigured to better meet the needs of students and education providers, which may in turn require a modification to the approved structure plan. Where a school site has been identified in an approved structure plan and the proponent seeks to vary the site configuration, only a minor modification to the structure plan is required where it is demonstrated overall service provision, local street frontage treatment or accessibility to the school is not compromised.

In some circumstances, particularly in regional areas, the provision of separate primary and secondary schools cannot always be justified. In such instances the Department of Education and Department of Education Services should be consulted to determine whether there should be sites set aside for separate primary and secondary schools, combined facilities (i.e. district high schools), or whether provision should be made for a shared facility between education service providers.

Refer to [Element 6: Education](#) for more information on the planning of schools.

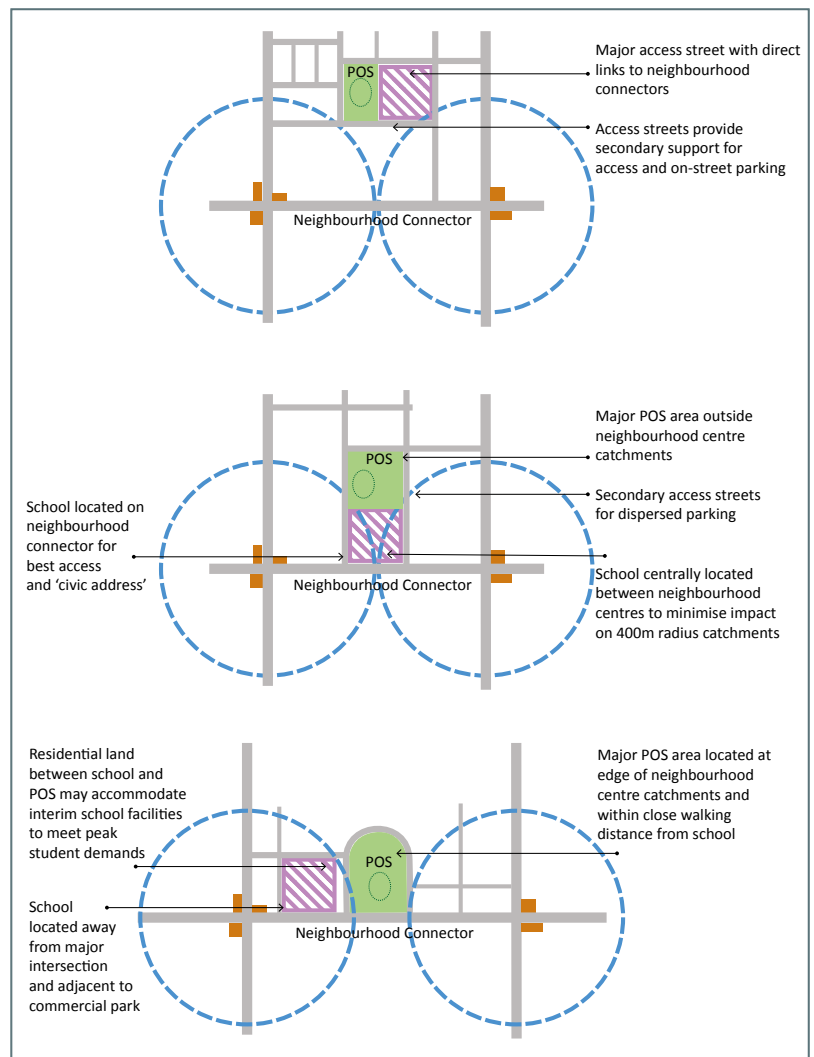


Figure 8: Location of primary schools

EDUCATION FACILITIES REQUIREMENTS

- 8.1 The number of educational facilities provided generally in accordance with [Table 2](#).
- 8.2 Tertiary education facilities are generally located:
- within a specialised or a secondary activity centre (or higher); and/or
 - within 800 metres walkable catchment of a (high-frequency) public transport service; and
 - serviced by integrator arterials, public transport and the strategic bike networks.
- 8.3 Secondary schools, senior colleges and non-government schools (K-12 years) are generally located:
- within its sub regional and/or district catchment;
 - on the edge of an 800 metres walkable catchment of an activity centres and/or high-frequency public transport service (or dedicated bus service during peak demand periods);
 - with other community facilities and/or public open space; and
 - serviced by integrator arterials, cycle and pedestrian networks.
- 8.4 Primary schools are generally located:
- centrally within its catchment (comprising two to three neighbourhoods);
 - with other community facilities and/or public open space; and
 - serviced by a dedicated local bus service (during peak demand periods) and cycle, pedestrian and street networks.
- 8.5 Primary schools are generally located in accordance with [Figure 8](#):
- a) at the edge or outside of the 400 metre walkable catchment, serving approximately three neighbourhoods;
 - b) on the neighbourhood connector between two neighbourhoods; or
 - c) near the centre of one neighbourhood.
- 8.6 Locating primary schools in activity centres (other than a local or neighbourhood centre) is not supported unless included in an approved activity centre plan.
- 8.7 Education facilities should have access to safe, continuous and interconnected walking and cycling routes and linked, where possible, to strategic bike networks. Where significant arterial route(s) need to be crossed, careful consideration should be given to the nature of the crossing, whether by grade separated crossing, controlled lights, dedicated crossing or other appropriate alternative.
- 8.8 The co-location of educational sites with community facilities and public open space is encouraged and should be considered at the earliest opportunity at structure planning stage in consultation with relevant stakeholders.

Infrastructure coordination, servicing and staging

Objective 9: Provide utility services in a land efficient, environmentally responsible and sustainable manner

Structure plans are often proposed for land where there are existing major utilities and easements to protect them such as high-voltage electricity and transmission and distribution lines, natural gas pipelines, gas distribution systems and water and sewerage mains. These utilities and easements may need to be protected to minimise the effect on the delivery of an efficient and sustainable urban form. In some instances, relocation or removal, or enabling certain development in close proximity may be necessary to ensure that an efficient urban structure can be achieved.

To optimise existing infrastructure and alignments, utility services (particularly trunk/distributor networks) are to be consolidated or upgraded to improve land efficiency and minimise duplication. Easements for existing or planned future utility services are to be provided where necessary to protect ongoing appropriate maintenance standards.

The area affected by a utility and easement should enhance the amenity of the area where possible, minimising visual impact and land-take to facilitate cost effective and efficient provision. Consideration is given to the ongoing use, servicing capability and capacity and operational and maintenance requirements. Land capability assessment may be required to ascertain utility servicing constraints.

Prior to preparing a structure plan for land affected by an existing or planned service easement or facility, the proponent should liaise with the utility service provider, the Department of Planning and the relevant local government to facilitate: the provision and location of utility services; relocation and/or realignment and protection of the service and associated equipment; or the surrender of existing easements either wholly or partially where no longer required.

The structure plan will need to discuss how utilities are to be funded and provided, the likely timing (short-term 0-5years, medium-term 5-10years, long-term 10+years) and future staging of subdivision and development. An infrastructure and servicing strategy should be prepared by a qualified engineering consultant appropriate to the level of structure planning being undertaken and included in the appendix of the structure plan.

Refer to [Element 2: Movement – Design Principle 3](#) and [Element 4: Lot Design – Design Principle 7](#) for more information on the provision of utility services.

INFRASTRUCTURE COORDINATION, SERVICING AND STAGING REQUIREMENTS

- 9.1 Consolidate all utility services in existing alignments and service corridors, with preference to upgrading and optimising existing infrastructure rather than installing new services whenever practicable.
- 9.2 Locate and design emergency services and utility infrastructure to minimise amenity impacts and reduce land use conflict.

Supporting documents

- [Appendix 1](#) - Site and context analysis
- *Australian Rainfall and Run-off* (IE Australia, 2001) (as amended)
- *Austroads Guidelines* – (Road Design, Road Safety, Traffic Management, Pavement Technology)
- *Better Urban Water Management* (WAPC, 2008)
- *Chapters B4 and B5 of Guidance statement 33: Environmental guidance for Planning and Development* (Environmental Protection Authority, 2008)
- *Decision process for stormwater management in WA* (In publication process) (Department of Water, 2014)
- *Designing Out Crime Planning Guidelines* (WAPC, 2006)
- *Developing a Local Water Management Strategy* (Department of Water, 2008)
- *Guidelines for District Water Management Strategies* (Department of Water, 2013)
- *Healthy Active by Design* (Heart Foundation, 2012)
- *Identifying and establishing waterways foreshore areas* (Department of Water, 2012)
- *Local Government Guidelines for Subdivisional Development* (Institute of Public Works Engineering Australia - WA Division, 2012)
- NewUrbanism.org: www.newurbanism.org/newurbanism/principles.html
- *Public Parkland Planning and Design Guide WA* (Department of Sport and Recreation, 2013)
- *State Planning Policy 2.1: Peel Harvey Coastal Plain Catchment Policy* (WAPC, 1992)
- *State Planning Policy 2.6: State Coastal Planning Policy* (WAPC, 2013)
- *State Planning Policy 2.7: Public Drinking Water Source Policy* (WAPC, 2003)
- *State Planning Policy 2.8: Bushland Policy for the Perth Metropolitan Region* (WAPC, 2010)
- *State Planning Policy 2.9: Water Resources* (WAPC, 2006)
- *State Planning Policy 2.10: Swan Canning River System* (WAPC, 2006)
- *State Planning Policy 4.2: Activity Centres for Perth and Peel* (WAPC, 2010)
- *State Planning Policy 5.1: Land Use planning in the Vicinity of Perth Airport* (WAPC, 2004)
- *State Planning Policy 5.3: Jandakot Airport Vicinity* (WAPC, 2006)
- *State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning* (WAPC, 2009)
- *Stormwater Management Manual for Western Australia* (Department of Water, 2004-2007)
- *Transport Assessment Guidelines for Developments* (WAPC, 2006)
- *Urban water management plans: Guidelines for preparing plans and for complying with subdivision conditions* (Department of Water, 2008)

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Liveable
Neighbourhoods



ELEMENT 2 MOVEMENT NETWORK

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Introduction

Liveable Neighbourhoods classifies streets based on the functional hierarchy, either as 'arterials' or 'local streets', with a range of types in each classification. A clear distinction can be drawn between 'arterials' and 'local streets'. The main function of 'arterials' is to accommodate the movement of regional and district vehicular traffic. Their function and design in relation to the urban structure is discussed in more detail in [Element 1: Community Design - Objective 3](#). 'Local streets' however, provide a wider range of functions in addition to vehicular traffic movement, including place-making, lot access; and provision of parking, utilities, drainage, lighting, street trees and street furniture. Liveable Neighbourhoods encourages a holistic approach to street design by balancing these functions to create streets that contribute to a sense of place.

Fundamentally, streets should not be designed just to accommodate the movement of vehicular traffic. It is important that urban designers and traffic engineers place a high priority on meeting the needs of pedestrians, cyclists and public transport users, so that growth in these modes of travel is encouraged. Streets make up the greater part of the public domain and well-designed streets contribute significantly to the quality of the built environment; and play a key role in the creation of sustainable communities and places where people want to live, work and play.

Element 2 sets out requirements and design solutions for a standard set of street types along with examples of traffic management treatments that satisfy the element objectives. In order to create a cohesive framework that guides the design of urban areas, this element should be read and applied with the other elements, particularly [Element 1 Community Design](#) and [Element 4 Lot Design](#).

Liveable Neighbourhoods provides principles and guidance for designing integrated networks and individual street design and is not intended to be a traffic engineering manual. As such, reference to, and consideration of, relevant traffic engineering standards and guidelines, including those of Austroads, Main Roads WA and the Public Transport Authority should be made when designing the transport networks to meet the objectives of Liveable Neighbourhoods.

Liveable Neighbourhoods provides guidance on preferred intersection and pedestrian crossing spacing along main roads; however, it does not directly deal with the design of primary distributors, which are roads under the control of Main Roads WA.

Street layout

Design principle 1: Create a permeable street network that prioritises pedestrians, cyclists and public transport and is integrated with surrounding land use

Good design is the key to creating thriving, vibrant, sustainable communities. Street networks should be connected or 'permeable', which encourages walking and cycling, using a variety of routes and make places easier to navigate. Internal permeability to appropriate external connections is important within a neighbourhood to encourage movement to and within by all modes of transport (not just vehicles).

The design of each street needs to convey to the user its primary function, character and identity, and encourage appropriate driver behaviour. Straight streets are generally more efficient in the use of land, however, curved or otherwise irregular streets may be appropriate to respect the local character and contribute to a sense of place.

An efficient street layout enables housing diversity by influencing housing typologies through small and narrow lots with rear laneway access to more conventional housing design with access from a primary street. Design of the street network also assists energy conservation through reduced vehicle travel, facilitates climate-responsive lot design, management of landform, mitigating bushfire risk, provision of business and commercial opportunities and future land use and residential density adaptability over time.

Refer to [Element 3: Activity Centres](#); [Element 4: Lot Design – Design Principle 5](#) and [Design Principle 6](#) for more information about street layout.

Walkable Neighbourhoods

Walkable neighbourhoods are typically characterised by having a range of community services within 5-10 minutes (400–800 metres) walking distance of residential areas which residents may access on foot. Liveable Neighbourhoods encourages a reduction in travel by private motor vehicles through the creation of mixed-use neighbourhoods with interconnected street patterns, where community services and facilities are within walking distance of most residents.

Providing pedestrian and cycling routes and public transport that link housing with locally accessible services and facilities can achieve more sustainable patterns of movement and reduce reliance on private vehicles. The way streets are laid out and how they relate to the surrounding buildings and spaces impacts on aesthetic and functional aspects of any neighbourhood.

To encourage walking, cycling and public transport over private vehicles, a street requires high pedestrian amenity, efficiency, legibility and safety whilst maintaining an acceptable level of access and function for private vehicles. Daily movement patterns are often varied and complex and therefore it is important to make pedestrian trips as short and pleasant as possible.

A network of streets should provide for perimeter blocks that are generally in a range of 70–120 metres by 120–240 metres. Clear and unambiguous definition of safe and secure private and public space should be achieved through fronting development. Smaller blocks located towards the neighbourhood

centre balance permeability with the provision of sufficient developable land for a range of land uses over time. Limiting street block length can assist to reduce vehicle speeds and creates the permeability necessary to encourage walking and route choice diversity (Figure 9).

A network of streets should be designed with a relatively continuous building frontage to create interest for pedestrians and provide passive surveillance to improve security. Direct frontage onto a street facilitates community interaction and enables streets to act as an integrating element in neighbourhoods and towns, rather than a barrier.

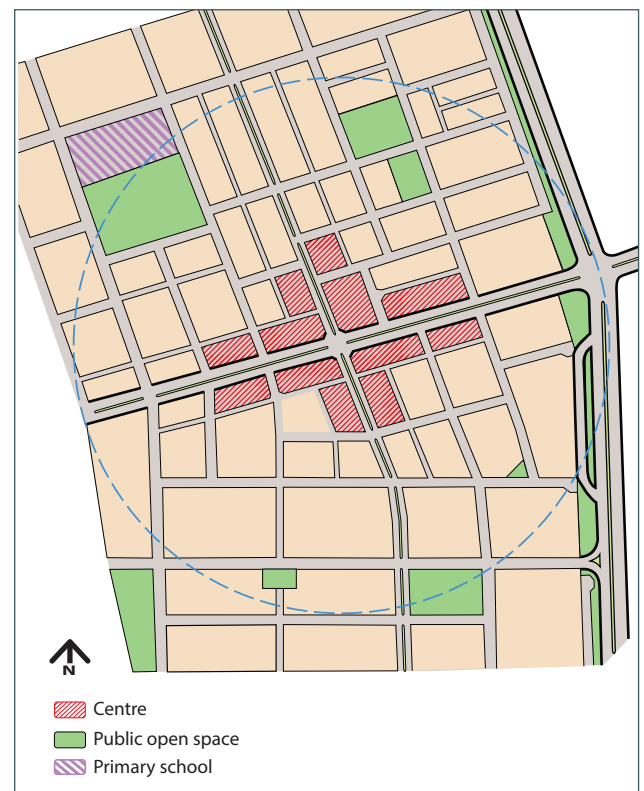


Figure 9: Typical street block design for a neighbourhood catchment

STREET LAYOUT REQUIREMENTS

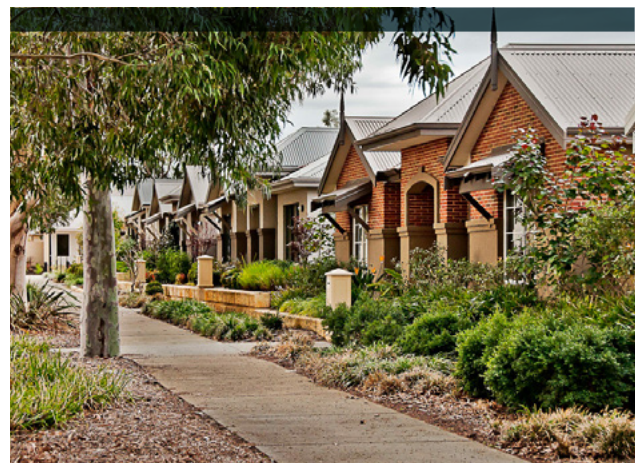
- 1.1 Provide a site responsive and highly connected street network, with street blocks no greater than 240 metres in length and 120 metres in width to facilitate walking, cycling and public transport.
- 1.2 Ensure the street layout provides for lots that are designed with a continuous street frontage that is safe, attractive and efficient for pedestrians, cyclists and vehicles and creates a sense of place. Where direct frontage is not provided, alternative vehicle access is required.
- 1.3 Balance vehicle traffic management with walking, cycling parking, the streetscape and community spaces.
- 1.4 In neighbourhoods abutting areas at risk from natural disasters including bushfires, provide streets designed, located and connected to allow safe and efficient movement of emergency vehicles.

Pedestrian movement

Walkable catchment analysis ([Appendix 2](#)) should be prepared and submitted with all structure plan proposals to assess the efficiency of a particular street network by calculating the percentage of an area that is within walking distance to a particular destination. The walkable catchment analysis should be undertaken for all major attractors particularly schools, activity centres, public transit stations and medical facilities. Where a street is proposed with traffic volume greater than those in [Table 9](#) (Appendix 3) the walkable catchment analysis should be adjusted to include any detours to designated and safe pedestrian crossing facilities.

The needs of pedestrians, including people with disabilities, must be considered during the design process. Consideration should be given to:

- journeys carried out on the street network rather than through a separate open space network, which may be poorly maintained and lack surveillance;
- access to public transport being safe and direct;
- footpaths on all streets, often on both sides to make walking and cycling quicker and safer;
- footpath widths at a minimum of 1.5 metres to enable pedestrians to pass each other comfortably; ease of use for people with prams, wheelchairs and other mobility aids; and kerb ramp design suited for elderly and people with disabilities;



Attractive, safe, pedestrian-friendly streetscapes

- footpaths with durable, non-skid tactile ground surfaces and ground indicators at bus stops, traffic signals and at other designated pedestrian crossing points in activity centres, near bus/train stations and medical centres where there is high pedestrian usage;
- shared path dimensions and design to facilitate ease of use for projected volumes and all user groups; and
- pram ramps located at all intersections and at other locations along the streets where appropriate (e.g. adjacent to bus stops, schools and other attractors).

Pedestrian crossing distances in local streets should be limited through kerb extensions and tight turning

radii which ensure vehicular traffic will slow to negotiate the tighter corners and be able to give way to crossing pedestrians. Footpaths require ramps at all kerb corners for wheelchairs and pram access and to also cater for people with disabilities or with mobility assistance devices.

Disability Discrimination Act obligations must be met and local governments be consulted with respect to disability service plans. *Austrroads Guidelines (Road Design, Road Safety, Traffic Management, Pavement Technology and Other)*, Australian Standards Series and *Planning and Designing for Pedestrians: Guidelines* (Department of Transport, 2012) should be referred to for the design and construction of pedestrian facilities.

PEDESTRIAN REQUIREMENTS

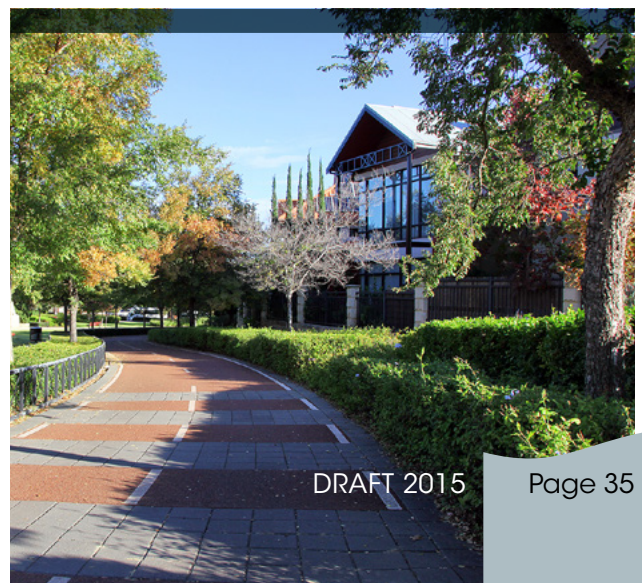
- 1.5** A footpath on at least one side of a local access street; and a footpath or shared path on both sides of integrator arterials and local access streets where pedestrian and cyclist activity is high (e.g. where the street forms part of a designated pedestrian or cycling network and connects to schools, centres and stations).
- 1.6** All footpaths to be a minimum of:
- 1.5 metres wide; offset a minimum of 0.3 metres from property boundaries;
 - 1.8 metres wide if abutting property boundaries;
 - 2.0 metres wide within 400 metres of school sites; and
 - 2.5 metres wide within 400 metres of activity centres.
- 1.7** All footpaths/shared paths to be continuous across property driveways and crossovers and located adjoining property boundaries separated from the street pavement. Footpaths and shared paths may abut the street pavement where it adjoins POS, in activity centres or where site constraints preclude alternative siting.

Bicycle network

The design of urban areas should actively encourage cycling and the provision of ancillary facilities and infrastructure. This includes bicycle parking facilities, low vehicle speeds and traffic volumes with appropriate pavement widths along local streets to allow cyclists to share with cars, marked cycle lanes on busier streets, shared paths and separate dedicated cycle lanes parallel to arterials.

The cycle network may comprise both on-street and off-street routes, planned in accordance with any State plan or local walking or bike plan and responding to:

Shared path



- projected bicycle travel demand;
- expected vehicle linkages between schools, local centres and other community facilities; and
- safety, security and convenience for users.

Bicycle routes should be identified to efficiently serve key destinations such as schools, centres, POS and train/bus stations. These may comprise dedicated bicycle lanes and shared use paths.

Bicycle commuters should expect the same level access, permeability and infrastructure as other means of transport to provide the shortest possible trip. Bicycle lanes physically separated from the carriageway are encouraged on arterials and 'neighbourhood connector A streets that have traffic volumes of more than 3,000 vehicles per day, particularly for young and inexperienced cyclists near schools, along river and coastal foreshores and other community facilities (Figure 10). Bicycle head-start treatments are encouraged at major signalised intersections. On-street cycle lanes or sealed shoulders should be provided on arterial routes where the traffic volume is more than 10,000 vehicles per day where there are no physical or environmental constraints and local access streets that run parallel to the arterial route. The configuration of the bike lane will require consideration to traffic flows, speeds, driver behaviour and the need for adequate safety buffers to protect cyclists from moving and parked vehicles, as well as pedestrians. Figures 14 and 15 demonstrate the different designs encouraged on integrator arterial routes to provide a safe environment for cyclists.

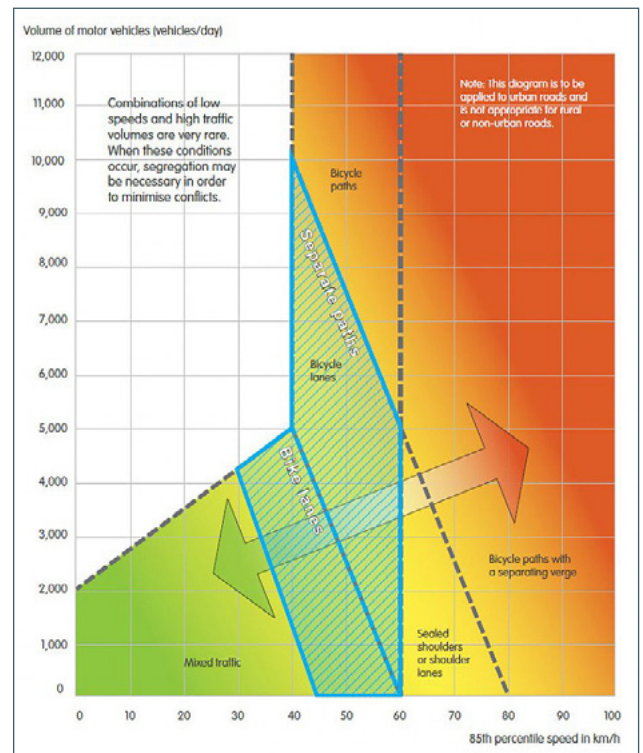


Figure 10: Cycling conditions versus traffic volumes

Source: *Cycling Aspects of Austroads Guides* (Austroads, 2014)

BICYCLE NETWORK REQUIREMENTS

- 1.8 On routes with a projected traffic volume less than 3,000 vehicles per day, on-street cycling is acceptable.
- 1.9 On routes with projected traffic volumes of more than 3,000 vehicles per day and within 800 metres of schools, transit stations, activity centres or where long-distance commuter cycling and recreational cycling is likely, shared paths and or on-street cycle lanes to be provided. An additional shared path may also be required particularly along streets with higher traffic volumes and speeds.
- 1.10 On routes with projected traffic volumes more than 10,000 vehicles per day separate dedicated cycle paths are recommended.
- 1.11 Off-street shared paths and bike paths to be designed to take into account the specific requirements of the route (e.g. of long distance commuter cycling and/or recreational cycling and facilities for the separation of pedestrians and cyclists where appropriate such as meeting points or junctions on high-use activity areas).

Public transport

At local structure plan and subdivision stages, consideration should be given to bus stop locations and pedestrian crossing points and to the design of intersections and traffic management devices to ensure buses can manoeuvre along intended routes.

Bus routes are generally located on integrator arterials and neighbourhood connectors, which provide a direct and convenient route through and between neighbourhoods. On these streets, buses will generally stop in the carriageway, at extended kerbs, rather than in embayments. Buses have traffic priority and this enables the bus to provide a periodic traffic-calming function. In certain situations a bus embayment may be required, for example at activity centre bus stops with high patronage. The desired minimum width of a bus embayment is 3 metres.

Design of streets for buses need to consider passenger comfort, and route efficiency which may be assisted by:

- locating bus stops and maximising accessibility and patronage via walkable catchments at an average stop spacing of 300 to 400 metres;
- locating bus stops near legible and safe pedestrian crossing facilities;
- ensuring bus stops and most pedestrian routes linking them obtain passive surveillance from surrounding development; and
- ensuring traffic management devices (where required) are appropriate for buses.

Legible and safe routes to transit stations and bus stops require increased consideration to maximise night time surveillance and safety. Main routes to transit stations should be fronted by a mix of housing and land uses that are open at night (e.g. delicatessens, gyms, recreation centres), with major openings (windows and doors) fronting the

route to maximise surveillance. Bus stops and their approaches should be in clear view of adjacent land uses, be provided with adequate lighting and have unobstructed sightlines from nearby buildings, and where possible located at key local trip attractors and destinations and as close as possible to intersecting streets. Ideally, bus stops should be located in conjunction with pedestrian crossings and be provided with seats and shelters where possible. Where pedestrian access is through POS, the length should be minimised to around 30 to 50 metres.

At rail station precincts, provision needs to be made for appropriate bus and rail interchange. In many cases, bus stops may be provided on-street, rather than in a dedicated bus interchange. Provision for car parking, motorcycle and bicycle parking is also likely to be required at stations. Large commuter carparks can provide a valuable interim use and should be laid out as future street blocks to enable later redevelopment.

The street layout in a railway station precinct should be designed to facilitate future long-term land use and density changes. This may involve providing additional street widths (20m or greater) to accommodate these future changes.

Provision of public transport modes may include bus priority intersections, bus-only lanes and dedicated bus or other transit-ways. Where bus or other transit-ways are planned, or may be warranted in future, consideration must be given to providing wider central medians on arterials as part of the district structure planning process.

The public transport facilities must comply with the requirements of the *Disability Discrimination Act 1992* and the associated *Disability Standards for Accessible Public Transport 2002* (Disability Standards).

Refer to [Element 1: Community Design – Objective 3](#) for more information on public transport requirements.

PUBLIC TRANSPORT REQUIREMENTS

1.12

Bus routes to be located on neighbourhood connectors or integrator arterials to provide highly accessible and relatively direct routes. An efficient bus service may be assisted by:

- locating bus stops conveniently for the walkable catchment served at an average spacing of 300-400 metres to balance accessibility with running time;
- locating bus stops adjacent to traffic lights and median islands on busy streets;
- ensuring bus stops and access routes to them have surveillance from surrounding development; and
- ensuring traffic management devices are bus friendly.

Street network

In designing the movement network, proponents must consider the details outlined in Table 3 and Table 4 to ensure the correct street type is selected based on intended adjacent land use, development type and density, function and projected traffic volume. Where likely traffic volumes are inconsistent, a more appropriate street type must be selected or alternatively change to the movement network is required. Projected traffic volumes may need to be recalculated and verified against those in Tables 3 and Table 4. A preliminary transport assessment is required for all structure plans to determine projected traffic volume at full development capacity. An access strategy should also be provided for all streets with likely traffic volumes above 5,000 vehicles per day (vpd).

Liveable Neighbourhoods supports technical specifications and design requirements set out in *Austrroads Guidelines – (Road Design, Road Safety, Traffic Management, Pavement Technology and Other)*, relevant Australian Standards (AS) and the Institute of Public Works Engineering Australia (WA Division) 2012 Guidelines. Traffic laws that govern pedestrians and other street users in Western Australia are contained in the Road Traffic Code 2000.

Arterials

Arterials are primarily designed to facilitate efficient and safe regional and district traffic movement while maximising community integration via development frontage and urban activity, where possible. Arterials classified as primary distributors fall under the control of Main Roads Western Australia and integrator arterials typically under the control of the WAPC and/or local government.

Liveable Neighbourhoods encourages development to front integrator arterials, rather than back on to them. Service streets, laneways or lot layout techniques are used to enable development to front integrator arterials whilst also minimising disruption to through traffic by providing alternative access. Future land use and development interface with the street (e.g. residential, commercial etc.) establishes the required level of access and control. Direct vehicular access for development fronting Integrator arterials must be avoided and intersections minimised.

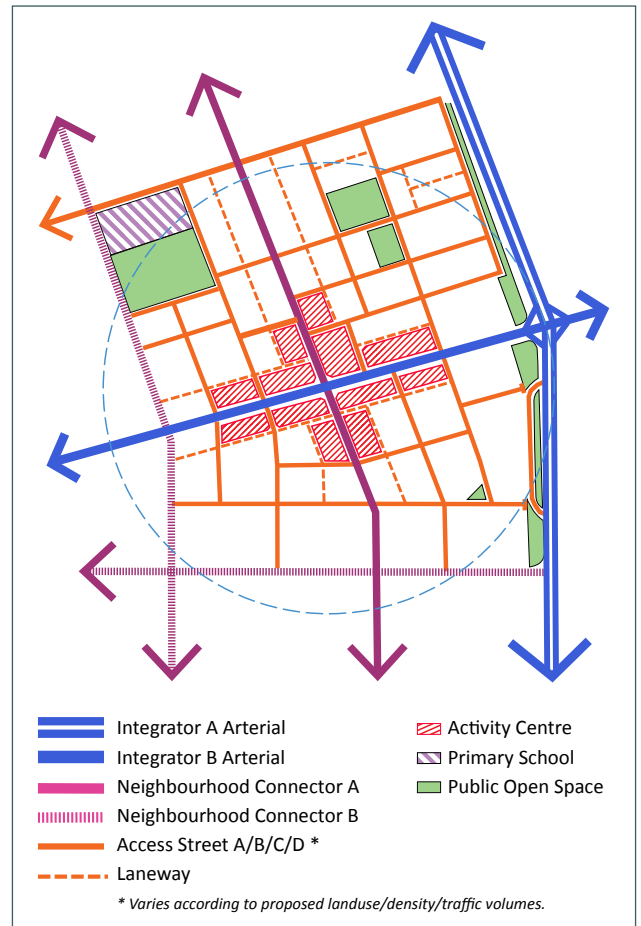
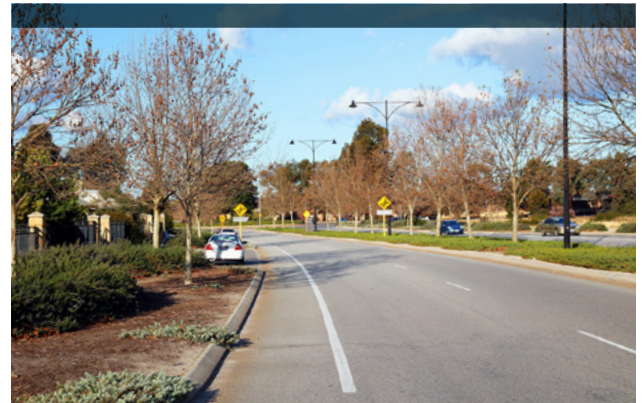


Figure 11: Typical street network for a neighbourhood catchment

Integrator arterials

Integrator arterials are classified as A or B according to design and projected traffic volume (Table 3, Table 4 and Figures 12-15 (pages 47-50)). Integrator A arterials are generally four-lane streets that have limited connections to enable the movement of vehicular traffic. They will typically have service streets outside of activity centres, with on-street parking on the service street to support higher density living and a mix of uses. Closer to activity centres on street parking is encouraged to activate the street frontage and encourage the movement economy. As major routes to centres and other key destinations integrator A arterials will generally have a high frequency public transport links, potentially dedicated bus lanes and the provision of dedicated cycle lanes and or shared path as shown in Figures 12-13.

Integrator B arterials are more appropriate to service main street activity centres. The street pavement is significantly narrower to create a more pedestrian friendly environment particularly when flowing through centres. Figures 14 and 15 demonstrate the built form and street environment typical for integrator B arterial, including on-street parking, and dedicated cycle lanes which may vary in design. In some cases direct vehicle access from adjoining properties is permitted, but should be limited.



Integrator arterial

Table 3: Function and characteristics of arterials

Type and function	Classification	Max speed limit (km/h)	Volume (vehicles per day)	Indicative street reserve width (metres)	Minimum street pavement width (metres)
Primary distributors Form the regional grid of MRWA traffic routes, including highways, and catering for inter-and intra-regional traffic. Major freight routes.	Six lane Primary distributor	≥80	30,000-50,000	Determined by Main Roads WA (Note, MRWA determines speed limits on these roads which can be up to 110k/hr.)	
	Four lane Primary distributor	80	20,000-35,000		
Integrator arterials Form a finer grain of routes than the primary distributors, with frequent connections to local streets. Low percentage of trucks. Usually bus routes. On-street bike lanes and separate dual-use paths are usually required.	Integrator A (Four lanes, outside centres)	70	15,000-35,000	53.6	2 x 8.3 including bike lane and 2 x 5.5 service street with parking.
	Integrator A - centres (Four lanes, in centres)	≤60	10,000-25,000	37.8	2 x 10.9 in centres including combined on-street parking and bike lane.
	Integrator B (Two lanes, outside centres)	60	7,000-15,000 15,000-20,000	31.2	2 x 7.6 including on-street parking and bike lane. Parking requires special consideration, or service street may be needed.
	Integrator B - centres (Two lanes)	≤50	7,000-15,000	28.2	2 x 7.6 including on-street parking.

Notes

- Wider central medians are to be provided where a route is planned to be used for a future fixed public transport route, or for stormwater management systems such as swales, tree pit or infiltration cells are required
- Where an arterial is constructed in an interim situation at a higher posted speed than that intended as the ultimate speed limit, the horizontal and vertical alignment should suit the higher speed, but the lane widths, planned intersection spacing's and deceleration lanes etc. should be designed to the ultimate speed standard (Tables 4, 5 and 6 of Appendix 3).
- Refer to Figures 12 to 15 for indicative cross-sections and street characteristics.

Table 4: Function and characteristics of local streets

Street type and function	Street name	Projected maximum volume (vehicles per day)	Indicative street reserve width (metres)	Maximum design/ target operating speed (km/hr)	Minimum street pavement width (metres)	Typical residential density
Neighbourhood connectors Streets with mostly residential frontage that typically provide the lower order sub-arterial network. These streets service and link neighbourhoods and activity centres.	Neighbourhood connector A	7,000	27.6	50 / 50	2 x 7.3 including parking, on-street bike lane, median plus shared path on one verge and footpath on the other side	R40 to R80
	Neighbourhood connector B	3,000	21.6	50 / 50	11.6 including parking, plus shared path on one verge.	R40 to R80
Access streets Access streets are to accommodate shared pedestrian, bike and vehicular movements. The requirements of adjacent land uses should be supported through street design.	Access street A – avenue	3,000	Overall width depends on design and function of central median	50 / 40	2 x 3.5 plus embayment parking.	Varies
	Access street B – wider street	3,000	20.1	50 / 40	10	Up to R40
	Access street C – yield or give way street	3,000	17.2	50 / 30	7.2 typical 7-7.5 range	Up to R35
	Access street D – narrow yield or give way street	1,000	15.5	50-20	5.5 typical 5.5-6 range	Less than R30
Laneways Provide access to the side or rear of lots principally for access to garages.	Laneway/service lane	300	6	15	6	Varies

Notes:

- Refer to figures 16 to 21 for cross-sections. Verge widths will often need to be increased if wider shared paths or trunk services are required. Verge widths on access streets abutting parks may usually be reduced on the park side (provided services can be accommodated); however the street must be able to accommodate a minimum 2.3 metre footpath on at least one side.
- Laneways may incorporate some services and can provide rubbish collection access and usually contain two-storey dwellings or some studio units over garages for surveillance. Lane may be widened in parts to create mews courts.

Figure 12: Integrator A Arterial - adjacent to activity centre

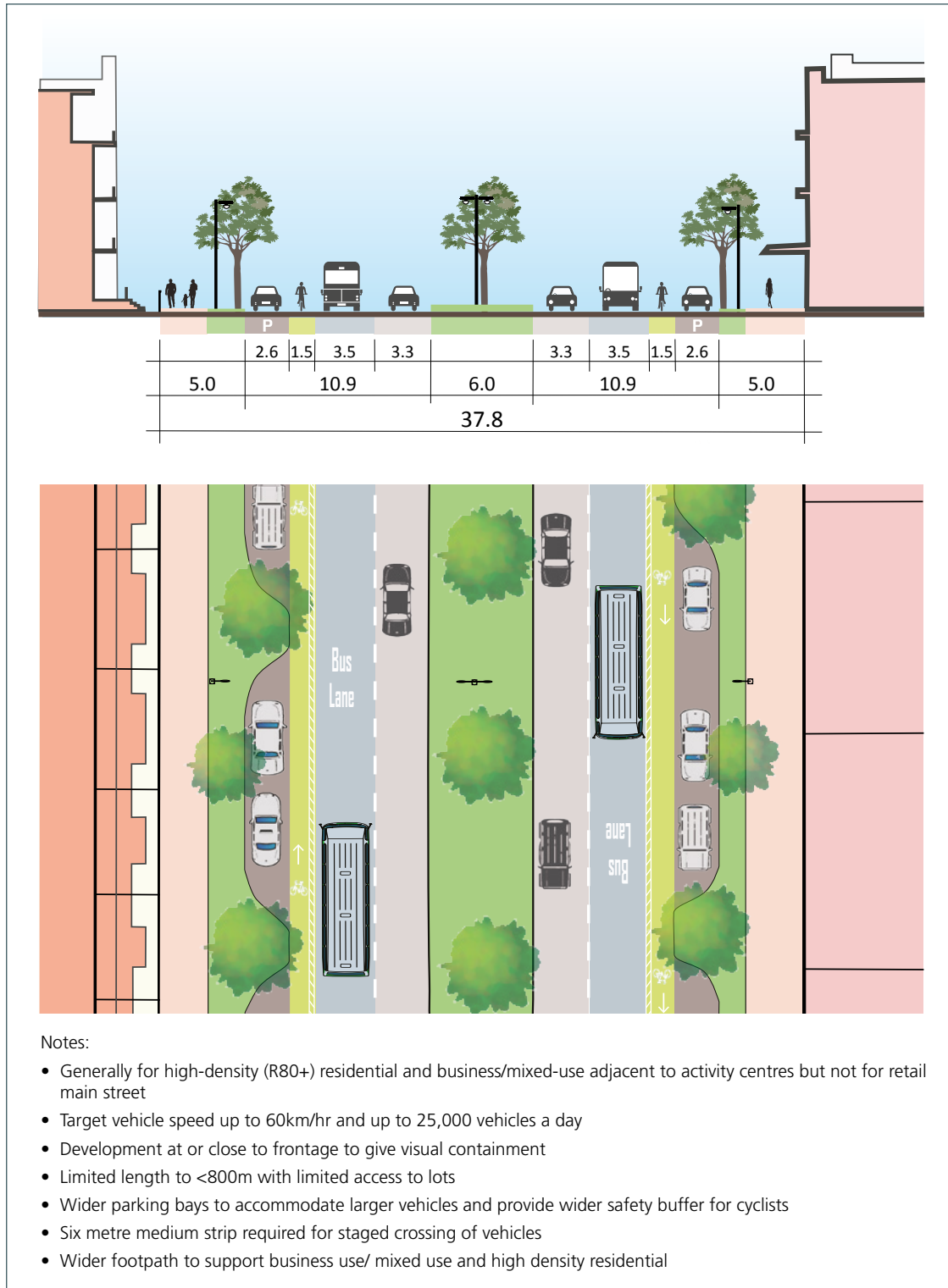


Figure 13: Integrator A arterial - with service streets

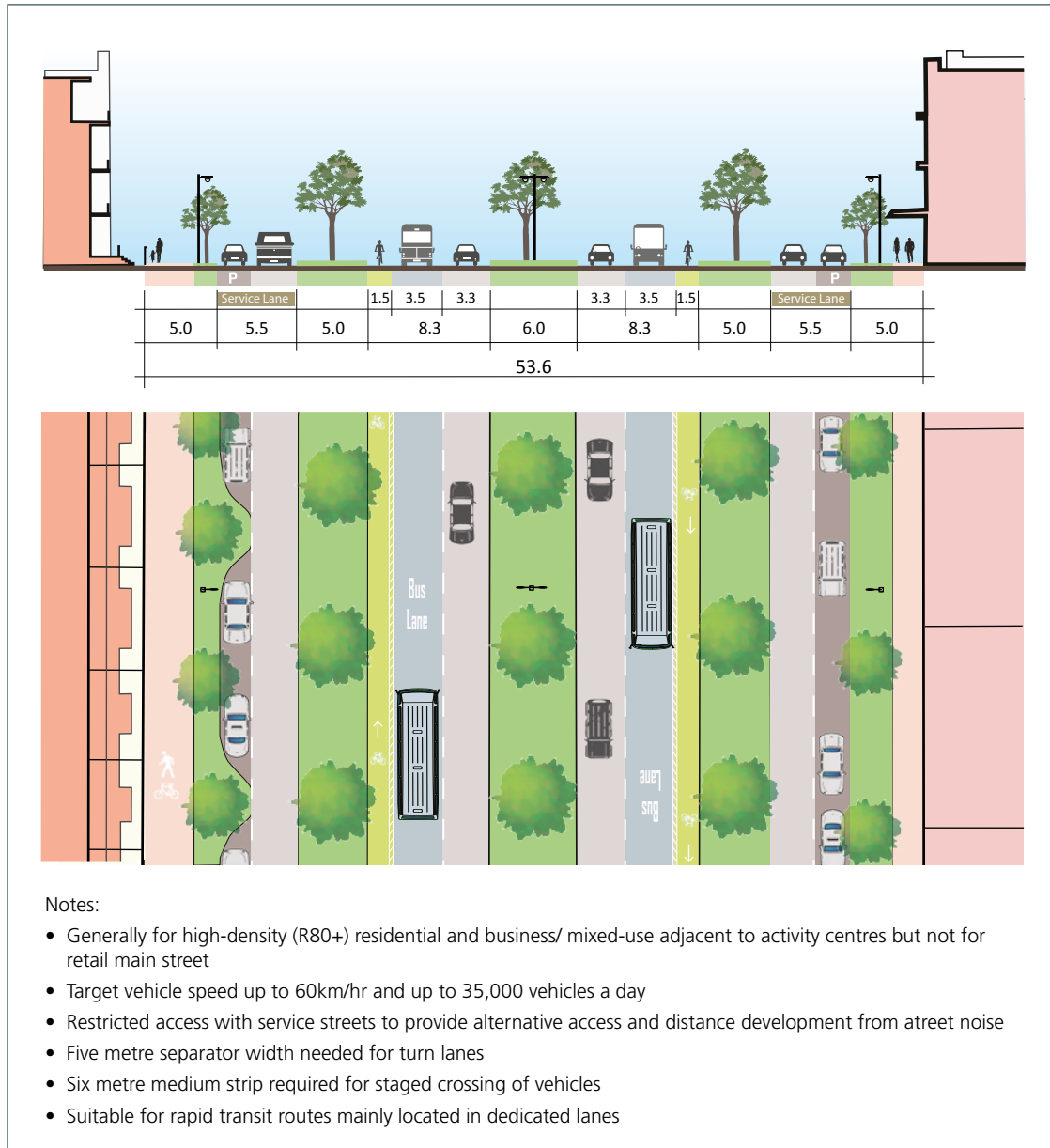


Figure 14: Integrator B arterial - activity centre main street

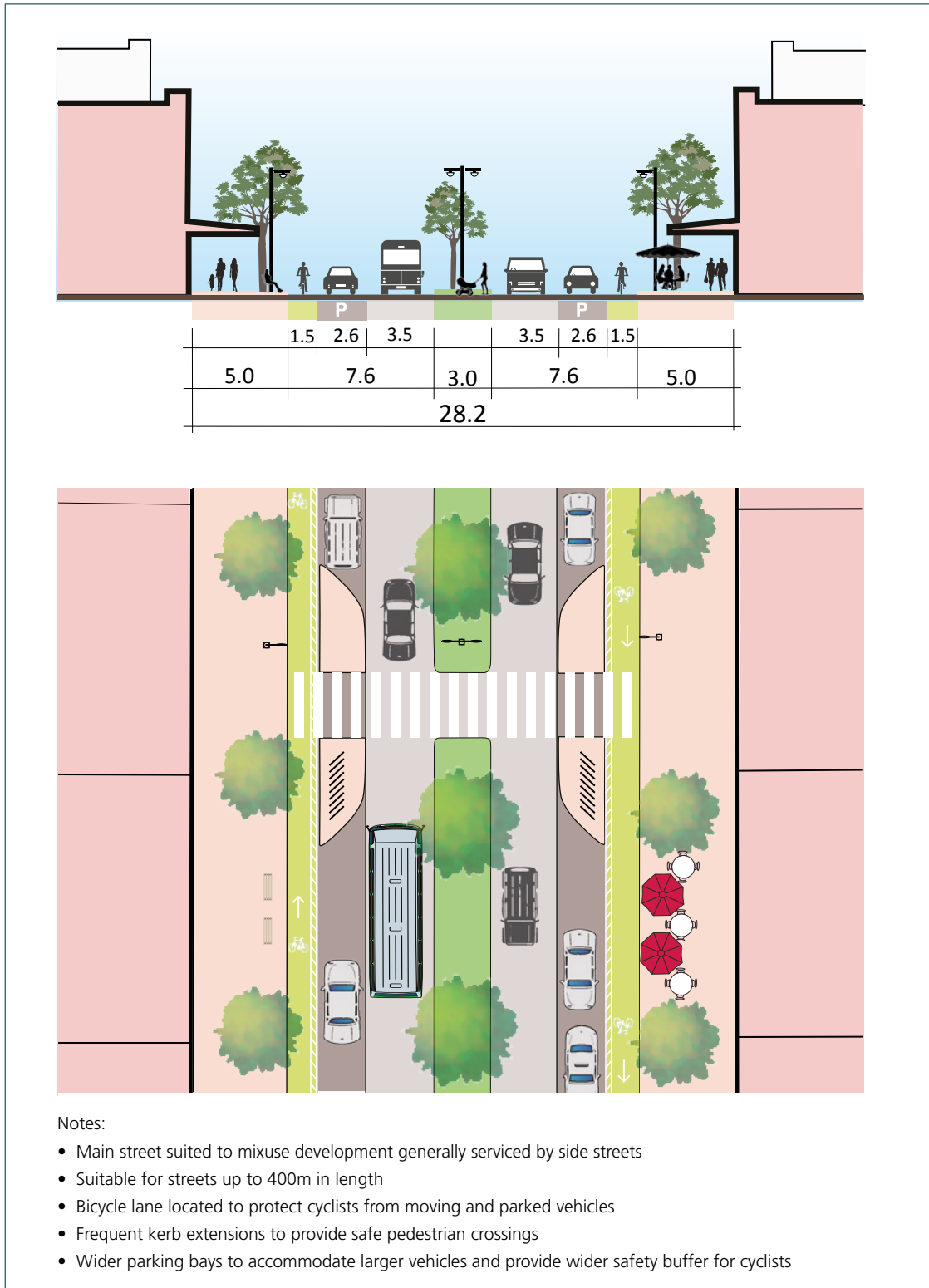
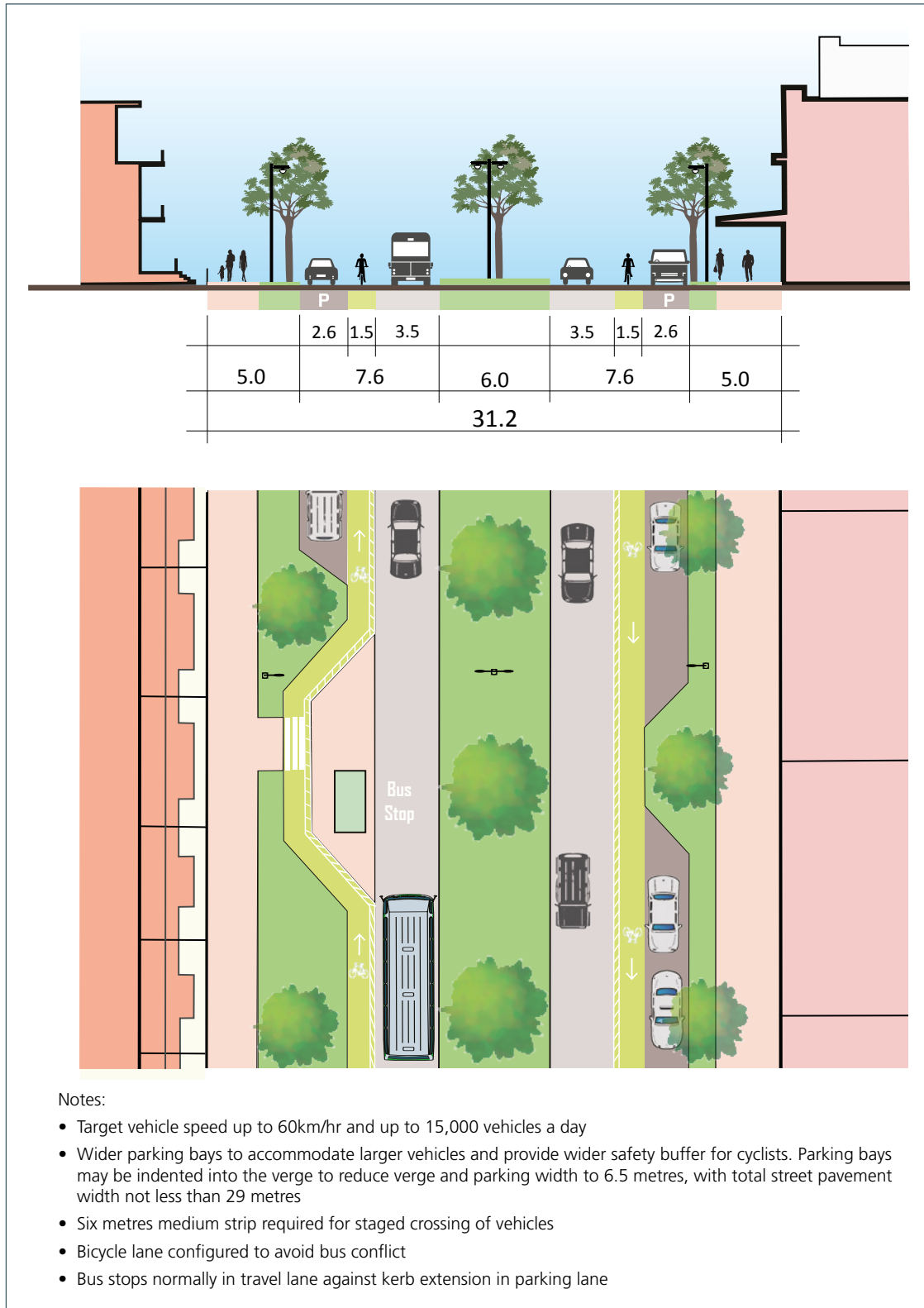


Figure 15: Integrator B arterial - outside activity centre



Local streets

Local streets promote social interaction, public health, safety and amenity. They facilitate surveillance, activity, visual interest and exposure, which assists commercial viability. On most local streets traffic volumes and speed should be low enough to provide a safe and pleasant pedestrian environment and allow vehicles to be able to enter and leave individual properties in either forward or reverse direction.

There are three main types of local streets (Figures 16 to 21) - neighbourhood connectors (A and B), access streets and laneways. Service lanes/special streets are included as an additional category.

Neighbourhood connectors

Neighbourhood connectors (A and B) link neighbourhoods and centres and are carefully designed to facilitate pedestrian use, calm traffic and have frequent local street connections. The neighbourhood connector should not attract substantial long distance through traffic, but provide for safe and convenient local travel to and from arterial routes, sometimes at signal-controlled intersections.

Neighbourhood connectors spread local traffic loads and reduce intersection loadings and support the location and viability of neighbourhood centres. Typically, neighbourhood connectors accommodate public transport and have wider paths on both sides and may have a shared path or on-street cycle lane depending on traffic volumes. When traffic volume exceeds 5,000 vehicles per day, vehicles reversing out of driveways may trigger safety issues. In these cases, access to the lot should be designed to allow vehicles to be able to exit in a forward direction, or alternative access provided, e.g. laneway. For traffic volumes between 5,000 vpd and 7,000 vpd, and when embayment parking is provided, an alternative solution may be to allow vehicles to reverse into protected embayment parking.

Neighbourhood connector As are generally two-lane divided streets used for higher vehicle volumes (up to 7,000 vpd), while taking into consideration safe pedestrian crossing and opportunities for stormwater management systems such as swales. These streets and their design need to have particular regard to context, function and adjacent land uses, particularly when acting as a main street within a centre. Neighbourhood connector Bs are two-lane undivided streets with no median and are suitable for lower traffic volumes (3,000 vpd). Both neighbourhood connectors will accommodate a diverse housing typology suited to higher densities and restricted vehicular access from the main street.

Activity centre neighbourhood connector street



Figure 16: Neighbourhood Connector A

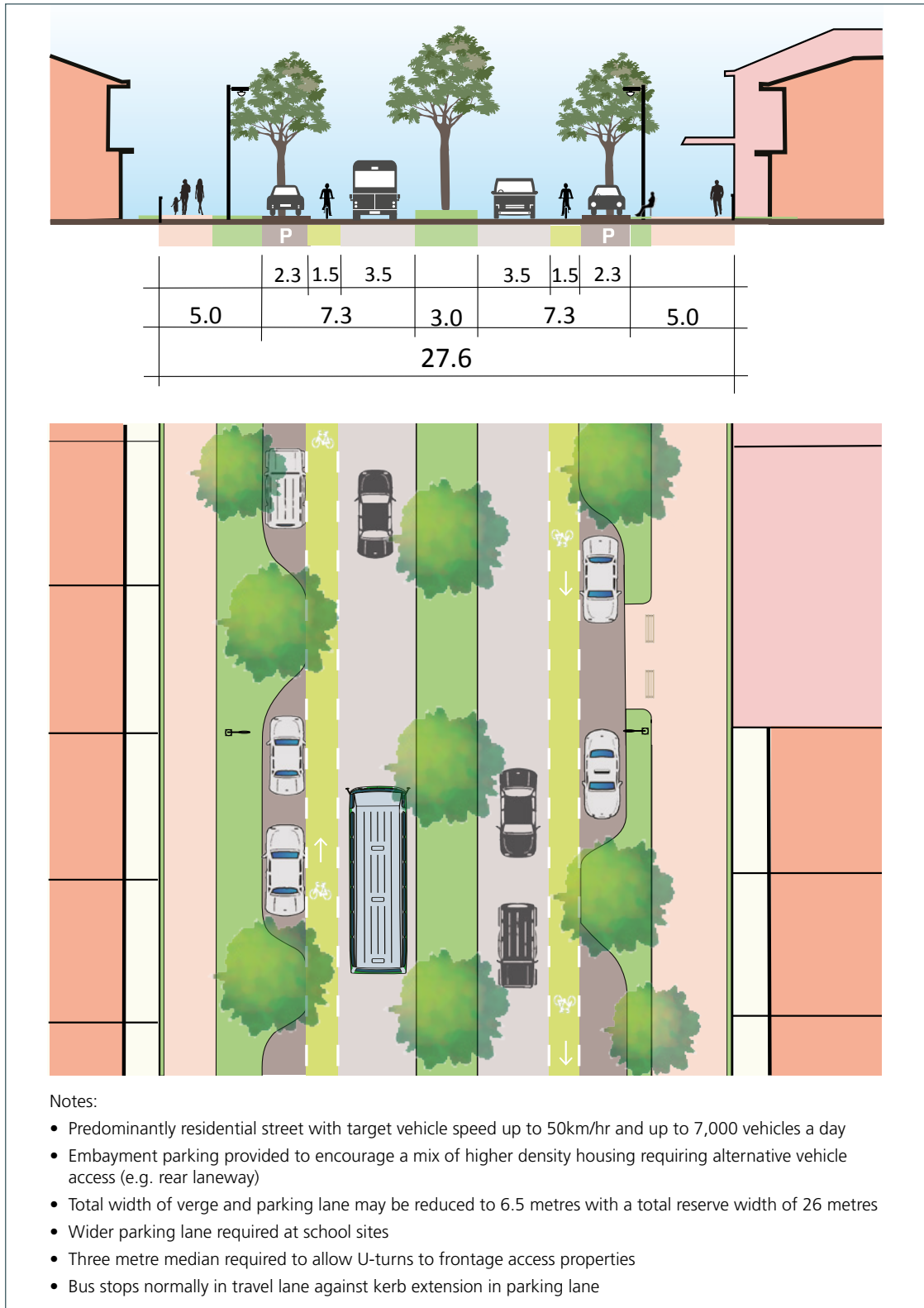
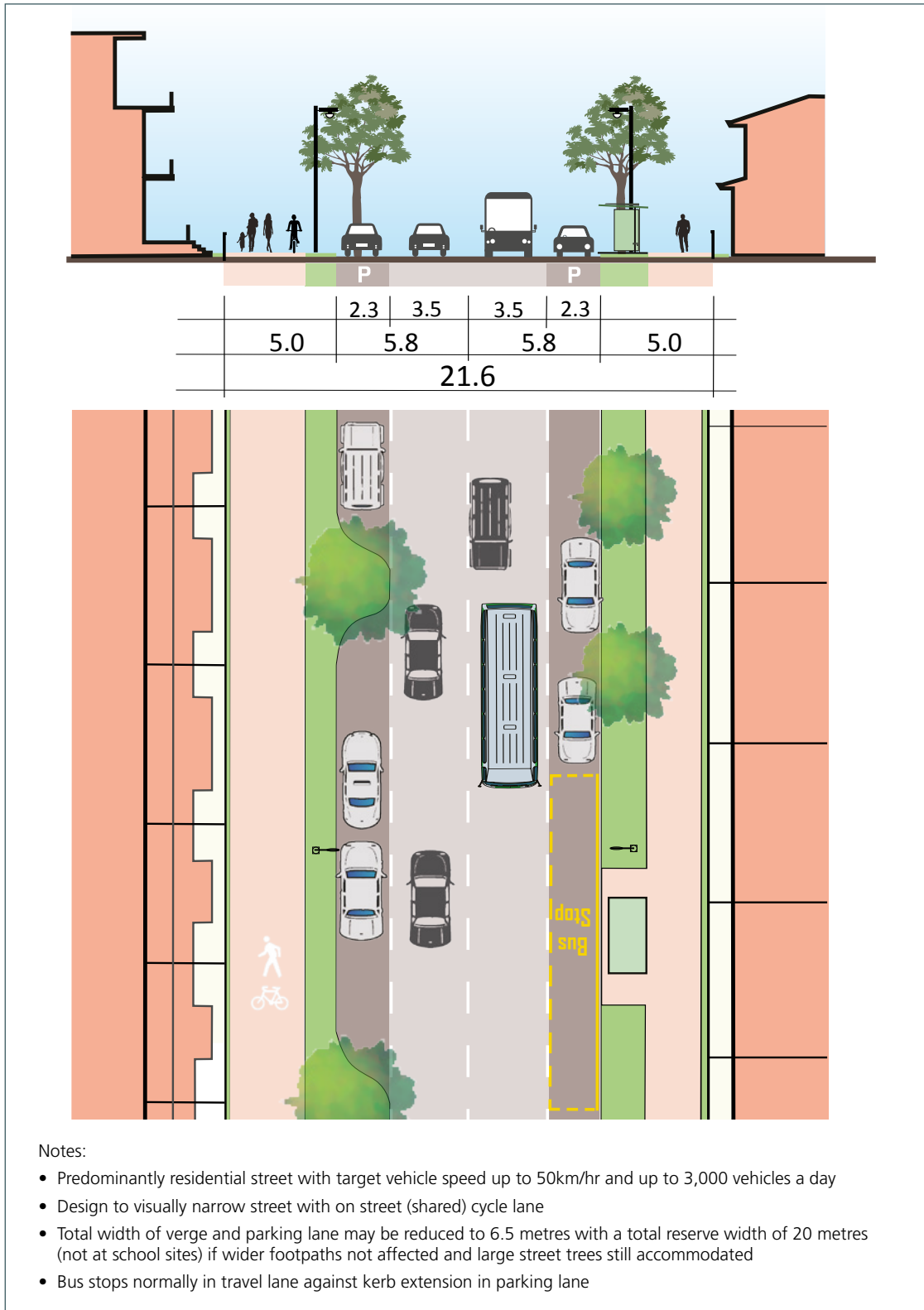


Figure 17: Neighbourhood Connector B

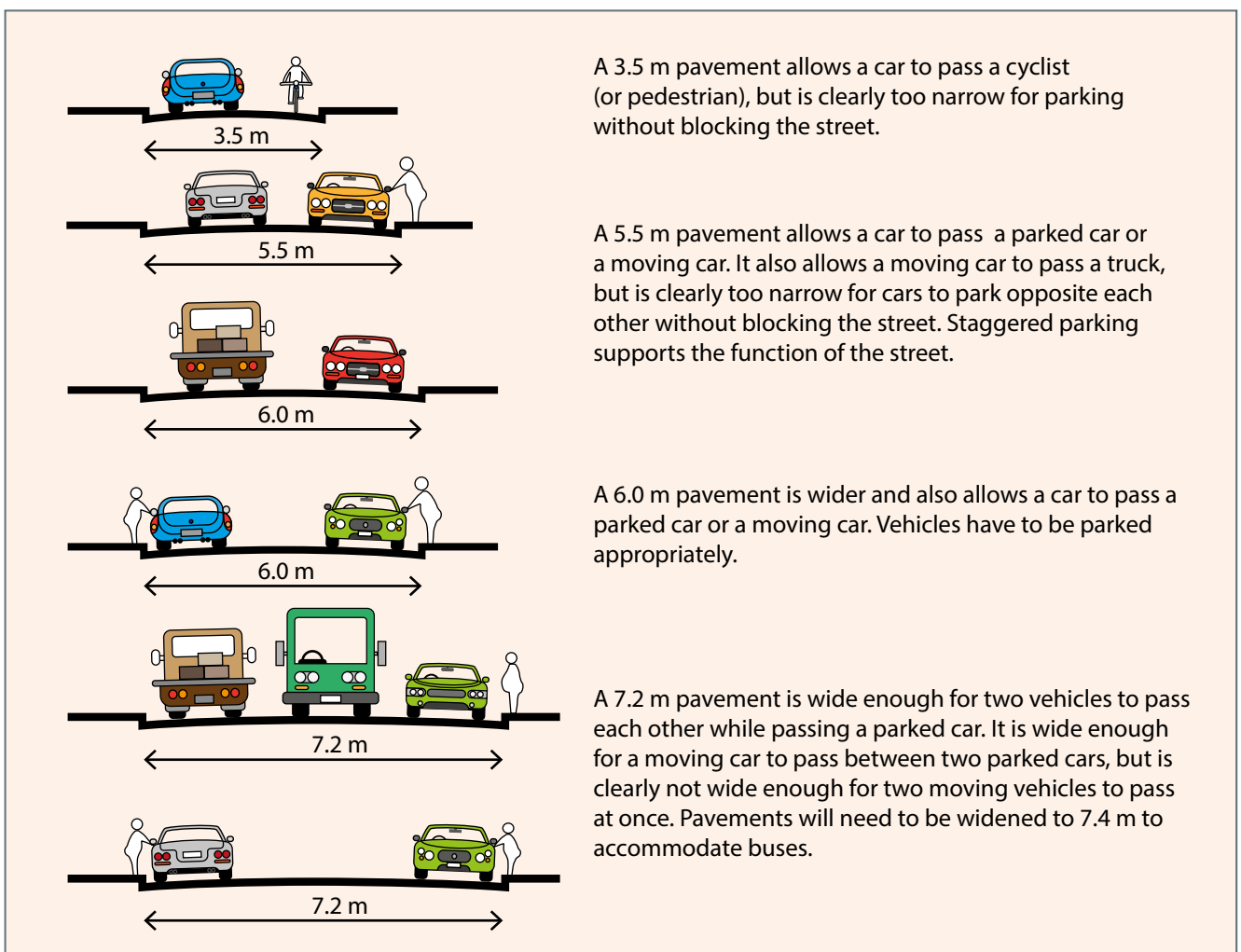


Local access streets

Local access streets are the most common street type in residential areas, designed specifically to provide access to dwellings and link to higher order streets such as neighbourhood connectors. The streetscape environment of access streets is characterised by low traffic speed and volumes, pedestrian and bike priority over vehicles and on street parking. Vehicle speed is constrained by short street length, on-street parking, pavement material, colour, construction and width differences, alignment and street trees.

Access streets have varied typologies to suit a range of typical residential areas at different densities, and traffic volumes. Figure 18 illustrates the parameters set for particular types of access and movement which influences the function of the street and type of access street type to be used.

In most urban residential areas, the two most frequently used access street pavement widths (not including verge width) are the 7.2 metres and the 5.5-6 metres wide yield types. The 7.2 metres yield type is typically used to maximise on-street parking on both sides of the street and thus slows traffic through a sense of enclosure. This width is typically used where residential densities are greater than 40 dwellings per hectare and for streets which surround or provide secondary access to activity centres, transit stations and for streets fronting schools or other high parking generating land uses. They are also commonly used for streets longer than 150 metres to manage speed. The 5.5-6 metres type is typically used where on-street parking is required on one side only, where residential density is less than 40 dwellings per hectare, resultant



A 3.5 m pavement allows a car to pass a cyclist (or pedestrian), but is clearly too narrow for parking without blocking the street.

A 5.5 m pavement allows a car to pass a parked car or a moving car. It also allows a moving car to pass a truck, but is clearly too narrow for cars to park opposite each other without blocking the street. Staggered parking supports the function of the street.

A 6.0 m pavement is wider and also allows a car to pass a parked car or a moving car. Vehicles have to be parked appropriately.

A 7.2 m pavement is wide enough for two vehicles to pass each other while passing a parked car. It is wide enough for a moving car to pass between two parked cars, but is clearly not wide enough for two moving vehicles to pass at once. Pavements will need to be widened to 7.4 m to accommodate buses.

Figure 18: Diagram of physical determinants for the width of pavements in access streets

low parking demand and for street length less than 150 metres. This type is suitable for streets that do not have a through traffic function and for streets fronting public open space or bushland.

There are four types of local access streets as illustrated in Figures 19-22 (pages 57-60) which all support particular types of lot sizes and vehicular access and parking arrangements.

Access street A with median strip is particularly suited where localised stormwater management is required with varying street and median width depending on stormwater design.

Access street B support densities greater than 40 dwellings per hectare, with fronting residential development comprising grouped and multiple dwellings with vehicular access obtained from secondary streets or the rear via laneways or special rear loaded streets. These streets may be used or modified (for example to provide angle parking) and are suitable for use as surrounding streets for activity centres, to allow for future expansion of these activity centres, and to also facilitate land-use transition from residential to commercial over time.



Access street A



Access street B



Access street C



Access street D

Access street C is the most typical and most common residential street. This type of street supports densities less than 40 dwellings per hectare, with fronting residential development, comprising single houses and grouped dwellings with direct vehicular access. A minimum double garage to lot frontage requirement of 10.5 metres and minimum single garage to lot frontage requirement of 7.5 metres is required to ensure adequate provision of street shade trees, on-street parking and to reduce garage dominance.

Refer to [Element 4: Lot Design - Design Principle 5](#).

Access street D can be used in limited circumstances for low traffic volume and low parking demand streets, usually where residential densities are less than 30 dwellings per hectare, and for streets fronting public open space or bushland. On-street parking is provided on one side only and may be provided informally or formally in special circumstances.

Figure 19: Access street A

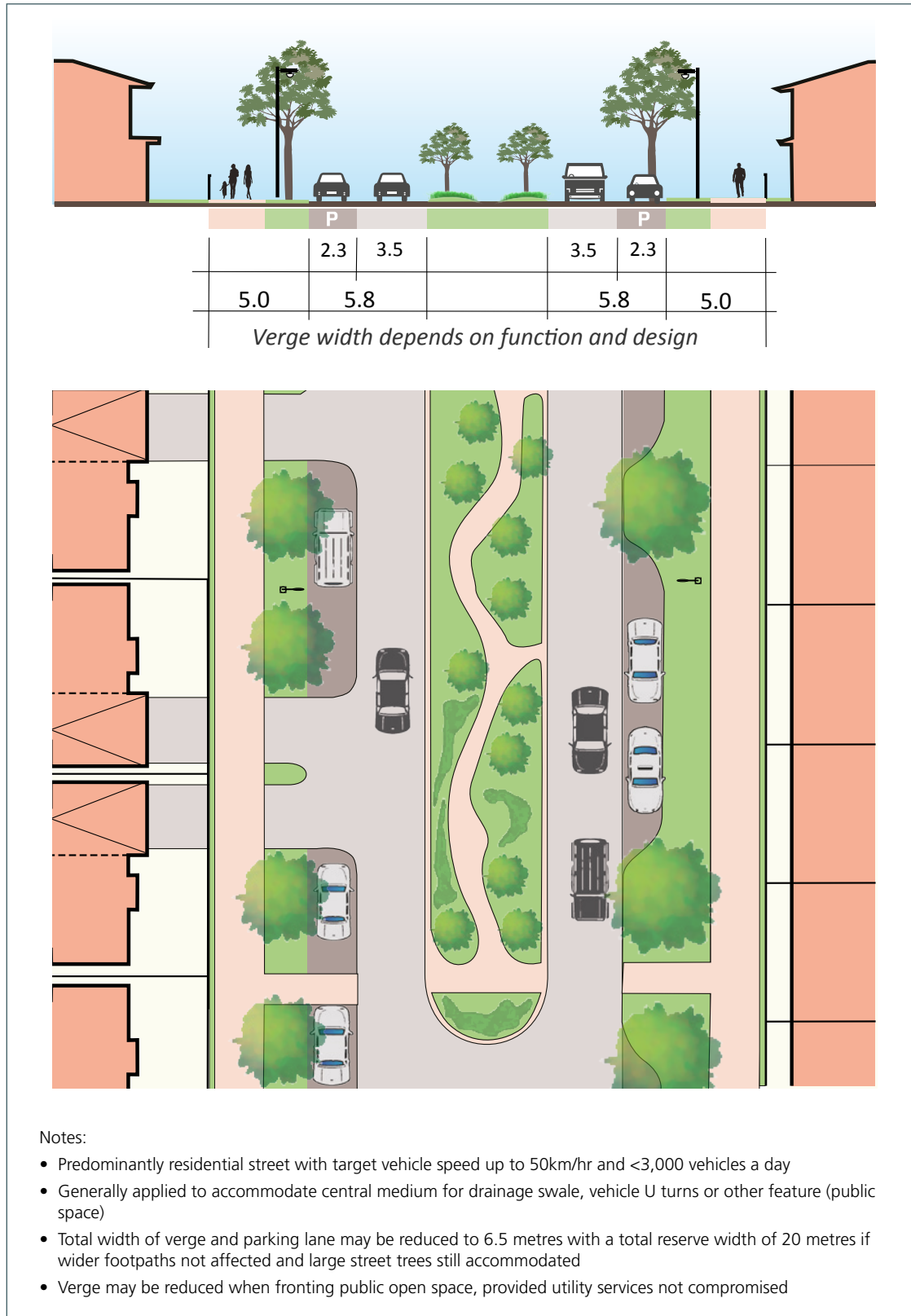


Figure 20: Access street B

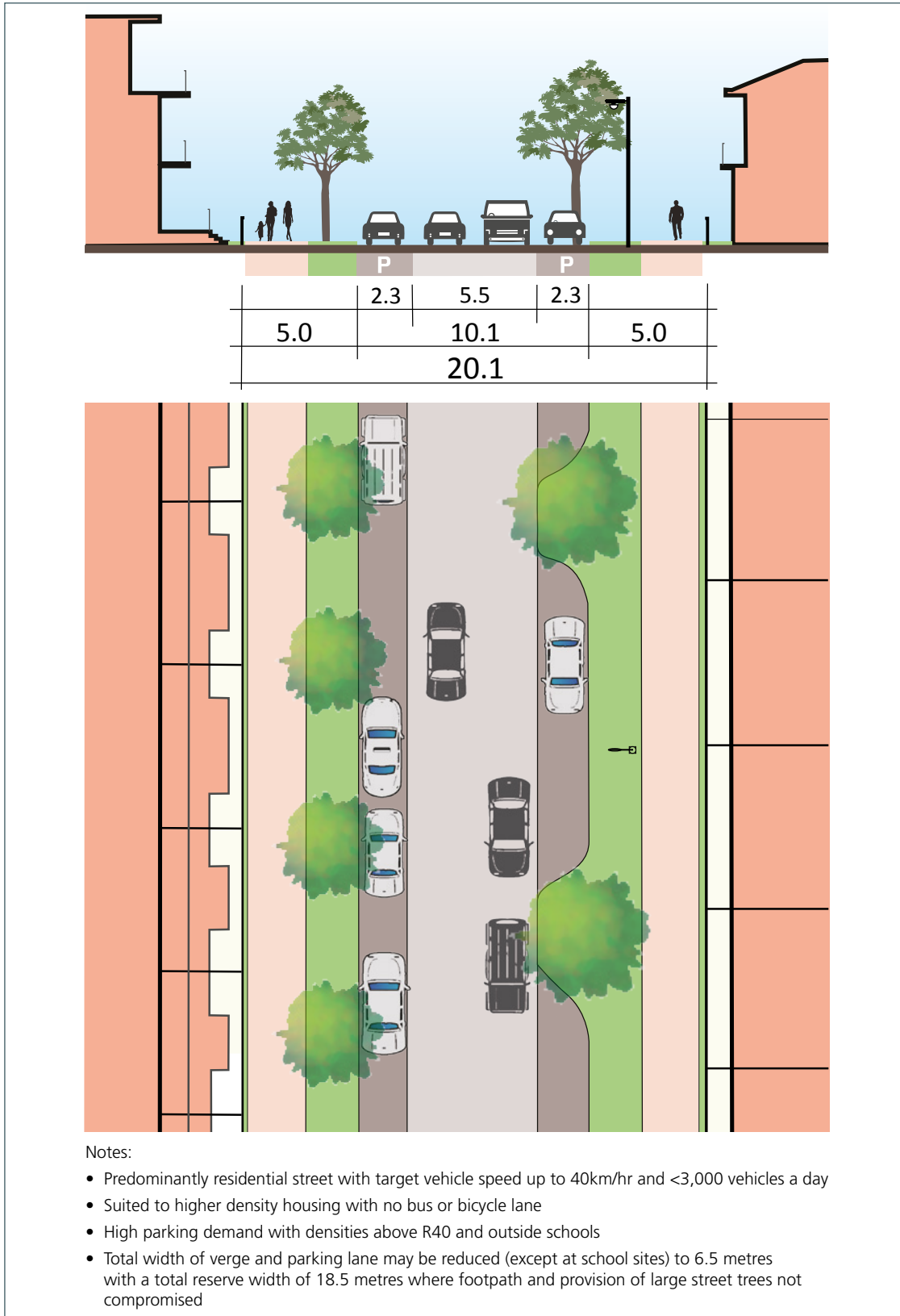


Figure 21: Access street C

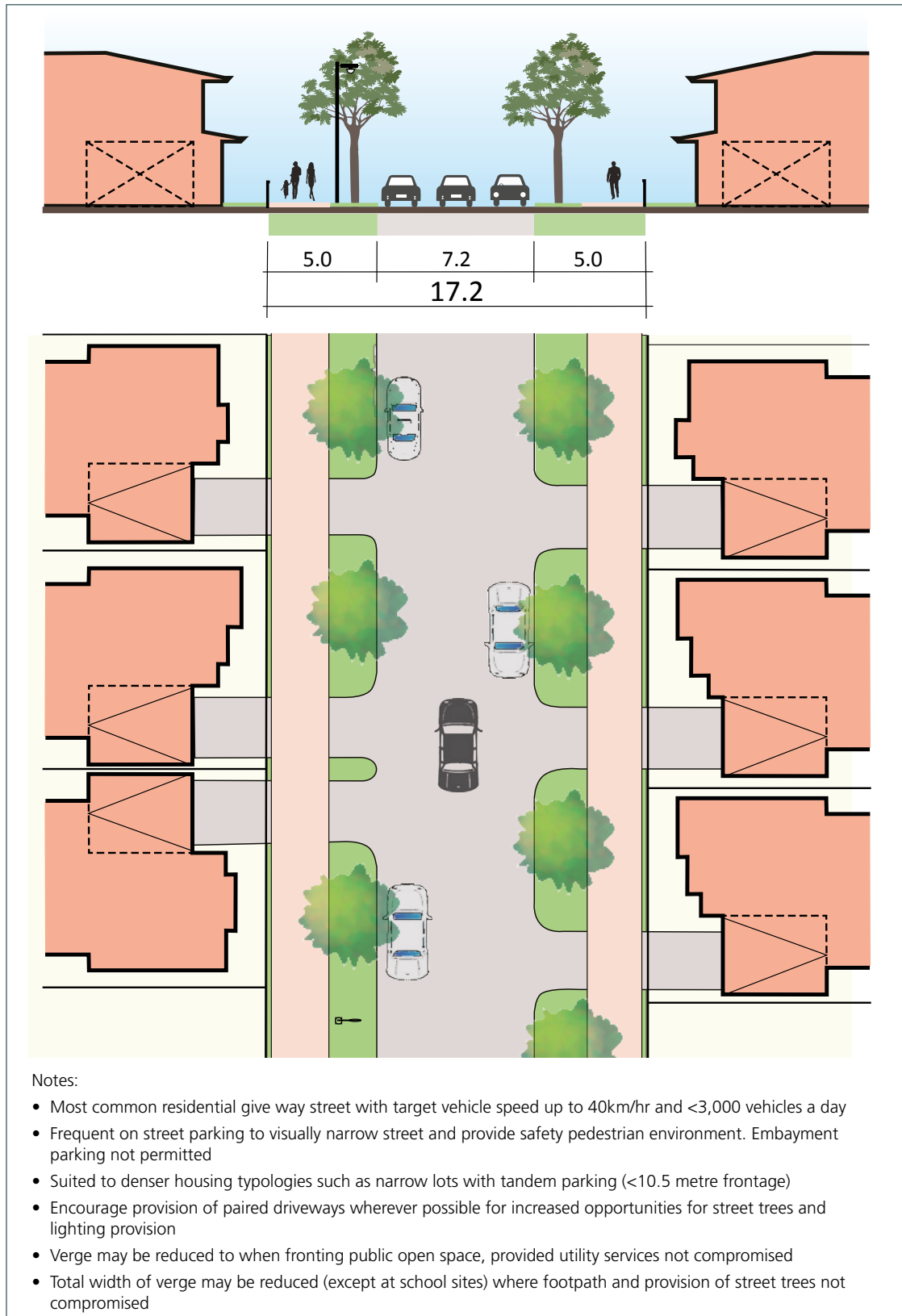
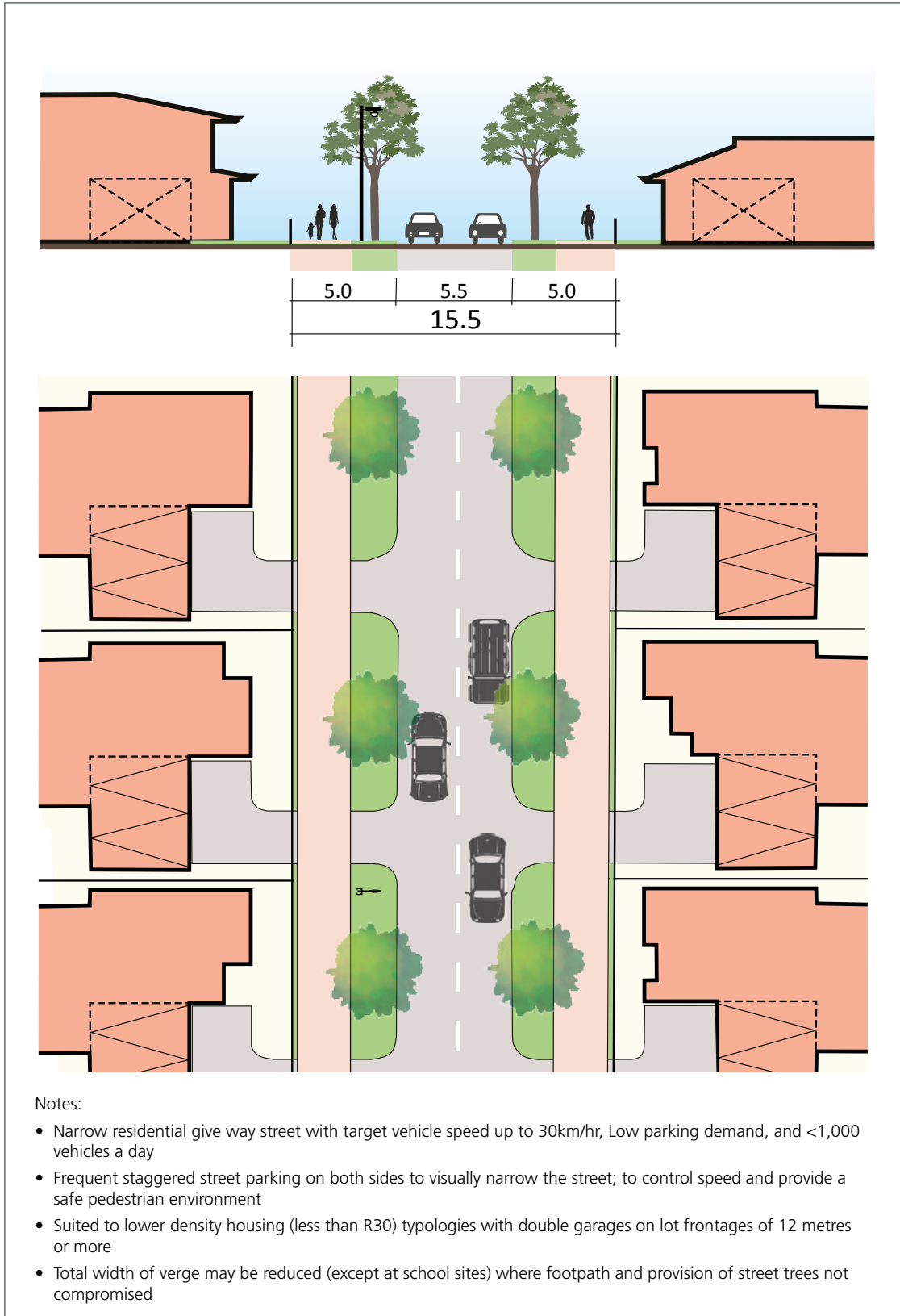


Figure 22: Access street D



Laneways

Where a street has a high traffic volume and safe vehicular access cannot be obtained, laneways provide appropriate alternate access. Garaging of cars at the rear of a property avoids a streetscape dominated by garages, especially where narrow lots are proposed. Laneways are also appropriate to obtain rear access for lots fronting activity centre main streets and for lots fronting public open space to activate frontages and maximise surveillance.

All laneways must have adequate sightline truncations at intersections for pedestrian and vehicular safety. Laneways should not be longer than 140 metres without a mid-lane link. They should provide good passive surveillance and direct sightlines for surveillance; and be of sufficient width to ensure adequate reversing space. Straight lanes and T-lanes provide a greater level of passive surveillance over

H-lanes, dog-leg lanes or tightly curved lanes. The design, layout and detailing of laneways and the strategic siting of buildings to overlook these laneways is an important consideration and is critical for community safety. In no circumstance should a lot solely front a laneway. Acceptable and undesirable laneway designs are illustrated in Figure 23.

Refer to [Element 4: Lot Design – Design Principle 5](#) for more information on the land use and design of lots for laneways.

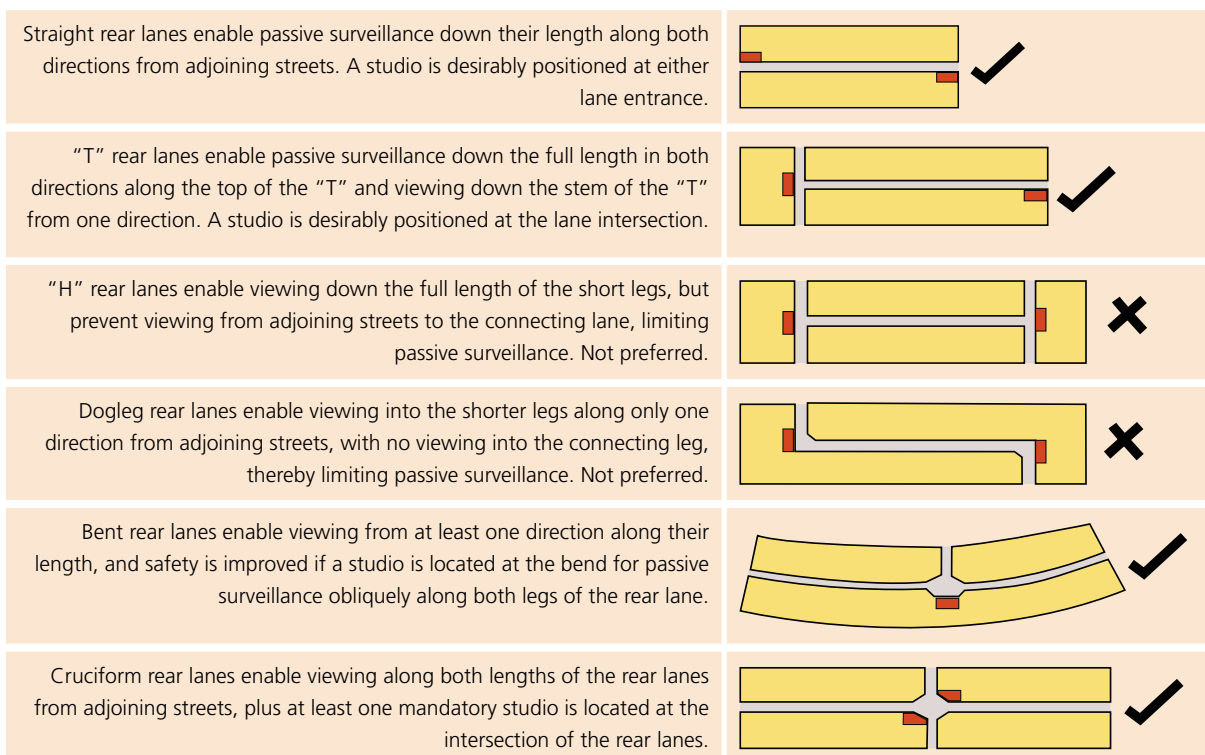


Figure 23: Rear laneways with studio housing above

Cul-de-sac streets

Cul-de-sac streets can adversely impact on the legibility and permeability of the street network, particularly for pedestrians and cyclists. They should be used sparingly and located so that they do not impede the overall interconnectivity of the pedestrian and vehicle movement system.

Cul-de-sac streets should be designed so that pedestrians and cyclists have through-access and provide the potential for longer term through access for vehicles based on future projected traffic volumes. In the example shown in Figure 24 the cul-de-sac is designed to allow vehicular access to dwellings orientated to provide passive surveillance to a small park, whilst providing a pedestrian/cyclist link and future option for a through street connection.

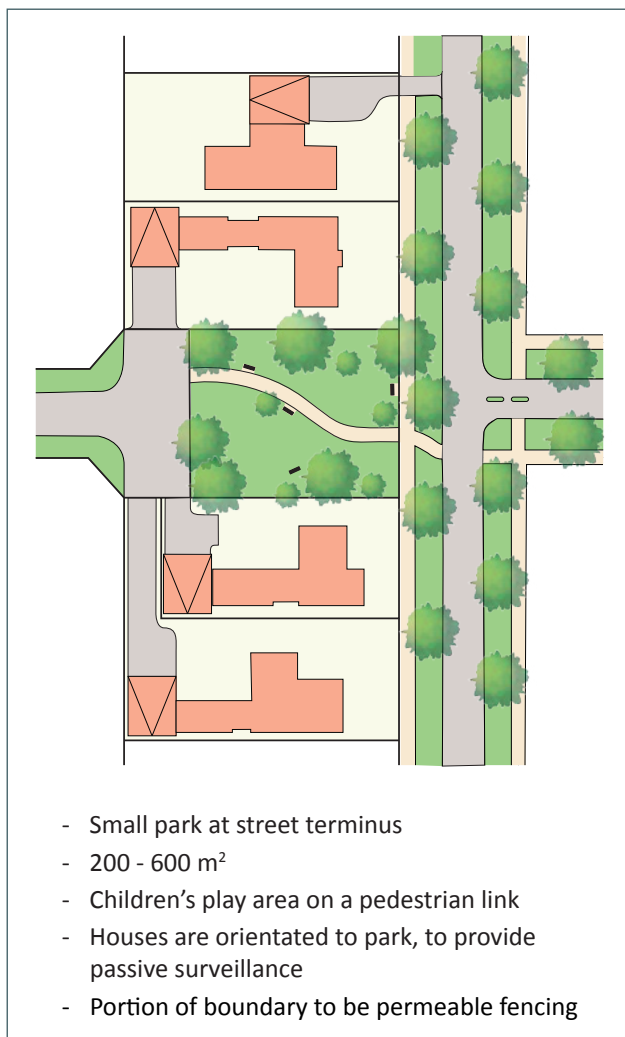


Figure 24: Culs-de-sac with access way



Pedestrian link

Special streets

Alternative street types to those identified within the hierarchy may be required for unique or special circumstances, such as:

- a main street with high volumes of slow moving traffic, on-street parking and high pedestrian amenity;
- where serving as both a main street and primary distributor flowing through some regional town centres;
- lots fronting public open space with restricted access; and
- where angled parking is provided, particularly in activity centres, near schools, railway stations or sports fields.

Special streets cannot be used simply to reduce the minimum street width. Where any alternate street type is proposed, detailed design and justification is required to be provided.

Shared space

Special streets may include shared spaces where pedestrians and cyclists have equal right to access as vehicular traffic. Where shared space is proposed, the following design features are desirable:

- An entry statement to signify the change in status – using signs, construction, architectural

or landscape features to differentiate and highlight the start/end of the shared space.

- A distinguishable pavement surface to highlight the differences in the street environment – by colour, texture and materials.
- Flush concrete kerbs, brick-paving or coloured asphalt is required. To avoid large uniform expanses of car-dominated street space, pavers can be used to form rumble strips and raised plateaus.
- Sufficient turning areas/manoeuvring space to accommodate emergency and service vehicle access (i.e. emergency and refuse collection vehicles).

The layout and design of shared space is developed in accordance with national and international best practice examples. Detailed design features, purpose and justification must be provided.



Shared space

STREET NETWORK REQUIREMENTS

1.13 All streets designed in accordance with required function design, design characteristics and traffic volumes in [Table 3](#) and [Table 4](#).

1.14 Local streets designed to support traffic moving in and between neighbourhoods and to spread traffic to lower volumes.

1.15 Where required, laneways located and designed to:

- a minimum width of six metres;
- a maximum length of 140 metres;
- a maximum length of 80 metres where lots do not have any alternate street frontage (e.g. public open space frontage lots);
- a minimum 2.8 metres sightline truncation (2m x 2m at 90 degree angle) at intersections;
- function solely as vehicle access to lots and not act as, or create an alternate, through-route in the overall network; and
- facilitate passive surveillance into, along and through laneways.

1.16 Cul-de-sac streets are not encouraged but may be considered where topography or other constraints exist. Where required they are located and designed to:

- a maximum length of 120 metres;
- serve no more than 20 lots/dwellings;
- include a minimum eight metre wide pedestrian access way connecting to the nearest route or culs-de-sac head; and
- ensure refuse and emergency service vehicles are able to make a three-point turn.

1.17 Incorporate shared spaces in areas of high pedestrian activity, such as town and neighbourhood activity centres, where pedestrian amenity and safety is a priority and to create a safe low traffic speed environment.

Design principle 2: Create a safe street environment for all users by applying appropriate street geometry design and traffic management

Intersection spacing

Liveable Neighbourhoods supports an interconnected movement network with frequent intersections to optimise legibility and permeability for cycling, walking and public transport. The street network is outlined at the structure plan stage to ensure it is consistent with the intersection spacing in [Table 5](#) (Appendix 3), signalised pedestrian crossing spacings in [Table 8](#) (Appendix 3) and [Table 9](#) (Appendix 3); and appropriate measures are in place to achieve target speeds.

On local streets, intersection spacing is based on providing access within the area for all users but with priority to pedestrians, cyclist and public transport, limiting travel distances and vehicle speeds. When developing the street network consideration must be given to maximising connections to adjoining urban areas, with the potential impacts of connecting to existing routes assessed to ensure traffic volumes on connected local streets are appropriate for the design and within the acceptable range as outlined in [Table 3](#) and [Table 4](#).

Intersection spacing must also conform to the requirements of relevant Australian Standards and Austroads guidelines for street design and traffic safety.

Controlling vehicle speed



Control of vehicle speed

Controlling vehicle speed is a key component in improving safety and amenity for all users, in particular for pedestrians and cyclists. Liveable Neighbourhoods encourages lower than the posted speed of the street, particularly through local and neighbourhood centres and especially on local streets.

A range of design measures may contribute to achieving target speeds. These include:

- active street frontages;
- pavement width appropriate to traffic volume, parking demand and fronting development density and land use intensity, so traffic is slowed by parked and opposing vehicles but capacity is not unduly constrained;
- short lengths between street intersections;
- traffic calming devices to create slow points along longer street blocks used where appropriate;
- entry treatments such as narrowed throats and raised pavements;
- mini roundabouts/chicanes – the requirement to retrospectively install roundabouts in the future must be identified during the structure planning stage to ensure sufficient land is available;
- visually and physically tight intersections (small kerb radii);
- trees close to street pavement and parking lanes;
- different pavement colour of parking/cycle lanes to visually narrow the street; and
- reduced building setbacks of buildings, especially activity centres.

Indicative spacing to achieve target speeds is shown in [Table 12](#) (Appendix 3).

Traffic volumes and speeds should be low enough on most local streets for pedestrians to cross without assistance. A tighter kerb radii is advocated to slow turning vehicles and reduce pedestrian crossing width, improving use, safety and amenity. Traffic calming

devices should be practical, safe and efficient for all users, particularly cyclists where reduced pavement width (e.g. slow points) is proposed. The use of such devices on proposed bus routes should also consider how buses would negotiate through them. Traffic-calming devices on bus routes should be avoided and, for where they are necessary, buses must be able to manoeuvre through them.

Intersection controls

Intersection controls are provided to improve the operation and safety of intersections. [Table 6](#) and [Table 7](#) in Appendix 3 provide advice on appropriate intersection controls.

Traffic volumes at intersections are lower on local streets and a give-way or stop sign is normally adequate. Roundabouts may be an appropriate means of control, particularly at the intersection of two neighbourhood connectors, to share priority and/or to improve safety by reducing traffic speed. Where a roundabout is proposed on a local street, the potential for the intersection to be on a bus route needs to be considered in the design.

Approach sight distance and intersection sight distances must be based on the design speeds for each street type. Minimum sight distances are to be in accordance with Table 5.1 and 5.3 in *Guide to Traffic Management Part 5: Road Management* (Austroads, 2014).

Main Roads WA is responsible for the installation of all traffic signals on arterial routes. All new traffic signal proposals or changes to existing signalised intersections must be discussed and supported by Main Roads WA.

Integrator arterial intersections

Intersection controls are primarily provided to manage traffic volume and speed on integrator arterials, while facilitating safe crossing for pedestrians and cyclists. Controls comprise priority (give-way or stop) and traffic signals, with the busier intersections likely to require traffic signals. Their spacing may vary along the route with closer spacing likely to be required in neighbourhood and town centres. Recommended signal spacing is shown in [Table 8](#) (Appendix 3).

The use of roundabouts on integrator arterials should be limited as they inhibit pedestrian and cycle movement and provide fewer breaks in traffic flow. Roundabouts may be considered on single carriageway two-lane arterials but only as an interim treatment before a dual carriageway is constructed.

Arterials can present significant barriers to pedestrian movement, including access to bus-stops. [Table 9](#) (Appendix 3) presents traffic volumes for different cross-sections at which pedestrians may experience difficulty crossing. Where traffic volumes at full development are likely to exceed these thresholds, signalised pedestrian crossing facilities or alternate safe pedestrian crossing facilities must be provided, as outlined in [Table 8](#) (Appendix 3).

Staggered priority T-intersections are encouraged over priority four-way integrator arterial intersections. The latter, however, should be considered if the safe and efficient operation of a staggered T-intersection under full traffic flow at full development cannot be guaranteed. A four-way integrator arterial intersection, when signalised would generally be more efficient than two signalised staggered T-intersections.

Kerb radius and truncations

Intersections should be designed so that the types of vehicles likely to be using them are able to do so safely and comfortably. Integrator arterials generally have a higher number of larger vehicles and therefore, higher turning requirements than local streets.

Slow vehicle speeds are essential for pedestrian safety. Under the Road Traffic Code, turning vehicles must give way to crossing pedestrians. Large kerb radii encourage higher turning vehicle speeds, which are inconsistent with the movement network Liveable Neighbourhoods promotes to maximise pedestrian use and safety. Intersection design must therefore balance turning vehicle requirements with the safety of other users, particularly pedestrians and cyclists.

[Table 10](#) (Appendix 3) provides indicative maximum kerb radii, which allows vehicles to negotiate the intersection while minimising turning vehicle speed. Tighter kerb radii also reduce the crossing distance for pedestrians improving pedestrian use and safety, as well as reducing the land take from excessive truncation. In certain cases, such as where special purpose streets or where intersecting streets are not

at 90 degrees to each other, a 'swept path' analysis may be required to verify the design and ensure appropriate vehicle intersection manoeuvrability.

Swept path analysis may be required and verified for buses negotiating these intersections, particularly for left or right turns.

In centres and around schools or other locations where there is likely to be a high number of pedestrians, it may be appropriate to further tighten kerb radii.

Corner truncations facilitate the alignment/positioning of stormwater and utilities, assist sightlines and maintain verge widths at corners when kerb radii are large. Streets with five metre-wide verges are sufficient to provide the required sightlines for drivers, pedestrians and cyclists at intersections without the need for truncations. The required truncations to maintain five metre verge widths are shown in [Table 11](#) (Appendix 3).

INTERSECTION SPACING REQUIREMENTS

- 2.1 The movement network designed to provide intersection spacing in accordance with [Table 5](#) (Appendix 3). Layout must consider future urban areas where they abut existing development to facilitate future street connections.
- 2.2 Traffic signals where required, including pedestrian crossing function, provided at spacing shown in [Table 8](#) (Appendix 3), where traffic volumes on the street being crossed exceed those in [Table 9](#) (Appendix 3).
- 2.3 On wider streets, street pavements should be narrowed by kerb extensions at intersections or at midblock to keep pedestrian crossing distances to a minimum and control turning vehicle speeds, while allowing for safe passage by cyclists and pedestrians.
- 2.4 Pram/wheelchair crossing provided at all intersections with a maximum grade of 1:10.
- 2.5 Intersection controls provided to ensure safe and efficient operation of all intersections in accordance with [Table 6](#) and [Table 7](#) (Appendix 3).
- 2.6 Kerb radii to be provided in accordance with [Table 10](#) (Appendix 3) to allow vehicles to negotiate the intersection while minimising turning vehicle speeds.
- 2.7 Truncations, provided in accordance with [Table 11](#) (Appendix 3) to maintain five metre verge width at street corners. Truncations of 2m x 2m provided at the intersections of laneways and streets where a shared-use path is located adjacent to the property boundary. Alternatively, narrowed entry to the laneway may be used to ensure adequate sight distance.
- 2.8 Roundabouts on local streets designed in accordance with Austroads standards, with a central island radius of up to five metres, increased to 7.5 metres, with a 6.5 metre circulating carriageway for those on proposed or potential bus route.

Design principle 3: Ensure all streets provide space for utility services, stormwater drainage, street trees and lighting

Street verge

Street verges accommodate utilities, stormwater management, street lighting, street trees, street landscaping and furniture and embayments for parking or public transport. The standard minimum verge width on all streets is five metres to allow for sufficient street tree planting for a safer and more pleasant environment; reduced urban heat island effects; and management of local stormwater collection and retention. Wider street verges facilitate improved streetscape amenity, increased property values, community interaction and health benefits from walking and cycling.

Structure plans should include cross-sections through typical streets, demonstrating that street verge widths can adequately accommodate utility services, street trees, landscaping and furniture, footpaths, shared use paths and on-street parking. Should widening or narrowing of verges for other desirable outcomes be proposed, justification is required to be provided and in consultation with civil engineers, local government, utility service providers and transport consultants.

The *Utility Providers Code of Practice* (2010) must be applied when preparing a local structure plan and implemented at subdivision.

Paved surfaces must be practical and durable to ensure safe and appropriate passage of vehicles, pedestrians and cyclists; and not impede stormwater flow or management. Design requirements are set out in Austroads Guidelines and IPEWA Guidelines.

All street lighting is to be designed in accordance with Australian Standard (AS) 1158 and incorporate energy efficient practice and technologies. Obtrusive and upwards waste lighting must be minimised in accordance with AS 4282.

Verges facilitate future land use, density intensification, utilities and stormwater management infrastructure changes; and assist in the provision of additional or new utility services (such as fit for purpose water supply/ dual reticulation systems etc).

A coordinated and efficient approach to utilities infrastructure planning is advocated via common trenching techniques.

Street trees

Street trees are an integral component of urban streetscapes, encouraging pedestrian and cyclist use, community interaction and fewer vehicle trips. Provision of street trees provides shade to buildings, outdoor living areas, street pavements and parking areas; lowers ambient temperatures; and assists in reducing adverse urban heat island effects and electricity use. Street trees assist local stormwater collection and retention; and perform other important environmental and ecological functions. Trees are also effective at intercepting rainfall, resulting in reduced stormwater runoff and soil erosion, with the scale and intensity of interception increasing with the size and amount of canopy cover.

The planting of new trees and the retention of existing trees should be considered as part of an overall vision for an urban forest strategy, which sets canopy targets for urban areas. Management plans should be prepared to provide the technical information to help achieve the targets, address plant selection, unobstructed soil volumes, staging, ongoing

Mature street trees



management and maintenance. Ensuring that street trees have the best possible chance of reaching maturity should be a priority.

Trees also have traffic-calming benefits by reducing vehicle speed where they are located closest to the street pavement and/or within medians. The placement of trees in verges should be carefully considered to minimise any potential crash risk (e.g. avoid tree locations on the outside of sharp bends). The spacing and location of street shade trees should be in accordance with IPWEA Guidelines, the Utility Providers Code of Conduct and local government policy. Trees should not be located too close to running traffic lanes; and where non-frangible trees are proposed in the verge, a hazard assessment should be carried out in accordance with *Guide to Road Design Part 6: Roadside Design, Safety and Barriers* (Austroads, 2010)

There are opportunities for street trees to be planted within the road reservation; both in central medians and in conjunction with on-street parking bays, through the use of innovative design solutions and use of alternative technologies such as structural cells and permeable paving.

Street stormwater management

Incorporating stormwater management techniques into the street network where possible, can minimise:

- impacts to public open space functionality and amenity;
- disturbance to existing landform, natural water courses and native vegetation;
- stormwater runoff peak flow rates and volumes; and
- pollutants to receiving water bodies.

Street verge and road reserve widths should be sufficient to incorporate water sensitive urban design techniques, which is particularly important in urban areas with small-sized lots (generally less than 260m²), where on-site stormwater management opportunities are limited. This will reduce the volume of stormwater requiring management in public open space and reserves.

Design approaches for amenity should be separated from design approaches for flood protection. This prevents over-design for 'serviceability' outcomes, resulting in excess volumes of water being either detained or transported to receiving environments and the associated cost of construction and ongoing system maintenance.

VERGE DESIGN REQUIREMENTS

3.1 Verge design to accommodate space for utility services, street trees, footpath, shared paths and landscaping at a minimum verge width of five metres. Street furniture (including light poles and traffic signs) located in the verge and not within footpaths/shared use paths.

3.2 Utility services may be considered in laneways where:

- it can be demonstrated it does not compromise access safety;
- utility service providers are able to access meters and inspection/maintenance points;
- where meters do not result in the need for recess metering facilities;
- utility service access points are consolidated in one location for ease of access for maintenance; and
- topography or geotechnical matters constrain the provision of services from the frontage street.

Major distribution/trunk utility services are not permitted in laneways due to constrained laneway reserve width, function and maintenance requirements.

3.3 Lighting provided to illuminate the street, including pedestrian, cycling routes and public transport stops in accordance with AS1158 and AS4282.

Continued on page 61

VERGE DESIGN REQUIREMENTS (CONTINUED)

- 3.4 Provide street trees in all local streets (except laneways) for pedestrian shade and shelter, streetscape amenity and traffic management. Remnant trees to be retained as street trees in accordance in AS4970, 2009.
- 3.5 Stormwater management infrastructure designed to take into account the street network, catchment characteristics and designed in accordance with Austroads Guidelines, the Stormwater Management Manual for Western Australia (Department of Water 2004–2007) and the Decision Process for Stormwater Management in WA (in publication process) (Department of Water, 2014).
- 3.6 Streets may accommodate minor flooding events, provided that vehicular access to adjoining land and depth and rate of water flow does not pose a public safety hazard.

Supporting documents

- *Austroads Guidelines (Road Design, Road Safety, Traffic Management, Pavement Technology and Cycling Aspects)*
- *Better Urban Water Management* (WAPC, 2008)
- *Design and Planning Guidelines for Public Transport Infrastructure – Traffic Management and Control Devices* (Public Transport Authority, 2011)
- *Designing Out Crime Planning Guidelines* (WAPC, 2006)
- *Development Control Policy 1.3 Strata Titles* (WAPC, 2009)
- *Development Control Policy 1.6 Planning to Support Transit Use and Transit-oriented Development* (WAPC, 2006)
- *Development Control Policy 2.6 Residential Road Planning* (WAPC, 1998)
- *Guidelines for Planning and Designing for Pedestrians* (Department of Transport, 2012)
- *Guidelines for Preparation of Integrated Transport Plans* (WAPC, 2012)
- *State Planning Policy 3.7 Planning for Bushfire Risk Management and Bushfire Management Guidelines* (WAPC, 2014)
- *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning and Implementation Guidelines* (WAPC, 2009)
- *Transport Assessment Guidelines for Developments* (WAPC, August 2006)
- *Tree Design Guidelines* (Landcom, 2008)
- *Practitioners Guide to Bus Movement and Priority* (Public Transport Authority, 2011)
- *Public Transport Bus Stop Layout Guidelines* (Public Transport Authority, 2010)

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Liveable
Neighbourhoods



ELEMENT 3

ACTIVITY CENTRES

Contents

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Introduction

This element expands upon the broad detail in [Element 1](#) (Objective 4) for activity centres and employment, with a focus on local and neighbourhood centres. It supports *State Planning Policy 4.2: Activity Centres for Perth and Peel* (WAPC, 2010) (SPP 4.2), which specifies requirements for the planning and development of district and higher order activity centres and specialised centres in the metropolitan Perth and Peel region. It also supports the Model Centre Framework under SPP 4.2, which provides guidance on the preparation and assessment of activity centre plans required as a prerequisite for new, and expansion of existing, district and higher order activity centres. The principles are expected to be applied to guide activity centre planning in regional areas, where relevant.

The establishment of well-located main street mixed-use activity centres that are pedestrian friendly and include higher density housing is necessary to serve local resident population and facilitate local employment creation. The design of an activity centre should support mixed land uses and buildings with capacity for them to evolve and adapt to changing economic and social conditions over time. Concentrating employment, retail, community and government services and residential dwellings in mixed-use activity centres generates land use and business synergies. It also enables centres to function as key community interaction and information hubs, local trip attractors and public transport, pedestrian and cyclist destinations. Mixed land-use and public transport are inextricably linked through:

- intensification of land use and mixed use in close proximity to transit stops, promoting public transport patronage and viability;
- retail facing streets encouraging pedestrian traffic and street activity and improving passing trade opportunities and long-term commercial viability, leading to improved level and diversity of other complimentary land uses; and
- the quality of the public domain having an impact on the vitality and level of activity of a centre.

Location, size and suggested layout of activity centres, specialised centres and non-residential land-uses are to be shown in structure plans. A local development plan may be required to guide the development of new, or expansion of existing, activity centres, other employment areas (e.g. industrial areas) or super lots to coordinate future development.

Design principle 4: Ensure urban form and lot design facilitate safe and convenient access to services, facilities and employment in mixed land use, main-street format activity centres

Main street mixed land use

The objective is to design centres to comprise a diverse and vibrant mix of high density housing (predominantly grouped and multiple dwellings in townhouse and apartment form) with commercial, retail and public open space that supports economic and social activity.

Main street mixed-use centres with retail and other trip attractors arranged to maximise pedestrian flow along streets is advocated. A range of high-density housing should be located in and surrounding all mixed-use

activity centres to create a sense of urban scale and intensity along streets, which is important for providing adequate walkable custom, improved safety and public transport patronage.

Pedestrian-scale retail main streets work best on streets that have traffic volumes in the range of 10,000–18,000 vehicles per day, but only have two lanes of slow moving traffic (generally at or below 30 km/h), and on-street parking.

To activate these streets, anchor stores (for example supermarkets or department stores) should open onto the main street and be strategically located centrally to support pedestrian flow past the smaller specialty shops. The route of pedestrians between key destinations in the centre is an important factor in centre planning (e.g. how people move between transit stops, car parking, public open space and other stores to the anchor stores).

The core of a typical retail main street is 200–400 metres long, but will often transition into more specialist, personal service-based and lower trip-attractor and rent-type businesses on the edges.

Specialist businesses play an important role in building business diversity and robustness and provide more locally accessible jobs.

To best capitalise on the movement economy of passing trade, these activity centres are usually best located adjoining and visible from (but not on) integrator A arterials (Figure 4, Element 1, Objective 4).

Local streets should be arranged to directly intersect with the main street, and the spacing of local streets should be close enough to create relatively small pedestrian-scale street blocks, so nearby residents can directly access the main street. The strategic location of signal-controlled intersections (rather than roundabouts) on arterials can facilitate both vehicle and pedestrian/cyclist access into the centre.

In most centres, the design of the street network associated with an activity centre will require careful consideration and site-specific investigation to balance the traffic aspects of intersection spacing with the requirements for creating an appropriate street network to deliver an economically viable centre.

District centre street blocks of around 180m x 200m have been found to provide sufficient space for an anchor store plus related main-street specialty shops and personal services businesses, and sufficient off-street parking; while also allowing for smaller non-retail buildings, including residential, on surrounding street frontages. Thus, a typical district centre might be provided for with three or four such street super-blocks, which total around 15–18 hectares for the mixed-use retail dominant core (Figure 25).



Main street activity centre

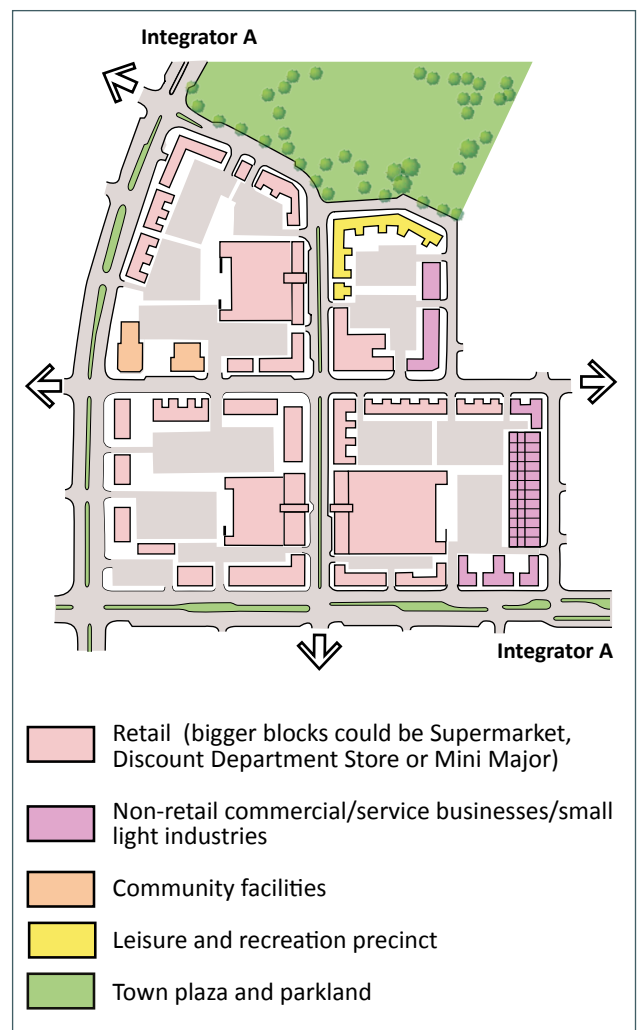


Figure 25: District centre structured as four street blocks

Buildings in centres need to address streets and public spaces through activated frontages (windows, doors and seating) to promote vitality and encourage natural street surveillance. Development with direct frontage onto streets provides activity, visual interest and exposure which assists commercial viability. They also help community interaction and enable streets to act as an integrating element in neighbourhoods and towns, rather than as a divider. Perimeter block development where development faces streets creates opportunities for car-parking at the rear of buildings. Centres should seek to achieve a strong and unique sense of place and local identity, and this should be derived from the local natural and cultural context.

In most situations, changes of use between residential and non-residential land uses or of significant development intensity and/or residential density should be made at the mid-line of a street block, (along the rear boundary line of lots, preferably with laneway access) rather than at a street frontage to provide a compatible use transition. Similar forms of development should front each other across a street to provide compatibility and legible streetscapes, or alternatively, provide appropriate graduating building height, bulk and scale.

Hybrid centre layout

Enclosed retail 'mall' formats are not supported as they do not activate surrounding streets, and are poor catalysers of non-retail jobs. There may be situations where a limited amount of the total retail floor space in a main street centre can be provided in an enclosed format. The amount and location of the enclosed mall retail floor space should comprise only a small proportion of the centre's total floor space, and it should be located so it does not significantly reduce the effectiveness of any associated anchor stores to activate the main street retail (Figure 26). Hybrid centres such as these should ideally be limited to situations where there is strong retail catchment and where important smaller retail drawcards (such as chemists, post offices and newsagents) are located on the main street, not in the enclosed mall.

In larger regional centres, there may also be a limited amount of retail floor space provided in enclosed formats or in pedestrian arcades, particularly comparison retail, provided as part of the overall retail mix. The key is to ensure that the amount and layout of the enclosed component complements

and reinforces the street-based retail, rather than weakening it. The exterior of any enclosed mall component or large anchor store should be lined with active frontages, unless that wall is flanking an intra-block car park, loading and service areas. Blank walls or major loading and/or service areas should not front or face streets.

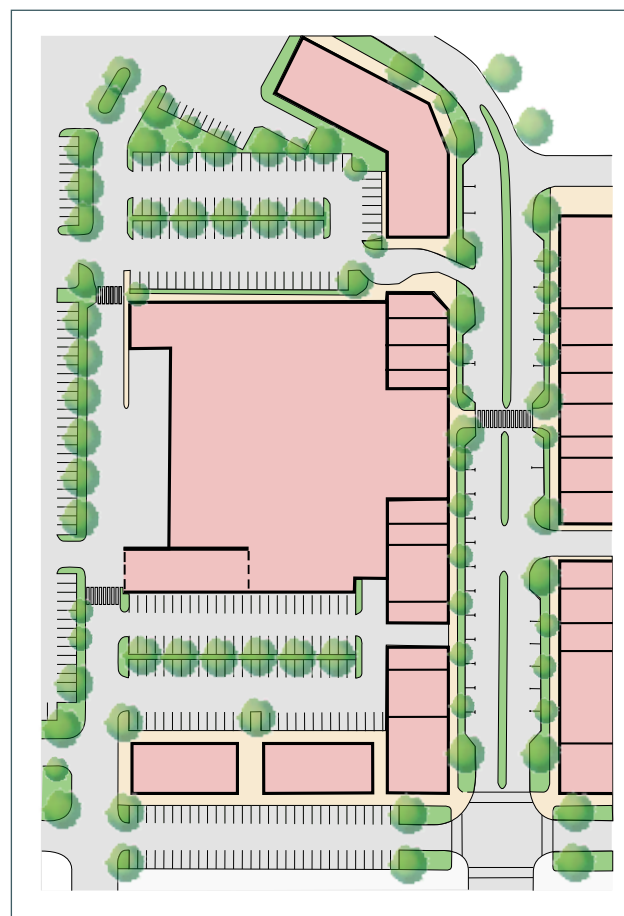
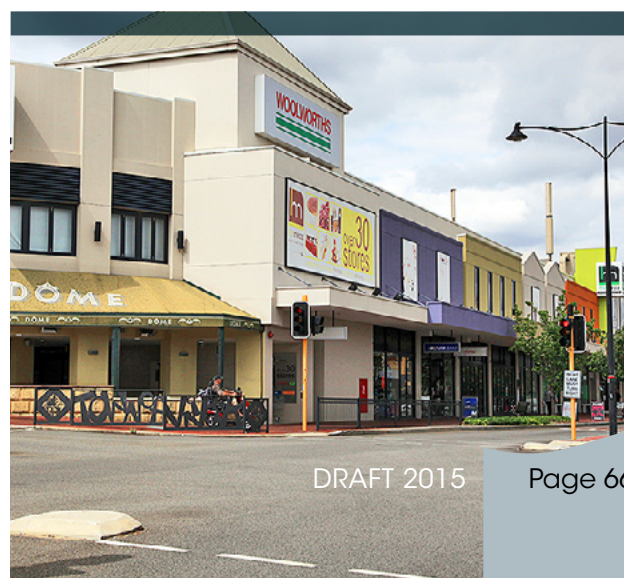


Figure 26: Supermarket designed to front onto a main street

Hybrid active centre street front



Neighbourhood and local activity centres

Neighbourhood and local activity centres located to provide local retail and community services in walking distance of most dwellings is advocated. These centres provide a local community focus and destination and are vital in generating local walking or cycling trips and increased public health through physical activity.

Neighbourhood and local activity centres will vary in size depending on a wide range of case specific factors. Neighbourhoods may only require one local activity centre comprising a corner store due to a higher order activity centre and/or high-frequency public transport route in close proximity to the neighbourhood. Some neighbourhood activity centres may be quite large and could incorporate a range of non-retail business uses, co-location with community facilities, parks and/or be located along coastal nodes or along activity corridors.

It should be noted that where a neighbourhood activity centre expansion is proposed over 6,000m², retail assessment is required under SPP 4.2. This scale of activity centre is likely to have limited application, as it is generally too small to catalyse substantial non-retail businesses, and it depletes the potential support through competition with nearby higher order activity centres. It may also reduce the viability of small, local or neighbourhood activity centres resulting in extensive suburban residential areas with no locally accessible retail offering.

Neighbourhood activity centres are important local community focal points that provide for local resident shopping and personal service needs. They may include a supermarket, personal services, convenience shops, professional offices and include public transport stops, aged persons and medium density housing.

Local activity centres provide for local community needs and may include a convenience store, café, a public transport stop and a post box. Land for several additional uses (such as a child-care centre, home-based businesses, small businesses or other local community related land uses and activities) should be accommodated, together with some aged persons and medium density housing and possibly a small plaza/public open space area. Figures 27 and 28 (page 70) includes various layouts for local and neighbourhood activity centres. Facilities such as payphones and post boxes are co-located where possible, preferably on

neighbourhood connector street. Placement should take into account movement and sightlines particularly for pedestrians and cyclists, safety through lighting and visibility, mail collection, parking and impact on nearby residential properties.

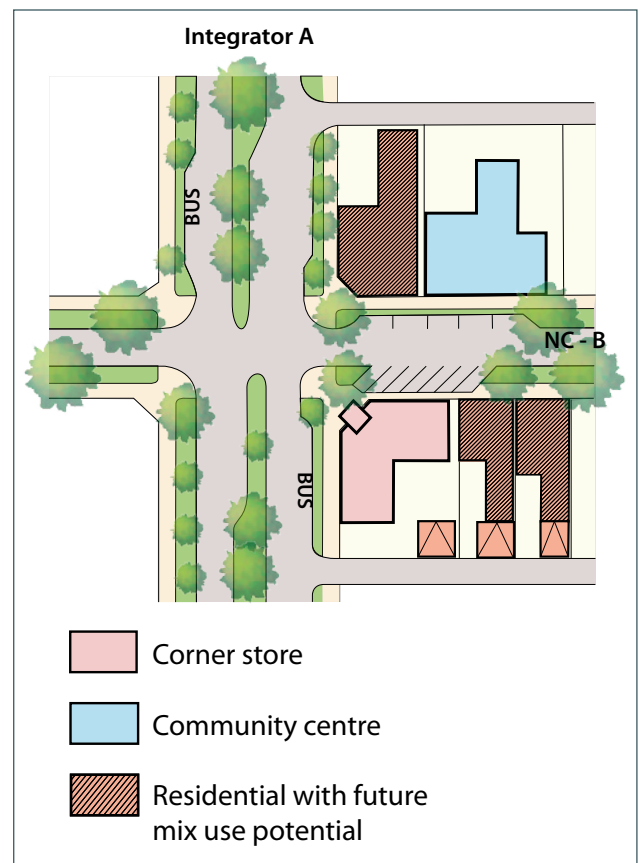


Figure 27: Layout for local activity centre

Typical main street neighbourhood centre



Key factors for a successful local or neighbourhood activity centre include:

- a minimum local residential catchment population of approximately 2,000 people (60–70 ha at >13 dwellings per site hectare) in a 400–450 metre radius, and including small areas beyond where lower density residential development might be located;
- central location in an optimal walkable catchment for local resident access;
- location on an intersection of relatively busy streets, preferably on a public transport route (e.g. total traffic of 5,000 to 10,000+ vehicles per day);
- maximise access via optimal vehicle turning movement (e.g. roundabout or median with slip lane);
- good on-street parking in front and across the street, a bike rack and a bus stop;
- building typologies that generate street surveillance, preferably two or more storey buildings incorporating an upper floor residential component; with a focus on ground floor retail;
- Trip-generating land uses such as commercial, business, mixed use and community services;
- High-quality and useable streetscapes featuring landmark and visually attractive buildings with articulated facades, abutting the street with on-street and rear vehicle parking, optimal solar access plaza/landscaped areas, verandahs for shade and shelter;
- quality public realm with activated public open space;
- slight under provision (rather than overprovision) of retail floor space, in order to maximise vitality and minimise under trading; and
- associated with several other small business premises, a post box, a child-care centre, and/or home-based businesses, perhaps in purpose-built live and work buildings.

Most activity centre plans will show indicative streets and blocks, building layout plans and built form criteria, to ensure that they can be designed to create high-quality streetscapes and public places well patronised by the local community.

MAIN STREET MIXED LAND-USE ACTIVITY CENTRE REQUIREMENTS

4.1	Activity centres are structured in a predominantly main street mixed-use layout. Development is preferably multi-storey, and is located to front streets and or a public plaza/park. Buildings are located close to, or with minimal street setback and detailed to create a strong and identifiable sense of place at a pedestrian scale.
4.2	Activity centres to comprise a network of pedestrian-scale street blocks that encourage pedestrian activity, facilitate crossing of busy streets and enable vehicle movement within well-defined street blocks where development fronts the street and off-street car parking is located at the rear or side of lots.
4.3	Provide local streets parallel to the integrator arterial where it passes through centres to service local traffic and alleviate intensification of movements at integrator arterial intersections.
4.4	Within neighbourhood activity centres, the spacing of local streets is reduced to create relatively small pedestrian-scale street blocks designed to restrict vehicular speeds to a level appropriate for an activity centre environment.
4.5	In the retail core of district and higher order activity centres, larger street blocks (typically around 180m x 200m) provided to enable the anticipated anchor retail stores to be incorporated into a main street layout.

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MAIN STREET MIXED LAND-USE ACTIVITY CENTRE REQUIREMENTS (CONTINUED)

- 4.6 Centres are provided with an appropriate range and distribution of civic squares, plazas, public open space and other supplementary public spaces. The design of activity centres creates a strong and identifiable sense of place and detailed to create a high quality street environment with shade, shelter, trees, pavement treatment, street furniture, landscaping and urban art.
- 4.7 Activity centres to include lots to accommodate a mix of uses including retail, office, community purposes, residential and home-based business.
- 4.8 Institutional uses and retirement complexes are designed in an efficient urban layout, well connected by streets into the core of the activity centre and to public transport services.
- 4.9 Lot layouts accommodate state and local government offices, civic and community facilities in activity centres located and designed as landmark buildings.
- 4.10 The street, lot and building layouts and interface treatments to provide compatibility between different uses without relying on spatial separations between uses. Transitions between uses designed to minimise land-use conflict while delivering an efficient urban form. Similar forms of development front each other across streets to provide compatibility and legible streetscapes.

Parking

Street reserves in activity centres and corridors should be wide enough to enable on-street parking, shade trees, utilities, and to incorporate at-source stormwater management to reduce stormwater runoff volume (refer to [Element 2: Movement Network- Design Principle 3](#)).

Providing on-street parking is an important component of mixed-use main-street activity centres, where managed for maximum efficiency as it provides an important buffer between moving vehicles and pedestrians. On-street parking supports and stimulates business. Often on-street parking alone can provide the majority of customer spaces required for local or smaller neighbourhood activity centres because demand is spread over business hours, visits are of relatively short duration and many local customers will prefer to walk or cycle to the activity centre.

Parking provision may be reduced where a mix of land uses operate at differing core hours, a combination of onsite and offsite parking is provided and managed and there is availability/take up of alternate non-vehicular transport modes. In new activity centres, the number of on-street spaces provided should count towards the total required parking provision for non-residential land uses in the activity centre.

Angle parking could be provided in streets surrounding a main street district activity centre where traffic volumes are less than 7,000 vehicles per day. Where service streets are used on integrator arterials in activity centres, these service streets could also provide angle parking.

When a neighbourhood connector or low volume integrator B passes through a neighbourhood activity centre, or small district centre, it may be able to be modified for short lengths to incorporate angle parking. Limited provision angle parking serving a corner store, local or smaller scale neighbourhood activity centre may often provide for local resident needs as the majority would access these centres via walking or cycling, and thus off-street/on-site car parking provision is to accommodate delivery and staff parking requirements (Figure 28).

Off-street parking is to be sleeved behind buildings in intra-block parking areas, totally or partially screened from the street, not be placed between the front of buildings and the street. Preference is given to parking areas that are shared between many uses and managed as public parking, rather than separate parking lots being attached to each building. This shared parking approach usually enables a reduced amount of parking to be provided overall and maximises efficient use. It is also able to better adapt to changing uses and demands over time.

To enable future intensification of larger centres, additional land may be required to be set aside for public car parking purposes to cater for centre expansion; and some off-street carpark areas should be designated, dimensioned and provided with appropriate access to facilitate potential multi-deck carparks.

Multi-deck carparks should be located and designed to minimise effect on the street through the use of innovative architectural features and where possible through the sleeving of the bulk of the carpark behind other buildings.



Local centre with angled parking

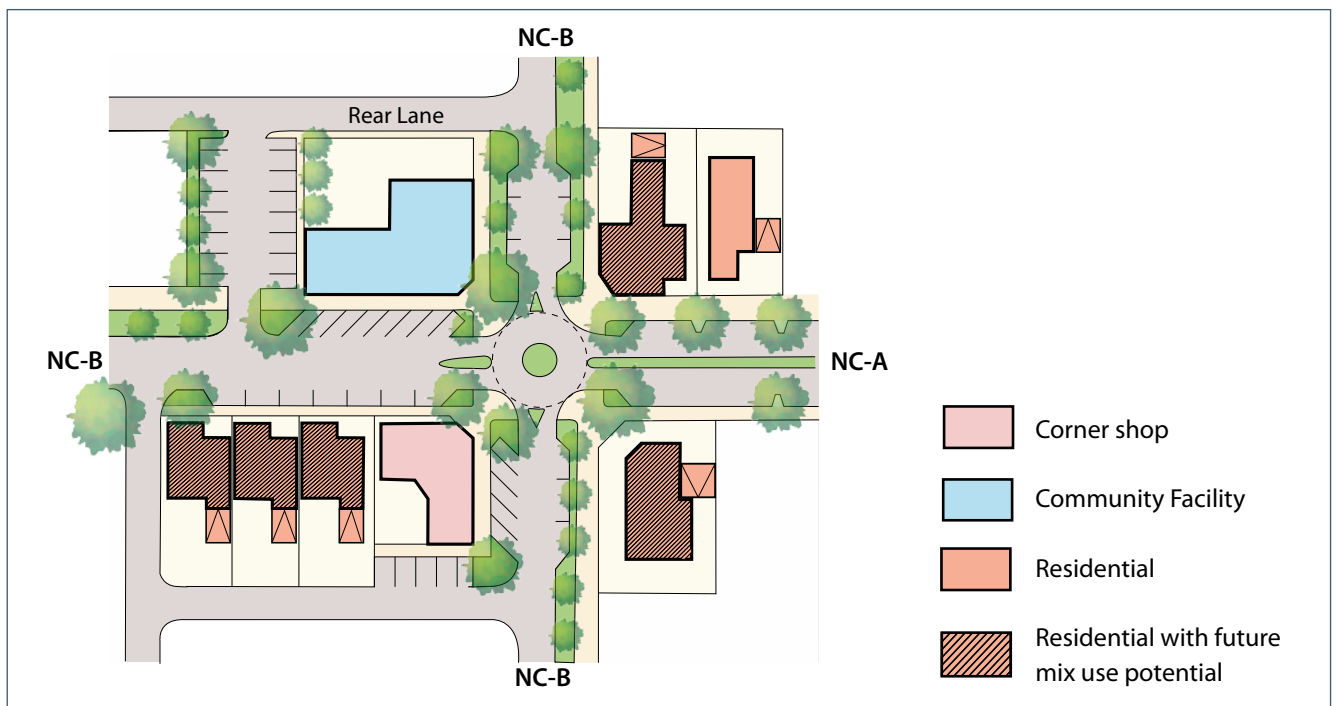


Figure 28: Layouts for neighbourhood activity centre

PARKING REQUIREMENTS

- 4.11 Street reserves within activity centres are to be of sufficient width and designed to provide on-street parking. Streets may be designed to include angle parking where traffic volumes are less than 7,000 vehicles per day.
- 4.12 In activity centres, off-street parking is located at the rear of buildings to minimise effect on the streets and designed and managed, as far as practical, as shared, intra-block car parks. Land may be required to be set aside as public carparking where shared parking is intended.
- 4.13 Customer parking within local and neighbourhood activity centres is provided primarily on-street. Off street parking primarily limited for staff and resident use and located either to the side or rear of a building. No parking provided in street setback areas.

Future intensification of lots

Planning for new urban areas is accompanied by planning for appropriate businesses and other employment generating activities in order to facilitate the creation of as many locally accessible jobs as possible.

Sufficient and appropriately located non-residential land should be identified in structure plans and have an appropriate street layout to accommodate a wide variety of business and home-based business opportunities. Transitions between land uses should be designed to minimise land use and amenity conflict, while delivering an efficient urban form. A structure plan identifies areas zoned for business, employment, home-based businesses, schools, residential, public open space and other land uses. The subdivision of lots with appropriate dimensions and characteristics accommodates these land uses.

Often, mixed commercial and residential development near activity centres will be proposed, yet only the residential component will be built in the first phase of development. Non-residential lots should be defined, and local development plans implemented to facilitate redevelopment over time to transition from residential to commercial. These local development plans should provide for efficient layout and access for rear parking,

together with, for example, large front setbacks that would enable a business to be constructed in front of a dwelling later, if residential use is permitted in the interim.

In areas that are being developed in advance of a future nearby major activity centre or transit station, lot dimensions and development should be designed to facilitate future intensification over time. This may be achieved using local development plans providing for dwellings to be located to enable re-subdivision adjacent to the existing house for one or more additional dwellings. On smaller lots, dwellings should be capable of being extended or adapted in future as a separate dwelling or business premises.

There is a presumption against the subdivision of land holdings into super lots (large lots in excess of 150ha) unless it can be demonstrated that it will not prejudice the orderly and proper planning of the land. This may require subdivision approval for at least the first stage of development and actual commencement of development. The preparation of a structure plan or local development plan may also be required to demonstrate the proposed massing and layout of future development upon proposed super lots.

Street block design to facilitate mix of uses and land use transition



FUTURE INTENSIFICATION OF LOTS REQUIREMENTS

- | | |
|------|--|
| 4.14 | In areas that are being developed in advance of a proposed activity centre or transit station, lot dimensions and development are designed to facilitate future intensification which may be required to be facilitated by a local development plan. |
| 4.15 | Where land designated for future non-residential use and development is intended to be used for residential purposes in the short term, the mechanisms to transition over time into commercial use and development should be outlined in the structure plan or where redevelopment is intended, in a local development plan. |
| 4.16 | To enable future land use and development intensification of higher order activity centres, off-street parking areas should be configured to facilitate future transformation into multi-deck car parks. |
| 4.17 | Super lots are only supported where it is demonstrated it facilitates land consolidation and/or for land assembly purposes for future urban development and will not be contrary to orderly and proper planning. |

Supporting documents

- *Designing Out Crime Planning Guidelines* (WAPC, 2006)
- *Development Control Policy 1.1: Subdivision of land* (DC 1.1 cl 3.4.2-4) (WAPC, 2004)
- *Local Government Guidelines for Subdivisional Development* (The Institute of Public Works Engineering Australia, 2012)
- *State Planning Policy 4.2: Activity Centres for Perth and Peel* (WAPC, 2010)

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Department of
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Western
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Planning
Commission



Liveable
Neighbourhoods



ELEMENT 4

LOT DESIGN

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Introduction

This element outlines requirements for residential lot design with an emphasis on greater lot variety and higher densities, to provide greater housing diversity, choice and affordability. Liveable Neighbourhoods encourages greater site-responsive lot design for climate-responsive dwellings and design facilitating development fronting streets and public open space to support local amenity, safety and passive surveillance.

Design principle 5: Create a site-responsive street and lot layout that provides local amenity, safe and efficient access and promotes a sense of place

Site-responsive design

Site-responsive design is advocated by providing an interconnected network of streets with development fronting the street and open spaces enhancing local identity and supporting housing diversity and increased residential density.

Lot size and layout needs to respond to the physical characteristics of an area such as slope (for example, small lots are more difficult to develop on steep slopes), existence of significant vegetation (for example, large trees retained on larger lots or in rear/front gardens), or proximity to desirable features or views (Figure 29).

Lot layouts need to accommodate landform, views, prevailing breezes, environmental features and take into account site constraints and optimise orientation to suit energy efficient housing where possible. Sufficient land should be made available for innovative design of best practice stormwater management as part of lot layout, including retention and/or detention of runoff from small rainfall events at source and implementation of water sensitive urban design principles.

Land capability assessment (structure planning) and/or geotechnical report (subdivision) may be required:

- where the land is low-lying with potential acid sulphate soil, environmental or health implications;
- where trenching results in the need for substantial backfilling; or
- where there is reason to doubt the ability of the land to support utility servicing (with or without treatment), from past experience in the particular area, or knowledge of the type of soil or terrain.

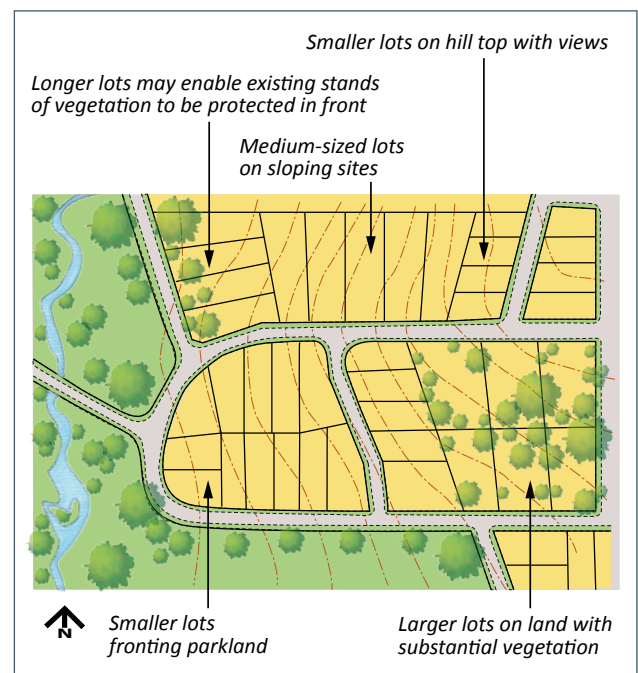


Figure 29: Lot design that is responsive to site characteristics

Lot solar orientation

The importance of suitable climatic orientation of living spaces is a well-established principle of energy efficient urban design (Figure 30). The benefits of a north-south and east-west orientation of lots in the southern latitudes derive from the variation in vertical and horizontal sun angles from summer to winter. With appropriately sized eaves, solar penetration into north-facing windows can be managed to maximise comfort and minimise energy use. Each climatic zone in Western Australia requires different lot layout and dwelling design responses to maximise the opportunities presented by these characteristics. Regardless of location, lots may be climate responsive if orientating streets within 15 degrees of north-south and/or an east-west and lot shape is square or rectangular.

In the temperate zone, lot design is required to capture winter sun and block summer sun. The correct orientation of lots allow appropriate building setback from the northern property boundary to enable

good winter sun access to suitably located and sized windows. The use of breezes to cool dwellings is also an important response to climatic conditions and may affect lot orientation, street layouts and length-to-width ratios, as well as contribute to the vernacular architecture and local identity. In northern Western Australia lot shape and size can increase shade and manage solar access.

Very narrow lots, for example, for terrace houses, work best oriented on a north-south axis so neighbouring buildings can shade east and west walls. Lots more than 12 metres wide are better oriented on an east-west axis to reduce the surface area of eastern and western walls and limit heat ingress. Design elements should incorporate strategies which mitigate urban warming such as the use of shade trees and vegetated stormwater management infrastructure on lots and within street reserves, such as green walls/roofs, tree-pits, vegetated swales and bio filters.

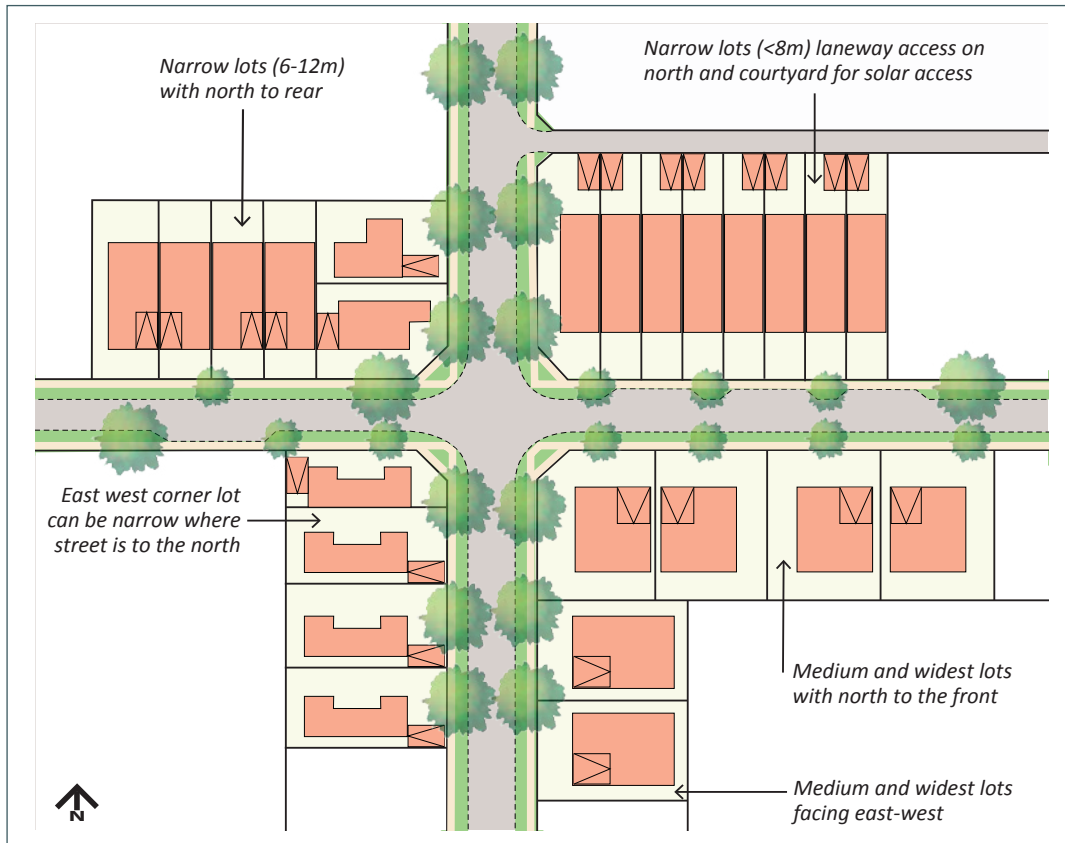


Figure 30: Lot configuration to improve solar access

SITE-RESPONSIVE DESIGN REQUIREMENTS

- 5.1 Street and lot design is to:
- facilitate climate responsive design;
 - protect natural and cultural features;
 - acknowledge site constraints including noise, soil erosion, drainage, saline or acid sulphate soils and bushfire risk;
 - accommodate natural topography and minimise earthworks, fill/excavation and retaining walls on sloping sites;
 - respond to views;
 - minimise overlooking and overshadowing;
 - provide for appropriate planting for microclimate management and energy conservation;
 - accommodate on-lot and streetscape stormwater management in accordance with water sensitive urban design principles (e.g. tree pits, swales, etc.); and
 - maximise opportunities for retention of mature trees.
- 5.2 Lots to be of a size, width and shape (generally rectangular or square) to provide for:
- solar orientation;
 - usable private outdoor space;
 - convenient vehicle access and adequate car parking; and
 - garaging in a manner that does not result in garages or carports dominating the street.
- 5.3 Lot shape, size and orientation to facilitate climate-responsive and energy efficient buildings by maximising solar access in winter and minimise in summer by:
- allowing dwellings to be constructed on the southern portion of the lot with usable open space and solar access to the north; and/or
 - increased width of south-facing slopes to allow solar access on the northern face of the dwelling.
- 5.4 Lots located north of latitude 26, shaped and oriented to maximise shading and the effect of prevailing breezes and minimise exposure of building walls and outdoor areas to direct sunlight.

Lot access

Residential lot access should be facilitated by lot dimensions that provide efficient garaging and have regard for on-street parking provision. Lot widths should suit dwellings so that garages do not dominate the streetscape. This may be achieved by:

- the average frontage width of lots with double garages and vehicle access from the primary street being not less than 12 metres in any street block;
- generally no more than five adjoining lots with frontage width less than 12 metres, where double garages and vehicle access from the primary street is intended;
- encouraging single-width garages but where a double garage is proposed to be accessed from the primary street, lots to be a minimum width of 10.5 metres and accessed by vehicular crossover, no wider than 4.5 metres where it meets the street;
- garages setback behind the dwelling and at least 4.5 metres from the street frontage to provide an additional tandem parking space for visitors; and
- providing laneways for access to double garages where lot widths are less than 10.5 metres and single garages where lots widths are less than 7.5 metres.

Approaches to reduce the impact of garaging such as the use of rear lanes where lots are narrow, and the use of single garages also increase the quantity of on-street parking as driveway crossovers are reduced. Refer to section Laneways.

Lots fronting public open space

Streets with lots fronting them should surround the majority of public open space (POS) as this provides amenity, safety and security for both POS users and residents. Street frontage contributes to the local streetscape and to personal and property security; it deters crime and vandalism and avoids the potential visual impact of extensive back fences.

Locating lots directly abutting POS should only be considered where full street frontage is impractical, and may be achieved by a variety of lot layout solutions such as incorporating rear laneways (limited to 80 metres in length) or battle-axe lots (Figure 31). These scenarios encourage the provision of diverse housing typologies that often supports higher density; accommodate smaller private open space providing a more affordable housing product. Lots that are to directly front POS may require further detailed planning (facilitated by a local development plan) to address siting, amenity and safety issues both for the development, POS and the street, such as: provision of footpaths to assist passive surveillance, uniform fencing of appropriate height, character, visual permeability and on-street parking embayments for visitor parking.

Laneways

Rear laneways help to deliver high quality streetscapes through relocating driveways and garages to the rear (or side) of narrow width and small lots particularly where alternative vehicle access is needed (for example, lots fronting major streets or public open space).

The level of convenience, community safety and security experienced by the adjoining lots and laneway users can be influenced by the design, layout and detailing of laneways, such as the strategic siting of buildings to overlook laneways to provide passive surveillance and safety and limiting the length of the laneway (refer to [Element 2, Design Principle 1](#)). Providing two-storey dwellings or studio units over laneway-access garages can provide activity and surveillance as well as contributing to greater density



Lots fronting POS

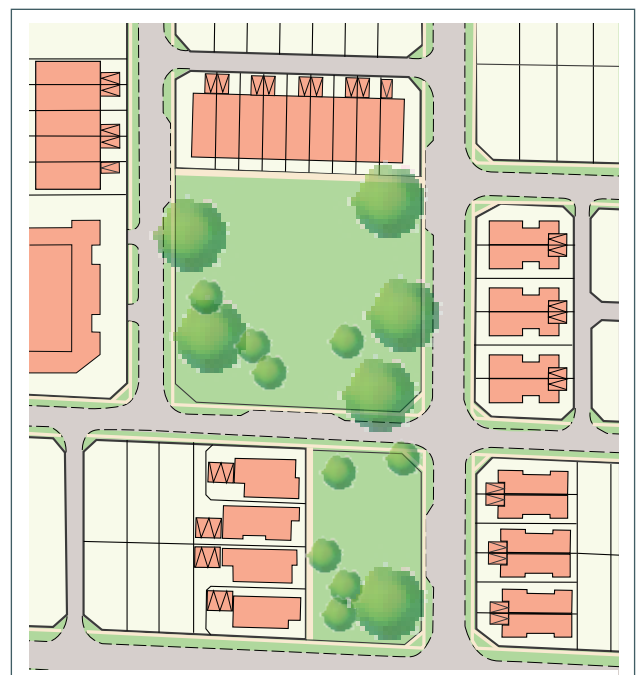


FIGURE 31: Examples of lots fronting POS

and an attractive built form environment. A local development plan may be required to facilitate development of these housing typologies.

The width of the laneway should minimise the requirement for building or fence setbacks on lots, particularly where these could result in hidden recesses or provide illegal access opportunities into rear yards. Half-a-metre (0.5 metres) setback for garages and fences, and a minimum laneway width of 6 metres, allow adequate reversing space and improve safety and surveillance.

Laneways also need to contain and manage small rainfall event runoff in accordance with Department of Water stormwater management criteria.



Passive surveillance of laneway



High quality streetscape in laneway

Battle-axe lots

A battle-axe lot configuration provides access via a distinct access leg, of sufficient width to accommodate a driveway and the necessary public utility services, which is attached to and forms part of the lot. Battle-axe lots can provide housing choice and make effective use of land where they can achieve adequate amenity for residents and neighbours and enhance community safety. However, battle-axe lot configurations should be used in limited situations and circumstances. Laneway access is the preferred design response. The limited situations and circumstances where battle-axe lots may be appropriate include where they may:

- provide an alternative access for lots fronting major streets with vehicle access restrictions, or POS;
- maximise views or frontage to POS;
- encourage retention of vegetation through reduced street construction requirements;
- provide vehicular access to significantly sloping sites where acceptable street gradient can't be achieved; or
- encourage retention of existing heritage or character buildings; as identified by the local planning framework.

The design of battle-axe lots should have regard to the requirements specified in *State Planning Policy 3.1: Residential Design Codes* (WAPC, 2013) (SPP 3.1) and *Development Control Policy 2.2: Residential Subdivision* (WAPC, 2013) (DC 2.2). A minimum effective lot area of 850m² is required for land where SPP 3.1 does not apply.

Access leg widths for each battle-axe lot are to be a minimum of four metres. This may be reduced to three metres to address site constraints and subject to support from the relevant local government and utility service providers. In some instances, a wider access leg may be required to address site constraints and to provide sufficient space for vehicle manoeuvring. In cases where battle-axe legs adjoin, an agreement between landowners and the local government is required to ensure reciprocal rights of access and any shared turning area is legally in place.

A 3x3-metre truncation is required at the point where the access leg joins the effective area of the lot, to allow for improved vehicular access into the lot and for sightline purposes. In addition, a further truncation should be provided at the point where the access leg

meets the street reserve in order to improve visibility and sightlines for vehicles, pedestrians and cyclists entering or leaving the lot, particularly where a footpath exists on the street.

Lot access to major streets

Development fronting major streets such as integrator A arterial and neighbourhood connector streets is advocated, rather than development backing on to them. This prevents unsightly rear fencing dominating the streetscape and creates a safer and more pleasant walkable environment. On lots fronting major streets it is critical to achieve appropriate vehicle access, mixed-use potential, noise management, visitor parking and to maintain amenity (Figure 32).

Lots backing onto integrator arterial streets and/or the use of solid walls should be avoided. It is possible to capitalise on the benefits associated with development fronting all streets other than Main Roads-controlled primary distributors (freeways and highways). Planning should provide alternative vehicle access through a variety of lot layout solutions that maintain street frontage including:

- using service streets for integrator arterials;
- using battle-axe lots to provide vehicle access from secondary streets;
- arranging lots to side onto busier streets, with vehicle access from a secondary street;
- providing for frontwards exit layouts for garages and driveways for larger lots fronting neighbourhood connectors;
- and
- shared driveways to garages at rear, arranged to require frontwards exit.

It is possible to capitalise on the benefits associated with development fronting all streets other than controlled access highways and freeways, such as incorporating mixed use/home based business.

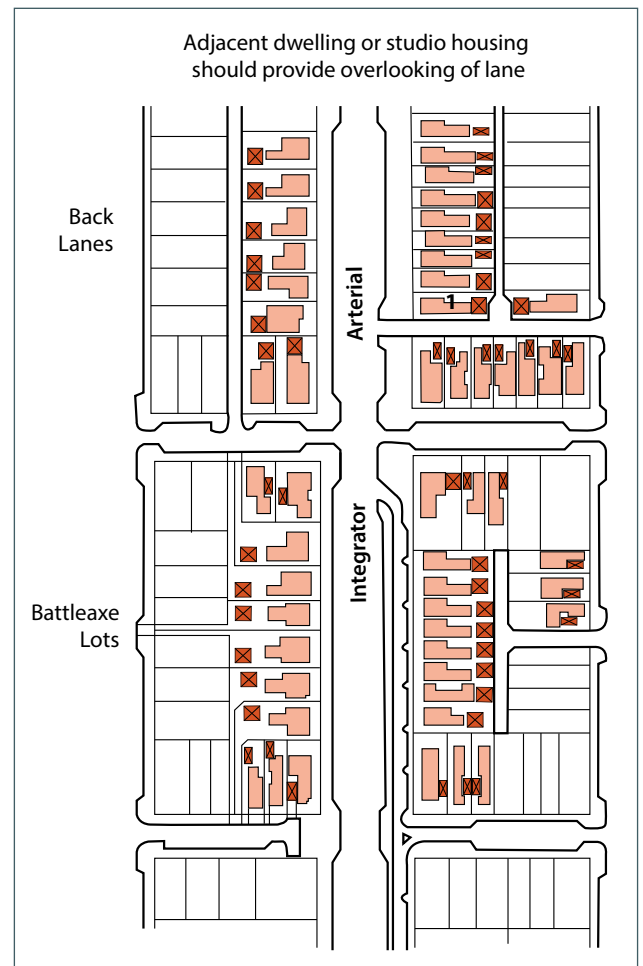


Figure 32: Lot layout to avoid vehicles reversing onto busy streets

Integrator arterial with service road



LOT ACCESS REQUIREMENTS

- 5.5 Orient lots to front all streets, including integrator arterials to provide streetscape amenity and passive surveillance to create a pedestrian friendly environment.
- 5.6 Lot design to avoid vehicles reversing onto streets with vehicle volumes greater than 5,000 vehicles per day.
- 5.7 Access to lots fronting integrator arterials generally provided with service streets or rear laneways. Where site constraints preclude service street provision, limited battle-axe lots or alternate form of vehicle access provision may be considered.
- 5.8 Laneways to be provided for vehicular access to lots:
- to provide opportunities to improve amenity of selected streets;
 - where lot widths are narrow;
 - for higher density residential or mixed use development;
 - where lots front public open space in some circumstances; or
 - where lots front busy streets where direct vehicular access is undesirable.
- 5.9 Lot layout served by rear laneways to be detailed to include activity and passive surveillance measures, through:
- locating housing typologies with upper levels that overlook the ends and junctions of laneways;
 - providing access from the laneway, including dwellings such as studio units having an independent entry from the laneway; and
 - garages are setback 0.5 metres.
- 5.10 Lots may front directly onto public open space in limited circumstances where:
- access is provided, by a rear laneway which has a maximum length of 80m and is located at the end of a street block; or by battle-axe lots;
 - there is a footpath or shared-use path along the public open space providing pedestrian access to the lots;
 - a street is located on the opposite side of the public open space of the lots fronting POS; and
 - visitor parking is provided along side streets.
- 5.11 Battle-axe lots to be used in limited circumstances, where amenity and safety can be maintained and where no alternative is available to address site constraints.
- 5.12 Lots having frontage and access to streets at both front and rear boundaries, other than rear laneways, are not supported, although exceptions may be made if the proposed lot is specifically designed and intended to be developed for commercial, industrial or high density residential land uses where multiple vehicular access points are required and where consistent with the operational and safety requirements of fronting streets.

Design principle 6: Provide housing density and diversity to meet the changing community needs

Housing diversity

Housing diversity is achieved by providing a variety of lot sizes and resultant housing types distributed throughout neighbourhoods and preferably within the same street (Figure 33). This facilitates housing diversity, choice and assists affordability ranging from lots for single dwellings to lots suitable for grouped and multiple dwellings.

Density targets facilitate housing diversity and vary depending on location. Higher densities are expected in areas 400 metres of a local or neighbourhood activity centre and 800 metres of a higher order activity centres or transit stations. Table 3 in *State Planning Policy 4.2: Activity Centres for Perth and Peel* (WAPC, 2010) (SPP 4.2) outlines housing density targets within specific walkable catchments for higher order activity centres and specialised centres. Refer also to [Element 1: Community Design - Objective 7](#).

A structure plan should define the broad residential density ranges that apply to specific residential and mixed use areas. This should be in accordance with housing demand and density targets identified in any relevant local government local planning or housing strategy, sub-regional and district structure plan and in SPP 4.2 where an activity centre is proposed. The structure plan outlines the requirement for residential code plans to be submitted at the time of subdivision to designate lot specific R-coding for land subject to R-coding ranges on the structure plan map.

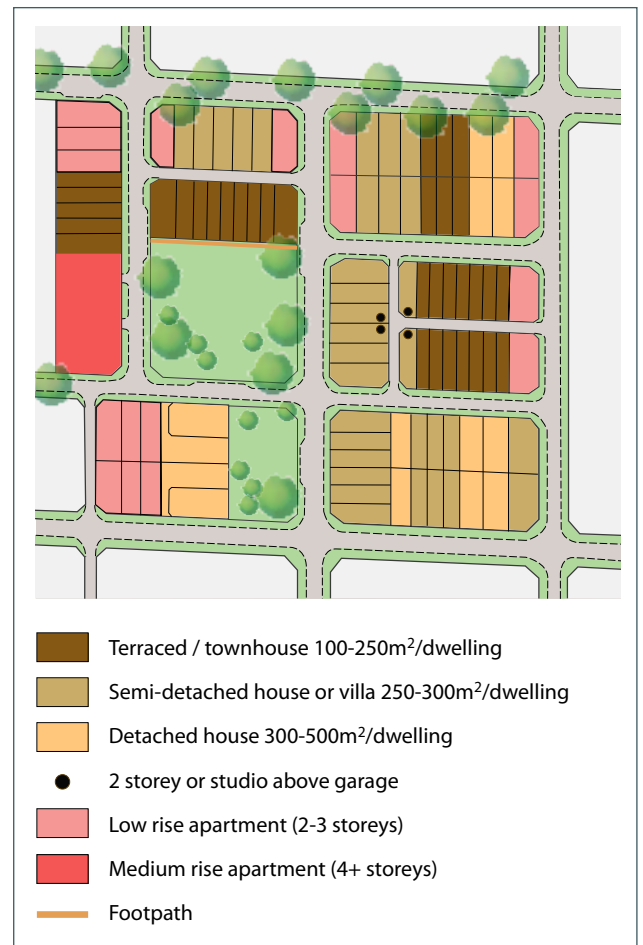


Figure 33: Housing typology that encourages lot density and diversity

Medium density housing



Small lot housing



Lot size and shape

Regular shaped lots and consistent lot dimensions allow a more efficient lot layout which minimises civil engineering and building construction costs and, in turn, assists housing affordability. In addition, standardised lot dimensions facilitate flexibility in future re-subdivision. Frontage to depth ratios of between 1:1.5 and 1:2 have been common practice and are proven effective.

The minimum and average site area and frontage requirements of the relevant R-Code designated to land under a local planning scheme will form the basis for the subdivision of residential land. Variations to these lot sizes may only be made in accordance with SPP 3.1 and DC 2.2 which allow for a five per cent variation at subdivision subject to criteria being met. Lot sizes greater than the specified minimum or average will be considered unless the WAPC, having regard to the reasons for the selection of the particular R-Code and any commitments made to service infrastructure, considers that uneconomic use of services would result.

Lots intended for re-subdivision and/or development of more than one dwelling are to be identified on a plan of subdivision. Proposals to subdivide land to create two or more lots of less than 260m² should be submitted with information regarding the manner in which such lots can effectively be developed in accordance with SPP 3.1, including the arrangement of proposed buildings, fences, driveways and other development on the land to enable the relationship between the subdivision and the development to be assessed. Local development plans may be used to define building envelopes and design requirements to achieve desirable built form outcomes, particularly for lots fronting public open space.

Providing denser housing in activity centres

A range of medium and high density housing should be located in and surrounding all activity centres. Housing in upper floors of mixed-use buildings is strongly encouraged. This provides centrally located housing and creates a sense of urban scale and intensity along streets.

In some urban fringe areas, land may be developed on sites near proposed transit stations or activity centres well in advance of provision of these facilities. In such cases, the subdivision pattern should be robust, to allow for future more intensive subdivision and development as the urban area matures and public transport provided. A subdivision design for larger lots accompanied by local development plan(s) setting out an overlay plan demonstrating how higher densities can be achieved in the future may be required and supported, provided that incremental intensification of the initial development to the target density can occur without significant demolition.

Refer to [Element 1: Community Design – Objective 7](#) and [Element 3: Activity centres – Design Principle 4](#) for more information about density.

Local development plans

Local development plans (previously referred to as detailed area plans) are a mechanism used to coordinate and assist in achieving better built form outcomes by linking lot design to future development. They are used to supplement development standards contained within local planning schemes and the R-Codes. They can facilitate the design and coordination of development upon small and usually highly constrained lots to ensure appropriate development outcomes, but can also assist to coordinate future staged development and redevelopment for larger lots, usually within or close proximity to future activity centres and transit stations. Local development plans can streamline the development approval process, with compliant development not requiring planning consent. Local development plans are to be prepared consistent with Table 13 and Table 14 and the objectives of SPP 3.1.

Local development plans must be used in limited situations and circumstances to guide and coordinate specific built form, access and amenity for particular development outcomes which are integral to urban design and community place making. Local development plans must not be used merely as a means to vary the deemed-to-comply provisions of the R-Codes. They should apply to specific lots and not entire housing estates.

Local planning scheme provisions may provide for local development plans to be prepared for a particular lot or group of lots. Once approved, the local development plan is used to assess and determine subdivision and development proposals. Where a local planning scheme does not include such provisions the WAPC may require alternative design coordination; for example, caveats or restrictive covenants for a specified period executed by the landowner.

Structure plans should describe and identify on the map (if known) where a local development plan(s) is required and identify the issues and main principles to be addressed.

It is preferable for any design considerations that may affect subdivision to be addressed prior to the subdivision application being made. Where design

coordination is likely to be required as a result of proposed subdivision, and a local development plan has not been approved, the WAPC may approve a subdivision subject to a condition requiring the applicant to submit and gain local government approval for a local development plan prior to subdivision clearance and issue of titles.

Local government may require an undertaking from the landowner that arrangements are in place ensuring that all prospective purchasers of lots subject to a local development plan will be provided with a copy of the local development plan.

TABLE 13: Matters for inclusion in local development plans

Building envelope – ground floor and upper floor setbacks, building envelopes including maximum building height, boundary wall location, length and height, and other side and rear setbacks (for example, relating to solar access, tree protection, easements); north boundary setback for solar access, nil setbacks for mixed-use development on main street centres.

Vehicle access and parking – vehicle access points and garage/carport location, size and on-street parking provision or shared use of nearby parking areas.

Fencing and retaining walls – heights, detailing, retaining wall height.

Utility services – easement types and location.

Private open space – outdoor living area size, location and areas to be left uncovered.

Landscaping – location of existing trees and vegetation retained on or off site.

Noise-attenuation and buffer – location and type of noise-attenuation and buffer measures.

Ancillary dwellings and/or studio dwellings, home business – location, configuration, size and parking provision.

Encroachments – reciprocal rights-of-way, party walls.

Time limit, expiry or variations to local development plan(s) – local development plans will have effect for a period of 10 years commencing on the day the local government approves the plan unless another period is agreed by the local government or if the local government earlier revokes its approval. Local development plans can only be amended by local government. Landowners in the area covered by a local development plan may request the local government to amend the plan.

TABLE 14: Criteria for evaluation of local development plans

Local development plans should result in development that satisfies the following matters:

- adequate light and ventilation, visual and acoustic privacy, occupant and community safety, solar access for amenity and energy efficiency;
- useable private recreational open space, comprising a unroofed/open component;
- amenity protection for existing abutting neighbours from overlooking, overshadowing, noise intrusion or visual bulk adjacent to principal private open space areas;
- streetscape quality and neighbourhood character, including building scale and character, fencing and landscaping, location of garages behind the fronts of dwellings;
- opportunities as identified for future building adaptation, redevelopment intensification or land use change;
- adequate on and off-street car parking, vehicle access, storage and servicing requirements; protection or response to any specific site or heritage features; and
- at-source management of runoff from small rainfall events resulting from the potential increased runoff created by the increased imperviousness often associated with increased urban density.

HOUSING DIVERSITY AND LOCAL DEVELOPMENT PLANS REQUIREMENTS

6.1	A range of residential lot sizes suitable for a variety of housing types and densities provided, preferably within each street block.
6.2	Lots capable of supporting higher density residential located within 400 metres of local and neighbourhood activity centres and 800 metres of higher order activity and specialised centres.
6.3	Local development plans may be prepared in accordance with Table 1 and Table 2 and the objectives of State Planning Policy 3.1: Residential Design Codes for lots: <ul style="list-style-type: none"> • with an area less than 260m² and irregularly configured lots; • where specific vehicle access and egress control is required; • abutting public open space; • on main streets and within and abutting local and neighbourhood activity centres that have been identified to accommodate a future change of use or future development intensification; • with particular site constraints; for example, where topography requires the construction of retaining walls to streets or boundaries; or • for which noise buffer and amelioration requirements need to be addressed.

Design principle 7: Provide sustainable utility services to each new lot in a timely, cost-effective, coordinated and visually acceptable manner

Utility service provision

The provision of utility services to proposed new lots is an essential requirement to service residents. The street and lot layout should enable efficient provision of utility services and ensure future new or upgraded services such as grey water distribution systems and communication networks (e.g. national broadband network) can be incorporated.

Consideration should be given to long-term use of the site, operational and maintenance requirements. The design and provision of public utilities, including sewerage, water, electricity, gas and communication services should be cost effective over the lifecycle and should seek to minimise adverse health and environmental impact. For areas with higher land use and density, the level of service may need to increase (for example, gas in activity centres to support restaurants, availability of broadband in commercial environments etc.). The selection of materials and technologies used in the construction of service networks should be determined by suitability, durability, ease of maintenance and cost effectiveness, whole-of-lifecycle costing, energy savings and reduction in greenhouse gas emissions.

The provision of utility services is to be determined in consultation with the WAPC, local government, and the utility service providers at the earliest possible stage of the planning process and during the site analysis stage of structure planning to determine:

- the location, size, distribution and capacity of existing infrastructure and the impact of the proposed development on these existing services;
- major sewerage and water supply infrastructure requirements, including future easements, proposed and existing sites for sewage treatment plants, pump stations, sewer mains, water towers, production bores and identify areas that cannot be reasonably provided with reticulated sewerage where the Government Sewerage Policy applies;
- major trunk utility service locations and requirements, including proposed and existing high-transmission lines, sub-stations and gas pipelines and required protection easements;
- the need for buffers; for example, from power generation and wastewater facilities, including a statement of compliance with draft *State Planning Policy 4.1: State Industrial Buffers* (WAPC 2009) (SPP 4.1) and *EPA Guidance Statement No.3 - Separation Distance between Industrial and Sensitive Land Uses* (EPA 2005); and
- the feasibility and provision of alternative systems, such as solar power, non-drinking water supply, and wastewater treatment.

Provision of utility services



Energy

Residential subdivisions generally have substantial electricity requirements that may require new distribution and transmission infrastructure, including zone substations and transmission lines to provide capacity required to supply development at full build out. Consideration to the visual amenity of the area is required and the provision of underground servicing is advocated, given considerable advantages including improved visual quality, supply safety and reliability, greater flexibility in street design and lower maintenance costs.

In all cases the provision of alternate renewable electricity generation systems (for example, solar and wind) from local (lot-specific) to district (multiple lot) scale is encouraged. In areas where a reticulated gas network is available, gas supply is encouraged for each lot.

Water

The supply of water for domestic use and firefighting purposes is essential; therefore, subdivision for urban purposes is to occur in locations where there is access to an adequate reticulated water supply. In areas of bushfire risk, an independent water supply is required (in addition to reticulated water supply) as reticulated water supply and water pressure cannot be guaranteed in the event of a bushfire. Additional facilities including hazard reduction zones, pumps, tanks, hoses etc. would also need to be considered in areas of bushfire risk.

Wastewater

The processing of wastewater (including sewerage) disposal is focused on the protection of public health and to minimise adverse environmental impact. Integration with non-drinking water supply and re-use systems is encouraged.

In the Perth metropolitan, Peel and greater Bunbury regions, there is a general presumption against urban development where reticulated sewerage cannot be provided. There may be circumstances, particularly in regional areas, where an area is located beyond reasonable access to a readily connectable sewerage system, in which case alternative sewage treatment systems must be provided in accordance with the Government Sewerage Policy.

Where an alternative wastewater treatment system is proposed, the proponent must demonstrate the suitability of the wastewater disposal method proposed to the WAPC and the Department of Health by providing:

- an understanding of the proposed extent of development and long term planning intentions of the area, identified in a local planning strategy (or similar) showing the area/areas, land uses, densities, lot sizes and envisaged development;
- a geotechnical/land capability report approved by the Department of Health demonstrating that the proposed method of wastewater disposal will not have an adverse impact on public health;
- advice from the Department of Parks and Wildlife or Department of Water indicating that the proposed wastewater disposal method will not have an adverse impact on the environment, watercourses or groundwater;
- satisfactory arrangements regarding the ongoing management and maintenance of sewer disposal infrastructure for example, Economic Regulation Authority licensing; and
- compliance with all relevant legislation, in particular with the Government Sewerage Policy.

Lot drainage

A piped drainage lot connection should only be provided as a last resort, where overland flow of roof and lot runoff from significant rainfall events from the lot to the street reserve cannot be achieved or infiltrated on site (for example, by using rainwater tanks, garden beds, underground soakage units or detention tanks). To ensure the use of water that is fit-for-purpose and reduce the demands on scheme water, alternative non-drinking water supply systems are encouraged.

Non-drinking water supply

It is estimated that up to 60 per cent of the average household water use does not need to be of drinking water quality and could be substituted with a non-drinking water source. Non-drinking water sources include groundwater, rainwater, stormwater and recycled water (treated wastewater and grey water). Non-drinking water has to be fit-for-purpose and may require further treatment depending on the intended use.

In suitable areas, rainwater tanks, domestic garden bores and grey water reuse systems can be installed by the homeowner and the water is usually safe for non-drinking purposes if it is used appropriately. Alternatively, non-drinking water can be supplied via a dual reticulation system (or third-pipe scheme) for in-house and/or garden watering by a water service provider. The implementation of such systems is encouraged provided they meet water quality standards for protecting public health and the environment and maximise water use efficiency through prioritised use of available water sources.

Dual reticulation systems are considered economically most viable in new residential developments where required underground infrastructure can be co-located and constructed concurrently with other utility services. The Departments of Health, Water and Environment Regulation provide guidance and regulate recycled water systems.

Telecommunications

Early consideration of wireless and mobile phone telecommunication requirements allows for them to be incorporated into the design of urban areas and mitigate potential visual and amenity impacts to the community. In all new developments within the NBN Communications fibre footprint, fibre ready pit and pipe infrastructure to be provided in accordance with the *Telecommunications Legislation Amendment (Fibre Deployment) Act 2011* (amendment to *Telecommunications Act 1997*).

UTILITY SERVICE PROVISION REQUIREMENTS

- | | |
|-----|---|
| 7.1 | Each lot provided with utility services appropriate for its intended use in a timely, efficient and cost effective manner over the short and long-term. |
| 7.2 | Where the location is such that development is accessible to, and can be readily connected to, the existing distribution system; and is technically and economically acceptable to the service provider: <ul style="list-style-type: none"> • connection to underground power, reticulated water and wastewater provided for each lot; and • the installation of gas, broadband and telecommunication and renewable energy systems encouraged for each lot. |
| 7.3 | Where a reticulated wastewater system is not available, an on-site effluent disposal system must be provided for transportation, treatment and disposal of wastewater in accordance with the Government Sewerage Policy: Perth Metropolitan Region (Department of Health, 1996). |
| 7.4 | In areas of bushfire risk, independent permanent and secure water supply to be provided that is sufficient for firefighting purposes. |
| 7.5 | Minimise the environmental impact of utility service infrastructure, including visual and landscape impact, while balancing service delivery. |
| 7.6 | Rainwater runoff either by overland flow or direct piped connection to only occur after on-lot retention and/or detention (for example, rainwater tanks, garden beds or underground soakage units or detention tanks) in accordance with Department of Water stormwater management criteria. |
| 7.7 | Provision of easements or infrastructure (third pipe) for non-drinking water supply is encouraged, subject to available and reliable sources, taking into account existing and planned water infrastructure, compatibility and ongoing management and maintenance of infrastructure. |

Supporting documents

Development Control Policy 2.2: Residential Subdivision (WAPC, 2013)

Draft State Planning Policy 5.1: Land Use planning in the Vicinity of Perth Airport (WAPC, 2014)

Government Sewerage Policy: Perth Metropolitan Area (Department of Health, 1996)

Guidelines for the approval of non-drinking water systems in Western Australia – Urban Developments (Department of Water, 2013)

Guidelines for the non-potable uses of recycled water in Western Australia (Department of Health, 2011)

Land Title Registration Practice Manual and Survey and Plan Practice Manual (Landgate, 2014)

State Planning Policy 3.1: Residential Design Codes (WAPC, 2013)

State Planning Policy 3.6: Development Contributions for Infrastructure (WAPC, 2009)

State Planning Policy 3.7: Planning for Bushfire Risk Management and Bushfire Management Guidelines (WAPC, 2014)

State Planning Policy 5.3: Jandakot Airport Vicinity (WAPC, 2014)

State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning (WAPC, 2009)

State Planning Policy 5.2: Telecommunications Infrastructure (WAPC, 2004)

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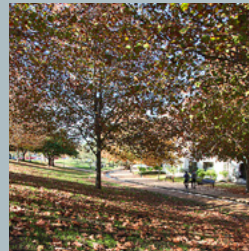
Department of
Planning



Western
Australian
Planning
Commission



Liveable
Neighbourhoods



ELEMENT 5

PUBLIC OPEN SPACE

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Introduction

An integrated network of public open space (POS) contributes significantly to the quality of life, vitality, identity, community interaction and sense of place in neighbourhoods. Public open spaces should complement each other through innovative and site responsive design; and encourage a healthy, active lifestyle by facilitating walking and cycling, and provide access to schools, community facilities and activity centres.

The POS size hierarchy and function is based on the *Classification Framework for Public Open Space* (Department of Sport and Recreation, 2012) to facilitate consistent terminology and enable comparative assessments of open space provision and function. A balance between native vegetation retention and provision of urban water management is advocated through the provision of functional POS for sport, nature and recreation.

The use of smaller parks close to or within activity centres and locating larger parks nearer to the edges of neighbourhoods via a POS network is advocated to maximise use and access by local residents and the wider community.

Design principle 8: Coordinate the design and delivery of an integrated network of public open space that provides communities with access to nature, sport and recreation

Public open space function

Public open space planning should consider what role the space provides for the community. Liveable Neighbourhoods identifies the function of POS as; *sport, recreation and nature*, which replaces the terms *active* and *passive* use. As part of the structure planning process, all POS should have a stated intended function which should be identified in the POS schedule and POS management/landscaping plan or strategy. Highly effective spaces generally offer multiple functions, so as to appeal to a wide range of users. The identification of the function of a site does not need to align to site boundaries – a function may only cover a portion of the land area and this can be identified accordingly.

All publicly accessible land can contribute to function, even if it is not a POS site. For example, a regional sporting facility on regional open space (ROS) providing sport opportunities, a BushForever site providing a nature function and a walking trail on an easement providing recreation opportunities.

Sport spaces provide a setting for formal structured or organised sporting pursuits capable of hosting team competitions, physical skill development and training. Sport spaces are designed to accommodate playing surface, buffer zones, and supplementary infrastructure requirements such as clubrooms, training nets and storage, as well as spatial and access requirements for spectators and visitors such as streets and parking provision.

Sites identified for sporting function should be flexible in their design to accommodate a range of sports or sized competitions and allow easy adaptation to different uses and functions in response to changing community preferences. A site which is able to provide space for multiple sports throughout the year and located alongside a space providing a nature and/or recreation function is a valuable community asset. Sites which are not just turf grass are more visually interesting, become a destination for a variety of different people, and are more valued by the community as a whole.

In the strategic planning for sport provision at a district scale, 6.5m² of active playing surface per resident is considered an appropriate guide, ideally accommodated within regional or district parkland to accommodate major sports events and high access requirements. Refer to any regional or sub-regional strategic planning to determine what can be allocated regionally and provide the remainder in POS contribution.

When determining the appropriate land area for any associated infrastructure in addition to playing surface, the ratio 1:1.4 should be used. Refer to *Sports Dimensions Guide for Playing Fields* (Department of Sport and Recreation, 2008), to ensure adequate allocation of land for sport spaces outlining spatial requirements and field dimensions for various organised sports and activities. Sport spaces should be preferably rectangular in shape and their length should not exceed twice the width. There should be no extreme differences in topographical levels (i.e. site slope no greater than one in 20) and should not require extensive earthworks, benching, retaining and/or fill.

Examples of appropriate sport spaces are:

- Sporting ovals of an appropriate size for competition use (as per *Sports Dimensions Guide for Playing Fields*: Department of Sport and Recreation, 2008)
- Outdoor basketball/netball/tennis courts
- Recreation centres including gyms, squash courts, swimming pools
- Associated infrastructure such as parking, club rooms, training areas and storage.

Recreation spaces provide a setting for informal play and physical activity, relaxation and social interaction. These spaces enhance physical and mental health of the community through activity that provides amusement, tranquillity or stimulation. Recreation spaces can be accessed by all to play, socialise, exercise, celebrate or participate in other activities that provide personal satisfaction or intrinsic reward.

Examples of appropriate recreation spaces are:

- Playgrounds and playscapes
- Community purpose sites (e.g. halls, libraries, local theatre, community gardens)
- Plazas, piazzas and civic squares (paved open pedestrian spaces to complement a main street)
- Skate parks and half-court basketball courts
- Picnic/barbeque areas, gazebos and casual seating
- Casual exercise, walking and training space for individuals and small groups
- Dog exercise and training areas
- Farmers' markets
- Bike parking facilities, solar charging stations and other facilities that are ancillary to transit near bus stops and train stations.

Nature spaces provide a setting for people to enjoy and connect with nature. Sites are managed to enable access by the community whilst protecting environmental values. It may be possible to provide a high quality space for improving environmental values, by considering the viability of the site and its contribution to local biodiversity. The *Local Government Biodiversity Planning Guidelines for*

Sport space



Recreation space



Nature space



the Perth Metropolitan Region (WALGA, 2004) provides guidance relating to size, connectivity, shape, perimeter/size ratio and vegetation condition useful for this process.

Nature sites should be identified as part of the site and context analysis to prevent the unnecessary clearing and/or degradation of any existing native vegetation retained on the site. Nature spaces should be fully accessible to the public (i.e. not fenced off), although providing walking trails to prevent undue damage to vegetation is acceptable. Nature sites should also have minimal water demands, and should not require ongoing irrigation post-establishment.

For land administration purposes POS providing a nature function are to be reserved for the purposes of 'recreation' just as for any other POS contribution (as shown on plan of subdivision and local planning scheme maps) and not 'conservation' as they are not BushForever or protected under any other environmental legislation.

Examples of appropriate nature spaces are:

- Native vegetation retention
- Walking trails through native vegetation areas
- Nature play areas
- Bird watching (bird hides and interpretative signage)
- Coastal and riverine foreshores
- Areas for quiet contemplation and reflection.

Size of public open space

Public open space of different sizes play different roles in the creation of valuable spaces for the community and any assemblage of sizes can be utilised to create the network of POS (Figure 36). All residential lots should be located within walking distance (within 300 metres) to a POS site of any size, to meet daily needs, and additionally, should be within the catchment of POS sites providing access to nature, sport and recreation opportunities. Refer to [Element 1: Community Design – Objective 5](#).

The size and shape of the POS site should be site responsive and considered simultaneously with its proposed function, particularly when it comes to the provision of certain sports which have minimum size requirements and specific land allocation needs. When

designing POS, the size and dimensions should allow future adaptation to changing community recreational requirements.

District parks are designed to attract a wide range of users groups for different purposes and can accommodate them concurrently. Their large size allows provision of small and large scale activities and leisure opportunities in the same space, adjacent to and interacting with each other where appropriate.

It is important to identify district parks in strategic planning in order to set aside adequate land. These larger parks are designed to serve a cluster of neighbourhoods and therefore need to be accessible by an arterial network and ideally serviced by public transport networks in order to cater for a wider user catchment.

Neighbourhood parks provide a recreational and social space for a whole neighbourhood to walk to and attract different user groups by providing a variety of different opportunities.

Neighbourhood parks should be located between or towards the edge of neighbourhoods rather than at the core. Neighbourhood parks are generally not compatible with activity centres due to their size and effect on access to the centre.

There is opportunity to provide a combination of recreation and nature functions within neighbourhood parks and opportunities for co-location particularly with school sites.

Refer to [Element 6: Education – Design Principle 10](#) for more information about co-location.

Local parks are designed to accommodate daily recreation for the local community. Local parks are primarily designed to include recreational and or nature space functions, but may include small sports functions such as basketball or tennis courts. These public open spaces are best located interspersed through a neighbourhood.

Small parks contribute to the landscape character and quality of the neighbourhood and make walking through the area more enjoyable and appealing to residents. They can be used as linkages in a network of green, shaded streetscapes and linear parklands to facilitate ease of access for all residents. Ensuring that small parks are located in close proximity to activity centres, or within 200 metres of another POS site will

establish connectivity, and leverage their effectiveness on walkability and recreation opportunities. Plazas, piazzas, civic spaces and paved open pedestrian spaces can complement and enhance main street based activity centres.

Community purpose sites contribute to community development, engagement and social infrastructure by providing a community gathering point and are best located adjacent to an activity centre, school or park, providing a place making function, enabling joint use and concentrated community activity. The proposed location must be justified in terms of its purpose, benefit to community design and user accessibility.

Community purpose sites are generally provided at the request of local government for specific purposes (e.g. community halls and centres, libraries, community gardens etc.) which are identified for future provision within a community facilities plan or strategy. With local government support, the WAPC accepts these sites as part of the required 10 per cent POS contribution (Refer to [Public Open Space Provision – Design Principle 9](#)).

Linear open space can assist with connectivity, encourage pedestrian movement along park avenues and provide ecological corridors and opportunities for living streams by retaining key landform features. Long, narrow POS sites that are longer than they are wide must be overlooked by adjoining residential lots for at least 50 per cent of their length. Pedestrian access ways cannot be credited as linear open space as a POS contribution. Well-designed linear open space which is at least 15 metres wide on average, with landscaping, park furniture and lighting, may however include a pedestrian and cycle path particularly; applicable in urban areas.

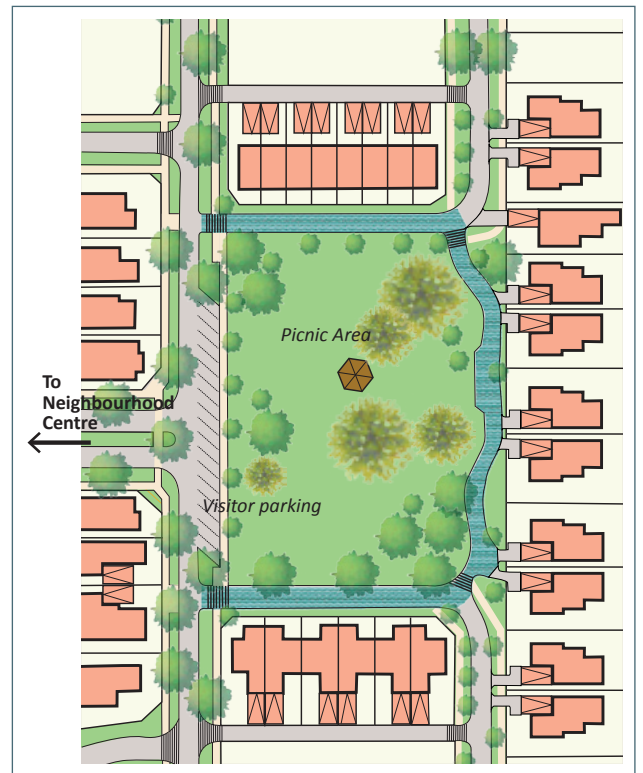
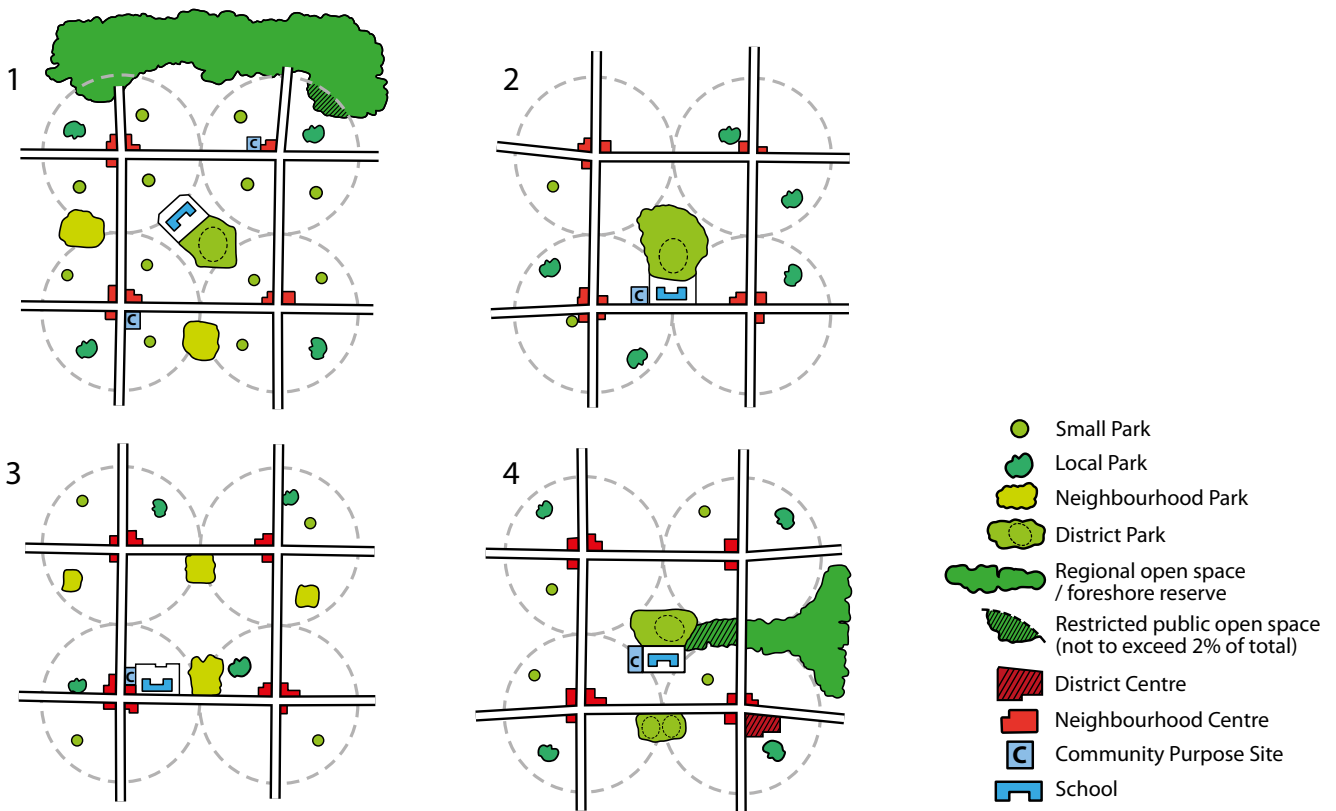


Figure 34: local park with medium density housing



Figure 35: Small corner park adjacent to bus stop



Park Type	Scenario 1 With many smaller parks and two community purpose sites, a central School location (Traditional Model)	Scenario 2 Focus on local parks with a large district park (suburban) (Suburban Model)	Scenario 3 Focus on even distribution using smaller parks (Schools in Local Centre) (Higher Density Model)	Scenario 4 Two small or local parks per neighbourhood and two district parks serving the cluster
Small Park	12 @ 0.3 ha = 3.6 ha	2 @ 0.4 ha = 0.8 ha	4 @ 0.2 ha, 0.4 ha, 0.3 ha, 0.2 ha = 1.1 ha	4 @ 0.3 ha, 0.3 ha, 0.4 ha, 0.4 ha = 1.4 ha
Local Park	4 @ 0.4 ha, 0.5 ha, 0.6 ha, 0.5 ha = 2 ha	7 @ 0.5 ha, 0.6 ha, 0.5 ha, 0.7 ha, 0.7 ha, 0.6 ha, 0.6 ha = 4.2 ha	4 @ 0.6 ha, 0.5 ha, 0.5 ha, 0.8 ha = 2.4 ha	4 @ 0.4 ha, 0.4 ha, 0.5 ha, 0.5 ha = 1.8 ha
Neighbourhood Park	2 @ 1 ha, 1.1 ha = 2.1 ha	2 @ 1.4 ha, 3 ha = 4.4 ha	4 @ 1.2 ha, 2.5 ha, 3.2 ha, 5 ha = 11.9 ha	Nil
District Park	1 @ 5.5 ha + school	1 @ 7.4 ha + school	(Provided nearby – within 2 km)	2 @ 5 ha, 5.8 ha = 10.8 ha + school
Community Purpose Site	2 @ 0.2 ha = 0.4 ha	1 @ 0.2 ha	1.6 ha + school	1 @ 0.2 ha
Restricted Use POS <2% of total	3.4 ha	Nil	Nil	2.8 ha
Total and % of GSA	17 ha 10%	17 ha 10%	17 ha 10%	17 ha 10%

Note:

The above should be read in conjunction with [Table 1](#), which gives a guide to the size of each public open space and the distance residents would be prepared to travel to use the site.

Figure 36: Public open space models

PUBLIC OPEN SPACE FUNCTION AND SIZE REQUIREMENTS

8.1 Sport spaces are designed to:

- provide a venue for structured sporting activities, auxiliary infrastructure and buffer zones;
- meet the appropriate size, access and parking requirements for competition use;
- provide an efficient layout that maximises useability; and
- be located on a site providing at least one other function (recreation and/or nature).

8.2 Nature spaces are designed to:

- provide residents with access to natural areas (not fenced off);
- support the preservation of natural features (e.g. native vegetation, trees, key views, rock outcrops, creek-lines); and
- support any Local Government Local Biodiversity Strategy, where applicable.

8.3 Recreation spaces are designed to:

- provide space for informal activity; and
- accommodate multiple types of recreation activities to cater to diverse resident demographics.

8.4 Community purpose sites provide space for facilities and are:

- located in activity centres or adjoining POS;
- generally at least 2000m² in size;
- generally provided on the basis of one for each group of three neighbourhoods (1500–1800 dwellings); and
- identified on an approved structure plan and will be required to be transferred free of cost to the local government where included as part of the 10 per cent public open space contribution.

8.5 Linear open space sites are to be:

- at least 15 metres wide on average (less than 15 metres wide is a pedestrian access way and not credited as POS);
- designed in accordance with Designing Out Crime Guidelines (WAPC 2006);
- used to connect at least two key destinations in the public open space network; and
- overlooked by residential lots for at least 50 per cent of their length.

Local government public open space strategies

Public open space strategies, either independently or in combination with a local planning strategy or other strategic local government documents, are a crucial tool for local governments to guide delivery of the most appropriate POS for the community.

The WAPC will be guided by the local government, particularly on matters relating to the size, distribution, function, landscape design and park management arrangements which must be considered and assessed in the early stages of structure plan preparation.

Matters that should be considered and outlined in a local government public open space strategy include:

- balanced provision of, and equitable access to nature, sport and recreation opportunities throughout the local government area;
- community needs as identified through consultation and analysis;
- projected demographic profile, population growth or decline and housing density (including access to private open space);

- local neighbourhood identity based on natural and cultural features that contribute to landscape character;
- creation of a continuous POS network though connected or linear POS for walking and cycling;
- identification of POS in areas where land is unlikely to be subject to structure planning, to ensure that individual subdivisions do not result in a fragmented POS network;
- integrated water cycle management information such as district/regional water management strategies, water supply strategies, water license availability and/or stormwater management planning;
- identification of where district/regional scale sporting facilities or recreational spaces are required and strategies for the formal acquisition or re-zoning of this land;
- areas of environmental importance identified through local biodiversity planning;
- shared use/co-location of POS (e.g. ovals and schools) and facilities with appropriate management plans and procedures;
- identification of minimum land size and development requirements to ensure that parks are developed to a minimum standard to enhance residential amenity and ensure functions identified in planning are fulfilled e.g. playgrounds, shade, shelter, drinking fountains, seating, footpaths/boardwalks;
- asset costs, maintenance requirements, and whole-of-life costs;
- responsibilities and contributions required from the State, local government and proponents;
- procedures relating to POS development plans, and landscaping plans; and
- handover and audit procedures to ensure infrastructure functions as intended.

Development of public open space

When designing an integrated network of POS the proponent must consult with the local government at the earliest stages of the planning process in order to consider how POS sites will be best developed being cognisant of ongoing maintenance.

An integrated approach to the planning, design, construction and maintenance of POS is encouraged, which allows room for creativity and innovation, whilst ensuring that minimum standards are achieved. When designing POS, the proponent should consider how functions relate to each other within the POS network. Some uses are compatible and integration should be encouraged in the design, such as living streams near a picnic or BBQ area. Some functions are incompatible and may require separation zone such as a sports area and a place for quiet relaxation.

The development, infrastructure and landscaping proposed for public open space should:

- implement the function/s (sport, nature, recreation) identified for the site;
- use locally indicative species and local building styles to preserve local heritage and landscape character;
- make use of local resources and materials that are robust, recycled/recyclable, and environmentally sound;
- be sensitive to limited water availability through innovation rather than limitation; and
- establish physical connections to the pedestrian and cycle network.

The Public Parkland Planning and Design Guide WA (Department of Sport and Recreation, 2013) is a valuable resource when considering design, minimum development requirements and ongoing management issues.

Surveillance

The configuration of lots surrounding POS sites must ensure POS is overlooked by buildings. Perimeter streets will generally be required around open space to create a safer and more secure environment, provide sufficient street frontage for visitor parking and avoid the unattractive appearance of extensive back fences.

Where a street is not provided, alternative appropriate arrangements must be demonstrated to ensure overlooking, clear sightlines and surveillance from adjoining buildings.

The design of POS for surveillance purposes should be in accordance with *Designing out Crime Guidelines* (WAPC, 2006).

Refer to [Element 4: Lot Design – Design Principle 5](#) for more information about lots fronting parks.

Integrated water management

Public open space provides an opportunity for integrated water management and water sensitive urban design. Public open space should be designed and constructed in accordance with Water Sensitive Urban Design principles and design guidelines (as outlined in the *Stormwater Management Manual for Western Australia* and the *Decision Process for Stormwater Management in WA* and associated guidelines).

The following considerations should apply to public open space where there is a lack of available water:

- the efficiency of open space with high water use requirements by co-locating ovals with schools;
- location of POS based on compatible soil and water conditions;
- alternatives to turf grass for POS not used for sport;
- landscaping with water-wise and local native plants, including perimeters and street verges, mulched garden beds and retention of existing vegetation;
- alternative, fit-for-purpose water sources to irrigate POS; and
- water sensitive urban design features to provide multi-function sites with similar water management requirements (Figure 37).

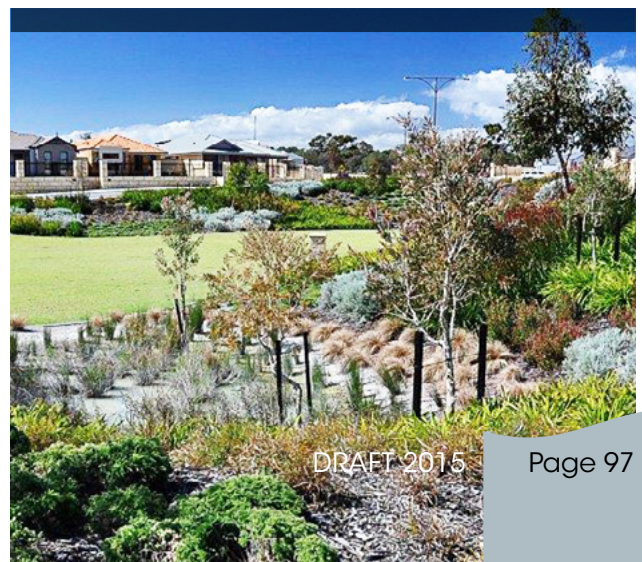
Hydrozoning, the grouping of vegetation types into categories with similar water requirements, enables more efficient and responsible use of irrigation water, reducing or eliminating the need for supplemental water from irrigation (xeriscaping). Examples of hydrozones, in order of their water requirements, are:

- zones of high-quality turf on all active playing surfaces (sports fields);



Figure 37: Example integration of water sensitive design within POS

Water sensitive design



- irrigated and non-irrigated lawn areas for recreation such as picnic and play areas, for which a seasonal change of lawn quality/colour may be noticed, depending on natural rainfall;
- walking trails and dog exercise areas without turf grass; and
- native vegetation and gardens solely reliant on rainfall.

The integration of land required for the detention and treatment of stormwater within POS should be detailed in an appropriate local water management plan/strategy submitted in support of a structure plan and adopted by the WAPC, local government and the Department of Water.

Public open space management plans

The functions identified in local government POS strategies and identified on structure plan maps are activated through development. The time between these stages of planning can be lengthy and involve a complex combination of landowners, stakeholders and approval processes. Public open space management plans are a useful tool to address compliance with

any relevant local government POS strategy, policy or plan. A POS management plan implements the function of the site, as declared in the POS schedule in a structure plan, by demonstrating proposed broad development and management responsibilities. Public open space management plans should be provided at structure plan stage, followed by a more detailed POS development plan at subdivision stage. The POS development plan is used to manage construction and operation of the POS and includes, as a minimum, proposed landscaping works, site constraints, a rehabilitation plan where relevant, and any specific environmental management measures.

The POS management plan should include:

- the sport, nature and recreation functions provided by reserves to create the network of POS;
- proposed development of POS including earthworks, reticulation, landscaping, and infrastructure;
- timelines and responsibilities;
- maintenance and funding agreements; and
- evidence of collaboration with the local government and compliance with applicable POS strategy for the locality.

DEVELOPMENT OF PUBLIC OPEN SPACE REQUIREMENTS

- | | |
|------------|---|
| 8.6 | Facilitate passive surveillance of POS to minimise issues relating to personal and property security, vandalism and poor visual amenity by: <ul style="list-style-type: none"> • requiring all lots abutting public open space to have visually permeable fencing and overlook the public open space; • ensuring all lots abutting public open space have a footpath which is connected to the pedestrian/cycle network along the length of the POS; • installing lighting in accordance with AS1158.1 (1986); and • considering sightlines and access in public open space location, design and landscaping. |
| 8.7 | Land area and infrastructure required for urban water management in public open space is: <ul style="list-style-type: none"> • integrated into the overall park design to ensure it does not compromise the public open space function; and • not to include traditional drainage infrastructure, such as trapezoidal drains and steep-sided sumps/basins. |
| 8.8 | Constructed permanent water bodies (e.g. ornamental lakes) are only permitted where designed in accordance with water sensitive urban design principles and approved in the Local Water Management Strategy and Urban Water Management Plan. |
| 8.9 | Public open space is developed by the proponent to a minimum standard (as described in the approved public open space management plan) and maintained for at least two summers (or as guided by the local government public open space Strategy where applicable). |

Design principle 9: Optimise the siting and design of public open space to promote accessible and efficient use of land

Public open space provision

In residential areas 10 per cent of the gross subdivisible area must be provided free of cost by the subdivider and vested in the Crown under the provisions of Section 152 of the *Planning and Development Act 2005* for POS and foreshore management purposes. This 10 per cent POS contribution applies to all urban areas across the State including all regional areas. The provision is a long-standing requirement originating from the 1955 Stephenson-Hepburn Plan.

In determining the gross subdivisible area, any land which is surveyed for government schools, major regional roads, public utility sites, municipal use sites, or, at WAPC discretion, any other non-residential use site, is deducted. Where a deposited plan is approved, any land which is shown on the deposited plan as being reserved for recreation or foreshore management automatically vests in the Crown without any conveyance, transfer or assignment or payment of a fee. All POS, no matter the function (i.e. nature, sport or recreation) identified in the POS schedule (detailed on following page), must be shown as 'Reserve for Recreation' 'Public Recreation' or 'Community Purpose Sites' on deposited plans. The *Crown Land Practice Manual* (Department of Lands, 2013) provides detailed guidance on the creation of reserves (see Chapter 4, Reserves) and management orders.

Community purpose sites identified in a structure plan and created through subdivision, will be required to be transferred free of cost as a Crown reserve if included as part of the 10 per cent POS contribution. The need for community infrastructure and development contributions should be documented in a community infrastructure plan that accompanies a structure plan.

Land which is not specifically reserved for POS, or where infrastructure is accommodated in reserves, may provide a valuable space for the community. Where the WAPC and the local government considers that the land will provide a POS function to the

community, it can be considered as Restricted Use POS and may receive some credit towards the overall 10 per cent POS contribution (see Restricted Use section, on page 107).

Public open space facilitates the integration of water management into the landscape. To encourage water management integration into the landscape and best practice planning, the WAPC is likely to accept the land area as an unrestricted contribution to POS where the design is in keeping with the principles of water sensitive urban design. Credit for reserves used for water management purposes is detailed on page 106.

Management orders and vesting

The appropriate management authority should be identified and described in the public open space management plan. Local governments are generally responsible for the ongoing management of reserves for recreation, foreshores and drainage. Public open space should be vested with the appropriate authority via management order after the lot has been created and ceded to the Crown. Generally, management orders should support the principle that reserves are in the public interest, are for the general benefit of the community and should preserve the community's right of access over the land. Where management orders place land in trust with a local government for POS, that land is to be used only for public recreational purposes and remain open to the general public.

'Leasing powers' may be included in a local government's management order over a Section 152 'public recreation' reserve in limited circumstances. The Department of Lands will generally not permit leasing of Section 152 recreation reserves to private recreation or sporting clubs. A case may be argued for the use of small areas within large reserves for club premises where the playing fields are open for public use when not being used by clubs. Small portions

of 'public recreation' reserves may be excised and separately reserved (for example, for 'club and club premises') with management order issued to local governments with power to lease.

Public open space schedule

Proponents demonstrate compliance with the public open space contribution through preparation and submission of a POS schedule, POS plan and declaration of function. These are prepared in collaboration with the local government and align with relevant higher order structure plans or strategic planning (e.g. local government POS strategy/plan). They outline the amount, function and distribution of POS provided and is submitted with a structure plan and verified at subdivision.

The public open space contribution is demonstrated by the following three parts:

- 1. The POS schedule: the calculation of public open space contribution** – detailing the amount, distribution and staging of delivery of the POS network including:
 - a. the total site area, less deductions and the resulting gross subdivisible area (GSA);
 - b. the POS contribution being a minimum of 10 per cent of the GSA; and
 - c. all restricted use POS and its contribution towards the 10 per cent contribution.

See Tables 16 and 17.

- 2. Public open space plan** – to show the network spatially. Supports the POS schedule and can be shown on any structure plan or subdivision plan, or a layer of a structure plan or subdivision plan, if it is clearly illustrated. See [Figure 38](#).

- 3. Declaration of function** – describing the intended functions to be accommodated on the site (sport, nature, recreation, community purposes) and its catchment. This supports the schedule. It can include all nearby publicly accessible land which provides a sport, nature or recreation function, even if it does not form part of the POS contribution. Functions provided by nearby sites outside the structure plan area can also be included. All POS sites should identify its catchment as per [Table 1](#) in [Element 1: Community Design- Objective 5](#). In most instances these plans should be developed illustrating catchments for access to sport, nature and recreation functions to demonstrate 100 per cent coverage. See Table 18 (page 103).

Table 16: Public open space schedule proforma

Public open space schedule based on 200ha (4 neighbourhoods)		
Calculation of Required POS Provision		
	Total site area (ha)	200.00
<i>Deductions</i>		
Environmental		
Conservation Category Wetland	3.00	
Bush Forever	11.00	
Regional Open Space Reserves	5.00	
Restricted Access Conservation Areas		
Surface area of natural water bodies		
Infrastructure		
Rail Reservation		
Regional Road Reservations, widenings - Primary/Other	1.00	
Public utilities (include pump station sites, transmission corridors)		
Drainage (steep sided drains and basins)	0.40	
Non Residential Land Uses		
Primary School	3.50	
High School		
Activity centres, commercial, retail (excluding residential component)	3.10	
Public Purpose Reserves		
Other		
Surplus Restricted Public Open Space Not Credited	0.84	
	<i>Total Deductions</i>	27.84
	Total Deductions	27.84
	Gross Subdivisible Area (total site area minus deductions)	172.16
	Required Public Open Space (10%)	17.22
Breakdown of POS Provided		
Restricted Public Open Space		
Conservation Category Wetland Buffer (up to 50m)	2.50	
Resource Enhancement, multiple use wetland or similar and associated buffers (up to 30m)	1.80	
Reserved land encumbered by easements ie powerlines, sewer gas - deemed suitable for POS	0.00	
	<i>Total Restricted POS</i>	4.30
	Total Restricted POS Credited to a maximum of 20% (i.e 20% of 17.22)	3.44
	Surplus Restricted POS Not Credited i.e. over the maximum 20% (refer Note 3)	0.84
Unrestricted Public Open Space: by function (refer Note 4)		
Sport	5.70	
Recreation	6.60	
Nature	1.54	
	<i>Total Unrestricted POS</i>	13.84
	Total Unrestricted POS	13.84
	Total	17.28
	POS Provision as Percentage of Gross Subdivisible Area	10.04%

Notes

1. To be read in conjunction with Public Open Space Provision Schedule (insert date) and Public Open Space Plan (insert date/plan no.).
2. The Neighbourhood Centre deductions are based on current planning and exclude residential component
3. Surplus restricted open space (in excess of 20% maximum) has been calculated as a deduction, in accordance with Liveable Neighbourhoods policy.
4. Indicative breakdown only - refer to POS Schedule: Declaration of Function for further information on functions provided in POS.

Table 17: An applied example of a POS schedule (refer to Table 18 and Figure 38)

Calculation of Required POS Provision		
	Total Site Area (ha)	320.59
<i>Deductions</i>		
Environmental		
Bush Forever Site (D16)	17.10	
Conservation Category Wetland (D18)	9.03	
Non-Residential Land Uses		
Schools (D1, D2, D3 & D17)	24.02	
Neighbourhood Centre (D4-D12)	3.12	
Infrastructure		
Railway Reserve, PTA Station, Carpark & Kiss n Ride (D13-15)	13.36	
Drainage Basins (D19, D21, D22 & D23)	1.42	
Dedicated Drainage Areas (D20, D25, D26)	0.78	
Pump Station (D24, D27)	0.08	
Other		
Surplus Restricted Public Open Space	1.43	
	<i>Total Deductions</i>	
	Total Deductions	70.34
	Gross Subdivisible Area (total area minus deductions)	250.25
	Required Public Open Space (10%)	25.02
Breakdown of POS Provided		
Restricted Public Open Space		
Conservation Category Wetland Buffer	5.27	
Resource Enhancement Wetland	1.16	
	<i>Total Restricted POS</i>	6.43
	Total Restricted POS Credited to a maximum of 20% (i.e. 20% of 25.02)	5.00
	Surplus Restricted POS Not Credited i.e. over maximum 20% (refer Note 1)	1.43
Unrestricted Public Open Space: by function		
Sport	4.27	
Recreation	10.65	
Nature	7.12	
	<i>Total Unrestricted POS</i>	22.04
	Total Unrestricted POS	22.04
	Total	27.04
	POS Provision as Percentage of Gross Subdivisible Area	10.80%

To be read in conjunction with Public Open Space - Function Provision Schedule

Note

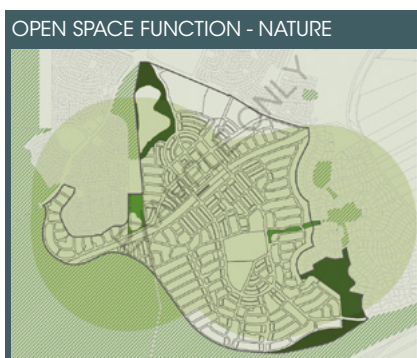
1. Surplus restricted public open space (in excess of 20% maximum) has been calculated as a deduction, in accordance with Liveable Neighbourhoods Policy.

Table 18 - An applied example of declaration of function (to support POS schedule)

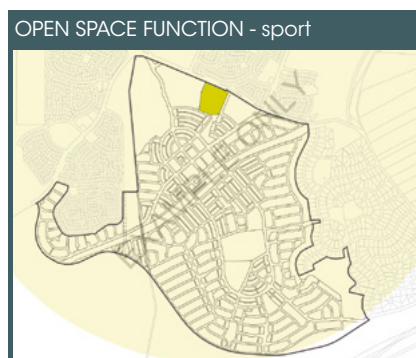
POS No.	Gross Area (ha)	Small Rainfall Event (up to 15ml)	Net Area (ha)	Category	Function
Deductions (that contribute to function)					
Bush Forever Site (D16)	17.10		17.10		Nature - native vegetation with footpath trail
Total Deductions			17.10		
Unrestricted Public Open Space					
2	2.81		2.81	District	Nature - Conservation Category Wetland/native vegetation
3	4.27		4.27	District	Sport - oval and pavillion with native vegetation and footpath trail
4	0.38		0.38	Small	Recreation - landscaped open space
5	0.30		0.30	Small	Recreation - landscaped open space
6	0.16		0.16	Small	Recreation - landscaped open space
7	0.13		0.13	Small	Recreation - community centre
8	0.06		0.06	Small	Recreation - village square
10	1.34		1.34	Neighbourhood	Nature - wetland
11	1.49		1.49	Neighbourhood	Nature - native vegetation
12	0.06		0.06	Small	Recreation - landscaped open space
13	1.48	0.27	1.21	Local	Recreation - landscaped open space
14			0.00		
14	0.23		0.23	Small	Recreation - landscaped open space
15	0.13		0.13	Local	Recreation - landscaped open space
16	0.62		0.62	Local	Recreation - landscaped open space
17	0.86		0.86	Local	Recreation - landscaped open space
18	0.55		0.55	Local	Recreation - landscaped open space
19	0.73	0.12	0.61	Local	Recreation - landscaped open space/play equipment
20	1.40		1.40	Neighbourhood	Recreation - landscaped open space
21			0.00		
21	1.00		1.00	Neighbourhood	Nature - native vegetation with footpath trail
22	0.48		0.48	Neighbourhood	Nature - native vegetation with footpath trail
24			0.00		
23	0.06		0.06	Small	Recreation - landscaped open space
24	0.44		0.44	Local	Recreation - landscaped open space
25	0.06		0.06	Small	Recreation - landscaped open space
26	0.09		0.09	Small	Recreation - landscaped open space
27	1.32	0.41	0.91	Neighbourhood	Recreation - landscaped open space
28	1.29	0.62	0.67	Neighbourhood	Recreation - landscaped open space
29	0.49		0.49	Local	Recreation - landscaped open space
30	1.40		1.40	Neighbourhood	Recreation - landscaped open space
Sub-Total	23.64	1.42	22.23		
Restricted Public Open Space					
1	5.27		5.27	District	Nature - Conservation Category Wetland buffer
9	1.16		1.16	Neighbourhood	Nature - Resource Enhancement Wetland
Sub-Total	6.42		6.42		
TOTAL Unrestricted & Restricted POS (ha)	30.07	1.42	28.65		

Notes

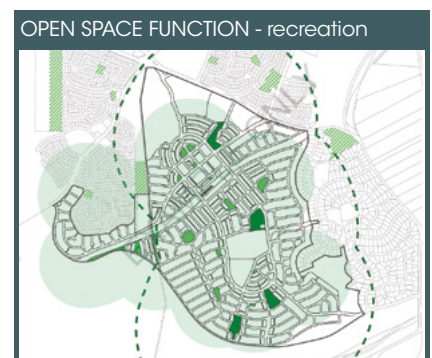
1. To be read in conjunction with Public Open Space Schedule
2. Small POS areas 12, 23 and 25 (combined total area 0.1813 ha) have not been credited in the Public Open Space Schedule.



- neighbourhood open space (400 m catchment)
- district open space (2 km catchment)
- ▨ Existing open space external to site



- District open space (2 km catchment)



- small and local open space (400 m catchment)
- neighbourhood open space (800 m catchment)
- ▨ Existing open space external to site

Figure 38: An applied example of a POS plan to support POS schedule and declaration of function

Variations to 10 per cent public open space contribution

A contribution of more or less than 10 per cent of the gross subdivisible area may be considered, or is needed where the area is subject to particular circumstances or when it is more appropriate to apply an alternate cash-in-lieu contribution instead of provision.

Mixed use

Public open space contribution for mixed use land zonings should account for the number and proportion of residents versus non-residential land use, benefit of a public space in a mixed use area, high density areas and the lack of private outdoor space. Commercial and other land uses other than residential do not generate a need to contribute to POS provision.

Regional

The 10 per cent POS contribution applies to all urban areas developed for residential purposes across the State. When planning and designing POS in regional areas, variations may be considered to take into consideration local climatic conditions and community needs specific to the region. For example, catering for shift workers – access in early mornings/late nights due to hotter climate. Where possible, regional considerations should be addressed under the relevant local scheme, policy or POS strategy.

Where the contribution is proposed to be reduced the POS must not include any restricted use public open space.

Cash-in-lieu

Under the provisions of Section 153 of the *Planning and Development Act 2005* payment can be made by a landowner to a local government in lieu of all or part of the POS contribution and is commonly referred to as cash-in-lieu.

In some, although limited, circumstances the provision of an area of land for POS may be too small to be practical and it may be more appropriate for payment in lieu of POS, or a combination of payment and land.

Payment in lieu of POS provision may be appropriate in the following situations:

- for small subdivisions generally less than 1ha, the provision of 10 per cent POS results in a 1,000m² POS area, which may be deemed by the local government to be impractical in terms of use and/or management;
- small, unusable and irregular shaped areas of land;
- sufficient POS is already available in the locality;
- POS has been provided in earlier subdivisions within the locality;
- POS is planned in another nearby location by way of a local planning scheme or structure plan; or
- where the local government requires funds to assist in maintaining or upgrading existing POS in the locality.

The cash-in-lieu sum must represent the value of the portion of land to be given up. Provision of cash-in-lieu of land must be approved by the local government and the WAPC via the subdivision process.

The expenditure of cash-in-lieu funds is specifically for development of land for public open space purposes as per section 154 of the *Planning and Development Act 2005*. The land must be public open space for public recreation with unrestricted access as per section 152 of the *Planning and Development Act 2005*.

Guidance on the provision of cash-in-lieu for POS is provided in [Appendix 4](#).

Five lots or less

The WAPC may require a public open space contribution of a lesser amount than 10 per cent where a proposal to create five lots or less is located within a locality where a number of lots could be similarly subdivided, in the expectation of equivalent cash-in-lieu contribution being made by the proponent.

The WAPC will not normally require a POS contribution for five lots or less, provided a contribution is not required under a local planning scheme or structure plan.

Public open space in stages

Although the public open space contribution for larger residential estates is usually provided in stages, the WAPC may require it to be provided for the entire area/estate in the first subdivision application.

Deductions

The 10 per cent public open space requirement applies only to land which generates a need for POS, primarily land for residential land use. Deductions from the total site area to determine the gross subdivisible area include all non-residential land uses that do not generate the need for a contribution to POS, and for which a POS allowance has not been sought.

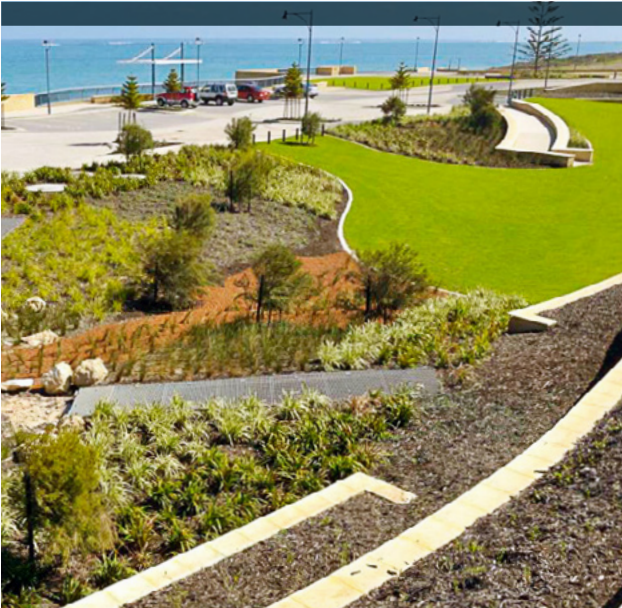
In the case of foreshore reserves and wetlands, the land area must be given up free of cost in addition to the 10 per cent POS requirement, however this land is not included in the gross subdivisible area.

The following land uses and areas are deducted from the total site area prior to the 10 per cent POS requirement being calculated.

- **Higher order activity centres** – the whole activity centre area other than land allocated for residential or mixed use
- **Regional roads** – ‘red’ or ‘blue’ labelled roads (e.g. freeways and highways)
- **School sites** – as defined in [Element 6 – Education](#)
- **Dedicated drainage reserves** – reserves used for water management purposes which do not receive a POS credit (as per Requirement 9.12 – for example, fenced drainage sumps)
- **BushForever sites** – as per *State Planning Policy 2.8 Bushland Policy* (WAPC, 2010) for the Perth Metropolitan Region and includes land previously referred to as ‘Environmental Protection Policy Areas’
- **Conservation category wetland** – or wetland of a similar environmental value as per *State Planning Policy 2.9 Water Resources* (WAPC, 2006) (SPP 2.9)
- **Surface area of natural water bodies** – measured as an average of high and low water mark, taking into account any modelled changes to water level post development

- **Restricted access conservation areas** – sites which are fenced off from the public with controlled access. Restricted access conservation areas are not accepted as a contribution to POS provision
- **Regional open space** – as identified in a region planning scheme or similar, and which is acquired by the State and zoned in region/local schemes as ‘Regional Open Space’
- **Transmission corridors** – corridors with restricted public access or are deemed by the WAPC or the local government to be unsuitable for POS. Where there is likely to be high maintenance costs, unacceptable risk to the public accessing the land, or landowner/easement/agency conflict on the use of the land, then the corridor must be deducted and not contribute to POS provision. If the transmission corridor is deemed suitable for POS then it can be considered and included as restricted use
- **Wetlands** – determined in accordance with SPP 2.9. An Environmental Protection Policy wetland, conservation category wetland, or wetland of a similar environmental value shall be ceded to the Crown free of cost and without payment of compensation by the Crown in addition to the 10 per cent open space contribution
- **Foreshore reserves** – for coastal areas foreshore reserves are determined through *State Planning Policy 2.6 State Coastal Planning Policy* (SPP 2.6) (WAPC, 2013) and its associated guidelines. For riverine watercourses determined in accordance with SPP 2.9, *Development Control Policy 2.3 Public Open Space in Residential Areas* (WAPC, 2002) and *State Planning Policy 2.10 Swan-Canning River System* (WAPC, 2006). Non-perennial streams and drainage channels may not always require foreshore reserves.

The foreshore reserve shall be ceded to the Crown free of cost and without payment of compensation by the Crown and will be in addition to the 10 per cent POS contribution. A foreshore management plan, compliant with SPP 2.6, should be prepared to support any application for structure plan or subdivision situated along the coast.



Foreshore reserve

Regional open space

Land for regional open space purposes is usually reserved under a region scheme and is obtained through negotiated purchase. Regional open space contributes towards overall public open space provision and is crucial for the overall network of POS providing sport, nature and recreation functions for residents and the wider community. In some cases, where regional open space is identified in a sub-regional structure plan but has not been acquired by the State, it can instead form part of the POS contribution in the same way as if it was a site identified in a local government POS strategy.

Regional open space, where identified at regional/sub-regional planning level, should be:

- listed in the POS Schedule;
- shown on deposited plans and structure plans as a separate lot;
- be accessible and useable for local residents as local POS; and
- included in a POS Management Plan – even if ongoing management is the responsibility of a different land manager.

Credit for reserves used for water management purposes

Public open space facilitates the integration of water management into the landscape. In areas where the design is in keeping with the principles of water sensitive urban design, the WAPC is likely to wholly accept it as part of the 10 per cent POS contribution.

Public open space used for stormwater management purposes and designed in compliance with the principles of Water Sensitive Urban Design is eligible for credit (unrestricted) toward the POS contribution. However, the WAPC is not prepared to accept POS land that is constrained or otherwise occupied by public utility uses or traditional drainage infrastructure such as sumps and basins.

Where water sensitive urban design principles are not incorporated, such as pipes and steep-sides with minimal vegetation, the land area to accommodate them is not eligible for credit.

Storm events are defined in *Decision Process for Stormwater Management in WA* (in publication process) (Department of Water, 2014) and the review of *Australian Rainfall and Runoff – A guide to flood estimation* (Institution of Engineers Australia, 2001).

Restricted use public open space

It is acknowledged that in some cases, land that is not specifically reserved for public open space, or where infrastructure is accommodated in reserves, can still provide a valuable space for the community for the purposes of sport, nature or recreation. Where the WAPC and local government consider that the land will provide a POS function to the community then it can be deemed as restricted use and may receive credit towards the overall POS contribution. All publicly accessible land contributes to the overall network of POS and should be included in the Public Open Space Schedule and Management Plan.

It is important that restricted use does not make up a large proportion of the POS contribution. The majority of space provided should be unencumbered and accessible to residents 100 per cent of the time. Land deemed restricted use POS is not limited to two

per cent, however only a maximum two per cent can contribute towards the overall minimum 10 per cent contribution.

Resource enhancement wetlands and buffers to environmentally sensitive areas are not deemed POS for 'recreation' purposes; however, in some cases it is acceptable for the land to be utilised and accessed by the community and therefore deemed to be 'restricted use'. These areas must have an approved management plan to manage impact and enhance the environmental values of the area.

All restricted use POS is included in the public open space management plan and public open space schedule, even if not fully or partly credited towards overall POS contribution.

PUBLIC OPEN SPACE PROVISION REQUIREMENTS

- | | |
|-----|---|
| 9.1 | A minimum contribution of 10 per cent of the gross subdivisible area must be provided free of cost by the subdivider for public open space. |
| 9.2 | A public open space schedule detailing the amount, distribution and function of public open space must be submitted with structure plans and verified at subdivision. |
| 9.3 | Public open space contribution for land zoned 'mixed use' will be determined by the WAPC on a case-by-case basis, having regard to the: <ul style="list-style-type: none"> • local government public open space strategy where applicable; • amount of mixed uses proposed and the potential number of residents; • amount of public open space available within 400 metres of the mixed use area; • proportion of the mixed use area likely to be used for non-residential purposes; and • level of innovation and quality of the resultant urban form in activity centres. |
| 9.4 | Residential subdivision within regional urban areas provide a 10 per cent public open space contribution. The WAPC, with the support of local government may accept a reduction to a minimum of five per cent of the gross subdivisible area in the following situations: <ul style="list-style-type: none"> • smaller country towns with limited growth prospects; • public open space responsive to particular climate; • where public open space is not used for water management purposes; • does not include any restricted use public open space; • the proponent, with advice from the local government, demonstrates that there is sufficient public open space in the locality; • the public open space is designed, developed and located to provide the entire community with access to sport, nature and recreation opportunities; and • the public open space is developed in accordance with a Landscaping/Public Open Space Management Plan approved by the local government. |
| 9.5 | The WAPC may accept, instead of the 10 per cent public open space contribution, all or part to be provided as cash-in-lieu where: <ul style="list-style-type: none"> • the land area is such that a 10 per cent contribution would be too small to be of practical use; and • there is already adequate POS taking into account any relevant public open space strategy and the overall objective of public open space function and distribution. |

Continued on page 109

PUBLIC OPEN SPACE PROVISION REQUIREMENTS (CONTINUED)

- 9.6 The WAPC may require the 10 per cent public open space contribution to be transferred as a lot in fee simple to the local government to be held in trust pending its future disposal. Use of funds received from the disposal of such land is compliant with the cash-in-lieu for public open space procedures outlined in Appendix 4.
- 9.7 The expenditure of cash-in-lieu funds is specifically for development of land for public open space purposes and the land must be public open space for public recreation with unrestricted public access.
- 9.8 For subdivision of five lots or less or for land which was subdivided before 1956, the WAPC may not always require a public open space contribution providing the contribution is not required under a local planning scheme or structure plan where:
- the subdivider demonstrates that sufficient land for public open space has already been given up in an earlier subdivision; or
 - the subdivider, with advice from the local government, demonstrates that there is sufficient public open space in the locality and the cumulative effect of other potential small subdivisions will not generate the demand for additional public open space.
- 9.9 The public open space contribution for the entire subdivision is given up in the first stage of subdivision where:
- the ceding of public open space will become the responsibility of another landowner;
 - a public open space staging plan has not been approved;
 - the balance of the public open space requirement may place an unreasonable burden on adjoining landowners; and
 - an agreement has not been reached with adjoining landowners about the sharing of public open space responsibilities.
- 9.10 The following is deducted from the site area prior to calculation of the 10 per cent gross subdivisible area:
- land acquired by the State for any purpose other than residential;
 - regional roads;
 - gazetted local streets;
 - school sites (as defined in Element 6 - Education);
 - higher order activity centres other than the residential or mixed use components;
 - land used for water management purposes not given credit towards public open space;
 - BushForever sites;
 - conservation category wetland, or wetland of a similar environmental value;
 - surface area of natural water bodies;
 - restricted access conservation areas;
 - foreshore reserves;
 - regional open space acquired by the State;
 - transmission corridors; and
 - other land uses that may be deducted, with the approval of the WAPC.
- 9.11 Storm water management systems located in public open space to manage small rainfall event run off piped directly from lots and street reserves receive zero per cent credit towards public open space provision.
- 9.12 Concrete-lined and/or steep-sided drains, retention basins and detention basins receive zero per cent credit towards public open space provision.

RESTRICTED USE PUBLIC OPEN SPACE REQUIREMENTS

- 9.13** Restricted use public open space can contribute a maximum of two per cent towards the 10 per cent of the gross subdivisible area minimum public open space requirement.
- 9.14** Eligible restricted use public open space (that may form a partial contribution to the 10 per cent public open space provision) include:
- reserved land encumbered by easements (for example, power lines, sewer, gas);
 - buffers to an environmentally sensitive area; and
 - a resource enhancement wetland, multiple use wetland, or wetland of a similar environmental value provided that:
 - the sites contribute to the network of public open space and provide a function for the community; and
 - it is supported by local government, referral agencies and the WAPC.
- 9.15** Where restricted use public open space exceeds two per cent of the public open space contribution:
- the remaining restricted use public open space can be deducted from the overall site area;
 - a public open space contribution allowance will not be given for any land identified as restricted use public open space over and above two per cent; and
 - those land areas identified as a deduction are not eligible to be considered as restricted use public open space.

Supporting documents

Better Urban Water Management (WAPC, 2008)

Classification Framework for Public Open Space
(Department of Sport and Recreation, 2012)

Development Control Policy 2.3 Public Open Space in Residential Areas (WAPC, 2002)

Designing Out Crime Guidelines (WAPC, 2006)

Draft Decision process for stormwater management in WA (Department of Water, 2007)

Public Parkland Planning and Design Guide WA
(Department of Sport and Recreation, 2013)

State Planning Policy 2.6: State Coastal Planning Policy (WAPC, 2013)

State Planning Policy 2.8: Bushland Policy for the Perth Metropolitan Region (WAPC, 2010)

State Planning Policy 2.9: Water Resources
(WAPC, 2006)

Stormwater Management Manual for Western Australia (Department of Water, 2004-2007)

The Crown Land Practice Manual: Chapter 4: Reserves
(Department of Lands, 2013)

The Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (West Australian Local Government Association, 2004)

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ELEMENT 6 EDUCATION

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Introduction

Education is an important component in designing and establishing communities. It is important that the location and size of school sites are carefully considered, including the design of the surrounding movement network, interface with adjoining land uses and parking. This element provides guidance generally on the provision of government and non-government schools and associated facilities. It is important to ensure that sufficient schools are provided and they are appropriately located to maximise accessibility to their catchments. For government secondary and non-government schools (K-12yrs), access to good public transport is considered important to service extended catchments.

Government primary schools should be conveniently located to their local catchment with a well-connected local movement network. A significant issue for the design and layout of schools is the increasing use of perimeter fencing of school sites, while maintaining an appropriate level of community access and security. It is essential that the surrounding land uses and resultant built form provides good school surveillance and the school layout promotes clear view corridors to maximise surveillance. Open style (permeable) fencing around school buildings is encouraged to delineate public and restricted access areas rather than high, solid fence types.

Design principle 10: Ensure that education sites are developable, serviceable and accessible; promoting safe, adaptable and efficient use of land and other community infrastructure including public open space

Size of educational sites

School site size, whether for a government or non-government school, varies depending on context, location and site characteristics, particularly in regional centres. Variation to school site size requirements can be considered where located in an established activity centre or high density urban area to maximise land efficiency; where only a portion of a normal school catchment is to be serviced; or the school is planned to temporarily operate in an interim manner.

School site size is based on the provision of standard facilities for a given number of children or enrolment catchment, as outlined in [Table 19](#). To provide flexibility in the provision of school sites and encourage innovative design, it is acknowledged that the size of the site may need to be varied in certain circumstances. These school site area requirements assume that the land is fully functional and serviceable. All planned government school sites should be shown in structure plans and reflect purchased and/or ceded school sites.

Land requirements for tertiary education facilities are dependent upon courses and programs offered and how they are delivered to suit the needs of the enrolment catchment. It is not considered feasible to plan a tertiary education facility on a site less than 11ha, with the optimal size to accommodate future growth and expansion being approximately 25ha.

Co-location of school sites with public open space and community facilities (i.e. junior and senior sporting ovals), fragmented land ownership and constraints on suitable available land has led to undesirable site configurations. In some instances, resultant site areas have been reduced which creates development, land use and ongoing management implications for school providers and other relevant stakeholders.

The role and function of school sites continue to evolve and respond to community need over time with resultant land requirements and servicing considerations.

Primary schools have expanded in function to incorporate kindergarten, pre-primary, special education and allied health facilities. Co-located education support facilities or stand-alone centres are being provided centrally within the catchment of several government primary/secondary schools. Non-government school providers advise that their new campuses may incorporate, in addition to traditional church facilities, a 'shop-front' for community outreach services within new urban areas.



Innovative school design

Table 19: Land requirements for education sites

	Primary	District High School # / Kindergarten to Year 12 (K-12) school.	Secondary (years 7-12);	Education support Centre/ Special Education facility	Tertiary Education facilities
Government	4 ha	14 ha	11 ha	Additional 1-1.5 ha	11-25ha [^]
Non- Government	4 ha*	10-12ha	8-10 ha		

DoE has advised that this school type is no longer preferred

* The Catholic Education Office requires a 5ha primary school site where church and/or associated community facilities are co-located.

Provision of education sites

Land required for new government secondary schools, tertiary education facilities and non-government schools are purchased in the open market on behalf of the Department of Education or by the relevant education providers.

Government secondary schools are reserved for public purpose in region schemes with other school sites zoned similarly under the local scheme. Often government secondary school sites and tertiary education facilities are acquired in advance of urban development in the surrounding community whereas non-government school providers may acquire sites later, once enrolment thresholds are met and areas well established.

Land for government primary schools in greenfield areas and large infill areas is given up by the landowner(s) at subdivision stage to the Department of Education, free-of-charge or in the form of a pro-rata contribution where the land is held in multiple land ownership. In limited circumstances, ceding land free-of-charge is not appropriate and, with Department of Education support, land denoted as proposed primary school site on the approved plan of subdivision may be set aside as a separate lot, pending future acquisition. The various development scenarios for the provision of government primary school sites are set out in Figure 39.

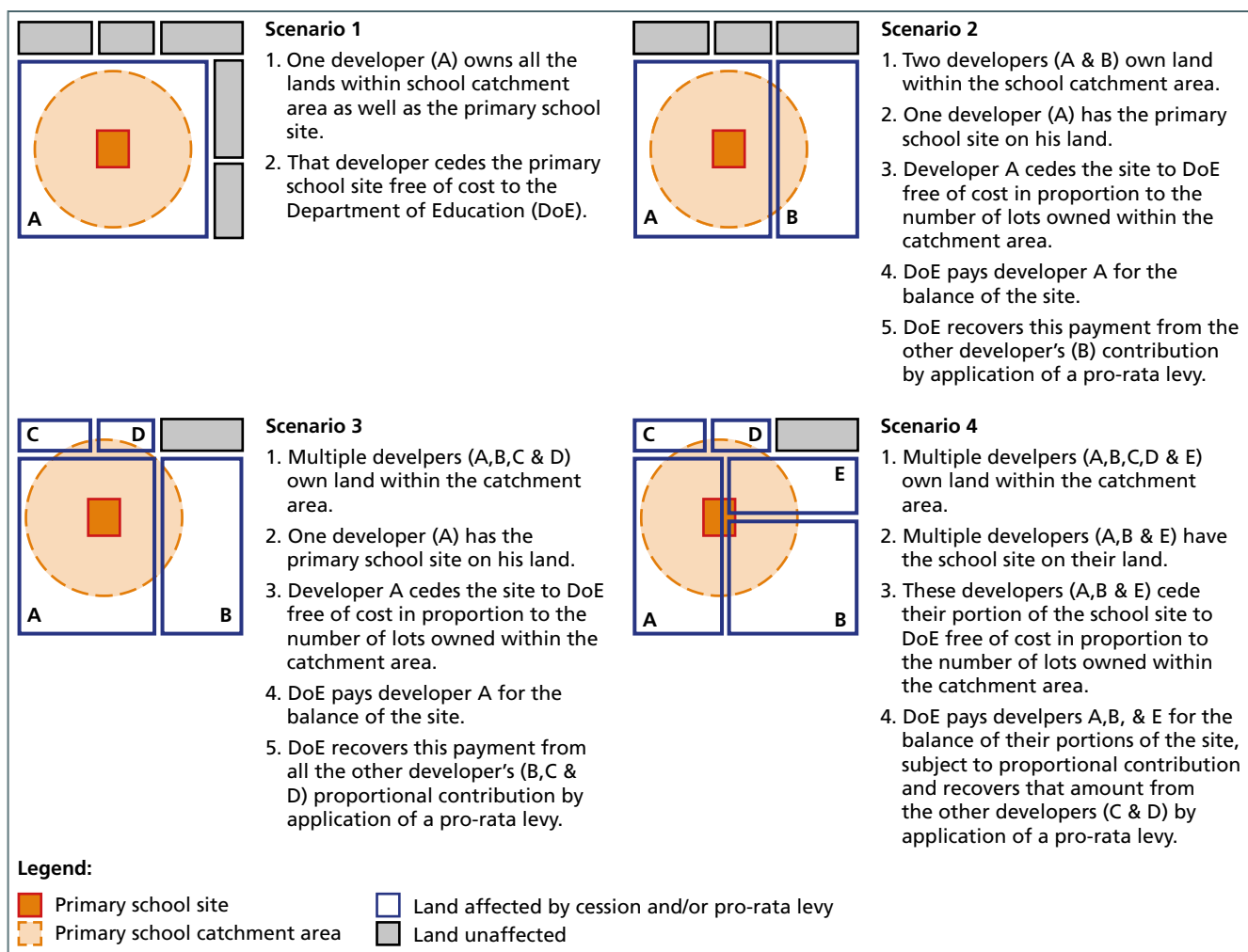


Figure 39: Provision of government primary schools

SIZE AND PROVISION OF SCHOOL SITES REQUIREMENTS

- | | |
|-------------|---|
| 10.1 | The size of education sites provided generally in accordance with Table 19 . |
| 10.2 | <p>A reduction in the size of government primary school sites may be considered to a minimum of 3.5 ha where:</p> <ol style="list-style-type: none"> a) the site complies with Requirements 10.5 and Requirements 10.6 (page 116); b) is co-located with adjoining public open space incorporating sport function recreational facilities; and c) a significant demand can be demonstrated (due to high population yields) for a primary school in or within close proximity of an activity centre or brownfield redevelopment area and supported by an endorsed structure plan. |
| 10.3 | The subdivider shall cede and/or contribute to the provision of government primary school sites free-of-charge. |
| 10.4 | Where land across the catchment area of the primary school is held in multiple land ownership, subdividing landowners are to provide a pro-rata contribution to Department of Education as a condition of subdivision towards the acquisition of the primary school site. |

Site considerations/layout

School sites must be located on functional and serviceable sites to reduce development costs and maximise development and usability. The topography of school sites is particularly important. The area occupied by the building footprint should be level, to facilitate a satisfactory relationship between buildings, access paths and play areas. The oval (playing field) can be at a lower level than the buildings to maximise sightlines and supervision, subject to universal access requirements being met. Sites with extreme topographical features requiring extensive earthworks, retaining walls, or subject to inundation are not acceptable. Public utilities (i.e. high-transmission power lines and transformers are not acceptable within school sites). Other easements and reserves for public utilities can only be included in the school site if demonstrated that they are safe and the site remains developable and useable.

The design and configuration of school sites should facilitate safety, surveillance and accessibility. Common boundaries of school sites with residential lots and other non-compatible land uses should be avoided where possible. School sites should be surrounded by frontage streets and compatible land uses, including public open space, recreation, sporting, and co-located community facilities (Figure 40). After-hours land uses should be promoted on adjoining sites and along frontage streets to assist surveillance. The final lot configuration of school sites and community infrastructure are determined at the subdivision stage and may require the need for a local development plan to address detailed design/built form considerations.

Interim (transportable) buildings

Changes in student enrolment numbers occur as the catchment population matures and/or evolves over time. Transportable classrooms are often required to temporarily cater for peak enrolment periods. The siting and orientation of transportable buildings need to address the same design and layout considerations as permanent school buildings.

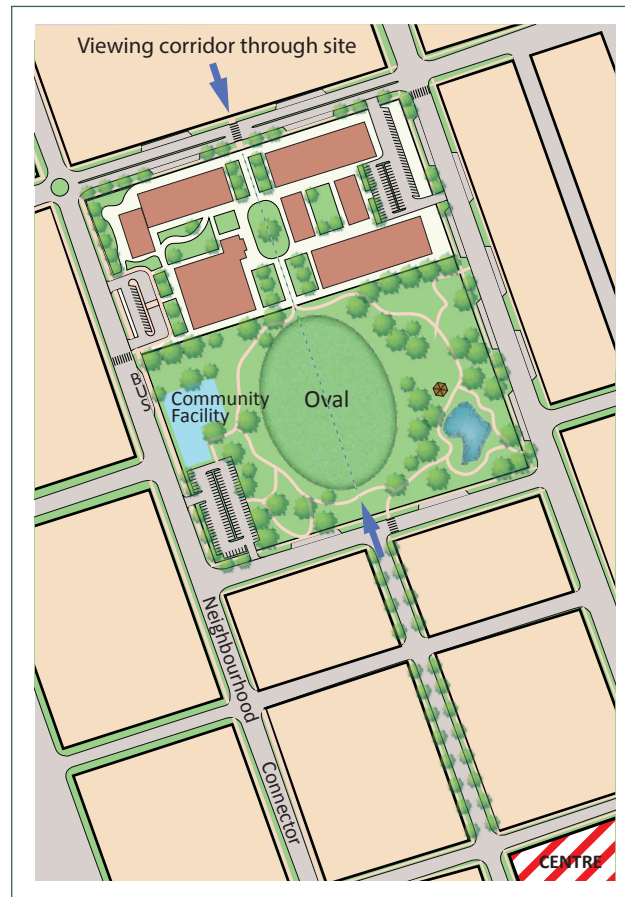


Figure 40: Typical street design and site layout and for a primary school

Co-location/shared use with community facilities

Public open spaces are an important component in education delivery. Public open space areas must also be accessible by the general community after school hours. Shared ovals with school sites are encouraged to improve land efficiency and allow the reduction of school site area, subject to certain criteria. Shared use generally requires a maintenance agreement between the school and local government to outline shared use, management and maintenance obligations.

Government and non-government schools are increasingly being clustered or co-located within educational and recreational precincts. School sites often provide the opportunity for co-location with junior and/or senior sized playing fields/facilities.

The Department of Education advises that the majority of new primary schools will be co-located with adjacent sport ovals (wholly or partly vested with the local government). These co-located facilities should address the following: at the right scale and function; accessible outside school hours; have appropriate management arrangements in place; and be robust enough in design to ensure the respective adjoining land uses can function independently if a co-located facility is no longer viable or ceases to operate. Currently, there is a range of resource (cost) sharing models that exist between the Department of Education, local government and other service providers and entities that support the co-location of facilities.

Co-location requires liaison with all stakeholders such as local government, Department of Sport and Recreation, Department of Health and Department of Education. Development of memorandums of understanding with local government for the sharing of facilities is generally required at the subdivision/development stage to support these co-location and or/shared use arrangements. This includes arrangements to be put in place to the satisfaction of the local government to provide financial contributions from the education provider for the management and maintenance of the open space including priority user rights for schools during school hours.

DESIGN AND SITE LAYOUT REQUIREMENTS

- | | |
|--------------|--|
| 10.5 | School sites sited and configured with an efficient layout to maximise usability and: <ul style="list-style-type: none"> a) be regular in shape, preferably rectangular where length should not exceed twice the width; b) not present extreme topographical level differences, with a site slope no greater than one in twenty (1:20); c) not require extensive earthworks, benching and/or fill; d) not present undue site constraints such as, but not limited to, area(s) subject to inundation (major flood events); wetland management areas; operational buffers; distribution network utility services (e.g. high voltage transmission power lines, gas pipelines and power transformer sites); and e) be able to be serviced with essential infrastructure (including adequate groundwater allocation to irrigate sport open space areas). |
| 10.6 | School sites located and designed to support accessibility and maximise safety through passive surveillance, including: <ul style="list-style-type: none"> a) surrounding (not adjoining) residential development designed to overlook school sites; b) configured lot layout and frontage street(s) to facilitate maximum access and surveillance; c) the use of appropriate landscaping and lighting; and d) the provision of permeable structures (i.e. fencing) that allow clear sightlines from surrounding land use and development to the site. |
| 10.7 | The siting and orientation of transportable buildings address the same design and layout considerations as permanent buildings. The provision of transportable buildings on existing or proposed school sites to be identified in consultation with the local government and the relevant school provider(s). |
| 10.8 | Where a school site is co-located with public open space, the public open space is to be designed and managed to enable use by the school and the public outside of school hours. |
| 10.9 | Junior and/or senior size sport ovals are to be co-located in the first instance with school sites. |
| 10.10 | Where a school site is co-located with public open space, the essential facilities for the functioning of the public open space are to be fully incorporated on a separate adjoining open space lot or Crown reserve. |
| 10.11 | Children's services facilities including child care, playgroups and out-of-school hours care to be co-located within primary school sites at a ratio of one for every two primary schools in new urban areas. |

Design principle 11: Ensure a servicing movement network that facilitates safe and efficient access to education sites by all users

Street network design for schools

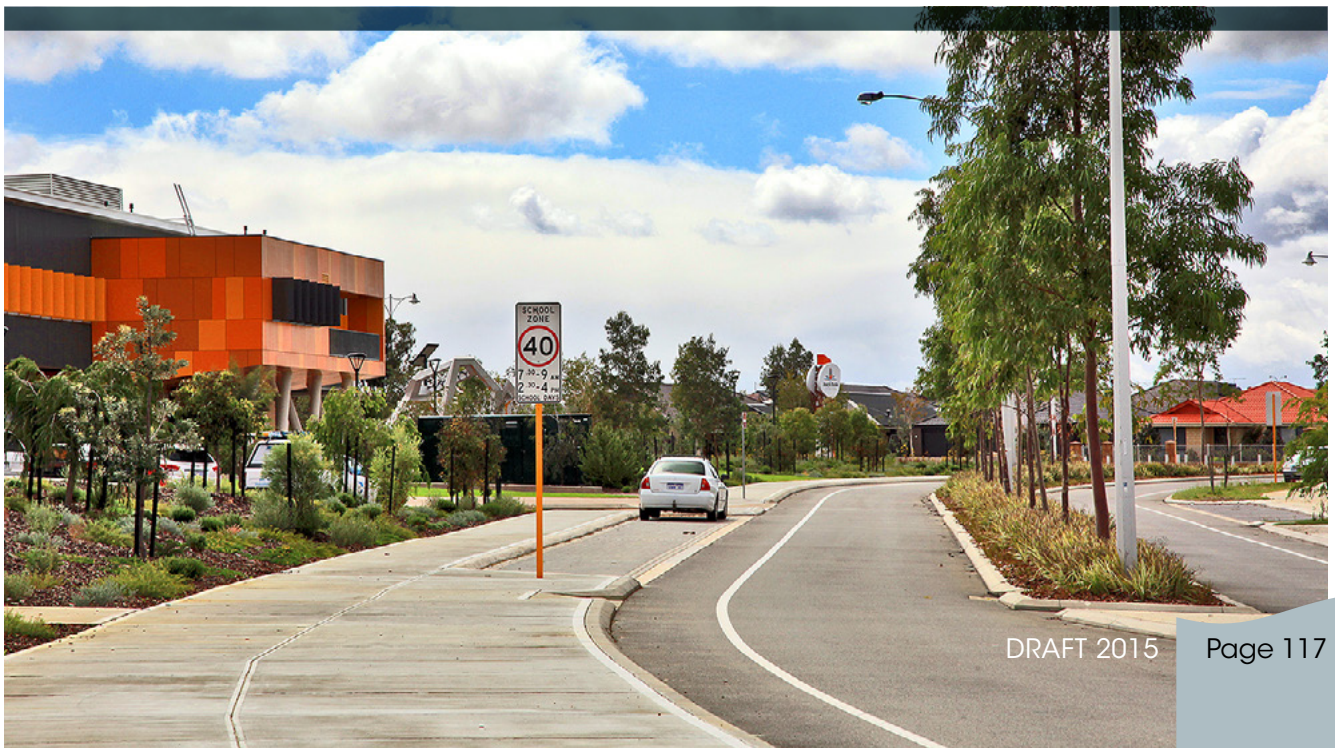
The street network surrounding education sites should facilitate short, safe and direct trips for pedestrians and cyclists and be accessible by public transport

Tertiary education facilities, secondary schools, senior colleges and non-government schools (K-12 years) surrounding movement network, walkable catchments and public transport should be identified in the relevant structure plan and/or activity centre plan. A movement network plan showing estimated traffic volumes requiring traffic management; public transport, pedestrian and cycle network; and a local traffic and transport management strategy should be included.

A primary schools servicing street network should be identified in structure plans including indicative street cross sections consistent with the functioning classification of the street as set out in [Element 2: Movement](#); a movement network plan showing estimated traffic volumes requiring traffic management; a public transport, pedestrian and cycle network; and a local traffic and transport

management strategy. More detailed planning at subdivision stage may identify the need for drop off and pick up facilities, bus embayments, on street parking and access to on-site parking. The safety of students travelling to, from, and around schools is an issue of concern for the whole community. The Western Australian Local Government Association Roadwise 2007 *Road Safety Around Schools Guidelines* has been developed to provide information, tools and advice to assist local governments and school providers to identify and address traffic management and road safety issues around schools. Two editions of the Guidelines have been developed, a Local Government edition and a Schools edition. The *Road Safety Around Schools Audit Checklist* (Road Safety Council, 2002) has also been prepared to identify particular street safety problems.

Pedestrian friendly street environment with on street car parking bays



School parking requirements

The location, type and number of on-street embayments and off-street car parking should be identified in a structure plan or activity centre plan. Traffic management devices (including on-street embayments and raised pedestrian crossings) are provided by the subdivider at the time of subdivision to the satisfaction of the local government, (as well as Education Department in the case of government schools). The cost of on-street embayments and raised pedestrian crossings are shared on a 50/50 basis by the subdivider and the school provider. The sharing of costs by subdividers may be spread across the catchment area of the school. Where subdivisions

occur well ahead of the establishment of the school the subdivider will normally be required to deposit a cash equivalent for the construction with the local government as a condition of subdivision.

Unlike government schools, which are considered public works under the relevant legislation, non-government school providers are not exempt from the requirement to obtain development approval under the local planning scheme including complying with the relevant scheme development provisions (i.e. parking standards).

STREET NETWORK DESIGN FOR SCHOOLS REQUIREMENTS

- 11.1** Access streets fronting educational facilities should be designed to create safe and efficient cyclist, pedestrian and public transport priority environments. Pedestrian-prioritised street environment may comprise, low speed zones, raised paving, median islands, trees, bollards, on-street parking and bus bays, drop off and pick up facilities and designated pedestrian crossings.
- 11.2** All streets fronting educational facilities are to be through streets (no culs-de-sac) and designed to provide safe and adequate on-street embayment parking, preferably, on the school site side.
- 11.3** Educational facilities sited to facilitate public transport servicing with bus drop off and pick up of students (preferably on the school side of a street) at stops in close proximity to main entrances.
- 11.4** Secondary schools to be bounded by a minimum of three streets including not more than one integrator arterial / neighbourhood connector and a minimum two local access streets, including an Access B street.
- 11.5** Primary schools to be bounded by a minimum of three streets including not more than one neighbourhood connector and a minimum two local access streets , including an Access B street. If the school is not located on a neighbourhood connector then a shared path must be provided from the nearest neighbourhood connector to the school site.
- 11.6** The longest boundaries of the school should be along local access streets to maximise the length of the street that can accommodate on-street parking and access to on-site parking.
- 11.7** The provision of staff and visitor on-site car parking is supported as part of an integrated development of the school site and co-location with other community and other open space facilities. The provision of large scale on-site car parking is generally discouraged.
- 11.8** On street parking and access for off-street parking for student drop off/pick-up to be designed and located to allow for pedestrian-priority and maximise safety, preferably on local access streets with low traffic volumes.
- 11.9** Provide and facilitate shared use of parking facilities and secure end of trip facilities for cyclists between education sites, co-located community facilities and public open space.

Supporting documents

A Guide to Governing Shared Community Facilities (Department of Planning and Community Development Victoria, 2010)

Community Use of School Facilities and Resources, Department of Education (Department of Education, 2008)

Designing Out Crime Planning Guidelines (WAPC, 2006)

Guidelines for Road Safety around Schools: Local Government Edition (West Australian Local Government Association, 2007)

Local Government Position Paper: Shared-Use Agreements (Western Australian Local Government Association May, 2010)

Road Safety Around Schools Audit Checklists (Road Safety Council, 2002)

Road Safety Around Schools Task Force (Main Road December, 2002)

Ten Criteria for Successful School Design
www.cabe.org.uk/schools

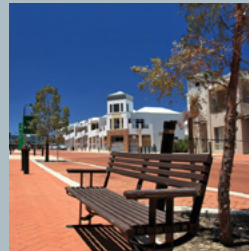
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Site and context analysis guide

This appendix provides a guide to the site and analysis process and is related to [Element 1: Community design](#). The components are interrelated and may be dealt with concurrently. The order and content is a guide only.

SITE AND CONTEXT ANALYSIS	
LAND TENURE AND FEASIBILITY	SOIL CONDITIONS
CONSISTENCY WITH CURRENT PLANS	WATER
TOPOGRAPHY, ENVIRONMENT AND NATURAL RESOURCES	HERITAGE
LANDSCAPE AND BUSHLAND	UTILITIES AND SERVICE PROVIDERS
COAST	MOVEMENT NETWORK, BUFFERS AND EXTERNAL IMPACTS
NATURAL HAZARDS AND DISATERS	PROPOSALS WITH PARTICULAR LAND USES
LOCAL PLANNING FRAMEWORK	SITES WITHIN PROXIMITY TO PARTICULAR AREAS AND USES

- Has a description of the location of the proposal been provided?
- Has a location plan showing the location of the proposal in relation to the area and region been provided?
- Has a statement concerning the area covered by the proposal in hectares or square metres and the current land uses been provided?
- Does the proposal include a copy of the certificate(s) of titles identifying owners included in the proposal?
- Is a separate plan showing existing cadastre and land ownership included?
- Has the opportunity for partnerships or integration with the surrounding area been investigated?

Consultation and Engagement:
Land owners within and adjacent to the proposal area.

- Is the proposal consistent with the zoning of the Region Scheme and/or local planning scheme?
- How does the proposal compare with the preceding structure or spatial plan? i.e. how does subdivisions compare with the structure plan? For structure plans, comparison of lower order against higher order structure plans.

Consultation and Engagement:
Department of Planning / Local Government

Documents to consider:

- Metropolitan Region Scheme
- Peel Region Scheme
- Greater Bunbury Region Scheme
- Directions 2031
- Strategic Assessment for Perth and Peel
- Sub-Regional Frameworks
- Relevant District Structure Plan
- Relevant Local Structure Plans
- Local Planning Scheme and Strategy

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LOCAL PLANNING FRAMEWORK	SITES WITHIN PROXIMITY TO PARTICULAR AREAS AND USES

- How does the proposal respond to topography and landform?
- Has the proposal considered ways to minimise impact on the environment, biodiversity and natural resources?

Consultation and Engagement:
Department of Planning / Office of Environmental Protection Authority / Department of Environment Regulation / Department of Parks and Wildlife

Documents to consider:

- SPP 2 Environment and Natural Resources Policy
- SPP 2.8 Bushland Policy for the Perth Metropolitan Region
- EPA Guidance Statement 33 – Environmental Guidance for Planning and Development

- How does the proposal respond to the landscape features, such as view corridors and green linkages, at varying scales?
- How does the proposal respond to natural, rural and built landscape character?
- Does the site contain bushland or remnant vegetation?

Consultation and Engagement:
Department of Planning / Local Government / Department of Environment Regulation / Department of Parks and Wildlife

Documents to consider:

- The Urban Forest of Perth and Peel
- BushForever
- Visual Landscape Planning in Western Australia
- SPP2.8 Bushland Policy for the Perth Metropolitan Regions
- PB69 Proposed Bush Forever Protection Areas

SITE AND CONTEXT ANALYSIS	
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LOCAL PLANNING FRAMEWORK	SITES WITHIN PROXIMITY TO PARTICULAR AREAS AND USES

- Is the land suitable for the proposed development?
- Does the site feature basic raw materials or featured them previously?
- Does the site contain or about a contaminated site?
- Has the previous land use for the site caused suspected contamination?
- Are there any acid sulphate soils within the site?

Consultation and Engagement:
 Department of Planning / Local Government / Department of Mines and Petroleum / Department of Environment Regulation

- Documents to consider:
- Land Capability Report included within the Structure Plan
 - PB 10 Geotechnical Reports for Subdivision
 - SPP 2.4 Basic Raw Materials
 - Basic Raw Materials Applicant's Manual
 - Acid Sulphate Soils Planning Guidelines
 - PB 64 Acid Sulphate Soils
 - Contaminated Site Database
 - Contaminated Sites Act 2003

- Has the proposal considered the impacts of hazards and natural disasters?
- Has the proposal considered bushfire mitigation and protection?
- Has the proposal considered sea level rise and coastal inundation?

- Is the proposal adjacent or within proximity to the coast?

Consultation and Engagement:
 Department of Planning / Local Government / Department of Fire and Emergency Services

Consultation and Engagement:
 Department of Planning / Local Government

- Documents to consider:
- SPP 3.4 Natural Hazards and Disasters
 - Planning for Bushfire Protection
 - PB111 Planning for Bushfire

- Documents to consider:
- SPP 2.6 State Coastal Planning Policy
 - Coastal Planning and Management Manual
 - State Coastal Planning Policy Guidelines

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- Within the site or surrounding context identify all wetlands, waterways and drains, associated floodways, buffers and reserves
- Have groundwater protection areas been identified?
- Is there any major hydrogeological conditions?
- Has the relevant urban water management strategy/plan been prepared to accompany the proposal?
- Are there likely or identified water issues such as water supply, or existing/new bore licences?
- Are there likely wastewater/sewerage issues?

Consultation and Engagement:
 Department of Planning / Local Government / Department of Water / Department of Health

- Documents to consider:
- SPP 2.6 State Coastal Planning Policy
 - State Coastal Planning Policy Guidelines
 - SPP 2.9 Water Resources
 - Better Urban Water Management
 - PB92 Urban Water Management
 - PB7 Government Sewerage Policy Perth Metropolitan Region
 - Coastal Planning and Management Manual
 - Contaminated Sites Act 2003

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Does the site have any areas of Aboriginal or post-settlement heritage?

Consultation and Engagement:
 Department of Planning / Local Government /
 Department of Indigenous Affairs / Heritage Council

Documents to consider:
 - SPP 3.5 Historic Heritage Conservation
 - PB 88 Historic Heritage Conservation

- Will there be implications for government and non-government agencies service providers as a result of the proposal?
- Will there be impacts on utilities, infrastructure and transmission corridors?
- Will there be the need for major services and infrastructure such as, electricity sub-stations, water pumping and wastewater facilities, drainage channels and infrastructure?

Consultation and Engagement:
 Department of Planning / Local Government / Department of Education /
 Non-government school providers / Department of Sport and Recreation /
 Department of Health / Department of Fire and Emergency Service / Police WA /
 Western Power / Water Corporation / ATCO (Gas) / Telstra

Documents to consider:
 - PB87 High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region
 - SPP5.4 Telecommunications Infrastructure

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- Has the capacity and functionality of existing movement network (including streets, public transport, cycling and pedestrian networks) been taken into consideration?
- Is the proposal within proximity to or contains a public transport node?
- Is the proposal impacted by buffers or external impacts caused by:
 - freight transport by road or rail
 - aviation
 - industrial activities

Consultation and Engagement:
 Department of Planning / Local Government / Public Transport Authority /
 Main Roads / Department of Transport / Relevant Port or Airport Authority /
 Department of State Development / Department of Environment Regulation /
 Department of Water

Documents to consider:
 - SPP 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning
 - EPA Guidance Statement 3 – Separation Distances between Industrial and Sensitive Land Uses
 - SPP 4.1 State Industrial Buffer Policy
 - Draft SPP 4.1 State Industrial Buffer Policy
 - SPP5.1 Land Use Planning in the Vicinity of Perth Airport
 - Draft SPP 5.1 Land Use Planning in the Vicinity of Perth Airport
 - SPP 5.3 Jandakot Airport Vicinity
 - Draft SPP 5.3 Jandakot Airport Vicinity
 - DC Policy 1.6 Planning to Support Transit Use and Transit Orientated Development

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LOCAL PLANNING FRAMEWORK	SITES WITHIN PROXIMITY TO PARTICULAR AREAS AND USES

- Will the site feature:
- Tourism
 - Industrial uses
 - Aboriginal Settlements
 - Rural or Special Rural uses
 - Canal Estates?

Consultation and Engagement:

Department of Planning / Local Government / Tourism WA / Department of State Development / Department of Agriculture and Food / Department of Water

Documents to consider:

- DC 4.1 Industrial Subdivision
- DC 4.2 Planning for Hazards and Safety
- SPP 3.2 Aboriginal Settlements
- Aboriginal settlements
- PB 108 Layout Plans
- PB 99 Holiday Home Guidelines
- PB 83 Planning for Tourism
- SPP 2.5 Land Use Planning in Rural Areas
- DC 3.4 Subdivision of Rural Land
- Rural Planning Guidelines
- DC 1.9 Amendments to Region Schemes
- DC 1.8 Canal Estates and Artificial Waterway Developments

SITE AND CONTEXT ANALYSIS	
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- Is the site located within or in proximity to the:
- Peel-Harvey Coastal Plain
 - Gnangara or Jandakot Groundwater Protection area
 - Public Drinking Water Source
 - Swan-Canning River System
 - Leeuwin-Naturaliste Ridge
 - Ningaloo Coast
 - Market Gardens near East Wanneroo
 - Swan Valley
 - Poultry Farm
 - Mosquito nuisance
 - Unexploded ordnances?

- Is the proposal consistent with the local government's planning framework?

Consultation and Engagement:
Local Government

Documents to consider:

Local Planning Scheme – including Local Planning Strategies, Activity Centre Strategies and Housing Strategies

Consultation and Engagement:

Department of Planning / Local Government / Department of Water / Water Corporation / Department of Health / Department of Environment Regulation / Department of Agriculture and Food / Department of Defence

Documents to consider:

- SPP 2.1 Peel Harvey Coastal Plain Catchment
- SPP 2.2 Gnangara Groundwater Protection
- SPP 2.3 Jandakot Groundwater Protection
- SPP 2.7 Public Drinking Water Source Policy
- SPP 2.10 Swan-Canning River System,
- SPP 6.1 Leeuwin-Naturalise Ridge Policy,
- SPP 6.3 Ningaloo Coast,
- PB 63 Policy for Dealing with Potential Conflicts between Residential Subdivision and Market Gardens in East Wanneroo
- PB 80 Swan Valley Planning Legislation Amendment Act 2006
- SPP 4.3 Poultry Farms Policy

The walkable catchment technique

Walkable catchments, sometimes referred to as 'ped-sheds', are maps showing the actual area in a five- minute walking distance from any centre, or ten minutes from any major transport stop such as a railway station. The centre could be a neighbourhood or town centre. The walkable catchment is simply a technique for comparative evaluation of how easy it is to move through an urban area in order to get to and from these centres or facilities. These maps are the best estimates of walkability, and as such are an indication of energy efficiency.

Walkable catchment calculations are expressed as the actual area in a five-minute walking distance as a percentage of the theoretical area in a five-minute walking distance. The theoretical five-minute walking distance is shown as a circle with a radius of about 400 metres drawn around any particular centre. This is an area of 50ha. When calculating a ten-minute walking distance, the radius used is about 800 metres, resulting in a circle area with an area of 200ha.

The higher the percentage of the theoretical area, the better the walkability and energy efficiency of the urban area. A good target for a walkable catchment is to have 60 per cent of the area in a five-minute walking distance, or ten minutes in the case of stations.

Process for calculating walkable catchments

1. On a scaled map, draw a circle of 400 metres radius around a neighbourhood or town centre, and an 800 metre radius circle around a rail station. When drawing the circles around a station, draw the inner 400 metre radius circle as a thick solid black line, and the 800 metre radius circle as a broken black line.
2. Starting from the centre, measure along the centre line of all available streets, to a distance of 400 metres. Where higher volume streets need to be crossed, the distance travelled should be reduced to account for the delay in crossing the street and/or the detour required to reach a safe crossing point. For every minute of assumed delay, the distance should be reduced by 80 metres, to reflect a more realistic five-minute travel distance.
3. Estimate the boundary of the lots in a 400 metre walk, and colour this area. The convention is to colour this area purple. This is the actual area from which a pedestrian would be able to access a centre along the available streets in a five-minute walk.
4. In the case of stations, repeat tasks 2 and 3 for a ten-minute walking distance, using 800 metres as the distance measure. Again, delay crossing roads and/or detours to safe crossing points should be included as these are particularly important around train stations, especially those stations located in the freeway median. Pedestrian delays at intersections around these stations can be substantial and the effective 10-minute travel distance can often be significantly less than 800 metres.
5. Using a grid of scaled hectares, (i.e. 100 x 100m squares at the appropriate scale), calculate the approximate area in hectares of the land coloured purple, and express this as a percentage of 50ha. This shows the actual area in 400 metres of the centre as a percentage of the 50ha circle. In [Figure 40](#), in the example of a conventional subdivision around a neighbourhood centre, this is 38 per cent, while in [Figure 41](#), for a walkable neighbourhood around a neighbourhood centre and transit station the figure is 60 per cent.
6. Repeat the exercise for rail stations, using the hectare grid, and calculate the area accessible in a ten-minute walk (800 metres) of the 200ha area. [Figure 41](#) shows that for a walkable neighbourhood the area accessible in a ten-minute walk is 58 per cent.

Note that the walkable catchment should always count the area of land used for dwellings but not include public open space contained in the accessible area.

Fine-tuning the calculation

There are practical influences on walkable catchments such as short-cuts through parks or along pedestrian paths. These should only be included where there is a high level of surveillance, during evenings and at weekends, from adjoining development that fronts the parks and where there is good lighting. Similarly, the walkable catchment may need to be reduced where there is poor surveillance and routes are perceived to be unsafe.



Figure 41: Conventional subdivision around a neighbourhood centre.

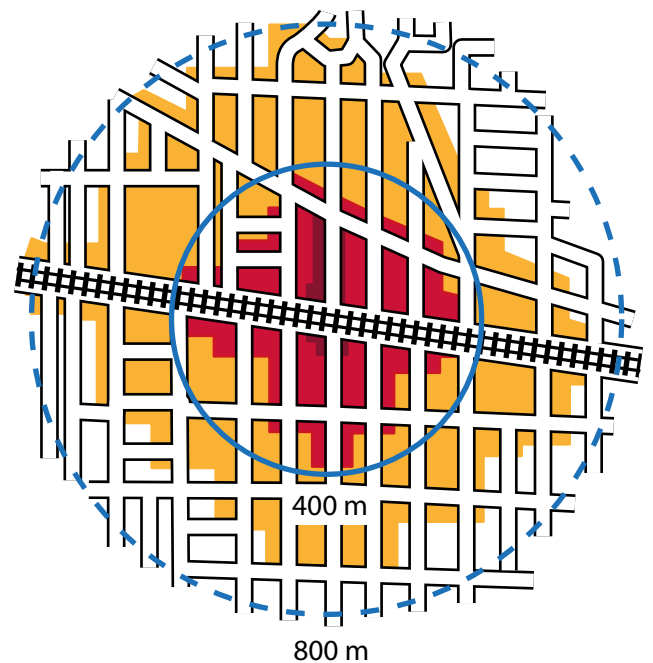


Figure 42: A walkable neighbourhood around a neighbourhood centre and transit station

Movement network tables of technical specifications

Table 5: Indicative terminating street spacing

Integrator Arterial through-route	Terminating route	Minimum spacing on same side of route -Unsignalised (based on left turn lane length on through route)	Minimum Left/right staggers (based on non-overlapping right turn lanes on through-route)	Right/left stagger (based on left turn lane length on through route)
Primary Distributor	Integrator A arterial	>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)
		>100m (70 km/h)	>225m (70 km/h)	20m – 70m (70 km/h)
		>125m (80 km/h)	>270m (80 km/h)	20m – 95m (80 km/h)
Primary Distributor	Integrator B arterial	>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)
		>100m (70 km/h)	>225m (70 km/h)	20m – 70m (70 km/h)
		>125m (80 km/h)	>270m (80 km/h)	20m – 95m (80 km/h)
Integrator A arterial	Integrator A arterial	>55m (50 km/h)	>140m (50 km/h)	20m – 35m (50 km/h)
		>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)
Integrator A arterial	Integrator B arterial	>55m (50 km/h)	>140m (50 km/h)	20m – 35m (50 km/h)
		>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)
Integrator A arterial	Neighbourhood connector	>55m (50 km/h)	>140m (50 km/h)	20m – 35m (50 km/h)
		>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)
Integrator B arterial	Integrator B arterial	>55m (50 km/h)	>140m (50 km/h)	20m – 35m (50 km/h)
		>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)
Integrator B arterial	Neighbourhood connector	>55m (50 km/h)	>140m (50 km/h)	20m – 35m (50 km/h)
		>75m (60 km/h)	>175m (60 km/h)	20m – 50m (60 km/h)

Local through-route	Terminating route	Minimum spacing on same side of route	Minimum left/right staggers (based on minimising corner cutting)	Right/left stagger (based on deflecting through movement on terminating route)
Neighbourhood connector	Neighbourhood connector	>40m	>40m	15m – 20m
Neighbourhood connector	Access street	>40m	>40m	15m – 20m
Access street	Access street	>20m	>20m	15m – 20m
Access street	Laneway	>20m	>20m	15m – 20m

Notes

- 1 – The speed in brackets is the posted speed of the through-route.
- 2 – Spacing is measured using route centreline to route centreline.
- 3 – For left/right staggers on integrator arterials, storage has been allowed for two queuing vehicles. Where higher levels of queuing vehicles are anticipated, the spacings in the table may need to be increased accordingly.

Table 6: Typical traffic controls at four-way intersections

Intersection Type	Signals	Roundabout	Stop/Give Way
Integrator Arterial/ Integrator Arterial	Yes	No, unless a safe and efficient alternative crossing facility is provided for pedestrians and cyclists	No
Integrator Arterial / Neighbourhood connector	Yes	Yes, but only if all four legs are single lane	No, unless median is closed and movements limited to left in/left out
Neighbourhood Connector / Neighbourhood Connector	Limited	Yes	Yes
Neighbourhood Connector / Access Street	No	Yes, including for speed control	Yes
Access Street / Access Street	No	Yes, but limited	Yes

Table 7: Typical traffic controls at three-way intersections

Intersection type	Signals	Roundabout	Stop/Give-way
Integrator Arterial / Integrator Arterial	Yes	No, unless a safe and efficient alternative crossing facility is provided for pedestrians and cyclists	No
Integrator Arterial / Neighbourhood connector	Yes	Yes, but only if all three legs are single lane	Yes, depending on volumes and nearby signals as alternative access
Neighbourhood Connector / Neighbourhood Connector	Limited	Yes	Yes
Neighbourhood Connector / Access Street	No	Yes, including for speed control	Yes
Access Street / Access Street	No	Yes, but very limited	Yes

Note: The traffic controls shown in Tables 6 and 7 are indicative of treatments that may be appropriate depending upon local conditions. Each location should be assessed to ensure the most appropriate measure of control is adopted for that particular location. In some limited situations this may be outside those shown in the tables.

Table 8: Signalised intersection / signalised pedestrian crossing facility spacing

Street type	Typical intersection spacing (value depends on signal cycle length and the need for two-direction signal coordination)	Maximum spacing to provide adequate frequent safe pedestrian crossing facilities including access to bus-stops (See notes 1 and 2)
Integrator B Arterial	400–500m	200m in areas of high frontage activity or in centres 400m in areas of low frontage activity
Integrator A Arterial – 60km/hr operating speed at full build out	500–750m	200m in areas of high frontage activity or in centres 400m in areas of low frontage activity
Integrator A Arterial – 70km/hr operating speed at full build out	750–1,000m	200m in areas of high frontage activity or in centres 400m in areas of low frontage activity
Primary Distributors	Determined by Main Roads WA	400m
The spacings in this table are provided for those urban areas typically resulting from Liveable Neighbourhoods designs, i.e. where there is a finer street block layout, higher pedestrian demands and traffic access demands are more concentrated.		

Note 1 – These spacings for signalised pedestrian crossing facilities are required where the volume at full development is likely to exceed that in Table 9.

Note 2 – The signalised intersections spacing’s of the previous column can be adopted where alternative signalised pedestrian crossing facilities are provided midblock to maintain the required maximum spacing’s.

Note 3 – The use of a grade separated facility, i.e. an overpass or underpass, may be considered in lieu of a signalised pedestrian crossing where it can be demonstrated that it would provide an equivalent or better level of service to pedestrians

Table 9: Traffic volumes thresholds for pedestrian crossing facilities

Street cross-section	Traffic volume affecting ability of pedestrians to cross (vehicles per hour – two way)	Approximate daily volumes (Peak x 10)
two lane undivided	1,100 vph	11,000 vpd
two lane divided (or with pedestrian refuge islands)	2,800 vph	28,000 vpd
four lane undivided (without pedestrian refuge islands)	700 vph	7,000 vpd
four lane divided (or with pedestrian refuge islands)	1,600 vph	16,000 vpd,

Source: Transport Assessment Guidelines for Developments Volume 5 (WAPC, 2006)

Note - Signalised pedestrian crossing facilities should be provided when the ultimate design volumes exceed those in this table unless it can be clearly demonstrated that pedestrians could cross safely and/or have an alternative safe crossing facility within the spacings in Table 8.

Table 10: Indicative maximum kerb radii

Intersection street types	Indicative maximum kerb radius (metres)
From Integrator Arterial to Integrator Arterial	9m (turning into single lane carriageway) 6m (turning into two lane carriageway)
From Integrator Arterial to Neighbourhood Connector	9m (limited number of large vehicles) Special treatment may be required for a higher number of large vehicles (e.g. dedicated slip lane with splitter island)
From Neighbourhood Connector to Integrator Arterial	9m (turning into single lane carriageway) 6m (turning into two lane carriageway)
From Integrator Arterial to Access Street	9m
From Access streets into Integrator Arterial	9m (turning into single lane carriageway) 6m (turning into two lane carriageway)
From Neighbourhood Connector to Neighbourhood Connector	6m (limited number of large vehicles turning) 9m (higher number of large vehicles turning)
From Neighbourhood Connector to Access Street	6m (limited number of large vehicles turning) 9m (higher number of large vehicles turning)
Access Street to Access Street	4.5m (limited number of larger vehicles turning) 6m (higher number of large vehicles turning)
Areas of high pedestrian activity, (e.g. within town or neighbourhood centres and around schools)	3m – 4.5m (subject to the provision of suitable access for service, delivery and emergency vehicles)

Table 11: Corner truncations

Kerb radius (metres)	Minimum truncation required (to retain five metre verge width at corner)
5m or less	No truncation required
6m	0.6m x 0.6m
9m	2.4m x 2.4m
12m	4.1m x 4.1m

Table 12: Indicative spacing of traffic management devices

Max 85th percentile speed between slow points (km/h)	Distance between slow points (metres)
25	40
30	75
35	100
40	120
45	140
50	155

Source: Table 3.3 *Austrroads, 2008 Guide to Traffic Management Part 8: Local Area Traffic Management*

Cash-in-lieu for public open space

- A1** Under the provisions of 153 of the *Planning and Development Act 2005*, the WAPC may agree to cash-in-lieu of public open space (POS) if the land area is such that a 10 per cent contribution would be too small to be of practical use, and there is already adequate public parkland taking into account the overall objective of parkland provision and distribution.
- A2** Having regard to A1, the WAPC may impose a condition seeking the provision of a cash-in-lieu equivalent of the POS, where:
- the local government has requested the condition and identified an existing or potential surplus of POS; or
 - the local government has an adopted strategy to provide open space by land acquisition in the locality of the subdivision; or
 - the otherwise required 10 per cent area of open space would yield an area of unsuitable size/s and dimension/s to be of practicable use.
- A3** The Act requires that the use of cash-in-lieu must either:
- be initiated by the owner of the land concerned, and requires approval of the relevant local government and the WAPC; or
 - required by the WAPC after consultation with the local government. In cases where the WAPC considers that it may be appropriate to use these provisions, the applicant will be so advised in the WAPC's letter of approval.
- A4** All money received by the local government in this way is required by the Act to be paid into a separate account of that authority, which under the *Local Government Financial Management Regulations 1996*, should clearly set out the purposes for which the money is held, the landholding from which it was obtained and the date on which it was paid to the local government. The money should be applied:
- a) For the purchase of land by the local government for parks, recreation grounds or open spaces generally, in the locality in which the land included in the plan of subdivision is situated;
 - b) In repaying any loans raised by the local government for the purchase of any such land; and
 - c) With the approval of the Minister for Planning, for the improvement or development of land as parks, recreation grounds or open spaces; generally of any land in the said locality vested in or administered by the local government for any of those purposes.
- A5** In each such instance, the WAPC should be advised of the location of the land in respect of which the money is to be expended, the nature and the timing of the expenditure, and the amount of money held by the local government concerned for acquisition or improvement of POS in the locality concerned. In addition, when it has recommended to the Minister that approval is given to the use of cash-in-lieu funds as provided for above, it will also recommend that the local government indicate when those improvement works have been completed.
- A6** The WAPC also requires that local governments provide an annual statement of the separate cash-in-lieu account, in order that it may be appraised of the position in each local government area with respect to the use of cash- in-lieu funds.
- A7** Expenditure of cash-in-lieu funds must be directly related to the use or development of land for POS purposes. The land must be vested or administered for recreation purposes with unrestricted public access. Land held in fee simple by the local government should, as a prerequisite, be reserved for public recreation in the local planning scheme.

- A8** The use of cash-in-lieu would not normally be acceptable for indoor recreation centres, enclosed tennis courts, bowling greens for clubs, and facilities for private clubs or similar facilities where access by the general public is restricted. Acceptable expenditure for cash-in-lieu funds may be for:
- clearing of vegetation
 - seating
 - earthworks
 - spectator cover and/or shelters
 - turf
 - toilets
 - landscaping
 - change rooms
 - community hall, readily available for public use
 - reticulation
 - lighting
 - play equipment
 - pathways
 - fencing
 - walk trails
 - car parking
 - signs relating to recreational pursuits.
- A9** Requests to the Minister for Planning for approval of the expenditure of cash-in-lieu should be submitted to the WAPC accompanied by a map and schedule showing the:
- location and WAPC reference number of the subdivision(s) from which the funds were obtained;
 - dollar value of the funds obtained;
 - location of the proposed reserve where the funds are proposed to be expended;
 - nature of the proposed expenditure; and
 - program for the expenditure.

Glossary

The following terms have been defined for the purposes of this document. Unless otherwise noted, terms used have common meanings and include those listed in the *Planning and Development Act 2005* and the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Access street: a street providing predominantly residential access where the local environment is dominant, traffic speeds and volumes are low and pedestrian and cycle movements are facilitated.

Arterial routes: the urban grid of transport routes that range from freeways (more than 50,000 vehicles per day) to Integrator arterials (down to 7,000 vehicles per day).

Activity centres: community focal points that include activities such as commercial, retail, higher density housing, entertainment, tourism, civic/community, higher education, and medical services. Activity centres vary in size and diversity and are designed to be well-served by public transport.

Building envelope: a diagram on a lot on a subdivision plan to the requirements of Liveable Neighbourhoods defining the limits for the siting and wall heights of any buildings.

Compatible use transition: locating the interface between incompatible uses at the rear boundary of the lots, where the impact is minimal, compared to locating the incompatible use interface along the street which has a greater effect on the streetscape and building fronts.

Community facilities: facilities which help communities and neighbourhoods to function effectively, including: sporting and recreational, community centres, child care and after school centres, libraries and cultural facilities, and such other services and facilities for which development contributions may reasonably be requested

Community purpose site: an area of land more than 2,000m² to accommodate community land uses such as community centres, meeting halls, libraries and kindergartens. Community purpose sites may form part of the public open space contribution.

Community infrastructure: facilities and services that assist communities and neighbourhoods to function effectively, including –

- sporting and recreational facilities
- community centres
- child care and after school centres
- libraries and cultural facilities; and
- such other services and facilities for which development contributions may reasonably be requested, having regard to the objectives, scope and provisions of *SPP 3.6 Development Contributions for Infrastructure*.

Decision-maker: has the same meaning given to it in *State Planning Policy 3.1 Residential Design Codes* (WAPC, 2013).

Development contribution: a fee or contribution charged against a development for the provision of infrastructure.

Frontage: the street alignment at the front of a lot and, in the case of a lot that abuts two or more streets, the boundary of which, when chosen, would enable the site to comply with Liveable Neighbourhoods.

Foreshore reserve: area of land set aside in public ownership that abuts a river, creek, lake, estuary or coast that has been identified for conservation, recreation and/or public access purposes.

Greenfield area: a large area of land zoned for urban development and located on the fringe of an urban area.

High-frequency bus route: has the same meaning as given to it in *State Planning Policy 3.1 Residential Design Codes* (WAPC, 2013).

Higher-order centre: is an activity centre serving a district service function or higher (regional, strategic metropolitan, secondary, specialised and district) and does not include neighbourhood and local centres.

Integrated urban water management: the integration of water supply, sewerage and stormwater, so that water is used optimally within a catchment resource, state and national policy context. It promotes the coordinated planning, development and management of water, land and related resources that

are linked to urban areas and the application of water-sensitive urban design principles in the built urban environment.

Integrator A arterial: means an arterial street that has frequent connections to local streets, development frontage along its length, and, typically, has service roads with on street parking for mixed-use, with direct vehicle access limited where there are no service streets. Indicative maximum traffic capacity is 35,000 vehicles per day.

Integrator B arterial: means an arterial street that has frequent connections to local streets, development frontage along its length, and typically, has one clear lane for each direction with on street parking. Indicative maximum traffic capacity is 20-000 vehicles per day.

Interconnected streets: are where the street system possesses numerous intersections and junctions providing many alternative vehicle and pedestrian routes which disperse traffic.

K-12: means kindergarten to Year 12 student enrolment.

Kerb: is the street verge interface of a street which may also serve to channel stormwater runoff.

Landscape character: the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement.

Laneway: a narrow local access street without a verge located along the rear and/or side property boundary, typically used in more dense residential areas when smaller lot layouts justify rear garaging, and where alternative vehicle access is needed for lots fronting busy streets or parks.

Leg length: the distance between intersections or junctions, or points and locations where vehicles must slow down, usually to a maximum of 20 km/h.

Legibility: where the design of the urban form, including the local street and public open space networks provides a sense of direction and connection, giving clear signals regarding the spatial layout and geography of an area.

Local centre: a small activity centres with a shop-retail floor space under 1,500m² NLA that includes services such as convenience stores, child care and public transport stop, that provide for the day-to-day needs of local communities.

Local character: refers to distinct features and characteristics of an area that is indicative of the neighbourhood (e.g. plant species, building materials, building styles).

Local development plan: a plan setting out specific and detailed guidance for development, including:

- a) site and development standards that are to apply to the development; and
- b) specifying exemptions from the requirement to obtain development approval for development in the area to which the plan relates.

Local identity: are the natural, cultural and historic characteristics of an area that are intrinsic to the locality, and which the local community relate to.

Local planning policies: policy prepared by a local government in accordance with the procedures set out in the local planning scheme.

Local planning strategy: is a document which supports the preparation and review of a local planning scheme in accordance with draft *Planning and Development (Local Planning Schemes) Regulations 2015*.

Local containment: is where there is a sufficient level of goods and services, facilities and employment opportunity to meet the daily needs of local residents in a mixed-use neighbourhood so that the need to travel to other areas for daily requirements is minimised.

Local streets: the local network of, access streets and neighbourhood connectors that serve the neighbourhood.

Lot: has the same definition as given in *State Planning Policy 3.1 Residential Design Codes* (WAPC, 2013).

Major rainfall events: is one per cent annual exceedance probability event (this criterion replaces but is equivalent to the 100-year rainfall event criterion). These rainfall events are managed with the focus on flood protection.

Mixed use: the compatible mixing of a range of uses, integrated in close proximity to each other to improve the efficiency and amenity of neighbourhoods, reduce travel demand, increase walkability, and make more efficient use of available space and buildings.

Mixed-use development: buildings that contain commercial and other non-residential uses in conjunction with residential dwellings in a multiple dwelling configuration.

Multi-functional: provides for more than one function of sport, nature and recreation for Public Open Space.

Multi-use: provides for multiple uses such as a sport site which has facilities for soccer and football.

Neighbourhood centres: important local community focal points that help to provide for the main daily to weekly household shopping and community needs and, facilities and public transport. They are serviced by public transport and also a focus for medium-density housing.

Neighbourhood connector: a local access street that provides the lower order sub-arterial network, servicing and linking neighbourhoods and activity centres. They spread local traffic loads, act as a bus route, have a predominantly residential frontage, have frequent connection points to local streets and are typically traffic-calmed to limit noise and facilitate pedestrian use.

Primary distributor: those arterial streets that are highly connective, with service streets wherever possible, and limited intersections. They are often signal controlled. Indicative maximum traffic capacity is 35,000 vehicles per day for four lanes and 50,000 vehicles per day for six lanes.

Private open space: has the same meaning as given to it in *State Planning Policy 3.1 Residential Design Codes* (WAPC, 2013).

Public open space (POS): land used or intended for use for recreational purposes by the public and includes parks, public gardens, playgrounds, and sports fields. In certain circumstances it can include regional open space, but does not include foreshore reserves.

Public open space function: is the primary use and expected activities within open spaces and they are identified as three types: recreation, sport and nature.

Public open space network: existing and proposed open space, foreshore reserves, parkland recreation areas and bush forever areas, street trees and shared paths.

Route: A way or course taken in getting from a starting point to a destination

Sense of place: the essential character and spirit of an area, literally meaning 'spirit of the place'.

Setback: has the same meaning as given to it in *State Planning Policy 3.1 Residential Design Codes* (WAPC, 2013).

Shared space: where pedestrians, cyclists and vehicular traffic have equal rights to access.

Shared use path: a pathway that is constructed and detailed in such a way as to allow for its shared use by pedestrians, bikes, wheelchairs etc.

Site-responsive: to respond to the physical characteristics of an area (such as landform, views, prevailing breezes, environmental features) and to manage constraints and opportunities to create optimum design outcomes.

Slow points: sections of a street which have geometric features which limit the travel speed of vehicles. These include bends, constrictions to street widths, surface obstructions etc.; and include junctions or intersections which are designed to slow traffic.

Small Rainfall Events: 15mm volume (this criterion replaces the 1-year, 1-hour average recurrence interval (ARI) rainfall event criterion). These rain events do not produce overland flow/runoff and can be retained on site to infiltrate quickly into the ground with good design.

Street alignment: the horizontal shape of the street reserve boundary.

Street network: a system of connected streets where multiple routes are available.

Street reserve: the land comprising the street pavement and verge set aside to accommodate utilities, stormwater flows, street lighting, street trees, street landscaping, furniture and embayments and usually vested in a public authority.

Streetscape: the visible components in a street between the facing buildings, including the form of the buildings, garages, setbacks, fencing, driveways, utility services, street surfaces, street trees and street furniture such as lighting, signs, barriers and bus shelters.

Structure plan: a plan for the coordination of subdivision and zoning of an area of land, but not site and development requirements.

Subdivision: for the purpose of the policy, the process that includes the division of a cadastral parcel of land to create two or more green title, strata and survey strata lots or the amalgamation of existing lots.

Sustainability: meeting the needs of current and future generations through the integration of environmental protection, social advancement and economic prosperity.

Target speed: the intended maximum vehicular speed in the subject section of street, and is used to determine the combination of street geometry and spacing and form of slow points.

Verge: part of the street reserve between the street and the boundary of adjacent lots (or other limit to street reserve). It may accommodate public utilities, footpaths, stormwater flows, street lighting poles, street trees and other landscaping.

Visually permeable: has the same meaning given to it as in *State Planning Policy 3.1 Residential Design Codes* (WAPC, 2013).

Walkable catchment: the actual area served in a 400 metre (five-minute) or 800 metre (10-minute) walking distance along an interconnected street network from a public transport stop, or activity centre.

Walkable neighbourhood: the area defined by a 400 metre or five-minute walk from a public transport stop, or activity centre where shops, schools, public transport, community facilities and other buildings front the streets.

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