

A detailed line drawing of a city street scene. In the foreground, a tram is moving towards the viewer on the left side of the road. To its right, a car is driving away. Further down the street, another tram is visible. On the right side of the road, a cyclist is riding away from the viewer. The street is lined with multi-story buildings on both sides, and there are trees and bushes in the background. The drawing is done in a sketchy, artistic style with simple lines.

CHAPTER 3

STREET DESIGN

'Streets are almost always public: owned by the public, and when we speak of the public realm we are speaking in large measure of streets. What is more, streets change. They are tinkered with constantly: kerbs change to make sidewalks narrower or wider, they are repaved, lights are changed, the streets are torn up and repaved again. The buildings along them change and in doing so change the streets. Every change brings with it the opportunity for improvement. If we can develop and design streets so that they are wonderful, fulfilling places to be, community building places, attractive public places for all people of cities and neighbourhoods, then we will have successfully designed about one-third of the city directly and will have an immense impact on the rest.' **Allan Jacobs**

'In a society becoming steadily more privatised with private homes, cars, computers, offices, and shopping centres, the public component of our lives is disappearing. It is more and more important to make cities inviting, so we can meet our fellow citizens face to face and experience directly through our senses. Public life in good quality public spaces is an important part of a democratic life and a full life.' **Jan Gehl**

'Cultures and climates differ all over the world, but people are the same. They'll gather in public if you give them a good place to do it'. **Jan Gehl.**

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3 STREET DESIGN

KEY POINTS OF THIS CHAPTER

- General street design principles
- Traffic and parking lane design
- Cycleway design
- Footpath design & street types
- Laneway, pedestrian link & arcade design
- Intersection design
- Footpath accessibility design manual

The majority of the public domain comprises streets. Streets are the most important element of the public domain connecting private and public places and linking different parts of neighbourhoods. They are the main ordering component determining the form and function of the urban environment.

In every type of street, the safe and efficient movement of people should be the primary design consideration. Well-appointed, good looking streets, that are comfortable for pedestrians, benefit the city by attracting people and encouraging economic activity, and supporting health and well-being, public safety, and social engagement. When designing public places it is also important to acknowledge and respond to special local characters that have developed and to creating a co-ordinated appearance and consistent image for the City of Parramatta.

3.1 STREET STRUCTURE & THE PUBLIC DOMAIN

The location of elements in the footway needs to be considered to minimise clutter and maintain a clear path of travel. This section provides general principles and design considerations for the street design.



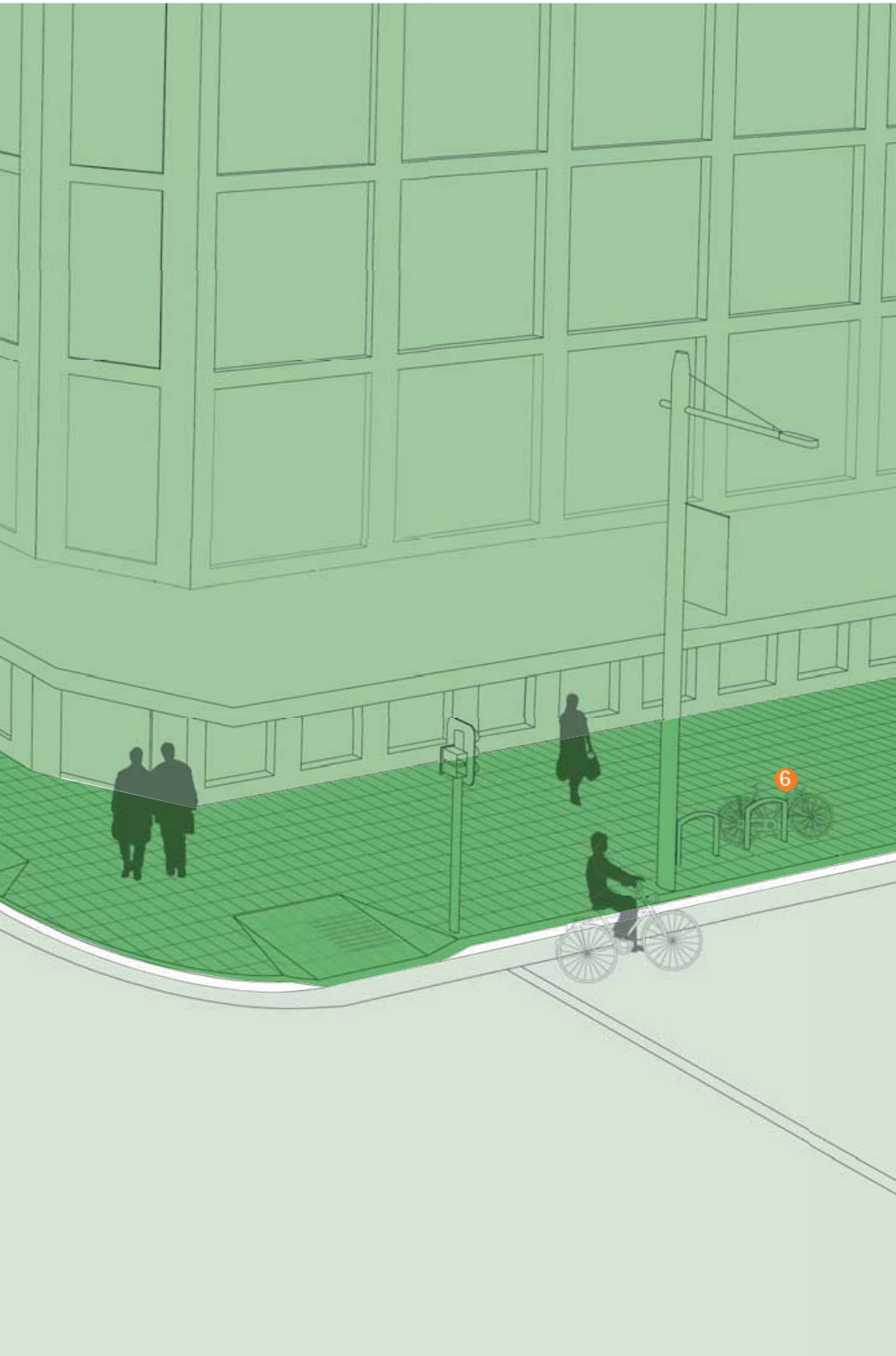
Figure 3.1 Street Structure and Public Domain Elements

STREET STRUCTURE

Footway - provides access for people.

Building Interface - frames the street and create a transition between public and private property.

Carriageway - provides access for public transport, servicing trucks, private vehicles and cyclists.



PUBLIC DOMAIN ELEMENTS

- 1 New **street trees** are required and their spacing and species should be co-ordinated with existing trees on the street or City's relevant street tree strategies. The location of trees also needs to be coordinated with streetlights, entrances and awnings.
- 2 Sometimes buildings include **setbacks** at ground level for entrances or create colonnades. Whilst privately owned these areas effectively form part of the City's public domain. They are to have continued levels and be finished in the same material as the public footway.
- 3 **Driveways** form part of the footpath and need to be designed for pedestrian priority.
- 4 Ensure **pit lids** align with pavement layout and vertical alignment
- 5 New **seating and/or bins** may be required and should be located in the street furniture zone.
- 6 **Bike racks** may be required.
- 7 **Widening footway** should be considered if the existing footway is narrower than minimum requirements. It should accommodate awnings with street trees and provide more opportunity for outdoor dining.
- 8 **Kerb ramps** are to be aligned with path of travel and with kerb ramps across the road. The location of traffic signals, or other poles, may need to be adjusted as not to conflict with ramp locations. This may require coordination with the RMS and a Traffic Management Plan.
- 9 **Multi Functional Poles** are to be provided in CBD and Town Centre retail streets in according to the Pole Strategy Maps (Chapter 4).

3.1.1 DESIGN PRINCIPLES

Well designed streets are safe, coherent and comfortable for all users. Designs must be co-ordinated and communicated via the development application process to achieve the following key principles for streets in the City of Parramatta.



LIVELY AND FUNCTIONAL

Streets that offer a high quality setting for active public life and activity.

Street settings that are durable and timeless in design.

Well-balanced street geometry and element settings that create memorable experiences to all street users.



ATTRACTIVE AND DISTINCTIVE

Consistent palettes for paving materials, street furniture, signage, wayfinding and other elements that create a coherent public domain image.

Local distinctiveness and character are respected by retaining heritage items and including special elements.



UNIVERSALLY ACCESSIBLE

Footpaths that provide access for people with all abilities, and ages.

A clear path of travel zone along the building façade gives continuous and unobstructed pathways and sightlines

Pedestrian and cycle network facilitates safe, accessible and convenient connections to destinations.

Providing good access and comfort furniture to major destinations.



SAFETY FOR EVERYONE

Balance the needs of all street users including pedestrian and cyclists.

Raised pedestrian crossings that provide safe access for pedestrians.

Kerb ramps that are aligned and provide smooth transitions.

Pavements that have complying non-slip surfaces.

High quality lighting that addresses all users needs.



PROTECTED AND COMFORTABLE

Awnings that give shelter from rain and sun in the busiest pedestrian areas.

Seating options that cater to all requirements.

Trees and landscape treatments that provide shade and amenity.



SUSTAINABILITY

Tree-lined streets with increased tree canopy coverages that provides biodiversity, comfortable micro-climatic conditions and contribute to energy saving.

WSUD solutions that are integrated with streetscape.

Robust and enduring street materials and elements that require low maintenance, and suit City's long-term operational capacity.

3.1.2 DESIGN COORDINATION

The City of Parramatta is on the brink of significant renewal throughout the LGA as a result of development uplift permitted in the Local Environmental Plan. Major development will trigger a need to develop new and upgrade existing streets to suit new previously unimagined urban contexts.

The design and delivery of new or upgraded streets is a complex process due to the range of stakeholders included and the many factors requiring. Space in the carriageway for vehicle, cycleway and transport, and in the verge for foot traffic, trees, furniture, signage, services and road infrastructure is highly contested. Well negotiated multidisciplinary design and delivery processes are essential to deliver the best outcomes. This is most critical for street trees. Where street trees are proposed they can contribute significant amenity if they are able to thrive. However, their living requirements are frequently compromised in the design and delivery process.

The following design considerations are recommended for all new and street upgrade projects to achieve the best street amenity:

- Provision of generous verges for pedestrian movement everywhere. For street upgrade projects relocation of existing kerbs by narrowing of travel lanes to achieve more generous verge widths must be considered.
- Street upgrades on a full street or logical block by block basis to achieve consistent alignments and treatments.
- Consideration of efficient and cost effective water sensitive urban design opportunities and passive watering for street trees.
- Provision of ideal soil volumes for each and every proposed street tree to allow it to thrive for its projected life span.
- Provision of pavement support in CBD and town centre streets, where street trees are proposed and large tree pit openings cannot be achieved, to minimise the negative impact of soil compaction.
- General conformance to the street design controls identified in the following sections.

3.2 STREET LAYOUT

The appropriate allocation of space in streets is important for functional success and safety. There are numerous competing factors for the limited space available. An analysis of requirements should consider:

- Space for pedestrian and vehicular movements
- Anticipated levels of pedestrian activity
- Traffic type, volumes, speed and parking patterns
- Safety and accessibility
- Growing conditions for street trees
- Required street elements
- Service infrastructures.

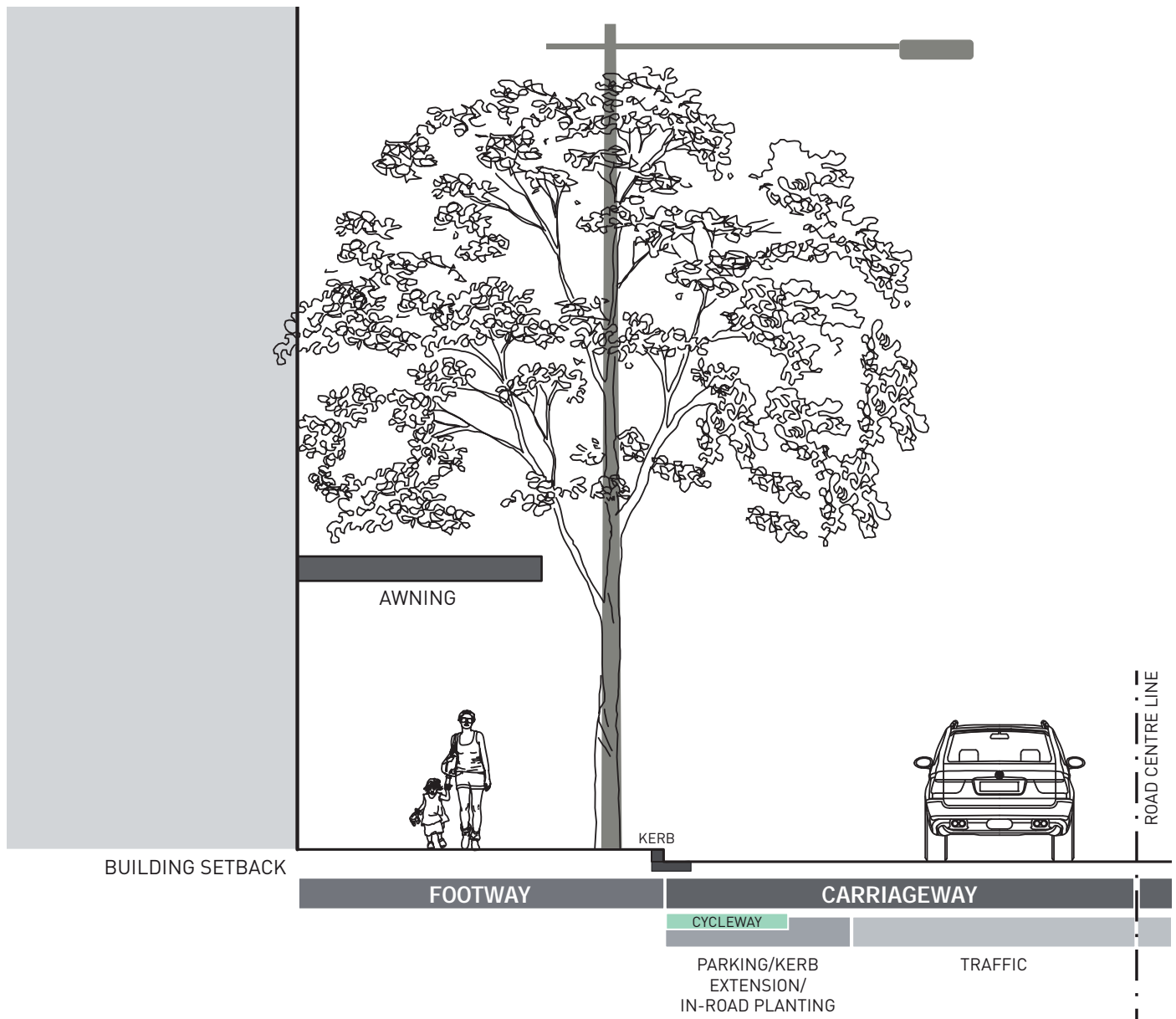
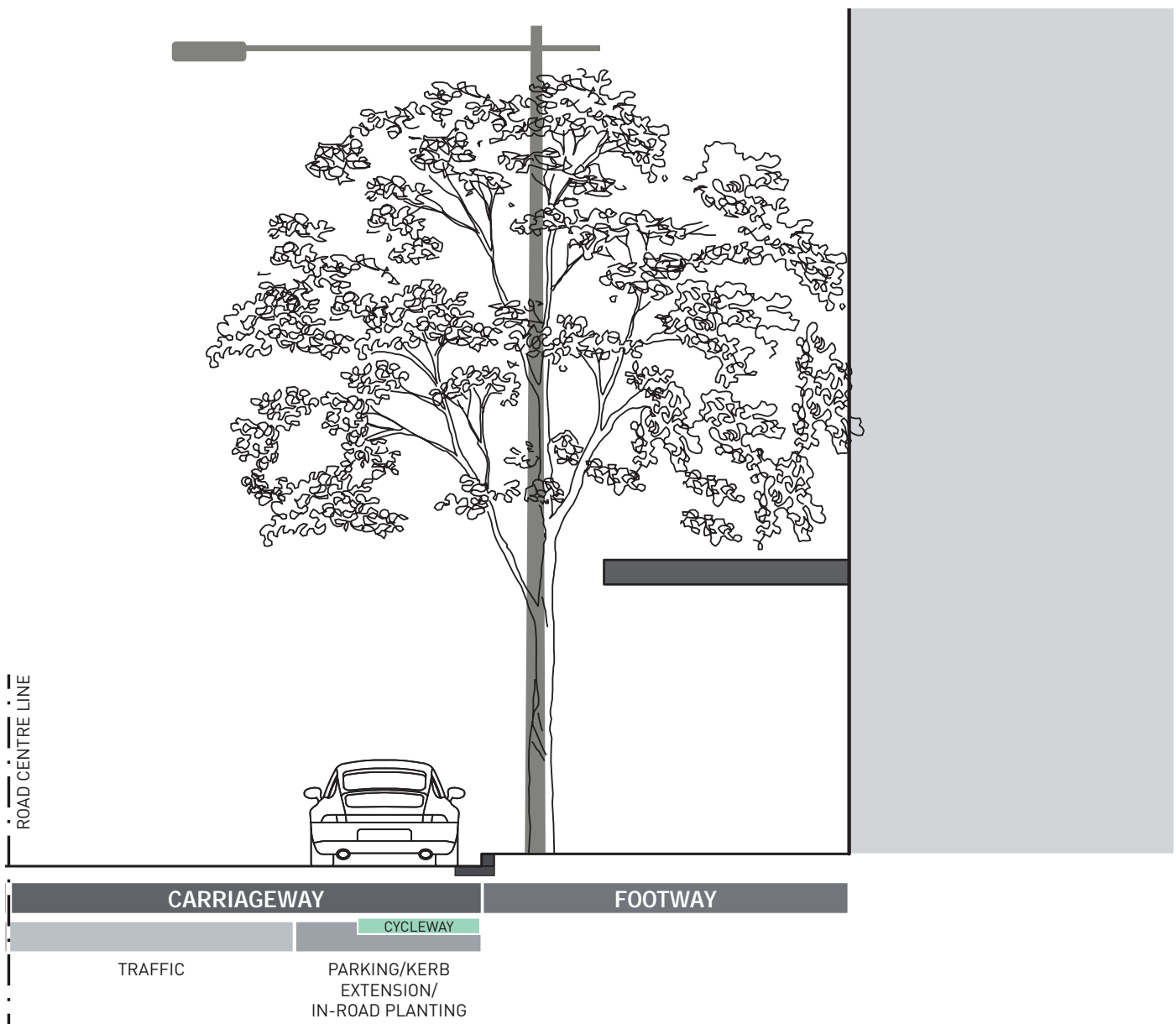


Figure 3.2 General Street Layout

Great streets balance the needs of all users, both in vehicles and on foot. In well-designed streets carriageways properly accommodate vehicles and well appointed footways encourage people to gather, sit, eat and socialise as well as to walk. Streets can be memorable places, and even destinations, in our urban places.

The following sections provide guidelines for designing new streets and major street upgrades to balance the needs of all users and to maximise pedestrian amenity. This includes determining typical street layouts and design criteria for:

- Carriageways (traffic and parking lanes)
- Cycleways (on-road and off-road types)
- Footways (awning structure, clear path of travel, foot traffic, planting, furniture, and egress zones - refer Figure 3.3)



3.2.1 FOOTWAYS

A hierarchy of street types is determined according to visual character and patterns of use. Key contributing factors include:

- the way a street engages with surrounding land uses at its edge;
- its RMS classification;
- the amount and type of traffic it is designed to carry (public transport, vehicle type, pedestrians, cyclists);
- street width, dimensions, alignment and gradient;
- visual character, and
- any special character (for example Eat Street, George Street, light rail routes and conservation areas have special street characters).

The following table articulates general street types in relation to land use zoning and other contributing factors.

GENERAL STREET TYPES		LAND USE ZONING
Commercial	CBD Commercial Core	B3, B4
	CBD Ring Road	Varied
	Town and Neighbourhood Commercial	B1, B2, B4
Residential	Urban Living (Mixed Use)	B4, R4
	High - Medium Density	R3, R4
	Low Density	R1, R2
Industrial	General Industrial	IN1, IN2
	Heavy Industrial	IN3 (Subject to site-specific designs)
LANEWAYS		
Service Lane	Refer to <i>Chapter 4 - Centre Strategies & Parramatta DCP 2011</i> .	
Shared Zone		
Pedestrian Lane		
THRU-SITE LINKS		
Open Air Pedestrian Link	Refer to <i>Parramatta DCP 2011</i> .	
Arcade		
SPECIAL STREETS		
Eat Street	To future design (liaise with Council officers)	
George Street		
Light Rail Routes		
Conservation areas		

Based on these general street types, the below table articulates the minimum required setouts and dimensions for functional zones in the footway as identified in Figure 3.3 and provides general arrangement approaches for typical streets in the City.

Table 3.1 Footway Width Recommendation

STREET TYPES	FOOTWAY ZONES						KERB	FOOTWAY WIDTH		AWNING	
	FOOT TRAFFIC		PLANTING		CLEAR PATH OF TRAVEL^ (Min.)	FURNITURE	PARKING EGRESS	KERB WIDTH	Preferred*	Min.**	Preferred
	Preferred	Min.	Preferred	Min.							
<i>CBD Commercial Core</i>	3.0m	2.4m	1.5m	1.2m	2.4m	Refer to Section 5.2 - Furniture Strategy	0.6m	0.15m unless stone kerb is required	4.65m	3.55m	To provide minimum clearance of 1.9m from the edge of awning to kerb face
<i>CBD Ring Road</i>	2.0m	1.8m	1.8m	1.5m	1.8m				3.95m	3.45m	
<i>Town & Neighbourhood Retail</i>	2.4m	1.8m	1.8m	1.5m	1.8m				4.35m	3.45m	
<i>Urban Living (Mixed use)</i>	2.4m	1.8m	1.8m	1.5m	1.8m				4.35m	3.45m	
<i>High - Medium Density Residential</i>	1.8m	1.5m	2m	1.8m	1.5m	Refer to Section 6.5.2 - Bus Stops/ Shelters	Not required	0.15m	3.95m	3.45m	Nil
<i>Low Density Residential</i>	1.5m	1.5m	2m	1.8m	1.5m				3.65m	3.45m	
<i>Industrial</i>	1.5m	1.5m	2m	1.8m	1.5m				3.65m	3.45m	

* Preferred Footway Width

The preferred footpath width is calculated based on the required widths for Foot Traffic and Planting Zones (plus kerb width), as measured from the face of kerb to property boundary.

All new streets should strive to meet the recommended footway widths.

For town centre /retail streets in new master planned projects, where zero building setbacks are proposed, wider footways minimum 5m are required in order to better accommodate street trees, outdoor seating and awnings.

Major streetscape upgrade projects should evaluate opportunities to widen footways to the recommended widths, as conditions allow.

** Minimum Footway Width

The minimum width is calculated based on the minimum requirements for Foot Traffic and Planting Zones (plus kerb width), as measured from the face of kerb to property boundary.

Minimum footway widths are permissible only with specific council approval. They should only be considered for short length, minor connector streets.

Clear Path of Travel (CPoT) is the zone of pedestrian movement on the footway which complies to the access standard AS1428.1. The CPoT needs to provide a clear shoreline, or other means, to assist people with vision impairment to navigate footpath areas safely. In local areas the path of travel is clearly delineated by the footpath in the nature strip. In centres, where the footway is fully paved, the CPoT is generally provided next to the property line.

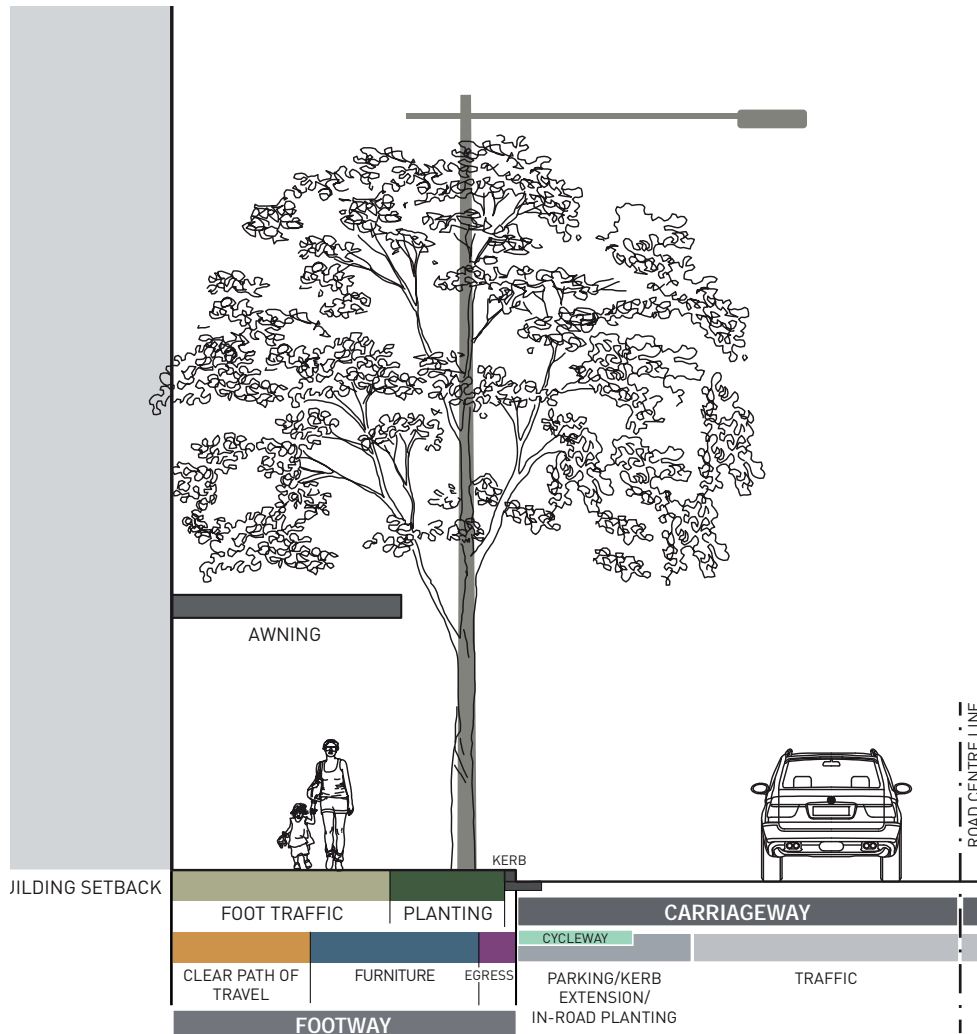


Figure 3.3 Footway Allocation in a CBD Street

3.2.2 CARRIAGEWAYS

The City encourages minimising traffic and parking lane widths to achieve higher levels of pedestrian amenity in all streets. The following recommended lane widths are provided to guide the design of new streets and major street upgrade projects.

Table 3.2 Recommended Carriage Widths for New Streets and Major Streetscape Upgrades

RMS CLASSIFICATION		PRIMARY TRAFFIC LANE	ADDITIONAL LANE	PARKING LANE
State Roads (i.e. arterial roads)		Managed by RMS		
Regional Roads (i.e. sub-arterial roads)		Subject to RMS requirements and site design		
Local Roads with high - moderate traffic flow (i.e. collectors)	Two lanes of traffic in either direction	3.0-3.4m	3.0m	2.1-2.5m
	One lane of traffic in either direction	3.0-3.4m	N/A	2.1-2.5m
Local Roads with low traffic flow (i.e. local access)	One lane of traffic in either direction	3.0-3.2m	N/A	2.1-2.3m
	Single lane, bi-directional streets and lanes	3.2-3.5m	N/A	2.1-2.3m
	Single lane, one-way streets and laneways	3.2-3.5m	N/A	2.1-2.3m
Shared Zone		To comply with RMS Shared Zone Guidelines		

3.2.3 CYCLEWAYS

City of Parramatta supports cycle-friendly street design and encourages well designed cycling provisions to be integrated into street infrastructure. Refer to the *Parramatta Bike Plan (May 2017)* for the proposed bike lane strategy for the City. The following table lists the preferred widths for typical cycleway types.

Table 3.3 Recommended Cycleway Widths

CYCLEWAY TYPES		PREFERRED
On-road Cycleways		
Physically Separated Single Direction Each Side		1.5-2.0m
Physically Separated Bi-directional one Side		2.8-3.5m
Dedicated Lanes (Painted Markings)	with buffer	min. 1.5m
	without buffer	min. 1.4m
Mixed Traffic with Contraflow		1.5-2.0m
Mixed Traffic		Normal traffic lane width
Shared Zone		To comply with RMS Shared Zone Guidelines
Off-road Cycleways		
Shared Path		2.5-4.0m
Separated Bi-directional		3.0m
Shared Bridge		min. 4.0m

PHYSICALLY SEPARATED SINGLE DIRECTION EACH SIDE

- Single direction separated cycleways on each side of the carriageway.
- A 0.4m and 1.0m wide physical barrier (e.g. raised kerb, or planting bed) is provided along the adjoining traffic lane and parking lane respectively.
- Green paint on cycleway is required.

PHYSICALLY SEPARATED BI-DIRECTIONAL ONE SIDE

- A designated two-way cycleway located on one side of the carriageway physically separating cyclist from traffic and pedestrians. Located between footway and parking/traffic lane.
- A 0.4m wide physical barrier (e.g. raised kerb, or planting bed) is provided along the adjoining traffic lane and parking lane respectively.
- Separated lane for each direction of movement with clear surface markings. Green paint on cycleway is required.

DEDICATED LANES (PAINTED MARKINGS) WITH/WITHOUT BUFFER

- Suitable for a street with low traffic speed and flow with low parking lane turn-overs.
- A 0.4m wide buffer is required between the cycleway and traffic lane or parking lane if space is allowed.

MIXED TRAFFIC WITH CONTRAFLow

- Cyclists mix with one-way traffic in the direction of one-way traffic.
- A separated contraflow cycleway for cyclists is provided against the one-way traffic flow.
- Median separation may be required subject to site conditions and risk assessment.
- Green paint on the contraflow lane is required.

MIXED TRAFFIC

- Suitable for low traffic flow streets. No additional width of traffic lane is required unless otherwise advised by the City.
- Bicycle symbols are clearly applied on road surface at regular intervals and at intersections.

SHARED ZONE

- Shared zones can be used where low vehicle traffic conditions permit a low speed 10km/h environment.
- Shared zones must comply with RMS requirements and approval.
- Adequate signage is required to alert the shared road condition.
- Refer to Chapter 4 - Place Strategies - for special finishes and fixtures requirements.

OFF-ROAD CYCLEWAYS

- Separated off-road cycleways separate pedestrian and cyclist use.
- Shared path cycleways allow for shared use by both cyclists and pedestrians.
- Located on the footway or in open spaces and reserves for recreation and commuting use.
- Height clearance of minimum 2.4m.
- Cross fall between minimum 2% and maximum 5%.
- Surface tolerances 5mm maximum variance.
- Adequate pavement marking and signage.
- The speed limit may be reduced depending on the volume of pedestrian flow.

3.3 TYPICAL STREET DESIGN GUIDELINES

The following sections identify the characteristics of, and provide design guidelines for, the varied urban contexts.

3.3.1 CBD COMMERCIAL CORE

CBD commercial core streets cater to a high volume of local and visiting pedestrians, and accommodate high levels of activity throughout the day and night. CBD retail core streets require generous footways, high levels of pedestrian amenity, distinctive designs, and high quality finishes, fixtures and fittings.

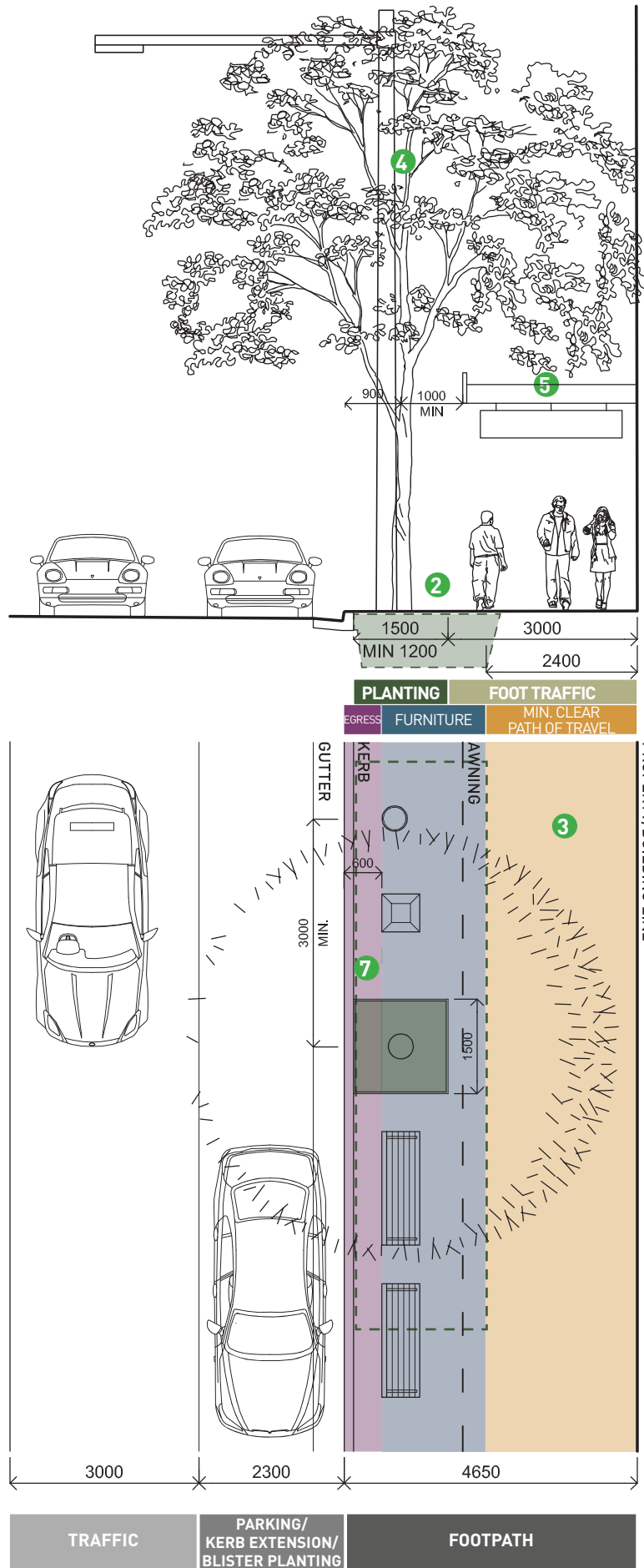
DESIGN CONSIDERATIONS

- 1 Achieve a safe and comfortable pedestrian environment that accommodates large pedestrian flows.
- 2 Provide a widened footway to accommodate large canopy trees and awnings where possible.
- 3 Provide an unambiguous clear path of travel in accordance with Table 3.1.
- 4 Provide large street trees and optimum soil volume in the root zone (refer Section 5.2).
- 5 Carefully co-ordinate awning lengths and widths with street tree planting to achieve the required continuous covered walkways and to maximise street trees.
- 6 Create rest places where space permits.
- 7 Provide vehicle egress zones to allow access to cars along parking lanes.



Figure 3.4 Typical street type -CBD commercial core

Figure 3.5 Typical Street Type
Layout - CBD Commercial Core



3.3.2 CBD RING ROAD

CBD Ring Roads are mostly classified sub-arterial roads. They move significant volumes of vehicles around the CBD in a variety of travel modes. Vehicular traffic on these streets tends to be relatively fast and continuous and bus service is frequent. The widths of traffic lanes are usually more generous to support smooth traffic flow. As a result, these streets are often lacking in pedestrian comforts, especially at street intersections.

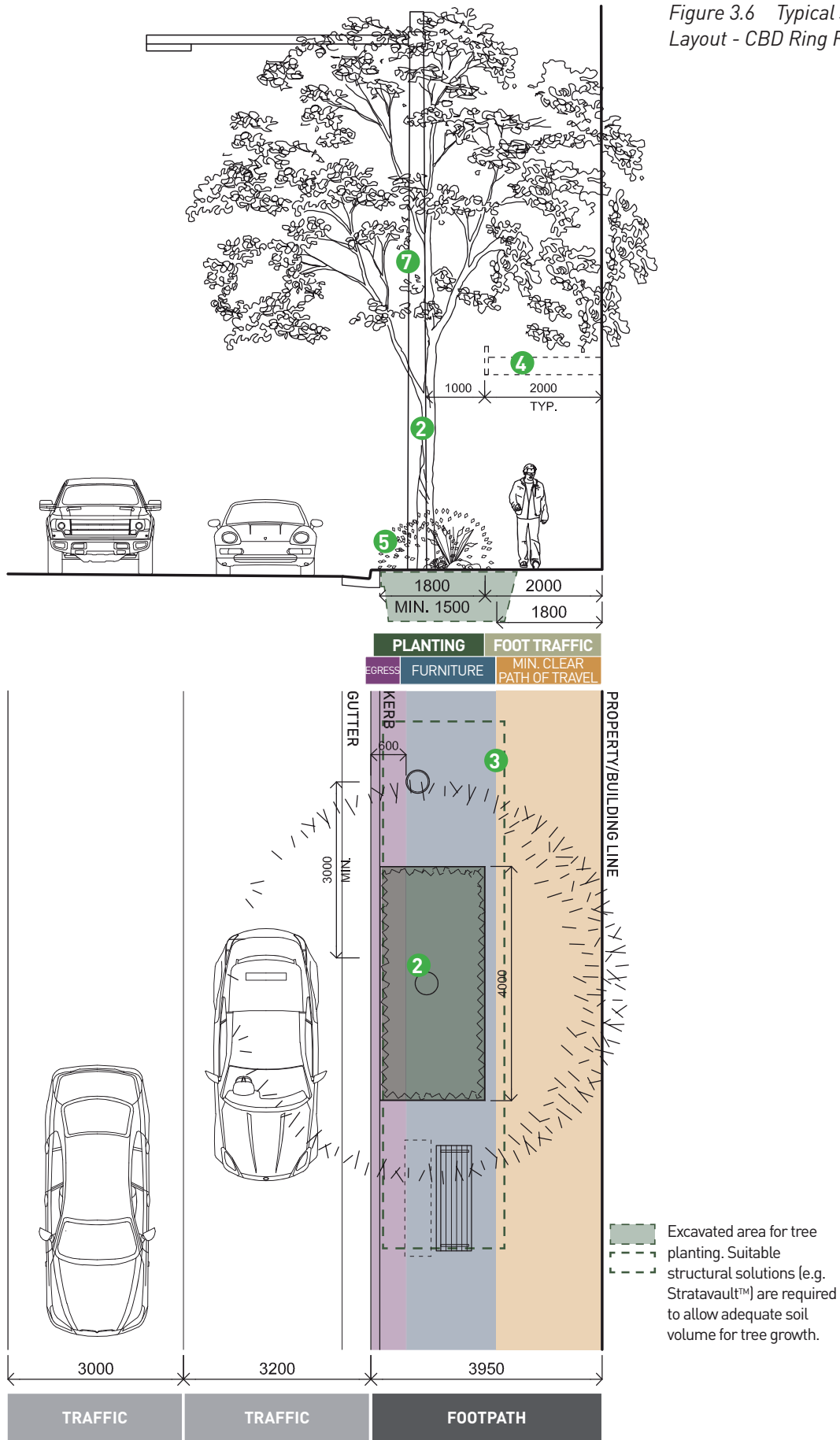
These streets must still offer a safe and comfortable pedestrian environment with amenities such as large shade street trees and corner kerb extensions.

DESIGN CONSIDERATIONS

- 1 Achieve a safe and comfortable pedestrian environment with shady street trees.
- 2 Favour large street tree species with high branching habit to minimise conflict with tall passing vehicles.
- 3 Optimise soil volume in the root zone for the selected tree species (refer 5.2).
- 4 Prioritise street tree planting over the provision of awnings. Reduce the width of awnings if they are required to accommodate street trees.
- 5 Consider understorey planting in large tree pits to optimise tree growth conditions and providing separation for pedestrians.
- 6 Encourage suitable planted areas in building setbacks to contribute to softening of the streetscape.



Figure 3.6 Typical Street Type
Layout - CBD Ring Road



3.3.3 TOWN & NEIGHBOURHOOD COMMERCIAL

Active retail strips in town centres and neighbourhood/local centres include many of Parramatta's most vibrant streets, such as Wigram Street in Harris Park. Many of these accommodate continuous activity throughout the day and into the night. They are the streets where local residents do their daily shopping, meet and socialise with friends, and entertain on the weekends.

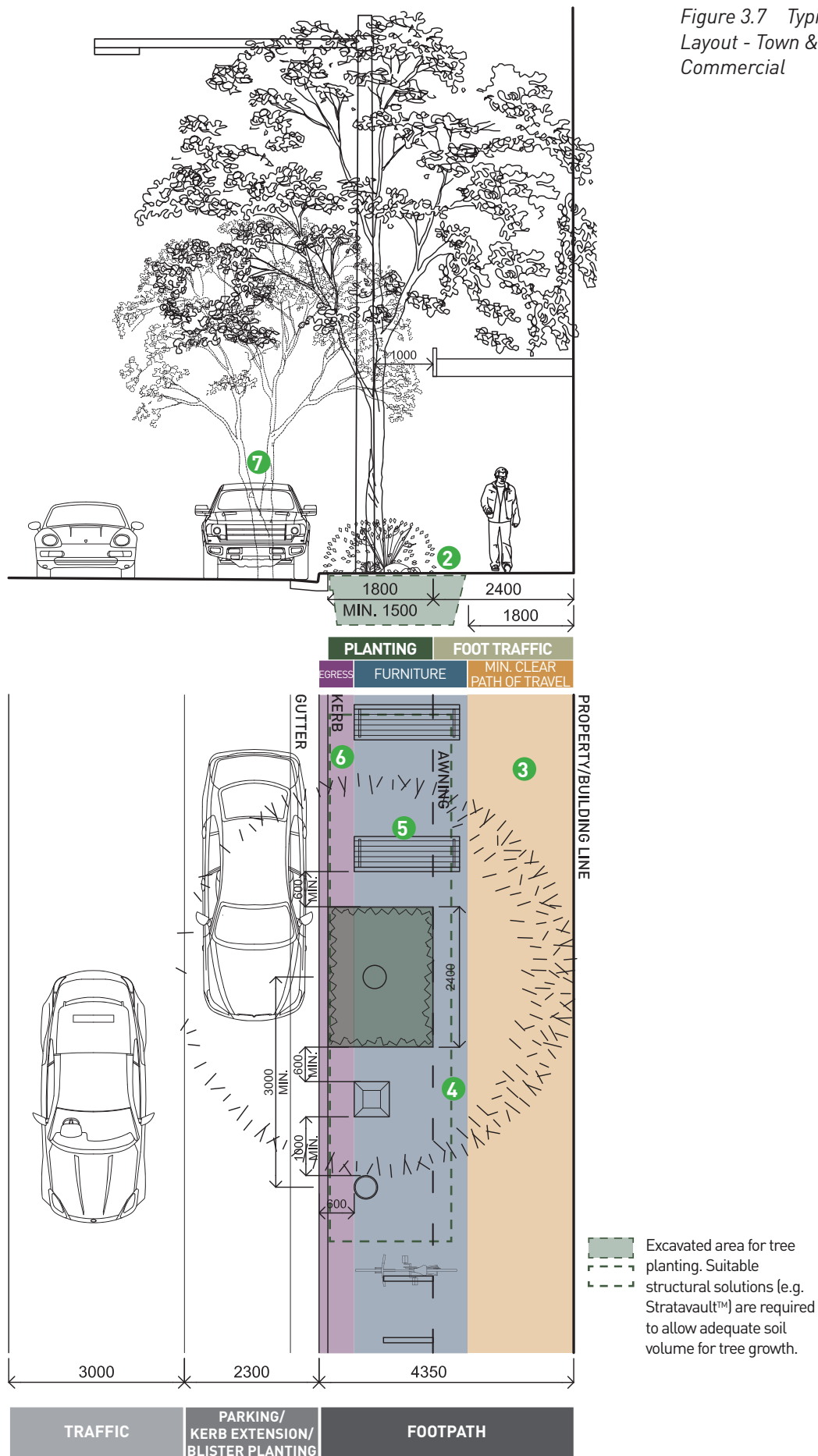
These streets should be distinctive and memorable local destinations with special design treatments, generous footways and high quality of finishes, fixtures and fittings.

DESIGN CONSIDERATIONS

- 1 Achieve a safe and comfortable pedestrian environment that accommodates large pedestrian flows.
- 2 Provide a widened footway to accommodate large canopy trees and awnings where possible.
- 3 Provide an unambiguous clear path of travel in accordance with AS1428 and Table 3.1.
- 4 Provide large street trees and optimum soil volume in the root zone (refer Section 5.1).
- 5 Create a generous furniture zone to allow for resting and varied street activities including outdoor dining.
- 6 Provide vehicle egress zones to allow access to cars in parking lanes.
- 7 Considering blister planting in the parking lane when planting in the footway is constrained.



Figure 3.7 Typical Street Type Layout - Town & Neighbourhood Commercial



3.3.4 URBAN LIVING

Considerable density uplift in existing centres and new urban villages are proposed in Parramatta. These areas are characterised by mixed use, high rise developments around new or expanded retail and commercial centres. New and upgraded streets and public places are anticipated to service significantly increased residential, worker and visitor populations.

These streets also should be distinctive and memorable destinations for local people embellished with special design treatments, generous footways, and high quality of finishes, fixtures and fittings.

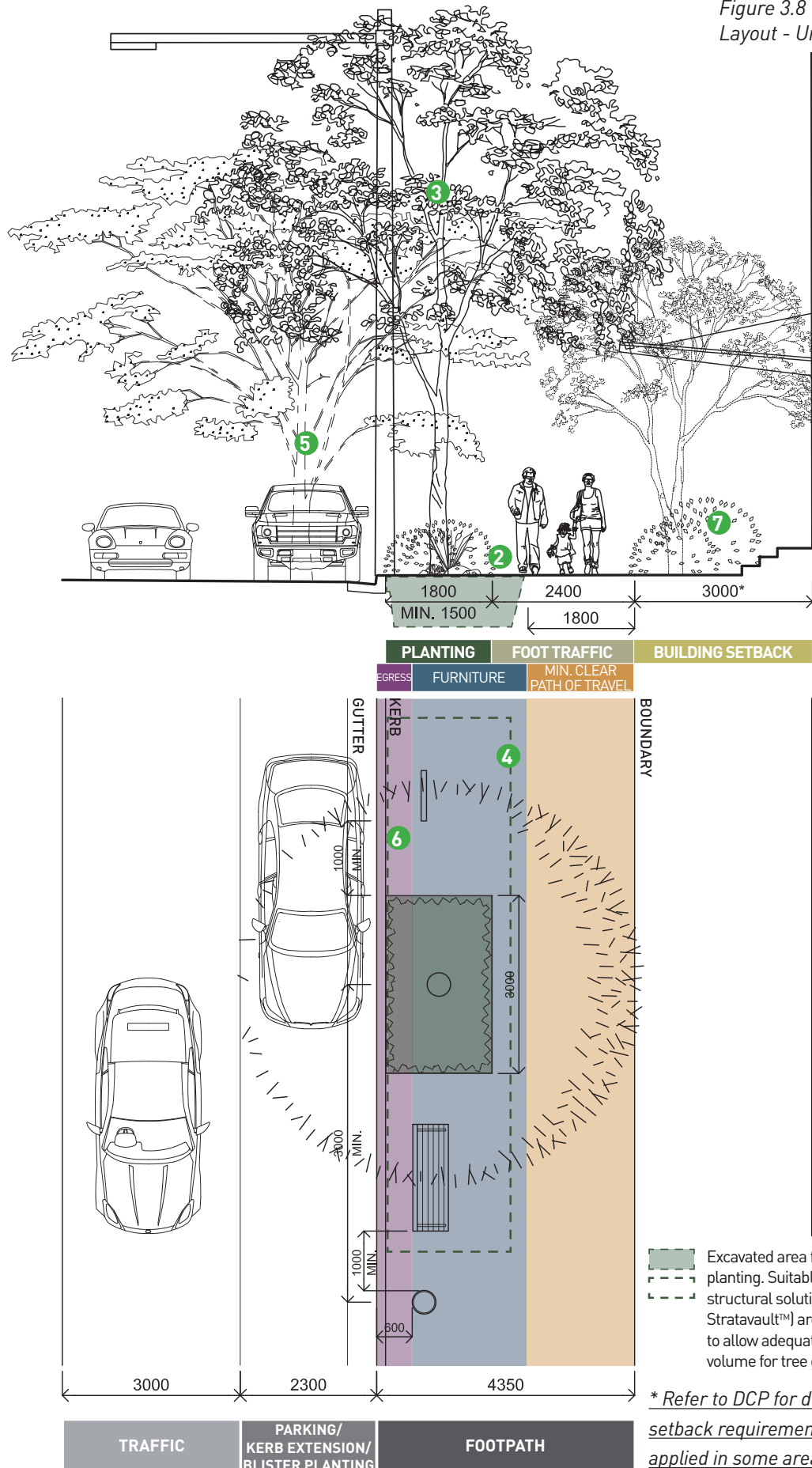
Undergrounding existing over-head power lines is considered key to achieving a suitable urban setting in these places.

DESIGN CONSIDERATIONS

- 1 Achieve a safe and comfortable pedestrian environment that accommodates large pedestrian flows.
- 2 Provide a widened footway to accommodate large canopy trees and awnings where possible.
- 3 Favour large canopy trees and minimum 5m width footway to balance the scale of high rise buildings.
- 4 Provide large street trees and optimum soil volume in the root zone (refer Section 5.1).
- 5 Considering blister planting in the parking lane when planting in footway is constrained
- 6 Provide vehicle egress zones to allow access to cars in parking lanes.
- 7 Encourage suitable planted areas in building setbacks to contribute to softening of the streetscape.



Figure 3.8 Typical Street Type Layout - Urban Living



3.3.5 MEDIUM-HIGH DENSITY RESIDENTIAL

These streets comprise residential apartment buildings with predominant residential ground floor use. Buildings are set back from the front boundary providing additional landscape to the streetscape. Medium to high density residential development is typically located near train stations or other public transport hubs. The streets attract bust vehicle and pedestrian activities during morning and evening peak hours.

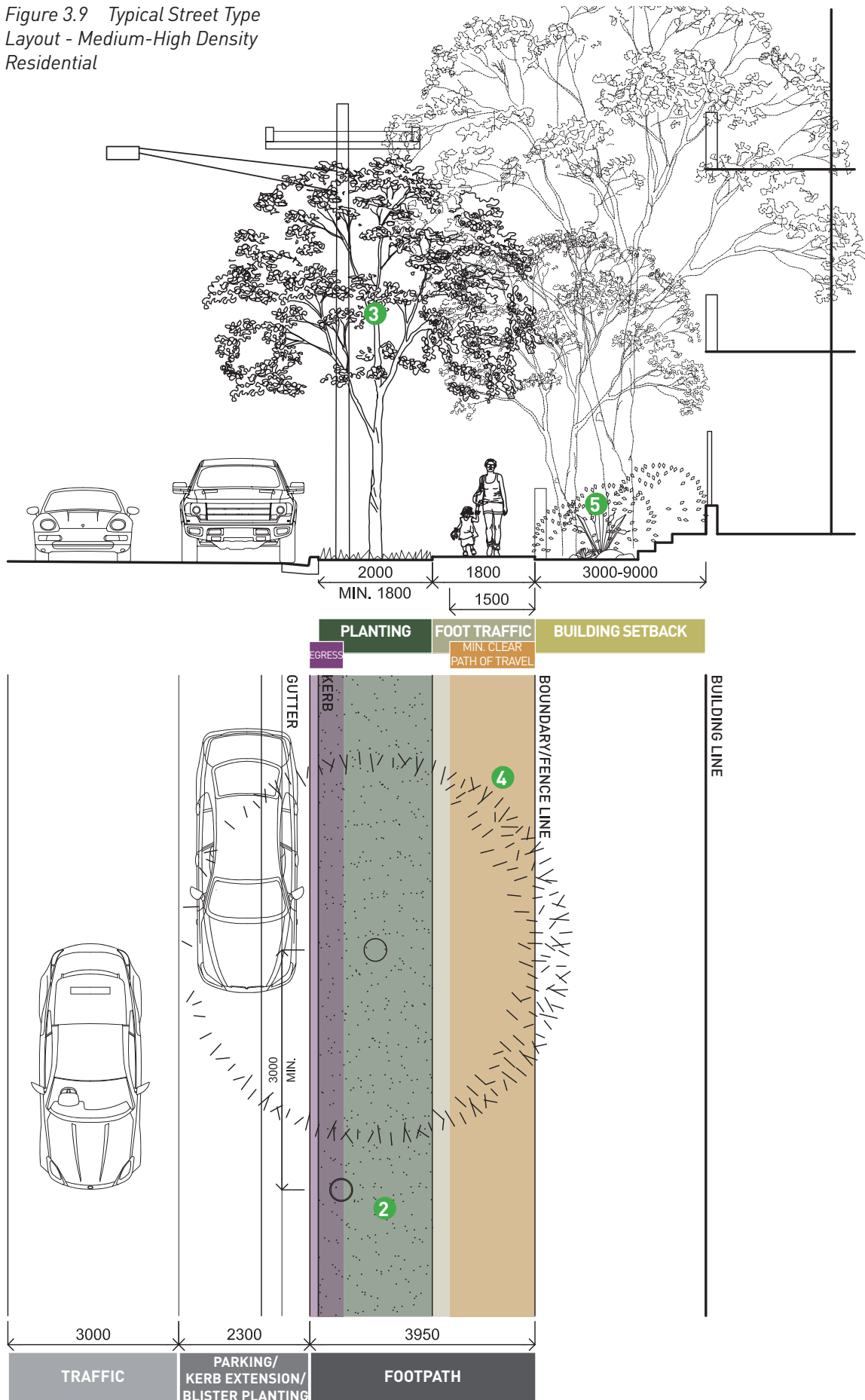
The Parramatta Ways Strategy, promoting the creation of a strong network of walkable green connections through local neighbourhoods, affects many local streets. Refer to the strategy for the scope and requirements for these streets.

DESIGN CONSIDERATIONS

- 1 Achieve a safe, comfortable and attractive environment for all street users.
- 2 Provide a generous turf verge with tree planting to suit street character and to accommodate constraints such as overhead wires.
- 3 Maximise tree canopy coverage and enhance green networks and connections to open spaces (refer to the *Parramatta Ways Walking Strategy*).
- 4 Provide a consistent concrete footpath in the footway abutting the property boundary and aligning with adjoining streets.
- 5 Provide front setbacks to new buildings that are free of basement car parking and that offer additional tree planting and landscaping to contribute to a comfortable, shady streetscape.



Figure 3.9 Typical Street Type
Layout - Medium-High Density
Residential



3.3.6 LOW DENSITY RESIDENTIAL

Low density residential streets represent the majority of streets in LGA. They are quiet streets with relatively low traffic and pedestrian volumes. Although they are less busy than other street types, they play a key role in supporting social interaction and healthy outdoor lifestyle and activity in neighbourhoods.

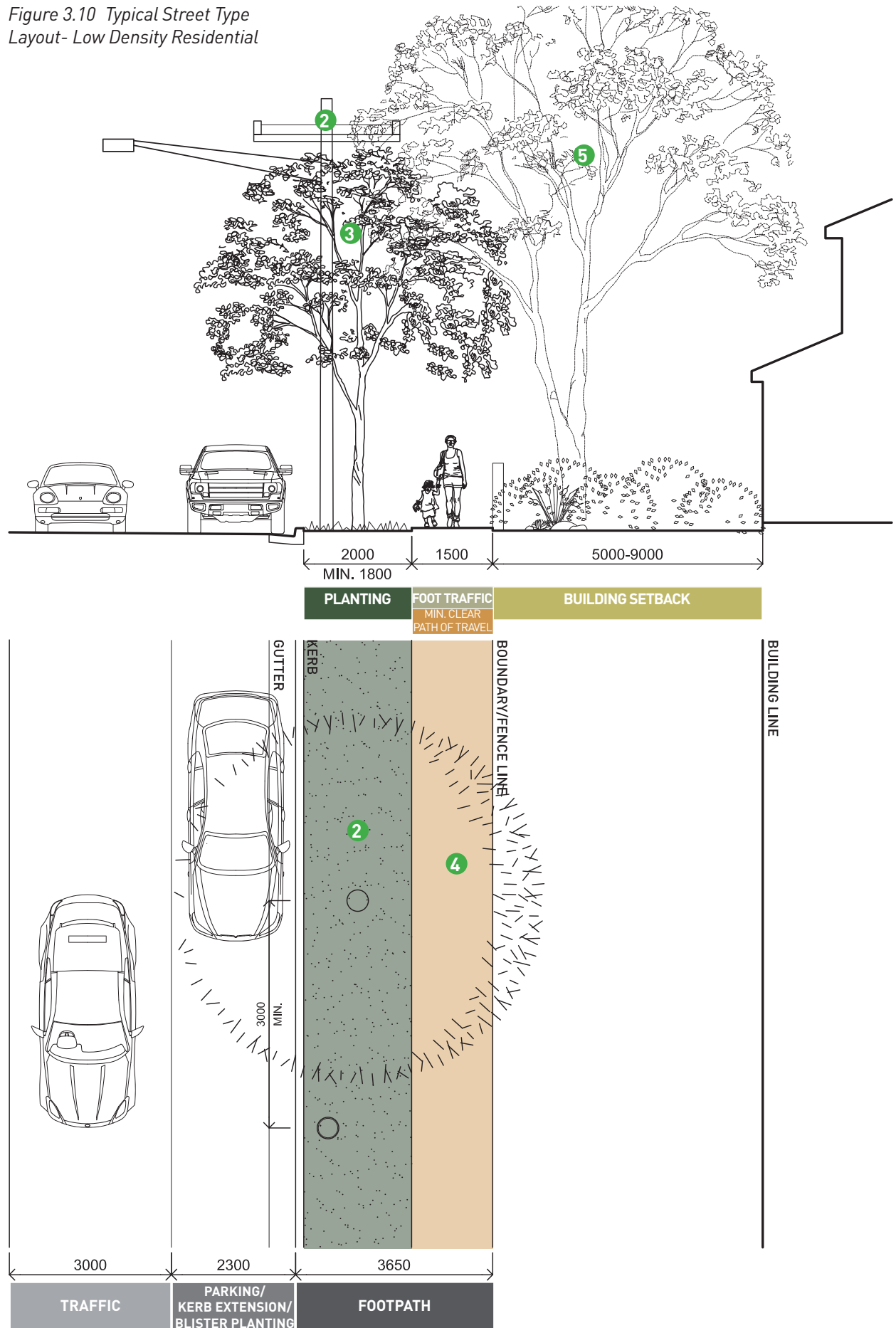
The Parramatta Ways Strategy, promoting the creation of a strong network of walkable green connections through local neighbourhoods, affects many local streets. Refer to the strategy for the scope and requirements for these streets.

DESIGN CONSIDERATIONS

- 1 Achieve a safe and attractive street environment with strong local character.
- 2 Provide a generous turf verge with tree planting to suit street character and to accommodate constraints such as overhead wires.
- 3 Maximise tree canopy coverage and enhance green networks and connections to open spaces (refer Parramatta Ways Walking Strategy).
- 4 Provide a consistent concrete footpath in the footway abutting the property boundary and aligning with adjoining streets.
- 5 Respect significant landscape features in private properties contributing to the public domain, especially in Heritage Conservation areas.
- 6 Provide appropriate traffic-calming devices to manage traffic speed.



Figure 3.10 Typical Street Type
Layout- Low Density Residential



3.3.7 INDUSTRIAL

Public streets in industrial areas traditionally support low levels of street frontage activity. They typically comprise wide carriageways to suit truck movements, large driveway entries, loading docks, and other service facilities to cater for industrial land use activities. Footpaths and landscaping amenities are often minimal.

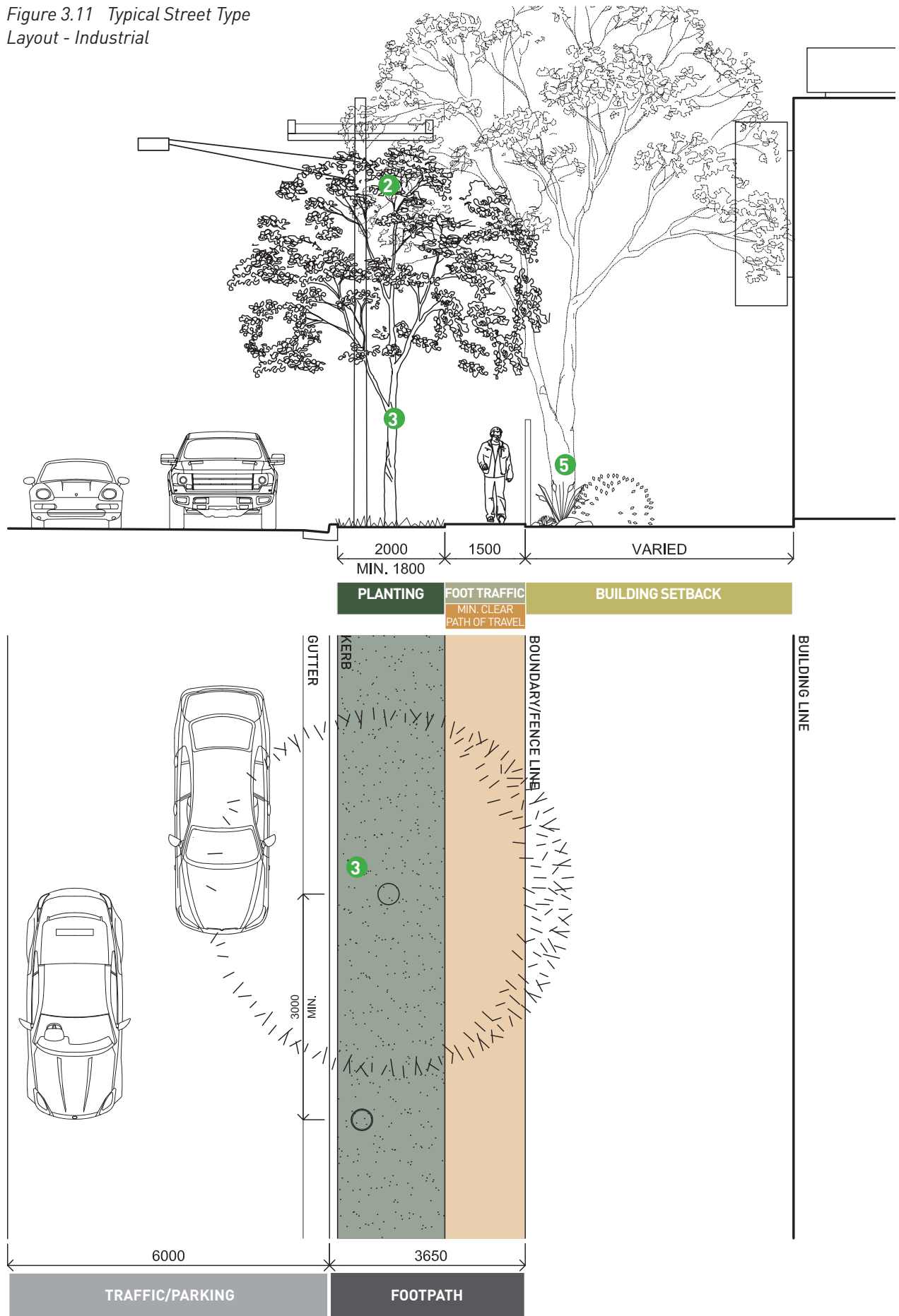
Many industrial areas are facing major urban renewal. A more diverse land use mix is envisaged offering cafe, food and other services to support the large worker populations. New streets in these zones must address pedestrian amenity, comfort and safety as well as the requirements for heavy vehicular movements in order to create desirable and walkable working communities.

DESIGN CONSIDERATIONS

- 1 Achieve an attractive, clean and safe environment for all users.
- 2 Maximise tree canopy coverage and enhance green networks and connections to open spaces (refer Parramatta Ways Walking Strategy).
- 3 Favour large street tree species with high branching habit to minimise conflict with tall passing vehicles.
- 4 Select tree species with air pollution tolerance and low maintenance requirements.
- 5 Encourage generous landscape planting in front setbacks to contribute to the street scape.
- 6 Provide appropriate traffic-calming devices to manage traffic speed.



Figure 3.11 Typical Street Type
Layout - Industrial



3.3.8 LANEWAYS

SERVICE LANES

Service lanes provide service and vehicle access to support commercial and retail properties in major centres. The lanes need to be safe and functional. Safe pedestrian access through service lanes is provided on a narrow footway separated from the carriageway as in all other streets. Provisions for pedestrians and cyclists should be determined subject to specific site context, adjacent destinations and traffic conditions in surrounding streets.

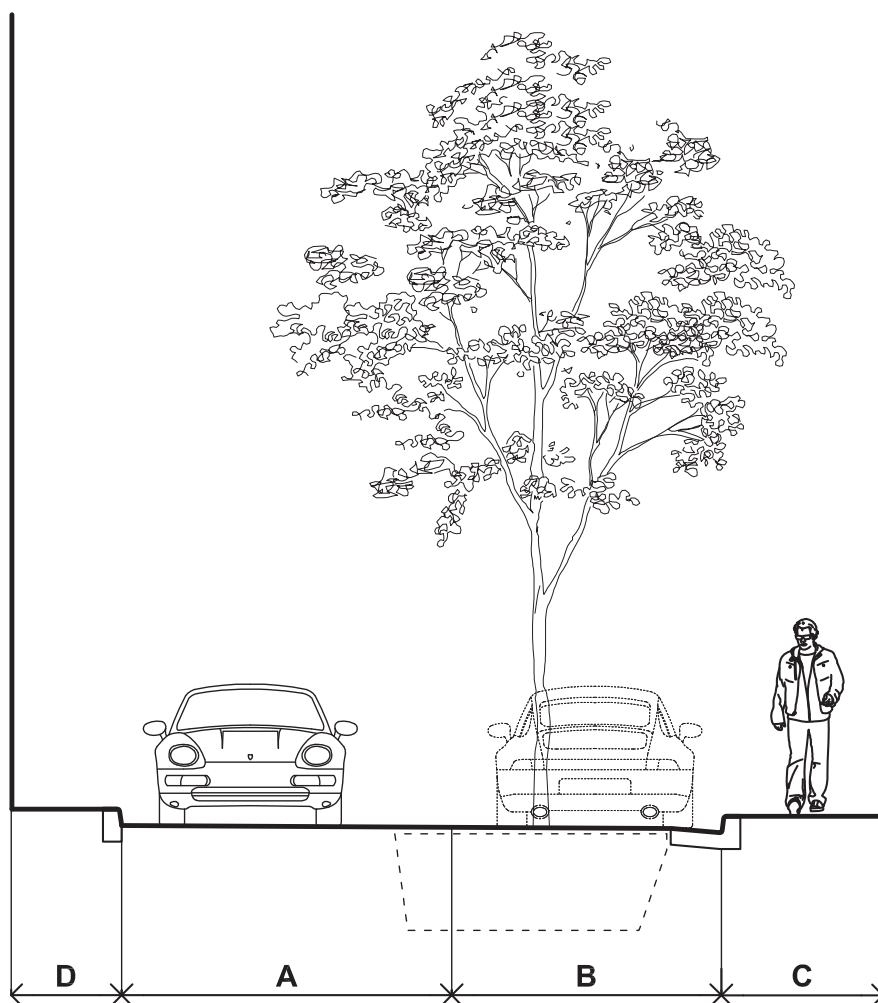


Table 3.4 Recommended Service Lane Widths

A	B		C	D
TRAFFIC LANE	TRAFFIC LANE	PARKING/ PLANTING	PRIMARY FOOTWAY	SECONDARY FOOTWAY
3.0-3.2m	2.5-3.2m	2.1-2.3m	1.0-2.4m	nil-1.5m

SHARED ZONES

Shared zones can be considered where pedestrian flow is high and traffic flow is relatively low. In shared zones there is no separation between pedestrians, cyclists and vehicles across the laneway and vehicle speed is limited to 10kph. There are no fixed spatial requirements for shared zones, however, designs must comply with RMS shared zone requirements and RMS approval needs to be obtained prior to construction.

PEDESTRIAN LANES

Pedestrian lanes are publicly owned links providing access between private properties to the local road network. They are for the exclusive use of pedestrians providing permeability through large city and centre blocks. Design controls to maximise lane safety and legibility include the following.

- Direct at-grade street to street connections. Stairs and changes of level to suit adjacent development is not permitted.
- Direct street to street sightlines along lanes. Changes in direction along the lanes are not preferred.
- Open to sky with no overhanging structure above except approved awnings.
- Lighting levels to meet recommended levels and Australian Standards.
- Active frontages along the lanes are preferred and encouraged.
- No basement car parking under.

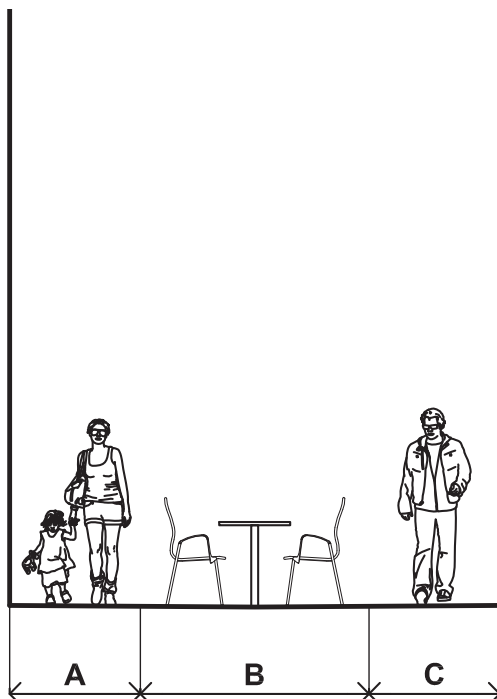


Table 3.5 Recommended Pedestrian Lane Widths

A	B	C
PRIMARY FOOTPATH	FURNITURE ZONE	SECONDARY FOOTPATH
2-2.5m	Min. 1m	nil-1.5m

THRU-SITE LINKS

Thru-site links are privately owned and managed zones through private developments. Where thru-site links are proposed, a public easement (right of way) is required at the development stage to confirm the required public access conditions.

Note: the following design controls for the thru-site links may not be applicable subject to relevant site specific DCPs.

ARCADES

Arcades are located within buildings. They provide direct access between public streets through buildings. Design controls for arcades include the following:

- Double ceiling height preferred
- Clear & legible entries from the street
- Active interior edges
- Generous dimensions.

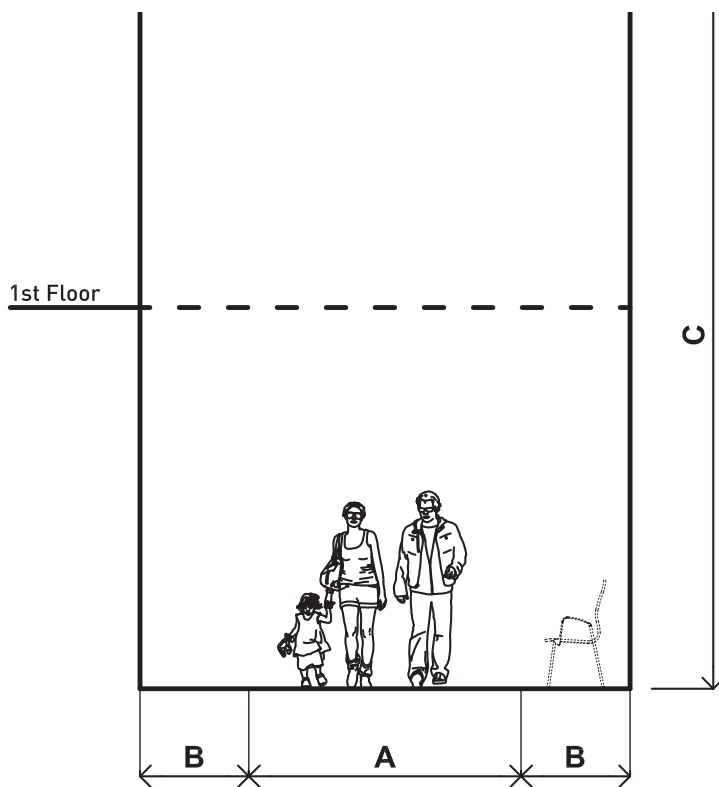


Table 3.6 Recommended Arcade Widths and Heights

A	B	C
PEDESTRIAN MOVEMENT	RETAIL INTERFACE	CEILING HEIGHT
Min. 2.5m	Min. 1m	Double storey height preferred (i.e. >8.0m)

OPEN AIR

Open air thru-site links are located between buildings. These are privately owned versions of pedestrian links. Design controls for open air thru-site links include the following:

- Direct street to street sight lines along lanes. Changes in direction along the lanes are not preferred.
- Open to sky with no overhanging structure above except approved awnings.
- Lighting levels to meet Council recommended levels and Australian Standards.
- Active frontages along the lanes are preferred and encouraged.

3.4 FOOTWAY ARRANGEMENT

The footway is perhaps the most contested zone for space for services and facilities in our urban places. Careful coordination and placement of street elements is required to achieve successful, functional footways in all streets and for all project contexts.

The table below identifies the suitability of common footway elements in busy commercial streets (i.e. street tree, furniture and outdoor dining) based on different footway widths.

Table 3.7 Footway Elements in CBD, Town Centres and Active Strips

FOOTWAY WIDTH	CBD			TOWN CENTRES & ACTIVE STRIPS		
	Street Tree	Furniture	Outdoor Dining (in Furniture Zone)	Street Tree	Furniture	Outdoor Dining (in Furniture Zone)
>4.5m	✓	✓	✓	✓	✓	✓
4.0-4.5mm	✓	✓	X	✓	✓	✓
3.65-4.0m	✓	Restricted*	X	✓	✓	X
3.0-3.65m	✓	X	X	✓	Bin only	X
<3.0m	X**	X	X	X	X	X

*Seat may be restricted, but bins and bike racks (parallel to kerb) can be considered.

** Tree planting is encouraged in blisters/parking lane wherever possible.

The following diagrams provide further articulate requirements for the arrangement of elements in typical footways widths as described above.

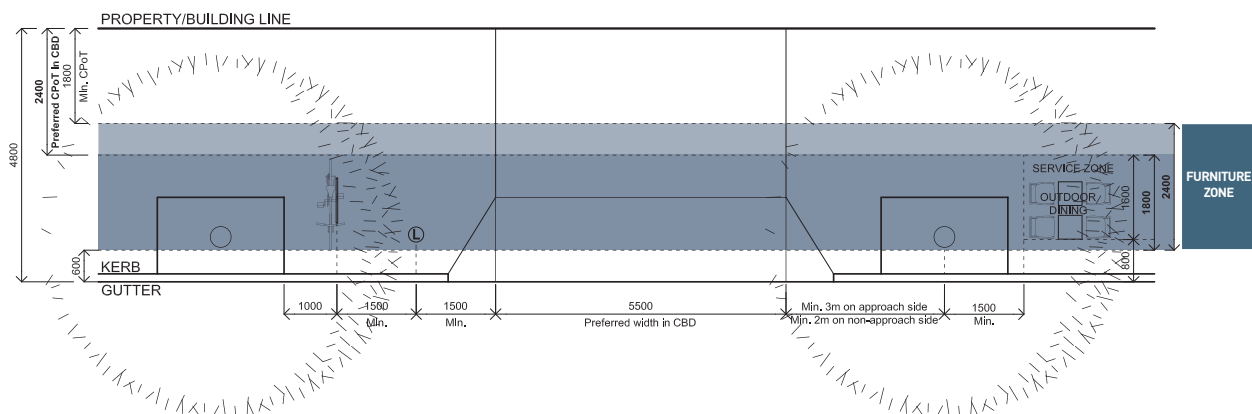


Figure 3.12 Typical Element Arrangement Diagram - 4.8m Wide Footway

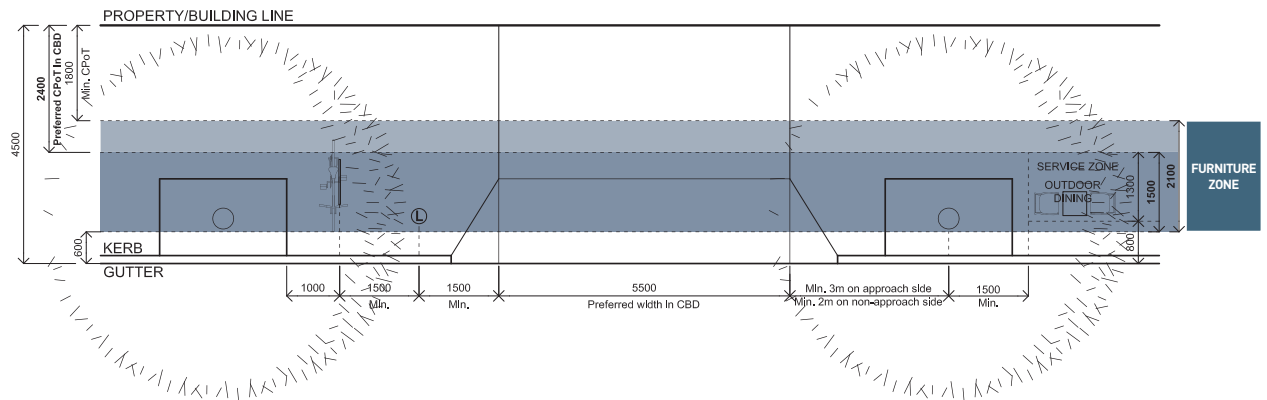


Figure 3.13 Typical Element Arrangement Diagram on a 4.5m wide Footway

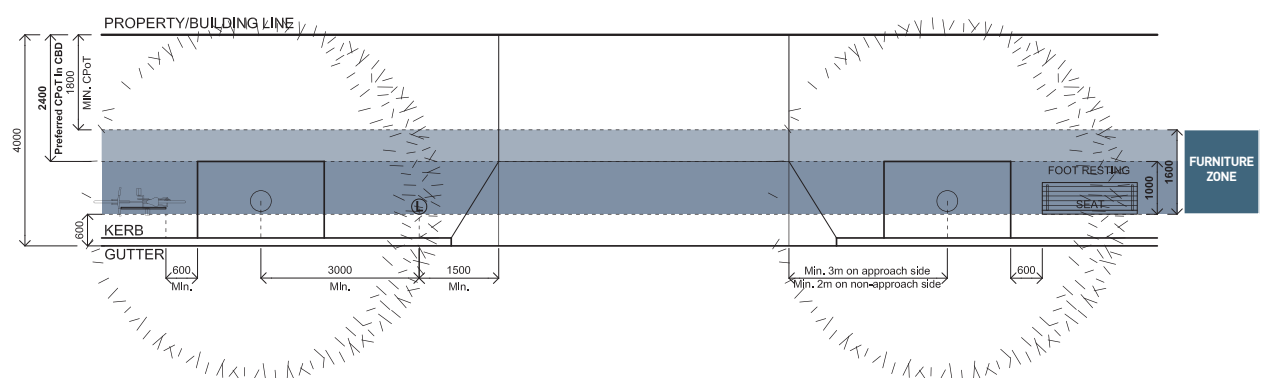


Figure 3.14 Typical Element Arrangement Diagram - 4.0m wide Footway

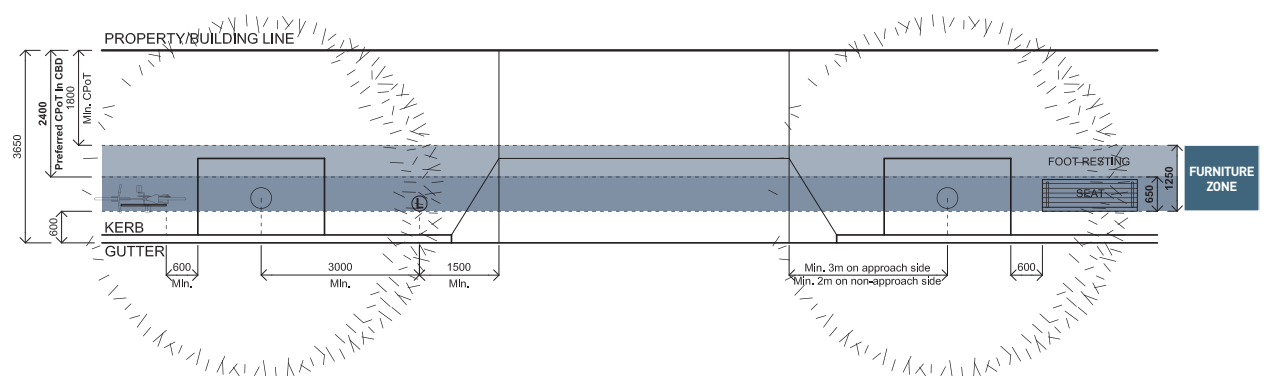


Figure 3.15 Typical Element Arrangement Diagram - 3.65m wide Footway

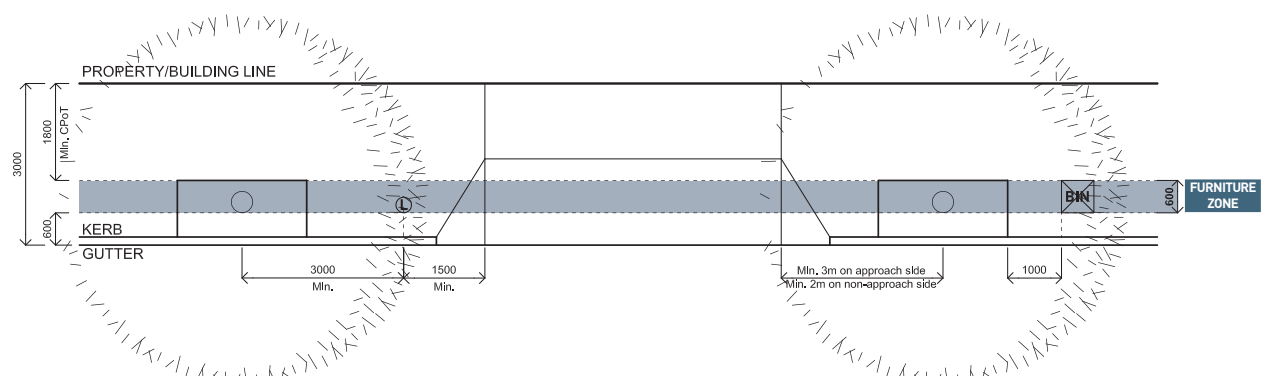


Figure 3.16 Typical Element Arrangement Diagram - 3.0m wide Footway

3.5 STREET INTERSECTION

Intersections should be designed to promote pedestrian safety and comfort. Intersection design should prioritise the following principles:

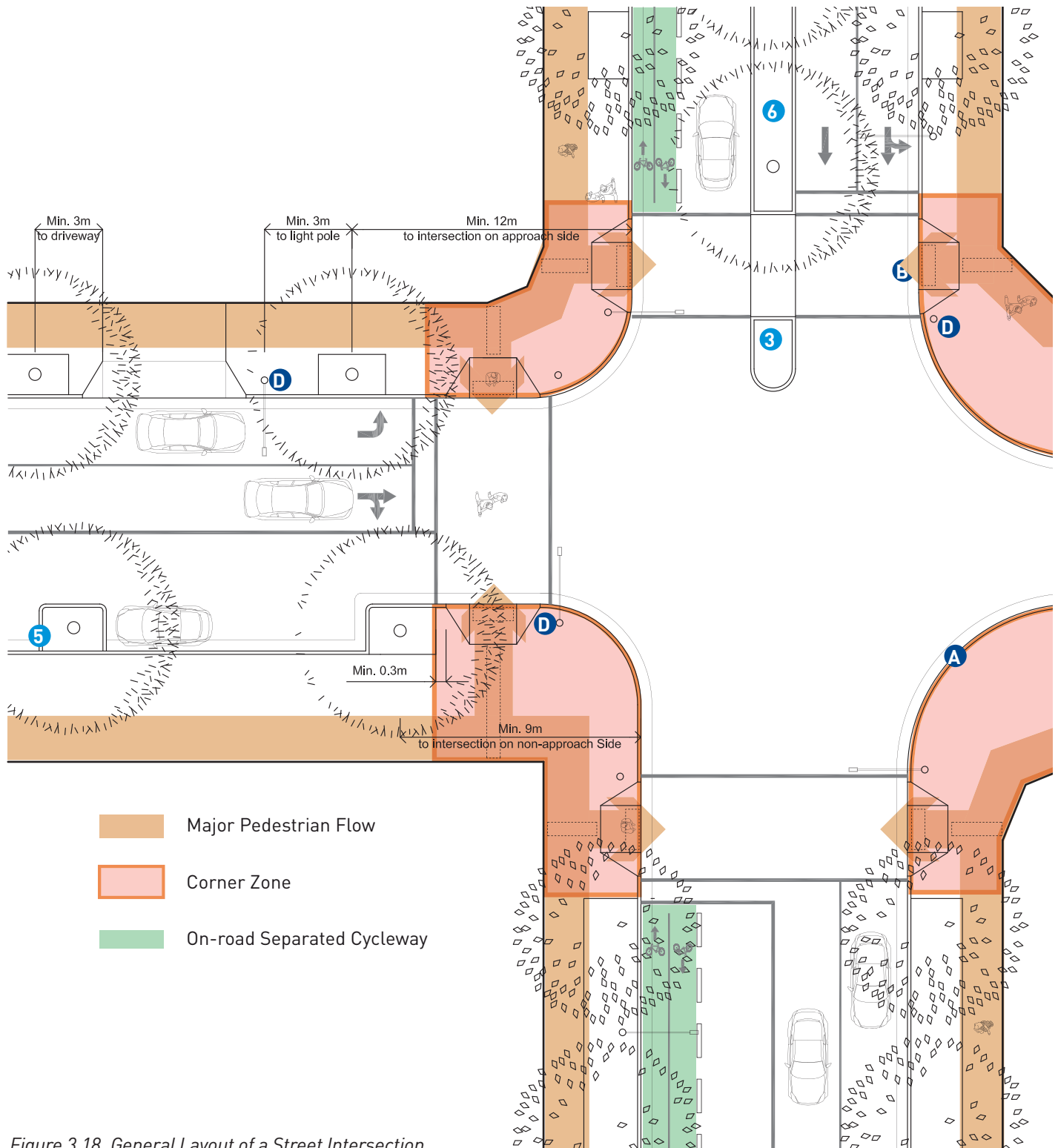
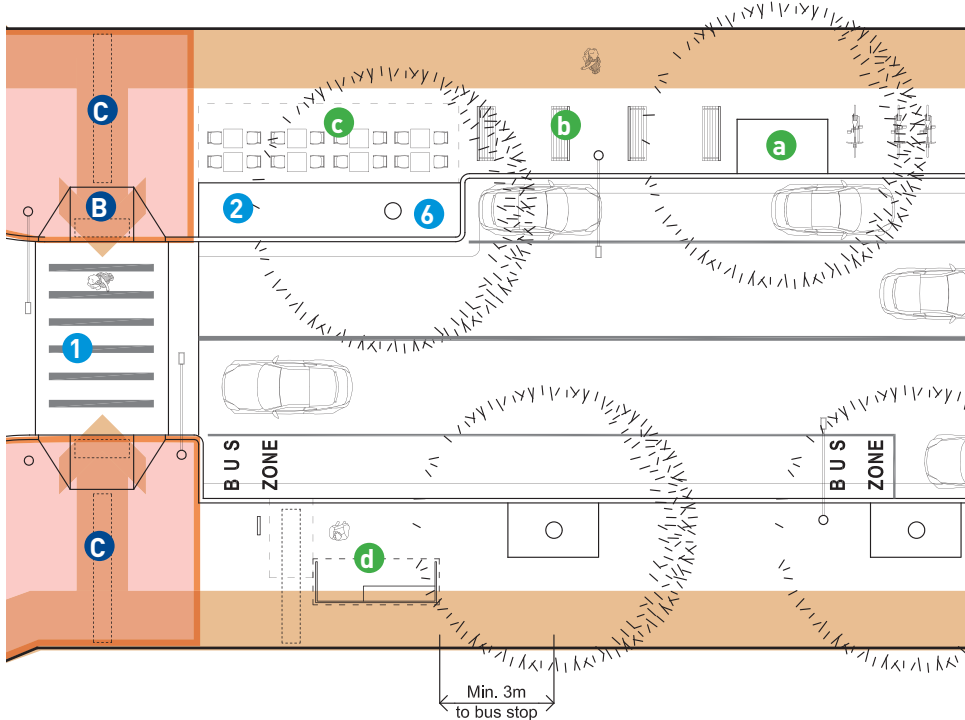


Figure 3.18 General Layout of a Street Intersection

- Minimising kerb radii, pedestrian crossing distance and maximising visibility
- Integrating traffic claiming devices into landscape treatments to slow down the traffic
- Providing accessibility indicators, such as kerb ramp, TGSi
- Generous Landing zone without clutters of unnecessary elements (refer to Design Tips for Landing Zone)
- Well-lit for all users



Elements of an Intersection

- A** Kerb Radii (*Section 3.5.1*)
- B** Kerb Ramp & Crossing (*Section 3.5.2 & 6.1.4*)
- C** TGSi (*Section 6.1.4 & 6.1.5*)
- D** Pole (e.g. light pole, traffic pole, street sign pole) (*Chapter 4*)

Special Features

- 1** Pedestrian Crossing
- 2** Kerb Extension (*Section 3.5.4*)
- 3** Refuge Island
- 4** Central Median
- 5** Blister Planting
- 6** WSUD Treatment

Elements on Footway

- a** Street Tree (*Section 5.1*)
- b** Furniture (*Section 5.2*)
- c** Outdoor Dining (*Section 5.3*)
- d** Bus Stop/Shelter (*Section 6.5.2*)

3.5.1 KERB RADII

The internal radii of turn for a typical service vehicle (8.8m long) is about 8m, it will be seen that a kerb radii of 9m will be needed for such vehicles to maintain a constant distance from the kerb while turning the corner. However, a kerb radii of 9m in all cases would mean large areas of carriageway at intersections, and longer pedestrian crossing distances, inappropriate in scale in many places, particularly in local areas, where traffic volumes are low.

Kerb radii should be designed individually based on the lane widths and other site conditions. The following table provides the recommended radii for road types in general conditions.

INTERSECTION TYPE		KERB RADII
Road A	Road B	
Regional road (sub-arterial)	Any other road	9m
Local road - major access	Local road - major access	9m
Local road - major access	Local road - minor access	6m
Local road - minor access	Local road - minor access	4.5m
Single lane, one-way streets and laneways	Any other road	4m
Shared Zone	Any other road	3m

3.5.2 KERB RAMP & CROSSING

Kerb ramps should be aligned with both the footway path of travel as much as possible (see below figure) and with corresponding ramps across intersections. However, site constraints often make this difficult to achieve. For complex sites, the alignment of kerb ramps across intersections is prioritised over alignment with footway path of travel.

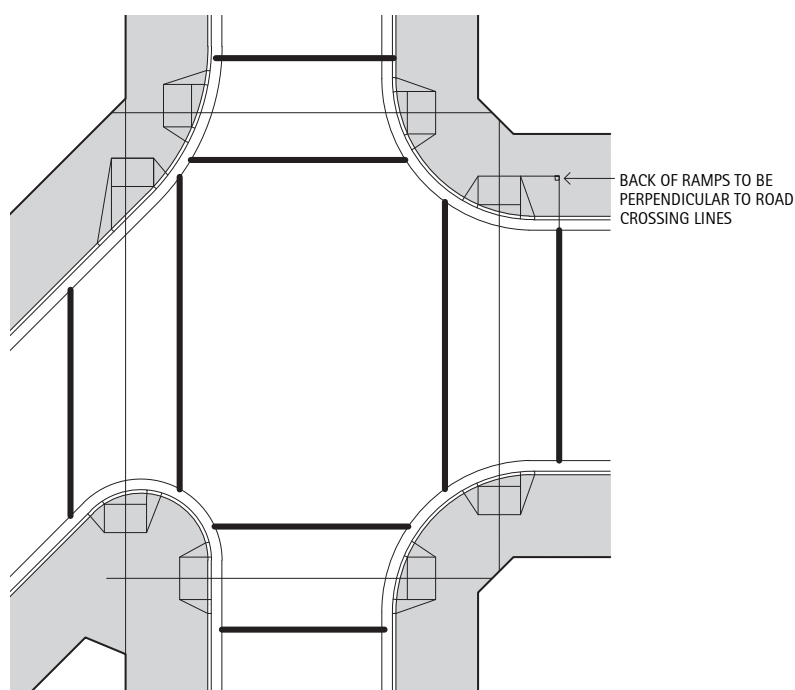


Figure 3.17 Kerb Ramps Aligned Across Intersections

For safe crossings, the importance of kerb ramps cannot be underestimated. Their location, design and construction in compliance with the current AS1428.1 (2009) ensures safe, equitable and dignified access through the streets for people of all ages and abilities.

3.5.3 POLES

There are a number of pole types appearing in the street footways, including light pole, traffic pole, street sign pole and so on. They could cause a significant visual clutter, especially in the footway Corner Zones. The following principles should be considered before a pole is to be placed at/near a street intersection:

- Poles should never be placed within the clear path of travel;
- Minimise poles and the placement of the poles should avoid creating visual clutter in the footway;
- Poles for Street name/way finding should be placed in a consistent location at each street corner;
- The material and finishes of the poles should be co-ordinated in a same area, and for the same type of poles;
- When different types of poles need to be placed in a same location, a shared pole (e.g. multi functional pole) should be used for the multiple purposes.

3.5.4 KERB EXTENSION

Kerb extension extends the footway into the carriageway to narrow the distance between the kerbs across the street and provide additional pedestrian space at the Corner Zone, or other key locations. Kerb extensions enhance pedestrian safety by increasing visibility, shortening crossing distance, slowing turning vehicles, and visually narrowing the street.

Kerb extensions should be considered on streets with following conditions:

- New streets;
- Streets with high pedestrian volumes, such as neighbourhood/local active strips, Parramatta Way routes;
- Wide streets with long crossing distances;
- Streets with high traffic flow and historic pedestrian safety concerns;
- Streets with lack of seating/resting places.

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