

# STREET DESIGN MANUAL: WALKABLE NEIGHBOURHOODS

A contemporary guide for the design and development  
of Queensland's residential neighbourhoods



## PART 3 PRACTICE NOTES



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## The Street Design Manual is in three parts:

### Part 1 – Planning and Design Guidelines

Guidelines relating primarily to the urban design of neighbourhoods, incorporating elements covering community design, the movement networks, the open space network, lot design, and centres.

### Part 2 – Detailed Design Guidelines

Guidelines relating to the detailed design of neighbourhood infrastructure including traffic, streets, active transport, and services.

### Part 3 - Companion Volume

Practice Notes will be “Live”, updated and augmented regularly.

*All parts draw from and include material from such documents as Economic Development Queensland guidelines and the Queensland Housing Code and the Model code for residential development (A code for reconfiguring a lot).*



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# Introduction

Part 3 – Practice Notes is a companion volume to the Street Design Manual: Walkable Neighbourhoods. These practice notes have been designed to provide detailed practical guidance in applying the principles, objectives, and strategies introduced in Parts 1 and 2. The practice notes are supported by real life examples, recommendations and references.

Part 3 – Practice Notes is a “Live” document, updated and augmented regularly.



# PRACTICE NOTE



## Walkable and legible neighbourhoods

### Walking in neighbourhoods

One of the fundamental principles of Walkable Neighbourhoods is to provide safe, comfortable, and convenient walking environments for all members of our communities, including:

- unescorted primary school children;
- carers with babies in prams;
- people with walking impairments; and
- the elderly.

Without footpath infrastructure in a street, these members of the community are likely to be dissuaded from starting a walking journey.

For this reason Walkable Neighbourhoods proposes that a footpath is provided in every street; for the lower order streets, at least on one side, and in the higher order roads, on both sides.

Footpath infrastructure is considered to be the essential fundamental foundation to the creation of a walkable neighbourhood.

To encourage residents to use the footpath infrastructure, the footpath must provide connectivity in the neighbourhood and:

- offer, for the recreational user, walking routes to connect to friends in the area, walking circuits for interest, and connections with community facilities; and
- provide direct connection to schools, activity centres, and public transport facilities.

To encourage their use other essential features of the footpath network are the actual and perceived safety of the footpath network and the pleasantness of the walking journey.

Other practice notes address these aspects of the footpath network. This practice note is primarily concerned with the connectivity of the footpath network in a neighbourhood provided by the layout of footpaths in streets, between streets, and in the open space network.

### Street patterns

As most of a neighbourhood's footpaths will be provided within the street, the streets pattern will significantly influence the degree of connectivity of the footpath network.

Of the typical street patterns:

Rectilinear grids:

- offer good connectivity provided the block lengths are not excessive. Long block lengths will reduce the connectivity in the direction of the short block dimension unless mid-block connections are provided; and
- allow multiple loop walking opportunities.

Modified grids:

- offer the potential for good connectivity as does the rectilinear grid, but may suffer from poor connectivity in some areas if there are poor cross-connections; and
- allow multiple loop walking opportunities.

Loops and culs de sac:

- will likely have poor connectivity without the extensive use of cross-connections; and
- will also likely have poor opportunities for loop walks without use of cross connections.

### Examples:

The following figures include examples of layouts having various levels of walkable connectivity. Those with poor connectivity may have had acceptable walkable connectivity if their layouts had included additional high-quality links for pedestrians and cyclists.



Figure 1.1 - Examples of neighbourhood street patterns – Pedestrian connectivity in 500m radius catchment

Example	Layout characteristics	
 <p data-bbox="236 882 405 904">Harristown TRC</p>	<p>Pattern Type:</p> <p>Typical block lengths:</p> <p>Cul de sac lengths:</p> <p>Infrastructure:</p> <p>Mid-block or cul de sac connections:</p> <p>Ability for walking loops:</p> <p>Overall comment:</p>	<p>Predominantly rectilinear grid</p> <p>250-460m long x 80m wide</p> <p>Few - 150m max.</p> <p>Footpaths only to major collectors</p> <p>Nil</p> <p>Fair</p> <p><b>Reasonable overall connectivity</b></p>
 <p data-bbox="252 1249 389 1272">Aspley BCC</p>	<p>Pattern Type:</p> <p>Typical block lengths:</p> <p>Cul de sac lengths:</p> <p>Infrastructure:</p> <p>Mid-block or cul de sac connections:</p> <p>Ability for walking loops:</p> <p>Overall comment:</p>	<p>Modified grid</p> <p>280-340m long x 60-80m wide</p> <p>Several - 210m max.</p> <p>Footpaths only to major collectors</p> <p>Nil</p> <p>Low</p> <p><b>Poor overall connectivity</b></p>
 <p data-bbox="245 1639 395 1662">Riverhills BCC</p>	<p>Pattern Type:</p> <p>Typical block lengths:</p> <p>Cul de sac lengths:</p> <p>Infrastructure:</p> <p>Mid-block or cul de sac connections:</p> <p>Ability for walking loops:</p> <p>Overall comment:</p>	<p>Curvilinear loops and culs de sac</p> <p>Varies to 250m long x 80m wide</p> <p>Many – 35 - 150m max.</p> <p>Footpaths only to major collectors</p> <p>Minimal</p> <p>Low</p> <p><b>Poor overall connectivity</b></p>
 <p data-bbox="226 2042 418 2065">North Lake MBRC</p>	<p>Pattern Type:</p> <p>Typical block lengths:</p> <p>Cul de sac lengths:</p> <p>Infrastructure:</p> <p>Mid-block or cul de sac connections:</p> <p>Ability for walking loops:</p> <p>Overall comment:</p>	<p>Modified rectilinear grid</p> <p>150-200m long x 60m wide</p> <p>Nil</p> <p>Footpaths to collectors, some streets and park network</p> <p>No</p> <p>Very high</p> <p><b>Very good overall connectivity</b></p>

**Block length**

Excessive block length results in the potential for a lack of pedestrian connectivity in the direction of the short block dimension in the absence of mid-block cross-connections.

However, reducing block dimensions leads to a reduction in efficiency with:

- increased road percentages; and
- increased number of corner lots.

In a rectilinear grid, without constraints, block length is not set by any particular feature.

For a modified grid, the resulting longest block length will usually be defined by the number of cross blocks and will be a function of the lot depth and road width.

Instinctively block dimensions of 300-400m appear excessive.

Figure 1.2 provides an example to illustrate the outcome of different numbers of cross blocks per long block.

There is no perfect block length but the “three block pattern” provides a compromise between shorter block lengths and road and corner lot efficiency.

On this basis and allowing for lot depths up to 32m and road reserves varying from 15-18m for local streets and collectors, results in a maximum block length around 220m.

The shorter block dimension will vary depending on the arrangement of the long blocks but will typically be of the order of 140m in this arrangement.

**Cross-connections**

Cross connection location and design will be critical to improving the walkability of a neighbourhood in particular with their:

- **locations** impacting connectivity;
- **width** affecting perception of safety and impacting on adjoining lot amenity; and
- **design** playing an important role in increasing the attractiveness of a walk.

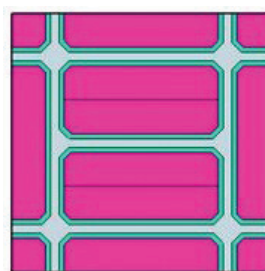
In general, the preferred cross connection characteristics are:

- shorter and wider over long and narrow;
- include walking and cycling paths; and
- multi-use such as additional on-street parking, tree retention, stormwater functions or play space.

Figure 1.2 - Block length and efficiency example

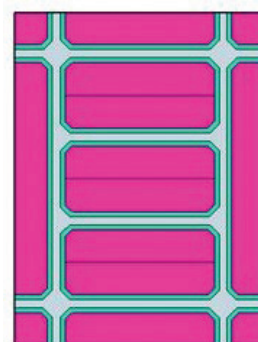
Lot sizes: 30m deep  
 Road width: 16m wide  
 Av. lot size: 400sqm

**2 Block Statistics**



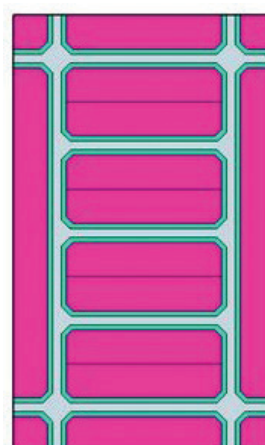
B1 = 136m  
 B2 = 136m  
 Road % = 31%  
 Corner lots = 22%

**3 Block Statistics**



B1 = 212m  
 B2 = 136m  
 Road % = 29.9%  
 Corner lots = 20%

**4 Block Statistics**



B1 = 288m  
 B2 = 136m  
 Road % = 29.3%  
 Corner lots = 18%



Figure 1.3 - Examples of street cross connections

**Preferred characteristics:**

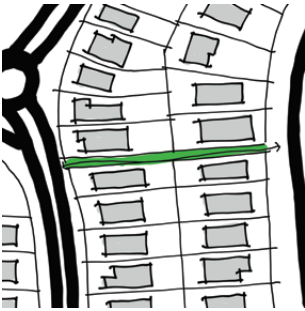
Length: Short as possible - 60 or 65 m max. preferable

Width: 5 or 10 m min. preferably wider if longer than 25 m

Infrastructure: Pedestrian and/or cycle path

Other: tree retention, additional parking, play space

*Mid-block connections*



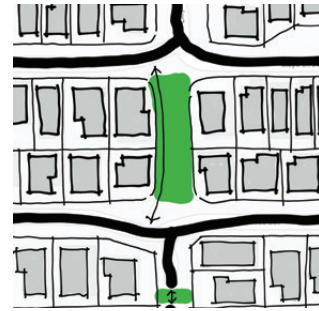
Indooroopilly BCC

Length: 90m  
Width: 3m  
Features: path only



Forest Lake BCC

Length: 64m  
Width: 20m  
Features: path, ex. trees, s/w flow



Springfield Lakes IRC

Length: 50m  
Width: 15m  
Features: path, ex. trees



*End of Culs de sac and Collector Street connections*



Riverhills BCC

Length: 60m  
Width: 3m  
Features: path only



Pacific Pines GCCC

Length: 50m  
Width: Varies 5-40m  
Features: path, trees, pocket park



Forest Lake BCC

Length: 5m  
Width: 30m  
Features: path, ex. trees, parking

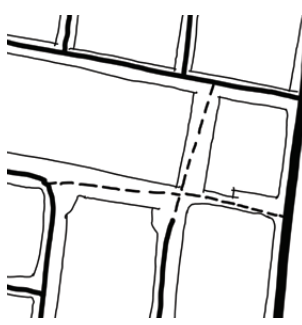


*Other connections*



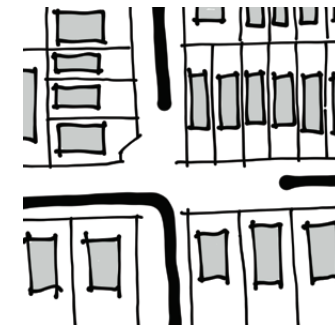
Mt Sheridan CRC

Length: 60m  
Width: 4m  
Features: path only



Marsden Marsden LCC

Length: 70m  
Width: 20m  
Features: path, trees



Redland Bay RBRC

Length: 30m  
Width: 20m  
Features: path, ex. trees



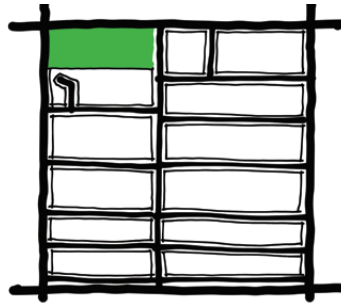
Figure 1.4 - Examples of street patterns

<b>Preferred characteristics:</b>	
Multiple connections to external street/road network	Rat running is minimised
Legibility	Good pedestrian connectivity
Block length 220m max. preferred	Block shapes allow for regular shaped allotments

**Grids**



Modified grid – Yarrabilba LCC  
Score: 6/6



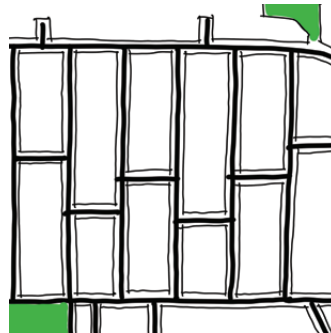
Rectilinear grid – Rockhampton RCC  
Score: 5/6



Radiant grid – Sippy Downs SCRC  
Score: 5/6



Fake grid – Forest Lake BCC  
Score: 4/6



Offset grid – Strathpine MBRC  
Score: 4/6

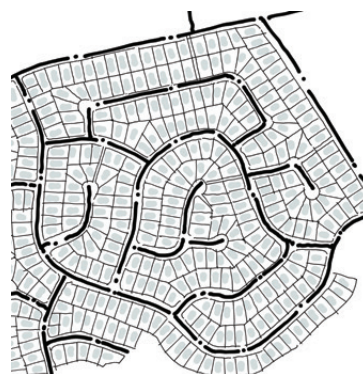


Fragmented grid – Shailer Park LCC  
Score: 4/6

**Other**



Loops and lollipops - Riverhills BCC  
Score: 2/6

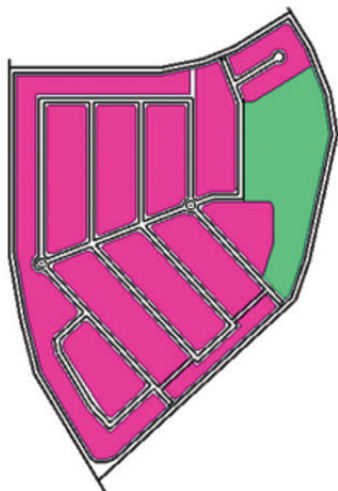


A bit of everything – Edmonton CRC  
Score: 2/6

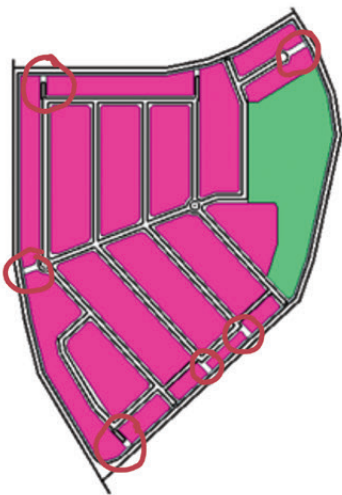


Dendritic – Highland Park GCCC  
Score: 1/6

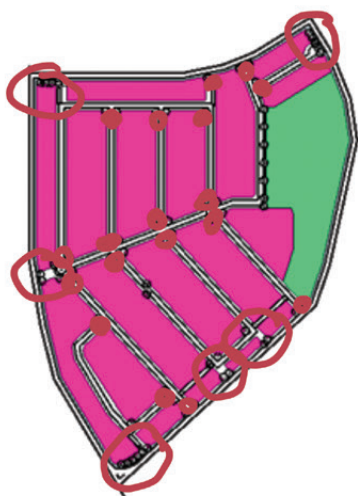
Figure 1.5 – Impact of increasing connections



<b>Option 1 – Few Connections</b>	
Total area:	24.1ha
Road area:	5.1ha
Lot area:	15.8ha
Open space:	3.2ha



<b>Option 2 – More Connections</b>	
Total area:	24.1ha
Road area:	5.2ha
Lot area:	15.7ha
Open space:	3.2ha
<b>Impact: Lot area down by 0.6%</b>	



<b>Option 3 – Wider Connections (+ increased for trees)</b>	
Total area:	24.1ha
Road area:	5.56ha
Lot area:	15.44ha
Open space:	3.1ha
<b>Impact: Lot area down by 2.3%</b>	





## PRACTICE NOTE



# Increasing trees in our neighbourhoods

**Queensland's most pleasant suburbs without question would be those suburbs with large spreading trees providing shade, shelter, aesthetic qualities, and a celebration of our sub-tropical and tropical climates.**



Figure 2.1 - Quality streetscape, established community

Unfortunately, in our new residential areas, particularly those with increased residential densities, the potential for large spreading trees in our neighbourhoods is being negatively impacted by:

- the high allowable site cover and small setbacks leading to limited trees within allotments; and
- a range of factors minimising the amount of trees and their size in the public realm.

In relation to this last aspect, the factors include:

- the shift of sewers from within allotments onto the street verge in higher density projects further increasing competition in the verge space available for street tree planting;
- the raw land price has increased so market competition is leading to an increased focus on minimisation of open space and road reserve to maximise saleable lot area;
- increased road percentages as residential densities increase; and
- builders and the purchaser demanding flat allotments resulting in significant earthworks and retaining walls.

Unfortunately, the current practice of street tree planting at the time of subdivision construction often results in street trees growing slowly or not achieving their full height due to damage and/or poor planting practices during the subsequent building phase.

As a consequence of the above in our new communities, large trees (either existing or new) are unlikely to be achieved within the allotments and the verge and are only likely to occur in park areas.



Figure 2.2 - Typical streetscape, new community (year 5)

This practice note provides techniques to increase the potential for larger trees in our new communities focused around four aspects:

1. Retention of existing trees;
2. Planned opportunistic tree planting;
3. Trees in lots; and
4. Implementation options.

### 1 Retention of existing trees

**Objective: To save existing vegetation within new neighbourhoods where practical**

The hierarchy of the potential for retention of existing trees in new neighbourhoods is:

- parks offer the best potential;
- the street reserve has some potential; and
- the allotment has almost no potential.

Some techniques to increase the retention of existing trees within the street reserve are:





Figure 2.3 - Meandering the pavement in a wider street reserve - Example



Figure 2.5 - Intersection detailing - Examples



Figure 2.4 - Narrowing the pavement in short sections - Examples



**Often successful tree retention will require non-standard verge profiles**



*Figure 2.6 - Tree placement in non-standard verge profiles*



## Case Study – Forest Lake Brisbane

Forest Lake in Brisbane was developed from 1990 to 2005 on a site that had been previously logged and was covered by regrowth.

The developer (Delfin) specifically chose as a marketing approach the retention of as much existing vegetation as possible; the marketing sub-phrase was Forest Lake: The Living Forest.

A planning and engineering design process was instituted to achieve this outcome.

### Forest Lake Tree Retention Process

Initial vegetation assessment to identify **'essential vegetation'**



First cut neighbourhood layout with park area around essential vegetation



Vegetation assessment to identify **'desirable vegetation'** in road reserves



Pavement and intersection refinement to retain desirable vegetation where practical



Detailed engineering design and construction to ensure identified desirable vegetation retained

In general, property boundary frontages were not amended or varied and were kept straight for installation and maintenance of verge services.

Modest tree retention within properties was achieved through building covenants but limited to within the first 2-3m setback and on lots where the front setback was 6m.

The above approaches were successful with trees retained at that time both continuing in place today and many acting as a frame for other private tree planting in the yards and verges.





2 Planned opportunistic tree planting areas

**Objective: To identify and plan opportunities for additional street tree planting**



Figure 2.7 - Take advantage of awkward spaces



Figure 2.10 - Slow points



Figure 2.8 - Ends of a culs de sac as an opportunity



Figure 2.11 - Buildouts

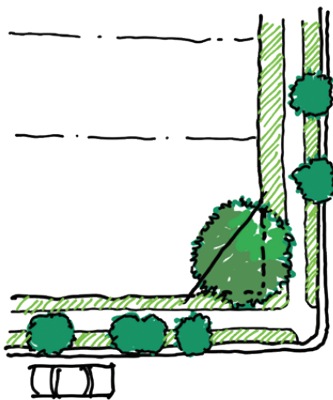


Figure 2.9 - Corner truncations



### 3 Trees in lots

**Objective: To facilitate large tree growth within lots**

Building development on small lots is controlled by either the relevant planning scheme, specific condition of planning approval (e.g. a Plan of Development [PoD]) or by the Queensland Development Code (QDC).

For the most part new communities with small allotments will operate under a PoD.

Most contemporary PoDs for small lots:

- have a front setback of 3-4m with the garage setback 5-5.5m;
- have side and rear setbacks of 0.9-1m;
- provide for a zero lot line wall of 10-15m in length;
- site cover of 70-80%; and
- do not have any specific requirement for the size or location of private open space.

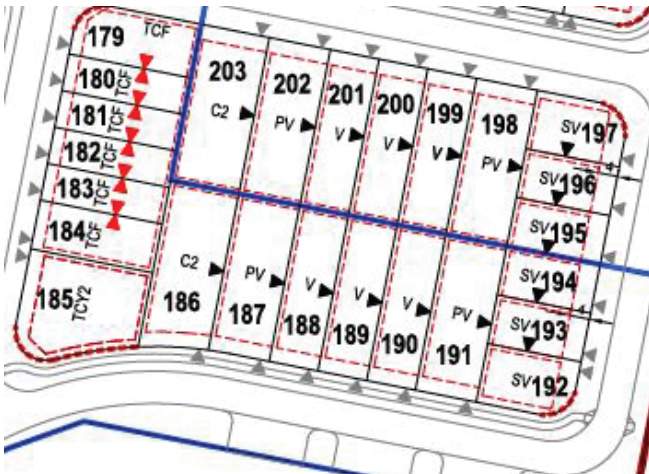


Figure 2.12 - Small lots with limited vegetation space

Consequently, opportunities for any significant vegetation within lots is unlikely.



Figure 2.13 - An approach for consideration

### Standard lots:

For select streets or lot types include in the PoD a requirement for a suitably located deep planting zone for significant tree planting.

These sites might be located to complement tree planting areas in the street e.g. buildouts.

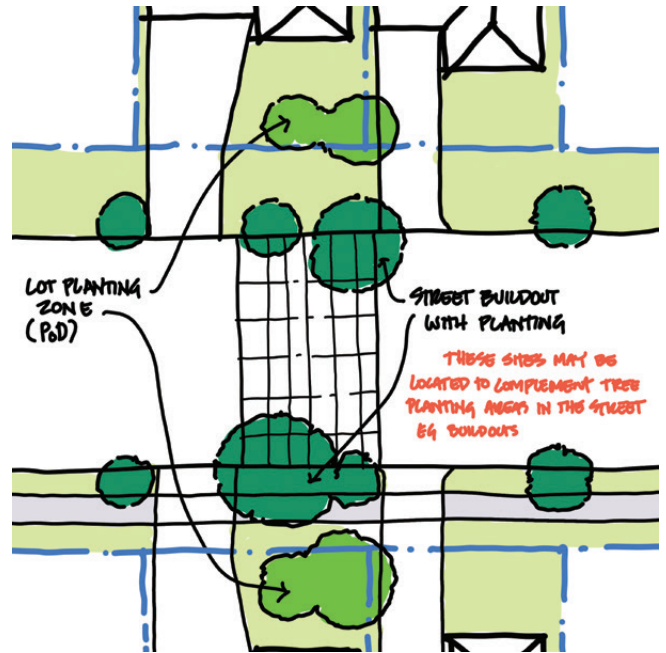


Figure 2.14 - Lot planting zones

### Rear lane lots

Modest landscaping in laneways can significantly improve the appearance of the lane. This is particularly important where some dwellings have their address from the lane.

Simple PoD inclusions will assist in the delivery of greener laneways.



Figure 2.15 - Green Laneway space

4. Implementation Options

**Objective: To maximise the size of street trees at maturity**

In residential estates traditional practice has been for the developer to install street trees at the time of subdivision.

With higher residential densities and narrow lot frontages the chances of street trees planted at the time of subdivision and prior to building works surviving undamaged is remote.

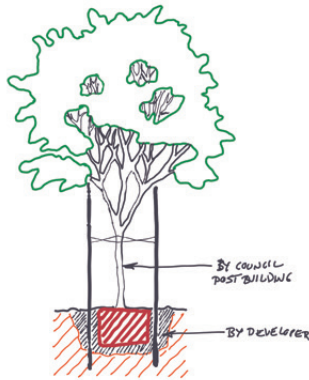


Figure 2.17 - Strategy for tree survival post construction planting



Figure 2.16 - Small lots during construction

Consequently, poor tree repair and/or placement will result in delayed growth or the street trees not achieving their full height at maturity.

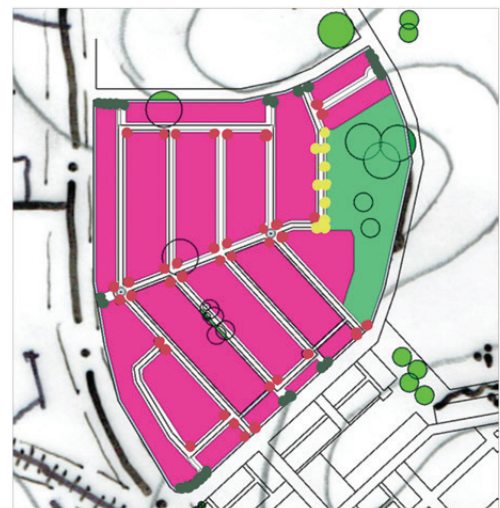
This is further compounded by uncertain planting area preparation by the developer in the first place i.e. over compacted growing areas and/or poor tree installation techniques.

An alternative approach to new street tree implementation is for:

- the developer to install in the verge at the time of subdivision specifically prepared deep planting areas for future street tree planting; and
- the local authority to install the street trees after the building works have been completed.

Further, the local authority could allow the developer to also install fast growing street tree species in verge locations in addition to the prepared areas to facilitate street greening for marketing purposes.

Any of these trees that survive the post-development and building phase will complement the future street tree planting in the prepared street tree planting areas.



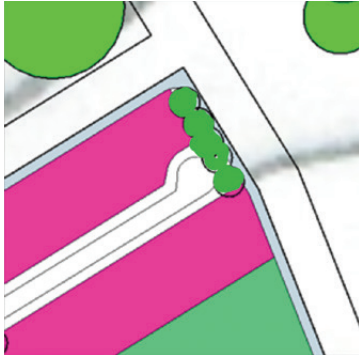
Technique	Loss of rea	Extra trees
Widened connections	1600 sqm of lots	20
Corner lot truncations	1000 sqm of lots	45
Park frontage street widening	1000 sqm of park	10

Figure 2.18 – Examples of increasing large street tree opportunities - Overview

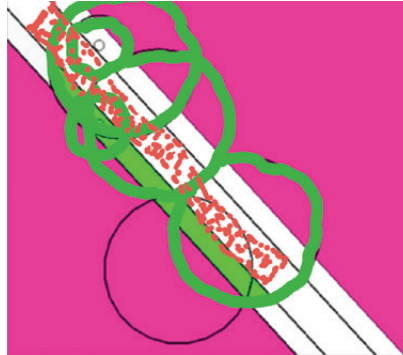




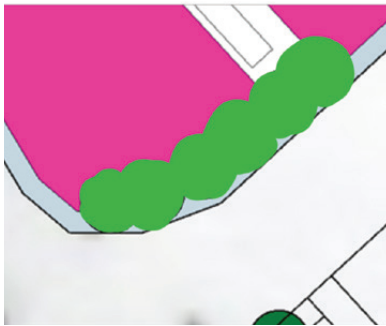
Figure 2.19 - Examples of increasing large street tree opportunities - Overview



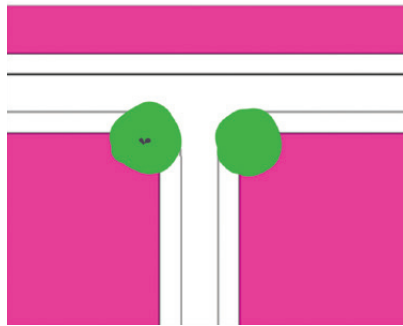
Widened connections



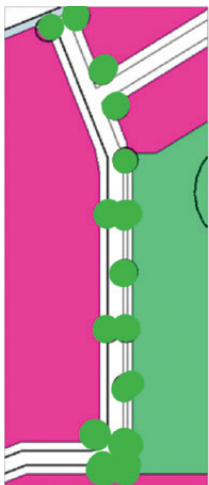
Street narrowing for tree retention



Widened feature entries



Corner truncations



Indented parking and buildouts



Corner truncations on major spine



# PRACTICE NOTE



## Contemporary Lot Typologies

When the first edition of Queensland Streets was released in 1989 the minimum lot size in local authorities was in excess of 600sqm and the average lot size was likely to have exceeded 700sqm.

In 1992 Brisbane City Council approved the introduction at Forest Lake of the villa lot, a 300sqm lot with a zero-lot line wall on one boundary.

The town cottage lot, 250sqm in size, was also introduced at Forest Lake several years later.

Both these products offered a more affordable, low maintenance three-bedroom home with single garage.



Figure 3.1 - Well-presented 3-bedroom cottage on small frontage lot

Since that time a wide variety of new lot sizes and dwelling types have been introduced into Queensland greenfield residential projects, including:

- standard lots for detached dwelling designs on lots from 250sqm;
- specialised lots and detached dwelling designs on lots from 160sqm; and
- terrace lots, both front loaded and rear loaded, on freehold lots from 60sqm.

Lot Type	LOT YIELD		LOT AREA		
	No. Lots	% Total Lots	Average Size	% of Total Area	Area
T1	4	1.62%	648m <sup>2</sup>	2.77%	2592m <sup>2</sup>
T2	6	2.43%	605m <sup>2</sup>	3.88%	3635m <sup>2</sup>
T3	8	3.24%	600m <sup>2</sup>	5.12%	4800m <sup>2</sup>
C1	16	6.48%	500m <sup>2</sup>	8.54%	8006m <sup>2</sup>
C2	19	7.69%	489m <sup>2</sup>	9.92%	9293m <sup>2</sup>
PV	60	24.29%	417m <sup>2</sup>	26.72%	25037m <sup>2</sup>
V	46	18.62%	323m <sup>2</sup>	15.89%	14891m <sup>2</sup>
TCY2	6	2.43%	396m <sup>2</sup>	2.54%	2377m <sup>2</sup>
TPV	18	7.29%	345m <sup>2</sup>	6.64%	6219m <sup>2</sup>
TC	14	5.67%	294m <sup>2</sup>	4.39%	4116m <sup>2</sup>
TV	11	4.45%	265m <sup>2</sup>	3.11%	2919m <sup>2</sup>
TCF	21	8.50%	209m <sup>2</sup>	4.70%	4407m <sup>2</sup>
MFS	2	0.81%	744m <sup>2</sup>	1.59%	1488m <sup>2</sup>

Table 3.1 - Lot type

The 2018 Land Supply and Monitoring report indicates that between 2011/12 and 2017/18 the median lot size in SEQ decreased from approximately 550sqm to 430sqm.

In addition the report indicated for 2017/18 that:

- the most common size category was 350 to 450sqm; and
- 2% of lots produced were in the range 60-200sqm.

### Contemporary lot types

This practice note provides examples of contemporary lot types and outlines the planning and design issues that need consideration with their introduction in a project.

Specific design issues for small lots and rear laneways are provided in Practice Notes 4 and 5, respectively.

### Key considerations

The experience from many Queensland projects since the introduction of small lots over 25 years ago is that the matters for consideration in relation to contemporary lot typologies include:

- narrow frontage lots issues;
- site cover and setbacks;
- approval of dwelling plans;
- titling ahead of building; and
- bookend lots.

#### Narrow frontage lots issues

Where lot frontages are in excess of 12.5m double car accommodation can occur on site without restricting on-street parking. Refer to Practice Note 4 Provision for on-street parking.

Below 12.5m frontages on-street parking becomes increasingly restricted or precluded.





For this reason, concentrations of narrow fronted lots, irrespective of the overall project density, will need to be assessed for on-street parking provision.

Even a small number of narrow frontage lots may also be inadvisable:

- at intersections or near roundabouts;
- adjacent to slow points; or
- around a cul de sac without additional parking or accessible bin pick up areas.

**Site cover and setbacks**

Most contemporary planning scheme provisions and plans of development allow for side and rear setbacks of 0.9-1.0m and site cover of 70-80% for smaller lots.

Issues arising with these setbacks include:

- lack of access to services and build over sewer issues; and
- further reduced side access if site retaining walls are required impacting storage of refuse bins behind the building line.

For these reasons it is suggested:

- that services be kept out of small lots where possible, unless site specific setback provisions (e.g. in a PoD) have been designed to suit the services; and
- refuse bin enclosures are required as part of planning approval where side access is restricted.



Figure 3.2 - Considerations required for refuse bins

**Approval of dwelling plans**

The requirement to approve dwelling plans for small lot development can restrict innovation and lead to building delays and increases minor amendment or generally in accordance with applications.

A suggested approach when considering a proposal that includes small lots is:

- no special requirement for any consideration of dwelling design where lots are 250sqm and above as standard builder’s plans are readily available;
- below 250sqm:
  - accept standard plans that have been built previously for the proposed lot size or
  - require indicative dwelling designs where no standard designs exist.

In relation to this last aspect, the preferred approach is that the PoD should only incorporate the key setback, site cover, and design aspects of the indicative plan, rather than the indicative design itself, to allow for flexibility in the future dwelling design.

This is the approach that was adopted on the Fitzgibbon Chase project with freehold lots down to 50sqm.

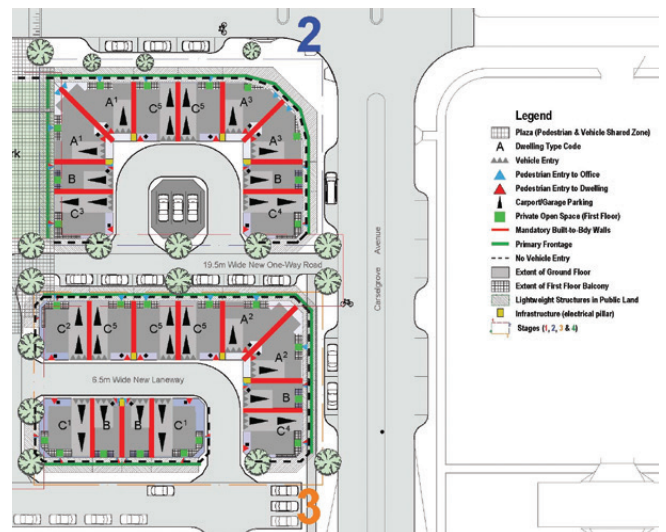


Figure 3.3 - Example small lot design

At Fitzgibbon Chase the subdivision titles were created ahead of the building construction.

Prior to the commencement of the higher density areas, a review of practices in other parts of Australia revealed that very small lot development was possible with titling happening before building with appropriate PoD controls.



Figure 3.4 - Lot end house design example



Figure 3.5 - Narrow lot construction strategy

Titling ahead of building improves housing affordability in that where a dwelling project is completed by way of a land contract and build contract:

- stamp duty is reduced by avoiding double stamp duty and by the buyer only paying stamp duty on the land component, not the house and land component; and
- the purchaser pays interest on the land and building at their personal rate, compared to the builder paying commercial rates and including their margin.

#### Bookend lots

In the past corner lots have not been as desirable as a standard mid-block lot as:

- they can take longer to sell; and
- they require more land for the same sized house due to the increased corner setbacks.

The end of block, the bookend, provides significant opportunities to introduce small lots into a project as the bookend:

- allows for a lot with a depth less than the standard lot depths without impacting on the overall grid; and
- replaces the larger less desirable corner lot with a smaller corner lot.

## Case Study – Fitzgibbon Chase

### Background

Fitzgibbon Chase was the first residential project of the Urban Land Development Authority (ULDA) which became Economic Development Queensland (EDQ).

The project is located 12km from Brisbane’s CBD and totals 110ha in area, with approximately 55ha developable after allowance for environmental and flooding constraints.

The project feasibility was prepared on a fully commercial basis with the intention of demonstrating that housing choice and affordability could be produced with appropriate planning controls and housing innovation.

Over its development life from 2009 to 2018, freehold lot sizes were designed, developed, and sold, ranging from 50sqm to 600+sqm.

The resulting house and land packages provided significant choice and diversity in living options as well as affordability outcomes.

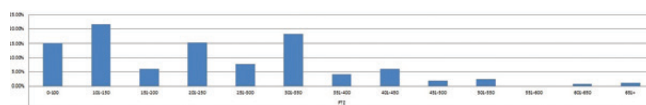


Table 3.2 - Fitzgibbon Chase lot sizes 2009-2017

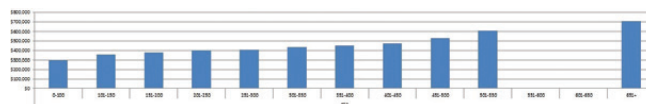


Table 3.3 - Fitzgibbon Chase H&L prices 2009-2017

### Lot Types

At the project launch in January 2010 only standard lot types were offered, namely:

- villa lots 250-320sqm;
- courtyard lots 450sqm; and
- traditional lots 500+sqm.

In conjunction with local builders, innovative housing types were investigated to test their marketability and impact on affordability.

This housing innovation included:

- rear-loaded and front-loaded terrace product on lots ranging from 60-175sqm; and
- rear lane loft homes on lots from 50sqm.

The strong market acceptance proved the concept of housing innovation with appropriate planning controls could deliver housing diversity and affordability outcomes.

Some of the key learnings from Fitzgibbon Chase in relation to the delivery of the small lot housing is included in Practice Note 4 – Designing for small lots.



Since 2012 residential development projects in other Priority Development Areas (PDA's) have produced their own area specific lot types to address housing choice and affordability.

In some instances, lot types similar to Fitzgibbon Chase, Figures 3.6 -3.8, have been introduced, but in many cases new lot types and housing designs have been produced to suit their local market. Refer to Figure 3.9 Yarrabilba snapshot.



Figure 3.6 - Source: <https://www.dsdmip.qld.gov.au/resources/plan/pda/fitzgibbon-development-scheme-part3.pdf>



Figure 3.7 - Fitzgibbon Snapshot – Stage 3-4 Source: <https://premise.com.au/project/fitzgibbon-chase/>

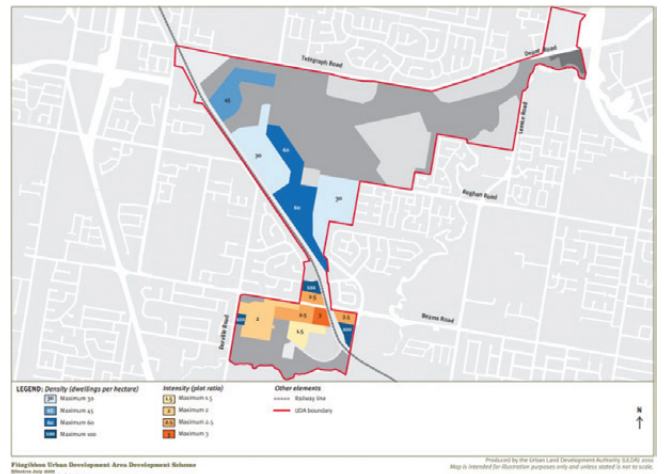
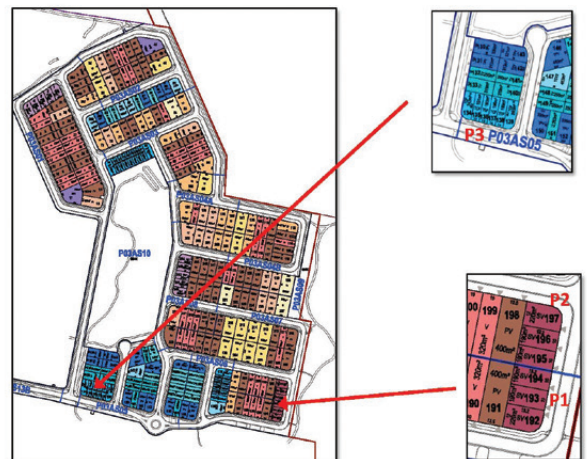


Figure 3.6, 3.7 & 3.8 - Fitzgibbon Snapshot Department of State Development Queensland, <https://www.dsdmip.qld.gov.au/resources/plan/pda/fitzgibbon-development-scheme-part3.pdf>



LAND USE BUDGET	
RESIDENTIAL	8 3722 ha
NEW ROAD - COLLECTOR	2 1869 ha
NEW ROAD - LOCAL	5 1002 ha
SIC LAND	0 9505 ha
EXISTING ROAD	0 5531 ha
LANDSCAPING / ROAD RESERVE	0 2570 ha
NEIGHBOURHOOD PARK (CREDITED PARK)	2 7276 ha
LINEAR PARK	4 8065 ha
MAJOR SPORTS PARK	12 6607 ha
EDUCATION	12 2734 ha
RETAIL / COMMUNITY / COMMERCIAL / MIXED USE & MULTI-RESIDENTIAL	3 2736 ha
CHILD CARE	0 4805 ha
<b>TOTAL</b>	<b>64 7 123 ha</b>
MINIMUM RESIDENTIAL DENSITY	15 721 ha
	243 du
	15 48 du/ha
MAXIMUM RESIDENTIAL DENSITY	15 721 ha
	247 du
	15 71 du/ha



Figure 3.9 - Yarrabilba Snapshot – Precinct 3



# PRACTICE NOTE



## Designing for small lots

**For the purposes of this Practice Note narrow lots are defined as lots with frontages less than 15 metres. Narrow lots require particular attention to detail in the urban and engineering design of their neighbourhoods, streets and the lots themselves to ensure amenity, functionality, legibility and safety to avoid conflicts and unnecessary costs and to simplify construction.**

Small lot narrow frontages demand greater attention to detail in the location and coordination of services within both lots and the street verge to avoid conflicts between services and with driveways.



Figure 4.1 - Narrow lot frontage linking directly to parklands

### Critical issues

- zero lot line on low side, unless an integrated solution;
- slope across small lots, unless integrated solution: maximum 10 per cent across lot and 5 per cent longitudinal; and
- infrastructure clashes with zero lot lines and driveways.

This practice note focusses on three facets:

1. Street and Verge
2. Services
3. Lot levels and retaining.

### 1. Street and Verge

To ensure safe and convenient access to lots, they should be located clear of driveways or narrow lots and if this cannot be avoided, driveways should be constructed as part of the subdivision works to provide safe and convenient access.

- In all other cases, driveway access at speed control devices should be prohibited.
- Trees and landscaping within speed control devices Should be incorporated to enhance the streetscape.



Figure 4.2 - Example street scaping

### Street lights

- Will be required for safety in laneways over 60 metres, preferably mid-block; and
- to minimize clashes with driveways and other services avoid locating on boundary of narrow lots, preferably locate on boundary of large lots.

### Stormwater gullies

To avoid clashes with driveways

- preferably locate gullies mid-block or non-driveway locations for large lots;
- avoid locating on driveway side of zero lot line boundary where known;
- avoid using large/long backstones;
- adopt one-way crossfall roads in access streets where feasible to minimize gullies on turning points and sags; and
- avoid gully pits in front of narrow lots where possible.





Figure 4.3 – Example drainage system clashing with verge requirements

#### Bioretention pods

- are Impacted by street grade;
- Preferred locations are on park frontages, higher order streets or in medians;
- undesirable in access and local access streets;
- are impacted by street grade; and
- preferably locate on secondary frontage.

#### Rear Laneways

Where possible:

- avoid locating utility services within laneways where utility services cannot be avoided within laneways;
- generally locate within an unpaved section of laneway along the edge of the trafficable surface; and

#### Streetscape

Avoid:

- narrow lots at end of street at “T” intersections;
- too many lots in a run (refer to Part 1 Element 4: Lot Design); and
- single narrow lots amongst larger lots.



Figure 4.4 - Example streetscaping to laneway

#### On-street car parking

Narrow frontages and driveways reduce opportunities for on-street parking.

To maximise opportunities:

- Narrow lots should be opposite larger lots where possible;
- increase opportunities for on-street parking by incorporating rear laneways (at increased cost and decreased developable area); and
- for rear laneways lofts refer to Practice Note – 5 Laneway design.

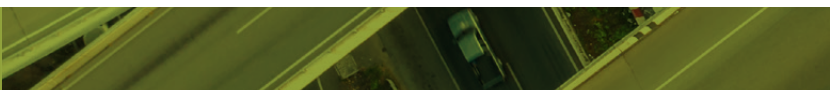
#### Footpaths

Reinforce pedestrian and cyclist priority by:

- constructing footpaths prior to driveways; and
- ensuring continuity of pavement treatment and footpath crossfalls through driveways.



Figure 4.5 - Example, footpath placement prior to driveway slabs



### *Driveways*

- Should be constructed to conform with and not replace footpaths;
- should be cut through the kerb to ensure accessible slope: and
- are typically located on the zero-lot line boundary.

### *Street trees*

- Coordinate location of street trees with entry and driveway locations for zero lot line lots; and
- trees should be protected during house construction, or planted after house construction has been completed.

## **2. Services**

### *Water meters and conduits*

- Avoid clashes with driveways for zero lot line lots.

### *Hydrants and valves*

- Preferably located opposite side boundaries of lots, or truncations, avoiding driveways.

### *Power pillars*

- Where positioning adjacent to zero lot line boundaries cannot be avoided, avoid clashes with driveways for zero lot line lots by offsetting to one side of boundary with adjacent lot; and
- power supply authority required minimum clearances to power supply pillars must be accommodated.

### *Communications pits*

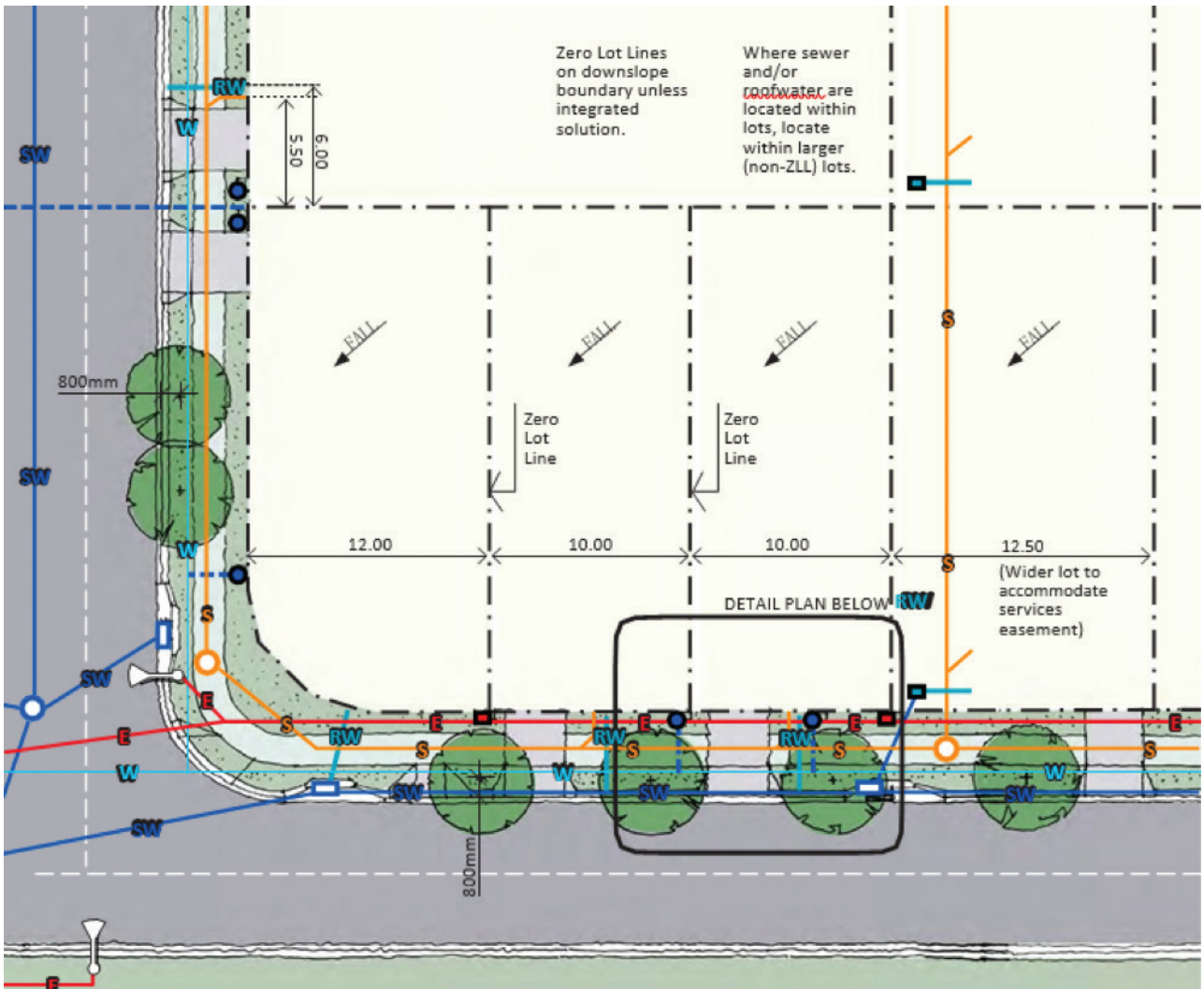
- Avoid clashes with driveways for zero lot line lots, offset to suit.

### *Sewer manholes and roof water pits*

- Preferably locate sewer and roof water mains within larger lots and along rear boundaries;
- avoid driveways;
- avoid locating sewer and roof water mains along zero lot line boundaries and within corner lots; and
- minimise sewers downside (longitudinal) boundaries and locations likely to be benched.

### *Pad mounted transformers*

- Plan well in advance and avoid visually intrusive locations, place in parks and open space and screen visual impacts through landscaping;
- avoid locations along view lines;
- avoid locations within lots; and
- should always be shown on sales plans.



- Legend**
- Stormwater: SW (blue line), Stormwater Manhole: blue circle
  - Roofwater: RW (red line), Water Main: W (blue line)
  - Water Conduit: blue line
  - Water Meter: blue circle
  - Sewerage: S (orange line), Sewer Manhole: orange circle
  - Electrical: E (red line), Power Supply Pillar: red square
  - Street Light: street light symbol
  - Lot Boundary: dashed line
  - Footpath: green hatched area
  - Driveway: grey hatched area

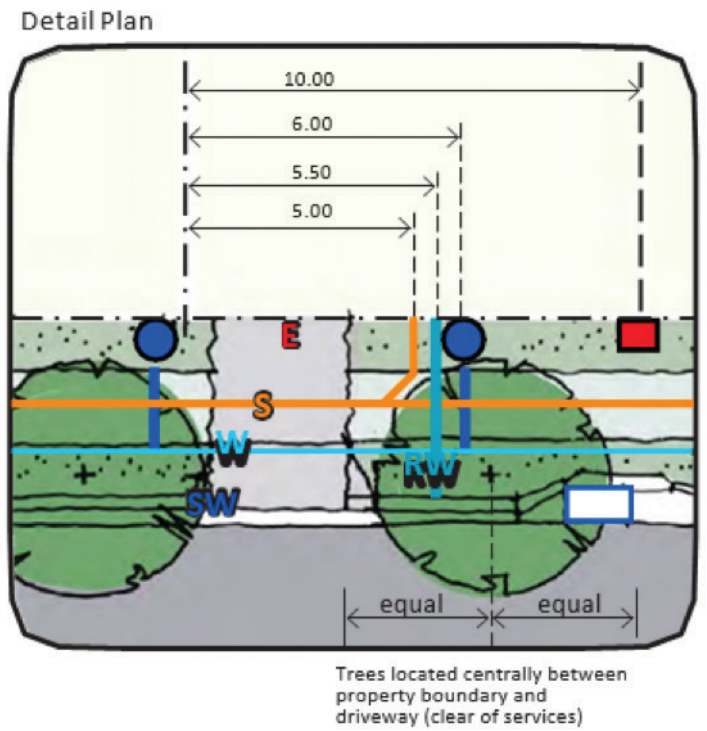


Figure 4.6 - Example services layout



## Telecommunications units

- Usually located within road reserve, however, as with pad mounted transformers, plan well in advance and avoid visually intrusive locations, place in parks and open space and screen visual impacts through landscaping;
- avoid locations along view lines; and
- should be shown on sales plans.

## Common trenching

Common trenching, or shared service allocation, is encouraged. It involves the provision of a number of services within one trench or service allocation area.

Advantages include:

- elimination of a number of single trenches, each with its own construction, settlement and reinstatement problems;
- accurate location of services for possible repair or maintenance;
- reduced verge width;
- increased verge width available for tree planting and/or landscaping;
- less conflict between services as depth relativities are known;
- more efficient use of construction equipment; and
- reduced verge and footpath disturbance enabling earlier establishment.

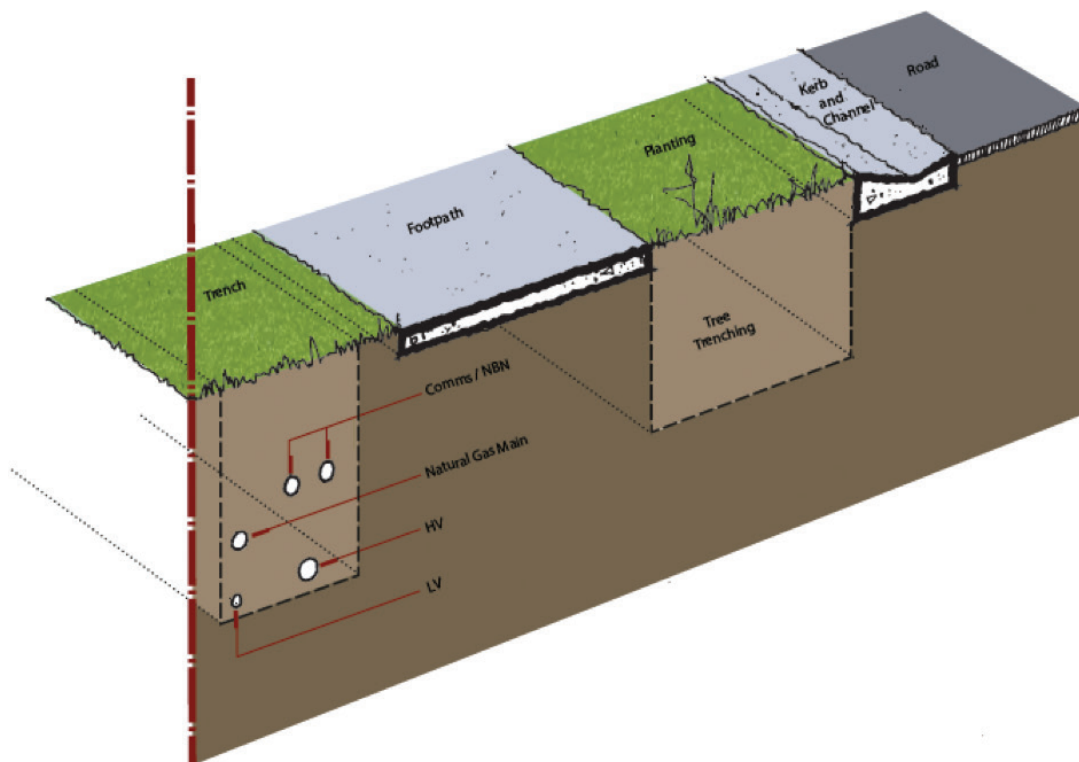
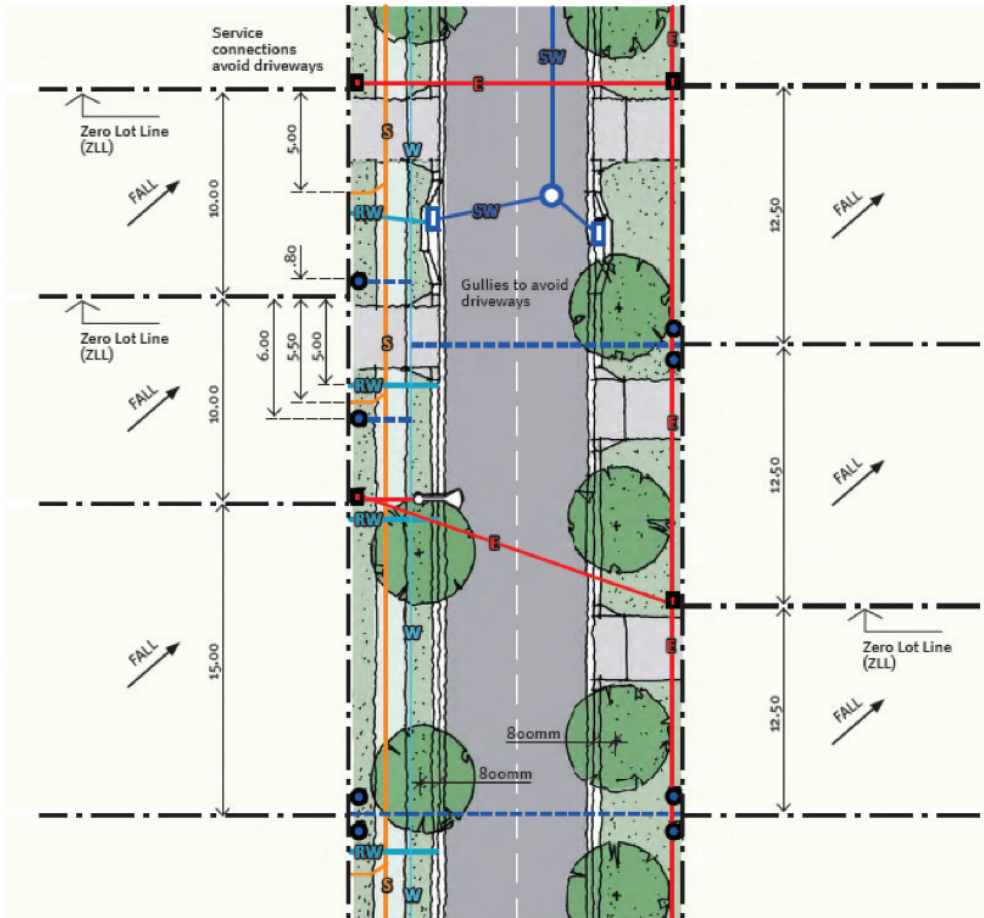


Figure 4.7 - Typical common trenching diagram



### Small lot servicing - mid lots



### Legend

Stormwater	
Stormwater Manhole	
Roofwater	
Water Main	
Water Conduit	
Water Meter	
Sewerage	
Electrical	
Power Supply Pillar	
Street Light	
Lot Boundary	
Footpath	
Driveway	

Figure 4.8 - Small lot servicing - mid lots

### 3. Lot levels and retaining

#### Zero lot lines

- To avoid retaining against the dwelling and associated drainage and waterproofing issues, locate zero lot lines on low side of lot unless an integrated solution is proposed.

#### Overland flow

Inherently, narrow lots have reduced capacity to accommodate overland flows within and across lots. To minimize problems arising from overland flow:

- provide interallotment drainage;
- avoid narrow lots below large drainage catchments;
- avoid cutting and retaining on the uphill side of lots sloping steeply (more than 1 in 8) to the street,
- particularly with side slope as this generally results in diversion and concentration of overland flow along fence lines to a point of weakness; and
- identify any natural depressions in the landform and ensure overland flow to and within these is managed to avoid nuisance to downstream properties.

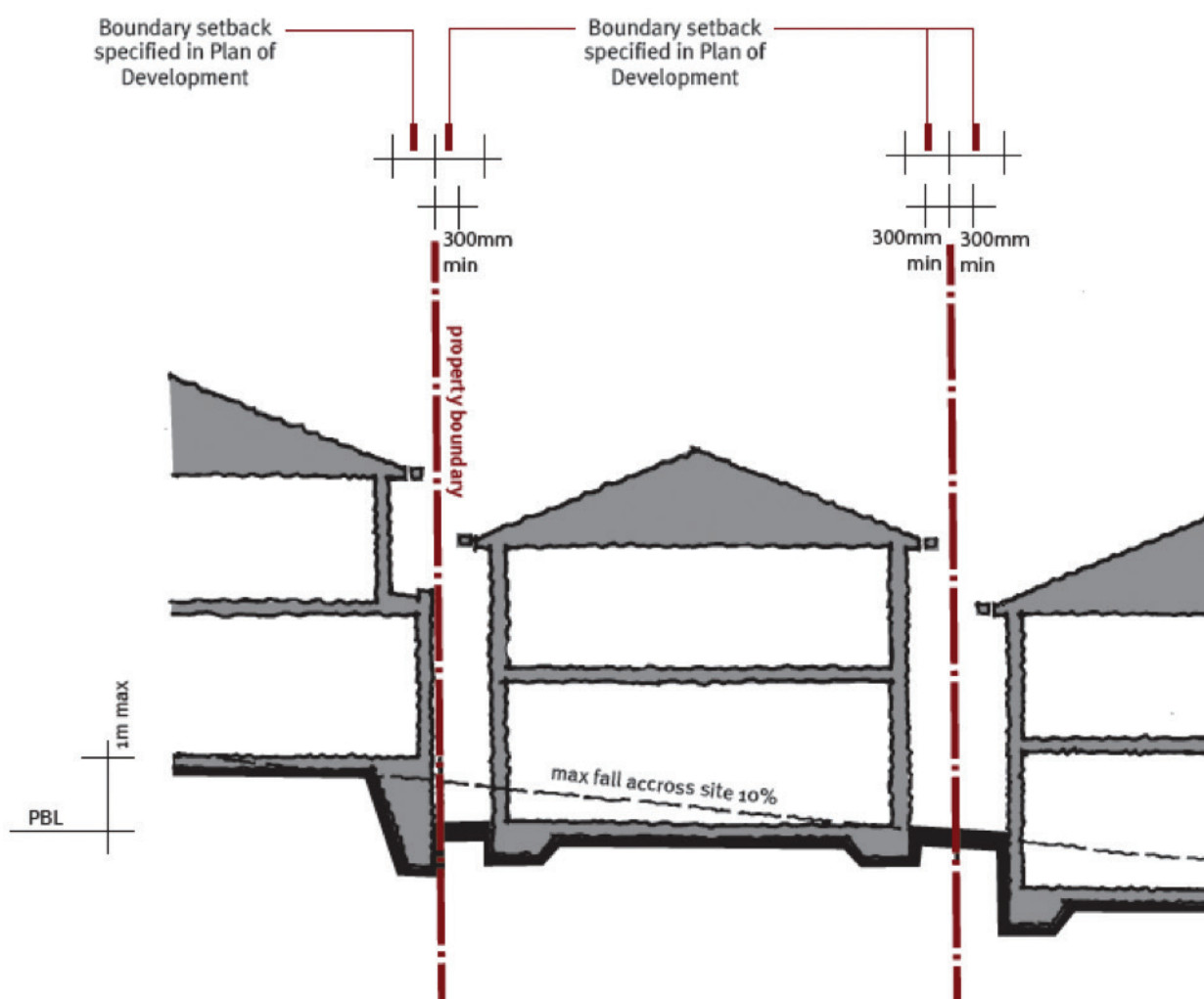


Figure 4.9 - Boundary setbacks for sloping sites



### Pad levels

Complete major earthworks at subdivision stage to manage retaining and overland flow

- Pad levels should be nominated with tolerance of +/- 100mm.

### Retaining walls and boundary fences

Manage retaining for amenity, solar access and structural integrity by:

- limiting the height of retaining walls to 1.2 m for lots < 450 m<sup>2</sup>;
- limiting the combined height with boundary fence to a maximum of 3.0 m;
- on zero lot lines, retaining wall and any feature treatment should extend to a minimum of 100 mm below the nominated pad level for adjacent downslope lot; and
- benching of sites at subdivision stage is not required if slope criteria met.

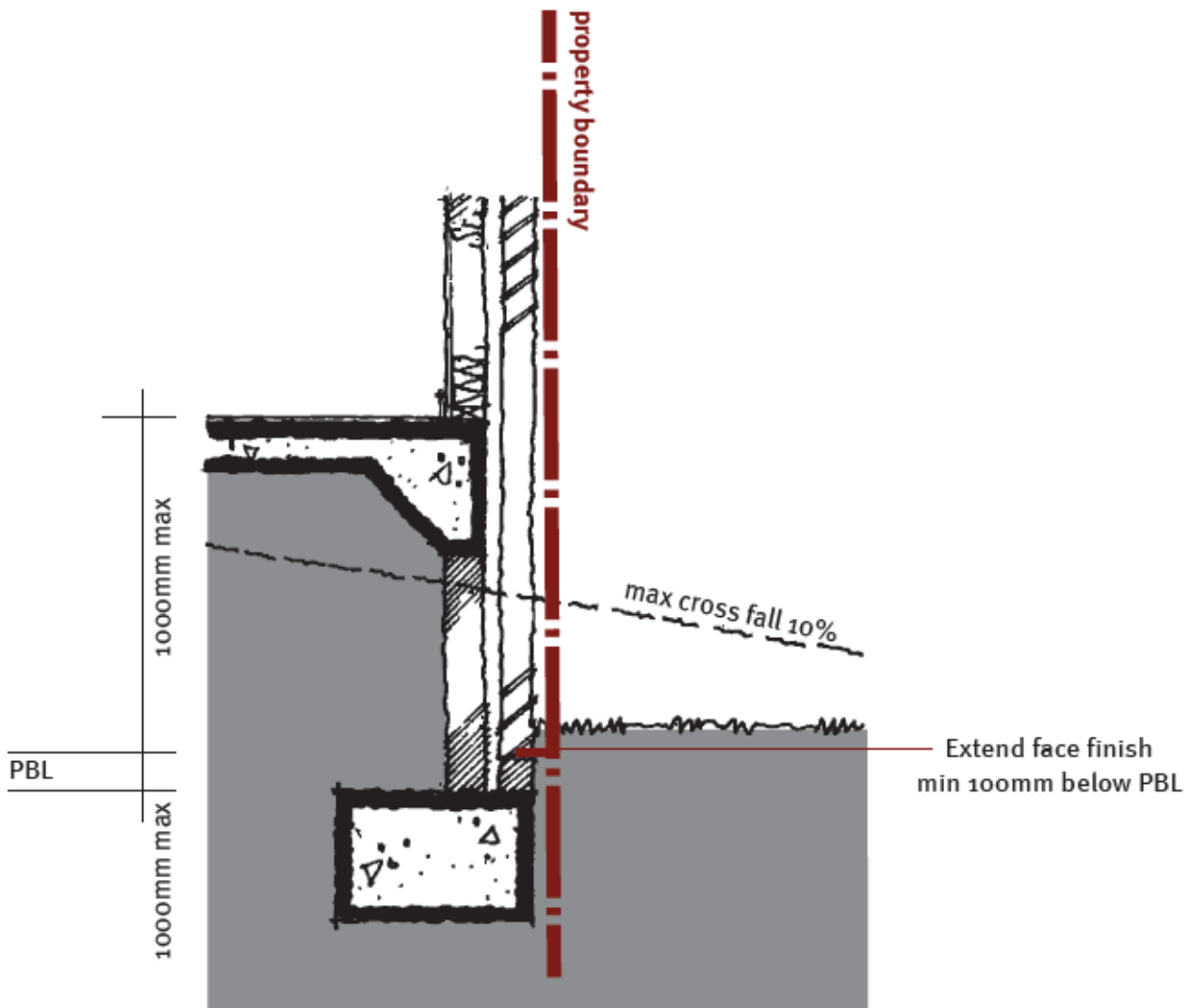
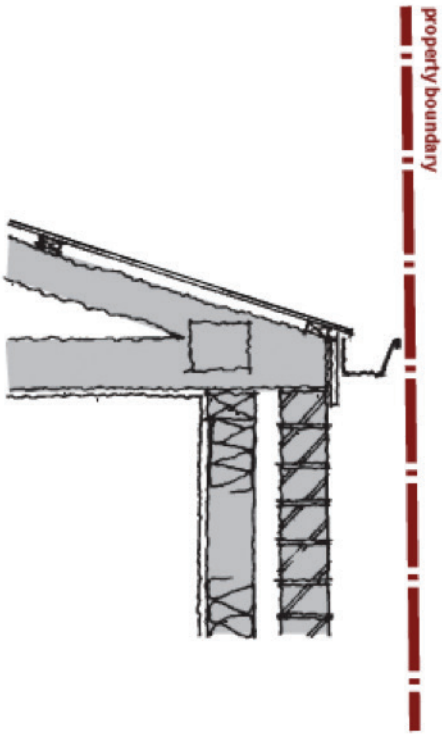
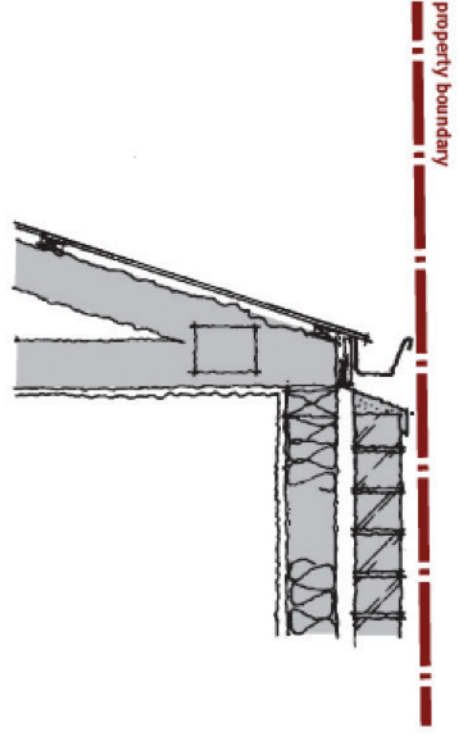


Figure 4.10 - Footing detail - built to boundary



**Gutter detail  
Fascia built to boundary**



**Gutter detail  
Set back built to boundary**

Figure 4.11 - Construction details options - Zero lot line housing



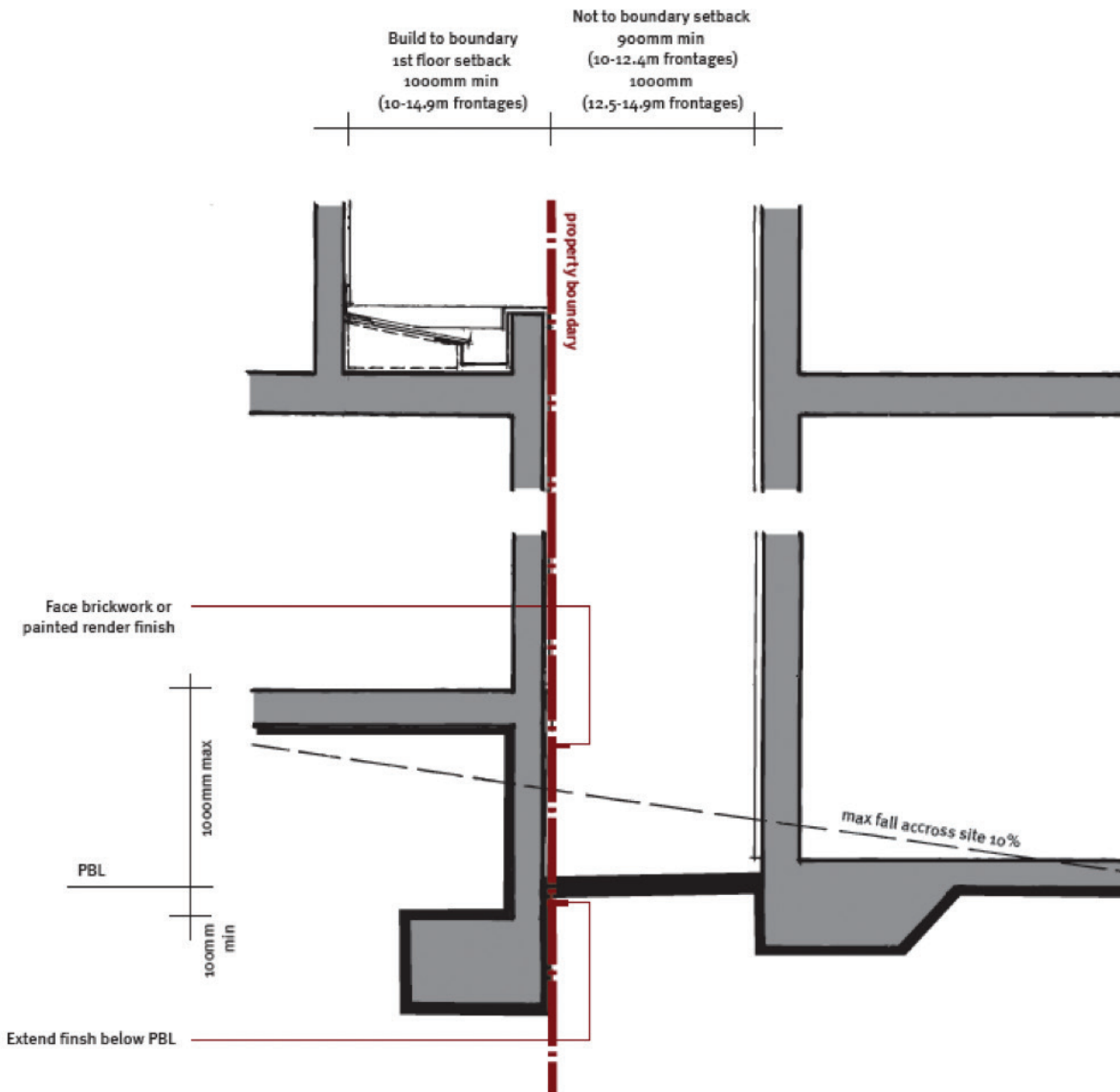


Figure 4.12 - Side boundary detail Concealed gutter built to boundary

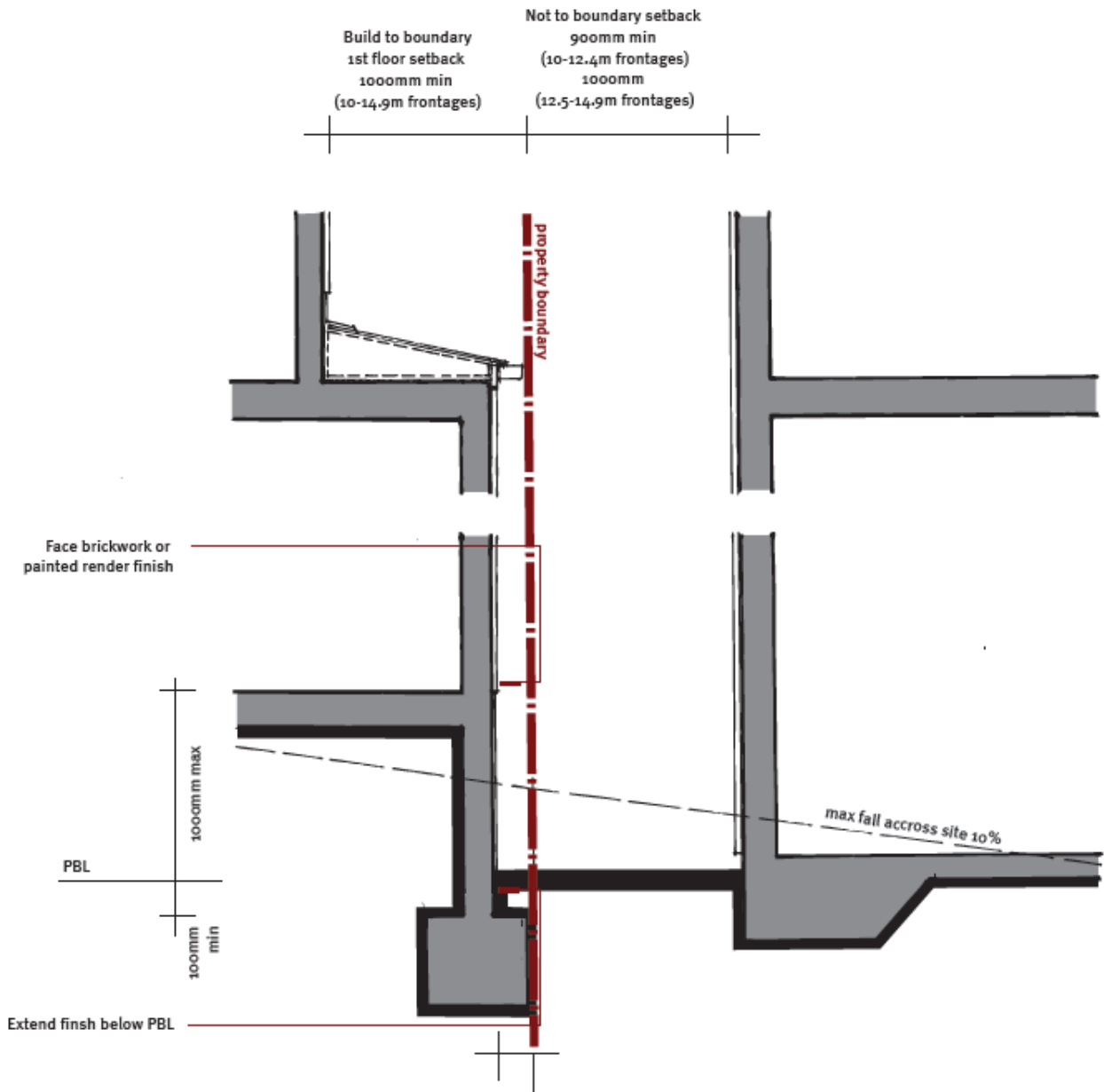


Figure 4.13 - Side boundary detail - Conventional fascia gutter built to boundary



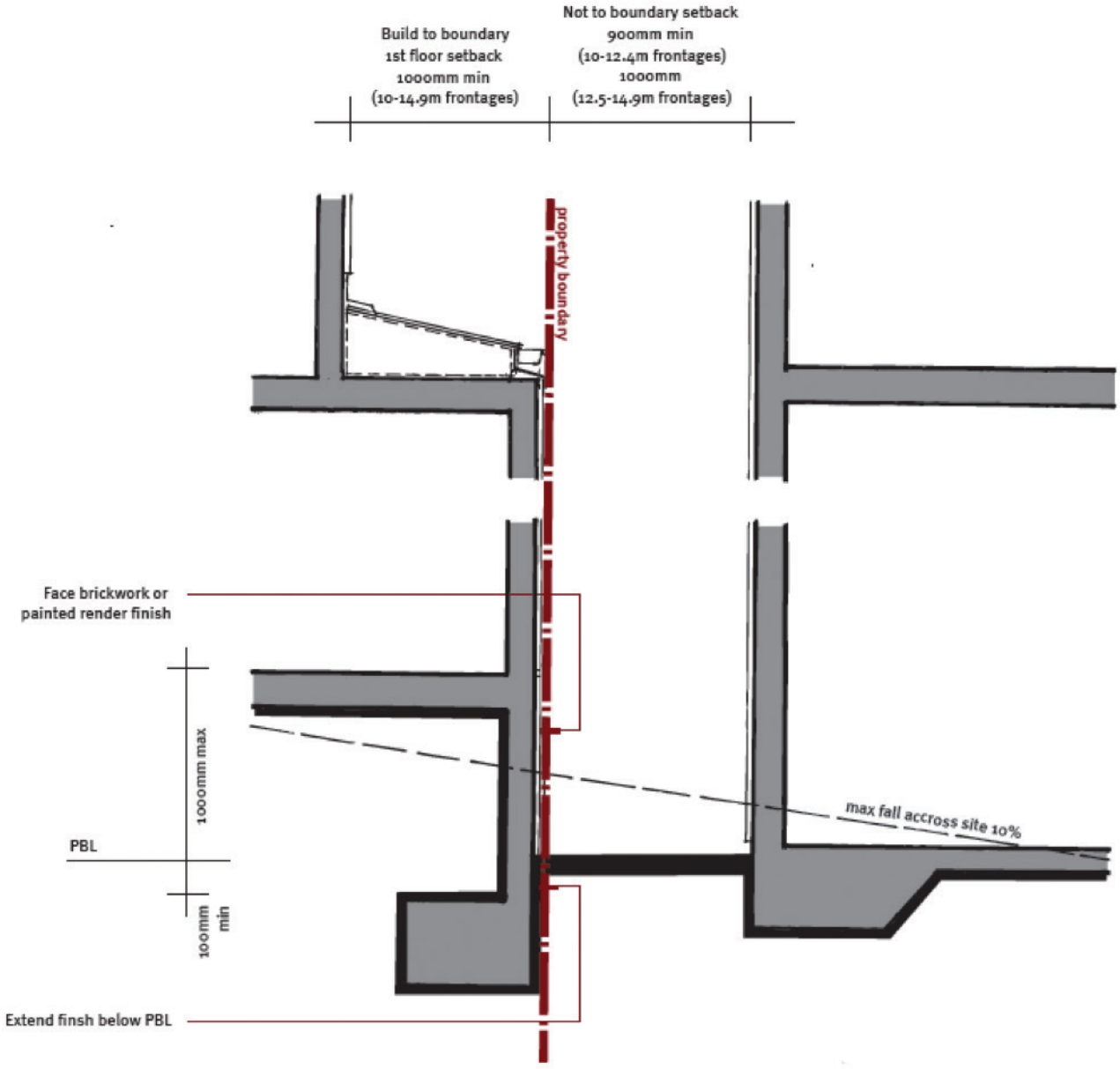


Figure 1.14 - Side boundary detail - Recessed gutter built to boundary



# PRACTICE NOTE



## Rear laneway design

**Rear laneways play a pivotal role in achieving diverse housing at densities of 20+ dws/ha. Rear laneways deliver highly attractive streetscapes by locating driveways and garages to the rear of narrow lots. Rear laneways increase costs and reduce developable land but can be cost-effective particularly when providing for loft apartments over laneway-accessed garages and when serving small lots which front the rear laneway.**

The former Urban Land Development Authority (ULDA) developed rear laneways at Fitzgibbon Chase, for both rear garage access and loft home frontages. Other developments throughout Australia have also been referenced in this practice note as examples of best practice in delivery of rear laneways.

This practice note has been prepared to assist in the design of rear laneways and the assessment of development applications involving rear laneways.

### 1. Types of rear laneways

Two functional types of rear laneways are typically used, namely those:

- A. providing access to garages; and
- B. those providing front door access to loft and other small dwellings.

Lanes providing front door accesses to dwellings should consider providing a higher level of amenity and landscaping within the lane.



Figure 5.1 - An example lanewayscape (Varsity Lakes)



Figure 5.2 - Rear laneway with primarily access to garages



Figure 5.3 - Rear laneway with front door and garage access (Fitzgibbon Chase)



## Rear laneway design considerations

All rear laneways:

Should	Should generally not
<ul style="list-style-type: none"> <li>• be wide enough to enable safe and efficient vehicle movement, including through movement of service vehicles, but not be overly wide (minimum 6.5 m reserve width recommended in most instances while - absolute maximum 7.5 m in most circumstances);</li> <li>• preferably be straight or at least a long radius curve or in a T-configuration (rather than H-laneways, dog-leg laneways or tightly curved laneways);</li> <li>• where there is a bend or intersection incorporated into the design, ensure the swept path of a garbage truck is accommodated. Similarly, operational clearances for the garbage truck need to be considered;</li> <li>• enable easy and safe access into and out of garages, avoiding tilt-panel or other doors that open into the laneway;</li> <li>• ensure rear yards of properties can be fenced for security;</li> <li>• have a centre draining profile with the stormwater catchment limited to the laneway;</li> <li>• have a pavement cross fall to the centre of 2.5 per cent to 3 per cent;</li> <li>• have sufficient capacity for minor and major stormwater flows to be contained within the laneway reserve;</li> <li>• have pavement kerb constructed 100 mm lower than the adjoining lot/building level to ensure major stormwater flows are conveyed in the laneway and not through the lot/building; and</li> <li>• have good passive surveillance into, along and through laneways, by having dwellings overlooking the laneway and other Crime Prevention Through Environmental Design (CPTED) measures.</li> </ul>	<ul style="list-style-type: none"> <li>• be longer than 140 m without a mid-lane link;</li> <li>• create a more convenient or direct through-route alternative for vehicles, cyclists or pedestrians than the adjoining street network;</li> <li>• be dead ends or culs-de-sac;</li> <li>• provide for visitor parking within the lane, unless in specifically designated areas;</li> <li>• have traffic calming devices; and</li> <li>• be a drainage path for any catchment external to the lane.</li> </ul>



Figure 5.4 - Laneways providing front door accesses to dwellings should consider providing a higher level of amenity and landscaping within the laneway.

Rear laneways that provide primary access to dwellings

Should also provide:

- a higher level of amenity and landscaping;
- a maximum 80 m from street visitor car parking to the entry of the dwelling fronting the rear laneway;
- well landscaped entrances visible from within the laneway; house numbers and letter boxes to indicate entry points to dwellings, in accordance with Australia Post requirements;
- provision for metered services and other infrastructure;
- pavement treatment and materials to enable ease of access to, and maintenance of, underground services (power, telecom, water, sewer);
- public lighting, with poles avoiding reversing vehicle paths;
- adequate sightlines for both pedestrians and motor vehicles at intersections; and
- acknowledgement of the (generally) low vehicle speed environment.



**2. When to provide a rear laneway**

Rear laneways are an important part of the street pattern as residential densities increase, in activity centres and when an urban streetscape is sought.

Rear laneways:

1. free up kerb space for additional on-street visitor parking provision;
2. leads to uninterrupted path and cycle networks in busy streets; and
3. provide for a significant increase in density and housing choice opportunities with rear loft product; But
4. require additional road reserve and costs.

**3. Laneway width & Garage Access**

A laneway’s width and lack of a verge distinguish it from a street. This distinction is important, to avoid any confusion as to its function so laneways widths should be kept to the minimum recommended. The laneway’s function is further reinforced and the useable private open space on the lot is maximised by minimising building setbacks to laneways.

The width of the laneway is determined by the space required for service infrastructure, vehicle turning movements, refuse bin collection, landscaping and planting, the laneway length, and the creation of a lanewayscape (rather than a streetscape).

Laneways reserve widths desirably should be no greater than 6.5 m with 7.5 m as an absolute maximum.

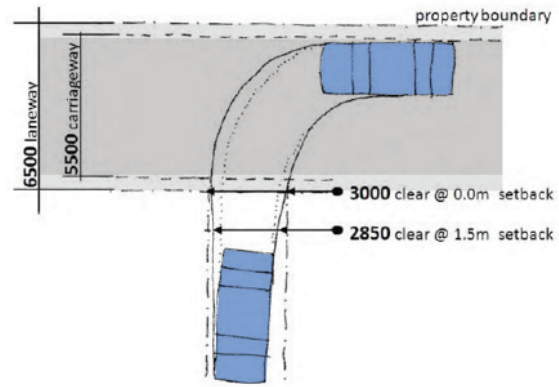
To minimise the setback from the laneway thereby maximising the private open space on the lot, the clear garage/carport entry will need to be wider than 2.4 m for a single garage/ carport.

This is to accommodate the turning path of a typical, moderate-sized motor vehicle, when entering the garage/ carport in a forward gear. The turning path must be clear

of other obstructions, such as pillars and columns. The swept path will also determine location of landscape planting clear of driveways.

Laneway width	Garage/carport door setback to laneway	Garage/carport door width clear when open
6.5 m	0 m	3 m
	1.5 m	2.85 m
7.5 m	0 m	2.8 m
	1.5 m	2.6 m

Table 5.2 - Laneway width and garage dimensions



Garage/ carport openings - moderate sized motor vehicles (As2800.1 - 2004 B99 vehicle)

Figure 5.5 - Property clearance to laneways

Note that by reducing garage/carport setbacks and providing a wider garage door, private open space (POS) within the lot can be maximized and in certain circumstances provide sufficient space for part-time tandem carparking within this POS (a carport). The closer the buildings are located to the property boundary and therefore the closer they are together across the laneway, the less likely the laneway will be confused with a street.

**4. Laneway length**

The level of convenience, safety, and security experienced by lane users is also dependent on the length of the lane and the nature and number of dwellings to be accessed from it.

A rear laneway at the end of a block will typically deliver a laneway with a length of 57-64 m depending on the length of the lots adopted in the block design. A rear laneway along the length of a block will typically deliver a block length of 120-150 m. A mid-block pedestrian/cycle link is recommended where the length of a rear laneway is over 150 m.

**5. Aesthetic treatment and landscaping**

The principle of providing diversity in housing in new neighbourhood development should extend to the treatment of buildings and landscaping in rear laneways.

Buildings should exhibit diversity in design, materials, colours, textures and finishes, with designs complementary to local conditions.

Some low maintenance planting is preferred in all laneways. Planting areas should be at least 750mm square (or if rectangular have minimum dimensions of 500mm x 750mm), have no turf, and have at least one tree planted mid-block and at the ends of the laneway.

Double garage/carport doors are appropriate when a diversity of building and landscaping materials and a variety in door treatment have been introduced, particularly when

the laneway services primarily garages. An appropriate lanewayscape can be more easily achieved when a diversity of building materials and articulation has been introduced into above-garage dwellings and the door is setback at least 0.5 metres from the face of the main dwelling.

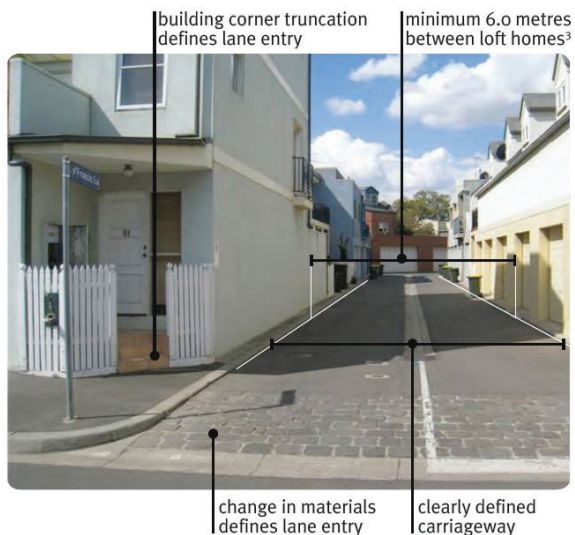


Figure 5.6 - Example, Laneway Characteristics

## 6. Laneway definition

The lane should be detailed so it reads as a laneway (and not a street). Defining the laneway should include consideration of:

- alternative surface treatments to asphalt, such as concrete or pavers;
- changing threshold treatment (height, materials, colour, reduced corner truncations);
- providing flush kerbs to open up laneway width;
- accommodating service infrastructure if it cannot otherwise be avoided e.g. electricity supply; and
- minimising setbacks to dwellings that front the laneway.

The end of and entry to the laneway should be clearly defined, which may include:

- the use of planting to define entry to an “industrial” looking laneway;
- laneways with view lines open to space or landmark building and/or tree; and
- mandated two-story construction on lots at laneway entry or adjoining mid-block link.



Figure 5.7 - A clearly defined rear laneway with minimum separation between facing loft homes (Kensington Banks)

Mandated two-story construction at lane entry and adjoining mid-block link defines entry/exit points to and from the laneway



Figure 5.8 - 5.0 metre-wide mid-block link off rear laneway provides opportunities for pedestrian and service infrastructure access, planting and lighting (Varsity Lakes)

The front door to loft homes and dwellings on small lots which front a laneway, should be visible from within the laneway. However, it is not essential that it be visible from the laneway entry. Addresses within a laneway should be clearly identified, including signpost (e.g. “Penny Lane”), letterbox, and house number.

Where two story buildings front a rear laneway:

- loft home balconies can be opposite - 6.5m minimum separation;
- detail balcony for total visual privacy up to rail height (shutters okay); and
- double garage doors are acceptable provided they are limited in number and considered as part of the overall lanewayscape.





Figure 5.9 - A clearly defined entry to a loft home with a frontage to a rear laneway ensures that all dwellings have an address (Fitzgibbon Chase)



Figure 5.10 - Loft homes with private balcony over double garage adds to the aesthetic treatment of the land (Fitzgibbon Chase)

### 7. Services

Where possible, all essential services (power, water, sewer, stormwater and telecom) should be provided in the street and not in the rear laneway. Usually this will require lots and lofts fronting a rear laneway to be serviced from the street frontage via easements located in the side setback of the dwellings which front the street.

This is typical where lots are serviced from both sides of the street and lofts fronting the laneway are subject to a community title scheme.

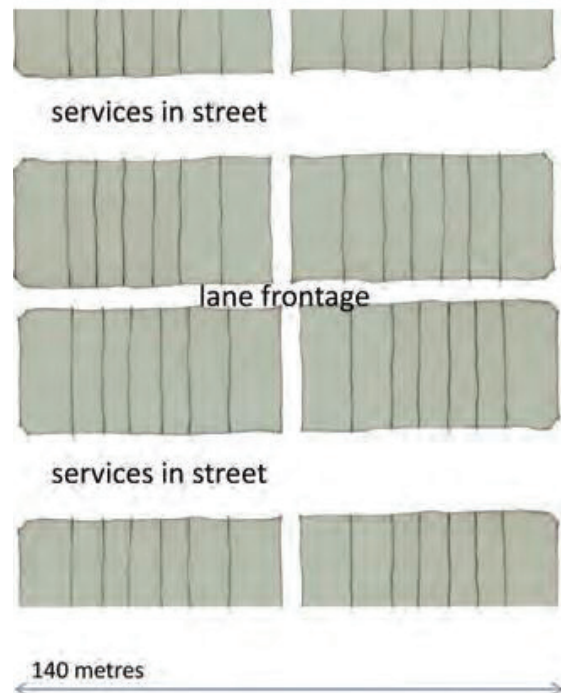


Figure 5.11 - Highlighting the need for services in small allotment Developments to place in the street.

Loft homes/lots fronting a rear laneway which are proposed to be fee simple Torrens title (not subject to a community title) may require services to be provided within the laneway. It is also efficient to locate services within the laneway, where lots front a non-access connector street and/or parkway.

When dwellings front a park, the utilities can be installed in a 3 to 4 m wide strip of land dedicated as road reserve between the lots and the park reserve. The pedestrian path for accessing the dwellings will also be that road reserve.



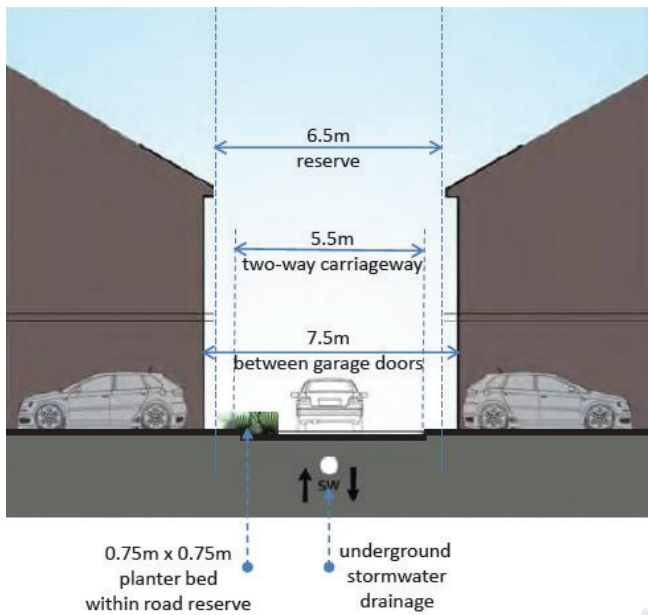


Figure 5.12 - Typical rear lane cross-section

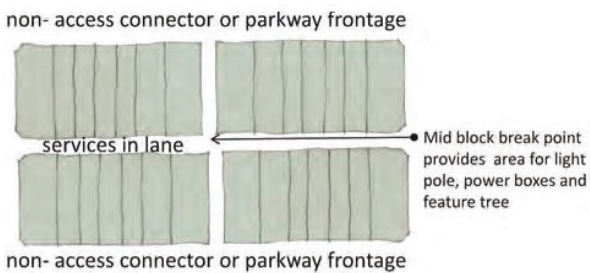


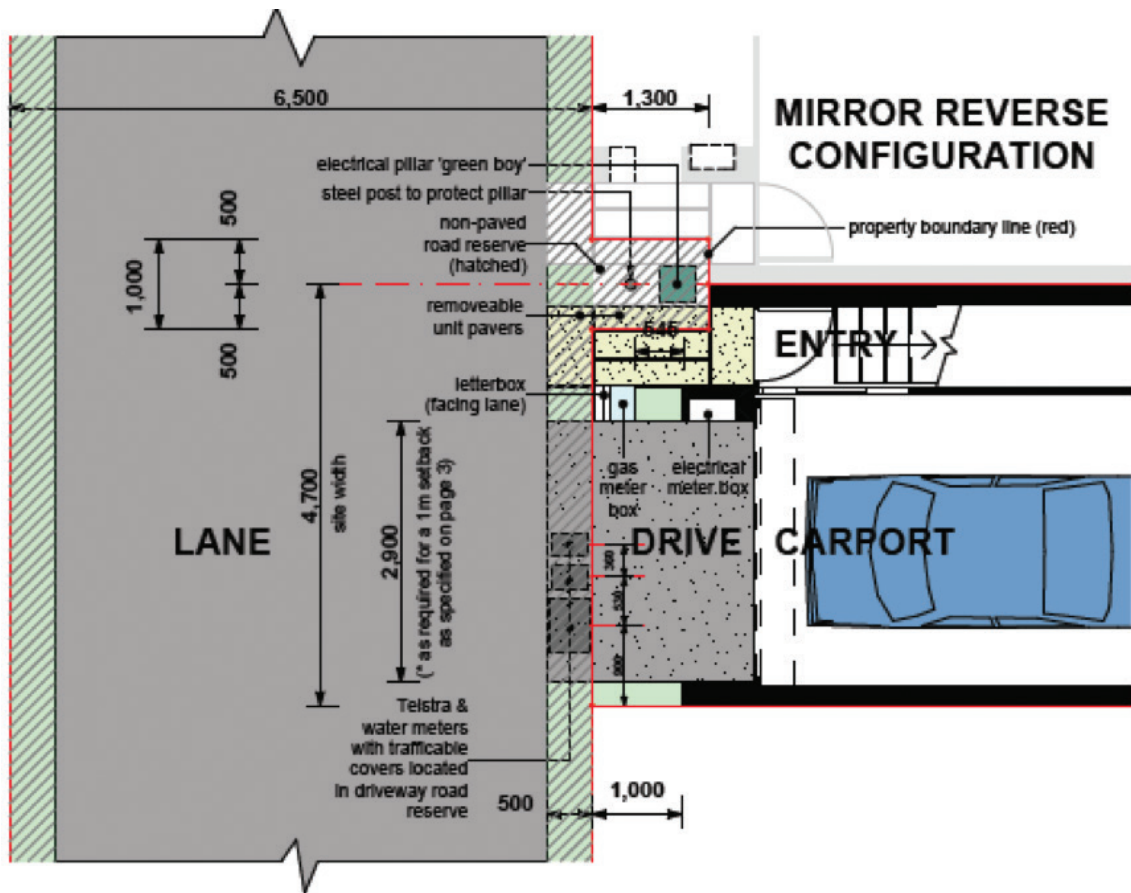
Figure 5.13 - Mid block break points providing location scope for services



Figure 5.14 - Essential services within the rear laneway (Varsity Lakes)

In a 6.5 m wide laneway, a mid-block link provides opportunities for electrical connection to light poles, as well as for trees and other planting and stormwater conveyance.

Street lighting poles can also be provided at the entrance to a rear laneway, however this typically only lights to a distance of 25-30 m into the laneway. As such, particular attention is required to the provision of street lighting to 6.5 m wide laneways longer than 60 m. Longer laneways may require a mid-block link or localised reserve widening to accommodate street lighting.



Servicing a pair of loft homes off a rear lane

Figure 5.15 - Services for a pair of loft homes off a rear laneway

Where mid-block links are not provided, the width of the laneway (road reserve) may have to be increased to 7 or 8.0 m where all services are provided within the laneway. In this situation, special attention also needs to be given to locating services to ensure there is sufficient separation between underground conduits and that access points to water meters and power boxes (green boys) are available and appropriately protected.

lane lighting close to lane entry and designed to minimise nuisance to residents



centre line drainage with gully pit

5.16 - Rear laneway with lighting at entry and centre line drainage (Fitzgibbon Chase)

## 8. Address

### *Ensuring an appropriate address*

It is imperative that each dwelling has an appropriate address for services such as Police, Ambulance, SES, Fire Brigade, and where required, Australia Post. This address may be different from the real property description (RPD). Whilst the real property description of a lot with two dwellings may relate to one street (or "Park Way") address, the dwelling fronting the rear laneway should have a service/ postal address relating to the name of the laneway. E.g. number (lot) 3 Kuranda Park Way therefore includes a dwelling which fronts (number) 3 Figure Palmerston Laneway.



5.17 - Palmerston Laneway off Carselgrove Avenue (Fitzgibbon Chase)

### *Servicing small dwellings off a rear laneway*

Where loft homes over garages provide off-street car parking for other dwellings, the loft apartment is typically freehold title or subject to a community management scheme and/or volumetrically subdivided. In the illustration below, the smaller lot is freehold and not subject to a community title. One on-site car parking space is provided per dwelling. Two on-site car parking spaces are provided in tandem on the lot for the larger dwelling which fronts the street/park.

Refer to Practice Note 4: Designing for small lots for further information. Tandem carparking provides additional on-site flexibility. One or both of the spaces could be used for motor vehicles, boats or an extension of private open space.



### 9. Small lots off rear laneways

The illustration below shows a solution for the provision of a small dwelling on a freehold Torrens title (not subject to community titling) with a front door facing a rear laneway. This solution takes advantage of the loft apartment provisions for balconies and other private open space and enables a small dwelling to be provided on a lot with a zero building setback to all boundaries and 100 per cent site coverage.



Figure 5.18 - Servicing small freehold dwellings off a rear laneway (Image supplied courtesy of Ausbuild)



Figure 5.19 - "Daintree Park Way" at Fitzgibbon Chase provides frontage to detached terrace houses including garages serviced via a rear laneway.

Where a dwelling fronts onto a park, a thin strip of road reserve including a 1.5 m wide pathway should be provided to enable postal access to these lots. This road reserve (3 to 4 m wide) can also accommodate the utilities that service these dwellings. These strips of public road are typically called a "Park Way".

## 10. Parking analysis plan

Typically loft homes can be built on any lot serviced by a rear laneway. Where it is anticipated that the majority of loft homes or other small dwellings will be built, a parking analysis plan may be required to demonstrate that the surrounding streets can accommodate sufficient on-street parking within 70 m walking distance for visitors accessing dwellings, which front the rear laneway. Typically, 0.75 on-street car parking spaces are required per house<sup>1</sup>.



Figure 5.20 - Motor vehicle parking considerations for narrow lots

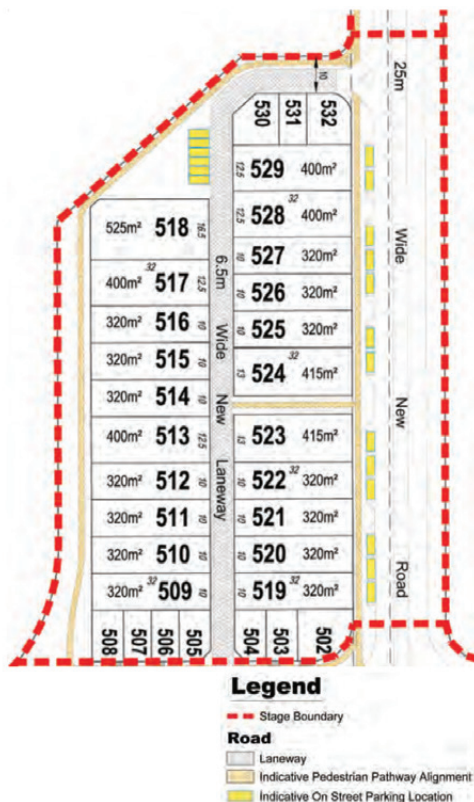


Figure 5.21 - Tandem car parking can be provided with an open-ended garage

However, where the dwellings front a park, visitor parking should be within 100 m walking distance from the dwellings. If the visitor parking will also be used by park visitors, at least 1.0 visitor parks per dwelling should be provided.

## 11. Bin storage and collection

Careful consideration of bin storage is needed, particularly where dwellings front a park or the laneway. Dedicated bin storage should be located within the lot and not in the garage or the laneway. The bin storage should be easily accessible, screened and well ventilated. Bins stored in driveways on laneways are an emerging issue and bin storage areas within garages are not desirable for residents. A properly designed laneway will allow space for bins and garbage trucks on collection day.

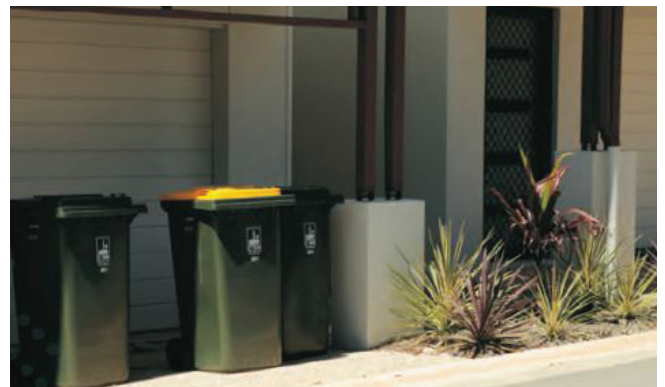


Figure 5.22 - Inadequate on-site bin storage leads to bins being left in the laneway. Dedicated accessible, screened, and ventilated bin areas should be provided in each lot and not in the garage.

## 12. Lessons for Builders

- Work out site levels exactly – due to the tight site, even minor slopes in the laneway and across the site can lead to errors and stormwater drainage issues;
- design from the start the water/power/gas connections – very poor outcomes can occur if poorly detailed; and
- bin storage areas, if located off living areas may be used for purposes other than for bin storage, resulting in bins left in the laneway.





# PRACTICE NOTE



## Design for Cyclists

### Aura: A Case Study

**It is widely recognised that many people in Australia would like to cycle more regularly whether for recreation or to get to work or nearby services.**

However, to generate real modal shift, cycling infrastructure needs to target and support the general public who are interested in cycling but are concerned for their safety or safety of others (i.e. where they need to share the road with cars or a footpath with pedestrians) and therefore they choose not to ride. This was noted back in 2008 by Rachel Smith identifying that up to 60% of the population are interested but are concerned for their safety.

The challenge of creating safe, accessible active transport networks that encourages more sustainable forms of transport has seen Stockland, Sunshine Coast Council and Economic Development Queensland develop individual responses, policies and standards which have been used collaboratively in the delivery of cycling infrastructure at Aura.

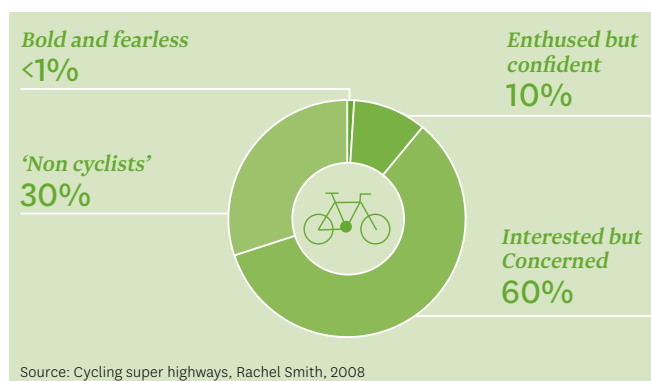


Figure 6.1 - The choice of riding or not is Influenced by how safe people feel using active modes of travel, on and off the carriage way.

### 1. About Aura

**Aura, Stockland's development of the Caloundra South Priority Development Area (PDA) on Queensland's Sunshine Coast is Australia's largest master planned community. The Caloundra South PDA covers 2,310ha of land and sits between the Bruce Highway to the west and Bells Creek road to the south. Once developed, Aura will provide approximately 20,000 dwellings and create 15,000 jobs.**



Figure 6.2 – Areal view of Caloundra South PDA

### 2. Aura: A Cycle City – A Unique Approach

Aura's unique approach has focused on a provision of a dedicated, 2-way cycle track with a separated network adjacent. The approach to the cycle track design has focused on the following objectives.

#### A. NETWORKED APPROACH – CONNECTING THE COMMUNITY

- connects key destinations and activity clusters (i.e. centres, employment precincts, major parks and recreation);
- safe crossing points on major roads; and
- provision of end of trip facilities at centre and major employment nodes.

#### B. TARGETED APPLICATION

- positioned only on limited access roads;
- supports responsive street network design to minimise obstructions; and
- reinforces role in hierarchy.

#### C. SIGNATURE CONFIGURATION AND NETWORK FUNCTION (an active transport 'beacon')

- highly legible;
- safer; and
- integrates with on-street and shared path network along creek corridors.

#### D. SPACE SAVING AND EFFECTIVE – STAGEABLE

- allows staging of bridges and higher order dual carriageway roads; and
- makes more efficient use of land.



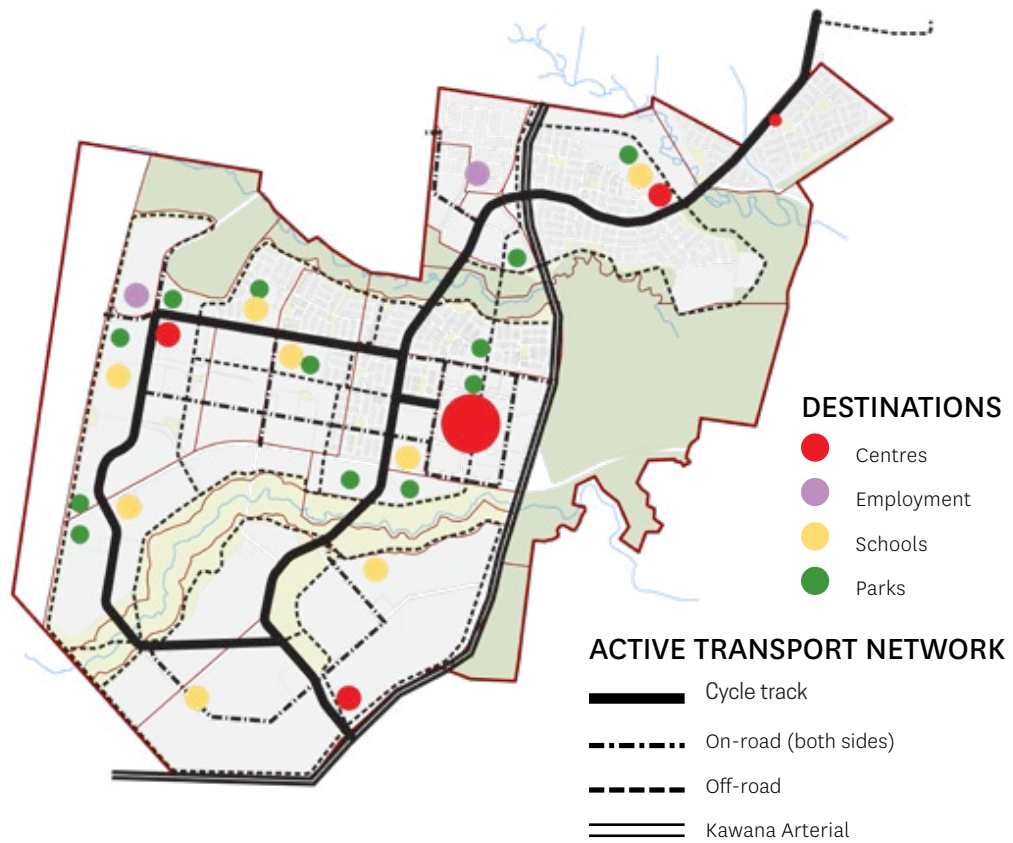


Figure 6.3 - Proposed cycle track and cycleway network plan

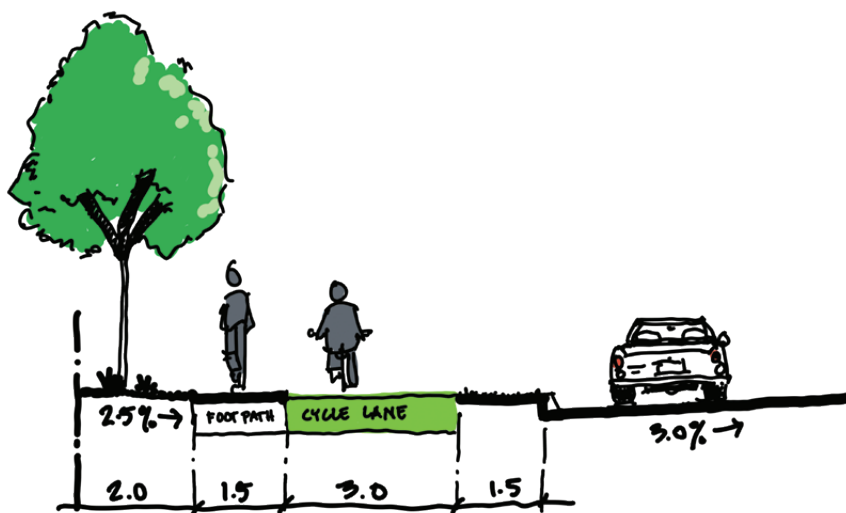


Figure 6.4 - Proposed cycle track section profile

## Indicative lengths:

- Cycle track – 53.7km
- Off Road Share Path – 5.7km
- On Road – 10.7 km

This equates to approximately 60km of cycle infrastructure that is separated from general traffic laneways.

## 3. Key Achievements in first 2 years

- Successful delivery and usage of the cycle network which has seen over 50% of primary school students use the network to get to school.
- RideScore\* partnership with Sunshine Coast Council, Baringa Primary School, and Stockland.
- Baringa Pedal park is one of the most popular parks on the Sunshine Coast, used by local residents and visitors alike. As a result, it was nominated by the Sunshine Coast Daily as one of the top 10 parks on the Sunshine Coast.
- Consistent feedback from residents and visitor on how much they love the cycle facilities and that it has increased how often they cycle.
- The early delivery of the veloway throughout Baringa has ensured positive behaviours of cycling are being adopted from the start of the new community.
- The early completion of over 4km of connecting cycle track to surrounding communities of Aura.

\* RideScore is the first program of its type in Australia to record student cycle trips and provide real-time information to parents. The technology consists of a Bluetooth beacon being attached under the bike seat and a reader is positioned at the school's bicycle storage area. An email notification is sent to the parent when the student arrives at and departs the school. Students accumulate one reward point for each day they cycle to school. Students are awarded prizes when they reach specified milestones.

## 4. Aura Cycling Infrastructure



Figure 6.5 - Separated cycle track



Figure 6.6 - Family using separated cycle track



Figure 6.7 - Protected intersection at roundabout



Figure 6.8 - Protected signalised intersection





Figure 6.9 - Cycling bridge



Figure 6.10 - Slow point

## 5. Resource Material

- Technical Note 128 Selection and Design of Cycle Tracks – May 2015 – Qld Department of Transport and Main Roads





# PRACTICE NOTE



## Building a Street Cross-Section

**It is no longer considered appropriate to draw on standard cross-section, nor minimum or average road reserve widths.**

In the process of building a street the reserve width, verge width, and carriageway (pavement) width should be developed using the relevant street and road design guidelines in Part 2 of this document, as well as other industry standards (e.g. Austroads, local authority standard drawings/design standards, Department of Transport and main Roads (DTMR) technical notes/guidelines, Public Transport Infrastructure Manual (PTIM)) as appropriate source documents. The guidance provided herein should not override these guidelines.

To assist practitioners in delivering a street cross-section that is fit for purpose, this practice note contains several demonstration examples that provide guidance on the “Build-A-Street” concept.

### **Demonstration Example 1 – Major Collector street with principal cycle corridor serving as a bus route**

In the subject example, the Major Collector street does not provide property access driveways, but does have frontage land uses that create a need for on-street parking. Traffic volumes are in the order of 8,000vpd (total two-way). The design speed has been adopted as 60km/h. Pedestrian activity is considered to be reasonably high given the bus stops and adjacent land uses.

The resultant cross section is as follows:

- 7.5 m verge, comprising:
  - 1.0 m separation from boundary to footpath
  - 2.0 m footpath
  - 3.0 m two way separated cycle track
  - 1.5 m separation from cycle track to kerb. This will include significant trees/vegetation;
- 2.5 m parking lane (to be widened to 3.0m at an indented bus stop);
- 3.5 m travel lane;
- 3.5 m travel lane;
- 2.5 m parking lane (to be widened to 3.0m at an indented bus stop); and
- 4.5 m verge, comprising:
  - 1.5 m separation from kerb to footpath. This will include significant trees/vegetation
  - 2.0 m footpath
  - 1.0 m separation from footpath to boundary.

**TOTAL STREET RESERVE = 24 m.**



### **Demonstration Example 2 – Access street with principal pedestrian corridor**

In the subject example, the Access street provides property access driveways, hence the need to accommodate on-street parking. Traffic volumes are in the order of 500vpd (total two-way). The design speed has been adopted as 40km/h. The street does not form part of a cycle corridor.

The resultant cross section is as follows:

- 5.4 m verge, comprising:
  - 1.5 m separation from boundary to footpath. This will include significant trees/vegetation
  - 2.4 m footpath
  - 1.5 m separation from footpath to kerb. This will include significant trees/vegetation;
- 5.5 m carriageway (pavement). This will accommodate on-street parking and two way traffic in shared use arrangements; and
- 4.0 m verge, comprising:
  - 1.5 m separation from kerb to footpath. This will include significant trees/vegetation
  - 1.2 m footpath
  - 1.0 m separation from footpath to boundary.

**TOTAL STREET RESERVE = 14.9 m.**

### **Demonstration Example 3 – Collector street with secondary cycle corridor**

In the subject example, the Collector street provides property access driveways, hence the need to accommodate on-street parking. Traffic volumes are in the order of 3,000vpd (total two-way). The design speed has been adopted as 50km/h. Pedestrian activity is considered to be low and for local use.

The resultant cross section is as follows:

- 4.5 m verge, comprising:
  - 1.0 m separation from boundary to path
  - 2.5 m shared pedestrian/cycle path
  - 1.5 m separation from path to kerb. This will include significant trees/vegetation;
- 2.3 m parking lane;
- 3.0 m travel lane;
- 3.0 m travel lane;
- 2.3 m parking lane; and
- 4.5 m verge, comprising:
  - 1.5 m separation from kerb to path. This will include significant trees/vegetation
  - 2.5 m shared pedestrian/cycle path
  - 1.0 m separation from path to boundary.

**TOTAL STREET RESERVE = 19.6 m.**



# PRACTICE NOTE



## Traffic Volume

**Traffic volume is a measure used to quantify the amount of vehicular, motorised, pedestrian or bicycle traffic using a road or street infrastructure including paths.**

### Determining Traffic Volume

Traffic volume is a major factor in designing the road and will generally determine the key parameters of the infrastructure required to accommodate such volume. Vehicular traffic is often expressed in Average Daily Traffic (ADT) calculated using an Annual Average Daily Traffic (AADT) - the total volume of traffic calculated on part of the road and divided by 365 days.

The following factors can influence traffic volume:

- site locality and its connectivity to road network;
- local attractors such as health clinics, hospitals, shopping centres, public transport stations, kindergartens or schools;
- travel behaviour (e.g. rat running and avoiding congested parts of road network);
- timing of travel - morning or afternoon peak or a defined local peak;
- weather conditions (e.g. flooding of roads can re-route traffic);
- events in the area; and
- emergency conditions.

To determine traffic volume, engineers can obtain traffic (or trip) generation data from traffic counts for a specific land use or by using one of the following sources:

- Local Government Planning Scheme;
- Guide to Traffic Generated Developments;
- Trip Generation; or
- other credible sources, if accepted for use by the Local Authority.

#### Tip

*When carrying out traffic counts in suburban areas, take a note of major traffic generators such as schools - it is best to avoid school holiday periods, public holidays, and student free days as the traffic volumes would generally be lower during these times.*

### Example

In detached suburban areas with limited public transport services and active travel infrastructure, the reliance on vehicular trips will generally be higher than in the areas that are well connected to, and serviced by, public transport and active travel infrastructure.

### Peak Hour Traffic Volume

Peak hour traffic is the amount of traffic using the road during the defined peak hour period. Generally, the AM and PM peaks are considered for estimation of traffic volume as a worst case scenario and the peak hour traffic volumes are used to evaluate the performance of road network. The peak periods are determined through traffic counts and selecting a 1-hour period with the highest volume of traffic recorded for AM and PM scenarios. Often the wider 'network peak' can coincide with the local peak or a school traffic peak although in some instances these peak periods can be different.

### Level of Service

Many local authorities use a Level of Service (LOS) as their desired standard of service (DSS) for the road network including intersections. LOS is a qualitative stratification of the performance measure or measures representing quality of service. A LOS definition is used to translate complex numerical performance results into a simple stratification system representative of road users' perceptions of the quality of service provided by a facility or service. LOS is generally represented by letters A to F, the latter indicates the worst intersection or road link performance situation (flow breakdown, demand is greater than capacity, and average vehicle delay exceeding 80 seconds).

When modelling is used (e.g. Signalized Intersection Design and Research Aid, SIDRA) for assessment and establishment of DSS, the outputs are often described as Degree of Saturation (DOS) which is a modelled volume to capacity ratio used as proxy for LOS. The degree of saturation of an intersection approach ranges from close to zero for very low traffic flows up to 1.0 for saturated flow or capacity. The degree of saturation of a signalised intersection approach may be defined as the ratio of the arrival flow (demand) to the capacity of the approach during the same period. A degree of saturation greater than 1.0 indicates oversaturated conditions in which long queues of vehicles build up on the critical approaches.

Many intersections and road links operate at a reduced level of service (e.g. LOS D, LOS E or even occasional LOS F) during the peak hours. Although it may not be the most convenient for commuters, occasional decrease in





performance and increased delay during peak hour may be acceptable in some situations. The changes between levels of LOS are not necessarily proportional and should be assessed on each and individual basis. Table 8.1 summarises the definitions for each mode’s level of service to the point at which the components fail.

**Tip**

Designers should be aware of differences between infrastructure required to maintain a specific LOS. In most cases, an increase in just one increment in LOS (e.g. from LOS E to LOS D) may trigger a significant upgrade of an intersection or a road link, potentially requiring extra land to accommodate additional road pavement width. It is important to note that LOS may worsen significantly during peak hours times and will perform well outside of these times.

evaluating the street capacity.

**Example**

The traffic volume for a new 350-lot residential development is calculated at 2,800vpd based on traffic generation of 8vpd/dwelling. It is assumed that each lot will have one dwelling. Proposed changes to the local planning scheme, due to be adopted in 6 months, will introduce higher densities for part of the development, potentially allowing 50 lots to be further subdivided into residential land parcels suitable to have one dwelling per each additional lot. Based on similar developments, the general community profile of the proposed development suggests a high car per dwelling ownership and an above average number of young children per household indicating that younger families favour this area. This is further explained by proximity to a district park, schools, and a bus station located across the major highway within 1 km distance.

A new road which will service this development is an Access Street type road (typical max. volume <3,000vpd). The local authority decided to consider the proposed planning scheme changes, resulting in re-calculation of traffic volume:

*Proposed before planning scheme changes:*  
 350 lots x 8vpd = 2,800 pd (assume 1 dwelling per lot)

*After planning scheme changes:*  
 (350 lots - 50 lots) + 100 lots = 400 lots (assuming 50 lots can each be subdivided into two)  
 400 lots x 8vpd = 3,200vpd

Consequently, because the proposed traffic volume of 3,200 is greater than the typical max. volume for Access Street, the designer must carefully consider the environmental capacity of the proposed street to accommodate proposed traffic. Factors such as car ownership per dwelling, the likelihood of children using the street for playing and occasional cycling, and connectivity to the nearest amenities must be considered.

In this case the designer may decide to provide a suitable shared use path to connect development to the school and other key amenities to reduce reliance on vehicles. It may also be beneficial to understand if the school and bus station have adequate end of trip facilities to accommodate active travel.

Level of Service	🚗 🚌		🚶	🚲	🚏 🚘
	<b>A</b>	No delay. No variability.	Opportunities to cross align with key desire lines. No wait times.	Dedicated minimum 3.0m off road path, grade separated.	No delay. No variability.
<b>B</b>	Operating speed between 60–80% of the posted speed limit.	Opportunities to cross close to key desire lines. Small to moderate wait times.	Dedicated minimum 2.0m kerb side lane, separated by parking and/or hard separator.	Operating speed between 60–80% of the posted speed limit.	
<b>C</b>	Operating speed between 40–60% of the posted speed limit.	Opportunities to cross within reasonable distance of key desire lines. Moderate wait times.	Dedicated 1.7m to 2.0m bicycle lane marked on the carriageway.	Operating speed between 40–60% of the posted speed limit.	
<b>D</b>	Operating speed between 20–40% of the posted speed limit.	Opportunities to cross not close to key desire lines. Moderate to long wait times.	Kerbside bicycle lane, 1.2m to 1.5m.	Operating speed between 20–40% of the posted speed limit.	
<b>E</b>	Operating speed between 10–20% of the posted speed limit.	Opportunities to cross are an unreasonable distance from key desire lines. Long wait times.	Kerbside 1m bicycle lane or Bus Lane.	Operating speed between 10–20% of the posted speed limit.	
<b>F</b>	Operating speed is less than 10% of the posted speed limit.	No opportunities to cross. Excessive wait times.	Wide kerbside lane marking or nothing. Shared lane with traffic.	Operating speed less than 10% of the posted speed limit.	

Table 8.1 - Reducing performance in ‘Level Of Service’ for carriage ways. Source: Vic Roads, Smartroads Guideline March 2015

**Environmental capacity of a street**

Designers must be aware of potential correlation between increasing traffic volumes and the degradation of residential amenity of a street. Designers should examine the key elements of a street and define the volume and character of the traffic permissible in the streets that it is consistent with good environmental conditions. It is suggested that the assessment of environmental capacity of the street becomes more significant as traffic increases and may not be as straightforward as assessing the exact quantity of traffic volume. Other factors such as traffic-generated noise, walkability, verge width, dwelling set-backs, pavement width, and local demographics must also be considered in

