Appendix D: Case studies for station categories

A number of case studies were assessed and the lessons learnt applied in the development of the parking management principles for the precincts surrounding the Sydney Metro Northwest stations. The locations analysed included:

- **strategic centre:** Macquarie Park, Chatswood
- **redeveloping centre:** Glenfield, Holsworthy
- **new centre:** Macarthur (Campbelltown), Leppington
- **local example:** Norbrik T-Way Stop (Glenwood).

Station & type	Strategic centre*	Presence of commuter car park with capacity	Local land uses**	Demand for non-public-transport-related parking	Existing employment centre	Local road network**
Macquarie Park **Strategic**	Yes	N/A	Medium density business park, local retail and low–medium density residential	Significant employment in immediate catchment	Yes	Arterial, sub-arterial & local
Chatswood **Strategic**	Yes	N/A	Mix of medium–high density residential and significant retail and commercial	Significant shopping centres and employment in immediate catchment	Yes	Arterial, sub-arterial & local
Glenfield **Redeveloping**	No	Larger – 800 spaces	Mostly low–medium density residential, local retail and education	Local schools, retail	Partial – minor retail	Sub-arterial, collector & local
Holsworthy **Redeveloping**	No	Larger – 1100 spaces	Mostly low–medium density residential,	N/A	No	Sub-arterial, collector & local
Macarthur (Campbelltown) **New**	No (Regional City Centre)	Larger – 800 spaces	Mix of medium–high density residential and significant retail	Significant shopping centre, University	Yes – retail	Arterial, sub-arterial & local
Leppington **New**	No	Larger – 850 spaces	Open space, mostly low density residential and rural uses	N/A	No	Sub-arterial & local
Norbrik (Glenwood)	No	Very small – 8 spaces	Mostly low density	N/A	Yes – minor retail	Arterial & local

Station & type	Strategic centre*	Presence of commuter car park with capacity	Local land uses**	Demand for non-public-transport-related parking	Existing employment centre	Local road network**
Local			residential, medium density business park and local retail			

*In A Plan for Growing Sydney (NSW Department of Planning and Environment, 2014)
**Existing and within one kilometre

Table D1: Characteristics of each interchange assessed

The assessment of each case study sought to understand how parking measures were applied, and the significance of distance to the station relative to on-street parking management. Assessment was undertaken through street-by-street review of parking measures. This was conducted in 2016; small changes have since affected on-street provision but the principles remain relevant.

The following questions were addressed:

- How far have parking management measures been implemented from the station entrance?
- Is there a discernible pattern?
- What type/s of parking was/were implemented?
- What key trip generators or attractors are there besides the station? What land uses could be influencing these restrictions?
- Are there any road network access implications that are driving implementation of these measures?
- Do pedestrian breakthroughs influence parking management measures?
- Particularly for residential areas, what are the implications? What happens in narrow/wider streets?
- Where can issues be reasonably predicted? How have these been responded to?

The figures below demonstrate each of the stations along with the broadest/most common application of parking management within 200 metre brackets from the station entrance, up to one kilometre. This demonstrates clear radical application of measures based on walking distance, with deviations from this norm driven by nearby significant land uses.

Station & type	0–200m	200–400m	400m+	Notes
Macquarie Park Strategic	No Parking	No Parking, 12P pay parking	12P pay parking 2P parking	Primarily arterial roads in close proximity to the station

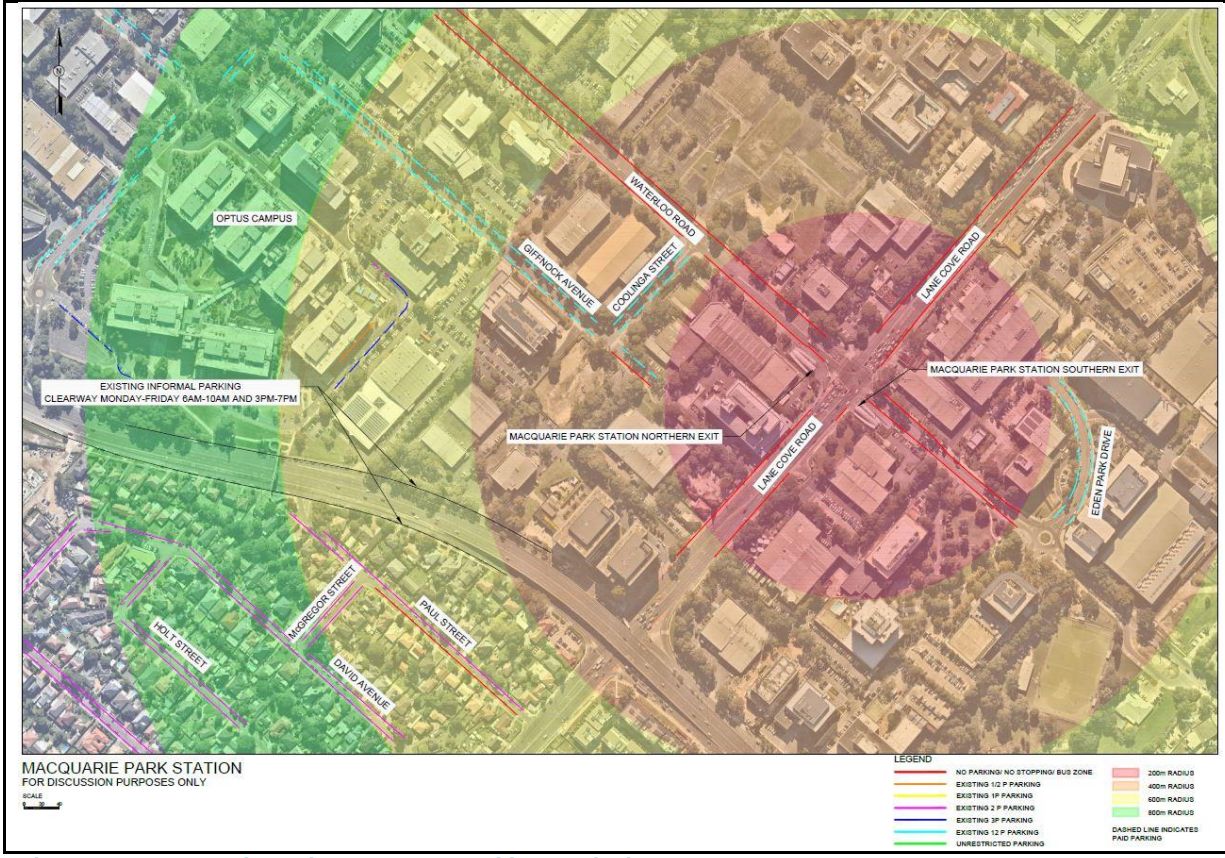

Figure D1: Macquarie Park – on-street parking analysis

Station & type	0–200m	200–400m	400m+	Notes
Chatswood Strategic	No Parking, 1P Pay Parking	No Parking, 1P Pay Parking, 2P Parking, Unrestricted	No Parking, 2P Parking, Unrestricted	Significant mix in 200–400m bracket

Figure D 2: Chatswood – on-street parking analysis

Station & type	0–200m	200–400m	400m+	Notes
Glenfield Redeveloping	No Parking, 1P Parking, 2P Parking, 3P Parking	No Parking, 3P Parking, Unrestricted Parking	No Parking, 3P Parking, Unrestricted	

Figure D 3: Glenfield – on-street parking analysis

Station & type	0–200m	200-400m	400m+	Notes
Macarthur (Campbelltown), New	No Parking	No Parking, Unrestricted	No Parking, 3P Parking, Unrestricted	Significant private parking at shopping centre, 3P around hospital

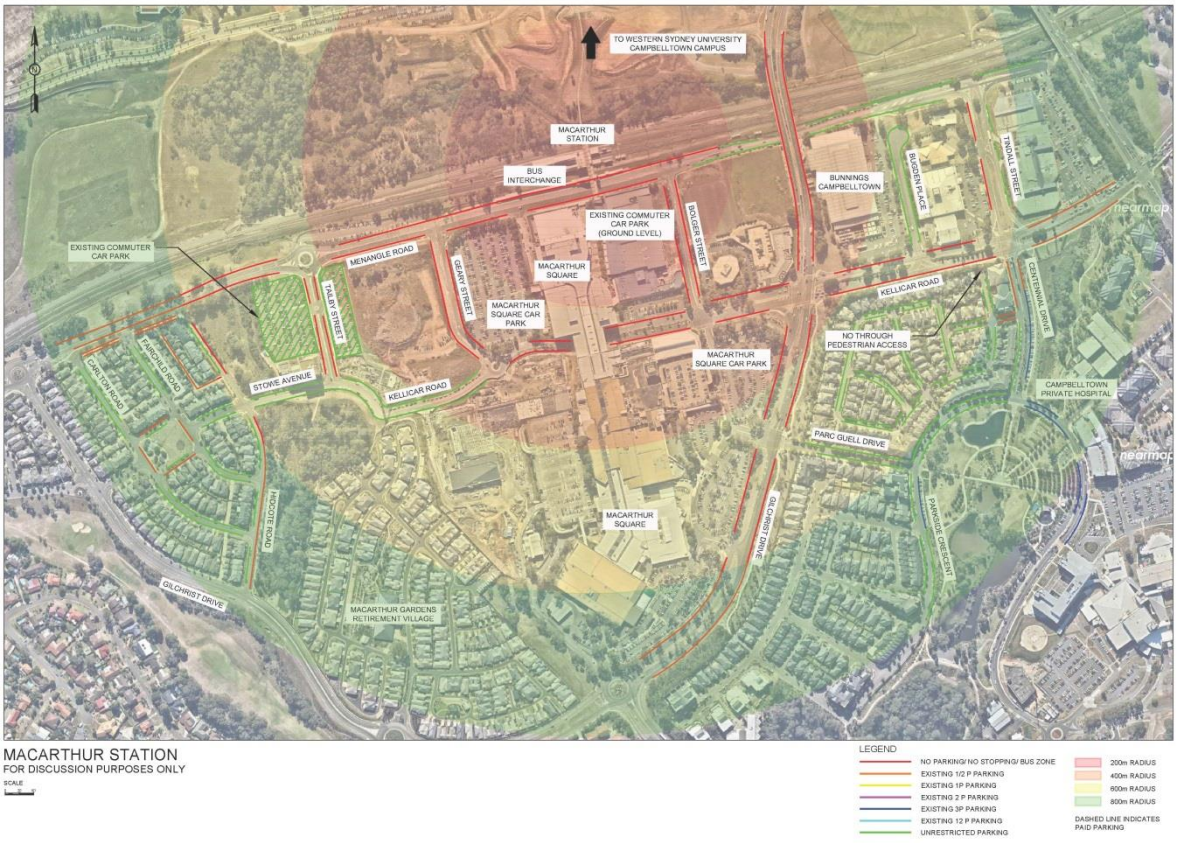

Figure D 4: Macarthur (Campbelltown) – on-street parking analysis

Station & type	0–200m	200–400m	400m+	Notes
Leppington New	No Parking	No Parking, Unrestricted	No Parking, Unrestricted	Local road network extremely limited

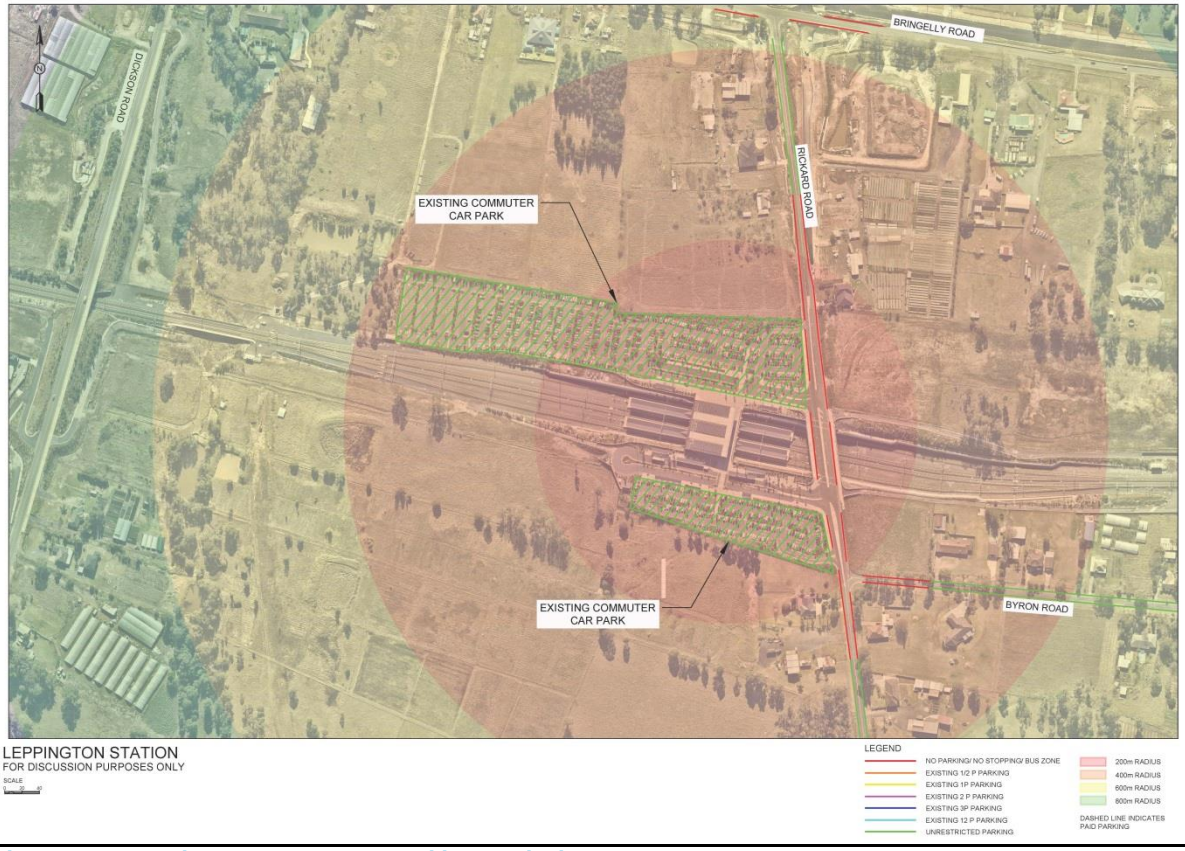

Figure D 5: Leppington – on-street parking analysis

More fine-grain analysis was undertaken at Norbrik T-Way stop in Glenwood, given the more specific local changes applied. This was particularly relevant given parking pressures that have emerged over the last five years, as a result of increased patronage on the Northwest T-Way.

Station & type	0–200m	200–400m	400m+	Notes
Norbrik (Glenwood) Local	4P Parking, Unrestricted	4P Parking, Unrestricted	Unrestricted	

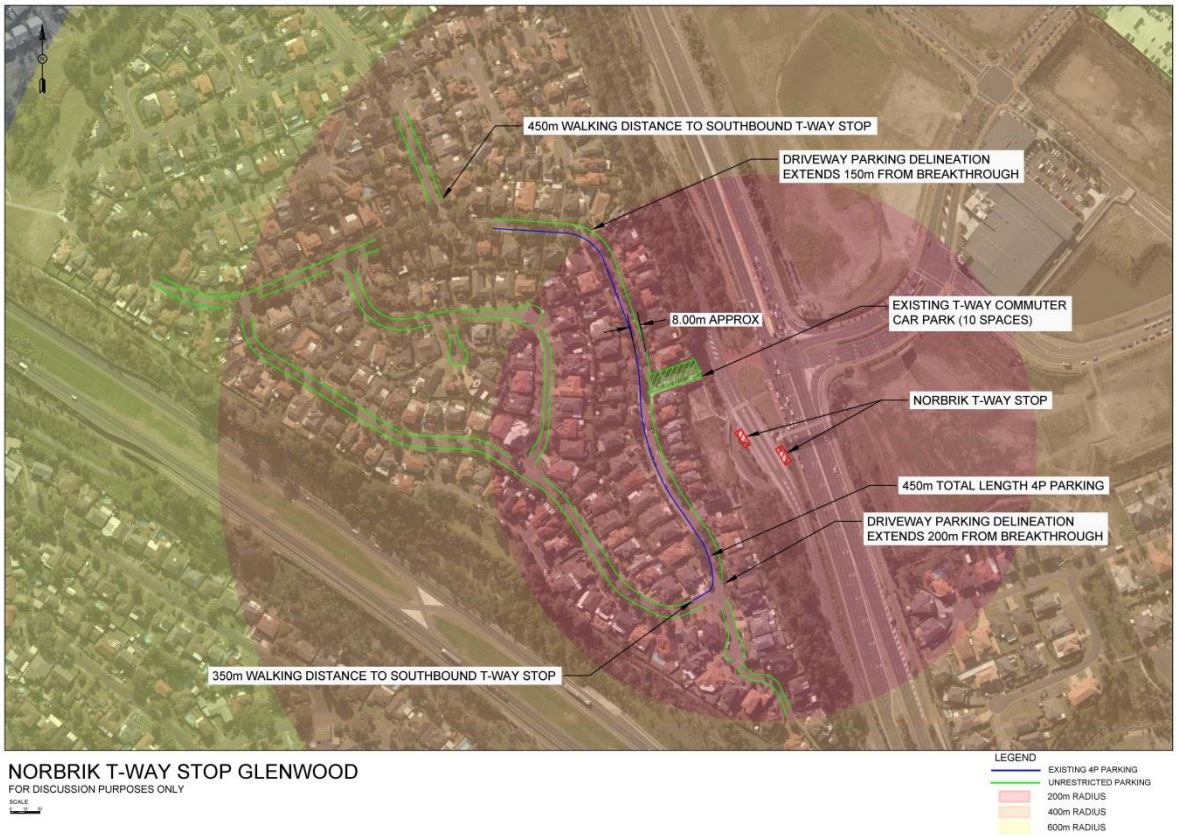

Figure D 6: Norbrik T-Way stop – on-street parking analysis

The following are key takeaway points for the case studies mentioned above:

- Parking management measures are generally implemented around stations by radial distance, impacted by walking access – this is further referred to as the **concentric principle.**
- Parking management measures, particularly timing restrictions, were much more fine-grained in centres with multiple and higher-intensity uses
- Narrower streets in close proximity to stations, particularly residential, were almost universally time-restricted to limit all-day parking – particularly for weekdays – although parking was not removed entirely.
- There were no instances of resident parking schemes driven entirely by their proximity to the station. Where existing, other uses such as hospitals and/or universities further intensified parking and thus complemented this requirement.
- Paid parking schemes were in existence, but were primarily oriented towards town centre or business park uses.

The analysis looking at overall parking management was supplemented with detailed studies of areas that would normally have unrestricted parking in principle, but where parking is still restricted due to widths of roads or other spatial requirements.

The **concentric principle** outlined above is clearly demonstrable at the stations reviewed. At Glenfield, for example, parking management has been applied by Campbelltown City Council

by radial distance from the station and adjacent town centre. Glenfield was specifically chosen for further study as it:

- has established parking management implemented by Campbelltown City Council
- has a mix of land uses and street types/widths without a significant single competing parking generator (a hospital or university)
- very closely adheres to the concentric principles
- has a large commuter car that is separated from one side of the station by major infrastructure
- has a road network which strongly influences car access patterns to the station.

Analysis of Glenfield clearly demonstrates the concentric principles in action – parking conditions are more intense and restricted the closer one is to the station and shops. This assessment is included in Figure D 7 and Table D 2 below.

Figure D 7: Trafalgar Street, Glenfield – parking management

Street	Width (m)	Parking – northbound	Parking – southbound
Glenfield – west of English	12.5	Time restrictions	Time restrictions
Glenfield – east of English	12.5	Unrestricted	Unrestricted
Kennet Place	7.5	Time restrictions	Time restrictions
Waterloo Place	7.5	Time restrictions	Time restrictions
Baldwin Avenue	6	Unrestricted	No Stopping
English Street	7.5	Unrestricted	Unrestricted
Stirling Place	7.5	Unrestricted	Unrestricted

Table D 2: Streets, widths and parking restrictions in Glenfield

Detailed analysis was also undertaken around Holsworthy Station (see Figure D 8 and Figure D 9 below), which revealed a variety of parking management measures to deal with both proximity to the station and narrow road widths as a result of urban development. Streets

impacted are located in the suburbs of Holsworthy and Wattle Grove. Holsworthy was identified as a suitable case study as it:

- has established parking management, implemented by Liverpool City Council
- is a relatively new railway station in close proximity to a prior, existing urban environment designed around the car and car-only access
- closely adheres to the concentric principle
- has a lot of physical street characteristics (roll-kerbs, narrow road widths, circuitous streets, indirect road access and so on) similar to those in the North West region, as it was developed around the same time.

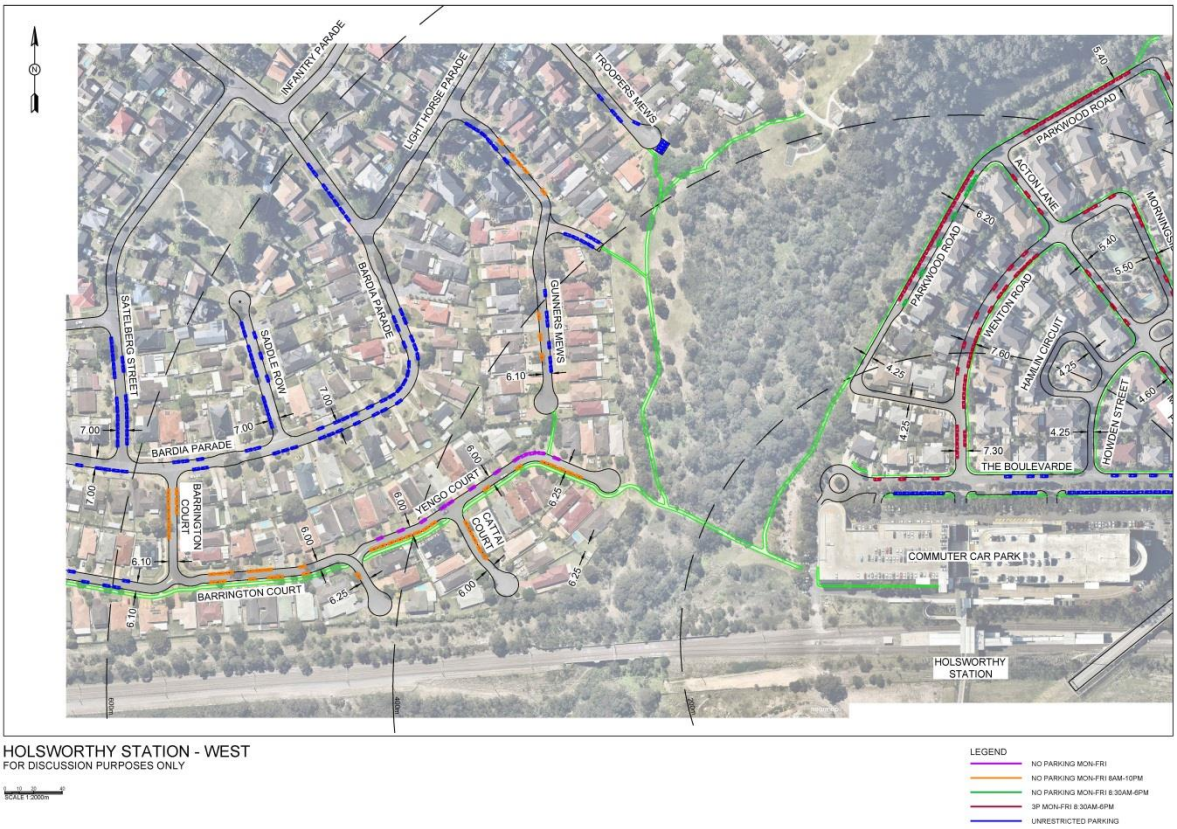

Figure D 8: Holsworthy on-street assessment (2017–West)

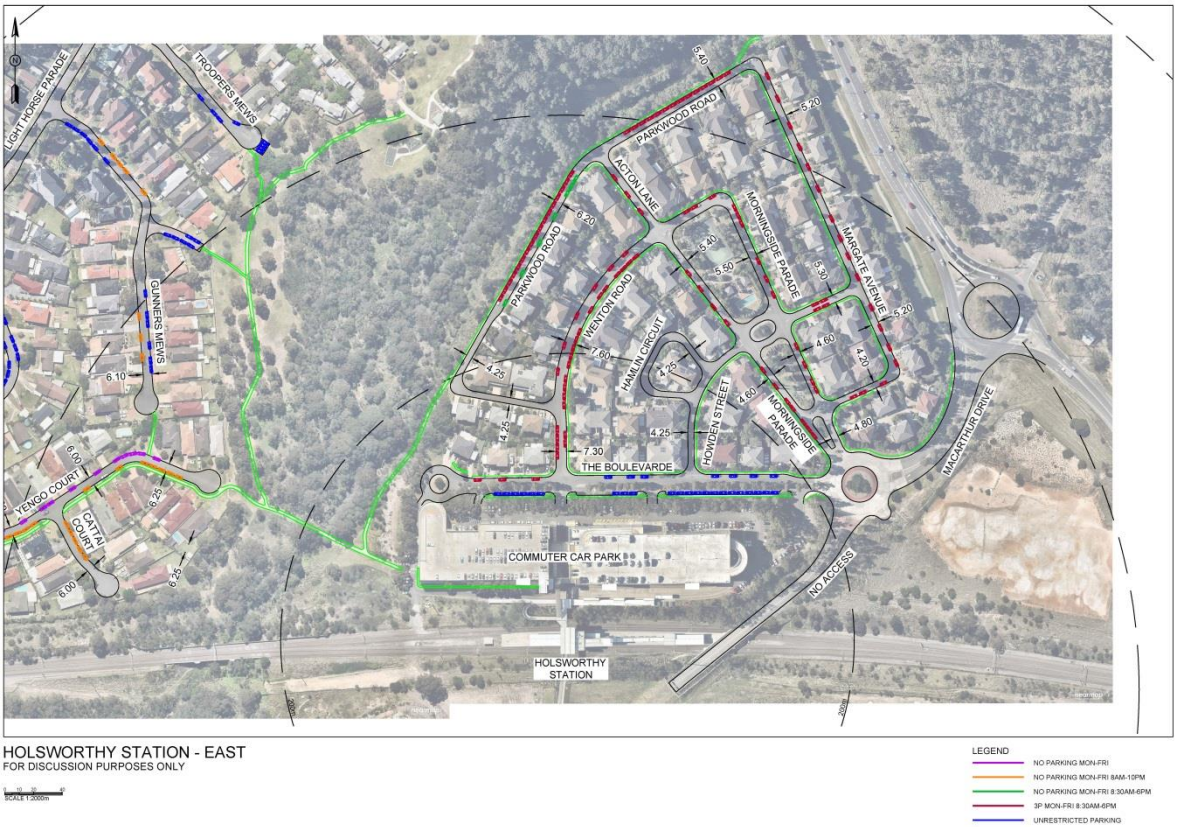

Figure D 9: Holsworthy on-street assessment (2017–East)

This allowed consideration of parking restrictions and how they were enforced, along with assessment of widths of these particular streets and when restrictions applied. These are summarised in Table D 3 below.

Street	Width (m)	Parking – northbound	Parking – southbound	Notes
Wenton Road	7.6	Restricted – weekday	Restricted – weekday	
Parkwood Road South	6.2	Restricted – weekday	No Parking – weekday	
Parkwood Road North	5.4	Restricted – weekday	No Parking	
Acton Lane	5.4	Restricted – weekday	No Parking	
Mornington Parade – north west	5.4	Restricted – weekday	No Parking	Only one-way traffic. Northbound and southbound assume two-way traffic
Mornington Parade – north east	5.5	No Parking	Restricted – weekday	Only one-way traffic. Northbound and southbound assume two-way traffic
Mornington Parade – south west	4.6	No Parking	Restricted – weekday	Only one-way traffic. Northbound and southbound assume two-way traffic
Mornington Parade – south east	4.6	Restricted – weekday	No Parking	Only one-way traffic. Northbound and southbound assume two-way traffic
Margate Avenue	5.2	No Parking	Restricted – weekday	

Street	Width (m)	Parking – northbound	Parking – southbound	Notes
Howden Street	4.25	No Parking	No Parking	
Yengo Court	6	No Parking – weekday	No Parking – weekday	
Cattai Court	6	No Parking – weekday	No Parking – weekday	
Barrington Court – North	6.1	No Parking – weekday	No Parking – weekday	
Barrington Court – South	6	No Parking – weekday	No Parking – weekday	
Bardia Parade	7	Unrestricted	Unrestricted	
Saddle Row	7	Unrestricted	Unrestricted	
Satelberg Street	7	Unrestricted	Unrestricted	
Gunners Mews	6.1	No Parking – weekday	Unrestricted	

Table D 3: Street widths and associated restrictions in Holsworthy

In the case of streets around Holsworthy Station, the following was discerned:

- Despite having one of the largest commuter carparks on the network, Holsworthy Station generates higher commuter car parking demand than it accommodates in the existing carparks
- Liverpool City Council has responded to resident concerns over Wattle Grove's very narrow roadways with the aim of minimising any safety or access concerns, rather than simply limiting on-street parking
- Although conducted on streets in a newer (post-station) development, commuter parking is restricted on streets in the area immediately north of the station; this reflects an intentional desire to limit parking in this area
- Between 200–600 metres from the station, streets of less than seven metres wide almost universally have some form of parking restriction during higher commuter demand periods.