



**ELLENBROOK PARKING STRATEGY
UPDATE**
2022 REVIEW

27 July 2022

Prepared for:
Ellenbrook Mgt Pty Ltd

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ELLENBROOK PARKING STRATEGY UPDATE

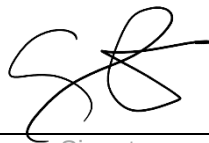
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ELLENBROOK PARKING STRATEGY UPDATE

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1 Introduction

This Review of the Ellenbrook Town Centre (ETC) Parking Strategy has been commissioned by Ellenbrook Mgt Pty Ltd in consultation with Hatch Roberts Day, City of Swan, the Public Transport Authority (PTA) and the Department of Planning, Lands and Heritage (DPLH).

This work builds upon the previous Strategy and Review undertaken by SKM in 2009 and 2014, respectively. The background of development and planning documentation which supports the ETC Parking Strategy is summarised in the Literature Review, presented as Appendix A of this report.

Since the last Review in 2014, there have been a number of changes that have triggered the need to undertake a further re-evaluation of the Strategy. These include:

1. The ongoing growth of the ETC and the maturation of the surrounding residential precincts
2. Refinement of the development yield and anticipated parking provision within the ETC
3. Updates to public transport planning, including the proposed introduction of the Ellenbrook Station, changes to access arrangements and inclusion of park and ride facilities.
4. Recent modifications to Planning Regulations which affect the application of cash-in-lieu policy.

1.1 Process

This ETC strategy review has incorporated the following key steps:

1. A comprehensive literature review to verify the intent of the ETC Parking Strategy and compare this to current Local and State Government planning frameworks
2. A review of the existing and planned development of the ETC
5. A detailed supply and demand assessment of the existing ETC car parking
6. A parking demand forecast, accommodating the impacts of mode shift, shared and reciprocal parking, and park and ride requirements at a fine-grained level.
7. Industry research into parking and transport trends
8. Recommendations for parking management across the public and private structure
9. Alignment of the existing cash-in-lieu mechanism with modified Planning Regulations

The parking supply and demand assessment of the ETC was informed by a review of the existing and projected Town Centre development, which formed the basis for a detailed model of ETC parking utilisation. The model results provide an indication of hourly parking demand across a typical weekday and weekend.



The requirements for parking determined through this model have been compared against the existing and proposed parking supply to establish a likely parking environment for the buildout horizon of the ETC. The parking principles and strategies established through the ETC Parking Strategy in 2009 and 2014 have been reviewed and updated to reflect the current context for transport in Perth.

These strategies also take into account the parking requirements and the provisions of State Planning Policy (SPP) 4.2 – Activity Centres for Perth and Peel, additional guidance provided by the Department of Transport (DoT) Parking Guidelines for Activity Centres and Parking Guidelines for Large Shopping Centres.

Current ETC Parking Strategy rates were compared against the baseline demand and supply rates identified from these sources to determine whether the projected supply would be sufficient to fulfil the agreed objectives.

1.2 Report structure

This report is structured in the following manner:

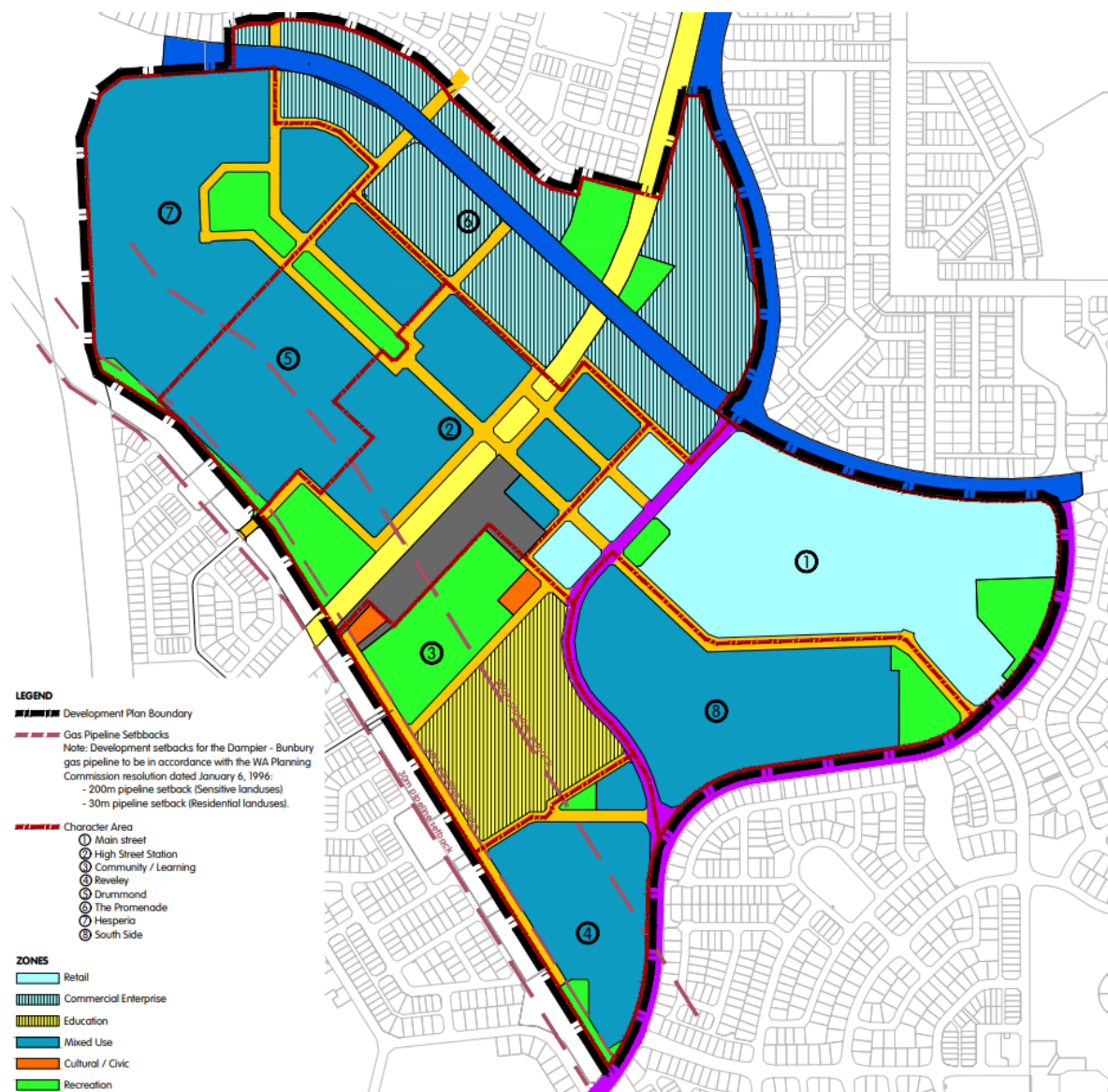
1. Introduction
2. ETC development (existing and future)
3. Current parking supply and demand
4. Future parking supply and demand
5. Town Centre parking principles
6. Parking strategies for the ETC
7. Parking rates for non-residential land uses
8. Parking rates for residential land uses
9. Cash-in-lieu policy
10. Management of public parking
11. Ellenbrook Town Centre parking policy summary

2 ETC development

2.1 Definition of the ETC

For the purposes of this report the ETC is as shown in Figure 1, broken down into seven different precincts based upon their corresponding land use.

Figure 1: ETC Zoning



2.2 Existing (2022) development

Existing land uses within the ETC were estimated via a combination of available aerial (April 2022) and street level imagery (between April 2018 and July 2020), with details provided in Table 1 below.

Table 1: ETC major land uses in June 2022

Land Use	Food & Beverage	Office / Commercial	Rec / Gym	Retail	Medical / Veterinary	High School	Childcare	Residential
1	2,200 seats	2,100 sq.m	400 sq.m	42,000 sq.m	3,000 sq.m			
2		800 sq.m		200 sq.m	1,200 sq.m			
3			700 sq.m			1,350 students		
4								85 single dwellings
5								65 single dwellings
6	200 seats	36,200 sq.m	1,800 sq.m	10,000 sq.m	200 sq.m		160 places	65 single dwellings
7		300 sq.m		700 sq.m			100 places	160 single dwellings
8			300 sq.m					185 retirement 120 aged care 135 apartments
Total	2,400 seats	39,400 sq.m	3,200 sq.m	52,900 sq.m	4,400 sq.m	1,350 students	260 places	560 single dwellings 135 apartments 120 aged care

* all floor areas counted as GFA and factored to NLA

2.3 Build-out snapshot

An estimate of the ultimate development within the ETC is detailed in Table 2. This assessment uses different categories for land use to better assess the parking requirement of the ultimate development.

For the purposes of this Strategy the land use floor spaces are measured on Net Lettable Area (NLA) as defined in Local Planning Scheme No. 17.

Table 2: ETC total build out

Land Use	Food & Beverage	Office / Service Commercial	Rec / Gym	Retail	Medical / Veterinary	High School	Childcare	Residential
Existing	2,400 seats	39,400 sq.m	3,200 sq.m	52,900 sq.m	4,400 sq.m	1,350 students	260 places	135 apartments 535 dwellings 120 aged care
Future	1,100 seats	30,700 sq.m	1,100 sq.m	18,950 sq.m	TBD	-	TBD	560 apartments 520 dwellings
Total	3,500 seats	70,100 sq.m	4,300 sq.m	71,850 sq.m	4,400 sq.m	1,350 students	260 places	1750 dwellings 120 aged care

The majority of the undeveloped land in the ETC is located in the 'High Street Station' precinct adjacent to the new Ellenbrook Station and residential land to the north-west. In addition to these lots, further service retail / commercial development is expected within 'The Promenade' precinct.

A projection for development within the High Street Station Precinct has been prepared by Hatch Roberts Day, and described in the following Figure 2.

Figure 2: ETC Land Uses



It is estimated that non-residential uses in the ETC are approximately 70% developed (as of June 2022), with approximately 50% of the housing development completed. This represents a substantial growth since the previous Parking Review in 2014, at which time only 36% of the projected development yield had been realised.

3 Current parking supply and demand

3.1 Parking supply

Hatch Roberts Day and Stantec have undertaken a numerical survey of current (2022) car parking supply across the ETC. This includes public and private, on-street and off-street parking, listed in Table 3 as follows:

Table 3: ETC parking supply in June 2022

Type	Total
Public Off-Street	244
Public On-Street (marked)	997
Public On-Street (unmarked)	182
Publicly Accessible Off-Street	5,035
Private Off-Street	372
Total	6,830

The parking supply has also increased significantly since the 2014 Parking Review. Previous manual counts of on-street and off-street parking identified 3,256 off-street spaces and 434 on-street spaces.

3.2 Parking demand

Stantec has undertaken a parking demand analysis for the entire ETC, based on best-practice techniques and including consideration of land use, temporal parking profiles and internal trip capture synergies. This parking demand analysis uses an understanding of existing land uses and typical parking behaviour to build a representative 'snapshot' of existing parking demand.

This base model is important, as it provides context for required changes in parking provision, supply restriction, pricing and demand management measures.

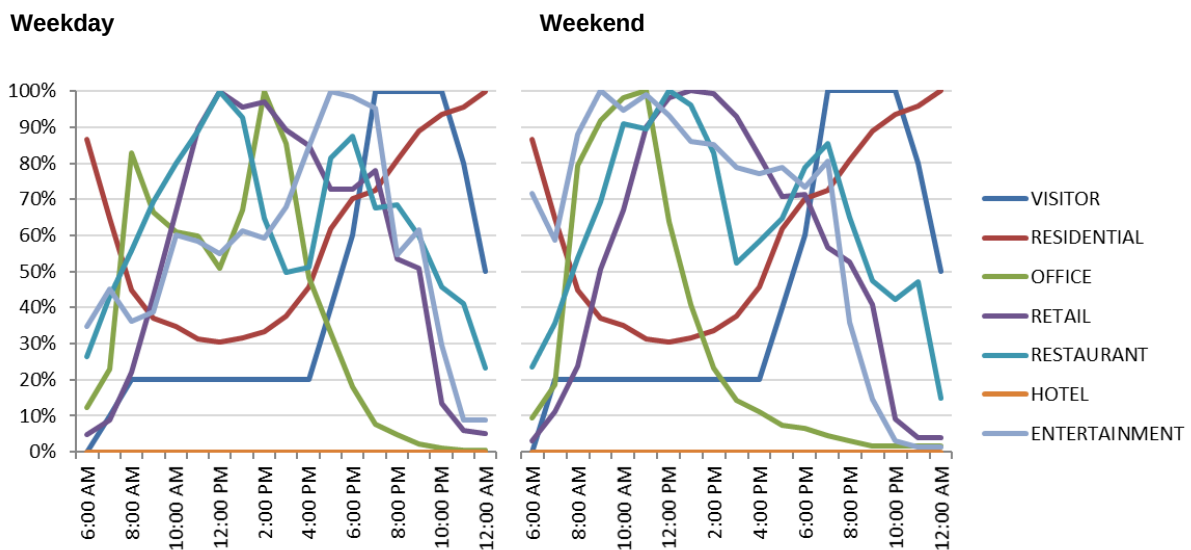
The ETC has been assessed as a whole, reflecting the assignment of parking generally as public or publicly accessible. Development has been disaggregated into separate land use designations according to the *Parking Generation 4th Edition* (ITE) and *Shared Parking* guides (ULI). Peak parking demands were extracted from these documents, for the most applicable category.

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3 Current parking supply and demand

The calculated profile for demand for each land use category is provided below in Figure 3.

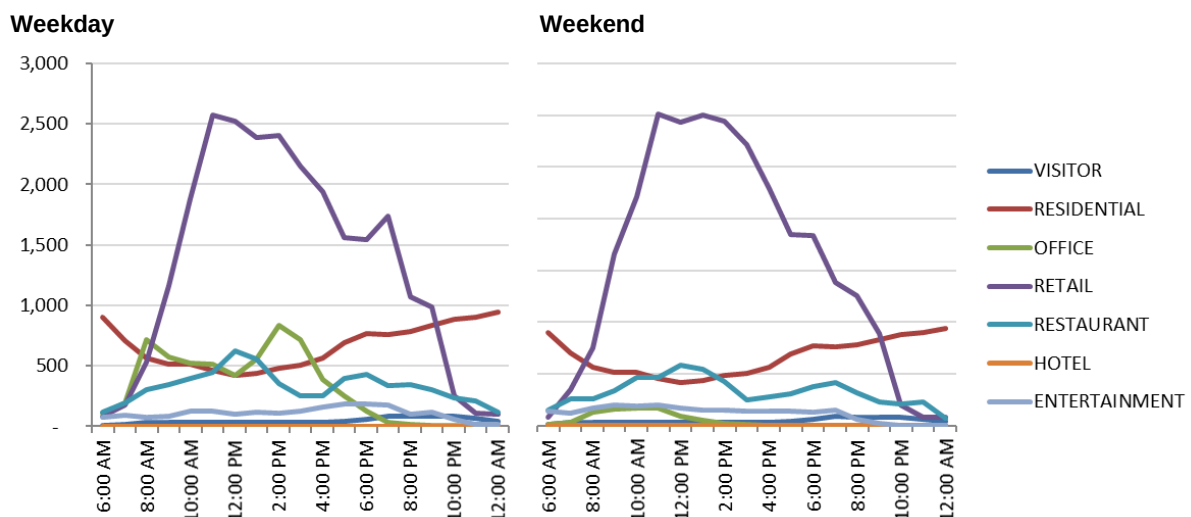
Figure 3: Parking demand profile by land use category – existing (2022)



Parking generation by land uses within the Study Area is heavily affected by mode share. ABS Census data from 2016 shows journey-to-work mode share is approximately 84% for destination trips to Ellenbrook (ABS Census 2016). This is generally consistent with other outer-suburban centres but can be expected to improve as the ETC is built-out and following Station construction.

The basic assessment for shared parking assumes that all bays are available for all uses. This is a simplification of the actual operation of on-site parking but provides an idealized benchmark for further analysis. There is also a significant change in parking behaviour between weekdays and weekends, requiring two related but separate parking demand assessments. The results of this analysis are shown below in Figure 4, describing theoretical parking demand profiles by land use across the day (6am-midnight).

Figure 4: Estimated parking demand by land use category - existing (2022)



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3 Current parking supply and demand

The modelled parking demand for the entire ETC area is described in the following, Figure 5.

Figure 5: Total estimated parking demand – existing (2022)



The model outputs show total demand including residential and exclusive private parking, resulting in a theoretical demand for public / publicly accessible parking of approximately 3,500 spaces.

Previous surveys conducted as part of the 2014 Parking Review identified a very low utilisation rate for parking, with a maximum demand in the order of 45% of total supply during the Saturday midday peak. This occupancy rate was significantly lower than anticipated based on the development yield.

This discrepancy was attributed to the fact that *“The ETC ha[d] yet to reach maturity in a development sense and this could account for some of the low parking utilisation as land uses are not yet operating at their full potential.”* (2014 Parking Review)

It is likely that the 2022 assessment may similarly overestimate the parking demand for the existing land uses, but further infill development, in addition to ongoing suburban residential growth in the surrounding catchment, can be expected to result in activity in-line with national benchmarks.

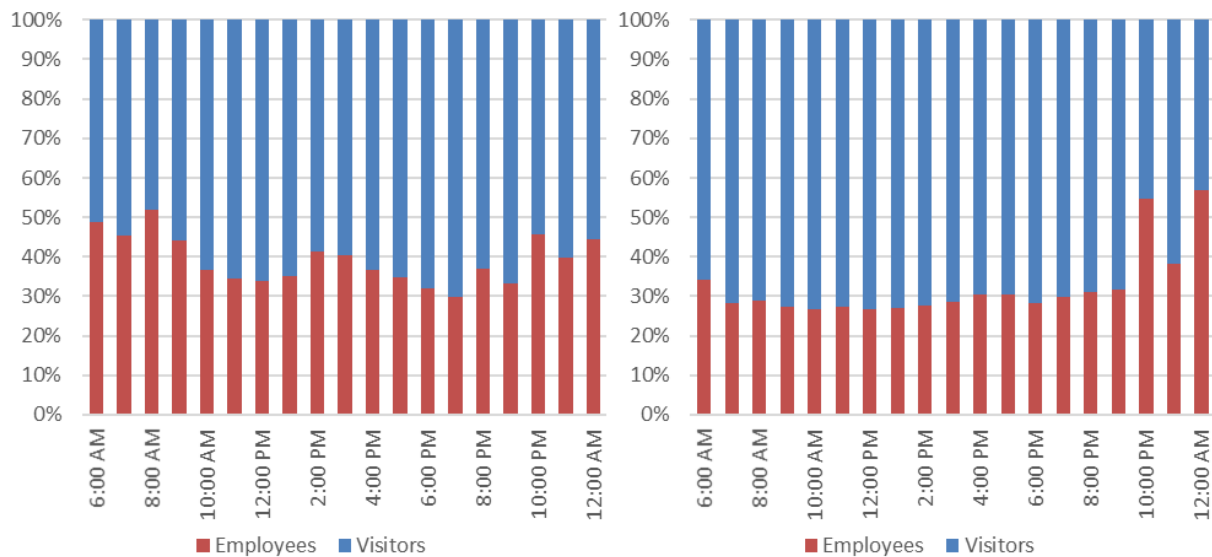
Of the existing parking demand, approximately 30-35% can be attributed to employees, as shown in the following modelled outputs (Figure 6).



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4 Future parking supply and demand

Figure 6: Estimated employee / visitor parking proportions – existing (2022)



This information can be used to assist in determining the appropriate management regime for public parking facilities.

4 Future parking supply and demand

4.1 Previous demand assessment

The 2014 Parking Strategy Review recommended the non-residential parking supply shown in Table 4 for the associated build-out horizon.

Table 4: 2014 Parking Strategy Review rates and supply table

Land Use	Unit	Desirable Parking Rate (No. of bays per 100sqm of NLA)	Recommended Parking Supply (Bays)
Retail	50,000m ²	4.3	2,150
Bulk Retail / Service Commercial	94,361m ²	2.2	2,359
Education / Recreation / Other	1 High School		500
Non-Retail / Mixed Use	40,000m ²	2.0	944
Non-Residential Parking Supply			5,953

These rates are generally appropriate for their respective land uses, but suffer from the lack of definition in forward projections.

For example, food & beverage uses tend to be aggregated with non-retail / mixed-use when considered at a high level, despite their categorisation as 'Retail' under the Parking Strategy.



Since 2014, the ETC has grown substantially, and land use projections for the remaining development areas have been progressed to a much higher level of detail. As a result, a finer-grained analysis of future parking demand can be completed, in line with the modelling methodology deployed for the existing (2022) horizon (Section 3.2).

4.2 Parking demand

The ultimate build-out of the ETC will create a dense mixed-use environment anchored by a high-quality public transport. However, it is expected that the need for parking to support access by car will continue for many years to come.

The ETC functions as a key destination for a large suburban and ex-urban catchment that includes not only the balance of Ellenbrook, but also emerging development through the Urban Growth Corridor and Bullsbrook areas. These areas are not anticipated to transition to alternative transport modes en masse, though progressive improvements to active transport infrastructure and bus routes will provide alternatives to private vehicle transport.

The 2014 Parking Strategy projected a future mode share for travel to/from and within the ETC including:

- Car driver: 50%
- Car passenger: 18%
- Walking: 14%
- Public Transport 10%
- Cycling 6%
- Motor Cycling (other) 2%

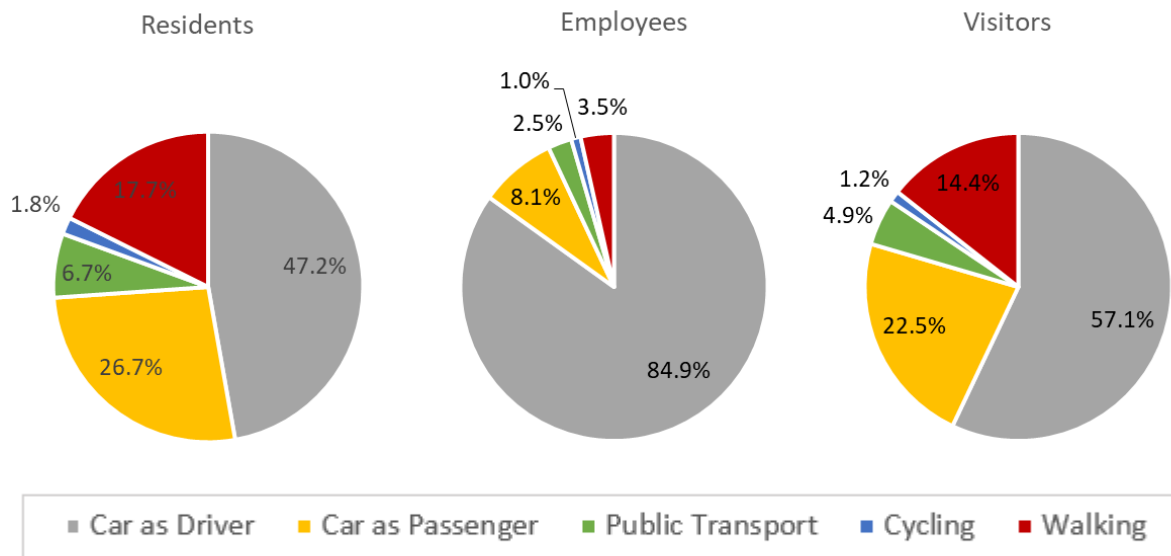
Based on these mode shares, it was estimated there could be about 30,000 car driver trips per day to, from and within the ETC, plus 3,500 bicycle trips and 1,000 motorcycle trips each day.

This mode share estimate includes all trip purposes, and was not differentiated between employees, residents and visitors. Using standard trip proportions, and based on existing land uses and ABS census data, an estimate of current mode shares has been modelled as follows (Figure 7).

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4 Future parking supply and demand

Figure 7: Estimated transport mode shares by trip purpose – existing (2022)



The proportional split between these groups will vary across the day, but an average within the ETC might be:

- Visitors: 50% of trips
- Employees: 25% of trips
- Residents: 25% of trips

The above split would represent the following existing mode shares across all trips to/from the ETC.

- Car driver: 62%
- Car passenger: 20%
- Walking: 12%
- Public Transport 5%
- Cycling 1%

This suggests that the target expressed in the 2014 Parking Strategy is not substantially beyond the current behaviour. The largest mode shifts appear to be from private vehicle to public transport (which will follow the Station development project) and to cycling (which will be supported by residential density within the ETC).

It is important to note that for the purpose of determining parking supply, destination trips to the ETC include only employees and visitors, not residents.

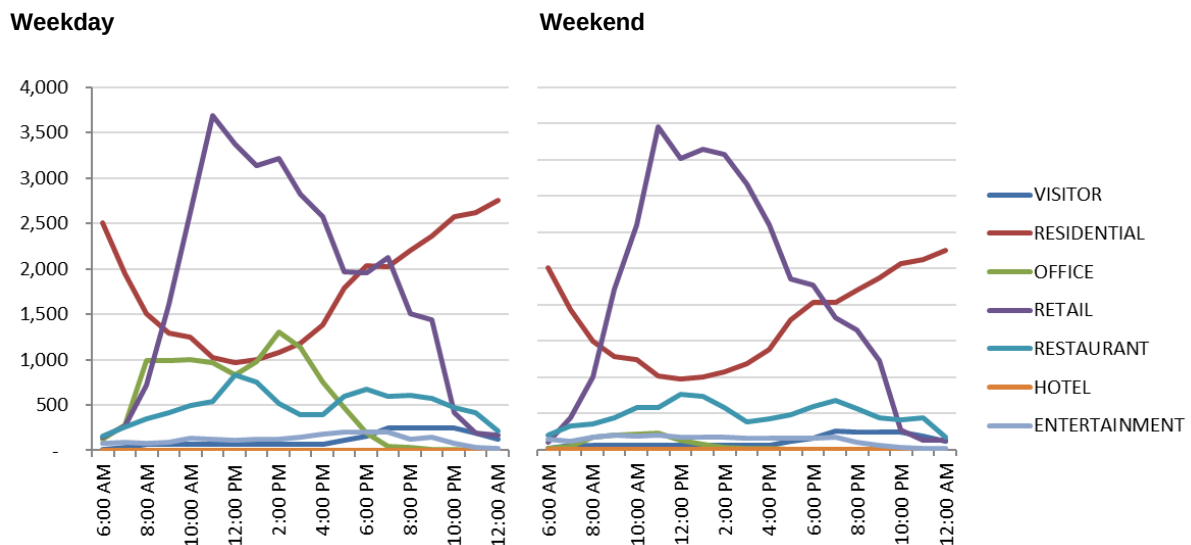
A model for ETC parking demand has been developed based on the full build-out projection described in Section 0, based on business-as-usual suburban mode shares (results shown in Figure 8 below).



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4 Future parking supply and demand

Figure 8: Estimated parking demand by land use category – full build-out horizon



There is significant growth across all land use categories, but particularly in the retail space. This will be accompanied by a general uplift in parking demand. However, the increase in activity will be offset by the intensification of employee and residents within the ETC core, which will result in more internal trips and a reduced need for parking.

The benefit of mixed-use synergies on parking demand is also estimated within the parking model, as described in the following Table 5.

Table 5: Estimated internal trip capture percentage

Period	Internal Trip Capture
AM Peak	24%
PM Peak	31%
Average Daily	24%
Weekend Peak	16%
Average Weekend	22%

These percentages represent trips between origin-destination pairs that occur within the ETC. Given the scale of the broader Development Plan Area, some of these will still generate vehicular trips, but there is a much greater opportunity for trips to be completed on foot or by other sustainable transport modes under a 'park once' model.

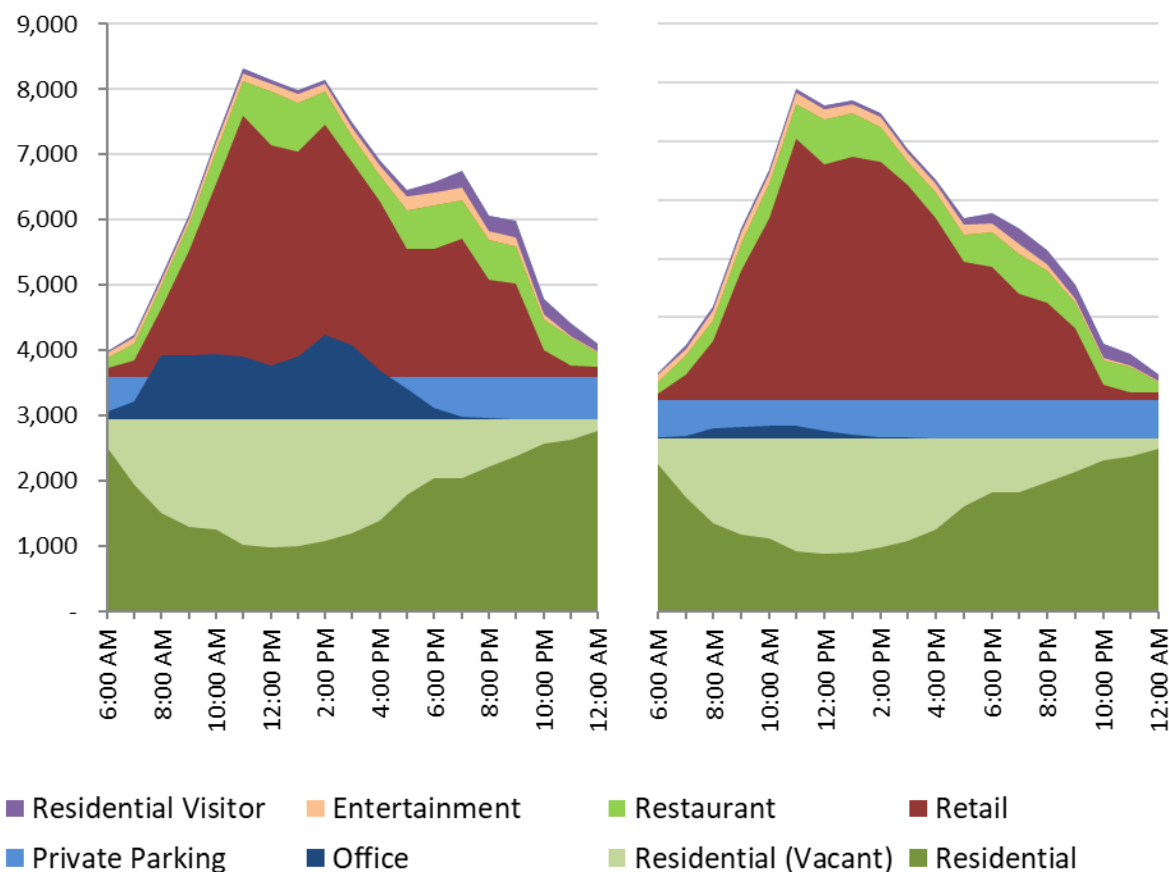
The total projected parking demand for the development horizon is provided in Figure 9 below.



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4 Future parking supply and demand

Figure 9: Total estimated parking demand – full build-out horizon



This projection comprises a business-as-usual approach to mode choice, but assumes that walking trips are viable between all internal uses. The model also establishes an upper bound for parking demand that ignores the impact of internal trip catchment effects. For the full build-out horizon, this upper bound is approximately 6,500-6,700 parking spaces.

While car parking provided in 'The Promenade' Precinct and intended for big-box retail development is unlikely to be used effectively by mixed use development in the 'South Side' precinct, the prevalence of public and publicly accessible parking allows for the ETC supply to be used efficiently across a wide range of uses. This is a key component of the Parking Strategy established for the ETC.

Nevertheless, parking cannot operate at 100% utilisation. Industry benchmarks establish an 'ideal' peak parking occupancy at 85-90% of supply. Applying this metric across the ETC structure results in an estimated requirement for non-residential parking of between 6,300 and 7,400 bays.

In addition to this, the impacts of commuter park and ride need to be considered. The Ellenbrook Station Access Strategy projects a commuter park and ride proportion of only 14%, with a requirement for 457 car parking bays. The Ellenbrook Station project proposes to construct 502 parking spaces to accommodate this demand.



However, the Station Access Strategy presumes that parking constraint will induce mode shift to alternative modes, rather than utilising informal and public parking. The *demand* for parking in the vicinity of the Station is therefore likely to exceed the projections from the Access Strategy.

4.3 Parking supply

Detailed parking demand modelling indicates that the proposed ETC at full build-out can be expected to consume up to 6,600 parking spaces, with approximately 7,400 bays required to facilitate an effective and efficient parking system. In addition, 500 commuter park and ride bays have been proposed to accommodate the direct needs of the Ellenbrook Station.

Current parking constructed and planned for the ETC has been captured by Hatch Roberts Day in the Parking Study Plan (Figure 10, overleaf). Additional provision for parking has been estimated for the balance of lots within the 'High Street Station' and 'The Promenade' to establish the ultimate supply across the ETC. This accounts for approximately 820 bays associated with big box service retail, and 520 bays located on-site within mixed-use development.

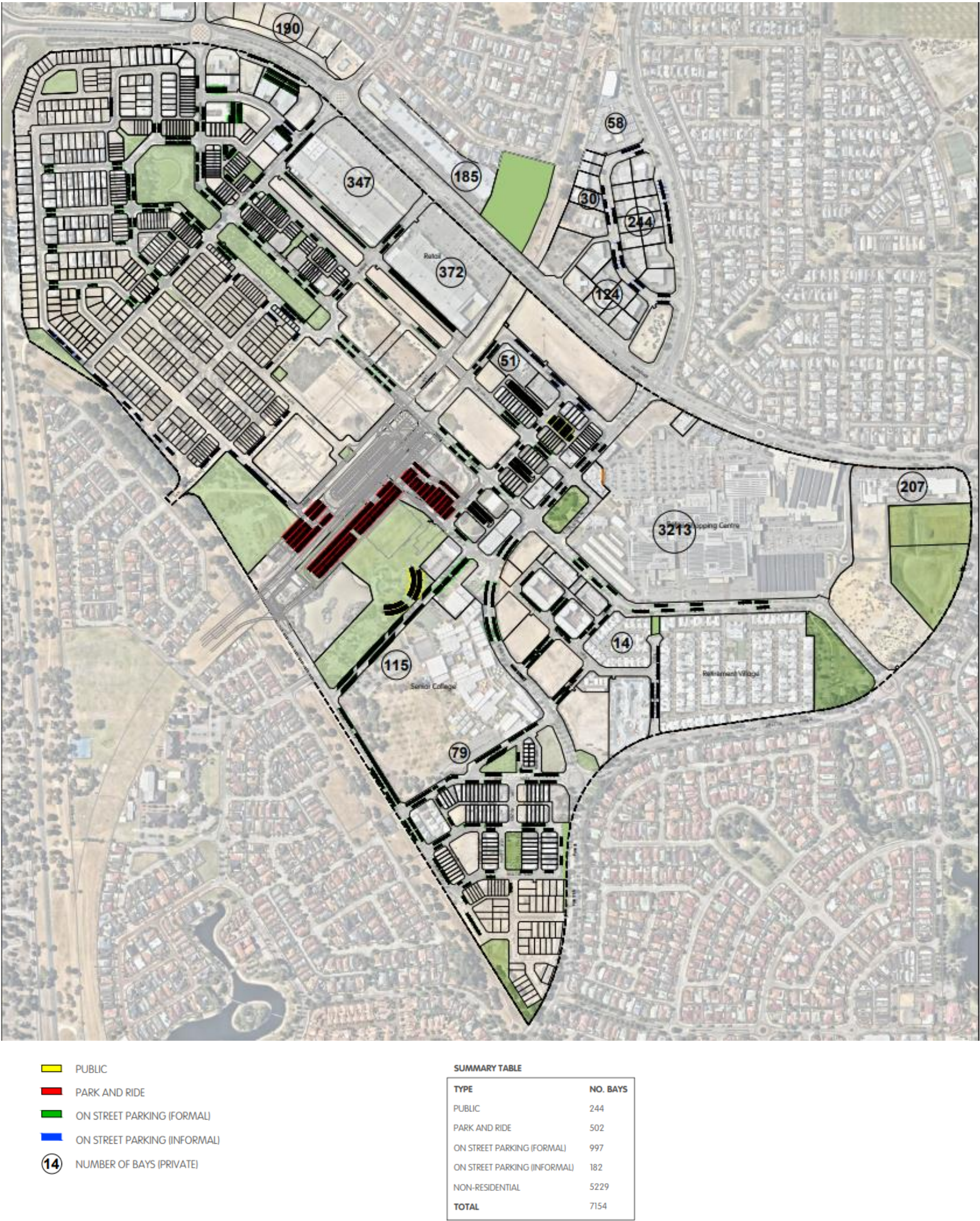
Ultimately, the expected parking supply is projected to be approximately as follows (Table 6).

Table 6: ETC parking supply at full build-out

Type	Total
Public Off-Street	250
Public On-Street (marked)	1000
Public On-Street (unmarked)	200
Publicly Accessible Off-Street	6,100
Private Off-Street	600
Commuter Park and Ride	500
Total	8,650

This is generally consistent with the projections from the 2014 Parking Strategy (with the addition of Station park and Ride), and is considered to be sufficient to accommodate the needs of the ETC through to the development horizon.

Figure 10: Parking study plan



5 Town centre parking principles

State Planning Policy (SPP) 4.2 – Activity centres for Perth and Peel was gazetted on the 31st of August 2010. It sets out a number of key policy objectives (shown below).

4. POLICY OBJECTIVES

Activity Centre Hierarchy	1. Distribute activity centres to meet different levels of community need and enable employment, goods and services to be accessed efficiently and equitably by the community.
	2. Apply the activity centre hierarchy as part of a long-term and integrated approach by public authorities and private stakeholders to the development of economic and social infrastructure.
Activity	3. Plan activity centres to support a wide range of retail and commercial premises and promote a competitive retail and commercial market.
	4. Increase the range of employment in activity centres and contribute to the achievement of sub-regional employment self-sufficiency targets.
	5. Increase the density and diversity of housing in and around activity centres ² to improve land efficiency, housing variety and support centre facilities.
Movement	6. Ensure activity centres provide sufficient development intensity and land use mix to support <i>high-frequency</i> public transport.
	7. Maximise access to activity centres by walking, cycling and public transport while reducing private car trips.
Urban Form	8. Plan activity centre development around a legible street network and quality public spaces. ³
Out-of-centre development	9. Concentrate activities, particularly those that generate high numbers of trips, within activity centres.

Source: State Planning Policy 4.2 – Activity Centres for Perth and Peel

A series of Parking Principles have been developed to support the objectives of SPP 4.2, and to create a town centre that is “a place for people”, has great amenity, is commercially vibrant, and is easily accessible and environmentally sustainable.

These Principles are intended to deliver parking that is sufficient to support the economic development of the ETC, while encouraging the use of public transport, walking and cycling.

5.1 Parking Principle 1

The amount and type of parking provided should support the town centre vision and broader transport and planning policies;

- Set appropriate minimum and maximum levels of parking for different uses
- Maximise shared/public parking
- Use time-based parking and pricing to ensure efficient turnover of spaces

5.2 Parking Principle 2

The amount and location of parking should assist in reducing impacts on people travelling to/from/within the centre;



- Parking policy should support use of more efficient and sustainable transport modes
- Locate parking to balance convenience for users with pedestrian amenity in the centre
- Provide bicycle, motorcycle and scooter parking as well as car parking
- The location and design of car parks should contribute to a safe, high quality pedestrian access experience, both on-street and within the car parks

5.3 Parking Principle 3

Maximise resource efficiency and the value of parking;

- Excessive parking has space and design implications that can restrict development and add cost
- The value of car parking bays decreases rapidly as number of bays approaches or exceeds peak demand
- *Limit the impact of informal commuter parking demand outside of designated park and ride facilities*

5.4 Parking Principle 4

Allocate on street space for car parking based on the following priorities;

1. Loading and servicing
2. Public transport stops/priority
3. Taxi stands
4. Bicycle/scooter/motorcycle parking
5. Short term car parking
6. Longer term car parking

5.5 Parking Principle 5

Visitors to the town centre should be provided with clear directions to available parking and between car parks and major activities and landmarks.

- Provide clear signage to parking stations
- Provide signage when car parks are full and provide signage to alternative available parking
- Provide way finding, signage at pedestrian exits from car parks to important destinations.



6 Parking strategies for the ETC

A series of parking strategies were presented in the Ellenbrook Parking Strategy to support the ETC parking policy and to assist in implementation. These strategies have been updated to reflect the changes to the policy environment and the maturity of development.

6.1 Parking Strategy 1

Establish minimum, desirable and maximum levels of parking for major town centre land uses;

- Desirable parking rates should be based on an understanding of the needs by employees and visitors to the ETC
- Incentivise a high degree of shared public and publicly accessible parking to maximise efficient supply
- Maximum levels provide a range of parking above the minimum.

6.2 Parking Strategy 2

Maximise the proportion of public/shared parking;

- Parking peaks occur at different times for different adjacent uses
- Shared parking for a variety of adjacent uses reduces the required parking supply and increases resource efficiency

6.3 Parking Strategy 3

Unbundle parking from sale of residential apartments;

- Residential apartments will have a mixture of one, two and three persons per apartment.
- Most apartment owners will have a need for one parking space, but some will have no cars and some may require two spaces
- People with no car should not be required to pay for a car space they will not use and occupiers with two cars should pay more
- Unbundling allows a pool of parking to be made available for the unit complex can be allocated based on owner/occupier need and demand



6.4 Parking Strategy 4

Position car parks to minimise impact on pedestrians;

- Where possible, limit access/egress to car parks from busy pedestrian streets
- Car parks on the periphery of the centre can channel pedestrian movement along town centre streets, activating these streets and increasing retail opportunities for small businesses

6.5 Parking Strategy 5

Sleeve car parks at ground level on town centre streets;

- Maintain active ground level uses along town centre streets
- Place car parking behind street frontages

6.6 Parking Strategy 6

Accept cash-in-lieu of parking where appropriate;

- In mixed use town centre areas, sometimes it is not practical to require parking on-site
- Cash-in-lieu provides options for different development types, particularly small developments
- Cash-in-lieu is a source of funding for transport infrastructure, including development of shared public car parks, management technology, wayfinding, shared paths, streetscape improvements and other local transport amenities

6.7 Parking Strategy 7

Manage town centre parking through price and time regulations;

- Time regulations encourage turnover of the most sought-after bays
- Differential pricing helps to free up space for customers
- A charge for parking assists in managing demand and encouraging greater use of walking, cycling and public transport
- Charging for parking will discourage inappropriate use of parking such as for park and ride in the ETC

6.8 Parking Strategy 8

Provide an efficient way finding system;

- Direct users to car parks and vacant bays
- Direct pedestrians from car parks to important town centre activities



6.9 Parking Strategy 9

Enforce parking regulations to benefit users and the community;

- Keep footpaths and bike paths clear
- Minimise illegal parking that is dangerous or causes congestion
- Reinforce the intent of the parking management system
- Use modern technology to enforce time stay and paid parking

6.10 Parking Strategy 10

Monitor potential overspill from control area;

- Resident parking areas may need to be implemented on periphery of paid parking area
- Paid parking area may need to be expanded with exemptions for residents

6.11 Parking Strategy 11

Implement parking strategy in stages;

- Implement controls when required to provide adequate, well located supply of parking
- Parking pricing should be on a demand responsive basis. In the early stages of development and near the periphery of the ETC, when supply exceeds demand, the appropriate price may be zero.



7 Parking rates for non-residential land uses

Land use parking rates are established to ensure that sufficient parking is available to facilitate the mobility needs of employees and visitors, and to maintain a sustainable economic base for the local economy.

These rates are based primarily on two factors:

- the intensity of use for a given unit area (i.e. the number of people a development is expected to accommodate), and
- the per-person parking requirement (informed by mode share and vehicle occupancy)

Each land use has a peak level of activity that is determined by its function, but the requirements for parking can be influenced by external and internal factors. For the purpose of this Review, land uses have been differentiated based on whether they are *employee-driven* or *visitor-driven*, as follows:

- Parking demand at **Employee-driven** land uses is influenced by proximity to public transport and provision of quality end-of-trip facilities
- Parking demand at **Visitor-driven** land uses is influenced by location within a dense urban community and opportunities for on-site mixed-use synergy

Examples of employee-driven land uses include offices and warehouses, while visitor-driven land uses include medical centres, restaurants, shops and places of assembly.

The purpose of public parking also be considered. Generally, the intention for on-street parking is that it provides community benefit for commercial and residential *visitors*, not employees or residents. Within the ETC, public off-street parking has been constructed that also supports the needs of employees, in the understanding that this provides significant benefit through a shared communal supply.

The 2014 Parking Strategy groups non-residential land uses into three different categories: retail, mixed use and bulk retail/services commercial, as shown in Table 7 below.

Table 7: Simplified land use categories

Retail	Mixed Use	Bulk Retail / Service Commercial
• Convenience store • Fast food outlet • Restaurant • Service Station • Shop	• Office • Cinema/Theatre • Consulting Rooms • Consulting Rooms: Group • Funeral Parlour • Medical Centre • Exhibition Centre • Tavern • Veterinary Centre	• Car Sales Lot • Car Sales Showroom • Car Wash Station • Factory Tenement • Building • Industry: Cottage • Industry: Light • Industry: Service • Motor Vehicle Repair • Garden Centre • Service Station • Showroom • Warehouse



These simplified categories have been reviewed against industry benchmarks to assess the sufficiency and appropriateness of the associated parking rates.

7.1 Shop / retail

The parking demand associated with retail development is highly variable, and related not only to the type and scale of the retail offering, but also the density of residential / business surrounding it.

In the absence of this information, ITE's Parking Generation guide projects parking demand for large-scale retail centres at approximately 4-5 spaces / 100m², of which approximately 15 - 20% is used by employees. In contrast, RTA Guidelines for Traffic Generating Development recommends 5.5-8 spaces / 100m².

Retail parking requirements tend to be lower for large Centres and where there are dense land uses nearby. This means that lower-density zones are likely to have the highest demand for parking. However, because the development yield in the outlying Precincts tends to be low, the adverse impacts of overspill are limited. These zones have local catchments that rely on the residential community immediately adjacent, which increases the number of people able to walk and cycle, and there tends to be more than enough capacity in the residential street network to accommodate on-street parking.

The Department of Transport has established a benchmark parking rate of 4.3 spaces per 100 sq.m, to be applied to all large shopping centres.

In this context, the existing minimum (4.0 spaces per 100 sq.m), maximum (5.0 spaces per 100sq.m) and desirable (4.3 spaces per 100 sq.m) parking rates are considered to be appropriate. Where on-site parking is to be provided below the desirable rate, this is likely to result in an increased burden on public facilities and can be supported with an equivalent cash in lieu contribution.

7.2 Restaurant / tavern

Standard rates for restaurant uses yield approximately 1 seat per 1.5 sq.m of serving area, which usually comprises only 50-60% of the total NLA. The recommendation from RTA's Guidelines for Traffic Generating Development is to assume that peak occupancy is only 85% of capacity for the purpose of parking and trip generation.

This results in an approximate occupancy rate of 28-34 customers per 100sq.m (NLA). Using an average vehicle occupancy of 2.5 per car suggests that customer parking demands could be in the range of 11.2-13.6 spaces per 100sq.m (NLA), assuming a 100% driving mode share.

According to ULI's Shared Parking guidelines, staff requirements for restaurants make up about 20% of the total demand. This means that if everyone drove to a restaurant, then a parking rate of 13-16 spaces per 100sq.m NLA would likely be sufficient. Unfortunately, this amount of parking consumes between 4x and 5x more space than the restaurant itself. This alone makes any requirement to provide 100% of parking on-site infeasible.

The average parking generation rates from two typical guidelines are described below:

- RTA Guide to Traffic Generating Developments (2002): 0.33 spaces per seat



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- ITE Parking Generation 4th edition (2010): 0.48 spaces per seat

However, several factors reduce the need for on-site parking considerably:

1. The above guidelines are based on surveys from suburban locations in the 1980's (ITE) and 1990's (RTA), and therefore do not adequately capture the travel behaviour of restaurant patrons. In fact, ongoing changes in travel behaviour have resulted in a much lower generation rate for parking.
2. Current behaviour is evidenced in the 2015 paper 'Do restaurant precincts need more parking?' (ATRF 2015) which surveyed business perceptions and practice in Brisbane restaurants. This paper established a car-as-driver mode share for guests of only 12%-25%, far below the perceptions of restaurant owners. This includes the much greater incidence of carpool, taxi/ride-hailing services as a consequence of 'responsible drinking' initiatives, in addition to the uptake for walking trips and public transport use.
3. Parking demand at restaurants is very strongly related to adjacent residential and employment density. Therefore, where restaurants are located in Centres, the need for parking is reduced. This is particularly pronounced during the midday peak, where walking trips are more prevalent. However even in suburban areas, there is a high incidence of walking trips from home, in addition to ride-hailing and other modes.
4. The highest demand period for F&B (evening peak 7-9pm) coincides with when surrounding public parking tends to see limited use. Any potential overspill from restaurant parking can therefore be accommodated by the adjacent external supply. The risk of undersupply of parking in this environment is therefore significantly lower than for other land uses.

As a result of these two factors, actual parking generation during the critical peak period is more likely to be in the order of 4-5 spaces per 100sq.m (NLA) which places it at the same scale as 'Retail'.

This includes all restaurant / F&B uses, including tavern developments (which are currently classified as 'Mixed Use').

7.3 Office

Parking requirements for employee-driven development tend to be affected by accessibility to sustainable transport alternatives and to a smaller extent by the quality of on-site end-of-trip facilities.

Baseline parking demand behaviours for office use have been extracted from *ITE Parking Generation 4th Edition* to determine an *unconstrained* parking demand. A review of this information indicates that approximately 6% of demand is related to visitors, and that even though parking was over-supplied (1.1 spaces per employee on average, the actual peak demand rate is approximately 0.83 spaces per employee).

The 2019 *Australian Government Office Occupancy Report* estimates that the employment density of office space in Western Australia is about 27.5 sq.m (NLA) per employee. This accounts for the amount of useable space (71% of NLA) and vacant workpoints (30%). In addition, only about 80% of employees attend work at the same time (work from home, meetings, leave etc.).

This implies that a parking supply rate of 1 space per 34.4 sq.m would be sufficient to cater for all employee parking demand at 100% driving mode share. Adding in the 6% visitor parking demand creates a baseline of 1 space per 32.3 sq.m.

This analysis has been applied to the existing mixed-use rate effective for 'office' development in the ETC



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Table 8: Comparison of office land use parking rates

	Employment density (m2 NLA per person)	Employees on-site	Parking rate (m2 NLA per space)	Current driver mode share %*	Employees per parking space	Supported driver mode share %
Unconstrained Demand	27.5	80%	34.4 (staff) 573 (visitors) 32.4 (combined)	84%	0.85	100%^
ETC Parking Strategy (min 2.0 / 100sq.m)	27.5	80%	53.2 (staff) 833 (visitors) 50 (combined)	84%	1.82	65%
ETC Parking Strategy (max. 2.5 / 100sq.m)	27.5	80%	42.6 (staff) 667 (visitors) 40 (combined)	84%	1.45	81%

^ assumes 6% of parking demand/supply for visitors

* Average journey-to-work car-as-driver mode share for employees in Ellenbrook

While the current parking rate for office development is lower than the current journey to work mode share, the construction of high-capacity public transport in the form of the Ellenbrook-Morley rail line, as well as the growth in the residential catchment will ultimately support higher levels of sustainable transport.

As such, the existing desirable (2.0 spaces per 100 sq.m) and maximum (2.5 spaces per 100 sq.m) parking rates are considered to be appropriate. Where on-site parking is to be provided below the desirable rate, this is likely to result in an increased burden on public facilities and can be supported with an equivalent cash in lieu contribution.

7.4 Medical

The parking needs for medical uses are highly dependent on the nature of the service provided:

- Medical Clinics (e.g. a walk-in GP clinic) generate a greater number of patients and require a higher visitor parking rate.
- Specialist Centres have a greater proportion of non-practitioner staff, but fewer patients.

These services may be provided in stand-alone facilities or combined on a single site. Parking generation is also poorly correlated to floor area, with a wide variation in different configurations and intensities by purpose.

Proximity of the development to high-density employment or residential nodes can reduce the parking requirement for visitors, but there is only a weak relationship between public transport accessibility and mode share – this reflects the demographic of patients and the fact that patients are often infirm or ill.



7.4.1 MEDICAL CLINICS AND SPECIALIST CENTRES

Research into parking demand rates suggests a baseline metric for parking demand at GP clinics is in the order of 5 spaces per consulting room.

It is reasonable to assume that the *employee* component of trip generation would operate at roughly the roughly equivalent of the office rate, at least for medical centres. While the requirements for staffing do vary, a ratio of simultaneous occupancy of around 1 to 1.5 staff per consulting room appears to be representative.

Additional parking provision is necessary to accommodate patients, which accounts for approximately 2/3 of the unconstrained parking demand. This comprises up to 2-3 patients for each consulting room during the highest peak periods.

Specialist centres have a higher employee/patient ratio, and specialists are often on-call or attending a primary hospital where they have admitting rights – this increases staff need to have access to a private vehicle (staff parking needs increase), but reduces the numbers of patients on-site at any one time.

On balance, this would likely result in a similar recommended parking rate for medical centres and specialist clinics. While the ratio between consulting rooms and floor area varies considerably, it is likely to be in the order of 1 consulting room per 100sq.m NLA.

As such, medical clinics and specialist centres are considered to generate parking demand at a similar rate to retail and restaurant uses, and should reasonably be categorised alongside these generators.

7.5 Childcare

The needs of childcare facilities are related primarily to staff, with a small demand for short-stay parent parking. This is because the peak period for pick-up/drop-off by parents tends to be over a considerable length of time, between 7am and 9am in the morning, and between 3pm and 6pm in the afternoon. These periods relate to the different demographics of users, tying demand to either the traditional work day, or to primary and secondary school times.

RTA Guide to Traffic Generating Developments identifies some representative metrics for parking behaviour at childcare centres based on local observations, with a peak demand for parking of 0.23 bays per child (including staff), and an average duration of stay of 6.8 minutes.

The NSW *Childcare Planning Guideline* recommends a parking rate of 1 space per 4 places, which is in-line with RTA estimates. This guideline also recommends reduction factors based on location, with a rate of 1 space per 10 places where the development is adjacent to a train station or located in a “high-rise building”.

The minimum ratios of staff to children is mandated by the *National Quality Framework* by age, as follows:

- 0-2 years: 1 educator per 4 children
- 2-3 years: 1 educator per 5 children



- 3-5 years: 1 educator per 10 children

In general, due to the mix of ages, this results in a staffing ratio of approximately 1 employee per 7 children. Employees are likely to have a similar mode share to office workers.

Given the high turnover rate of visitor parking, this supply is ideally provided on-street, rather than on-site. In particular since the parking is also not required during the day, when other land use peaks occur.

A recommended parking rate for childcare is:

- Employee parking – 1 space per 10 places
- Visitor parking – 1 space per 10 places, including consideration for on-street parking along the frontage.

The demand for parking at childcare facilities is not related to floor area, and should therefore be separated from other categories.

7.6 Bulk retail and service commercial

Showroom retail and service commercial development comes in a wide range of formats and intensities. Parking requirements tend to reflect the visitation needs of the particular, with employment density being low across the majority of development types.

The parking demand analysis completed for the 2014 Parking Strategy Review corroborates industry benchmarks for these types of developments, with a parking provision of approximately 2.0-3.0 spaces per 100 sq.m. This range provides some flexibility to accommodate individual requirements, but may need to be varied for some particular uses (e.g. modern warehouse developments may require only 1 employee per 100sq.m due to improvement in automation). For this reason, there may be cause to re-evaluate parking requirements on a site-specific basis via a Parking Needs Assessment or similar.

Irrespective, where parking demand is expected to exceed the provision of on-site facilities, cash-in-lieu of parking would be appropriate.

7.7 Mixed use

For the purpose of the ETC Parking Strategy, 'mixed-use' refers to non-residential development consisting of both retail and non-retail. Non-retail land uses acceptable in the mixed-use zone include office, cinema, consulting rooms, funeral parlour, medical centre, exhibition centre, tavern and veterinary centre.

Where a development consists of multiple land uses where peak demands occur at different times of day, it is reasonable to assume that on-site parking can be shared between land uses. This type of parking arrangement is appropriate for situations where peak demand differs between the constituent land uses. Representative land pairs which can leverage this effect include:

- Residential Visitor Parking and Commercial / Office; and



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- Office / Entertainment or Office / Restaurant.

The extent to which parking can be shared is related directly to the types of land uses proposed and the extent to which their peak hours of operation differ.

The more exclusive the parking is the less effective it becomes for the system as a whole. Shared parking takes advantage of the fact that most parking bays are only used part-time by a particular group, and many parking facilities have a significant proportion of unused bays, with utilisation patterns that follow predictable daily, weekly and annual cycles.

A general benchmark for reduction is difficult to identify at a strategic level. It is recommended that all applications for parking reductions based on internal shared parking be justified through a parking assessment. One simple metric for evaluating the opportunity for shared parking uses a Peak Parking Demand table submitted by the Applicant, as part of a Parking Needs Assessment Plan, which provides enough evidence to show that demand will not unreasonably coincide.



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Table 1-1 Example shared parking demand table

Development type	Development users	Shared parking needs assessment				'Unshared' assessment (peak demand per land use)
		Morning	Midday	Afternoon	Evening	
e.g. Office/Restaurant In Town centre	Office Staff	150	150	150	0	160
	Office Visitors	10	10	10	0	
	Restaurant Staff	5	10	10	20	120
	Restaurant Customers	25	50	20	100	
	Total	190	220	190	120	280

Note: This assessment supports a peak parking demand of 220 spaces, instead of the 280 spaces that would be required if evaluated separately

An exception to this assessment requirement is with respect to residential / commercial development, in which it is considered reasonable that the requirement for residential visitor parking be waived so long as there is sufficient on-site, shared commercial parking to satisfy the visitor parking requirement and the commercial uses are not active during evenings (when residential visitation is high).

It is understood that some mixed-use sites may not be capable of supporting the minimum parking requirements. As such, the City may accept cash-in-lieu of the assessed parking need for any number of bays not provided.

7.8 Recommended parking rates for non-residential development

A modified table of land use categories is proposed to reflect the parking needs of constituent uses (Table 9 below).

Table 9: Revised land use categories

Retail / Medical / F&B	Office / Entertainment	Bulk Retail / Service Commercial	Other
- Convenience store - Fast food outlet - Restaurant - Service Station - Shop Tavern Consulting Rooms Consulting Rooms: Group Medical Centre Veterinary Centre	- Office - Cinema/Theatre - Exhibition Centre Gym	- Car Sales Lot - Car Sales Showroom - Car Wash Station - Factory Tenement Building - Industry: Cottage - Industry: Light - Industry: Service - Motor Vehicle Repair - Garden Centre - Service Station - Showroom - Warehouse - Funeral Parlour	e.g. - Childcare - Aged Care Facility



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The recommended car parking rates for non-residential development discussed in Section 7.1 to Section 7.7 are summarised in Table 10.

Table 10: Recommended car parking rates for non-residential uses

Land Use	Desirable Rate (per 100m ² of NLA)	Minimum Rate (per 100m ² of NLA)	Maximum Rate (per 100m ² of NLA)
Retail / Medical / F&B	4.3	4.0	5.0
Office / Entertainment	2.0		2.5
Bulk Retail / Service Commercial	2.5	2.2	3.0
Other: • Childcare	1 per 5 places		1 per 4 places

Cash-in-lieu of parking on site will be required to be paid for the following uses when parking provided on site is less than:

- Retail / Medical / F&B: less than 4.3 bays per 100m² NLA
- Office / Entertainment: less than 2.0 bays per 100m² NLA
- Bulk retail / Service commercial: less than 2.5 bays per 100m² NLA

Parking within a mixed-use development may be reduced on the basis of a Parking Needs Assessment that demonstrates that bays may be shared between on-site uses. Where on-site parking is provided at less than the identified need, cash-in-lieu of parking will be required.

Cash-in-lieu is discussed further in Section 9.

7.9 Bicycle parking and end-of-trip facilities

7.9.1 EMPLOYEES

In 2013, The City of Perth completed a review of end-of-trip facilities within the Perth Parking Management Area (PPMA). This work is the most recent and proximal assessment of bike parking requirements relevant to the City of South Perth. Some findings from background research included in this Review are repeated below, for reference.

From a 2010 survey of Perth CBD employees:

- Of the respondents who cycled, 39% stated that private vehicles would have been utilised if it had not been possible to cycle for these trips

This implies that mode shift to bikes may be primarily from public transport modes, although this should be considered in the context of the Perth CBD public transport mode share which is generally equivalent in magnitude to the private vehicle mode share.

- The provision of end-of-trip facilities was identified as a major improvement requested by new cyclists and for occasional cyclists to increase the frequency of their cycling trips



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- Lack of EoT facilities was a barrier to cycling into the CBD, a significant number of respondents indicated they would start cycling if facilities were available
- Lack of EoT facilities were a particular barrier for women

Generally, the minimum supply of employee bike parking should be consistent with the long-term mode share targets for cycling to the ETC, which has been identified at 6%. It is in the best interests of the ETC for cycling end-of-trip facilities to be marginally over-supplied to ensure sufficiency. As such, guidance has been provided using a 10% benchmark and aligned with floor area or other standard metrics to support administration of the policy (see **Section 9**).

Relating bicycle parking back to mode share is a transparent way to assign minimum standards, and allows developments to interrogate their needs through the design process, using the City's policy as a benchmark.

7.9.2 VISITORS

The benefits of providing superior bicycle end-of-trip facilities have been observed for employee commuting, but are much less significant for non-employee trips, at least at the relatively modest levels of usage observed in the City of South Perth.

Visitors are more likely to choose walking and cycling modes at the residential origin, independent of the provision at their destination. Active transport usage to retail, entertainment and restaurant uses is more closely related to safe, attractive corridors, rather than end-of-trip, as well as to the density of land uses in the Precinct.

7.9.3 BICYCLE PARKING RATES

The following assigns bike parking rates using the same broad zoning and land use categorisation as for car parking, with sufficient facilities to accommodate a 10% cycling mode share (Table 11).

Table 11: Bicycle parking rates

Zone	Employee bike parking (m ² NLA per space)	Visitor bike parking (m ² NLA per space)
Office	1 per 300sq.m	1 per 5,000sq.m
Restaurant / tavern	1 per 120sq.m	1 per 30sq.m
Shop / retail	1 per 1000sq.m	1 per 100sq.m
Bulk retail and Service / commercial	1 per 1000sq.m	1 per 1000sq.m
Other	1 per 10 employees on-site	1 per 10 visitors on-site

It should be noted that the requirements for bike parking are different for employees and for visitors. Employees need secure facilities with end-of-trip facilities such as changerooms, showers and lockers.



Visitors need accessible parking close to entrance points and with good passive surveillance.

7.9.4 NON-STANDARD BIKE PARKING

The micro-mobility market is rapidly fragmenting into a huge variety of different platforms: cargo bikes, e-bikes, e-scooters, etc. This explosion of choice gives owners more opportunities to pick the option that is best for them. The impact at the destination is that many bike parking solutions do not appropriately cater for these vehicles. End-of-trip facilities should ideally include traditional racks, scooter racks and high-flexibility u-rails to ensure secure parking for all users.

Where staff parking is provided, this may also include power points in secure facilities for charging.

7.9.5 END-OF-TRIP FACILITIES (EOTF)

EOTF at destinations support bicycle trips by providing facilities for people to effectively end their trip by showering, changing and storing personal belongings. Although bicycle parking itself may be sufficient in many cases for short-stay trips, EOTF will typically be required to accommodate long-stay trips for land uses such as offices. EOTF should include change rooms, showers and lockers to store clothing and towels.

An increase in the quality of facilities is correlated with increased cycling. Results from the City of Perth study showed consistently that those buildings that provided the highest quality showers, lockers and other ancillary end-of-trip facilities had them oversubscribed by users. In a policy context, this suggests that provision of high-quality end-of-trip facilities, alongside additional bike parking, can result in a decrease in private vehicle modes. The proposed rates for EOTF applicable to long-term non-residential land uses are outlined in Table 12: EOTF0.

Table 12: EOTF provision

No. showers	No. change rooms	No. lockers
One shower per 5 employee bicycle parking spaces	One change room per shower	Two lockers per employee bicycle parking space

Note: where more than one shower or change room is required, separate male and female facilities must be provided. This may include any proportion of individual unisex facilities.

The provision of two lockers per bicycle parking space recognises the need for lockers by groups other than cyclists (people who run, or go to the gym etc.) and the fact that not all cyclists will ride every day.

7.10 Motorcycle and Scooter Parking

Review of ABS Census (2016) data shows that motorcycles and scooters are used very rarely for journey-to-work trips to or from the ETC (less than 1% of all trips). However, the size of the motorcycle fleet is approximately 5% of all vehicles across Australia.

This suggests that there may be a differential between commuter use of motorbikes and recreational/utility use. With respect to parking supply, this implies that motorbike/scooter parking needs may be different for land uses which are heavily dominated by employees (e.g. office) or visitors (e.g. retail), which would be reflected in different parking rates for these two categories of use.

The provision of motorcycle/scooter parking is of benefit primarily to the business, not necessarily to the vehicle owner. Motorcycles and scooters may park in standard bays, but this tends to be a poor use of space. Provision of motorbike/scooter parking in excess of the statutory requirements is unlikely to reduce car parking demand at a strategic level. In addition, current trends in both consumer choice and sustainable transport planning are towards electric bikes and scooters, as opposed to motorised transport.

This suggests that modifications to bike parking areas may better support the needs of the employees and visitors, in preference to motorcycle/scooter bays. This suggests that a provision for motorcycle parking of 1-2% of bays would be sufficient to accommodate demand.

7.11 Service / delivery and loading

The provision of on-site service / delivery and loading is generally related to the scale of development, the intensity of use and the availability of public on-street facilities. The likely requirement for deliveries in new commercial developments should be considered and enabled where appropriate through an increase in on-street loading zone areas, particularly in 'main street' precincts where demand for parking is high, and where smaller office / retail development is located.

Loading bays / zones should be flexible / shared where possible between businesses, and have timed restrictions (usually 15 minutes), and designed to accommodate larger and heavier vehicles as appropriate.

However, larger office / commercial buildings should be serviced via on-site docks connected to basement or under-croft parking structures. Access to dock areas should be designed to minimise the impact of service / delivery vehicles on pedestrian, cycling and bus modes.

8 Parking rates for residential land uses

8.1 Single houses and multiple dwellings coded less than R40

The requirements for bicycle, motorcycle and car parking for low and medium density residential development are set by State Planning Policy 7.3 Residential Design Codes (R-Codes) – Volume 1. These are presented under a series of design principles which allows developments to determine an appropriate supply of parking, along with a simplified ‘deemed to comply’ metric based on locational criteria.

The R-Code car parking requirements for dwellings in these locations are detailed in Table 11, where Location A refers to a Lot that is within 800m of a train station on a high-frequency rail route or high frequency bus route. The majority of the ETC would be classified as Location A under these criteria.

Table 13: Deemed to comply parking bays per single house or dwelling coded less than R40

LOCATION A		Studio and 1 bedroom dwelling	2 bedroom dwelling	3 or more bedroom dwelling	Ancillary dwelling
Minimum required parking (space per dwelling)		0	0	0	0
Maximum parking permitted (space per dwelling)	Garage parking	1	1 ¹	2	1
	Carport, uncovered or basement parking	No maximum parking spaces apply			
LOCATION B		Studio and 1 bedroom dwelling	2 bedroom dwelling	3 or more bedroom dwelling	Ancillary dwelling
Minimum required parking (space per dwelling)		1	1	2	1
Maximum parking permitted (space per dwelling)	Garage parking	1	2	2	1
	Carport, uncovered or basement parking	No maximum parking spaces apply			
Notes: Tree requirements apply for uncovered at-grade car parking areas (grouped and multiple dwellings), refer C2.3.7 .					
¹ A double garage is permitted where accessed from a right-of-way .					
LOCATION A – includes all land located within:					
- 800m of a train station on a high-frequency rail route, measured in a straight line from the pedestrian entry to the train station platform to any part of a lot; - 250m of a high-frequency bus route, or multiple bus routes that if combined have timed stops every 15 minutes during weekday peak periods (7 – 9am and 5 – 7pm), measured in a straight line from along any part of the bus route to any part of the lot; and/or - the defined boundaries of an activity centre.					
LOCATION B – includes all land that is not within Location A.					

Source: State Planning Policy 3.1 Residential Design Codes

The updated R-Codes Volume 1 permits any residential development to provide zero parking bays within Location A, and sets maximum rates for parking only where it is provided in the form of individual garage parking.



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In Location B, outside of the influence of high-frequency public transport, a minimum parking supply is required (2 for dwellings with 3 or more bedrooms and 1 for all other dwellings). Again, maximum rates apply only where provided in the form of individual garage parking.

The requirements for bicycle, motorcycle and visitor parking are also defined in the 'deemed-to-comply' provisions, as shown in Table 14 below.

Table 14: Deemed to comply bicycle, motorcycle and visitor spaces per single house or dwelling coded less than R40

		Minimum number of bicycle spaces (per dwelling)
Single house and grouped dwelling		1 per dwelling
Multiple dwelling		0.5 x the total number of dwellings
<i>Notes: Where the bicycle parking calculation results in a fraction of a space, the requirement is to be rounded up to the nearest whole number.</i> <i>(i.e. bicycle parking for 13 multiple dwellings is $13 \times 0.5 = 6.5$ which equates to 7 bicycle spaces.)</i>		

		Minimum number of visitor spaces (per dwelling)
Visitor car parking	0 - 4 dwellings	No visitor bays required
	5 or more dwellings	0.2 x the total number of dwellings
Visitor bicycle parking	0 - 9 dwellings	No visitor bays required
	10 or more dwellings	0.1 x the total number of dwellings
<i>Notes: Where the visitor parking calculation results in a fraction of a space, the requirement is to be rounded up to the nearest whole number.</i> <i>(i.e. visitor car parking for 6 dwellings is $6 \times 0.2 = 1.2$ which equates to 2 visitor parking spaces.)</i>		

C.3.4.2: Multiple dwelling development of 20 or more dwellings to provide one motorcycle/scooter space on-site for every 10 car parking spaces.



8.2 Multiple dwellings coded R40 or greater

The same locational categories are used to determine parking requirements for multiple dwellings coded R40 and greater, as set out in Planning Policy 7.3 Residential Design Codes (R-Codes) – Volume 2. Acceptable outcomes for car parking requirements are outlined in Table 15.

Note that these ratios are not expressed as maximum or minimum, but only a target rate, and they are not explicitly not considered to represent a comprehensive ‘deemed-to-comply’ provision.

Table 15: Acceptable outcomes for parking in multiple dwellings

Parking types		Location A	Location B
Car parking ¹	1 bedroom dwellings	0.75 bay per dwelling	1 bay per dwelling
	2+ bedroom dwellings	1 bay per dwelling	1.25 bays per dwelling
	Visitor	1 bay per four dwellings up to 12 dwellings 1 bay per eight dwellings for the 13th dwelling and above	
Bicycle parking ¹	Resident	0.5 space per dwelling	
	Visitor	1 space per 10 dwellings	
Motorcycle/ Scooter parking ²		Developments exceeding 20 dwellings provide 1 motorcycle/scooter space for every 10 car bays	

¹ Calculations of parking ratios shall be rounded up to the next whole number.

² For each five motorcycle/scooter parking bays provided in accordance with Table 3.9, car parking bays may be reduced by one bay.

Definitions:

Location A: within 800m walkable catchment of a train station and/or 250m of a transit stop (bus or light rail) of a high-frequency route and/or within the defined boundaries of an activity centre.

Location B: not within Location A.

Source: State Planning Policy 3.1 Residential Design Codes

These car parking provision requirements can be provided in scenarios where car parking is unbundled from the sale of individual dwellings, and provide a benchmark for the overall provision across a development structure – to be allocated based on the needs of tenants / residents.

8.3 Residential visitors

Residential visitors prefer to park in at-grade on-street or nearby off-street car parks in close walking distance to their destination. Particularly within a dense mixed-use Centre, the need for residential visitors to park within the associated Lot is greatly reduced, as visitors are highly likely to meet residents outside of the home, or to incorporate external activities into their trip, reducing the value of on-site residential parking.

Residential visitors are therefore not strictly distinct from commercial visitors and can therefore share parking facilities, provided:

- Access is maintained outside of business hours; and
- Requirements for personal legibility, safety and security are considered and provided for.

Therefore, the key determination of parking supply is whether sufficient on-street car parking is available at the peak times where residential visitation occurs (i.e. afternoons and evenings). This is consistent with the Design Principles of the R-Codes – Volume 1 and R-Codes - Volume 2.

Irrespective of the provision of public parking for residential visitation, there will still be some need for short-stay parking by delivery drivers, loading etc. and these activities should be managed through access to appropriately managed on-site facilities.

8.4 Unbundled parking

Depending on their circumstances, some owners of town centre apartments may require zero, one or two parking bays. It is inequitable for people who do not own a car to automatically pay for a parking bay, inclusive in the purchase of an apartment. To provide greater equity it is proposed that the purchase (or lease) of an apartment be unbundled from the sale (or lease) of the parking bay or bays.

9 Cash-in-lieu policy

Public parking is essentially provided as a community benefit by the City, in support of residential or commercial development. The provision of public parking is the responsibility of the City, including associated construction, maintenance and operations costs. This means that the cost burden of parking supply is applied to residents and business owners through rates, and to visitors through parking fees.

There are substantial benefits to public parking; it is more efficient and more flexible, and demand can be managed by the City through paid parking. However, there is a limit to the number of parking spaces that can be constructed. The WAPC's *Manner and Form - Payment in Lieu of Parking Plan* clearly outlines the benefit of an effective cash-in-lieu policy, particularly where funds may be spent on improvements to transport that reduce parking demand.

In some cases, it will be impractical or uneconomic to provide any parking or all of the required parking on a site. This is particularly the case for small retail and non-retail mixed-use development. In such cases it will be permissible to pay cash-in-lieu of on-site parking.

Since public parking is of benefit to the community as a whole, its supply *can* be considered to reduce the requirement for private parking. Generally, this parking would be used by *visitors* to the area, rather than employees, however the parking management structure of the ETC explicitly supports employee parking in public bays in some zones. The availability of public parking is already factored into the desirable parking rates – any further reduction in on-site parking would be accompanied by cash-in-lieu payments to the City.

The conditions pertaining to cash-in-lieu are:

- Cash-in-lieu payments will be required when the onsite parking provided is below the desirable level for the following uses:
 - Retail / Medical / F&B: 4.3 bays per 100m² NLA
 - Office / Entertainment: 2.0 bays per 100m² NLA
 - Bulk Retail / Service Commercial: 2.5 bays per 100m² NLA
- Any reduction in onsite parking provision below the desirable levels will require a cash-in-lieu payment.
- The cash-in-lieu payment per bay will be based on the cost of construction of a single multi-deck parking space. This cost will be calculated by the City of Swan on an annual basis, with the applicable cash-in-lieu payment determined to be 50% of this cost.
- Cash-in-lieu payments shall be paid into a special public parking cash-in-lieu account of the City of Swan which shall only be used to:
 - Construct public car parks within the ETC
 - Construct public bicycle and motorcycle parking within the ETC



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9 Cash-in-lieu policy

- Purchase and install parking infrastructure or wayfinding signage within the ETC
- Construct pedestrian, cycling or public transport facilities within the ETC
- No funds from the special public parking cash-in-lieu account shall be used for operation of car parks, or to fund parking enforcement

It is unlikely that cash-in-lieu payments will apply to car parking for major retail or bulk retail developments within the ETC, due to the size and scale of the applicable Lots. The majority of cash-in-lieu payments are expected to apply to small mixed-use developments with limited opportunities for on-site parking.



10 Management of public parking

10.1 Paid parking

The full build-out of land uses within the ETC, combined with the external pressures on parking as a result of commuter park and ride are likely to create a situation where local demand for parking exceeds the available supply. This scenario can be effectively managed by introducing paid parking to influence the demand for parking at a very fine-grained level. Paid parking can be combined with duration restrictions which effectively limit the supply of parking to specific groups. This combination is very powerful.

A parking management strategy is recommended that encourages long-stay (employee) parking at the periphery of the ETC and short stay parking (one- or two-hours' duration) in the highest demand bays within the centre.

The construction of the Ellenbrook Station and the associated demand for commuter park and ride are expected to create the need for paid parking. As such, it would be beneficial to introduce paid parking facilities at a low introductory rate prior to Station completion, to acclimatise local employees and visitors.

10.2 Demand Responsive Pricing

Parking prices are an effective tool to manage the demand for parking. Incorporating demand responsive pricing into the any future paid parking fee structure will enable the City to adjust on-street parking fees to reflect the balance of supply and demand. This will allow fees to be increased or reduced based on occupancy levels.

Paid parking is recommended in locations with high demand and where a higher turnover is preferred. Demand responsive pricing requires an understanding of parking occupancy rates to determine if the fee is appropriate. A particular location is considered to have the 'correct' parking fee if it exhibits an 85-90% occupancy during peak periods. This fee could vary between different times of day or different days of the week.

A potential methodology to determine the correct price for parking is described below:

- Monitor the occupancy of paid parking bays and the availability of adjacent free parking.
- Periodically (e.g. every 6 months) modifying the fee structure of paid parking based on occupancy:
 - If average peak demand is less than 60% of supply, reduce the hourly fee by 20c
 - If average peak demand is more than 80% of supply, increase the hourly fee by 20c
 - If average peak demand is between 60% and 80%, keep the price the same.

Where parking supply is higher than demand, the appropriate price for parking may well be zero.



It is also important to implement good user information that indicates parking locations and prices to allow drivers to choose between more convenient but costly parking or cheaper parking a short distance away.

10.3 Short stay and long stay parking

The high proportion of shared parking across the ETC increases the need for consistent management of long-stay and short-stay parking. However, this form of parking delivery gives a high degree of control and flexibility to the City.

Long stay parking will be necessary to support employees, at office and commercial uses within the centre. This parking can be located in consolidated car parks further from employment nodes (i.e. at the periphery of the ETC), or co-located with development as appropriate.

Short-stay parking will be used by visitors to the Centre, and is required to provide the economic activity that fuels retail, restaurant and other key land uses. This parking should ideally be located close to destinations, but provided in a way that minimises the impact of vehicle movements on the pedestrian realm. On-street bays are ideally suited to short-stay use, though there is also value in destination car parks close to activity, which provide a legible waypoint for visitors to the ETC. Short-stay parking may be provided in the form of duration restrictions only, as paid parking, or with an initial free period, depending on their desired purpose.

10.4 Management of on-street public parking

On-street public parking bays within the Town Centre should be managed to support high demand. Parking bays within the ETC core would be duration-restricted to reinforce high turnover and maximise their utility. Paid parking would also be applicable; set at the price necessary to maximise efficiency (using demand responsive pricing).

Duration restrictions would be increased for on-street parking further from the centre, with paid parking introduced where demand is excessive. Public on-street parking will be managed by the City of Swan.

A variety of on-street parking management options and their intent/impacts are described below:

- **2P Free Parking:** Time restricted 2-hour parking is best used in retail and residential areas, to support visitation throughout the day. This form of parking may also be used where there is moderate commercial visitor demand, to limit use by employees. However, where there is a scarcity of employee parking, free 2-hour parking may be used illegitimately by employees.
- **4P Free Parking:** Time restricted 4-hour parking supports medium-stay uses such as recreational and cultural facilities. However, such parking controls are generally not recommended where these areas are located close to businesses. The incentive for employees and other long-stay users to park in these zones illegitimately (by re-parking their vehicle every 4 hours), is strong.
- **All day Free Parking:** All-day free parking provides the maximum flexibility for users, but is appropriate only when there is ample parking supply to cater for everyone. Where demand



begins to approach 85% or more of supply at peak times, alternative controls should be used to differentiate parking areas.

- **Time Restrictions:** It is recommended that all managed parking be restricted to the 8am-6pm period. For the majority of the network, this can be retained for Monday-Friday only, but in locations where weekend demand is high, parking restrictions should be set for Monday-Sunday.

Limiting duration restrictions and or paid parking to daylight hours limits the potential impact on residents and visitors. This is particularly important in the 'High Street Station' precinct, as a result of the high level of residential density and mixed-use throughout the area.

- **1P Paid Parking:** Used in retail areas to support high turnover business visitors, and to redistribute longer-stay activates to adjacent off-street public and private car parks
- **2P Paid Parking:** Used in areas adjacent to retail to support business and medical visitors; specifically excludes use by employees and construction workers and all-day parking.
- **4P Paid Parking:** Allows a mixture of uses; specifically excludes all day parking.

First-Hour Free Parking: By permitting the first 1 or 2 hours' free before payment commences, this method promotes short stay uses and encourages rapid turnover of parking, while allowing flexibility for users to stay longer if they wish. This is particularly valuable to shift parking off-street, and away from prime on-street locations.

Private car parks often utilise this form of parking management to shift cars onto their site, ensuring that customers walk through their establishment and an increase in footfall. Though its effectiveness can be diminished if there is free parking in close proximity.

10.5 Management of off-street public parking

It is expected where retail use predominates, adjacent off-street public parking would be short-stay with a maximum of 2-3 hours. The use of duration restrictions as the only form of management in these areas can create issues where parking is near dense employment (office/commercial development) as employees are likely to park in retail bays, moving their vehicles once per day as necessary to avoid infringement.

All-day parking is required where the majority of land use is office / commercial. This parking can be located further away from activity, and provided at a lower (or zero) fee basis. The key conflict with long-stay parking is the imposition of commuter park and ride users. For this reason, it is not recommended that free long-stay employee parking be located within close proximity of the Station. Any such parking would necessarily require fee payment to deter commuter parking. It is likely that public parking established for use by employees would be managed by the City of Swan.

Off-street short-stay parking suitable for retail and other land uses is more likely to be managed by the private sector.

A variety of off-street parking management options and their intent/impacts are described below:



- **Free Parking:** Off-street parking is an expensive resource, provided by a business or on behalf of the City for the community. There are many important reasons to provide parking, for the benefit of social, cultural or economic development.

However, where demand for this free resource exceeds the available supply, alternative methods of control are recommended. This may include duration restrictions to increase turnover and relocate long-stay parkers, or the introduction of paid parking to manage demand.

- **2P Paid Parking:** Parking in high-turnover areas to support recreation or retail/restaurant uses; specifically excludes use by all day parkers.
- **4P Paid Parking:** Allows a mixture of short-stay uses and specifically excludes use for park 'n' ride, with minimal value for all day parkers.
- **Unrestricted Paid Parking:** Allows use for all purposes but disadvantages long-stay employees.
- **Capped Fee Parking:** Allows for hourly paid parking up to a set duration cap with no additional cost beyond this duration. This is intended to create spaces for employees to park in the public realm, while still retaining viability for short-stay visitors including
- **Private/Tenant Parking:** This parking is privately owned and outside of the control of the City and this Plan. It is beneficial for the function of the parking system that all bays are efficiently used.

Where the City transitions to a paid parking focus and demand for parking on the whole increases, there will be increased pressure on private parking. This may result in a change in management of these private bays.

10.6 Wayfinding signage

Effective parking management relies on drivers understanding where parking is available. Therefore, it is recommended that wayfinding signage be erected directing drivers to key parking nodes. This encourages more efficient use of the available parking and also improves legibility for drivers.

One effective method for supporting decision-making is to publish a map that identifies short-stay / long-stay parking, as well as free and paid parking areas. This gives drivers an opportunity to choose whether they wish to park closer to their destination and pay more, or park further away for free.

The implementation of demand-responsive pricing helps create an environment where all types of parking can be accommodated.

10.7 Service vehicle access (laneway and kerbside loading)

While larger retail and commercial developments will be able to provide off-street service/loading facilities, developments within the mixed-use core are much less likely to have this capability. Where possible, service vehicle access should be incorporated into rear laneways. To further support the



service/loading requirements for these key businesses, on-street loading bays along Main Street and The Parkway is recommended.

The specific location of loading bays should be determined in coordination with development.

10.8 Taxi rank

Formal taxi service may not be particularly popular in this area, but the advent of ride-hailing and food-pickup/delivery services means that there is a greatly increased demand for very short-stay parking.

This suggests that kerbside layover areas in key locations adjacent to entertainment and F&B uses will assist in maintaining safe traffic movements through the ETC.

10.9 Bicycle parking

Public bike facilities will help encourage casual cycling to the ETC, and can be provided by installing simple u-rails at community facilities (library, parks, civic centre) and at key intersections. Where cycling infrastructure is provided on-street, bike parking should also be provided in on-street embayments. Conversely, where cycling facilities are provided in the form of shared paths, bike parking should also be located off-street.

Public bicycle parking provided in civic and public spaces may be supplemented by additional visitor u-rails constructed as part of development. The rates for bicycle parking provision are detailed in Section 7.9.3.

11 Ellenbrook town centre parking policy summary

The Ellenbrook parking policy and strategy has been developed to:

- Assist with the rational and efficient development of the ETC
- Provide guidance on the longer-term management of the car parking within ETC

11.1 Town centre parking principles

The ETC parking principles were developed to support the policy objectives of SPP4.2. The included principles were work shopped with representatives of the City of Swan, the Department of Planning, Hatch Roberts Day and LWP to ensure they reflect local development priorities for Ellenbrook. The agreed parking principles have been retained in this updated Parking Strategy:

- **Parking Principle 1:** The amount and type of parking provided should support the town centre vision and broader transport and planning policies
- **Parking Principle 2:** The amount and location of parking should assist in reducing impacts on people travelling to/from within the centre
- **Parking Principle 3:** Maximise resource efficiency and the value of parking



- **Parking Principle 4:** Allocate on street space for car parking based on the following priorities
- **Parking Principle 5:** Visitors to the town centre should be provided with clear directions to available parking and between car parks and major activities and landmarks

11.2 Parking strategic for ETC

Similarly, the following strategies for parking in ETC were agreed:

- **Parking Strategy 1:** Establish minimum and desirable maximum levels of parking for major town centre land uses
- **Parking Strategy 2:** Maximise the proportion of public/shared parking
- **Parking Strategy 3:** Unbundle parking from sale of residential apartments
- **Parking Strategy 4:** Position car parks to minimise impact on pedestrians
- **Parking Strategy 5:** Sleeve car parks at ground level on town centre streets
- **Public Strategy 6:** Accept cash-in-lieu of parking where appropriate
- **Parking Strategy 7:** Manage town centre parking through price and time regulations
- **Parking Strategy 8:** Provide an efficient way finding system
- **Parking Strategy 9:** Enforce parking regulations to benefit users and the community
- **Parking Strategy 10:** Monitor potential overspill from control area
- **Parking Strategy 11:** Implement parking strategy in stages

11.3 Parking rates and numbers

11.3.1 RESIDENTIAL

Parking for residential properties in the ETC are proposed to comply with the guidance in SPP 7.3. The deemed-to-comply and acceptable outcomes from Volume 1 and Volume 2 of the R-Codes have been included in Section 8, for reference.

Some additional consideration is recommended with respect to residential visitor parking, which may reasonably be provided in the form of on-street and nearby public off-street facilities, in accordance with the Design Principles of the R-Codes.

It is estimated that about 2,300 residential car parking bays will be required to meet the needs of the estimated 1,750 dwellings within the ETC at full development.

11.3.2 NON-RESIDENTIAL

The desirable, minimum and desirable maximum rate of parking for non-residential development is outlined in Table 16.



Table 16: Car parking rates for non-residential uses

Land Use	Desirable Rate (per 100m ² of NLA)	Minimum Rate (per 100m ² of NLA)	Maximum Rate (per 100m ² of NLA)
Retail / Medical / F&B	4.3	4.0	5.0
Office / Entertainment	2.0		2.5
Bulk Retail / Service Commercial	2.5	2.2	3.0
Other: • Childcare	1 per 5 places		1 per 4 places

The parking rates for specific uses, such as educational institutions and cultural facilities should be dealt with on a case by case basis, taking the location of the use and its operational requirements, such as number of employees or students and hours of operation into consideration.

11.4 Parking for bicycles and motorcycles

11.4.1 RESIDENTIAL

Parking for bicycles and motorcycles at non-apartment dwellings can be provided for in individual garages and other storage areas without the need for dedicated parking provision. For apartments bicycle and motorcycle parking should be provided in accordance with the appropriate R-Codes provisions.

11.4.2 NON-RESIDENTIAL

The following parking for bicycles is proposed:

Table 17: Non-residential bicycle parking

Zone	Employee bike parking (m ² NLA per space)	Visitor bike parking (m ² NLA per space)
Office	1 per 300sq.m	1 per 5,000sq.m
Restaurant / tavern	1 per 120sq.m	1 per 30sq.m
Shop / retail	1 per 1000sq.m	1 per 100sq.m
Bulk retail and Service / commercial	1 per 1000sq.m	1 per 1000sq.m
Other	1 per 10 employees on-site	1 per 10 visitors on-site

Parking for motorcycles is proposed at 1-2% of the car parking supply.

11.5 Cash-in-lieu policy

Cash-in-lieu of onsite parking will be permitted for non-residential parking at the discretion of the City.

Cash-in-lieu of parking will be required where:



- On-site parking is proposed below the desirable level of parking for the following uses:
 - Retail / Medical / F&B: 4.3 bays per 100m² NLA
 - Office / Entertainment: 2.0 bays per 100m² NLA
 - Bulk Retail / Service Commercial: 2.5 bays per 100m² NLA
- Cash-in-lieu payments shall be paid into a special public parking cash-in-lieu account of the City of Swan which may be used to:
 - Construct public car parks within the ETC
 - Construct public bicycle and motorcycle parking within the ETC
 - Install parking wayfinding or parking management infrastructure
 - Undertake streetscape improvements, cycling network improvements and other infrastructure upgrades *where these would result in a reduction in driving mode share and/or parking requirements*
- Funds from the special public parking cash-in-lieu account shall be not be used to support operational expenses of car parks or parking compliance.
- Cash-in-lieu of parking will attract a fee equivalent to 50% of the construction cost for a single bay in a multi-deck parking structure. This fee will be calculated by the City and applied to all applications for cash-in-lieu.

11.6 Management of public parking

Guidelines on the management of parking within the ETC are provided in Section 10 of this report. These guidelines are intended to encourage the efficient use of parking, and include the introduction of paid parking in the ETC.

It is recommended that paid parking be introduced following the construction of the Ellenbrook Station.

Paid parking should be introduced on a Demand Responsive basis (refer Section 10.2). This method ensures that parking is maintained at a high efficiency, and acknowledges that where supply greatly exceeds local demand the appropriate price for may well be zero.

11.7 Monitoring and review

The Ellenbrook Town Centre Parking Policy should be reviewed every five years and modified as required to suit the environment and planning for the ETC.



Appendix A Literature Review

