APPENDIX F
PARKING STRATEGY

Murdoch Mixed Use Precinct
LandCorp
13-Nov-2015

Murdoch Mixed Use Precinct

Parking Strategy

Murdoch Mixed Use Precinct

Parking Strategy

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Table of Contents

Executive Summary

The Murdoch Mixed Use Precinct (MUP) provides an opportunity to develop a transit-orientated hub in a significant and rapidly growing activity centre. The MUP will provide a vibrant hub linking Murdoch Bus and Rail Station and Fiona Stanley Hospital and St John of God Hospital. Planning and design of the MUP site is integrated with these developments and the broader Murdoch Activity Centre expansion. This includes consideration of the reserve capacity of the adjacent regional road network (particularly South Street and Kwinana Freeway) and opportunities to reduce traffic generation during peak times.

In recognition of the limited available road capacity at Murdoch, the State Government developed the *Murdoch Activity Centre Access and Parking Policy* (Western Australian Planning Commission (WAPC), 2011). This Parking Policy identifies parking management principles and parking supply limits to support transit orientated development across the Murdoch Activity Centre and minimise traffic congestion during peak periods.

The Murdoch Parking Policy sets a **parking cap of 170 car parks per hectare** for the MUP site. The cap equates to a maximum supply of 1,629 bays (based on a 9.5 hectare MUP site area).This cap is intended to constrain peak period car trips, targeting commercial and long-term visitor parking. The parking cap excludes the Public Transport Authority Park 'n' Ride facility, special purpose parking (such as disabled bays, motorbike parking, and loading zones) and private residential parking.

To achieve this parking cap, opportunities to reduce standard parking supply rates for the proposed MUP land uses were assessed. Reducing the parking supply rate (and subsequent peak period traffic generation) for commercial employees is likely to provide the most benefits for the transport network, with a large number of rail and bus services available at peak commuting times. There is also a significant opportunity to reduce the parking rates for retail employees and visitors as many retail trips are likely to come from adjacent workplaces, residences and hospital visitors (within walking distance), with retail employees also having access to good public transport services. Although the residential parking is not included in the MUP parking cap, benefits were identified from reducing residential parking rates such as assisting in reducing the cost of dwellings and attracting key hospital workers, local students and residents who are interested in sustainable travel options.

The proposed parking rates for the MUP are based on the identified opportunities to reduce the parking supply and extensive research into comparative activity centre developments in Perth and throughout Australia. The proposed **maximum** parking supply rates are outlined in the following table. The parking rates are in accordance with the conditional subdivisional approval based on a previous design (approved 26 April 2013), exceeding the minimum public parking requirements.

Proposed MUP Parking Rates

Land Use	Parking Supply Rate (maximum)
Residential Tenants	- 1 & 2 bedroom dwellings - average of 1.1 parking spaces per dwelling - 3 bedroom dwellings – 2 parking spaces per dwelling
Residential Visitors	- An additional 5% of the residential tenant parking supply
Commercial and Commercial Health	- 1 space per 60 square metres Gross Floor Area (GFA) - A minimum of 25% of the total permitted parking supply to be designated as public parking*****
Hotel Accommodation Employee and Visitor	- 1 space per 3 bedrooms - A minimum 25% of the total permitted parking supply to be designated as public parking*****
Large Retail (>1000 square metres) Employee and Visitor	- 1 space per 35 square metres GFA to be designated as public parking
Small Retail (<1000 square metres) Employee and Visitor	- 1 space per 50 square metres GFA to be designated as public parking

* *Where more than 6 public parking bays are required*

There are limited opportunities to provide on-street public parking within the MUP and the development of a site solely to provide parking is not permitted. Public parking supply rates are therefore incorporated into the total parking supply for the major MUP activities. This will provide the additional benefit of dispersing the public parking

areas throughout the MUP, minimising amenity impacts and distributing the traffic generation across the street network. The public parking must be managed to provide access for visitors to all destinations, but can include time or fee restrictions to prioritise short-term visitor parking over all day commuter parking.

The estimated parking supply for activities included in the MUP parking cap assessment is summarised below.

Estimated Parking Supply for Land Uses included in the Parking Cap

Land Use	Ultimate Floorspace	Maximum Parking Rate	Estimated Total Parking Supply	Minimum Public Parking Supply	Maximum Tenant / Employee Parking Supply
Commercial / Commercial Health	41,360 square metres GFA	- 1 space per 60 square metres GFA - A minimum of 25% of the total parking supply to be designated as public parking**	689 bays	172 public parking bays (minimum)	517 employee parking bays (maximum)
Hotel Short-Term Accommodation	82 bedrooms	- 1 space per 3 bedrooms - A minimum of 25% of the total parking supply to be designated as public parking**	27 bays	7 public parking bays (minimum)	20 employee parking bays (maximum)
Large Retail (Supermarket)	2,800 square metres GFA	- 1 space per 35 square metres GFA - 100% of the total parking supply to be designated as public parking	80 bays	80 public parking bays	-
Small Retail	2,480 square metres GFA	- 1 space per 50 square metres GFA - 100% of the total parking supply to be designated as public parking	50 bays	50 public parking bays	-
On-Street Parking	-	-	41 bays 21 bays (existing) on Barry Marshall Parade and 20 bays (proposed) on Road 1	41 public parking bays	-
Total Estimated Parking Spaces for Parking Cap Assessment			**887 bays**	**Minimum 350 public parking bays (39%)**	**Maximum 537 employee / tenant parking bays**

** *Where more than 6 public parking bays are required*

Approximately 887 commercial, hotel, retail and on-street parking spaces are provided within the MUP development site. This is less than the parking cap of 1,629 bays (170 bays per hectare). This provides flexibility to provide additional spaces without exceeding the parking cap, for example, for specific practitioner demands.

If the demand for commercial, retail or hotel accommodation floorspace is more than the anticipated yields included in the MUP Draft LSP, employee and visitor parking will need to be managed to ensure the total MUP parking cap of 170 bays per hectare is not exceeded. Approval for additional floorspace would require a developer to demonstrate how access can be managed without increasing the total parking supply or how additional parking would not significantly impact peak period traffic congestion.

An estimated 350 public parking spaces (39 per cent) could be dispersed across the MUP development sites and on-street parking spaces. This meets the Murdoch Parking Policy requirement of a minimum of 25 per cent of the parking supply for activities included in the parking cap assessment to be provided as public parking.

Parking for residential tenants and visitors is in addition to the estimated 887 commercial, retail, hotel and on-street parking spaces. Additional parking for people with disabilities and service vehicles is to be provided to meet the Building Code of Australia, Australian Standards and City of Melville specifications. Minimum provision for bicycle parking within each development is also included in this Parking Strategy.

A Development Application must be lodged by the future land owners of individual sites within the MUP, which will include the proposed site parking provision to comply with the maximum parking rates outlined in this Strategy. The Development Application must include a Parking Management Plan outlining the management and enforcement of parking, and a Travel Plan as specified in the Murdoch Parking Policy.

1.0 Introduction

The Murdoch Mixed Use Precinct (MUP) provides an opportunity to develop a transit-orientated hub in a significant and rapidly growing activity centre. The MUP will also support the specialised health and education facilities and provide a range of daily activities, including student and residential dwellings, within walking and cycling distance of key commercial and retail activities.

The site is located alongside the Kwinana Freeway and South Street road interchange and Murdoch Rail and Bus Station. These transport corridors also provide access to other major Murdoch activities, including Fiona Stanley Hospital, St John of God Hospital and Murdoch University. In recognition of the limited available road capacity at Murdoch, the State Government developed the *Murdoch Activity Centre: Access and Parking Policy* (Western Australian Planning Commission (WAPC), 2011). This Policy outlines parking supply limits and management principles to support transit orientated development and reduce peak period traffic generation across the Murdoch Activity Centre.

LandCorp are the State Government agency tasked with developing the Murdoch MUP Structure Plan and providing the supporting infrastructure, Development Guidelines and Parking Strategy to ensure the site's objectives are met. This Parking Strategy identifies feasible parking supply rates which are aligned with the Murdoch Parking Policy objectives, and encourage an increase in public transport, walking and cycling trips for the precinct. The parking rates outlined in this Strategy represent the maximum permissible supply for the major land uses proposed in the MUP Structure Plan.

The Parking Strategy also identifies complimentary parking management measures which can be considered by future land owners and developers of the MUP site. These complementary measures provide opportunities for future developers to support a reduced parking supply on their site, but are not mandatory to meet this Parking Strategy or Murdoch Parking Policy requirements.

1.1 MUP Transport Objectives

The MUP vision includes seven transport objectives to provide an accessible and sustainable centre. The supply and management of parking will influence the travel choices made by the MUP commuters, visitors and residents, and is a key component of achieving an increase in public transport, walking and cycling trips.

The transport objectives for the MUP are:

- Provide easy & safe access to the bus/rail interchange.
- Provide effective pedestrian linkages through the site.
- Strengthen pedestrian and cycle connectivity to and within the precinct.
- Promote public transport by providing easy, regular and convenient connections.
- Modal split target: 40 per cent Public Transport.
- Low car dependency.
- Transitions from a transit 'Origin' to 'Destination' over time.

1.2 Murdoch Activity Centre Access and Parking Policy

The State Government intends to provide detailed guidance for parking management in Specialised Activity Centres in the proposed *State Planning Policy - Metropolitan Centres Parking.* As this is not yet published, the MUP Parking Strategy has been developed to complement the parking supply and management principles in the *Murdoch Activity Centre Access and Parking Policy*.

The Murdoch Parking Policy includes parking supply rates based on the predicted medium and long-term capacity of the surrounding road network. For the MUP, the Murdoch Parking Policy sets **a parking cap of 170 car parks per hectare**. The cap for the MUP site equates to a maximum supply of 1,629 bays (based on a 9.5 hectare site area). This cap is intended to constrain peak period travel, therefore targeting commercial and long-term visitor parking.

The parking cap excludes the following parking facilities present within the MUP site:

- The Public Transport Authority (PTA) Park ‘n’ Ride facility.
- Special purpose parking (such as disabled bays, motorbike parking, and loading zones).
- Private residential parking, including residential visitor parking spaces.

1.3 MUP Subdivision Approval Conditions

Conditional subdivision approval was previously obtained for the MUP site, based on a previous scheme. Although the current proposal has a slightly different layout and design for the site, it is broadly consistent with the previous proposal in terms of land use and yields and thus the previous subdivision conditions are relevant to this proposal. The subdivision approval for the MUP site included conditions for the parking supply and management. These conditions are consistent with the objectives of the *Murdoch Activity Centre Access and Parking Policy* to minimise peak period traffic generation for the MUP site and provide an efficient parking supply. The maximum parking rates in this Parking Strategy meet the subdivision approval conditions.

2.0 MUP Parking Rates

The Murdoch MUP presents a unique opportunity to reduce the parking supply compared to standard commercial, retail or residential developments. This is due to the mixed use nature of the site, and ease of access to local and regional public transport services. The site is being designed to promote self-sufficiency, encouraging short walking trips for a range of daily activities between dwellings, workplaces, supermarkets, cafes and other retail facilities. In addition, the placement of the site immediately adjacent to Murdoch Station, with transit access prioritised along the central road corridor within MUP (Barry Marshall Parade) promotes public transport access for residents, workers, visitors and students to key activities within the Murdoch Activity Centre.

2.1 Opportunities to Minimise Parking

The parking demand from different uses was assessed to identify opportunities and transport network benefits for reducing the parking supply from standard parking rates. The assessment considered the parking demand for the proposed general land uses at MUP; residential, commercial, large and small retail and short-term accommodation (hotel) activities.

The criteria considered in this assessment were as follows:

- Are other travel options available which match typical travel times and needs of the activity?
- Is the activity likely to generate car trips at peak travel times on the MUP and adjacent regional road network?
- Can parking be shared with other users (as public parking) or used by alternative activities at different times (reciprocal use)?

The assessment identified some opportunities to reduce the parking supply for all the activities. In particular reducing the parking rates (and subsequent parking demand) for commercial employees is likely to provide the most benefits for the transport network, with a large number of rail and bus services available at peak commuting times. There is also a significant opportunity to reduce the parking rates for retail employees and visitors as many retail trips are likely to come from adjacent workplaces, residences and hospital visitors, with retail employees also having access to good public transport services. There is some opportunity to reduce the parking rates for residential tenants and visitors, which will assist with reducing the cost of dwellings and attracting key hospital workers, local students and residents who are interesting in sustainable travel options.

More details on the assessment ratings for each land use activity are provided in **Appendix A**.

2.2 Proposed MUP Parking Rates

The maximum proposed MUP parking rates are outlined in **Table 1**. These rates are based on the opportunities to reduce the parking supply identified in the previous section, and extensive research into comparative activity centre developments in Perth and throughout Australia. These maximum rates are considered acceptable to attract the desired commercial investment in the site, whilst still aiming to reduce the proportion of car trips to the centre when compared to traditional Perth metropolitan developments. As such, the rates set a benchmark for TOD developments in Perth. A comparison to the parking rates in comparable centres is provided in **Appendix B**.

Table 1 Proposed MUP Parking Rates

Land Use Activity	Parking Supply Rate (maximum)	Supporting Information
Residential Tenants	1 & 2 bedroom dwellings - average of 1.1 parking spaces per dwelling 3 bedroom dwellings – 2 parking spaces per dwelling	The proposed maximum residential parking rate is less than the standard R-Codes rate, and allows flexibility in supply for individual dwellings within each site. Extensive research in the USA supports a reduced MUP residential parking provision, indicating a 20% reduced parking demand (Parker and Arrington, 2002) and a 44% reduction in vehicle trips (50% at peak times - Cervero and Arrington, 2008) for residents living in a TOD compared to surrounding suburban dwellings. Due to the site location some residents will only require 1 or even 0 spaces (such as student dwellings), which allows other residents to lease / purchase additional spaces as required. This would support resident parking to be unbundled from lease /

Land Use Activity	Parking Supply Rate (maximum)	Supporting Information
		purchase of residential strata lots to allow more efficient use of resident parking.
Residential Visitors	**An additional 5%** of the residential tenant parking supply	The residential visitor supply is for visitors originating from the broader metropolitan area who do not have reasonable access to public transport due to the time of visit or length of their trip. A number of visits will take place after hours when there is less demand for on-street parking and public parking within the MUP, allowing for a reduced visitor parking rate within each individual residential site.
Commercial and Commercial Health Employee	1 space per 60 square metres Gross Floor Area (GFA)	Commuters to MUP commercial activities are a key target for the desired 40 per cent of MUP trips by public transport. To support this target, a considerable reduction in the standard commercial parking supply rate is proposed (Melville City Council – 1 space per 40 square metres). The reduced commercial parking supply (in conjunction with increased public transport use and opportunity for workers to live within MUP) is considered to be feasible for the MUP site. This is supported by USA research which indicates an increase in TOD public transport commuter use by a factor of 5 compared to the surrounding city (Lund, Cervero & Willson, 2004).
Hotel Accommodation Employee	1 space per 3 bedrooms	This maximum rate is less than the standard City of Melville requirements, but more than the standard Road Transport Authority (NSW) rate of 1 per 5 bedrooms which is often used a benchmark in traffic assessments. Due to site location, many interstate and international short-term tenants will not require a car reducing the parking demand. The maximum parking supply will still allow for some visitors to arrive by car, and provide some capacity for employee parking. Parking for restaurants / bars within a hotel should be supplied based on the retail parking rates. Parking for conference facilities would need to be assessed on an individual basis, with the availability of public transport access and general public parking considered rather than an additional supply of parking for the exclusive use of conference attendees.
Commercial, Commercial – Health and Hotel Accommodation Visitor	**A minimum 25%*** of the employee parking supply to be provided as public parking	This parking is provided for visitors to specialised commercial activities who originate from outside the Murdoch Activity Centre. The parking is to be designated as public parking for short-term visitors, with management and enforcement measures to be outlined in the Travel Plans and Parking Management Plans submitted as part of each development application.
Large Retail (>1000 square metres) Employee and Visitor	1 space per 35 square metres GFA, **100% to be provided as public parking**	Large retail includes supermarkets or other larger retail centres. All of this parking is proposed to be supplied as public parking. The proposed rate is a reduction on the standard rate used at other centres in Perth but will still supply adequate parking for the range of MUP visitors who will likely make use of this car park. It is recommended for the parking fee rates to be managed to prioritise the large retail visitors, followed by short-term visitors. All day commuter parking should be discouraged through appropriate fees and / or time limits for a large proportion of the public parking.
Small Retail (<1000 square metres)	1 space per 50 square metres GFA, **100% to be**	This parking rate is similar to the minimum parking rate proposed for other TOD developments. A large proportion of the retail within the MUP development is likely to be categorised as small retail and this is

Land Use Activity	Parking Supply Rate (maximum)	Supporting Information
Employee and Visitor	**provided as public parking**	considered a moderate parking rate to ensure there is some supply of public and retail commuter parking within each development site.

**Only applicable for sites where more than 6 public parking bays would be required*

2.3 Public Parking

Public parking provides an opportunity to minimise the overall supply of visitor parking by providing a shared parking resource. The shared public parking can be used by visitors accessing multiple activities within the MUP site and allowing reciprocal use of parking by activities with different peak visitor times (such as weekday commercial health visitors and weekend / after-hours residential or retail visitors).

There are limited opportunities to provide on-street public parking within the MUP and the development of a site solely to provide parking is not permitted under the Murdoch Parking Policy. Public parking supply rates are therefore incorporated into the total parking supply for the major MUP activities. This will provide the additional benefit of dispersing the public parking areas throughout the MUP, minimising amenity impacts and distributing the traffic generation across the street network.

The proposed parking rates include a minimum 25 per cent of the total parking supply (100 per cent for the retail activities) to be designed and managed as public parking. This excludes residential parking and other activities which are exempt from the Murdoch Parking Policy maximum parking supply cap. Consistent with the MUP conditional subdivision approval, the minimum public parking supply is only applicable if more than six public parking spaces are required for an individual lot based on the maximum permissible employee parking rate (even if less employee parking is elected to be supplied).

The public parking must be available for visitors to all destinations, but can include time or fee restrictions to prioritise short-term visitor parking over all day commuter parking. More information on the management of public parking areas is provided in **Section 5.1.3**.

3.0 MUP Development Yields

The proposed site and road layout for the MUP development is illustrated in **Figure 1**. The ultimate scale of development for different land uses is summarised in **Table 2**, with two yield density scenarios developed:

- Scenario 1 – High
- Scenario 2 – Medium

The two scenarios differ only in the number of residential apartments provided.

Figure 1 MUP Development Plan

Source: Murdoch MUP Preliminary Site Plan (ARM Architecture, 10 July 2015

Table 2 Proposed MUP Ultimate Development Yields

Land Use	Ultimate Floorspace / Dwellings	
	Scenario 1 - High	Scenario 2 - Medium
Commercial / Commercial Health	41,360 square metres GFA	
Hotel Short-Term Accommodation	82 bedrooms	
Large Retail (Supermarket)	2,800 square metres GFA	
Small Retail	2,480 square metres GFA	
Residential	1,234 apartment dwellings	913 apartment dwellings

4.0 Parking Supply

4.1 Land Uses included in the Parking Cap

The Murdoch Parking Policy specifies a maximum parking supply of 170 car parks per hectare or 1,629 bays for the MUP development site (the MUP land area is 9.585 hectares). This parking cap only applies to the following proposed land uses for the MUP:

- Commercial and Commercial Health.
- Hotel Short-Term Accommodation.
- Retail.
- On-street public parking.

An estimate of the parking supply for these activities is provided in **Table 3**. The estimated parking supply is based on the ultimate scale of development for MUP and the maximum parking supply rates outlined in **Table 1**.

Table 3 Estimated Parking Supply for Land Uses included in the Parking Cap

Land Use	Ultimate Floorspace	Maximum Parking Rate	Estimated Total Parking Supply	Minimum Public Parking Supply	Maximum Tenant / Employee Parking Supply
Commercial / Commercial Health	41,360square metres GFA	- 1 space per 60 square metres GFA - A minimum of 25% of the total parking supply to be designated as public parking	689 bays	172 public parking bays (minimum)	517 employee parking bays (maximum)
Hotel Short-Term Accommodation	82 bedrooms	- 1 space per 3 bedrooms - A minimum of 25% of the total parking supply to be designated as public parking	27 bays	7 public parking bays (minimum)	20 employee parking bays (maximum)
Large Retail (Supermarket)	2,800 square metres GFA	- 1 space per 35 square metres GFA - 100% of the total parking supply to be designated as public parking	80 bays	80 public parking bays	-
Small Retail	2,480 square metres GFA	- 1 space per 50 square metres GFA - 100% of the total parking supply to be designated as public parking	50 bays	50 public parking bays	-
On-Street Parking	-	-	41 bays 21 bays (existing) on Barry Marshall Parade and 20 bays (proposed) on Road 1	41 public parking bays	
Total Estimated Parking Spaces for Parking Cap Assessment			**887 bays**	**Minimum 350 public parking bays (39%)**	**Maximum 537 employee / tenant parking bays**

As outlined in **Table 3**, based on the forecast ultimate development the estimated parking supply for activities included in the Murdoch Parking Policy is 887 parking bays. This is 742 bays less than the maximum permissible supply of 1,629 bays (maximum 170 bays per hectare for the MUP site). The estimated minimum public parking supply is 39 per cent, which is comparable to the proportion of public parking provided in the Perth CBD. There is thus capacity to provide additional spaces without exceeding the parking cap, for example, this spare capacity could be used to allow commercial health activities to provide additional parking to meet specific practitioner demands. The approval of additional parking would however require an assessment of the impact on the peak period traffic congestion.

The estimated parking supply is based on the forecast ultimate MUP development. Should there be demand for additional commercial, retail or hotel accommodation floorspace in the future, this could be provided if a developer can demonstrate alternative access measures for employees and visitors which do not result in the parking exceeding the maximum parking cap of 1,629 bays for the total MUP site (or for additional parking spaces which don't generate peak period trips).

4.1.1 Employee Parking Rates and Target Mode Share

The MUP target of 40 per cent of trips by public transport is most critical for commuter trips which take place at peak travel periods. The proposed parking supply rates outlined in this strategy aim to reduce traffic generation by commuters, and encourage more public transport trips. To assess the potential contribution of the proposed parking rates to achieving this target, a high level comparison of the estimated supply of commuter parking against the forecast number of commercial and retail employees is provided in **Table 4**. The potential employee numbers included in **Table 4** are based on the forecast MUP employment generation *(* Urbis, 2015).

Table 4 Projected MUP Employees and On-Site Employee Parking

Land Use	Gross Floor Area	Forecast Employee Numbers (Ultimate)	Proposed Parking Supply	% of Employees with access to a Parking Space
Commercial & Commercial Health	41,360 square metres	2,112 employees	689 total bays: 517 employee bays 172 visitor bays	24%
Retail	5,280 square metres	206 employees	130 total bays*: 45 employee bays 85 visitor bays	22%*

*Assumes a maximum of 50% of small retail parking and maximum 25% of large retail parking available for employees, with the remainder used for short-term visitor parking

This comparison allows a potential 'car as driver' mode choice to be calculated, providing for up to 24 per cent of commercial employees and 22 per cent of retail employees to drive to work (in a worst case scenario where everyone within each workplace worked at similar times). In addition to this, a number of employees would arrive as passengers in a car (either dropped off or in a car share arrangement). Allowing for an extra 10 per cent of commuters to arrive as car passengers, a total of 34 per cent of commercial and commercial / health employees and 32 per cent of retail employees could arrive by car. The remaining 66 per cent of commercial and commercial / health employees and 68 per cent of retail employees would arrive by public transport, walking or cycling, exceeding the MUP target of 40 per cent of trips by public transport.

This high level assessment indicates the proposed parking supply rates included in this Strategy will contribute to reducing traffic generation by MUP commuters, supporting the objectives of the MUP development and the Murdoch Parking Policy.

4.2 Land Uses excluded from the Parking Cap

Parking requirements for land uses and activities not included in the MUP parking cap assessment are discussed in this section.

4.2.1 Residential Parking

Residential tenant and visitor parking bays are considered to generate counter-flow peak period trips for the MUP and adjacent regional road network. These parking bays are thus not included in the calculation of the parking cap assessment for the MUP site, as outlined in the Murdoch Parking Policy.

In the high density yield scenario (Scenario 1), an estimated supply of 1,234 apartment dwellings is proposed for the MUP site, which is expected to be supplied as a mix of one, two and three bedroom apartments. In the medium density yield scenario (Scenario 2), an estimated 913 apartment dwellings are proposed. It is noted that the exact ratio of apartment sizes would be determined by the developer.

The estimated total parking supply for the residential dwellings for both scenarios is provided in **Table 5**. The proposed parking rates include specific provision for residential visitors, and in addition residential visitors will be able to use the on-street and proposed off-street public parking bays. There is likely to be low demand from commercial visitors for the public parking bays in the evenings and on weekends, when residential visitor demand is most likely at its highest. This will enable 'reciprocal' use of the public parking bays between these movements.

It is noted that the estimated parking supply in **Table 5** is based on an assumed ratio of 95 percent of dwellings being 1 and 2 bedroom apartments and 5 percent of dwellings being 3 bedroom apartments; however the exact ratio would be determined at a later stage by the developer.

Table 5 Estimated Residential Parking Supply

No. of dwellings		Maximum Parking Rate	Estimated Parking Supply	
Scenario 1 – High	Scenario 2 – Medium		Scenario 1 – High	Scenario 2 – Medium
1,234 dwellings	913 dwellings	**Residential tenants:** 1 & 2 bedroom dwellings – average of 1.1 parking spaces per dwelling 3 bedroom dwellings – 2 parking spaces per dwelling	1,412 parking bays	1,045 parking bays
		Residential visitors: An additional 5% of the residential tenant parking supply	70 parking bays	52 parking bays
Total Estimated Parking Spaces			**1,482 residential bays**	**1,097 residential bays**

4.2.2 Parking for People with Disabilities

This parking is to be provided in accordance with the minimum parking requirements for people with disabilities outlined in the Building Code of Australia and designed to meet Australian Standards dimensions and access specifications. These parking bays are not included in the calculation of the parking cap assessment for the MUP site, as outlined in the Murdoch Parking Policy.

4.2.3 Service Vehicle Parking

Service vehicle parking requirements should be assessed on an individual basis for each development site. As a minimum, in commercial developments over 500 square metres at least one permanently reserved parking bay should be provided for service, delivery and courier vehicles (as specified in the City of Melville Car Parking Policy CP- 079). These parking bays are not included in the calculation of the parking cap assessment for the MUP site, as outlined in the Murdoch Parking Policy.

4.2.4 Bicycle Parking

Providing easily accessible and functional end of trip facilities for cyclists will be important to attract commuter and visitor cycling trips for the MUP. The City of Melville does not specify minimum bicycle parking rates for new developments. The City of Fremantle and City of Vincent include mixed use precincts in their city centres and have parking policies which include minimum bicycle parking details for different land uses. Bicycle parking rates are also included in the Austroads Guide to Traffic Management Part 11: Parking (2008). The recommended minimum bicycle parking rates identified in **Table 6** are based on these parking policies. These minimum parking rates are in addition to bicycle parking provided in the MUP public spaces.

Table 6 Recommended minimum bicycle end of trip facilities for the MUP

Land Use	Minimum supply	Supporting information
Residential	Adequate storage space per dwelling to accommodate a bicycle (as per AS 2890.3 Parking Facilities Part 3: Bicycle parking facilities); and 1 bicycle park per 4 dwellings. Alternatively – a minimum of 1 secure bicycle park per dwelling to be provided	This is more than the minimum bicycle parking rate recommended by City of Vincent and City of Fremantle; but is considered appropriate for the MUP site due to the access to regional bicycle network and the attractiveness of residential options for local students and employees
Residential visitor	1 space per 16 dwellings	To be provided in a publicly accessible area near visitor entrance, either visible from street or clearly signposted
Commercial	1 space per 200 square metres of GFA	It is recommended for shared visitor bicycle parking to be provided in a prominent location outside each development site, or within car park areas clearly signposted from the street
Large Retail (>1000 square metres)	1 space per 300 square metres GFA for employees; and 1 space per 200 square metres GFA for visitors	To be provided in publicly accessible space near main shop entrance, preferably visible from street or clearly signposted
Small Retail (<1000 square metres)	**Café**: 1 space per 25 square metres GFA for employees and 2 spaces for visitor parking **Restaurant:** 1 space per 100 square metres GFA and 2 spaces for visitor parking **Take-away food outlet:** 1 space per 100 square metres GFA for employees and 1 space per 200 square metres GFA **All other small retail:** 1 space per 300 square metres GFA for employees; and 1 space per 200 square metres GFA for visitors	It is recommended for shared visitor bicycle parking to be provided in a prominent location outside each development site, or within car park areas clearly signposted from the street
Hotel Accommodation	1 bicycle park per 40 units	It is also recommended for hotel management to provide several bicycles for free use by hotel visitors to encourage short bicycle trips around the MUP and MAC site.
End of Trip facilities (excludes residential uses)	Developments required to provide 10 or more bicycle parking bays must also provide: - A minimum of one female shower and one male shower, located in separate change rooms. - Additional shower facilities to be provided at a rate of one female shower and one male shower for every additional 10 bicycle parking bays, to a maximum of five female and five male showers per development. - A locker to be provided for every bicycle parking bay provided	

The Green Building Council of Australia include minimum bicycle parking rates in the Green Star assessment. These are based on the number of employees rather than the development floorspace. The Green Star minimum bicycle parking rates can be used instead of the minimum parking rates outlined in **Table 6.**

Table 7 Green Star Minimum Employee Bicycle Parking Rates

Minimum Parking Rate for 1 Point	Minimum Parking Rate for 2 Points
- One secure bike parking space per 20 staff - One shower for every 10 bike parking spaces - Change facilities adjacent to showers - One secure locker per bike space in the change facilities	- One secure bike space per 10 staff - One shower for every 10 bike parking spaces - Change facilities adjacent to showers - One secure locker per bike space in the change facilities

5.0 MUP Parking Management Opportunities

Section 5.1 outlines measures which must be considered by future developers / land owners to ensure parking is managed to reduce peak period traffic generation and is available for the intended user (short-term visitor or weekday commuter). **Section 5.2** provides recommendations for additional measures which may be considered by future site developers / land owners to provide an efficient parking supply, but are not mandatory to meet the Murdoch Parking Policy requirements.

5.1 Mandatory Parking Management Measures

The parking measures outlined in the following section must be considered by future developers to obtain development approval for their site.

5.1.1 Parking Space Ownership

As specified in the Murdoch Parking Policy and MUP conditional subdivision approval, the lot owner is to retain ownership and management of the parking spaces for activities included in the Murdoch Parking Policy parking supply cap. This will ensure parking spaces within each lot are managed efficiently, allowing for reciprocal use where possible and providing a shared, well designed public parking area. It will also ensure the spaces are managed and enforced for their intended use, preventing leasing or licensing of parking spaces for other activities. An exemption to this is the potential placement of public parking on an adjacent or near-by property. This could provide benefits for both visitors and site owners / developers, allowing for more efficient access and layout, wayfinding, enforcement and management of public parking spaces.

5.1.2 Workplace and Residential Travel Plans

Each site user and employer will be required to develop and implement a Travel Plan, as well as a Parking Management Plan. Initiatives to support sustainable transport use and reduce the overall parking demand specific to each activity will be investigated as part of the development process, with a Draft Travel Plan and Parking Management Plan to be submitted with all development applications.

5.1.3 Public Parking

The proposed MUP parking rates include a requirement for commercial, retail and non-permanent accommodation land uses to provide public parking as part of their total parking supply, except where six or less public parking spaces are required. The site owner or developer will be responsible for allocating parking for individual activities within each site. It is recommended for a section of car park on each site to be designed as the public parking area for all the individual site activities. This would enable signage, access and maintenance of the public parking for individual shops or offices to be efficiently managed, and to be easily located by visitors. The area must be available for public access at all times, subject to time or fee restrictions which discourage all day commuter parking.

The public parking is to be managed to discourage additional peak period car trips, with employees of these activities contributing to the largest number of peak trips. Site owners or managers must outline the intended management and enforcement of their public parking supply to ensure these bays are not used as all-day commuter parking. Management can include parking time limits or the charging of fees for longer-stay weekday visitors.

The public parking management and enforcement measures are to be outlined in the site Travel Plan and Parking Management Plan, to be submitted and implemented as part of the development approval process. The Parking Management Plan could include the placement of public parking on a nearby or adjacent site if it is shown to provide user benefits or to overcome site constraints. Consideration of cash-in-lieu for public parking may also be considered by the WAPC.

5.2 Optional Parking Management Measures

The complimentary measures outlined in the following section provide opportunities for future developers to support a reduced parking supply on their site, but are not a development requirement to meet the Murdoch Parking Policy objectives.

5.2.1 Commuter Parking

The management of commuter parking is essential to discourage unnecessary commuter car trips and ensure visitor parking is not occupied for long periods by commuters. As well as minimising the supply of employee parking, management should also consider:

- Appropriate parking fees to reflect the true cost of parking and reduce commuter parking demand with charging on a 'pay as you park' basis rather than monthly or yearly parking fees.
- Reduced parking fees or exclusive parking spaces prioritised for car share (cars arriving with at least two occupants). This would require parking spaces to be monitored (in person or electronically) to restrict these benefits to car drivers arriving with passengers.

It is also recommended for future land owners to investigate opportunities for reciprocal use of parking which could reduce the overall parking supply within their site, saving development costs and increasing design flexibility. After hours use of commercial parking by hospitality, leisure and residential activities within a specific site is one potential opportunity.

5.2.2 Residential Parking

The proposed residential parking rates support the parking to be unbundled from the lease or purchase of dwellings to allow more efficient use of resident parking. Placing a financial value on car parking spaces will encourage prospective residents to only lease or purchase the number of parking spaces they actually require. This arrangement will also attract residents who do not require a car for any of their daily trips, such as those who work or study within the MAC or are able to commute by bus or rail to external workplaces. Purchasing or renting a dwelling without parking will reduce the cost to prospective residents, making the MUP residential apartments more attractive than surrounding traditional dwelling options.

It is also recommended for residential car parks to be designed to enable ultimate flexibility for different vehicle types. For example, designing bays as skinny and deep allows parking for two micro cars or one standard car and a motorbike/scooter. On-wall / pillar bicycle parking can also be provided at the end of each space to enable owners to store bicycles outside their home.

5.2.3 Hotel and Residential Car Share Scheme

To reduce the car parking supply and provide a more attractive facility for prospective residents and hotel customers, it is recommended for developers to coordinate with companies providing short-term car rental or car share schemes as part of a site development. Car share operates in a similar manner as bicycle share schemes, with members paying an annual fee to access shared vehicles located close to their work or homes. This would enable residents who may occasionally need a car for weekend trips or activities which can't be accessed by public transport to join a car share scheme rather than rely on private car ownership.

Residential car share schemes are well established in Sydney, Melbourne and Brisbane, with five different companies providing private car share services in Australia. The car share schemes are often supported by Local Government through the provision of free on-street parking spaces for designated car share vehicles, as occurred in the City of Fremantle when a private car share scheme operated between 2007 and 2010. Proposals for new TOD developments in the eastern states, such as development sites in the Footscray Central Activities District, are including space for car share vehicles (in conjunction with the private car share operators) to support a reduced parking supply for individual tenants.

6.0 MUP Impact on Park ‘n’ Ride Facility

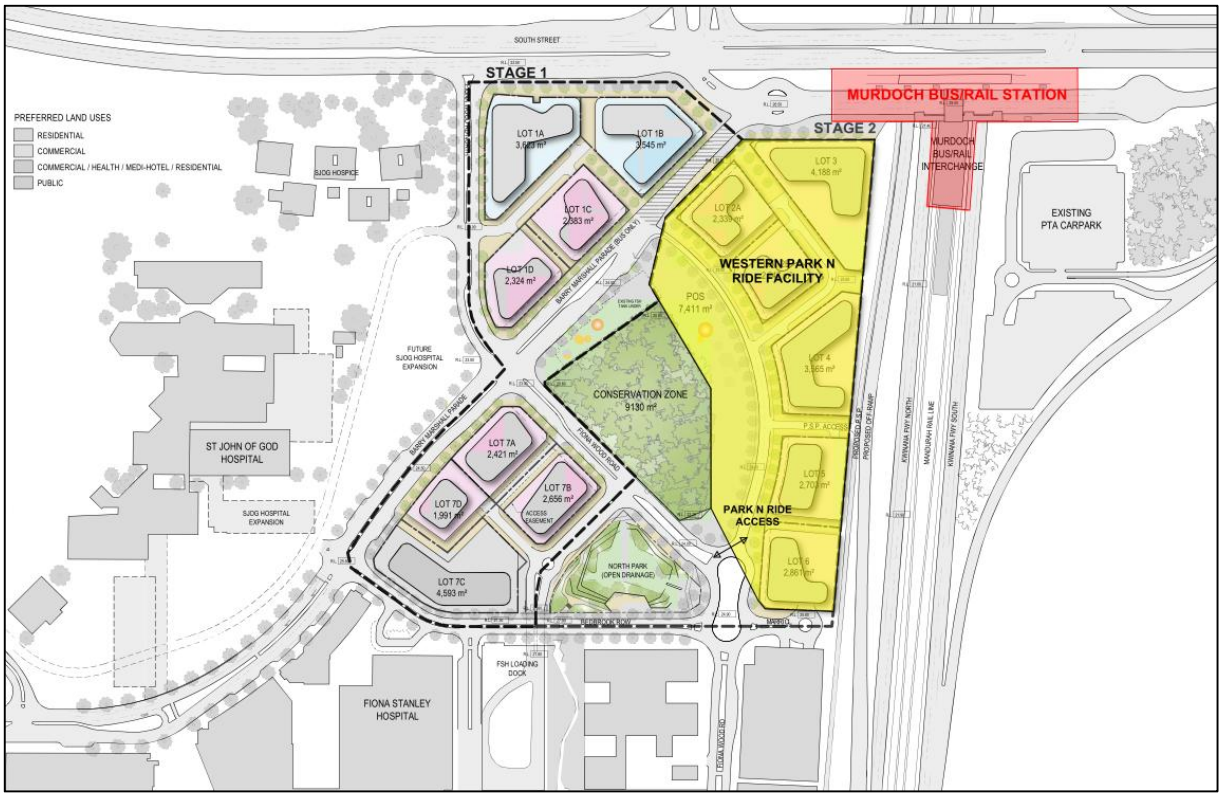
The large western section of the Murdoch Station Park ‘n’ Ride facility is located within the MUP Stage 2 development site. As well as impacting on the MUP development site, the retention of the western Park ‘n’ Ride facility in the current location will impact on peak traffic generation on the MUP and surrounding regional road network. The parking facility peak traffic movements coincide with the morning (6:45-7:45 AM) and afternoon (15:30-16:30 PM) peak movements for the two hospitals adjacent to the MUP site.

For Stage 1 of the MUP development, the western Park ‘n’ Ride facility will be retained within the MUP Stage 2 site. Existing access will be maintained via Fiona Wood Road, as illustrated in **Figure 2**.

It is intended for the western Park ‘n’ Ride facility to be relocated prior to Stage 2 of the MUP development. Several relocation options are under investigation by the PTA and Department of Transport, including the construction of a multi-storey carpark over the existing eastern Park ‘n’ Ride facility. The relocation options would remove all Park ‘n’ Ride vehicle traffic from the MUP network by Stage 2 of the development. The relocation options are subject to further investigations by the PTA and the Department of Transport, followed by consideration by the State Government. Although the Government lease agreement for the western Park ‘n’ Ride site expires in 2017, the relocation will only occur when there is agreement on a suitable option by all relevant government stakeholders.

It is noted that the recently implemented SmartParker system will prevent the use of the PTA car park by MUP commuters and visitors (and the adjacent hospital sites).

Figure 2 MUP Stage 1 Access to the Existing Western Park ‘n’ Ride Facility



7.0 Conclusion

The MUP Parking Strategy identifies opportunities to minimise traffic generation at peak travel times whilst supporting the commercial development of the site. The proposed parking supply rates were developed through research into parking provision at comparable TOD sites, consideration of travel options available for each activity and opportunities to share parking. The parking rates are in accordance with the conditional subdivisional approval based on a previous design (approved 26 April 2013), exceeding the minimum public parking requirements.

The proposed **maximum** parking supply rates are summarised in **Table 8**:

Table 8 Proposed MUP Parking Rates

Land Use	Parking Supply Rate (maximum)
Residential Tenants	- 1 & 2 bedroom dwellings - average of 1.1 parking spaces per dwelling - 3 bedroom dwellings – 2 parking spaces per dwelling
Residential Visitors	- An additional 5% of the residential tenant parking supply
Commercial and Commercial Health	- 1 space per 60 square metres Gross Floor Area (GFA) - A minimum of 25% of the total permitted parking supply to be designated as public parking
Hotel Accommodation Employee and Visitor	- 1 space per 3 bedrooms - A minimum 25% of the total permitted parking supply to be designated as public parking*
Large Retail (>1000 square metres) Employee and Visitor	- 1 space per 35 square metres GFA to be designated as public parking
Small Retail (<1000 square metres) Employee and Visitor	- 1 space per 50 square metres GFA to be designated as public parking

**Where more than 6 public parking bays are required*

The *Murdoch Activity Centre Access and Parking Policy* sets a maximum parking cap of 1,629 bays or 170 bays per hectare for the MUP site, for commercial, retail and all other non-permanent residential activities (excluding special purpose bays). Based on the ultimate scale of development included in the MUP Draft LSP, the proposed parking rates would supply a maximum of 887 parking spaces for the activities included in the parking cap assessment. This is 742 bays less than the maximum permissible commercial and retail parking supply of 1,629 bays. This provides capacity for additional spaces to be provided without exceeding the parking cap, such as for commercial health activities to provide for practitioner demands.

If the demand for commercial, retail or hotel accommodation floorspace is more than the anticipated yields included in the MUP Draft LSP, employee and visitor parking will need to be managed to ensure the total MUP parking cap of 170 bays per hectare is not exceeded. Approval for additional floorspace would require a developer to demonstrate how access can be managed without increasing the total parking supply or how additional parking would not significantly impact peak period traffic congestion.

The estimated total parking supply of 887 parking spaces for activities included in the MUP parking cap assessment incorporates a minimum 350 or 39 per cent public parking spaces (including 41 on-street parking bays). This is similar to the proportion of public parking provided in the Perth CBD and exceeds the minimum 25 per cent public parking required by the MUP conditional subdivisional approval and the *Murdoch Activity Centre Access and Parking Policy.* These parking bays must be available for visitors to all destinations, but can include time or fee restrictions to prioritise short-term visitor parking over all day commuter parking.

The management of parking spaces will be critical to ensure visitor parking is retained for short-term visitors rather than employee parking during peak weekday times. Each landowner must submit a Parking Management Plan and Travel Plan outlining how parking will be managed and enforced as part of the development application approval process, as specified in the Murdoch Parking Policy.

Appendix A

Assessment of opportunities to reduce parking supply rates

Appendix A Assessment of opportunities to reduce parking supply rates

A simple scoring system was used to compare the opportunities and benefits from reducing the parking supply rates for the different MUP uses:

- 1 = Poor opportunities / benefits
- 2 = Fair opportunities / benefits
- 3 = Good opportunities / benefits

The criteria considered in this assessment were:

- Whether other travel options are available which match typical travel times & needs of the activity.
- Whether the activity is likely to generate car trips at peak travel times on the MUP and adjacent regional road network.
- Whether the parking could be shared with other users (as public parking) or used by alternative activities at different times (reciprocal use).

Table 9 Opportunities and benefits for reducing the parking supply rate for different activities

Land Use Activity	Suitability of car-alternative travel options	Impact on peak traffic congestion	Opportunity to share parking with other activities	Opportunity / Benefit for reduced parking (SUM of scores)
Commercial (employee parking)	3 Excellent PT access at peak commuting times, and walk and cycle access for local residents	3 Commuter car trips to commercial activities likely to directly impact peak traffic congestion	2 There is some opportunity for reciprocal use of commercial parking by evening / weekend activities within the same site, depending on security requirements for commercial tenant parking	**8** **Significant opportunity to reduce supply & some opportunity for reciprocal parking use for evening / weekend activities within the same site**
Large Retail	2 Likely to attract many walking trips from local MUP and FSH / SJOGH employees, & commuters from Murdoch Station transferring from rail to bus/car/cycle. Will also attract car trips for larger shops, and from wider residential catchment	2 Unlikely to impact morning peak traffic, but could impact afternoon peak traffic congestion	3 Opportunity to share public parking for range of retail, leisure & entertainment activities	**7** **Large opportunity to provide shared public parking available for range of MUP visitors**
Small Retail	3 Aimed at people already working, living or visiting the MUP or adjacent FSH / SJOGH, therefore minimal	1 Unlikely to generate large number of car trips during morning or afternoon peak traffic congestion (some impact from	3 Opportunity to share public parking for range of retail, leisure & entertainment activities	**7** **Large opportunity to reduce parking supply & provide shared public parking for range of MUP visitors**

Land Use Activity	Suitability of car-alternative travel options	Impact on peak traffic congestion	Opportunity to share parking with other activities	Opportunity / Benefit for reduced parking (SUM of scores)
	demand for visitor parking. Evening retail commuters may require car, but smaller numbers.	employees, but small numbers)		
Short-Term Accommodation Visitors (Hotel)	2 Many international / interstate visitors likely to use taxis for airport travel, with easy PT and walking access within MUP for daily activities – reduces need for individual hire cars. Regional visitors may arrive by car.	2 Visitors commuting to external workplaces will contribute to peak traffic congestion	2 Visitor cars likely to occupy parking for long periods; but demand could be reduced through an onsite car hire scheme	**6** **Some opportunity to reduce parking supply as lower demand from interstate / international visitors**
Short-Term Accommodation Employees (Hotel)	2 Evening hotel employees may require car	2 Daytime hotel employees could contribute to peak traffic congestion	2 Could be provided as public parking for daytime visitors; available exclusively for staff during nights	**6** **Some opportunity to reduce parking supply**
Residential Visitor	2 Many visitors arrive after hours or on the weekend when there are less PT options, and many will come from outside walking & cycling catchments	1 Unlikely to attract many visitors during peak traffic congestion	2 Some opportunity to share visitor parking with other activities (either as shared public parking or reciprocal use of commercial parking in evening / weekend)	**5** **Some opportunity to provide shared public parking for range of MUP visitors**
Residential Tenant	2 PT, walking and cycling available for many weekday activities (work, education trips). Some weekend and after hour activities may require car; opportunity to reduce demand through onsite car hire scheme.	2 Counter-flow peak hour trips for MUP and adjacent MAC road network	1 Resident cars likely to occupy parking bay for long period. Opportunity to unbundle parking from dwelling lease / purchase arrangements to reduce overall parking demand.	**5** **Opportunity to reduce parking for some dwellings**

Appendix B

Comparison of Parking Rates

Appendix B Comparison of Parking Rates

Land Use & Proposed MUP Parking Rate	Comparison Rates					
	City of Melville requirements	North Ryde (Sydney)	Subi Centro	Stirling City Centre (proposed car parking ratios, October 2010)	Cockburn Central	Claremont North East Precinct (proposed ratios, 2012)
Residential 1.2 bays / dwelling +0.06 visitor bays / dwelling Proposed for residential parking to be unbundled from dwelling leases / purchases	R-Codes for multiple dwellings – min of 1 / dwelling, max of 2 per dwelling (includes 10% of bays to be allocated for visitors)	0.6 to 1 bay / one bedroom dwelling 0.9 to 1.2 bay / two bedroom dwelling + 0.2 visitor bays / dwelling	1 bay / dwelling	0 bay / unit min 1 bay / unit max + 0.06 visitor bays, ideally on street	1 bay / 1-2 bedroom dwelling 2 bays / 3 bedroom dwelling + 0.1 visitor bays	1.2 bays / apartment max 2 bays / town house max. Parking to be 'unbundled' from apartments, so that people have a choice whether to buy /rent a bay.
Commercial 1 / 60 square metres *75% tenant, 25% visitor*	1 / 40 square metres NLA	1 bay / 40sq.m. GFA	1 bay / 40 sq.m. min 1 bay / 25 sq.m. max	1 bay / 250 sq.m. min 1 bay / 100 sq.m. max	1 bay / 40 sq.m. GFA	1 bay / 66 square metre *40% tenant, 60% visitor*
Retail Large (>1000sq. m.) – 1 / 35 square metre Small (<1000sq. m.) - 1 / 50 square metre	Shop City Centre – 5.5 bays per 100 sq. m. NLA (1 / 18 sq.m NLA) Small bar / Restaurant / café – 1 / 4 patrons at capacity & 1 / staff member	1 bay / 25sq.m. GFA	Large (>1000sq. m.) 1 bay / 20 sq.m. min 1 bay / 15 sq.m. max Small (<1000sq. m.)– 1 bay / 30 sq.m. min 1 bay / 20 sq.m. max	Large (supermarket) – 1 bay / 50 sq.m. min 1 bay / 25 sq.m. max	1 bay / 25 sq.m. GFA	1 bay / 50 square metre
Hotel (Short Term Accommodation) 1 / 3 bedrooms	1 bay / bedroom & 1 / staff member & 1 per 4 sq. m. of any function area	1 bay / 1.5 rooms				
Notes		The North Ryde /Macquarie Park office market has been a strong		Public car parking encouraged over private parking	Assumes that all parking generated by residential development is contained	The approach has been to maximise the percentage of public

Land Use & Proposed MUP Parking Rate	Comparison Rates					
	City of Melville requirements	North Ryde (Sydney)	Subi Centro	Stirling City Centre (proposed car parking ratios, October 2010)	Cockburn Central	Claremont North East Precinct (proposed ratios, 2012)
		performer. Car parking provision has been widely cited as a key strength.			within the building envelopes and does not extend into any neighbouring at grade parking areas (i.e. under croft parking), while parking for mixed use, office & retail is provided centrally in the street blocks, behind the built form	short term car parking while limiting non-residential private parking.