

Activity Centre Structure Plan



MURDOCH MIXED USE PRECINCT



Prepared for LandCorp
Prepared by Taylor Burrell Barnett



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DOCUMENT HISTORY AND STATUS

Murdoch Mixed Use Precinct Activity Centre Structure Plan

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11/023-0	SD	30.04.13
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11/023-3	LB	13.11.15
11/023-4	LB	25.08.16

ENDORSEMENT

This Structure Plan is prepared under the provision of the **City of Melville Local Planning Scheme No. 6**

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

..... Date

Signed for and on behalf of the Western Australian Planning Commission

.....

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

..... Witness

..... Date

..... Date of Expiry

TABLE OF AMENDMENTS

Amendment No.	Summary of the Amendment	Amendment Type	Date Approved by WAPC

EXECUTIVE SUMMARY

This Activity Centre Structure Plan (ACSP) applies to Lot 108, Lot 109, Part Lot 101, Lot 110, Lot 111, Lot 112, Part Lot 510, Part Lot 4083 and portions of Fiona Wood Road, Barry Marshall Parade, South Street and Kwinana Freeway road reserves, Murdoch (referred to as the 'Murdoch Mixed Use Precinct' or 'subject land').

The ACSP proposes mixed use development of the land and associated public open space (POS). An existing conservation area is located centrally within the subject land which will remain.

The Murdoch Mixed Use Precinct (MUP) is included within the Murdoch Specialised Activity Centre Structure Plan (MSACSP) (endorsed by the Western Australian Planning Commission (WAPC) in October 2013) and identified for mixed use development. The MSACSP supersedes the Murdoch Activity Centre Structure Plan (Part A – Fiona Stanley Hospital and Health Precinct) 2007. The MSACSP is a strategic planning document to guide future development of the Murdoch Specialised Centre and should be read in conjunction with the Murdoch MUP ACSP.

It is proposed that the development of the Murdoch MUP will occur in two stages. Stage 2 will be reliant on the relocation of the Public Transport Authority's (PTA) 'Park and Ride' facility for Murdoch Station located within the north-eastern portion of the subject land. The 'Park and Ride' facility is to remain until such time as the State Government determines a suitable strategy for its removal. This ACSP allows for the ultimate development of the Murdoch MUP, however the implementation of Stage 2 will not occur until such time as an alternative solution for the location of the 'Park and Ride' facility is agreed.

Item	Data		Structure Plan Ref. (Section No.)
Total area covered by the Structure Plan	9.60 ha		1.2.3
Area of each land use proposed:	Hectares	Lot Yield	6.1
• Mixed Use	5.90 ha	14 lots	
Total Estimated Lot Yield	Approximately 14 lots		6.1
Estimated No. of Dwellings	Approximately 900-1200 dwellings		4.1.2
Estimated Residential Site Density	217-289 dwellings per site/ha		N/A
Estimated Population	Approximately 1800-2400 people (based on 2 persons / dwelling)		N/A
No. of High Schools	N/A		N/A
No. of Primary Schools	N/A		N/A
Estimated Commercial Floor Space (ex. retail and commercial health floorspace)	33,120 sqm		4.1.3
Estimated area and percentage of Public Open Space given over to:			6.3.1
• Local Parks (ex. North Park)	0.7625 ha	9.22%	
Estimated percentage of natural area			6.3.1
• Conservation Area (FSH Public Open Space Land - North Park)	0.91 ha	9.48%	

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APPENDIX E - TRANSPORT ASSESSMENT
APPENDIX F - PARKING STRATEGY
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PART ONE IMPLEMENTATION

1 STRUCTURE PLAN AREA

This Activity Centre Structure Plan (ACSP) shall apply to the Murdoch Mixed Use Precinct (MUP) (Lot 108, Lot 109, Part Lot 101, Lot 110, Lot 111, Lot 112, Part Lot 510, Part Lot 4083 and portions of Fiona Wood Road, Barry Marshall Parade, South Street and Kwinana Freeway road reserves, Murdoch), being the land contained within the inner edge of the line denoting the structure plan boundary on the ACSP map (**Plan 1**).

This ACSP allows for the ultimate development of the Murdoch MUP, however the implementation of Stage 2 will not occur until such time as an alternative solution for the location of the 'Park and Ride' facility is agreed.

2 OPERATION

This ACSP comes into effect on the date it is approved by the Western Australian Planning Commission (WAPC).

3 STAGING

The indicative staging of the Murdoch MUP has been broken into two stages to ensure the project's infrastructure construction staging is coordinated with Fiona Stanley Hospital (FSH), surrounding infrastructure such as works by Main Roads WA (MRWA), maintaining 'Park and Ride' operations and to release land in line with the estimated level of market demand.

Stage 1 has been determined based on the utilisation of existing infrastructure such as roads and pedestrian connections associated with FSH.

Stage 2 will be reliant on the relocation of the Public Transport Authority's (PTA) 'Park and Ride' facility for Murdoch Station located within the north-eastern portion of the subject land. The 'Park and Ride' facility is to remain until such time as the State Government determines a suitable strategy for its removal.

4 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

4.1 LAND USE

The ACSP map (**Plan 1**) outlines the following land use, zones and reserves applicable within the ACSP area:

MIXED USE 'R-ACO'

The 'Mixed Use' area is intended to facilitate the development of a mix of varied, but compatible, land uses including; residential, offices, retail, commercial, civic uses and entertainment facilities in a highly integrated built form outcome.

LOCAL RESERVE – OPEN SPACE

'Local Reserve – Open Space' land is intended to be public land vested with the local government, and is to function as open space available for a wide variety of community uses which may include, but are not limited to, outdoor recreation, community markets, public entertainment and civic events.

CONSERVATION

The 'Conservation Area' is land identified for its conservation significance under the Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999. The conservation area is the subject of an agreement between the Department of Health and the Commonwealth Government.

FIONA STANLEY HOSPITAL LAND OPEN SPACE

The 'Fiona Stanley Hospital Land Open Space' (referred to as 'North Park') is an area of open space associated with the FSH. North Park is located within a Crown Reserve (for 'Health Purposes') vested in the Minister for Health and is located within the ACSP area. This area of open space will provide direct pedestrian connections between FSH with the Murdoch MUP and will act as an extension of the 'green corridor' wayfinding link.

4.1.1 MIXED USE

The Mixed Use area is intended to provide for a wide variety of uses within a highly integrated development. Land uses may include (but are not limited to) residential, retail, commercial, office, entertainment, medical, civic and community uses.

The objectives of the Mixed Use area are to:

- a) Provide a diversity of land uses and housing types.
- b) Provide for development that contributes to the creation of a high quality public realm and creates a sense of identity and character.
- c) Facilitate provision of employment.

LAND USE PERMISSIBILITY

The Zoning Table and clause 18(7) of LPS6 identify land use permissibility within the ACSP. Accordingly, land use permissibility within the Murdoch MUP shall be in accordance with the following table.

Preferred land uses for land designated 'mixed use' within the ACSP include predominantly residential uses around the boulevard and Conservation Area. Preferred land uses for larger sites along Barry Marshall Parade include commercial land uses due to high visibility from South Street.

LAND USE TABLE

Use Class	Permissibility
Auction Premises	X
Car Sales Premises	X
Child Minding Centre	P
Cinema/Theatre	D
Conservation/Recreation	P
Consulting Room(s)	P
Convenience Store	P
Corner Store	P
Educational Establishment	P
Garden Centre	D
Home Business	P
Home Occupation	P
Home Office	P
Hospital	P
Hotel/Tavern	P
Industry Light & Service	X
Industry General	X
Industry Noxious & Hazardous	X
Lunch Bar	P
Medical Centre	P
Motor Vehicle Hire/Repair/Sales	X
Motor Vehicle Wrecking	X
Office	P
Open Air Display	A
Plant Nursery	X
Public Amusement	P
Public Worship	D
Restaurant	P
Residential	P
Restricted Premises	X
Service Station	A

Use Class	Permissibility
Shop	P
Showroom	A
Storage	X
Veterinary Clinic	D
Veterinary Hospital	A
Other uses not listed above	D

RESIDENTIAL

The residential density for the ACSP area is:

- 'R-AC0'

Residential development within the ACSP should be in accordance with the 'R-AC0' code, the ACSP and relevant adopted Design Guidelines. In the event of there being any conflict between the provisions, standards or requirements of the ACSP and the provisions, standards or requirements of the adopted Design Guidelines, then the Design Guidelines shall prevail.

Dwelling Target

Objective:

- To provide for a minimum of 80 dwellings per hectare (gross) dwellings within the ACSP area.
- To provide predominantly multiple dwellings.

Density

There is no maximum residential density applicable to the land.

Diversity

Diversity of housing product is to be provided. Diversity may be achieved via a variety of elements including dwelling size, design, cost or ownership structure to accommodate different household types. Diversity may also be distributed within the Murdoch MUP in a number of ways, for example, mixing different products within buildings or designation of a particular precinct area, development site or a building within a site for a particular residential typology. The diversity of dwelling types throughout the Murdoch MUP is to be addressed further through the Design Guidelines and subsequent development applications.

4.1.2 PUBLIC OPEN SPACE

Public Open Space (POS) is to be provided generally in accordance with **Plan 1** and the table below.

POS SITE	SIZE (HA)
Murdoch Boulevard POS	0.7625

4.2 DEVELOPMENT

4.2.1 PARKING

Parking within the Precinct is to be provided in accordance with the following table having regard to the intent of the *Interim Murdoch Centre Access and Parking Policy* and the *City of Melville Car Parking and Access Policy*.

Parking Type	Parking Requirements
Commercial/ Commercial Health	Maximum 1 car bay per 60m ² of gross floor area; 25% minimum designated as public parking
Hotel Accommodation	Maximum 1 car bay per 3 bedrooms; 25% minimum designated as public parking
Large Retail (more than 1,000m ² gross floor area)	Maximum 1 car bay per 35m ² of gross floor area; all designated as public parking
Small Retail (less than 1,000m ² gross floor area)	Maximum 1 car bay per 50m ² of gross floor area; all designated as public parking
Residential Occupants	1 & 2 bedroom dwellings - average of 1.1 car bay per dwelling (as a minimum) 3 bedroom dwellings - minimum 2 car bays per dwelling (Note: residential parking is excluded from cap)
Residential Visitors	An additional 5% of the required residential occupant car bays (as a minimum); all designated as visitor bays (Note: residential parking is excluded from cap)

4.2.2 BUILDING HEIGHT

A minimum building height for all sites is six storeys. Building height within the Murdoch MUP ACSP is to be in accordance with adopted Design Guidelines.

Varying maximum building height limits apply, due to the proximity of Jandakot Airport to ensure Airspace Protection, under the Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996 and administered by the Commonwealth Department of Infrastructure and Regional Development.

4.2.3 PLOT RATIO

There is no maximum plot ratio applicable within the Murdoch MUP.

4.2.4 SETBACKS

Building setbacks within the Murdoch MUP are to be in accordance with the relevant adopted Design Guidelines.

4.2.5 PUBLIC ART

Development will be required to comply with the Council Policy CP-085 *Provision of Public Art in Development Proposals*.

5 DESIGN GUIDELINES

Design Guidelines are to be adopted by the City of Melville as a Local Planning Policy (LPP) prior to development of the land in the Murdoch MUP (unless otherwise agreed with the City of Melville).

Upon adoption, the Design Guidelines will provide a comprehensive development framework for the Murdoch MUP. Accordingly, additional Local Development Plans (LDPs) may not be required.

5.1 CONTENT OF DESIGN GUIDELINES

The role of the Design Guidelines is to guide development within the Murdoch MUP and to provide sufficient detail to ensure adequate control over development (via a performance based approach) to achieve quality and desirable built form outcomes. The following matters should be considered in the preparation of the Design Guidelines:

- Land use
- Minimum number of dwellings and dwelling diversity
- Building height, form and typology
- Building envelopes
- Setbacks
- Activation
- Form and mass of buildings
- Relationship between buildings and the public realm
- Landmark and gateway buildings
- Climate and wind
- Overshadowing, overlooking and privacy
- Vehicular access, parking and service areas

Development applications received, either as a singular land use or as a component of an integrated mixed use development, are to be assessed by the City of Melville against the provisions of this ACSP and the procedural requirements identified in the adopted Design Guidelines for the Murdoch MUP.

In relation to residential development, in the event of there being any variations or conflict between the provisions, standards or requirements of the R-Codes and the provisions, standards or requirements of this ACSP or future adopted Design Guidelines, then the provisions, standards or requirements of the R-Codes shall prevail, except where the provisions are stated in the Design Guidelines, adopted as a LPP.

6 ADDITIONAL INFORMATION

The table below outlines additional information that will be required at future approval stages. Additional information requirements may not be limited to those listed; the City may require other information in relation to particular proposals.

Additional information	Approval stage	Consultation required
Construction Environmental Management Plan (CEMP)	Condition of subdivision	
Urban Water Management Plan (UWMP)	Condition of subdivision	
Landscape Management Plan	Condition of subdivision	
Acoustic Report (Noise Attenuation)	Condition of planning approval	

PART TWO EXPLANATORY INFORMATION

1 PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

This documentation has been prepared by Taylor Burrell Barnett, on behalf of LandCorp, to facilitate the assessment and approval of an Activity Centre Structure Plan (ACSP) for the Murdoch Mixed Use Precinct (MUP) (the 'subject land').

The MUP is included within the larger Murdoch Activity Centre (MAC), which is a planned Specialised Activity Centre identified in a number of important state level policies and documents.

The subject land has been identified by the Western Australian State Government as a strategic priority area for mixed use urban development to support the surrounding area including the Fiona Stanley Hospital (FSH), St John of God Hospital (SJOGH), Murdoch University and Challenger TAFE and the local community.

The ACSP outlines the development vision for the ultimate development of the Murdoch MUP and establishes key requirements. The ACSP also includes information regarding the development of the public realm and assesses the proposed development in context with the surrounding physical and natural environment. Stage 2 of the development will not proceed until such time as an alternative solution for the location of the 'Park and Ride' facility is agreed.

1.2 LAND DESCRIPTION

1.2.1 LOCATION

The location and extent of the Murdoch MUP is outlined in **Figure 1**. The subject land is situated immediately to the south-west of the intersection of the Kwinana Freeway and South Street, adjacent the Murdoch Bus-Rail Interchange. The subject land is bounded by South Street and the Murdoch Bus-Rail Interchange to the north, the Kwinana Freeway to the east, the FSH to the south and SJOGH to the west.

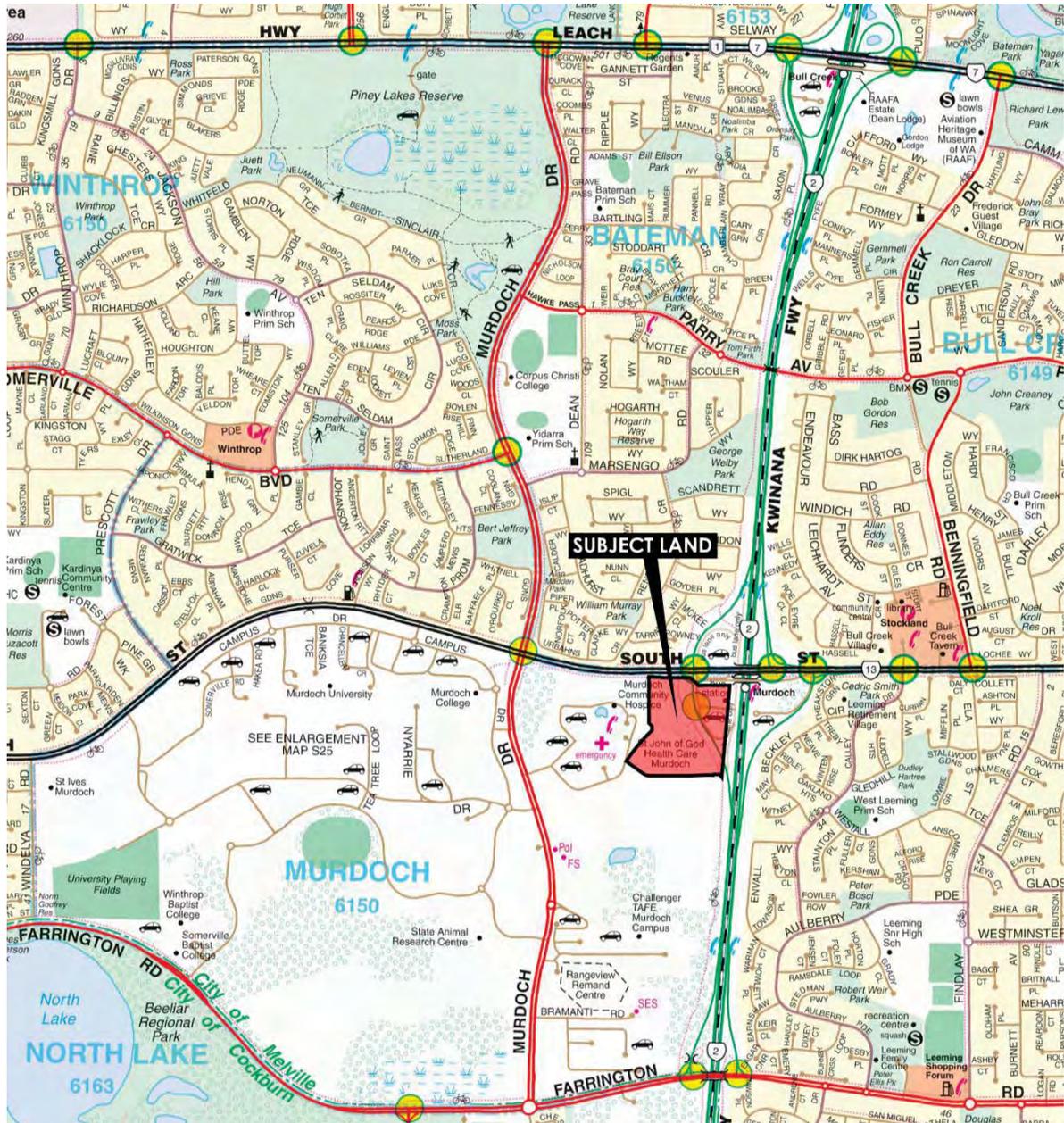


Figure 1 - Location Plan

1.2.2 AREA AND LAND USE

The subject land is partially developed with car parking associated with the Murdoch Rail-Bus Interchange in the eastern portion of the subject land, which is currently under lease to the Public Transport Authority of WA (PTA). There is an existing environmental conservation area located centrally within the subject land, however the balance of the land is vacant and cleared. Existing dedicated road reserves, Barry Marshall Parade and Fiona Wood Road constructed as part of the FSH works permeate the subject land.

The subject land is adjacent the FSH and SJOGH to the south and west respectively. Two major tertiary education facilities are located nearby; the Murdoch University is located beyond the SJOGH to the west and Challenger TAFE beyond FSH to the south (refer **Figure 2**).

The subject land is approximately 1 kilometre (km) from Bull Creek Shopping Centre, which is the nearest District Centre. The surrounding land to the north and east is predominantly residential. The adjacent Kwinana Freeway and Murdoch Bus-Rail interchange provide the Murdoch MUP with access to the regional road and transport network.

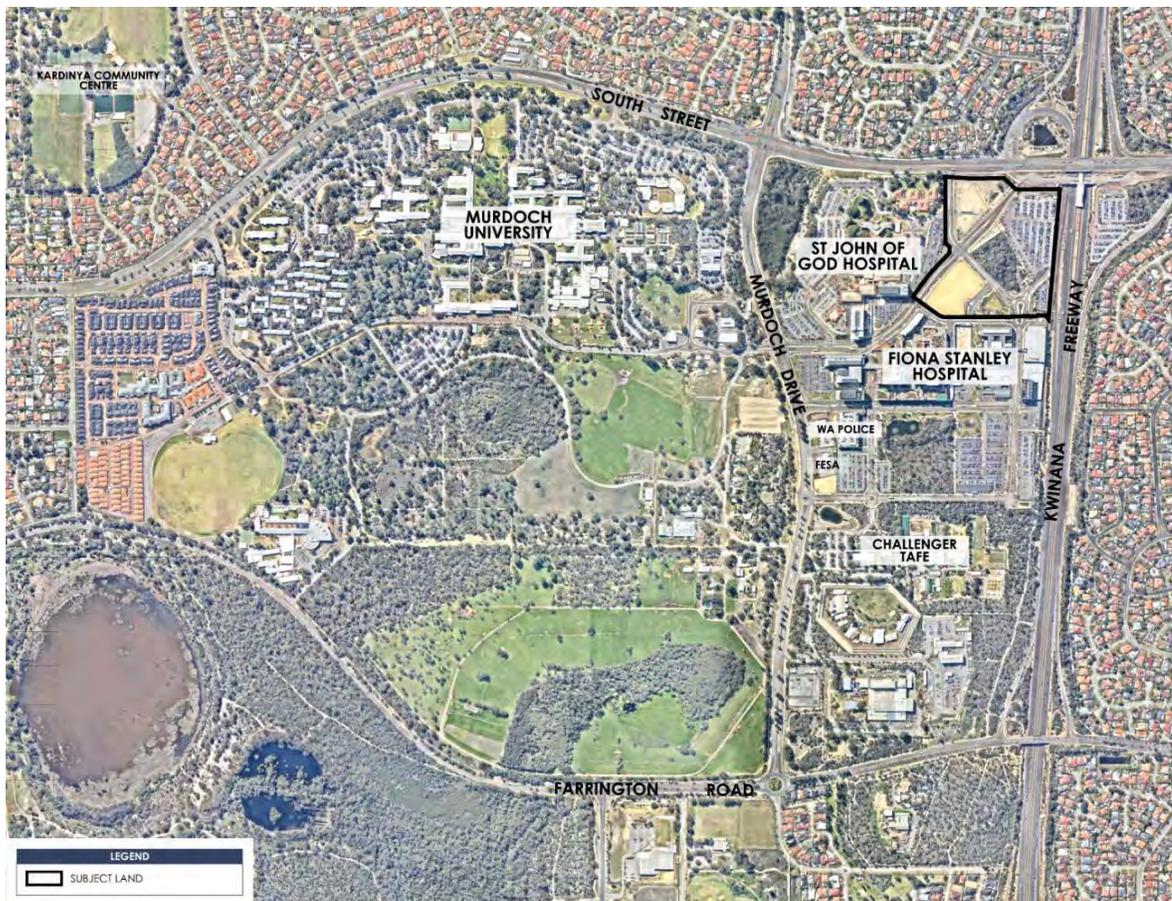


Figure 2 - Context Plan

1.2.3 LEGAL DESCRIPTION AND OWNERSHIP

The subject land is approximately 9.60 hectares (ha) in area comprising Portion of Lot 101, Lot 108, Lot 109, Lot 110, Lot 111, Lot 112, Portion of Lot 510, Portion of Lot 4083, Lot 513, Lot 515 and Portions of Barry Marshall Parade, South Street and Kwinana Freeway (refer **Figure 3** and **Table 1**), and may be described as follows:

Table 1- Land Tenure

Lot/Reserve	Plan Number	Volume/Folio	Area (ha)
Portion of Lot 101	P 77102	LR 3164/914	0.6155
Lot 108	P 77102	LR 3164/920	0.9134
Lot 109	P 68014	LR 3164/907	0.8722
Lot 110	P 77102	LR 3164/921	1.1980
Lot 111	P 68014	LR 3164/908	0.1703
Lot 112	P 68014	LR 3164/909	0.3413
Portion of Lot 510	P 66700	LR 3159/7	1.6320
Portion of Lot 4083	P 192736	LR 3107/157	1.7605
Lot 513 (Portion of Barry Marshall Parade)	P 68014	LR 3164/911	0.5222
Lot 515 (Ficna Wood Road)	P 68014	LR 3164/913	1.1194
Road Reserve (Portions of Barry Marshall Parade & South Street)			0.2921
Portion of Kwinana Freeway			0.1555
TOTAL			9.5924

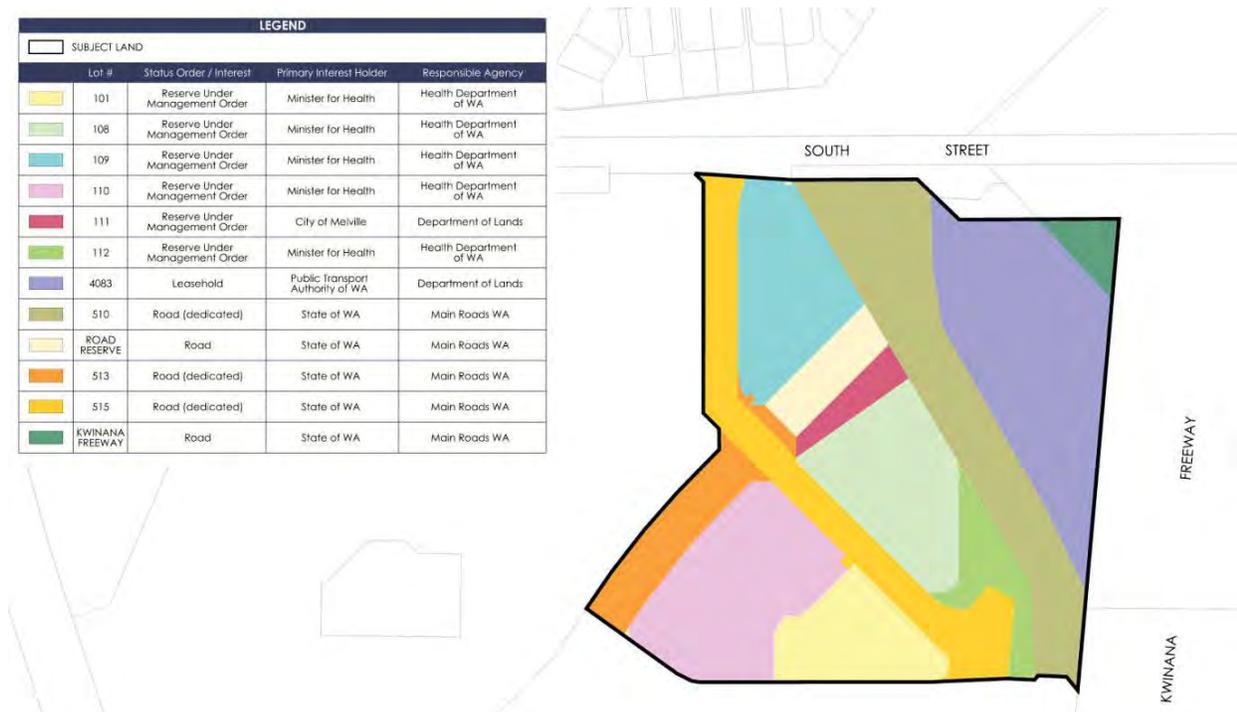


Figure 3 - Land Tenure

1.3 PLANNING FRAMEWORK

1.3.1 ZONING AND RESERVATIONS

METROPOLITAN REGION SCHEME

The subject land is currently zoned 'Urban' under the Metropolitan Region Scheme (MRS) (refer **Figure 4**).

The subject land abuts 'Primary Regional Roads' reservation (South Street and Kwinana Freeway) under the MRS directly to the north and east respectively. The balance of the adjoining MAC land is reserved 'Public Purposes'. Land to the north and east of the subject land beyond the 'Primary Regional Roads' reservation is zoned 'Urban' under the MRS.

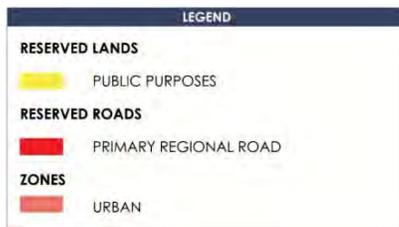
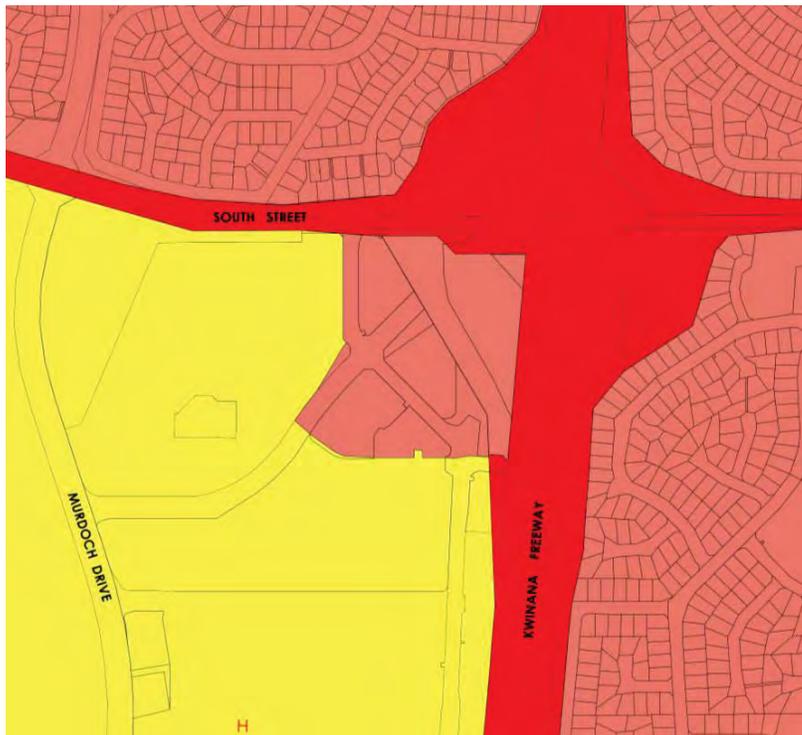


Figure 4 - MRS Zoning

CITY OF MELVILLE LOCAL PLANNING SCHEME NO. 6

The Murdoch MUP is zoned 'Urban Development' under the City of Melville's Local Planning Scheme No. 6 (the Scheme) (refer **Figure 5**). As such, the subdivision and development of land within the Murdoch MUP is to be generally in accordance with an ACSP that applies to the land.

The remainder of the MAC is predominantly reserved 'Public Purposes' under the Scheme.

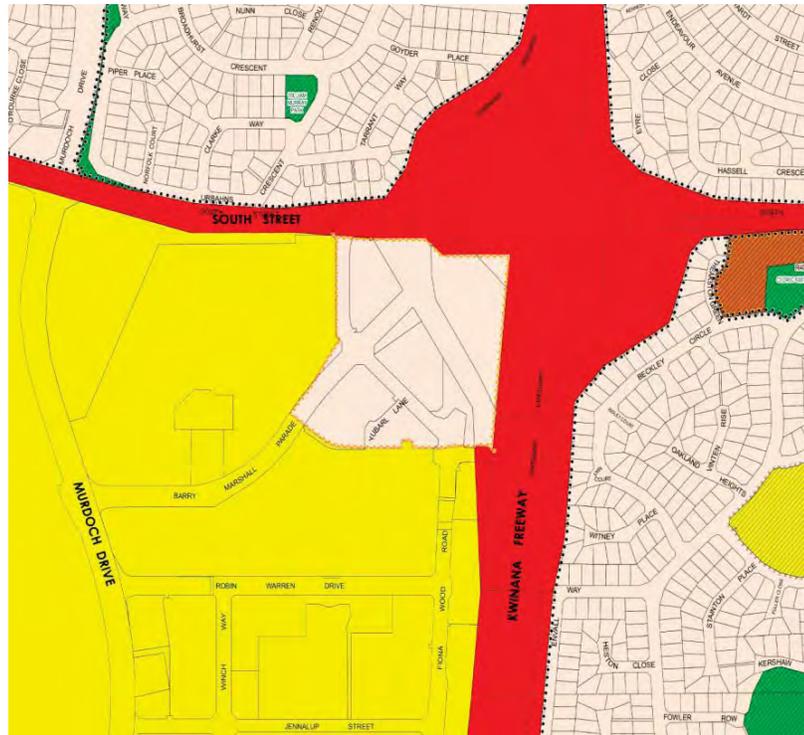


Figure 5 – LPS6 Zoning

1.3.2 DRAFT CENTRAL SUB-REGIONAL PLANNING FRAMEWORK (2015)

The subject land is located in the Central sub-region of the Perth and Peel @3.5million Planning Framework document. The Central sub-region is expected to supply an additional 215,000 dwellings under the draft Strategy, with 18,500 to be provided within the City of Melville and 160,000 of these additional dwellings to occur within the identified urban consolidation areas of activity centres, corridors and station precincts. The draft strategy notes the subject land as 'activity centre – core'.

Activity centres play a crucial role in the provision of employment and creation of a sense of place. For this reason, the framework places a focus on increasing residential development in and surrounding activity centres linked by a robust movement network.

1.3.3 DIRECTIONS 2031 AND BEYOND

Published by the Western Australian Planning Commission (WAPC) in August 2010, Directions 2031 and Beyond: Metropolitan Planning Beyond the Horizon (Directions 2031) *"is a high level spatial framework and strategic plan that establishes a vision for future growth for the metropolitan Perth and Peel region..."*.

Directions 2031 divides the metropolitan area into sub-regions, and discusses how growth should be accommodated within these. The subject land is located within the 'Central Metropolitan Perth' sub-region, and is identified as 'Urban'. Similarly, land located within the wider MAC is identified as 'Urban'.

Directions 2031 also identifies the MAC as a 'specialised centre'. Specialised centres are characterised as centres that are based around major institutions or airports. Directions 2031 suggests these specialised centres should:

- Provide adequate locations for business and smaller institutions related to the main institutions.
- Have places for general commercial and community services to support its employees, students, visitors and residents.
- Provide places where interaction can occur between users of the centre, so that stronger links can be facilitated across a range of organisations and businesses in the centre.

This ACSP is consistent with the vision of Directions 2031 as it will facilitate a mixed use centre that will provide a diverse range of uses to provide opportunities for the establishment of complimentary business to the adjoining hospitals, provide employment and a range of support to employees of the hospitals and local businesses as well as students from nearby educational facilities. The location of the Murdoch MUP adjacent the transport interchange makes it ideal for the planned mixed use area.

It is envisaged the range of uses in the Murdoch MUP including recreation, entertainment and convenience retail will generate activity and, assisted by its location on a direct route to the bus rail interchange from the hospital and educational facilities, contribute to the area becoming a focal point and meeting place for the MAC and beyond.

1.3.4 DRAFT CENTRAL METROPOLITAN PERTH SUB-REGIONAL STRATEGY

The implementation initiatives discussed in Directions 2031 include a recommendation for the preparation of metropolitan sub-regional strategies as part of the State Government's review of Perth's strategic planning framework.

The subject land is identified for 'Public Purposes' (reflecting its previous Reservation under the MRS) under the draft sub-regional structure plan which also identifies Murdoch as a 'specialised centre'.

1.3.5 MURDOCH SPECIALISED ACTIVITY CENTRE STRUCTURE PLAN

The Murdoch MUP is included within the Murdoch Specialised Activity Centre Structure Plan (MSACSP) (endorsed by the WAPC in October 2013) and identified for mixed use development. The MSACSP supersedes the Murdoch Activity Centre Structure Plan (Part A – Fiona Stanley Hospital and Health Precinct) 2007. The MSACSP is a strategic planning document to guide future development of the Murdoch Specialised Centre and should be read in conjunction with the Murdoch MUP ACSP.

The aim of the MSACSP is to develop a structure plan for a broader area to provide a common vision and overall plan. The MSACSP study commenced in February 2011 and included consultation with key agencies, stakeholders, business and community groups.

The MSACSP identifies the subject land for mixed use development offering unique and wide ranging development opportunities with a variety of land uses, including hotel/medihotel, student accommodation, civic facilities, residential, retail and commercial entertainment uses. In order to achieve the intensity of both the urban form and activity of the MAC, targets and capacities have been identified. For the urban core (Mixed Use Precinct and Murdoch Square), an estimated dwelling capacity of 1,500 dwellings, in addition to 400 student accommodation dwellings, and a minimum residential density of 80 dwellings per gross hectare has been identified.

1.3.6 PLANNING POLICIES

STATE PLANNING POLICIES

SPP 4.2 ACTIVITY CENTRES FOR PERTH AND PEEL

State Planning Policy 4.2 - Activity Centres for Perth and Peel (SPP 4.2) replaced the Metropolitan Centres Policy as the framework for the development of activity centres within the Perth and Peel regions. SPP 4.2 addresses location, distribution, function and land use, and urban design principles relating to centres. SPP 4.2 articulates the objective to reduce the overall need to travel by creating a more efficient urban form. Fundamentally, SPP 4.2 considers that co-location of activity centres with public transport is critical to ensuring the success of centres and urban form. As previously mentioned, the subject land is immediately adjacent the Murdoch Eus-Rail Interchange, which is a significant transport hub.

Specialised centres provide opportunities for the development of a range of land uses that complement the primary function of these centres. The ACSP will facilitate development consistent with the intent for development of 'specialised centres'.

SPP 5.4 ROAD AND RAIL TRANSPORT NOISE AND FREIGHT CONSIDERATIONS IN LAND USE PLANNING

State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning (SPP 5.4) seeks to minimise the adverse impact of transport noise, without placing unreasonable restrictions on noise-sensitive residential development. SPP 5.4 is applied where the proposal includes:

- A proposed new noise-sensitive development in the vicinity of an existing or future major road, rail or freight handling facility.
- A proposed new major road or rail infrastructure project in the vicinity of existing or future noise sensitive and uses.
- A proposed major redevelopment of existing major road or rail infrastructure in the vicinity of existing or future noise-sensitive land uses.
- A proposed new freight handling facility.

A Noise Assessment has been undertaken by AECOM. This report assesses the current and future noise impacts from Kwinana Freeway and South Street, which presently accommodates heavy trucks, and the future noise impacts associated with the railway. Further information regarding the modelling undertaken is provided at Section 2.6.

DEVELOPMENT CONTROL POLICY 1.6 PLANNING TO SUPPORT TRANSIT USE AND TRANSIT ORIENTED DEVELOPMENT

Development Control Policy No. 1.6 - Planning to Support Transit Use and Transit Oriented Development (DC 1.6) has been prepared to maximise the benefits to the community of an effective and well used public transit system by promoting planning and development outcomes that will support and sustain public transport use, and which will achieve the more effective integration of land use and public transport infrastructure. The subject land will function as a 'transit oriented precinct' as detailed in DC 1.6.

The subject land is adjacent to the Murdoch Bus-Rail Interchange and is located within the 800m walkable catchment. The proximity of the subject land to Murdoch Station will play an important role in the success of the Murdoch MUP, which in turn will contribute to the success of the overall MAC and the precinct as a Transit Oriented Development (TOD).

The ACSP will facilitate development consistent with the following objectives of DC 1.6:

- To promote and facilitate the use of public transport as a more sustainable alternative to the private car for personal travel, to enhance community accessibility to services and facilities, including employment opportunities, community services and recreational facilities, and to improve equity in accessibility for those who do not own or have access to a car.
- To encourage spatial patterns of development that make it easier to plan and efficiently operate public transport services, and for the existing and potential users of public transport to access those services.
- To encourage balanced public transport rider-ship along transit corridors by creating places that are destinations as well as points of departure.
- To ensure the optimal use of land within transit oriented precincts by encouraging the development of uses and activities that will benefit from their proximity and accessibility to public transport, and which will in turn generate a demand for the use of transit infrastructure and services.

- To ensure that opportunities for transit supportive development are realised, both on public and privately owned land, and that transit infrastructure is effectively integrated with other development, to maximise safety, security and convenience for transit users.
- To promote and facilitate walking and cycling within TOD precincts by establishing and maintaining high levels of amenity, safety and permeability in the urban form, and to promote and facilitate opportunities for integrating transport modes by creating opportunities for convenient, safe and secure mode interchange.

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 such, the Murdoch Activity Centre Access and Parking Policy has been prepared to outline parking supply and management principles for the Murdoch Activity Centre.

The Policy includes parking supply rates based on the predicted medium and long-term capacity of the surrounding road network. For the Murdoch MUP, the Policy sets a parking cap of 170 car parks per hectare. The cap for the Murdoch MUP site equates to a maximum supply of 1,632 bays (based on a 9.6 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 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.

LOCAL PLANNING POLICIES

CITY OF MELVILLE COMMUNITY CONCEPT PLAN

The purpose of the Community Concept Plan (CCP) Policy is to outline a vision for the land use and development of the City of Melville. The CCP is a non-statutory policy that effectively works as a land use strategy to guide growth and change throughout the City of Melville. The plan identifies various mixed use areas including district centre, neighbourhood centre, residential area and conservation area.

Conservation areas have been incorporated into the plan to provide protection of urban bushland and wetland features, and the provision of conservation links for “green corridors”. The retention of remnant vegetation evident within the subject land has been considered as part of this ACSP.

The subject land is identified in the CCP as a major prospective commercial and employment centre, whilst recognising the conservation value of the conservation area included on the land. The expanding nature of the MAC will provide employment opportunities as discussed in the City’s Local Employment Solutions Policy.

CITY OF MELVILLE ENVIRONMENTAL POLICY

The City of Melville Environmental Policy provides guidance to minimise the impact of development on the environment and promote sustainability and the enhancement of biodiversity. The City will promote sustainable development through the formulation of policies and programs to protect and enhance the environmental qualities for future generations.

Sustainability goals for the MSACSP area have been determined in accordance with various sustainability programs and policies of the WAPC and Local Government and State Authorities to ensure the use of sustainability features in urban land development.

1.3.7 OTHER APPROVALS AND DECISIONS

The WAPC previously granted Conditional Subdivision Approval over the subject land on 26 April 2013 (WAPC Ref: 147075). The primary purpose of the proposed subdivision was to create the roads and infrastructure associated with the Stage 1 works of the Murdoch MUP and construction of the FSH and wider health precinct. Any future subdivision of the subject land is to be in accordance with this ACSP.

1.3.8 PRE LODGEMENT CONSULTATION

The Murdoch MUP Stakeholder Working Group was established by LandCorp in June 2011 to ensure regular liaison between primary stakeholders. The Stakeholder Working Group has been consulted throughout the planning and statutory approvals phase of the project.

STAKEHOLDER WORKING GROUP

The Working Group consists of representatives of the following key agencies:

Department of Planning (DoP)	South Metropolitan Area Health Service
Department of Transport (DoT)	Main Roads WA (MRWA)
City of Melville	Public Transport Authority (PTA)
Department of Health (DoH)	

OTHER STAKEHOLDERS

- Murdoch University
- SJOGH
- Challenger TAFE

Furthermore, LandCorp has consulted with the City of Melville and key agencies through the preparation and approval of the MRS and Local Scheme amendment requests relating to the subject land. More recently, LandCorp and its consultant team have engaged with the City of Melville and the DoP prior to the preparation and lodgement of this ACSP.

2 SITE CONDITIONS AND CONSTRAINTS

An Environmental Assessment Report has been prepared by Strategen to support the ACSP. This report is included as **Appendix A**.

2.1 GEOLOGY, LANDFORMS AND SOILS

The subject land lies between 20 and 26 metres (m) Australian Height Datum (mAHD), and generally slopes in a north-easterly direction towards the Kwinana Freeway.

The superficial formation in the area of the site consists of Quaternary sediments of the Kwinana Group namely, Bassendean Sands overlaying the Guildford formation. Preliminary geotechnical surveys indicate that an approximately two metre thick lens of clay is present at a level of about 14mAHD in and around the Conservation Area.

The subject land is located on the Swan Coastal Plain, and is situated on Bassendean Sands, which indicates that it provides good potential for infiltration, due to its sandy composition. There is, however, a possibility that coffee rock occurs on the subject land, which may reduce the potential for infiltration.

2.1.1 ACID SULPHATE SOILS

There is a 'low to moderate risk' of acid sulfate soils (ASS) occurring within the subject land at a depth of 3m from the surface. Preliminary testing by Coffey (2008) indicated that such ASS was present at a depth greater than 3m.

2.1.2 CONTAMINATED SITES

A search of the Department of Environment Regulation's (DER) Contaminated Sites Database indicates that there are no known contaminated sites located within a 1km radius of the subject land.

2.2 FLORA AND VEGETATION

2.2.1 VEGETATION

Since the development of FSH, the only native vegetation retained on the subject land is located within the identified Conservation Area. The vegetation found within this area is considered to be in excellent condition and is representative of Marri-Banksia-Melaleuca woodland, which is described as a 'small area, recently burnt, comprising an over storey of *Corymbia calophylla* (Marri) and *Banksia attenuate*, with scattered *B. menziesii* and *Melaleuca preissiana*, over *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Patersonia*, and various herbs'. A small area of Jarrah-Banksia-Melaleuca woodland is located in the southern portion of the Conservation Area.

No other intact plant communities were recorded within the subject land, with recorded vegetation being mostly the result of regrowth after past disturbance with species that were mostly native to the locality.

2.2.2 FLORA

It was noted prior to the site specific flora survey that only one endangered flora species had been previously recorded within the locality (Grand Spider Orchid), but this species was not sighted during the site specific survey. No other Declared Rare Flora (DRF) or Priority Flora species were recorded during the site survey either.

2.3 CONSERVATION AREA

The subject land contains a central portion of native bushland approximately 0.9ha in area that has been identified for its conservation significance under the Environmental Protection and Biodiversity Conservation Act 1999. This area is subject to a conservation agreement between the DoH and the Commonwealth Government which regulates the retention, protection and management of the specified area in its entirety in perpetuity.

Melaleuca species are generally associated with the wetter areas. This community is considered to be well reserved and to be at low risk of becoming extinct on the Swan Coastal Plain. The retention of the Conservation Area in its entirety will ensure that environmental features of significant value located within the subject land are protected and managed.

2.4 FAUNA

2.4.1 HABITAT ASSESSMENT

Fauna habitats have been identified within the Conservation Area:

- Jarrah-Banksia-Melaleuca woodland.
- Marri-Banksia-Melaleuca woodland.
- Degraded Jarrah-Banksia low woodland, with rehabilitation species and the understorey dominated by weeds.

2.4.2 FAUNA OCCURRENCE

Other than the Conservation Area, the subject land supports limited vegetation and does not support other areas of potential fauna habitat such as wetlands. The subject land therefore provides little, to no, fauna habitat value and the size of the Conservation Area means it is unlikely to support terrestrial mammals. The main species of concern is the Black Cockatoo species due to presence of larger trees outside the Conservation Area that may be utilised by this species.

The clearing associated with the FSH included the clearing of the Murdoch MUP Stage 1 area. This clearing was approved as part of the FSH Environmental Protection and Biodiversity Conservation (EPBC) Act action, which specifically related to Black Cockatoo species. As a consequence, the Murdoch MUP development will be required to include a certain percentage of native species and cockatoo habitat trees within the landscape plantings in both public open space (POS) and lots.

2.5 HYDROLOGY

A draft Local Water Management Strategy (LWMS) has been prepared for the subject land (**Appendix B**). A summary of the relevant hydrological matters is provided below.

2.5.1 SURFACE WATER

There are no mapped surface water bodies on the subject land. There is a Conservation Category Wetland (CCW), known as Quenda Wetland, located in the north-west corner of the wider MAC, approximately 400m west of the subject land. The wetland is defined as a sumpland and is seasonally inundated.

2.5.2 GROUNDWATER

Based on monitoring undertaken by Strategen, average annual maximum groundwater levels within the subject land are estimated at between 18.8 mAHD in the north-west and 19.6 mAHD in the south-east. Groundwater flows in a north-westerly direction. Groundwater within the subject land is considered suitable for irrigation purposes.

2.5.3 DRAINAGE

An extensive drainage system was constructed in the western and southern portions of the subject land as part of the construction of FSH. This drainage system allows for the infiltration of stormwater from the existing roads and buildings within the subject land, primarily through underground storage tanks. The existing drainage system will be retained and expanded as required to meet the needs of the development.

2.6 ROAD AND RAIL TRANSPORT NOISE

The subject land is located adjacent to two primary freight roads, being the Kwinana Freeway and South Street and is therefore subject to the requirements of the WAPC's SPP 5.4.

SPP 5.4 requires that new sensitive developments, including residential developments, located adjacent to primary road and rail routes, demonstrate that the development meets the outdoor noise level requirements. These requirements are to be met at 1m from the most exposed habitable façade of the proposed building at each floor level and at least one outdoor living area on each residential lot.

Detailed noise modelling has been undertaken by AECOM to assess the extent of these noise impacts and determine the necessary mitigation measures required in order to achieve acceptable indoor noise levels in noise-sensitive areas. The report assumes a high density/scale scenario and identifies the requirement for mitigation measures to be incorporated into the future built form for residential development sites fronting Kwinana Freeway and South Street. Preliminary noise mitigation and insulation measure recommendations have been provided in the context of the proposed development and various predicted facade noise level scenarios. Further information regarding the modelling undertaken and the necessary mitigation measures is provided in **Appendix C**.

2.7 ABORIGINAL HERITAGE

An Aboriginal Heritage survey of the Murdoch MUP was conducted in 2006 as part of the assessment for FSH. Whilst there are no registered Aboriginal sites recorded, the survey area is of considerable heritage value to the Nyoongar people due to its connection to the chain of wetlands and lakes which once stretched from the Moore River to the Peel Inlet. An Aboriginal Heritage Management Plan for the FSH was prepared to facilitate the ground works monitoring programme.

Previous heritage research has established that:

- In accordance with the Aboriginal Heritage Act 1972, there are no ethnographic or archaeological impediments to the proposed development proceeding.
- There are no Aboriginal sites, new ethnographic sites or new archaeological sites identified within the subject land.
- Given the reported Aboriginal usage of the general area survey for camping and foraging during the 19th and 20th Centuries, there is some potential for heritage material to be uncovered during ground disturbing activity.
- Aboriginal consultants have stipulated that ground disturbing activity within the subject land is to be monitored by suitably qualified Nyoongar monitors under advice from an archaeologist acceptable to the Nyoongar stakeholders.

- Aboriginal consultants have requested that signage and artworks acknowledging prior Aboriginal ownership of, and continuing connection to, the survey area should be incorporated into any built environment within the subject land.
- Aboriginal Elders have requested that the proponent holds periodic briefing meetings with them to keep them informed of the progress of the proposed development.

Native Title has been extinguished within the ACSP area.

3 STRUCTURE PLAN

3.1 PROJECT VISION AND OBJECTIVES

3.1.1 VISION

The vision for the Murdoch MUP is to:

“Create a transit based, ‘destination’ hub that provides a range of complementary activities including commercial office, allied health, retail, residential and short-stay accommodation.”

3.1.2 OBJECTIVES

The objectives for the Murdoch MUP provided in the MACSP (Part A) 2007 and updated via a Stakeholder Workshop in 2011 are as follows.

Place	Create a significant ‘destination’ development Day - night / weekday - weekend activity An exemplar for transit oriented development in WA
Land Use	A diverse place of living, employment, civic, entertainment and leisure activity A variety of complementary activities that support the primary Health & Entertainment sectors
Sustainable Development	A new standard for conserving resources on a centre wide basis Seek to protect existing environmental assets within development objectives
Transport & Access	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 Low car dependency Transitions from a transit ‘Origin’ to ‘Destination’ as development increases
Delivery	Initial stage targeted for 2016 commencement on site 10-15 year build out period

3.2 CONCEPT MASTERPLAN

In addition to the ACSP map included within Part 1 – Implementation, a Proposed Development (Stage 1) Concept Masterplan (**Figure 6A**) and Ultimate Development Concept Masterplan (**Figure 6B**) have been prepared to provide an illustration of the development intent. This graphical representation is indicative only; however, it indicates how the public spaces will be developed and the relationship of the public/private interface between the public spaces and development sites of the Murdoch MUP. Implementation of the Ultimate Development Concept Masterplan will not occur until such time as an alternative solution for the location of the ‘Park and Ride’ facility is agreed.

LEGEND

□ SUBJECT LAND

NOTES

- 1 Boulevard entry Public Open Space - pedestrian, cycle and visual connection.
- 2 Built form reinforcing the Street.
- 3 Barry Marshall Parade - public transport only section.
- 4 Existing Conservation Area - subject of conservation agreement between Department of Health and Commonwealth Government



PROPOSED DEVELOPMENT (STAGE 1) - CONCEPT MASTERPLAN
 Murdoch Mixed Use Precinct
 A Laraborga Project

LEGEND

□ SUBJECT LAND

- NOTES**
- 1 Murdoch Boulevard Public Open Space.
 - 2 Boulevard entry Public Open Space - pedestrian, cycle and visual connection.
 - 3 Murdoch Boulevard - shared pedestrian and vehicle zone with short term street parking.
 - 4 Built form reinforcing the Street.
 - 5 Barry Marshall Parade - public transport only section.
 - 6 Indicative pedestrian link to Murdoch Station.
 - 7 Existing Conservation Area - subject of conservation agreement between Department of Health and Commonwealth Government



4 ACTIVITY

4.1 LAND USE AND DIVERSITY

In accordance with SPP 4.2, the Murdoch MUP will provide a diverse range of land uses that are consistent with the centre's classification as a specialised centre. The proposed land uses will complement the primary function of the MAC as a health, education and research centre, predominantly residential, commercial, retail, entertainment and community/civic uses.

The 'R-AC 0' coding is identified for Murdoch MUP and may be applied for multiple dwelling developments within mixed use and activity centres. State Planning Policy 3.1 - Residential Design Codes (SPP 3.1) provides for development standards to be set out in adopted structure plans and local development plans (LDPs). It is proposed that development standards pertaining to development within the Murdoch MUP will be outlined in Design Guidelines adopted as a Local Planning Policy (LPP) by the City of Melville. Part 1 – Implementation outlines that there is no maximum density or plot ratio applicable within the ACSP area. Instead, matters such as bulk and scale will be influenced via other elements including setbacks, building envelope, streetscape interface, private open space and building height, which will be addressed in Design Guidelines for the Murdoch MUP.

4.1.1 BUILDING HEIGHT

Maximum building height limits apply, due to the proximity of Jandakot Airport to ensure Airspace Protection, under the Airports Act 1996 and Airports (Protection of Airspace) Regulations 1996 and administered by the Commonwealth Department of Infrastructure and Regional Development. Maximum building heights are controlled by the restrictions of the Jandakot Aerodrome [CASA Obstacle Limitation Surface](#) and FSH helipad. The total maximum height of any building (measured from AHD) shall be in accordance with these controls. Further information is available from Jandakot Airport at: <http://www.jandakotairport.com.au/development/airspace-protection.html> or the Department of Infrastructure and Regional Development at: <https://infrastructure.gov.au/aviation/safety/protection/index.aspx>

In order to ensure development is built to a sufficient scale to facilitate the density envisaged for the Murdoch MUP and achieve the project design vision, particularly regarding the creation of a strong interface between development and Murdoch Boulevard, it is considered appropriate to set minimum building heights. The minimum building height control will be a requirement of the future Design Guidelines. As shown on **Figure 7**, the minimum building height for all sites is 6 storeys.



Figure 7 - Building Heights Plan

4.1.2 DWELLING PRODUCT TYPE, MIX AND YIELD

It is envisaged that the Murdoch MUP will provide primarily multiple dwellings to contribute to the desired scale and density of the centre and will help to achieve the desired dwelling and population targets identified for the MAC and sub-region.

Diversity of housing product is to be provided. Diversity may relate to a number of elements including dwelling size, design, cost or ownership structure to accommodate different household types. Diversity may be achieved within the Murdoch MUP in a number of ways, for example, mixing different products within buildings or designation of a particular precinct area, development site or a building within a site for a particular residential typology.

The diversity of dwelling types throughout the Murdoch MUP is to be addressed further through the Design Guidelines and subsequent development applications.

Table 2 below outlines one of the possible residential development scenarios for the ultimate development of Murdoch MUP, including a mix of one, two and three bedrooms multiple dwellings.

Table 2 - Dwelling Product Type, Mix & Yield

Product by bed count	Net floor area m2	%age apartments by count	%age apartments by NLA	Product count
1	50	10%	6.3%	110
1	65	20% (30% total 1 bed)	16.3% (23% total 1 bed)	220
2	75	35%	32.9%	385
2	90	20% (55% total 2 bed)	22.6% (55% total 2 bed)	220
3	110	10%	13.8%	110
3	130	5% (15% total 3 bed)	8.2% (22% total 3 bed)	55
TOTAL				1,100

4.1.3 NON-RESIDENTIAL LAND USE

A Retail Needs and Economic Strategy has been prepared by Urbis as required under Section 6.5 of SPP4.2. A copy of this strategy (summarised below) is included at **Appendix D**.

COMMERCIAL

Commercial development in the Murdoch MUP will support the surrounding residential, university and medical precincts including the FSH, SJOGH and Murdoch University. The ACSP yield scenarios indicate a total of 33,120m² of commercial office space and 8,240m² of commercial health floorspace with respect to the ultimate development of Murdoch MUP, with the majority of that space envisaged to accommodate medical consulting, medical support services, government administration and business services.

Demand for office space in Murdoch and within the MUP area will be driven primarily by activities related to the hospitals and, to a lesser extent, by Murdoch University and reflect the importance of the location as a knowledge hub. The previously mooted relocation of aspects of the WA Police to the Murdoch MUP under the State Government's Office Accommodation Master Planning Strategy now seems less likely to occur, due in part to changes in economic and office market conditions over the past three years. In the absence of a significant government anchor tenant, take-up of the commercial office space is expected to be largely determined by market activity and the extent to which there is a requirement for such space from the prospective uses described above.

Development of the commercial space is only likely to proceed based on its commercial feasibility, and the prevailing market conditions suggests that development of the space is likely to be constrained over the near to medium term, unless there is other space demand drivers to emerge out of the health precinct, such as a shortage of specialised office space / consulting rooms in the hospital complexes as they now stand.

Proximity to the health precincts may, in the medium to longer term, stimulate demand for commercial / office space and the development of health clusters as presently occurs in locations around SJOGH in Subiaco and the Queen Elizabeth II Medical Centre in Nedlands. Medical technology companies may also seek to co-locate around these major private and public health facilities.

The combination of retail floorspace at ground level within Sites 1A and 1B (**Figure 20**) will assist with the viability of commercial floorspace at Sites 1A and 1B through the ability to generate an activity node. These land uses would develop more effectively than if these two uses were separated.

RETAIL

The Retail Needs Assessment undertaken by Urbis assessed the demand for retail floorspace generated within the surrounding context (retail trade area) with respect to the ultimate development of the Murdoch MUP. The findings of this analysis are summarised as follows:

- The total trade area turnover by 2030 for the Murdoch MUP is forecast to reach \$45.3 million. \$22.4 million (46.8%) will be derived from residents, with the hospital and university staff, patients, visitors and students expected to generate a further \$22.9 million.
- The analysis indicates supportable retail floorspace for the Murdoch MUP of 5,271m² by 2030. The turnover suggests that a supermarket format in the order of 2,500-3,000m² could be supported as early as 2021 (subject to the extent of development within the Murdoch MUP by this time), with the balance to be comprised of an array of specialty stores.

- By 2030 Grocery / Fresh Food is expected to comprise 73.5% of forecast turnover generated from the Murdoch MUP residents and other user groups. Food and beverage spend (i.e. non grocery), general expenditure and services expenditure account for 13.9%, 10.8% and 5% of turnover respectively.
- The accessibility of the subject land to the wider resident market may prove a barrier to attracting a major chain supermarket, particularly in terms of a store in the 2,500-3,000m² range. In this regard, the potential market shares assessed for the supermarket could be significantly lower than forecast. Under this scenario, a smaller supermarket of less than 1,000m² that focuses on serving the Murdoch MUP and the occasional shop from the wider resident market may only be realised.
- Planning for the proposed retail centre should therefore allow for a 2,500-3,000m² supermarket and a smaller 400-800m² supermarket.
- Ideally, retail floorspace should be concentrated rather than dispersed, and it is suggested the preferred location for the retail space is in an area most easily accessible by the majority of tenants within the Murdoch MUP and external to the subject land. This would suggest the locations at Sites 1A and 1D, however retail concentrated around Sites 7C and 7D may provide superior accessibility to the users of the health campuses at the same time as retaining a degree of accessibility for internal MAC users.

PREFERRED LOCATIONS FOR RETAIL

The Concept Masterplan envisages ground level retail at the northern end of Murdoch Boulevard to create an activated edge to the public realm. Ground level retail is also encouraged adjacent to Murdoch Station and FSH, and along the main pedestrian routes from Murdoch Station and FSH into the Murdoch MUP. Retail should be made up of multiple tenancies with a variety of tenancy sizes and opening hours to provide opportunity for activation. The 'mixed use' designation will provide flexibility for land uses to change and evolve with the Murdoch MUP as it develops and grows over time.

Subject to retail and commercial take up rates, it is expected that some development sites may develop residential on the ground level on frontages preferred for retail or commercial development, such as on Murdoch Boulevard, in the first instance. In this event, ground floor residential uses will be required to be designed to avoid physical limitations that would prevent conversion for retail / commercial use and to incorporate features that facilitate conversion as development progresses and demand for floorspace increases (e.g., ceiling heights, allowance for services, and preparation of strata management plans engineered to allow conversion as a right).

4.2 EMPLOYMENT

The MAC is designated as a Specialised Activity Centre under Directions 2031 and SPP 4.2. The MAC has been identified as one of the top four priority Activity Centre projects for Government.

Under SPP 4.2, the Murdoch MUP is designated as a specialised health, education and research centre and is envisaged, by the DoP, to be one of Perth's largest centres of activity outside of the Perth CBD. Specialised centres focus on regionally significant economic or institutional activities that generate many work and visitor trips. SPP 4.2 outlines that "a range of land uses that complement the primary function of these centres will be encouraged on a scale that will not discourage from other centres within the hierarchy".

The MAC will have a health and education focus, incorporating four major institutions which will be the key activity drivers of the precinct – FSH, SJOGH, Murdoch University and Challenger TAFE. The Murdoch MUP will provide a range of complementary uses including commercial office, allied health, retail, residential and short-stay accommodation.

4.2.1 EMPLOYMENT ESTIMATES

Advice received from FSH and SJOGH indicates a combined full-time equivalent workforce of approximately 4,650 employees with 75% of this attributable to FSH. Murdoch University is believed to have a full time equivalent workforce of approximately 1,690 employees. Challenger TAFE is appreciably lower with an estimated 100 full time equivalent staff.

The floorspace yields contained within the Murdoch MUP ACSP (ultimate development) suggest that by full build out and at full occupancy, the MUP may result in net new employment of approximately 2,430 full time equivalent employees. The analysis makes no allowance for the relocation of WA Police functions to the Murdoch MUP as had previously been mooted and assumes a conventional take up rate of floorspace over time.

Employment estimates are based on Planning Land Use Category (PLUC) employment density ratios and office leasing market intelligence. Office density rates are around 15m² of NLA / employee or around 18m² GFA / employee.

Estimated commercial floorspace is expected to account for 61% of floorspace in the Murdoch MUP, equating to 76% of new employment for the Murdoch MUP.

5 MOVEMENT

AECOM has undertaken an analysis of the existing movement networks in the vicinity of the Murdoch MUP and assessed the impact of the proposed development on these existing networks. The Transport Assessment Report is included at **Appendix E**.

5.1 REGIONAL PERSPECTIVE

5.1.1 ROAD NETWORK AND ACCESS

The location of the Murdoch MUP immediately adjacent to Murdoch Station and Kwinana Freeway provides a direct rail and regional road link to the Perth CBD, as well as the north-south strategic metropolitan centres of Joondalup and Mandurah. South Street on the northern boundary of the subject land provides a primary east-west road link between the strategic centres of Fremantle, Murdoch and residential and industrial areas in the east. South Street experiences congestion at peak times with heavy demands from traffic accessing the Kwinana Freeway, as well as regional freight and commuter through-movements. The movement strategy for the Murdoch MUP recognises the capacity limitations of the regional road network, aiming for a significant increase in the proportion of the MAC public transport trips and an increase in local walking and cycling trips between MAC activities (**Figure 8**).

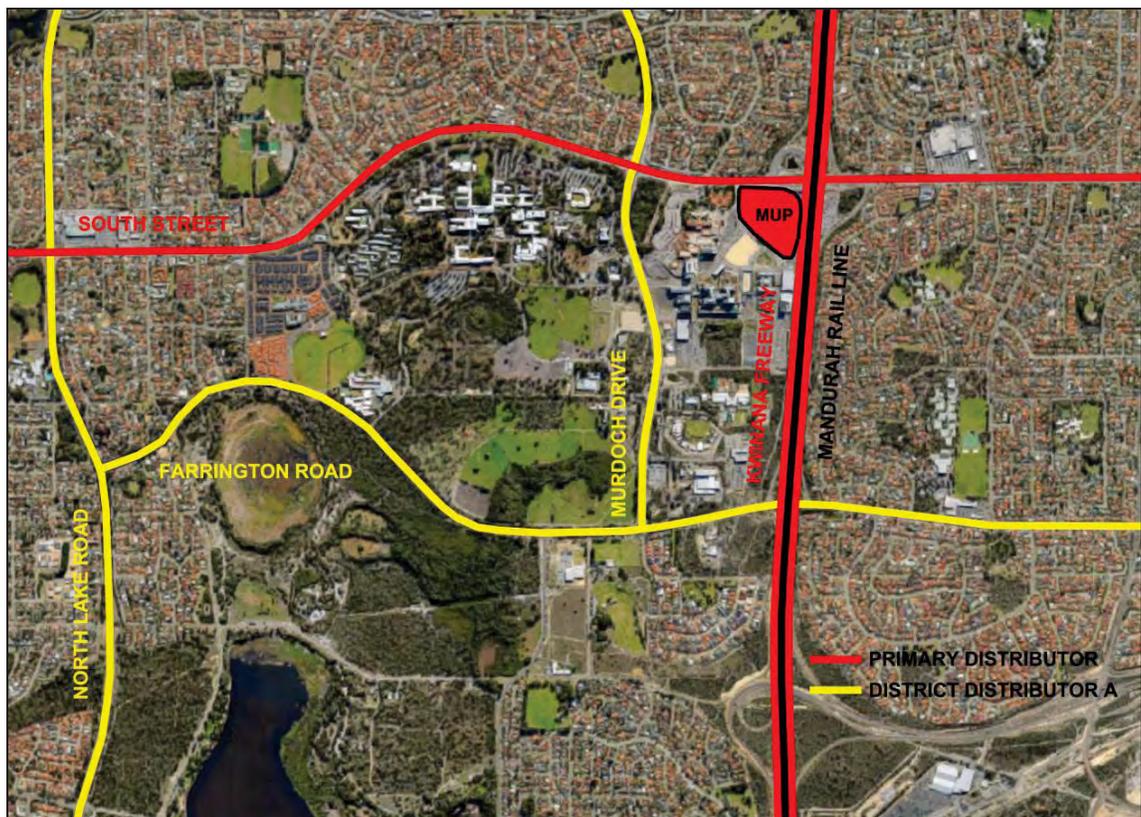


Figure 8 - Regional / District Road Network

The Kwinana Freeway runs on a north-south alignment between the Perth CBD and Mandurah. The Kwinana Freeway has recently been upgraded to allow for an additional lane in each direction, providing a total of three lanes per carriageway.

South Street is classed as a 'Primary Distributor' and runs east-west between Canning Vale and South Fremantle. There are currently three lanes in each direction in the vicinity of the subject land. A full interchange is provided with the Kwinana Freeway. A new left in, left-out access to the Murdoch MUP at Fiona Wood Road is located some 150m west of the Kwinana Freeway northbound on / off ramps.

Roe Highway provides a connection from Midland to the south of the Perth CBD, terminating at the Kwinana Freeway approximately 2.5km south of the South Street Interchange. Northbound and southbound access to / from the Kwinana Freeway is available at the Interchange, with two lanes in each direction. Planning is currently being progressed by MRWA for the extension of Roe Highway west of Kwinana Freeway to Stock Road, as Section 1 of the Perth Freight Link project.

Leach Highway runs on a parallel alignment to Roe Highway between Perth Airport and the Kwinana Freeway, and then extends to Fremantle in the west. The Kwinana Freeway intersection is located approximately 2.5km north of the South Street Interchange and there are three lanes running in each direction.

Farrington Road is a 'District Distributor - Type A' running for some 5km between Karel Avenue in the east and North Lake Road in the west. North facing ramps are provided at the interchange with the Kwinana Freeway, located approximately 1.5km west of Karel Avenue. There are up to two lanes in each direction with stronger residential characteristics pertaining east of the Kwinana Freeway.

Murdoch Drive is a 'District Distributor - Type A' connecting Farrington Road with Leach Highway on a north-south alignment. It intersects with the primary MAC access road (Main Street), approximately 500m south of the South Street at-grade intersection.

North Lake Road also runs on a north-south alignment in the vicinity of the subject land and connects Farrington Road, South Street and Leach Highway.

5.1.2 PERTH FREIGHT LINK (ROE 8 AND SOUTHERN CONNECTION)

At present, the State Government has committed to the Perth Freight Link Section 1 road upgrade, which includes the extension of Roe Highway (Roe 8) and a new connection to Murdoch Drive (southern connection) **(Figure 9)**.

The extension of Roe Highway will provide regional benefits for freight movements in addition to the connectivity benefits for the MAC. The southern connection will provide an additional freeway access option for vehicles from the southern catchment, directing traffic away from and easing pressure on the South Street corridor and the congested Freeway interchange.



Figure 9 - Perth Freight Link

5.1.3 SUMMARY

Traffic studies undertaken to assess existing and future capacity constraints on the regional road network surrounding the Murdoch MUP considered the impact of more significant traffic generators within MAC (FSH, SJOGH) as well as the proposed development.

There have been a number of upgrades to the road network in the vicinity of the Murdoch MUP in recent years. These include:

- Widening of the Kwinana Freeway (Leach Highway to Roe Highway) – completed in 2013:** The project involved widening Kwinana Freeway to three lanes in each direction between Leach Highway and Roe Highway.
- Relocation of the Kwinana Freeway northbound to South Street off-ramp – completed in 2013:** The off-ramp was relocated to access South Street from the north side to allow for construction of the transit connection from Barry Marshall Parade to Murdoch Rail-Bus Interchange. This will also enable future development of Stage 2 of the Murdoch MUP.
- Murdoch Drive / South Street intersection upgrade – completed in 2014:** Widening of the whole intersection was undertaken to provide an additional right turning lane from Murdoch Drive northbound onto South Street eastbound (for traffic exiting the Murdoch MUP / MAC heading towards the Kwinana Freeway and eastern South Street catchments), and an additional right turning lane from South Street eastbound onto Murdoch Drive northbound.

The upgrade of the Murdoch Drive / South Street intersection in particular has seen a significant reduction in the level of congestion experienced in the peak periods. However, there are still a number of pinch points in the road network, particularly the Kwinana Freeway / South Street interchange and the Murdoch Drive / Farrington Road roundabout.

Fiona Wood Road provides a left in, left out access between the Murdoch MUP and South Street, servicing traffic exiting the Kwinana Freeway, traffic coming from catchments east of Kwinana Freeway and exiting traffic heading west. Fiona Wood Road is a main entrance, with a signalised intersection with Barry Marshall Parade placed to provide adequate queuing space for traffic heading into the Murdoch MUP and west to FSH.

Barry Marshall Parade links FSH, SJOGH and the Murdoch MUP to Murdoch Drive, a 'District Distributor' road. This provides a connection to western catchments via South Street as well as northern and southern catchments within the City of Melville and City of Cockburn. The recently upgraded intersection of Murdoch Drive and South Street accommodates all other movements not possible at Fiona Wood Road, which operates as north left-in, left-out access only.

LandCorp and the City of Melville are continuing to consult and engage with the relevant transport agencies including the PTA, MRWA, DoT, and the DoP at both a MUP project level and MAC level. Collaborative efforts between LandCorp and the PTA in particular aim to establish a road network solution which will offer heightened public transport vehicle mobility through the Murdoch MUP, and car access to the health precinct and the 'Park and Ride' sites over the various stages of land redevelopment.

Whilst the Murdoch MUP will not be a significant generator of traffic, it will be established as a TOD next to the Murdoch Rail-Bus Interchange, which will provide the opportunity to increase public transport use. The proposed design of the Murdoch MUP will also encourage pedestrian and cycling movement as an alternative to use of private vehicles.

5.2 PUBLIC TRANSPORT INFRASTRUCTURE

The Murdoch MUP is being developed to capitalise on the ease of access to Murdoch Station, with a target for public transport to be used for a larger proportion of trips (40%) than driving a vehicle (around 35% of trips). The proposed infrastructure connections and initiatives to encourage public transport use for the Murdoch MUP are outlined in this section and supported by the following MUP objectives relevant to public transport access:

- Provide easy and safe access to the bus / rail interchange.
- Promote public transport by providing easy, regular and convenient connections.
- Modal split target: 40% public transport.
- Transitions from a transit 'Origin' to a 'Destination' over time.

5.2.1 TRANSIT ORIENTED DEVELOPMENT

The target public transport mode share of 40% is considered feasible due to the proximity of the subject land to Murdoch Station and the public transport and parking measures outlined in the following sections. This target is consistent with the proposed 40% transport mode share across the MAC site.

Each site in the Murdoch MUP is located at a distance of 400m or less from Murdoch Station, well within the 800m walking catchment, providing an opportunity for the subject land to be transformed as a TOD. As outlined in DC 1.6, a general objective of TOD is to increase the residential density within a 10 minute walk (800m) of major bus or train stations. A particular focus is for the TOD to evolve from an 'origin' to a 'destination' of public transport trips. Proposed commercial and retail uses will help to achieve this objective and potentially generate counter flow peak trips on the rail network, assisting to create a more balanced rail demand and achieving broader PTA objectives.

The Murdoch MUP will provide an additional 900-1200 residential dwellings within the station walking catchment, dependent upon a medium or high yield scenario for the ultimate development. This will almost double the current number of residential dwellings within the walkable catchment, however not anticipated to add significant demand for peak hour departures. In addition, a number of the residential dwellings are targeted at the local student population and local MAC employees, minimising the peak hour demand for residents commuting to other activity centres.

5.2.2 EXISTING PUBLIC TRANSPORT NETWORK

The Murdoch MUP is well serviced by the public transport network, being located adjacent to Murdoch Station, the busiest interchange outside the Perth CBD. Murdoch Station is serviced by the Mandurah train line, which runs a high frequency service between Perth and Mandurah.

Reflecting the important role of bus feeder routes to the Murdoch Station rail patronage, the interchange is well serviced by 21 bus routes. These buses connect Murdoch to a number of suburbs including Bull Creek and Booragoon to the north, Cannington, Thornlie, Maddington, Willetton, Southern River and North Harrisdale to the east, Jandakot and Cockburn Central to the south and Fremantle to the west. In addition, the buses include routes 98 and 99 (Circle Route) which travel a ring route through the middle suburbs around the CBD, including centres as far north as Stirling. Overall frequencies in the peak periods average approximately three minutes to the northern and eastern suburbs and two minutes to the southern and western suburbs.

5.2.3 PROPOSED PUBLIC TRANSPORT NETWORK

Accentuating the ease and benefits of rail access to the subject land has been a focus of the proposed design. Providing attractive, efficient bus access for residential catchments to the east and west of the Murdoch MUP (not serviced by rail) is also a key consideration, with the proposed bus priority (and potential Light Rail Transit (LRT)) link influencing the Murdoch MUP street network design.

BARRY MARSHALL PARADE TRANSIT LINK

The configuration of Barry Marshall Parade prioritises public transport movements through the subject land. Bus lanes are provided, with a transit only link through to the interchange at Murdoch Station. Bus priority at the signalised intersections (pre-emptive bus signals) along Barry Marshall Drive has recently been incorporated to further minimise delay for bus passengers. The bus stop locations on Barry Marshall Parade were selected to minimise the distance and major road crossings for the key generators of FSH and SJOGH. People visiting or living in the Murdoch MUP are within a 400m walkable catchment of either the Barry Marshall Parade bus stops or Murdoch Station bus interchange.

A large proportion of bus routes accessing Murdoch Station were rerouted through the subject land, taking advantage of the bus priority measures along Barry Marshall Parade and its direct link to the Murdoch Rail-Bus Interchange. Through this, it is envisaged that Barry Marshall Parade would form part of the future Rapid Bus Transit (RBT) network identified in the draft Public Transport for Perth in 2031 plan and MSACSP. This transit link provides the potential to significantly improve public transport access to the Murdoch MUP and the broader MAC area from the eastern and western catchment areas, where the majority of car trips are generated.

ACTIVATION OF TRANSIT ZONE

Along with the provision of physical infrastructure to link the Murdoch MUP and Murdoch Station, it is proposed that the northern section of Barry Marshall Parade will be activated to promote transit use. Raised road profiles will encourage slower traffic movement that prioritises public transport users.

Special lease arrangements to attract early morning coffee and food vendors could occur within this space, with opening times linked to major shift changes as FSH and SJOGH. Development of special weekend events, such as Sunday markets, is also being investigated to attract off peak public transport trips and recognise the seven-day operation of FSH and SJOGH.

FUTURE LIGHT RAIL TRANSIT LINK

A proposed LRT system through to Murdoch Station could replace the east-west RBT route between Fremantle and Cannington via Murdoch Station currently proposed under the draft Public Transport for Perth in 2031 plan. This would create an attractive, efficient link between Murdoch and other strategic health and tertiary education centres, and greatly improve public transport access to the Murdoch MUP and MAC from eastern and western residential catchments not currently serviced by rail, assisting with the desired modal share targets.

Whilst further planning is required, the transit link along Barry Marshall Parade has been designed to accommodate LRT should this option be realised in the future. Barry Marshall Parade is constructed as a 31m wide transit only road reservation between the bus interchange and Fiona Wood Road, which is sufficient to enable provision of bus or LRT lanes and wide footpaths. As illustrated in **Figure 10**, a minimum road reserve width of 21m is required for the provision of LRT. The interchange with Fiona Wood Road will be designed to accommodate the future introduction of LRT. The gradient along Barry Marshall Parade will not pose a constraint for the future operation of LRT, with an average gradient of less than 1.4%.

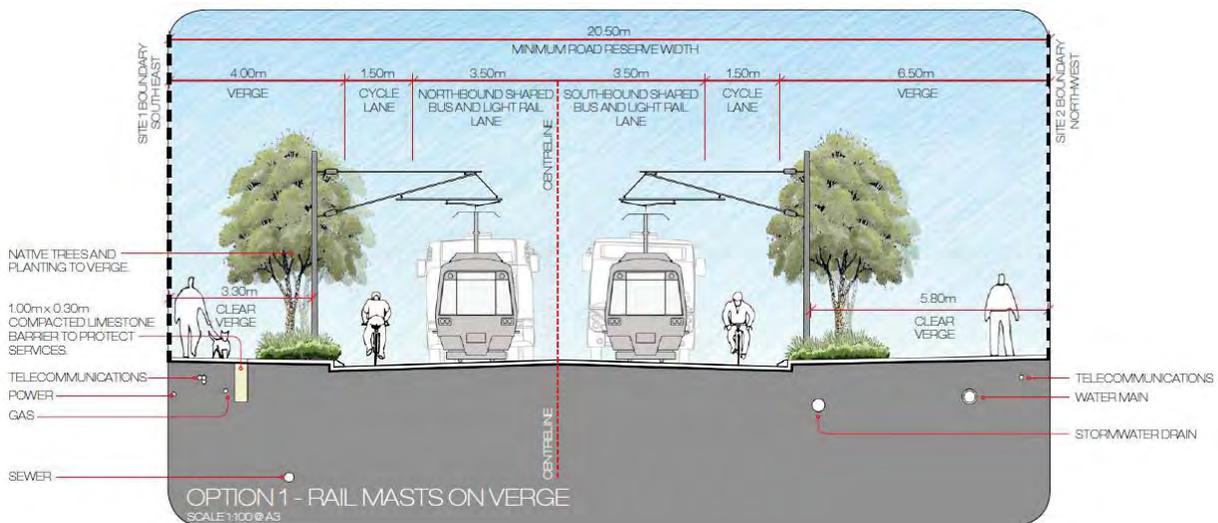


Figure 10 - Indicative Light Rail Options for Barry Marshall Parade Transit Link

Along the remaining section of Barry Marshall Parade which is shared with other traffic, a minimum road reservation of around 31m can accommodate two light rail tracks and associated infrastructure. The bus lanes on Barry Marshall Parade provide some capacity for a future LRT link, although the reduction of traffic lanes is also necessary to provide continuous transit lanes (to be shared between LRT and buses).

5.3 TRAFFIC ASSESSMENT

Traffic analysis for the Murdoch MUP was undertaken based on a Commuter microsimulation model which AECOM has developed for the DoT for the overall MAC. The 2031 model includes the entire MSACSP area and future planned surrounding road upgrades such as the extension of Roe Highway and associated southern connection (South Metro Connect design), as well as the southern extension of Fiona Wood Road to Farrington Road.

5.3.1 TRAFFIC GENERATION ASSUMPTIONS

The 2031 peak period traffic demands for specific destinations within MAC were derived as follows:

- Murdoch University including Eastern Precinct – 2031 STEM model
- FSH and SJOGH – previous microsimulation modelling work undertaken by Urbsol
- Murdoch Station ‘Park and Ride’ – observation of existing volumes and movements

The traffic impact assessment is based upon the full build out and occupancy of Murdoch MUP Stage 1 only. Stage 2 was not modelled due to the uncertainty surrounding the potential relocation of the Murdoch Station ‘Park and Ride’ facility (west of Kwinana Freeway), which sits within the Stage 2 development area. As such, the scenario modelled assumes the ‘Park and Ride’ facility is retained within Stage 2 site during the development of Stage 1.

Traffic generation for Stage 1 was split into two zones – Site 1 (comprising Sites 1A, 1B, 1C and 1D) and Site 7 (comprising Sites 7A, 7B, 7C and 7D). The total number of trips assumed to be generated by the MUP Stage 1 development is summarised in **Table 3**.

Table 3 - Stage 1 Trip Generation

Peak Period (2 hour)	Inbound Trips	Outbound Trips
Site 1 Total		
AM	474	75
PM	76	519
Site 7 Total		
AM	331	242
PM	500	546

5.3.2 TRAFFIC ANALYSIS

INTERSECTION ASSESSMENT

Table 4 summarises the levels of service (LoS) at key intersections in the vicinity of, and within, the subject land.

The results showed significant westbound traffic delay and queuing at South Street / Kwinana Freeway interchange in the AM peak. Since these three intersections are closely spaced, the model results only reflect the delay and queuing on the short links between the intersections. The critical capacity constraint occurs at the northbound interchange, but the queues impact both upstream ramp intersections and beyond towards the east.

Congestion is also expected at Murdoch Drive / South Street intersection in both peaks. Other intersections in the vicinity of the Murdoch MUP are expected to operate satisfactorily.

Table 4 - Intersection Assessment

Intersection	Approach	AM Peak			PM Peak		
		Ave Delay (s)	Max Queue (veh)	LoS	Ave Delay (s)	Max Queue (veh)	LoS
South Street / Kwinana Fwy Southbound On Ramp	South St EB	28	30	B	31	28	C
	Bus Station EB	94	2	F	94	63	F
	Eastern Car Park NB	81	14	F	69	29	E
	South St WB	370	426	F	31	96	C
	All	230	118	F	34	54	C
South Street / Kwinana Fwy Southbound Off Ramp	South St EB	15	18	B	4	10	A
	South St WB	71	67	F	9	10	A
	Kwinana SB Off-ramp	83	52	F	94	25	F
	All	56	46	D	15	15	B
South Street / Kwinana Fwy Northbound Ramps	South St WB	57	85	E	38	45	C
	Bus Station WB	78	2	F	90	1	F
	South St EB	73	61	F	31	48	C
	South St NB Off Ramp	291	96	F	74	19	F
	All	90	61	F	38	28	C
Murdoch Drive / South Street	South St WB	57	76	E	73	88	F
	Murdoch Dr NB	59	46	E	40	68	C
	Murdoch Dr SB	82	43	F	71	30	F
	South St EB	67	42	E	76	52	F
	All	64	52	E	62	60	E

Intersection	Approach	AM Peak			PM Peak		
Murdoch Drive / Barry Marshall Pde	Barry Marshall WB	47	18	D	43	38	D
	Murdoch Dr NB	30	27	C	42	35	C
	Murdoch Dr SB	38	44	C	34	24	C
	Discovery EB	50	6	D	50	33	D
	All	38	24	C	42	33	C
Barry Marshall Pde / Fiona Wood Road	Barry Marshall WB	53	3	D	50	5	D
	Fiona Wood NB	59	5	E	58	3	E
	Fiona Wood SB	27	16	B	52	10	D
	Barry Marshall EB	54	11	D	31	19	C
	All	37	9	C	37	9	C

EXTERNAL ROAD NETWORK

Congestion is generally expected on the road network at the entry points to the MAC area, particularly at the South Street / Kwinana Freeway interchange and at the Murdoch Drive / Farrington Road / New Southern Connection intersection.

Significant westbound congestion is expected to occur at the South Street / Kwinana Freeway interchange with all three intersections experiencing LoS F in the AM peak. Extensive queuing is shown on the westbound approach to the interchange, however it is noted that this is predominantly due to the heavy demand from Kwinana Freeway northern catchment and South Street eastern catchment to access other parts of the MAC development.

The proposed Murdoch Drive / Farrington Road / New Southern Connection intersection connecting MAC to the Roe Highway extension would experience high levels of congestion, especially northbound in the AM peak and southbound in the PM peak, due to large traffic demands generated by MAC.

The Fiona Wood Road entrances, both left-in / left-out intersections, one at the northern end off South Street and the other at the southern end off Farrington Road are shown to operate satisfactorily.

MUP ROAD NETWORK

The microsimulation modelling has not identified any mid-block capacity issues on the internal road network at Barry Marshall Parade, Fiona Wood Road and Bedbrook Row.

Mid-block capacity analysis has not been considered necessary for the internal MUP road network. The MUP network is generally characterised by short, access streets. The cross-sections for the major access roads (Fiona Wood Road, Barry Marshall Parade and Bedbrook Row) were determined by intersection capacity rather than the mid-block requirements due to the short length of these street blocks.

All other proposed roads within the Murdoch MUP cater for local access to on-street and off-street parking facilities. The local access streets include a single lane in each direction (with the exception of a portion of Murdoch Boulevard (Road 1)), and are designed for low traffic and slow speed conditions.

SUMMARY OF TRAFFIC IMPACTS

The traffic impact assessment has identified a number of issues with the operation of the external road network, particularly at the South Street / Kwinana Freeway interchange and the Murdoch Drive / Farrington Road / New Southern Connection intersection.

It is noted that **the proposed development is not considered to be the primary cause of the predicted peak period congestion on the external road network**. The Murdoch MUP Parking Strategy and objectives to achieve a 40% public transport mode share for employees and create a self-sufficient centre all contribute to reducing peak period traffic generated by the proposed development. Vehicle trips generated by the MUP Stage 1 development account for only 10% of all vehicle trips into the MAC area.

A significant proportion of the high traffic demands are instead attributed to the wider MAC area. Addressing the predicted traffic demand and corresponding peak period delay at the South Street / Kwinana Freeway interchange should therefore be addressed by the broader MAC transport strategy.

The Murdoch MUP internal intersections are all predicted to operate satisfactorily.

5.3.3 EXTERNAL NETWORK ANALYSIS

5.4 PEDESTRIAN MOVEMENT & CYCLING

The vision for the Murdoch MUP will support walking and cycling trips for local residents and commuters, as well as visitors to the two adjacent hospitals. The proposed infrastructure and initiatives to encourage people to walk and cycle within, and to, the Murdoch MUP are outlined in this section.

The relevant MUP objectives for pedestrian and cycling access are:

- Provide easy and safe access to the bus / rail interchange.
- Provide effective pedestrian linkages through the site.
- Strengthen pedestrian and cycle connectivity to and within the precinct.

The Murdoch MUP objectives recognise the importance of attractive pedestrian links in achieving the aspirational public transport mode share target. In addition, the objectives highlight the role of the Murdoch MUP to encourage walking and cycling trips to and from other major MAC activities to access a range of daily activities. Despite potential for a significant number of vehicle trips to be avoided, the target mode share for walking and cycling is still reasonably low at 10-15% of all Murdoch MUP trips.

5.4.1 EXISTING PEDESTRIAN NETWORK

Whilst there are reasonably well connected pedestrian networks within the surrounding suburbs, there are a number of access barriers to the subject land (and wider MAC) site. The road width, volume and speed of traffic along the major road corridors bordering the subject land (Kwinana Freeway, South Street, Murdoch Drive and potentially the extension of Roe Highway) present safety and perceptual barriers. These roads restrict permeability resulting in longer walking and cycling trips, and the dominance of traffic does little to attract non-vehicular traffic along or across these corridors.

For cycling, a shared path is provided along South Street; although this only continues on the northern side of the road west of Murdoch Drive with no direct access between the subject land and Murdoch University. Dedicated bicycle lanes are provided along Murdoch Drive between South Street and Farrington Road, connecting to shared paths at both ends.

In the broader context, residential areas north of South Street and east of the Kwinana Freeway are disconnected from the MAC with no convenient walking or cycling access. These areas are typically characterised by cul-de-sac neighbourhood design, which reduce connectivity and increase travel distances to nearby places.

5.4.2 PROPOSED PEDESTRIAN NETWORK

The proposed pedestrian network will provide attractive, easy access between the subject land, the adjacent hospital and education activities and Murdoch Station. Focusing on these links will greatly improve pedestrian connectivity between major traffic generators within the MAC and promoting it as a TOD. Improving access to the existing suburbs is to be addressed through the MAC and broader government transport initiatives. The existing and proposed network is shown in **Figure 11**.

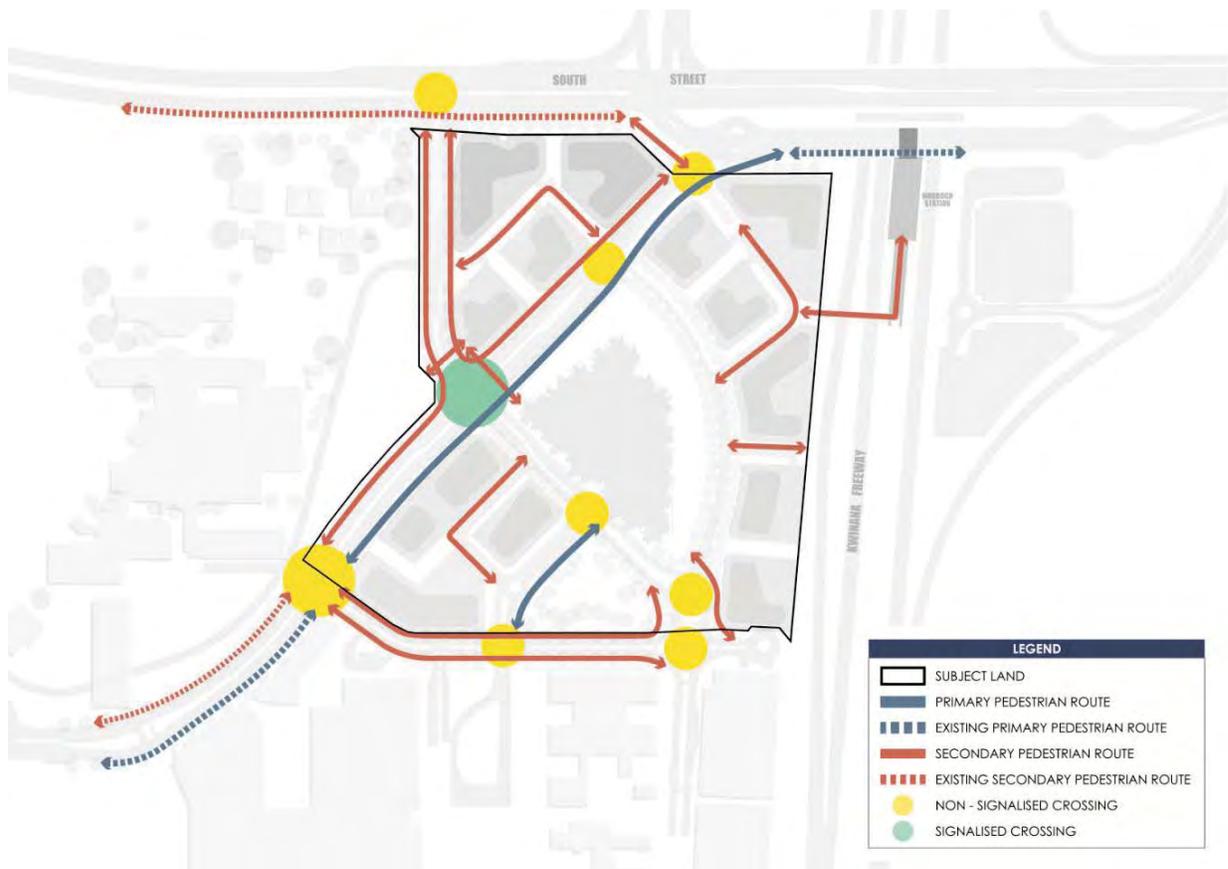


Figure 11 - Proposed Pedestrian Movement Network

PEDESTRIAN LINKAGES

Creating a permeable development with attractive, vibrant pedestrian links has been a key focus of the Murdoch MUP. The proposed network provides a people-focused centre around the Conservation Area, with a number of green and pedestrian-cycling only connections extending from the centre. The central street network is designed to be low speed, low volume with wide footpaths, emphasising the focus on people movement through the Murdoch MUP. A number of boardwalks provided around the Conservation Area, while providing a recreational purpose, also help to emphasise the pedestrian focus within the subject land. The street network provides a number of route options with Barry Marshall Parade and the adjacent FSH parking buildings, intended to disperse traffic through the lower speed, people focused areas and provide multiple pedestrian links within the Murdoch MUP.

Attracting commuters and visitors to travel by rail or bus are objectives embedded in the Murdoch MUP design process. To achieve this several direct pedestrian links are provided between the subject land and Murdoch Station:

- Barry Marshall Parade: provides a direct pedestrian (and bus) link to Murdoch Station. The streetscape is to be designed to provide a continuous sightline to Murdoch Station along with shaded footpaths activated by retail and hospitality activities.
- Principal Shared Path (PSP) Access: this will provide a direct pedestrian link between the centre of the MUP and the proposed Kwinana Freeway PSP. The access is designed to provide a continuous sightline to the Conservation Area, and is likely to encourage commuters using the PSP to visit the Murdoch MUP.

PEDESTRIAN CROSSING OPPORTUNITIES

Within the Murdoch MUP, Barry Marshall Parade is likely to present the most conflict between pedestrian crossing movements and through traffic. To improve crossing opportunities along Barry Marshall Parade it is intended to provide parallel pedestrian crossing phases at the two signalised intersections.

With the exception of Fiona Wood Road, the remaining streets within the Murdoch MUP are likely to be characterised by lower volumes of slow moving traffic with a narrow carriageway design. Formal pedestrian crossing facilities are unlikely to be needed along these streets.

5.4.3 PROPOSED CYCLING NETWORK

Throughout the MAC it is proposed that along high volume traffic roads, cycle routes be provided via shared paths separated from the road carriageway. Along transit routes, the road design should ensure the safe integration of the cycle network along the corridor. In other areas, where the focus is on pedestrian and cyclist movement over vehicle movement, on-road cycle lanes are proposed, which will help to lower traffic volumes and speeds, and create a safer environment for non-motorised road users. The proposed cycle facilities within the Murdoch MUP are integrated with existing and proposed cycle routes extending through the MAC and surrounding suburbs. The existing and proposed cycle network is outlined in **Figure 12**.

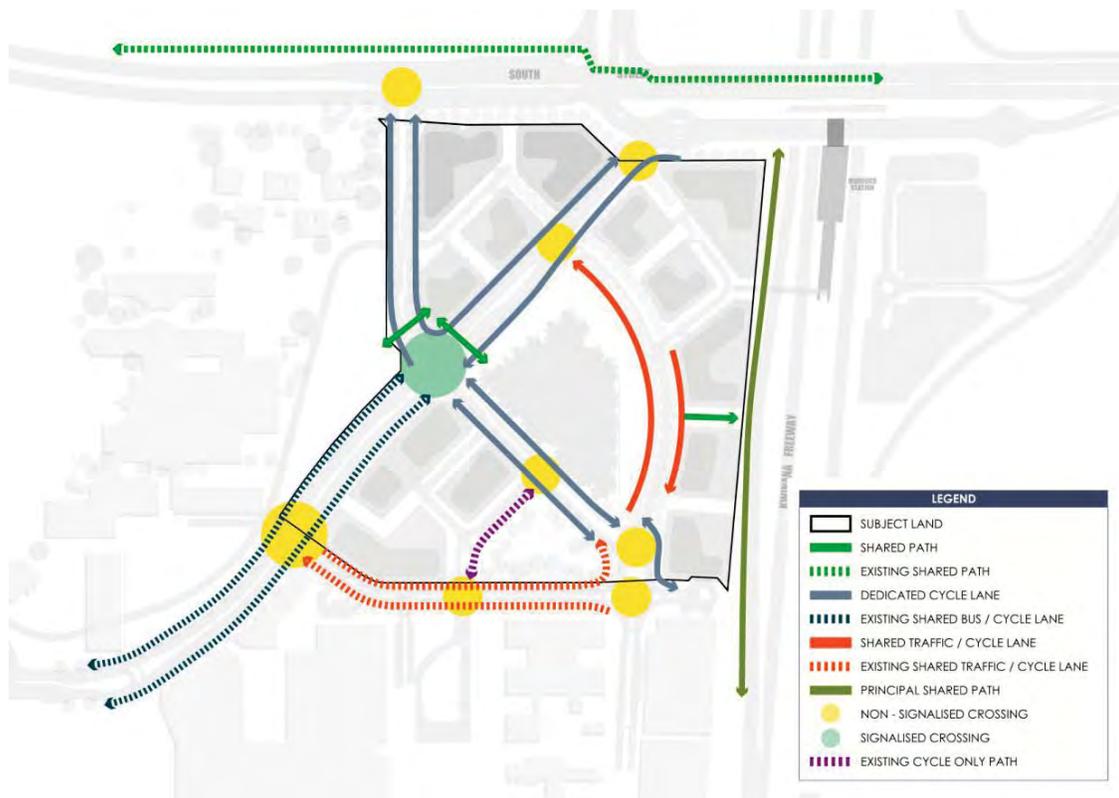


Figure 12 - Proposed Cycle Network

CYCLING LINKAGES

On-road cycle lanes along Barry Marshall Parade and Bedbrook Row and a dedicated cycle only path to the PSP provide direct links to key external routes. Within the Murdoch MUP, pedestrian movement becomes the focus, and as such, only informal pedestrian and cycle space is provided along Murdoch Boulevard (refer **Figure 12**). The provision of wider cycle lanes will be considered as part of Stage 2 works for Barry Marshall Parade north of Fiona Wood Road.

CYCLE PARKING

To further encourage cycling within the Murdoch MUP, end of trip facilities, including secure, sheltered bike racks and shower facilities are to be provided in all commercial buildings. On-street public bike racks are also to be provided at regular intervals within the Murdoch MUP. This will include lockable and open bike storage in a shared area adjacent to the on-road cycle paths.

5.5 VEHICLE MOVEMENT & ACCESS

5.5.1 VEHICLE MOVEMENT

BARRY MARSHALL PARADE

The proposed Murdoch MUP street network is characterised by the main transit and vehicle through-route along Barry Marshall Parade, with a dispersed, slower street network radiating from Fiona Wood Road and Murdoch Boulevard. The intent of the street network is to provide an efficient transit link through the subject land linked directly to Murdoch Rail-Bus Interchange, and connecting through to FSH, SJOGH and other key MAC trip generators to the west. Barry Marshall Parade also provides a sightline between Murdoch Station, FSH and SJOGH with active, landscaped street frontage encouraging pedestrian movements between these key activities.

The existing cross-sections for Barry Marshall Parade south and north of Fiona Wood Road are shown in **Figure 13** and **Figure 14** respectively. The road includes wide footpaths, dedicated cycle lanes and a median. South of Fiona Wood Road, Barry Marshall Parade has a single traffic lane, a shared bus/cycle lane and on-street parking in both directions. North of Fiona Wood Road, the road is a bus only link, with a dedicated bus lane provided in both directions. Traffic lanes are also provided to allow for future access to the Murdoch MUP Stage 2 development.

A low speed limit of 40km per hour (km/h) is proposed along Barry Marshall Parade, which helps to facilitate the safe integration of all road users.

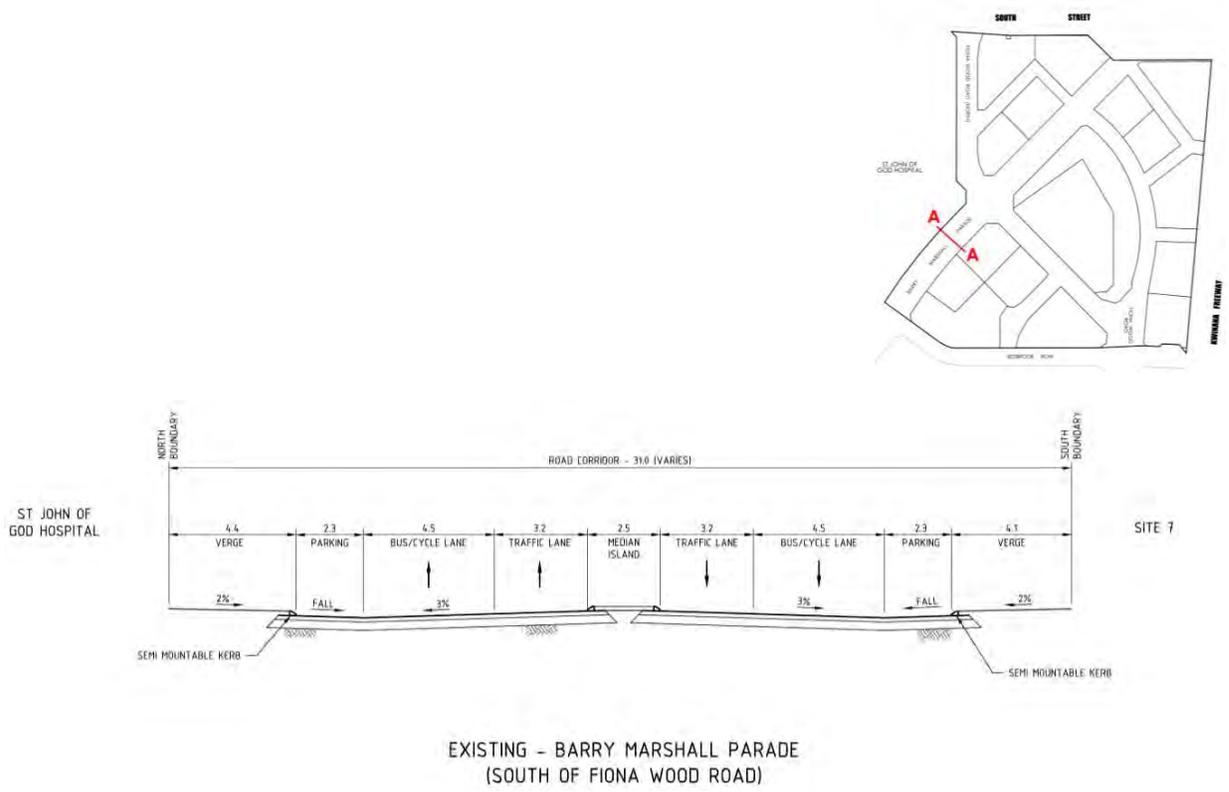


Figure 13 - Section A-A Barry Marshall Parade (South of Fiona Wood Road)

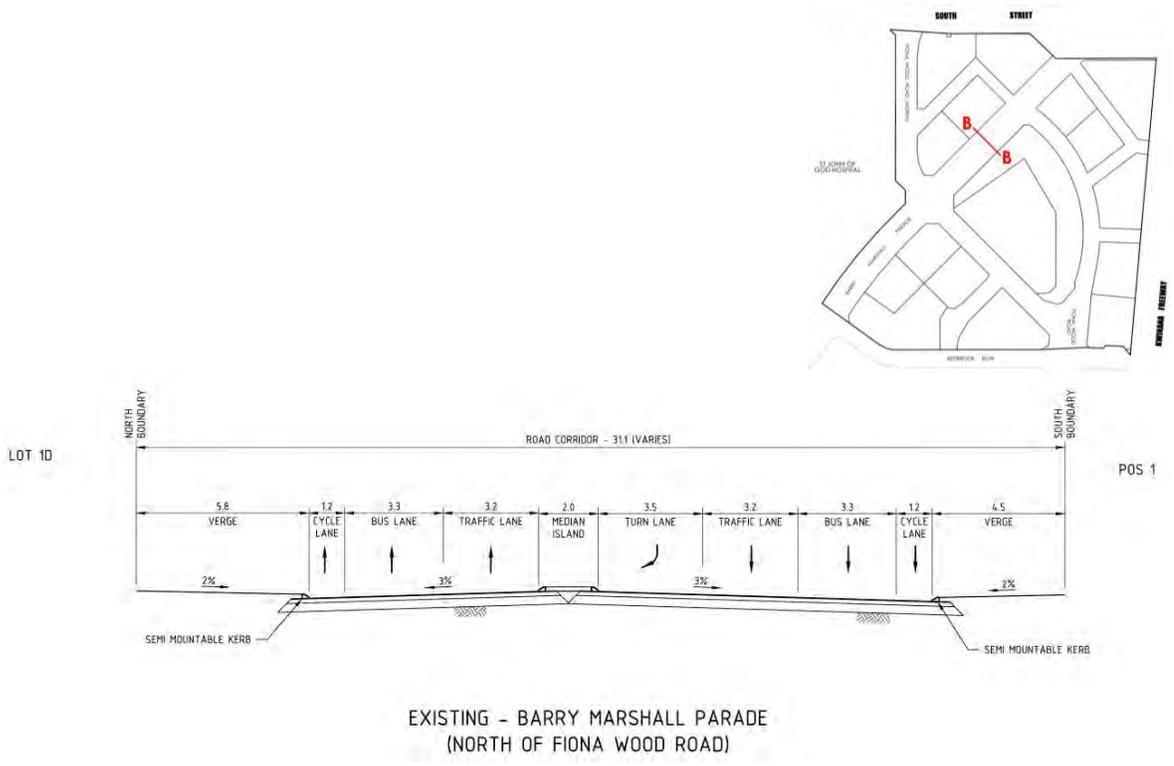


Figure 14 - Section B-B Barry Marshall Parade (North of Fiona Wood Road)

FIONA WOOD ROAD

The existing cross-sections for Fiona Wood Road south of Barry Marshall Parade and north of Barry Marshall Parade are illustrated in **Figure 15** and **Figure 16** respectively. These include wide footpaths on the north section and a dedicated cycle lane. Two lanes are provided in the southeast bound direction (travelling towards Bedbrook Row), providing a safe access lane into Site 7.

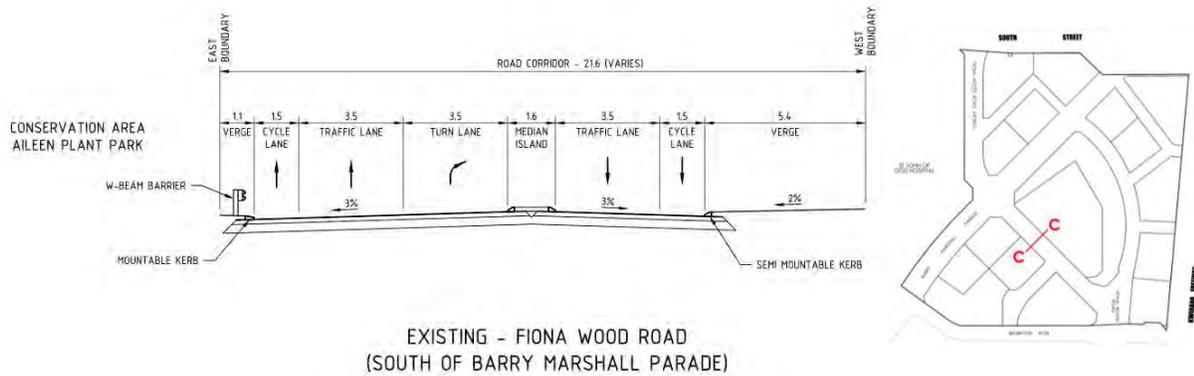


Figure 15 - Section C-C Fiona Wood Road (South of Barry Marshall Parade)

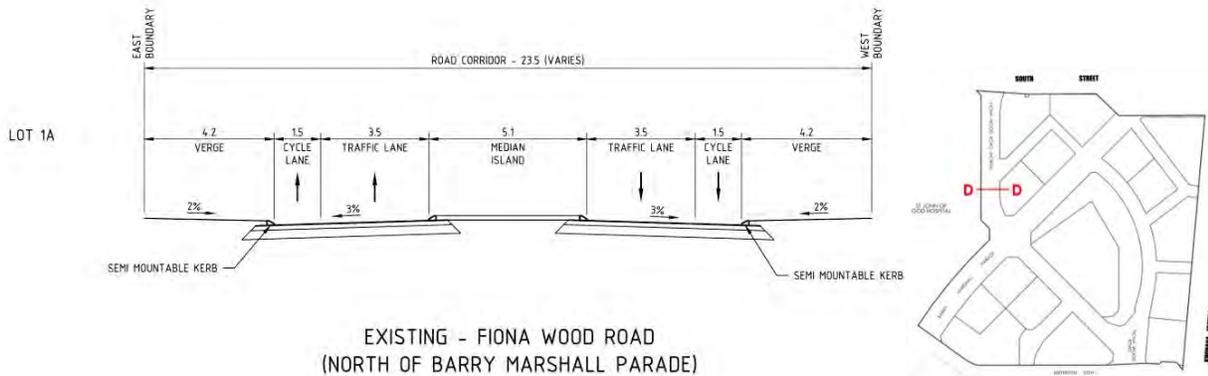
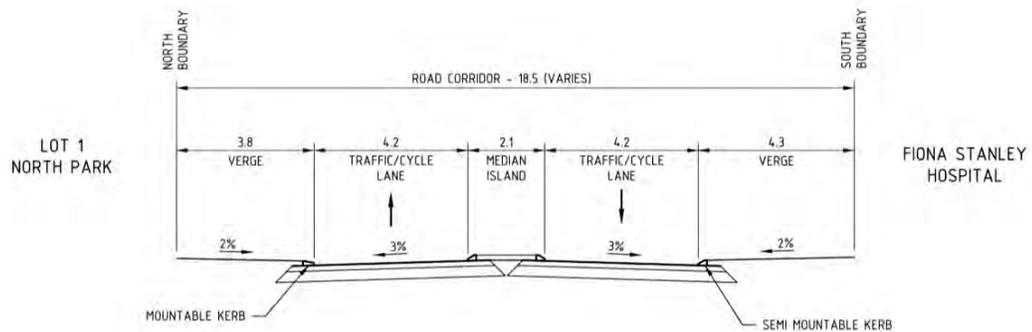
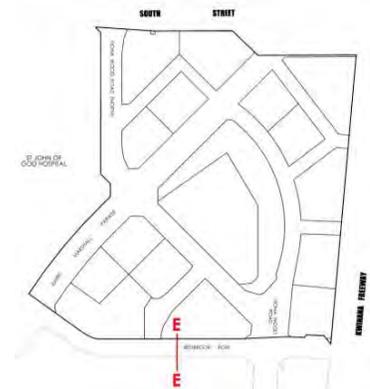


Figure 16 - Section D-D Fiona Wood Road- (North of Barry Marshall Parade)

BEDBROOK ROW

Similar to Fiona Wood Road, Bedbrook Row will carry larger volumes of traffic, particularly from the FSH. The existing cross-section for Bedbrook Row is illustrated in **Figure 17**. The road has one shared traffic and cycle lane in each direction, with wide verges and a median provided for crossing pedestrians.



EXISTING - BEDBROOK ROW

Figure 17 - Section E-E Bedbrook Row (Approach to Barry Marshall Parade)

MURDOCH BOULEVARD

The proposed cross-sections for the north and south sections of Murdoch Boulevard (Road 1) are illustrated in **Figure 18** and **Figure 19**. The northern section is one way only, consisting of a shared traffic and cycle lane directing traffic northbound onto Barry Marshall Parade. The southern section has one shared traffic and cycle lane in each direction, permitting access onto Fiona Wood Road and Bedbrook Row. The slow-speed road environment will support more confident cyclists sharing the traffic lanes with vehicles. On-street parking is proposed within Murdoch Boulevard (Road 1).

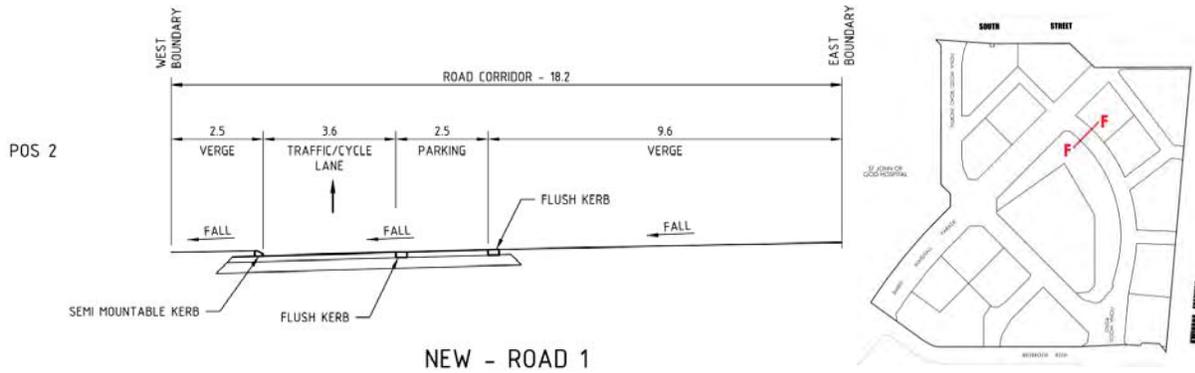


Figure 18 - Section F-F Murdoch Boulevard (Road 1) North

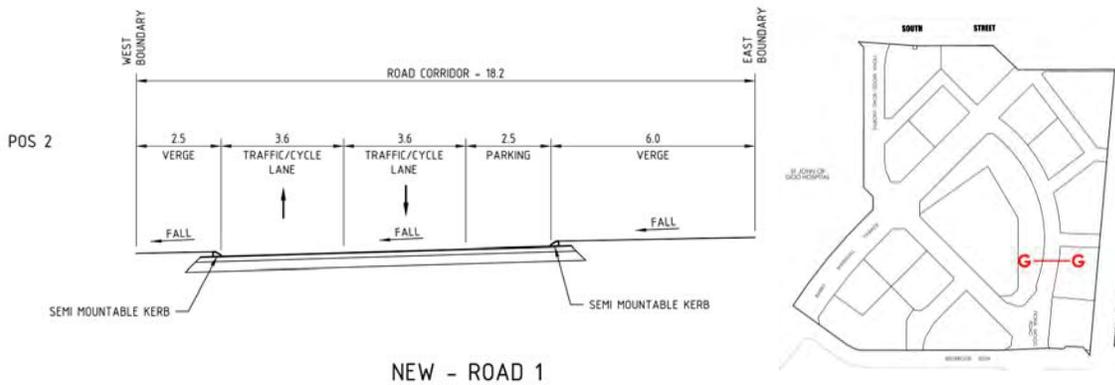


Figure 19 - Section G-G Murdoch Boulevard (Road 1) South

5.6 PARKING

A comprehensive Parking Strategy Report has been prepared by AECOM for the Murdoch MUP (**Appendix F**). The primary objective of the project is to offer appropriate parking provision whilst avoiding the creation of expansive car parks. Given the mixture of residential and non-residential uses proposed and the proximity of the Murdoch MUP to the Murdoch Rail-Bus Interchange, the combined impact of these elements requires careful assessment to determine what car parking facilities need to be provided in order to meet the anticipated demand for car parking for the proposed development and to encourage alternative modes of transport.

The strategy for the provision of car parking in the Murdoch MUP is broadly guided by the following key principles:

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

5.6.1 MURDOCH MUP PARKING STRATEGY

The Murdoch MUP Parking Strategy has been developed in accordance with the parking supply and management principles in the *Interim Murdoch Centre Access and Parking Policy*. The Policy is an interim measure to guide for the future transport planning for the MAC until the proposed State Planning Policy – Metropolitan Centres Parking has been gazetted. The car parking requirements as outlined in Part 1, section 4.2.1 will take effect upon approval of the Murdoch MUP ACSP and the provisions will be separately incorporated/normalised into the City of Melville *Car Parking and Access Policy*.

The Policy includes parking supply rates based on the predicted medium and long-term capacity of the surrounding road network. The Policy sets a parking cap of 170 car parks per gross hectare for the Murdoch MUP. The cap for the Murdoch MUP equates to a maximum supply of 1,632 bays (based on a 9.6 ha gross 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 subject land:

- The PTA 'Park and Ride' facility.
- Special purpose parking (such as disabled bays, motorbike parking and loading zones).
- Private residential parking, including residential visitor parking spaces.

5.6.2 RESIDENTIAL PARKING

It will be the requirement of the developer to provide sufficient onsite car parking for the number of proposed dwellings on each development site. The rate of provision for residential tenant parking and residential visitor parking is provided below (**Table 5**).

A preliminary assessment of the residential car parking provision has been undertaken on the basis of the possible development scenario. The differential rates of provision for different sized dwellings have been used to calculate the overall residential parking requirement.

Table 5 - Residential Parking Ratios

Parking Type	Parking Requirements (minimum)
Residential Occupants	1 & 2 bedroom dwellings - average of 1.1 car bay per dwelling (as a minimum)
	3 bedroom dwellings - minimum 2 car bays per dwelling (Note: residential parking is excluded from cap)
Residential Visitor	An additional 5% of the required residential occupant car bays (as a minimum); all designated as visitor bays (Note: residential parking is excluded from cap)

5.6.3 NON-RESIDENTIAL AND VISITOR PARKING

The following maximum parking requirements identified in the Murdoch MUP Parking Strategy apply to non-residential development within the Murdoch MUP (**Table 6**). These rates are based on the opportunities to reduce the parking supply from standard parking rates, and extensive research into comparative activity centre developments in Perth and throughout Australia.

A total of 41 on-street parking spaces are proposed for the proposed development, including the existing 21 on-street bays on Barry Marshall Parade and a further 20 bays to be provided along Murdoch Boulevard (Road 1). These are intended to be managed for short term visitor parking. 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.

Table 6 - Non-Residential Parking Ratios

Parking Type	Parking Requirements (maximum)
Commercial/ Commercial Health	Maximum 1 car bay per 60m ² of gross floor area; 25% minimum designated as public parking
Hotel Accommodation	Maximum 1 car bay per 3 bedrooms; 25% minimum designated as public parking
Large Retail (more than 1,000m ² gross floor area)	Maximum 1 car bay per 35m ² of gross floor area; all designated as public parking
Small Retail (less than 1,000m ² gross floor area)	Maximum 1 car bay per 50m ² of gross floor area; all designated as public parking

6 URBAN FORM

6.1 URBAN STRUCTURE AND BUILT FORM

The Murdoch MUP is a catalyst project in the creation of the wider MAC. The key purpose of the Murdoch MUP is to create a transit-based hub which provides a range of complementary activities including commercial, medical/health related uses, retail, residential and short-stay accommodation.

Stage 1 of the Murdoch MUP retains the existing roads and infrastructure so as not to impact upon FSH. Stage 2 of the Murdoch MUP will be reliant on the relocation of the existing PTA carpark, affording scope for creating a new urban form.

A significant portion of the subject land is an existing Conservation Area, which is not publicly accessible. The urban structure treats the Conservation Area as a significant public asset which can contribute to the broader public realm via integration with the landscape and built environment.

Murdoch Boulevard is proposed on an arc alignment, encircling the eastern side of the Conservation Area. The boulevard creates a consistent address for the new residential development sites and a distinct identity for the proposed development. The built form of these development sites reinforces the broader urban structure, with preferred building heights of 10-11 storeys aligned with the curve, strengthening the edge of the public realm and landscape beyond.

Murdoch Boulevard is predominantly a two-way road with short term public parking along both sides to encourage street and retail use. With dedicated crossing points, traffic-calming treatments and landscaping, the boulevard will be pedestrian focused with priority given to pedestrians and cyclists. Traffic calming strategies and left-only access to Barry Marshall Parade ensures this is used for residents and users of the area, rather than a through-way for general traffic.

The boulevard creates a zone of POS between the Conservation Area and the development sites to the east and north. The curve of the boulevard creates a sense of focus to the Conservation Area, creating a new public space made up of varying spaces suitable for a range of passive and active recreational and community uses.

Residential developments address the POS, providing passive surveillance as well as views and amenity for residents. The landscape zone also protects the Conservation Area by ensuring that development is set back on the north and east, maintaining vital sun access to significant trees.

An area of POS to the north-west of the Conservation Area provides a strong visual connection into the proposed development for vehicle, cycle and pedestrian traffic entering the Murdoch MUP from South Street, as well as through-traffic to FSH and SJOGH. The view across this POS into the focal point of the Conservation Area is a major entry marker for the Murdoch MUP. Likewise, the view looking across North Park and down the boulevard (from the southern boundary of the ACSP area) is an important connection from FSH.

The curve of the boulevard forms a radiating array of view corridors between development sites. These axes form visual links with Murdoch Station, FSH and the Kwinana Freeway. The radiating nature of the view lines ensures that the public space is always the focal point of the proposed development.

The northern end of the boulevard terminates in a perpendicular intersection with Barry Marshall Parade - a major bus route linking Murdoch University with the Murdoch Rail-Bus Interchange. At this intersection, the bus-only portion of Barry Marshall Parade has the potential to become a shared space encouraging pedestrian movement between Stages 1 and 2 of the Murdoch MUP.

The proposed development includes 14 development sites (refer **Figure 20**). Whilst the 'mixed use' designation is intended to allow flexibility in terms of land use that may establish on each of the development sites, it is anticipated that buildings which are predominantly residential will be focused around the boulevard and Conservation Area. This arrangement will provide amenity to residents by allowing views across the central Conservation Area and POS. The development sites on the boulevard are also of an appropriate size and amenity to be suitable for short-stay apartments or medihotel uses adjacent to FSH and SJOGH.

It is anticipated the larger sites along Barry Marshall Parade, which are high visibility from South Street, will attract predominantly larger commercial businesses.

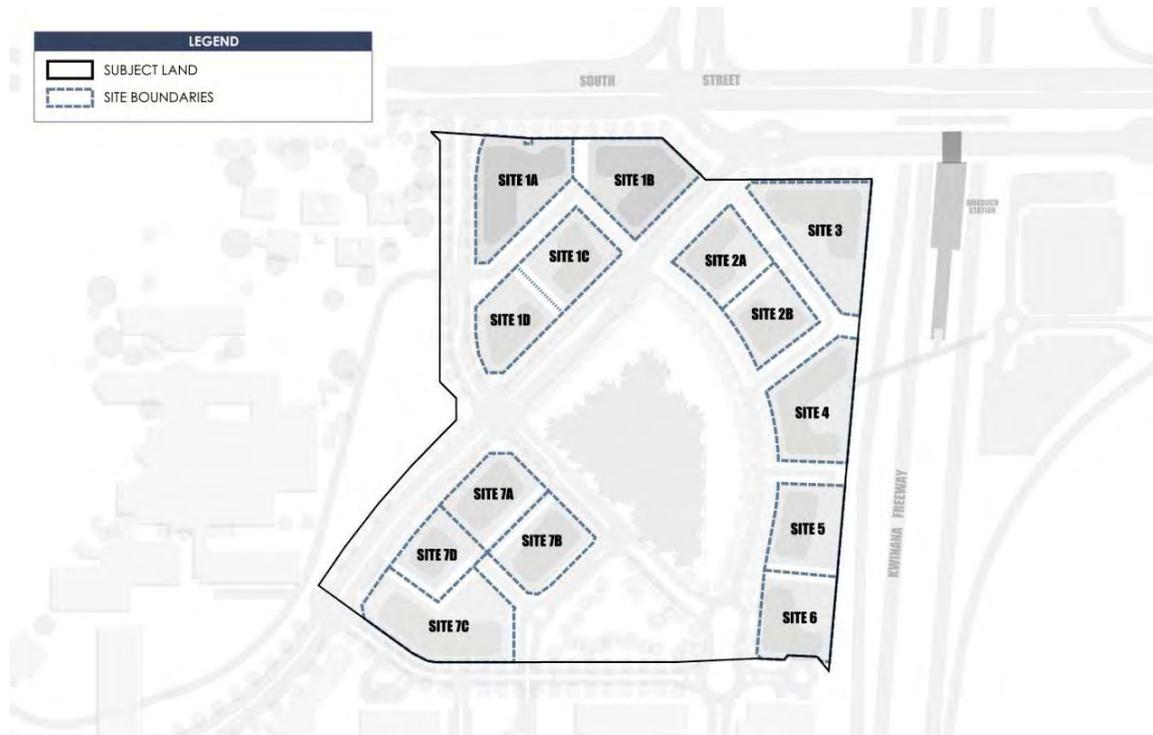


Figure 20 - Development Sites

PREFERRED LAND USES BY DEVELOPMENT SITE

LEVEL	SITES 1A, 1B	SITES 1C, 1D, 2A, 2B, 3, 4, 5, 6	SITES 7A, 7B, 7C, 7D
Ground Floor	Retail, food & beverage, commercial, foyers, loading and car park access, screened carpark	Retail, food & beverage, convertible small commercial, convertible residential, foyers, loading and car park access, screened car park.	Retail, food & beverage, convertible small commercial, medical/health, convertible residential, foyers, loading and car park access, screened car park.
Podium Levels	Commercial, screened car park.	Residential, serviced apartments, hotel, commercial, visually screened car park	Residential, serviced apartments, hotel, commercial, medical/health, medi-hotel, visually screened car park.
Tower	Commercial.	Residential, serviced apartments, hotel, commercial.	Residential, serviced apartments, hotel, commercial, medical/health, medi-hotel.

6.2 STREET INTERFACE

The public domain and built form are interconnected - the built form and how it relates to the public domain (and vice versa) will be the key to the creation of an engaging and attractive destination.

The Concept Masterplan considers a hierarchy of street interfaces being primary, secondary and tertiary (Figure 21).

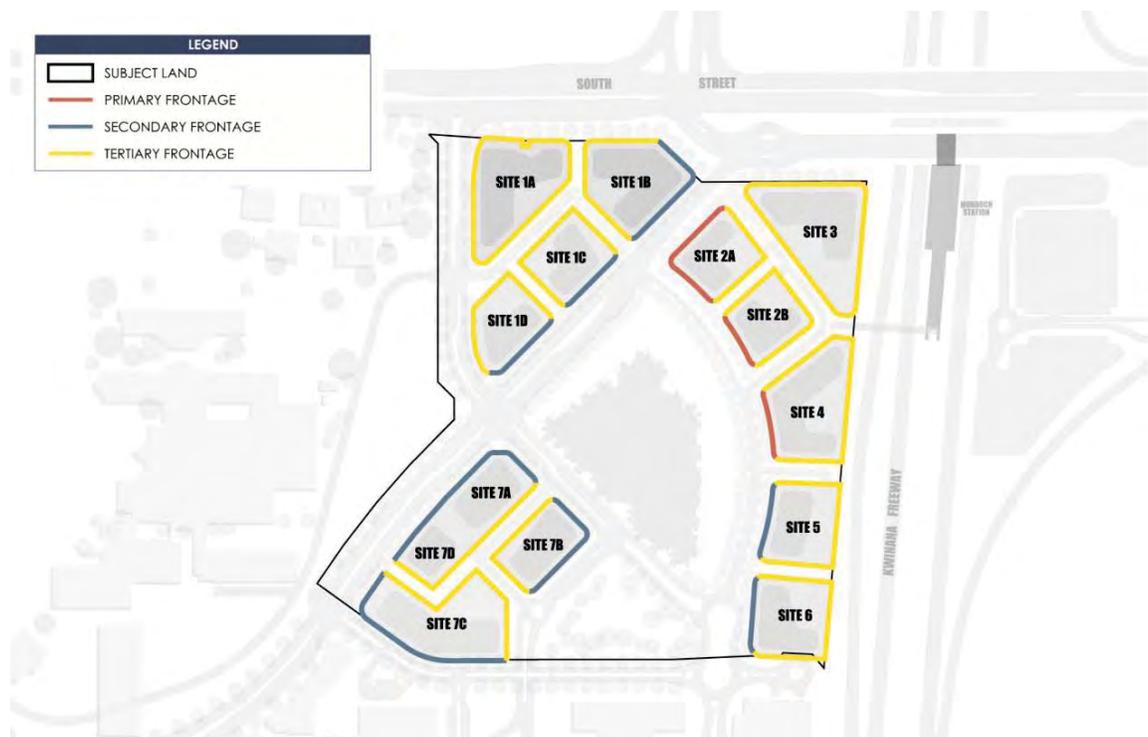


Figure 21 - Street Interface

6.2.1 PRIMARY FRONTAGES

Murdoch Boulevard is designated as a 'primary frontage' for adjoining development. The street interface of buildings on the boulevard is crucial in reinforcing the central POS. Buildings fronting the boulevard are to create a cohesive, activated edge to the public realm. Building heights of a minimum of 6 storeys will be required to provide sufficient urban form and scale, and give development a clear sense of address. A podium-tower massing model is encouraged (different massing approaches can be explored where buildings enhance the public realm).

At ground level fronting Murdoch Boulevard, buildings will be defined by a continuous colonnaded arcade space to the outer edge of the boulevard. The colonnade provides both a sheltered pedestrian area and a zone for alfresco dining. It is also an important defining architectural feature across the development sites, providing a cohesive backdrop to reinforce the public realm.

Multiple, small tenancies at ground level are encouraged and may include retail, commercial, food & beverage, community, residential and civic elements. An allowance for extra wide footpaths to the outer edge of Murdoch Boulevard will allow for adjoining retail and commercial uses to extend into the public realm. Regular spacing of street trees and associated seating will create an interface between the public realm and the built form and increase the opportunity for social interaction. Building foyers, private balconies and breakout spaces should overlook the public realm.

The central POS provides a contrast to, and relief from, the urban built form environment. Its amenity is a point of focus for development on the boulevard which frames and overlooks the space to provide a strong and well defined streetscape. Buildings oriented towards, and overlooking, the POS provides excellent opportunity for passive surveillance contributing to the sense of safety.

In order to minimise the impact on the public realm, vehicular access to carparks, building service areas and loading docks is not permitted from the primary frontage.

6.2.2 SECONDARY FRONTAGES

Barry Marshall Parade, Fiona Wood Road (south) and Bedbrook Row are important interfaces with adjoining development and are designated 'secondary frontages'. Ground level retail activation is encouraged, however commercial and residential ground-floor uses are also acceptable. The Design Guidelines will require ground level development to provide an appropriate street interface to contribute to the creation of an active, attractive and comfortable street environment.

Podium-level carparks are permissible on secondary frontages, however must be visually screened to provide an active interface to the street.

6.2.3 TERTIARY FRONTAGES

'Tertiary frontages' overlook service roads or areas which are not pedestrian routes, such as Kwinana Freeway. Ground-level and podium-level car parks are considered acceptable on tertiary frontages, but must be visually screened to provide an appropriate interface to the street. Consideration must also be given to views from Kwinana Freeway.

6.3 PUBLIC REALM

6.3.1 PUBLIC OPEN SPACE PROVISION

In the case of mixed use development, there is no minimum requirement for the provision of POS under Liveable Neighbourhoods. Liveable Neighbourhoods states that the appropriate POS contribution for mixed use development will be determined by the WAPC on a case by case basis.

Figure 22 and **Table 7** below show that the ACSP proposes 9.22% of land for POS for the ultimate development. The extent of the POS provision in this instance is primarily an outcome of the concept to incorporate the existing conservation area (which is not POS) into the design and augment its value by surrounding it with useable POS to create a central open space area at the heart of the Murdoch MUP.

This proposed provision is a slight reduction to the standard POS requirement of 10% POS for residential development under Liveable Neighbourhood, however the proposed provision is considered appropriate for a mixed use precinct. It should also be noted that the subject land is well located within an existing urban context allowing the future residents to take advantage of a variety of established recreation and leisure opportunities.

The FSH Open Space Land ('North Park') is an area of open space associated with the FSH. It should be noted that whilst included within the ACSP area, North Park does not form part of the POS contribution for the Murdoch MUP given its tenure as a Crown Reserve (for 'Health Purposes') vested in the Minister for Health. This area of open space will provide direct pedestrian connections between FSH with the Murdoch MUP and will act as an extension of the 'green corridor' wayfinding link.

Table 7 - Public Open Space Schedule

PUBLIC OPEN SPACE		
Gross Site Area		9.60 ha
Deductions		
Conservation Area	0.9134 ha	
FSH Open Space ('North Park')	0.4171 ha	
Total Deductions	1.3305 ha	
Net Subdivisible Area		8.2695 ha
PUBLIC OPEN SPACE PROVISION		
Murdoch Boulevard POS	0.7625 ha	
Total Public Open Space		0.7625 ha
Percentage of Public Open Space Provided		9.22%



Figure 22 - Public Open Space

The total POS provision is suitable to the proposed development and composition of land uses. As shown on the Landscape Masterplan (**Figure 23**), the POS areas will provide the opportunity for a number of varied and easily accessible passive and active recreational facilities such as:

- Discovery and learning playground
- Multi-use shelters and arbors
- Viewing platforms
- A variety of gathering spaces
- Boardwalks
- Integrated path systems
- Feature lighting
- Security and safety lighting
- Informal open recreation spaces
- Fitness equipment
- Smaller contemplative spaces
- Interpretive signage
- Public art
- Pop-up café / kiosk

In addition, the Conservation Area (0.9134ha) and its natural vegetation will provide a backdrop to the POS and increase the sense of openness and proximity to natural vegetation. Although it is not credited as POS, it will provide considerable passive recreation value to the future residents, workers and visitors to the Murdoch MUP.

The proposed provision of POS is considered more than adequate to meet the needs of the MUP.

6.3.2 PUBLIC REALM PROVISION

The emphasis for the design of the central public realm is the provision of an integrated network of flexible spaces that can have multiple uses and allow for different sized activities to occur. These activities shall range across the age spectrum and the spaces will provide the flexibility for use by people of different abilities and cultures.

In addition to the Conservation Area (Aileen Plant Park) additional areas of POS will be provided in the development of the Murdoch MUP. The focal point, the Conservation Area and surrounding POS will provide an activated, vibrant and integrated public space.

Surrounding the Conservation Area is a greenlink of active and passive POS, which integrates landscape planting, recreation spaces, and civic/community facilities. Varied seating arrangements throughout the POS will allow for formal and casual meeting while enabling both private seclusion and group gatherings. A fully inter-connected path system will be provided to ensure a strong linkage between all POS areas.



WEST PARK
 INITIAL PROPOSAL TO DEVELOP A MIXED USE PRECINCT WITH A FOCUS ON COMMERCIAL AND RESIDENTIAL DEVELOPMENT. THE PRECINCT IS TO BE DEVELOPED IN STAGES, WITH THE WEST PARK BEING THE FIRST STAGE. THE WEST PARK WILL BE A MIXED USE DEVELOPMENT WITH COMMERCIAL, RESIDENTIAL AND PUBLIC OPEN SPACE. THE WEST PARK WILL BE DEVELOPED IN STAGES, WITH THE WEST PARK BEING THE FIRST STAGE. THE WEST PARK WILL BE A MIXED USE DEVELOPMENT WITH COMMERCIAL, RESIDENTIAL AND PUBLIC OPEN SPACE.



NORTH PARK
 INITIAL PROPOSAL TO DEVELOP A MIXED USE PRECINCT WITH A FOCUS ON COMMERCIAL AND RESIDENTIAL DEVELOPMENT. THE PRECINCT IS TO BE DEVELOPED IN STAGES, WITH THE NORTH PARK BEING THE FIRST STAGE. THE NORTH PARK WILL BE A MIXED USE DEVELOPMENT WITH COMMERCIAL, RESIDENTIAL AND PUBLIC OPEN SPACE. THE NORTH PARK WILL BE DEVELOPED IN STAGES, WITH THE NORTH PARK BEING THE FIRST STAGE. THE NORTH PARK WILL BE A MIXED USE DEVELOPMENT WITH COMMERCIAL, RESIDENTIAL AND PUBLIC OPEN SPACE.

CENTRAL PARK
 INITIAL PROPOSAL TO DEVELOP A MIXED USE PRECINCT WITH A FOCUS ON COMMERCIAL AND RESIDENTIAL DEVELOPMENT. THE PRECINCT IS TO BE DEVELOPED IN STAGES, WITH THE CENTRAL PARK BEING THE FIRST STAGE. THE CENTRAL PARK WILL BE A MIXED USE DEVELOPMENT WITH COMMERCIAL, RESIDENTIAL AND PUBLIC OPEN SPACE. THE CENTRAL PARK WILL BE DEVELOPED IN STAGES, WITH THE CENTRAL PARK BEING THE FIRST STAGE. THE CENTRAL PARK WILL BE A MIXED USE DEVELOPMENT WITH COMMERCIAL, RESIDENTIAL AND PUBLIC OPEN SPACE.



The 'West Park' is located adjacent the intersection of Barry Marshall Parade and Fiona Wood Road. It is proposed to contain small areas of turf, amenity plantings and irregular groupings of trees and structures to mitigate the wind effects while combining seating and public art opportunities. This will provide both formal and informal opportunities for seating and shall enable a buffer zone to be established within the central POS area. A feature structure consisting of a transportable pop-up style café use or similar is proposed to be located over the top of the existing subsurface stormwater storage tanks within POS. The café will be visible from Barry Marshall Parade and will take advantage of pedestrian and cyclist activity between Murdoch Station and wider MAC area. The purpose and intent of the pop-up café is to provide the opportunity for early activation of the public realm and Stage 1 of the Murdoch MUP. A bank of street trees along Barry Marshall Parade provides potential raingarden opportunities and separation between the road and pedestrian areas. Low seating walls and small areas of grass create seating opportunities.

The 'North Park' is proposed to display a more urban feel at the high visibility corner of the POS area adjacent to Barry Marshall Parade. A seating area and feature structure at the northern end provide gathering space and shade and shelter which anchors this end of the POS. The seating areas have been designed to cater for various sized public gatherings. Open grass areas with selected mounded seating slopes with small exotic and deciduous trees will soften the space and provide visual interest. A multi-use area for special events will include shelters and power outlets for temporary uses and also cater for exercise equipment to the grass edge. Deciduous exotic trees will provide seasonal distinction while protecting the diversity of habitat and foraging for Carnaby's Black Cockatoos. The access path adjacent to the retained vegetation overlooks both the natural bushland environment and the adjacent usable park area.

The 'Central Park' features play equipment set into a change of level sloping down toward the retained native vegetation. This includes a series of climbing walls that disguise the retaining wall return while providing a colourful and fun addition to the park. A mix of traditional and nature play equipment is mingled with native vegetation species to visually breakdown the existing heavy visual barrier between protected bushland and publicly accessible areas. A steel 'skywalk' structure located in 'Central Park' will allow views into and over the canopy of the Aileen Plant Park and also back over the adjacent play area providing passive surveillance. Fencing under the skywalk prevents access into the protected Conservation Area. The northern end of the Central Park is dominated by a modern arbor structure which is set on axis view from the adjacent street. This arbor focuses on the important retained existing bushland as its view line termination. An amphitheatre seating element allows for small gatherings and events in a more secluded area with the Conservation Area as a backdrop. The view line will run down over a series of stepped turf amphitheatre steps and a small stage structure. A disabled access ramp to one side will allow all ability access to the slide base and planted zones.

The 'South Park' features an open grass kickabout area and a series of built shade structures over natural ground. Avenue planting and a low continuous freestanding seating wall around the edge of the park defines active space from the adjacent road. The grass area is located over proposed subsurface stormwater storage tanks. A boardwalk element to the south end of the park overlooks the retained and protected bushland and is also the preferred location for public art elements on this feature corner of the POS.

The subsurface stormwater storage tanks have been redesigned in location to better cater for public usability at surface level and to avoid any structural weight related issues.

Issues of safety will be paramount within the public realm and Crime Prevention Through Environmental Design (CPTED) strategies will be applied within all spaces. In addition, all lighting within the POS will conform to all relevant Australian Standards and enable appropriate lighting levels to be maintained throughout the subject land. Passive surveillance will be provided via the surrounding building height and use mix.

All landscape detail is subject to further resolution during detailed design.

6.4 LANDSCAPING

The primary objective in the design and construction of the public realm is to provide an appropriate balance between conservation, amenity and public recreation that creates a readily usable, interconnected, aesthetically pleasing and liveable environment to residents and visitors alike. A strong identity will be created through the integration of structures and amenity planting with the central Conservation Area (Aileen Plant Park). Community gathering and activities, informal recreation, habitat creation and public facilities will all draw upon this.

6.4.1 DESIGN OBJECTIVES

Figure 23 provides a graphical representation of the public realm vision for the ultimate development of the Murdoch MUP.

An emphasis shall be placed on the predominant use of local provenance and native plant species throughout the subject land's POS areas. However, where enabled by Federal conditions, some exotic plant species may be used in various locations to assist in spatial delineation and seasonal colour. Where these exotic species are proposed they will be selected for their ability to provide foraging or habitat for Carnaby's Black Cockatoos.

Mass plantings of single species plants will be developed within potential edge Water Sensitive Urban Design (WSUD) rain gardens to ensure effective health and viability while enabling clear sight lines into the central POS from the surrounding streetscapes. Tree planting within these beds will be grouped in more informal configurations. Generally, the tree planting to all of the central POS will reflect an informal design to align with the retained bushland and contrast to the structured and formal arrangement of street tree planting adjacent to the buildings. Groupings shall be arranged for shade provision, view shaft clearance and organisation of spatial areas within the public realm.

Understorey planting will reinforce the tree strategy in creating areas for privacy, providing visual amenity and environmental and educational benefits while enhancing the remnant bushland. Turf areas will be used in varying ways for large scale active recreation as well as smaller passive uses. In conjunction with other permeable surfacing within the POS, it will enable high levels of groundwater percolation.

Streetscape treatment to the surrounding roads of Barry Marshall Parade and Fiona Wood Road are proposed to consist of concrete footpaths, seating, rubbish bins with verge and median tree and shrub planting.

Barry Marshall Parade is proposed to display a formal planting of verge trees at regular intervals to reinforce the arterial traffic route and to create an avenue effect. The lower order roads of Fiona Wood Road and Bedbrook Row are proposed to display more informal groupings of trees. All these tree plantings will display understory planting of native species with half of the number of plants being of local provenance.

6.5 KEY NODES, LANDMARKS AND VIEW LINES

There are a number of key locations situated at the termination of key view lines in the Murdoch MUP. Many development sites will feature key facades that are visible from outside the subject land and will act as landmarks for locating and defining the proposed development. Landmark facades will be engaging and distinguishable from the surrounding context. **Figures 24-27** provide a graphical representation of these elements demonstrating the ultimate development of the Murdoch MUP subject to resolution of the location of the 'Park and Ride' facility.

Key nodes within the Murdoch MUP include Site 2, Site 3, Site 7 and Murdoch Station. These nodes will provide ground level permeability and create direct view lines to, from and through the development sites. Where pedestrian egress will occur from Murdoch Station, these nodes will have obvious access points across the central POS area. Key nodes are the preferred location for retail, food & beverage and supermarket uses.

View lines will be integral to the design and will enable both pedestrians and vehicular users to sight different components within the public realm. In this way, interest in, and exploration of, the POS can draw people into the Murdoch MUP. View lines that are clear of obstructions and have obvious pathways and landmarks will reinforce access ways across the central POS area.

Radiating connections provide strong view lines into and out of the central POS area, linking the Murdoch MUP with Murdoch Station and FSH/SJOGH. The radiating nature of the view lines ensures that the public space is always the focal point of the development. A connected pedestrian network will be reinforced by consistent use of materials, clear view lines between key nodes and visual landmarks. This assists in linking the subject land with the surrounding context and promoting legibility and wayfinding.



Figure 24 - View looking south-east down Fiona Wood Road (ultimate development scenario)



Figure 25 - View looking south-west down Barry Marshall Parade (ultimate development scenario)



Figure 26 - Aerial view looking south-west (ultimate development scenario)



Figure 27 - Aerial view looking north-east (ultimate development scenario)

6.6 WAYFINDING

An objective of the Murdoch MUP is to provide clear and legible wayfinding by bringing together surrounding transit, health and education precincts. Built form will contribute to effective wayfinding through visual permeability and defining clear view lines and boundaries.

Where development sites address the public realm, open foyers, small commercial tenancies, balconies and community residential space must be visually permeable.

FSH signage directing vehicles and pedestrians to the hospital main entries must be carefully considered and remain a separate visual language to minimise the impact on the public realm of the Murdoch MUP. A coordinated suite of signage and furniture will emphasise the identity and character distinct from the FSH. The incorporation of interpretive signage within the public art scheme will enhance the amenity of the Conservation Area.

Building and tenancy signage must be integrated with building facades to enhance the public realm.

6.7 PUBLIC ART

A Public Art Strategy has been prepared to provide guidance for the planning, procurement, delivery and management of public art within the Murdoch MUP (**Appendix G**) and is for information purposes and may be subject to further review and agreement by the City of Melville. Development will be required to comply with the Council Policy CP-085 *Provision of Public Art in Development Proposals*. Public art will retain a sense of belonging and create a unique character and identity within the Murdoch MUP. Furthermore, public art will contribute to the creation of a vibrant contemporary development, celebrating its natural features, rich social history and associations with leading healthcare, delivery and medical research institutions. Opportunities for public art to physically enhance the POS and the general public realm will be considered as part of each development site.

The Public Art Strategy also provides guidelines for public and private landowner contributions towards public art on a “percent for art” basis. Landowners of all private developments within the Murdoch MUP with a construction cost of \$1 million or greater must provide 1% of the construction cost towards public art. Of this, 50% of the public art contribution will be retained by the City of Melville as cash in lieu to enable the commissioning of significant artworks within the POS. The balance of the public art contribution will be used to acquire public art specific to the private development. The Public Art Strategy provides direction for the acquisition, locations and themes of public art to ensure that high quality public art is provided within the private developments within the Murdoch MUP. Furthermore, Council’s Policy CP-085 provides flexibility to enable consideration of applying the 50/50 art/cash contribution as discussed above and the potential for modifications to art selection and procurement processes.

The provision of public art as an integral component of the Murdoch MUP will be considered as part of a holistic approach to the design of the development. A Selection Panel will be convened to manage all public art commissions. For public art within POS, an Art Selection Committee will be convened, including members from LandCorp (and consultant team), City of Melville and other stakeholders and/or community members depending on the intent and location of the public art. For private developments, public art projects will be managed by a public art consultant with input from stakeholders, including the developer, architect and City of Melville.

7 CIVIL ENGINEERING & INFRASTRUCTURE REQUIREMENTS

7.1 EXISTING INFRASTRUCTURE

There are currently several major services within the northern portion of the subject land to the west of Murdoch Station. These services are located within the existing South Street verge, Murdoch Station 'Park and Ride' and traverse under the existing Kwinana Freeway and Murdoch Station.

It is proposed to locally realign services within a new services corridor within the Stage 1 boundary of the Murdoch MUP. This will permit the services to link from the Kwinana Freeway corridor to Barry Marshall Parade and to connect back into their existing locations within the South Street southern verge.

7.1.1 WATER DISTRIBUTION MAIN

Existing water distribution main will be relocated by installing the Main Street extension road crossing section (unconnected). The total relocation length of the 800mm diameter water distribution main is approximately 330m.

7.1.2 GAS MAIN

There is an existing ATCO/Westnet Energy 160mm diameter medium pressure gas main which runs parallel with the 800mm diameter water main and also traverses the Kwinana Freeway. The constraints of the gas main are similar to the water distribution main described above, and therefore the relocation solution is similar. The total relocation length of the 160mm medium pressure main is approximately 310m.

7.1.3 MURDOCH STATION WATER SERVICES

There are currently 2 water services that provide Murdoch Station with dedicated fire and water service. These traverse the subject land and will require relocation as part of the proposed development.

In order to maintain water services to the Murdoch Station in the initial stage of works, it is anticipated that a water reticulation main will be extended along Barry Marshall Parade, from Fiona Wood Road towards the bus interchange.

7.1.4 MURDOCH STATION POWER SERVICES

Existing high voltage power feeding the Murdoch Station infrastructure passes through the northern portion of the subject land, west of the Murdoch Rail-Bus Interchange. During the initial stage of works, these services will be relocated from the subject land to the southern South Street verge.

7.1.5 DRAINAGE – SOUTH STREET AND BUS INTERCHANGE CONNECTION

Stormwater drainage from the existing South Street and the western side of the Murdoch Rail-Bus Interchange is discharged via a piped network to the existing drainage basin located within the north-west portion of the Kwinana Freeway interchange. The existing piped network traverses the northern portion of the subject land and requires relocation as part of the proposed development.

Ultimately, it is anticipated that this stormwater drainage runoff will be diverted via the proposed southern South Street verge and to the existing MRWA freeway drainage network, which will free up in capacity following the removal of the Murdoch Station 'Park and Ride' facility. This will require the relocation of approximately 100m of 450mm diameter drainage pipe to re-route the existing stormwater.

7.1.6 EXISTING COMMUNICATION SERVICES

Existing communications services which traverse the northern portion of the subject land will require relocation to accommodate for the development of the northern development sites. These services include Telstra, Amcom, AARNet and Uecomm.

The initial relocation will comprise the realignment of conduits and pits to suit the perimeter of the development and the proposed southern South Street verge. The ultimate Stage 2 works will require additional relocation of the Amcom and AARNet services to the proposed road alignments, following the relocation of the Murdoch Station 'Park and Ride' facility.

7.1.7 EXISTING WESTERN PTA 'PARK AND RIDE' DRAINAGE AND ANCILLARY SERVICES

There are a number of existing minor services within the Murdoch Station 'Park and Ride' facility that are located within the subject land. Apart from the 150mm diameter water main relocation documented above, the remainder of the minor services servicing the existing carpark area will become redundant with the relocation of the 'Park and Ride' facility. The decommissioning and removal of these existing minor services will be required as part of proposed final stage of development.

7.2 INFRASTRUCTURE UPGRADES REQUIRED

The proposed development will not require any modification to existing road alignments and minor services which have been constructed to facilitate the development of FSH (with the exception of the major services noted above).

Development of Stage 2 will require the extension of minor reticulations services that are currently outside of the FSH reticulation service extent.

7.2.1 WATER

The water mains infrastructure installed for the FSH development allowed for future development within the MUP, and therefore the original FSH designs have incorporated water main sizes to cope with the additional demands. There are suitably sized water reticulation mains in Barry Marshall Parade, South Street and Fiona Wood Road that will allow for connection with water reticulation mains throughout the Murdoch MUP. Extensions of water reticulation services will be required to the north of the Barry Marshall Parade/ Fiona Wood Road intersection in order to service the proposed northern development sites, and in the initial stage, the Murdoch 'Park and Ride' fire and water services.

7.2.2 GAS

It is understood that the existing reticulation gas mains installed as part of the FSH works have sufficient capacity to service the proposed development. Should the development require additional gas supplies not catered for within the FSH development, additional gas supplies may be available from the existing medium pressure main located within the South Street southern verge. The extension of gas reticulation mains is required along Fiona Wood Road and Barry Marshall Parade in order to service the proposed northern development sites.

7.2.3 TELSTRA AND COMMUNICATION SERVICES

The existing Telstra and Optus communication networks are to remain and do not require relocation. Minor extension of network pit and conduits along Fiona Wood Road and Barry Marshall Parade will be required to ensure provision of communication connectivity to the proposed northern development sites.

7.2.4 SEWER SERVICES

The existing gravity sewer mains installed as part of the FSH development have been sized to accommodate the development of the subject land. When determining the sewer outflows from the proposed development, a high density scenario has been applied. The sewer design will undergo re-evaluation upon the finalisation of the type and density of development proposed within the Murdoch MUP.

During the initial stage of the proposed development, only a minor extension of gravity sewer is required along Barry Marshall Parade to service the northern development sites. The sewer will be extended further in Stage 2.

7.2.5 POWER

Two existing transformers have been installed as part of the FSH development to service Stage 1 of the Murdoch MUP. Further subdivision of Stage 1 will necessitate additional transformer sites.

Stage 1 works will add approximately 9.3MVA to the network via the extension of high voltage cables to Ringmain units and transformers strategically placed throughout the subject land. The Stage 2 works will add approximately 6.9MVA load to the network and as such, a new feeder is required to be run from the Murdoch Zone Substation. It is anticipated that this feeder will be interconnected into the Stage 1 works via Barry Marshall Parade. Conduits will be provided in the Stage 1 works to accommodate the feeder with minimal reinstatement works to the Stage 1 road verges.

It is envisaged that existing street lighting installed as part of the FSH works will remain. Additional lighting will be installed within new internal roads and Stage 2 works, utilising Western Power decorative poles and standard fittings for primary roads. Proposed pedestrian zones and POS areas will also incorporate feature lighting.

7.3 LOCAL WATER MANAGEMENT STRATEGY

A draft LWMS has been prepared by Strategen to accompany the ACSP and is included as **Appendix B**. A summary of the key aspects of the proposed drainage regime are outlined below.

The key guiding principles of the LWMS are to:

- Facilitate implementation of sustainable best practice in urban water management.
- Encourage environmentally responsive development.
- Provide integration with planning processes and clarity for agencies involved with implementation.
- Facilitate adaptive management responses to the monitored outcomes of development.
- Minimise public risk.
- Reduce potable water use.

The proposed development will maintain the pre-development surface water flows off the site in events up to and including the 1 in 100-year Average Return Interval (ARI) event by ensuring stormwater is infiltrated on site. Rainfall in events up to the 1 in 1-year event will be treated through use of Best Management Practices (BMPs) that treat water quality, in line with the Stormwater Management Manual (DoW 2004-2007).

8 IMPLEMENTATION

8.1 INDICATIVE STAGING

The indicative staging of the Murdoch MUP has been broken into 2 stages to ensure the project's infrastructure construction staging is coordinated with FSH, surrounding infrastructure such as works by MRWA, maintaining 'Park and Ride' operations and to release land in line with the estimated level of market demand (**Figure 28**).

Stage 1 has been determined based on the utilisation of existing infrastructure such as roads and pedestrian connections associated with FSH.

Stage 2 will be reliant on the relocation of the Public Transport Authority's (PTA) 'Park and Ride' facility for Murdoch Station located within the north-eastern portion of the subject land. The 'Park and Ride' facility is to remain until such time as the State Government determines a suitable strategy for its removal. This ACSP allows for the ultimate development of the Murdoch MUP, however the implementation of Stage 2 will not occur until such time as an alternative solution for the location of the 'Park and Ride' facility is agreed.

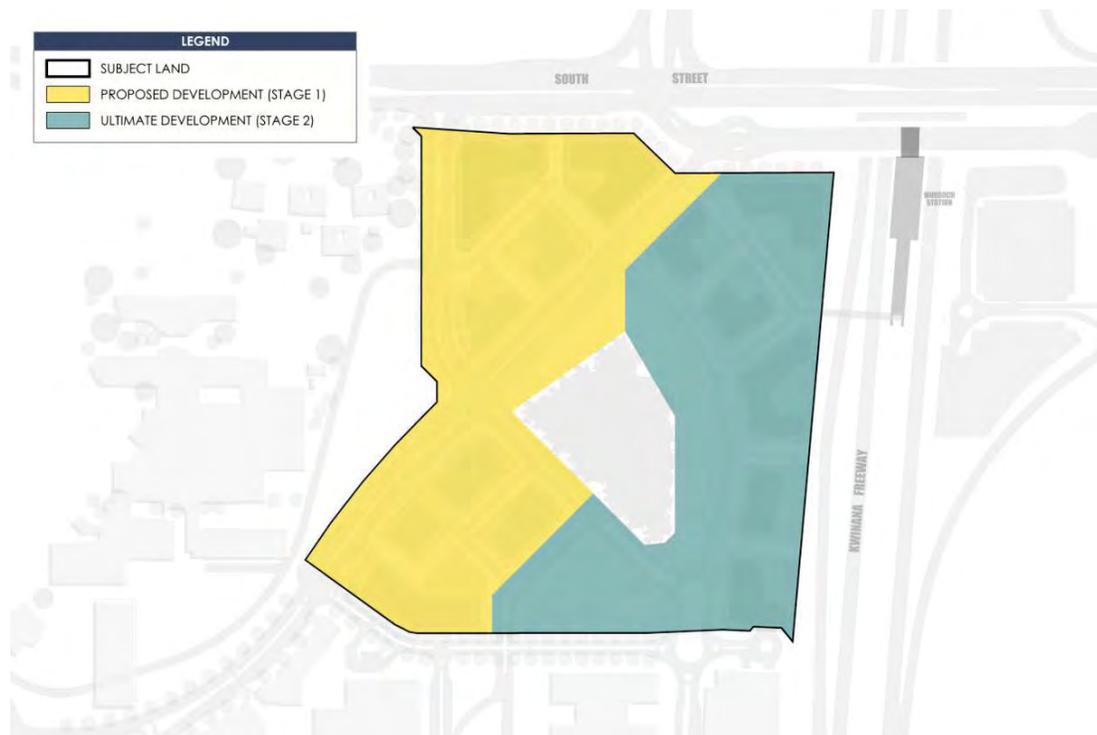


Figure 28 - Indicative Staging Plan

8.2 ENVIRONMENTAL MANAGEMENT

8.2.1 DUST, NOISE AND VIBRATION (CONSTRUCTION) MANAGEMENT

A Construction Environmental Management Plan (CEMP) will be required for the Murdoch MUP, as a condition of subdivision approval. The overall purpose of the CEMP is to establish a framework for minimising and managing environmental impacts during the construction phase of the development. The CEMP contains provisions for monitoring and evaluating the environmental performance and also contains actions to ensure compliance with State and Federal environmental approval conditions relevant to the development. Various environmental factors such as dust, noise and vibration are identified and addressed in a series of management plans. The CEMP addresses the following for all relevant environmental aspects:

- Relevant FSH environmental approval conditions (i.e., conditions related to construction works).
- Requirements of relevant FSH environmental management plans.
- Potential environmental impacts of the proposed activities.
- Environmental management objectives, targets and indicators for the development.
- Control measures/management actions.
- Monitoring and reporting.
- Contingencies.

8.2.2 ACOUSTIC REPORT (NOISE ATTENUATION)

Noise attenuation measures will be required for future buildings affected by both major traffic corridors – Kwinana Freeway and South Street. Detailed noise modelling has been undertaken by AECOM (based on a higher density/scale than envisaged for the Murdoch MUP) to assess the extent of these noise impacts and determine the necessary mitigation measures required in order to achieve acceptable indoor noise levels in noise-sensitive areas. This modelling has identified the requirement for mitigation measures to be incorporated into the future built form for all residential development sites fronting these roads. Preliminary noise mitigation and insulation measure recommendations have been provided considering the concept plan design and various predicted facade noise level scenarios. Further information regarding the modelling undertaken and the necessary mitigation measures is provided in **Appendix C**.

8.2.3 URBAN WATER MANAGEMENT PLAN

An Urban Water Management Plan (UWMP) will be required for the Murdoch MUP, as a condition of subdivision approval. The UWMP will include:

- Detailed landscaping design for the proposed for the POS and details on how this will be managed, including irrigation volumes and methods.
- Detailed drainage design, including confirmation of pipe sizing and locations, type of manhole, rain garden design and landscaping.
- Design guidelines and requirements for lot scale drainage systems.