Broome North Structure Plan Stage 2

Landcorp

Access and Movement Report

Final

30 November 2017

Broome North Structure Plan Stage 2

Project No:	IW128200
Document Title:	Access and Movement Report
Document No.:	
Revision:	Final
Date:	30 November 2017
Client Name:	Landcorp
Client No:	
Project Manager:	Desmond Ho
Author:	Emmerson Richardson/desmond Ho
File Name:	E:\IW128200 Broom north LDP2\Broome North Structure Plan Stage 2 FINAL 28112017.docx

Jacobs Group (Australia) Pty Limited
ABN 37 001 024 095
11th Floor, Durack Centre
263 Adelaide Terrace
PO Box H615
Perth WA 6001 Australia
T +61 8 9469 4400
F +61 8 9469 4488
www.jacobs.com

Document history and status

Revision	Date	Description	By	Review	Approved
Draft	14/06/2016	Draft for comment	ER		
Final	12/07/2016	Final	ER	LF	ER
Final	22/07/2016	LDP2 to Structure Plan Stage 2	LF	ER	ER
Final	25/07/2016	Playing field amended in plans	LF	ER	ER
Final	30/11/2017	Amend Base Plans & figures & edit report	DH	RI	RI

Contents

1. Introduction

This access and movement assessment has been provided by Jacobs to support Structure Plan Stage 2 for Broome North. Jacobs (previously SKM) provided an access and movement report for a previous version of the plan (then known as Local Development Plan 2) in December 2012.

A revised plan has been proposed by Roberts Day following meetings between Landcorp and the Shire of Broome. The latest Structure Plan Stage 2 is attached as **Figure 1.1**. This report relates to the structure plan shown in **Figure 1.1**.

The assessment of access and movement for Structure Plan Stage 2 has been undertaken with reference to the broader street network for Broome North (discussed in **Section 2**).

Structure Plan Stage 2 is situated to the north of the existing Blue Haze light industrial area and the Broome North Stage 1 development. It is bordered by Magabala Road (to the west), Fairway Drive (to the north), Broome Road (to the east) and the Ecological Cultural Corridor (to the south).

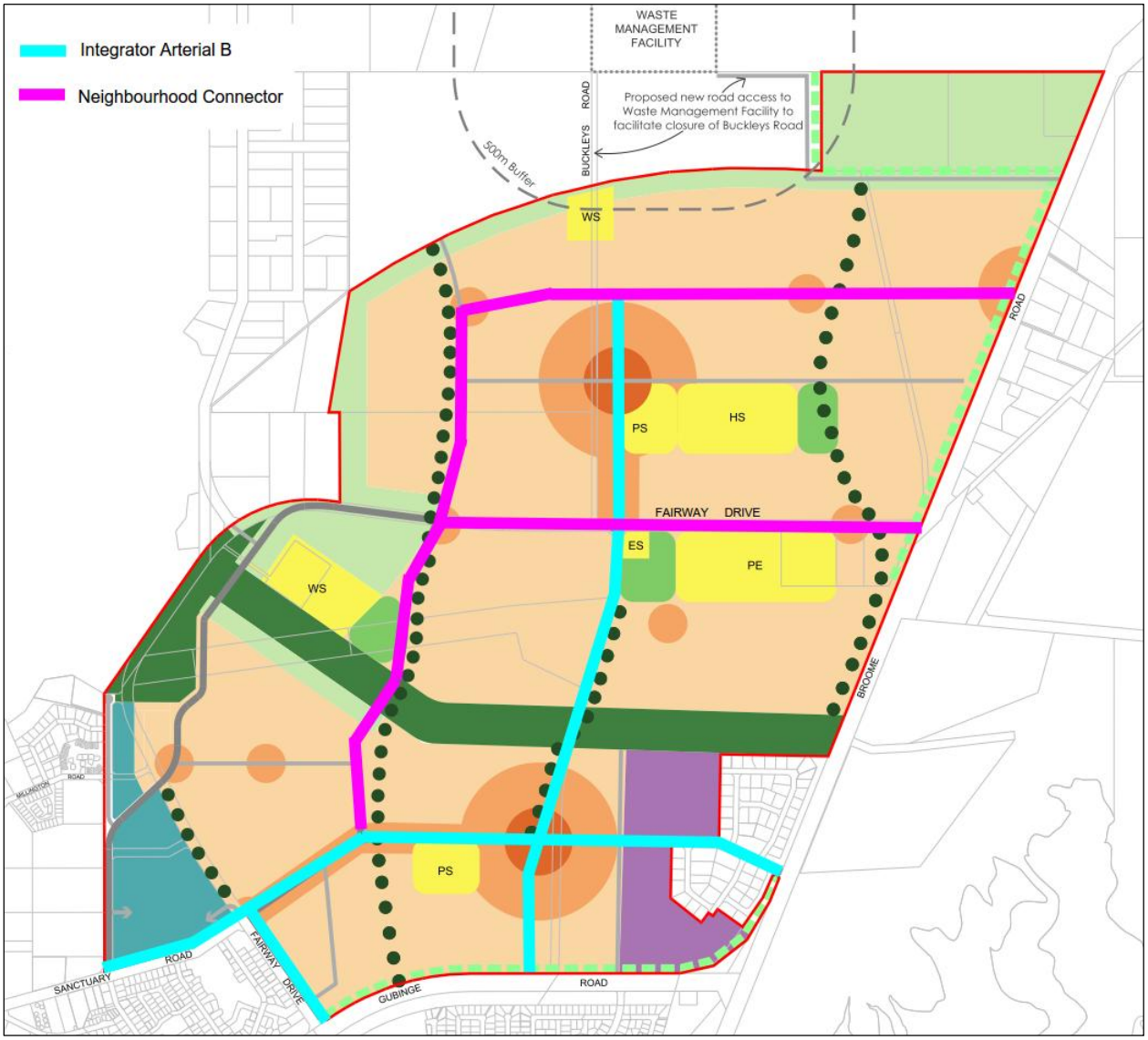
Figure 1.1: Structure Plan Stage 2 structure plan (Source: Roberts Day)

2.

2. Broome north street hierarchy and projected district travel

The street layout, as modified in the latest district structure planning, is shown in **Figure 2.1**. **Figure 2.1** also shows a proposed road hierarchy based on the street layout and estimated traffic volumes.

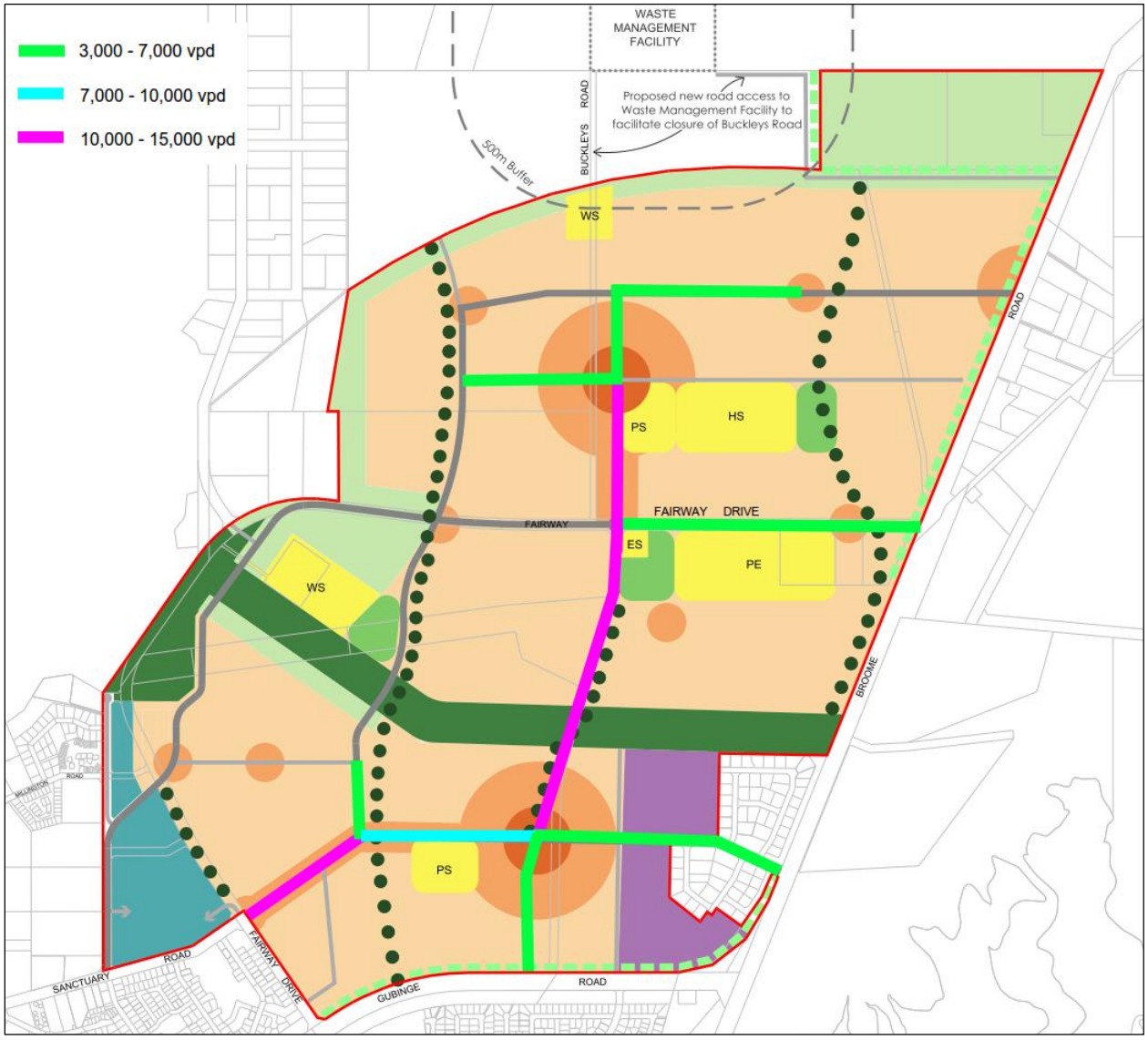
Figure 2.1: Proposed road hierarchy



The street network for Broome North has been designed to accommodate a daily traffic volume of between 35,000 and 40,000 vehicles per day, including traffic travelling to Broome North from other areas of Broome. Projected traffic volumes, at full development of Broome North, are shown in **Figure 2.2**. Projected traffic volumes in the vicinity of Stage 2 are:

- Magabala Road – 10,000 – 15,000vpd
- Fairway Drive – 3,000 – 7,000vpd

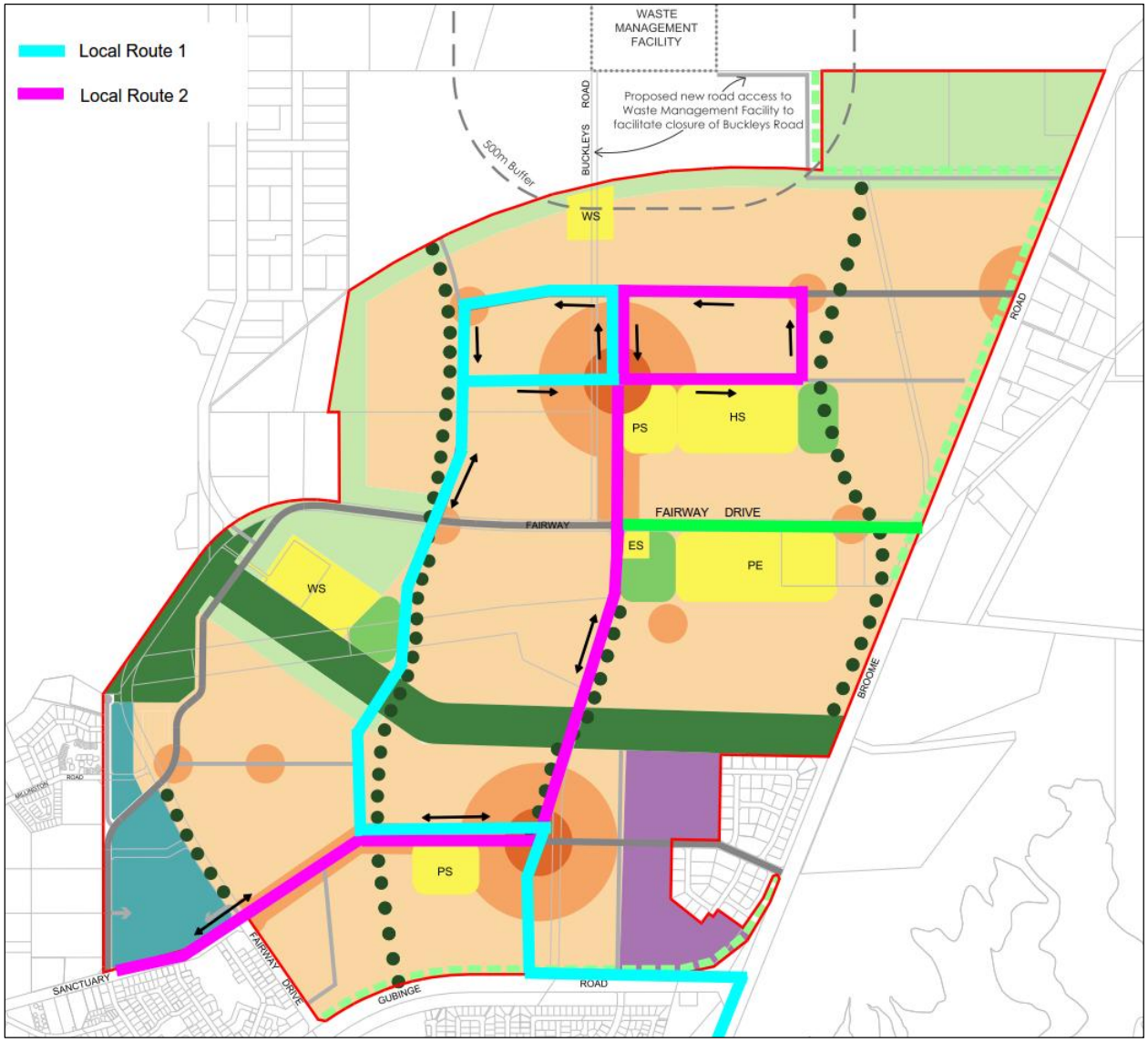
Figure 2.2: Forecast traffic volumes



Two bus routes have been proposed to serve Broome North (refer **Figure 2.3**). One of these bus routes is proposed to travel along Fairway Drive and Magabala Road adjacent to the proposed Stage 2 development providing public transport access to both the northern and southern retail areas within Broome North and Cable Beach and Chinatown. Bus travel to/ from Broome North is estimated to be about 1,500 trips per day at full development.

The size of Broome and the generally flat terrain makes it suitable for reasonable levels of walking and cycling. Footpaths are proposed on both sides of major roads and on at least one side of local streets. Local streets are proposed to be designed for slow speed travel suitable for cycling and shared use paths will be provided to serve schools and along major roads where required. Up to 6,000 walking and cycling trips are expected each day within Broome North at full development.

Figure 2.3: Proposed public transport routes



3. Transport and street design principles for Structure Plan Stage 2

Objectives and key planning principles were developed by Jacobs (previously SKM) in 2012 and were subsequently agreed in discussions with Landcorp, the Shire of Broome and Roberts Day.

3.1 Broad objective

The high level objective for Structure Plan Stage 2 is *to provide a well-connected street network for access and to develop safe, attractive streets for living.*

3.2 Key principals underpinning design

The key principles underpinning the design are:

Safe, slow street for all users – local street design speed of 30kph

- Design local streets for max 30kph travel;
- Use network design to provide short street lengths;
- Narrow pavement width for moving traffic – commensurate with drainage needs;
- Maximise on-street parking to help slow traffic;
- Well positioned footpaths under shade trees;
- Cyclists share local streets with motorists;
- Intersections designed for safe pedestrian crossing and slow traffic speed;
- Small kerb radii at intersections to reduce speed on entry to the street;
- Eliminate need for mid-block traffic management devices – humps, slow points etc.; and
- Avenues of trees to provide shade for pedestrians on footpaths and parked cars on street and to create a sense of enclosure to help slow traffic.

A legible well connected movement network

- Full grid pedestrian network with pedestrian links through open space and parklands;
- Modified grid for vehicle movement to maintain short street lengths and safe intersections; and
- A permeable, easy to comprehend street network that provides options for travel to school and to homes.

3.3 Outcomes to be achieved

Adherence to these principles in street design is intended to ensure the following outcomes are achieved:

1. Local access streets will have low traffic volumes;
2. Streets will encourage walking by providing safe, direct, shaded walking routes;
3. Vehicle speeds will be low enhancing safety for all users; and
4. Vehicle access will be convenient and easily understood.

4. Projected traffic volumes

The proposed yield for Structure Plan Stage 2 is:

- Urban living (182 lots-residential R25-40) – 344 dwellings;
- Neighbourhood living (333 lots-residential R20) – 333 dwellings; and
- School (estimated 600 students and 35 teaching staff).

The estimated average people per dwelling are:

- Urban living - 2.2 people per dwelling; and
- Neighbourhood living - 3.0 people per dwelling.

Thus it is estimated that the population of Structure Plan Stage 2 will be about 1,756 people. Assuming 3.5 trips per person per day and a car driver mode share of 65%, the estimated daily trips generated from Structure Plan Stage 2 residences is 3,995 trips per day.

In addition, some incoming trips will be attracted to the homes within Structure Plan Stage 2 (deliveries, social visits etc). For an area this size it is reasonable to assume an additional 10% (i.e. 10% above the vehicle generated trips). In addition, the school could be expected to generate about 800 trips per day from outside the Structure Plan Stage 2 area. The total daily vehicle trips are therefore estimated to be:

- Residential generated trips – 3,995 per day;
- Residential attraction trips – 400 per day; and
- School/ church trips from outside Structure Plan Stage 2 – 800 per day.

Total estimated daily trips – 5,200 per day

With this volume of total daily traffic, the maximum traffic volumes on the major access streets within the network are predicted to be less than 2,500 vpd. Traffic on the remainder of the local access streets is predicated to be less than 800 trips per day, with most streets carrying less than 400 vehicles per day.

5. Structure Plan Stage 2 street network and hierarchy

Jacobs has worked with Roberts Day and the project team in the development of the Structure Plan Stage 2 street network. The intent has been to:

- Provide a well-connected street network for access and to develop safe attractive streets for living; and
- Provide safe streets for all by keeping traffic speeds low.

A simple street hierarchy has been proposed for the Structure Plan Stage 2 area and is shown in **Figure 5.1**. The main access to Structure Plan Stage 2 is from Magabala Road to the west (integrator arterial) and Fairway Drive to the north (neighbourhood connector).

Figure 5.1: Street hierarchy for Structure Plan Stage 2 (Source: Roberts Day)

Magabala Road is an integrator arterial road that connects Fairway Drive to Gubinge Road. It provides a connection between Structure Plan Stage 2 and the southern and northern retail centres within Broome North, to Cable Beach via Sanctuary Road and to the remainder of Broome via Gubinge Road.

Fairway Drive is an east-west neighbourhood connector through Broome North.

Broome Road to the east is a primary arterial road but is not connected directly to the Structure Plan Stage 2 area.

The principal purpose of all streets within Structure Plan Stage 2 is to provide access. It is therefore proposed that all streets internal to the area be classified as access streets. The major access streets are highlighted in **Figure 5.1**. These streets could carry daily traffic volumes up to 3000 vpd if required and provide the main connections to the surrounding integrator arterial road (Magabala Road) and neighbourhood connector road (Fairway Drive). Full movement access intersections are proposed where these major access streets connect with Magabala Road and Fairway Drive. It is proposed that these intersections be standard T-intersections with

protected right turn lanes from the integrator arterial and neighbourhood connector roads into the major access streets. It is proposed that a roundabout be provided at the intersection of Magabala Road and Fairway Drive.

All other access and egress to/from Structure Plan Stage 2 from Magabala Road and, all but one onto Fairway Drive, is to be by left turn in and left turn out only. This will be enforced by the proposed median island in both Magabala Road and Fairway Drive.

All streets within Structure Plan Stage 2 other than those highlighted in **Figure 5.1** will be local access streets with a projected maximum daily traffic volume of less than 800 vpd. Most are projected to have a daily traffic volume of less than 400 vpd.

Almost all of the intersections internal to Structure Plan Stage 2 are T-intersections that enable simple decision making by drivers and produce safe outcomes. In a number of cases, it is proposed that a slight dog-leg be provided to help enforce the proposed stop signs and improve safety. These dog legs also act to reduce speed along otherwise straight sections of road, effectively creating a modified grid network for motor vehicle travel, whilst maintaining the grid for pedestrians. The intersection treatments are shown indicatively in **Figure 5.2**.

It is proposed that the east west street to the north of the ecological cultural corridor be closed to traffic approximately mid-way along its length. This will assist in keeping traffic volumes low and assist in reducing speeds, consistent with its classification as a local street.

The internal street network provides for a choice for movements within the area which will ensure a reasonably even spread of traffic. The near grid network provides for good connectivity, including for pedestrians and cyclists. Whilst movement through the area would be possible, there are no through routes that are more attractive or faster than travel along the surrounding routes of Fairway Drive and Magabala Road. The local street network has been designed to deliver low speeds that will enhance safety for all users - pedestrians, cyclists and motorists.

Figure 5.2: Road detail and shared path network (Source: Roberts Day/Landcorp)

6. Pedestrians and cyclists

It is estimated that about 15% of all transport trips within Structure Plan Stage 2 would be walking or cycling trips or would include a component of walking or cycling (e.g. to public transport). The estimated number of walking and cycling trips within Structure Plan Stage 2 is about 1,500 trips per day. Of these about 75% are estimated to be walking trips with the remainder cycling trips. However, it is quite possible that cycling will become more popular and provision has been made for an increased level of cycling in the LDP.

It is proposed that all local access streets would have a footpath on one side. In addition, it is proposed that a shared path be provided on Fairway Drive, Magabala Road and on selected streets within Structure Plan Stage 2 to provide safe access for cyclists to school and other facilities. The proposed network of shared pedestrian/ cyclist paths is shown in **Figure 6.1.** The principal purpose of these shared use paths is to provide access for young and vulnerable cyclists to school and for leisure purposes and to provide safe access to the pathways along Magabala Road and Fairway Drive.

The proposed local street network within Structure Plan Stage 2 has been designed to accommodate relatively low volumes of traffic at low traffic speeds. Along local streets, the combination of low traffic speeds and volume of traffic will result in a safe environment for cycling and walking.

Figure 6.1: Proposed network of shared pedestrian/ cyclist paths

Walking and cycling benefits health and limits some negative impacts associated with excessive car use. There is potential for walking and cycling to provide a significant and growing number of transport trips, including travel to school, providing it is made as safe and comfortable as possible. In the hot climate prevalent in Broome, it is

appropriate that footpaths be provided under shade trees where possible. The layout of streets and street cross section designs to achieve this are discussed in **Section 7**.

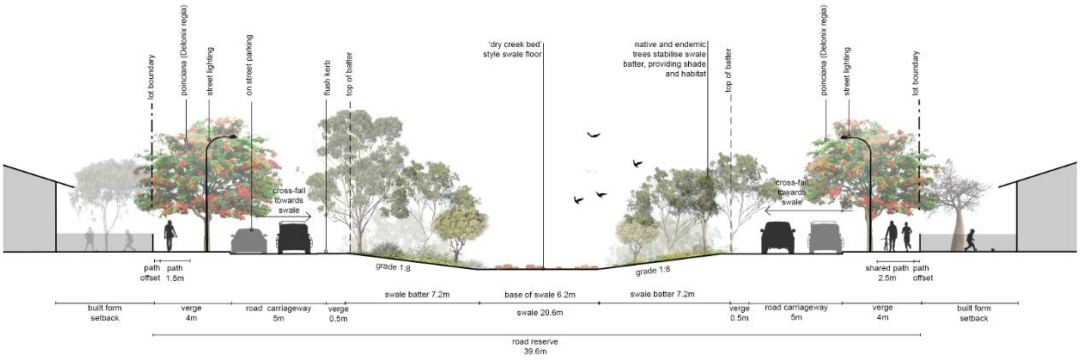
7. Street types and cross sections

7.1 Major access streets – one-way either side of a central swale

These streets provide a major entrance statement to the Structure Plan Stage 2 area from Magabala Road. These streets are proposed to be 40 metres in width, primarily to provide for drainage. It is proposed the one way carriageway be constructed to a width of 5.0 metres with a flush kerb on the swale side, with provision made for parking on the carriageway. The on-street parking is essential to narrow the carriageway for traffic and keep speeds low. If it is decided not to allow on-street parking the one-way carriageways should be constructed to 3.5 metres in width with flush or mountable kerbs to enable vehicles to park on the verge.

The preferred street typology is shown in **Figure 7.1.**

Figure 7.1: Major access street with central swale (Source: Roberts Day/Landcorp)



7.2 Streets with two way road on one side of swale

The street typologies will be provided on the major east-west routes to the east of roads with the central swale. A road carriageway of 7.4 metres is proposed which makes provisions for random parking and two way traffic. The proposed street cross section for this typology is shown in **Figure 7.2** (for the case of housing on both sides) and in **Figure 7.3** (for the case of POS on one side).

Figure 7.2: Major access street with swale on one side (Source: Roberts Day/Landcorp)

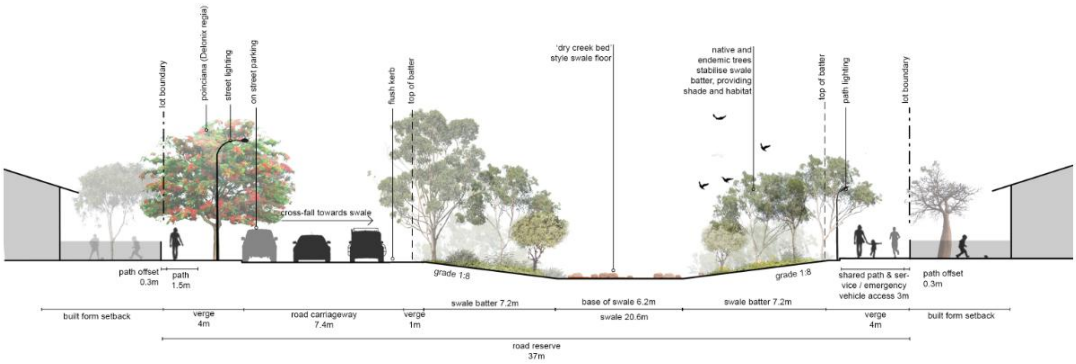
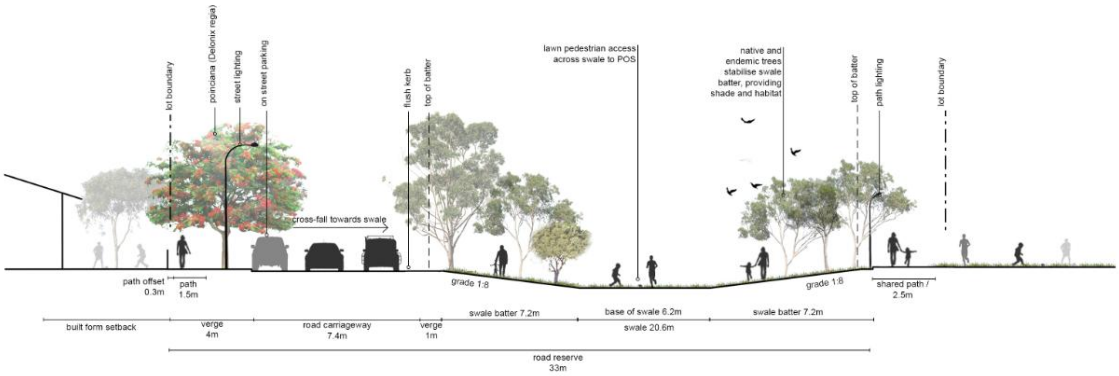


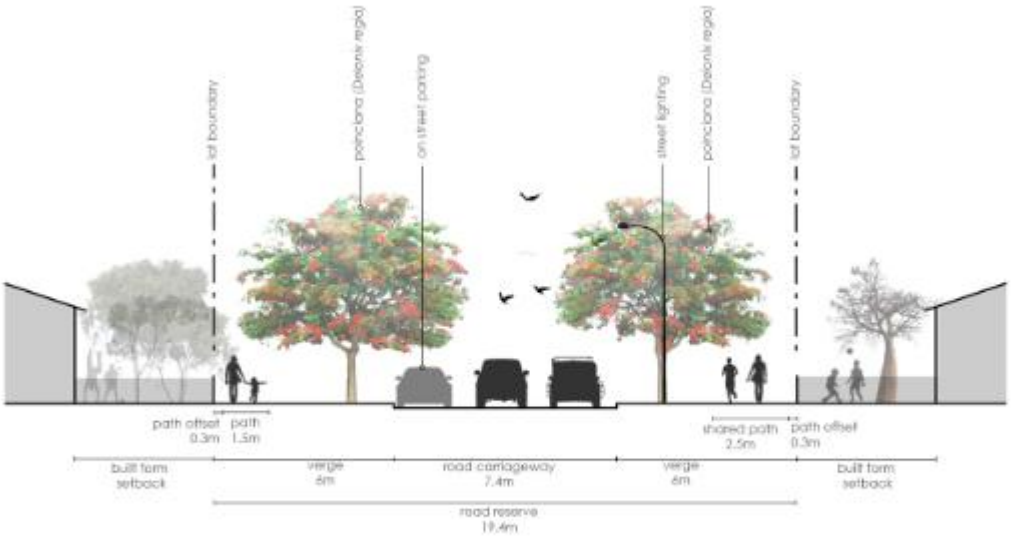
Figure 7.3: Major access street with swale and POS interface (Source: Roberts Day/Landcorp)



7.3 Other major access streets

These streets are those highlighted in **Figure 5.1** that do not have swales. It is proposed that the street pavement on these streets be 7.4 metres to make provision for random parking and two way traffic. The street typology for this street type is shown in **Figure 7.4.**

Figure 7.4: Major access streets without swale (Source: Roberts Day/Landcorp)



7.4 Local access streets (non-major)

Unless required for drainage or for on-street parking, local access streets should be constructed to a width of 5.5 metres. Where parking is permitted and encouraged on-street, a street width of 7.2 metres is preferred. This width allows for random on-street parking that helps to control traffic speed. The street typology for this street type is shown in **Figure 7.5.** The preferred street typology of a local street adjacent to POS is shown in **Figure 7.6**.

Figure 7.5: Local access street (Source: Roberts Day/Landcorp)

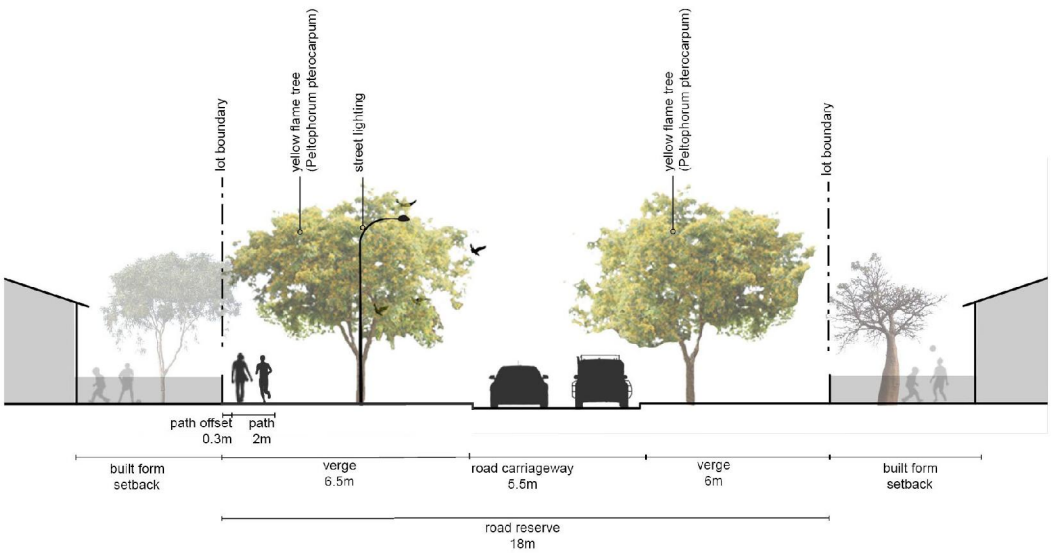
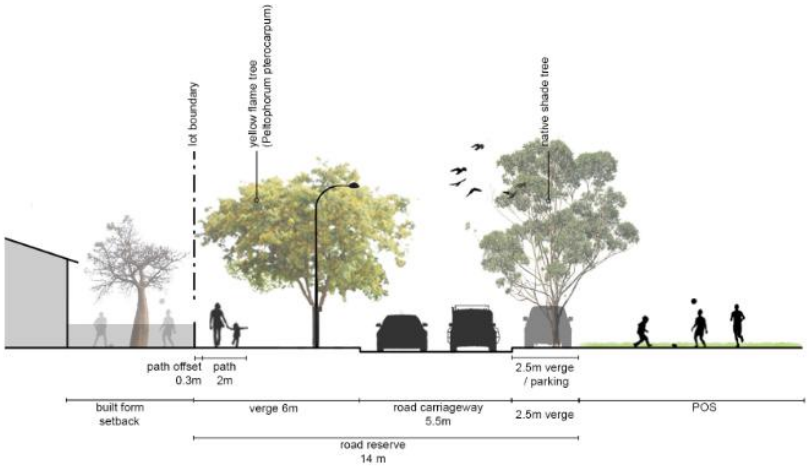


Figure 7.6: Local access street adjacent to POS (Source: Roberts Day/Landcorp)



7.5 Surrounding integrator arterial and neighbourhood connector roads

It is proposed the street reservation width of these roads be 30 metres. This makes provision to provide for two lanes of traffic in each direction in the future, should that ever be required. The cross section for this layout would be a 5.4 metre verge, a 6.6 metre carriageway on each side and a 5 metre median. The preferred street typology for these roads is shown in **Figure 7.8**. The 6 metre median permits a 3 metre right turn lane and a 3.0m residual median to assist pedestrians crossing. The typology of these streets is shown in **Figure 7.7** (initial construction) and **Figure 7.8** (final modified construction, if required).

Initially these roads could be constructed with a 8 metre median with a 5.6 metre carriageway on each side that would provide for a 3.3 metre traffic lane and a 2.3 metre parking lane. Traffic lane widths should be kept to 3.3 metres on a low volume integrator arterial street to keep traffic speeds moderate. 3.5 metre lanes are more suited to freeways or major freight roads. With this layout the kerb and drainage on the verge side could be placed in its permanent position and any future widening to provide a dual carriageway could be by reducing the median width from 8.0 metres to 6.0 metres.

Figure 7.7: Integrator arterial / neighbourhood connector initial construction (Source: Roberts Day/ Landcorp)

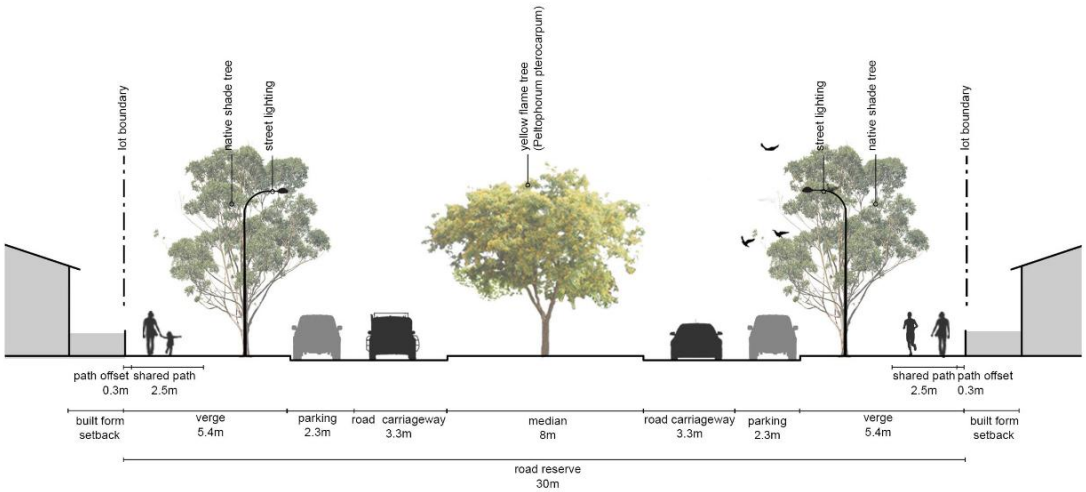
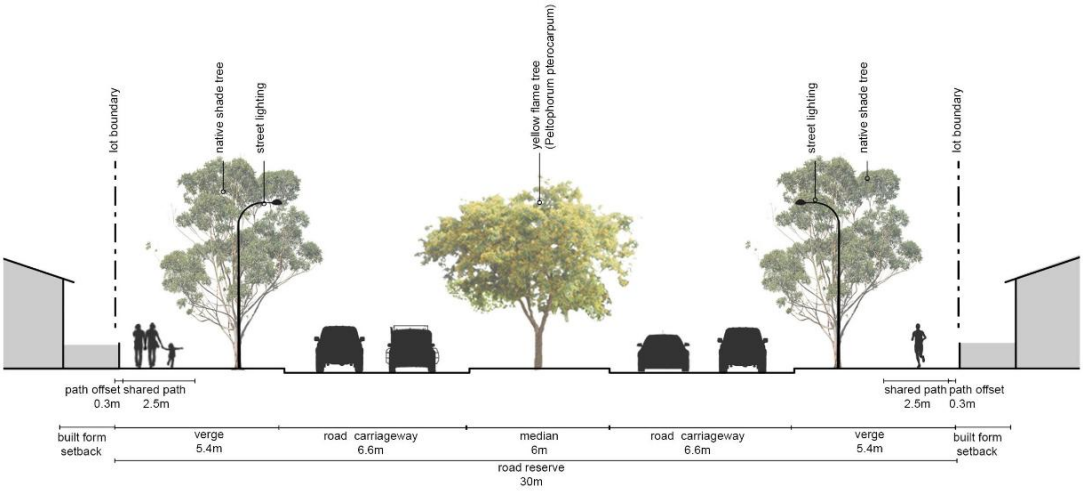
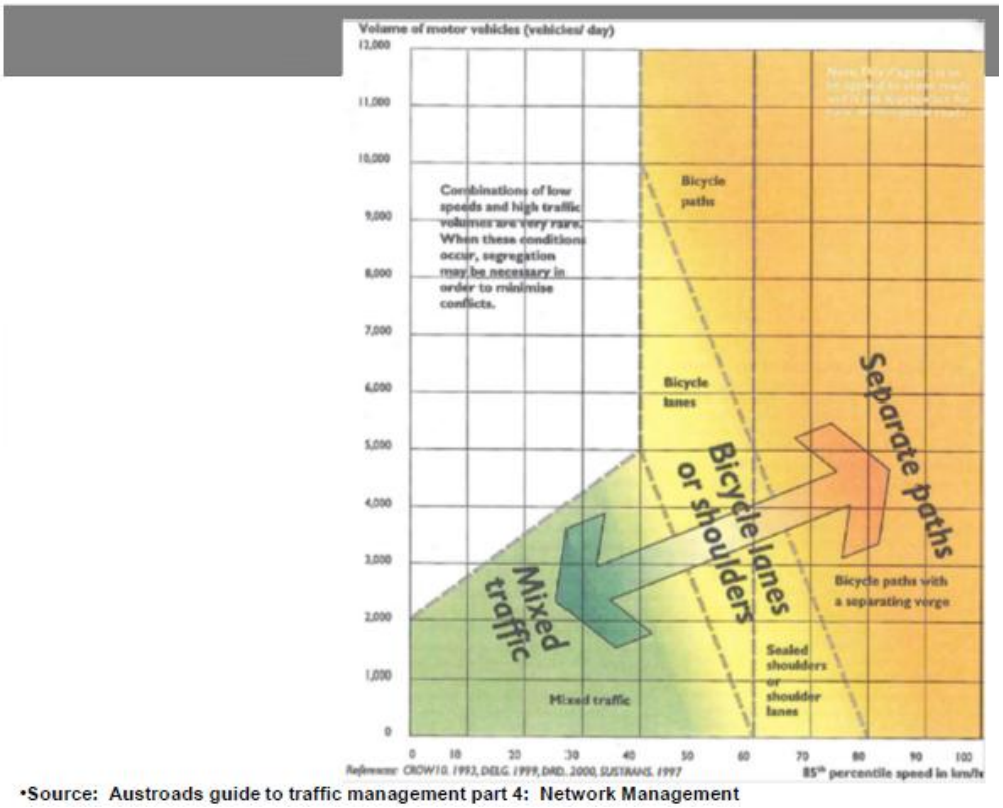


Figure 7.8: Integrator arterial / neighbourhood connector possible final construction (Source: Roberts Day/ Landcorp)



Provision for cyclists and pedestrians should be made by providing a 2.5 metre shared path on each side of the street. Cycle lanes should not be provided on integrator arterial roads such as Magabala Road which is projected to carry between 10,000 and 15,000 vpd. Austroads Guide to Traffic Management Part 4 recommends separate paths be provided at volumes above 10,000vpd at 40kph and at volumes above 5,000 vpd at 60kph. The Austroads guideline diagram is shown in **Figure 7.9** below.

Figure 7.9 : Austroads Guidelines for Bicycles



•Source: Austroads guide to traffic management part 4: Network Management

8. Access and parking arrangements for school / church

The area in the north-east area of Structure Plan Stage 2 has been set aside for an Anglican school and church complex. The layout will not be known until the complex is designed.

Although not confirmed, we understand the school will have about 600 students from pre-primary to secondary and about 35 teaching staff.

At this stage Jacobs has not assessed the parking and access in any detail, other than to suggest that parking could be provided on site at a variety of locations around the school site and accessed from Fairway Drive, from the major access street on the school western boundary and from the access street on the school southern boundary. These bays would primarily be used for school purposes during the week but a number of these bays could be made available for church and other uses outside school times.

Jacobs will be in a position to assess the parking demand, location and type of parking and traffic impacts when more details of school and church planning are available.