DEVELOPMENT PLAN

LOT 522 ON PLAN 74182, AND LOT 521 MADIGAN ROAD, GAP RIDGE

OUR REF: 8123 29/09/2015

ROWEGROUP

DOCUMENT CONTROL

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Version	File Name	Prepared by	Approved by	Date
1	8123_14jun01R_ns	Nathan Stewart	Sean Fairfoul	17/10/2014
2	8123_14dec01R_sf	Nathan Stewart	Sean Fairfoul	03/12/2014
3	8123_15mar01R_ns	Nathan Stewart	Sean Fairfoul	12/05/2015
4	8123_15sept01R_ns	Nathan Stewart	Sean Fairfoul	29/09/2015

This report has been authorised by;

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This structure plan is prepared under the provisions of the City of Karratha Town Planning Scheme No.8

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: 14 JANUARY 2016

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:

M. Wieclaw Witness

18 January 2016 Date

14 January 2026 Date of Expiry

RECORD OF ENDORSEMENT

CERTIFIED THAT THIS DEVELOPMENT PLAN WAS ADOPTED 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

And by

RESOLUTION OF THE COUNCIL OF THE CITY OF KARRATHA ON

..... Date

And

PURSUANT TO THE COUNCIL'S RESOLUTION HEREUNTO AFFIXED IN THE PRESENCE OF:

.....

Mayor/President,

CITY OF KARRATHA

City of Common Seal Karratha

.....

Chief Executive Officer,

CITY OF KARRATHA

..... Date

This Development Plan is prepared under the provisions of the City of Karratha (Shire of Roebourne) Town Planning Scheme No. 8

TABLE OF MODIFICATIONS TO DEVELOPMENT PLAN

Modification No.	Description of Modification	Date Endorsed by Council	Date Endorsed by WAPC

EXECUTIVE SUMMARY

This Development Plan applies to Lot 522 on Plan 74182, and Lot 521 Madigan Road, Gap Ridge. It outlines:

- The location of the Development Plan area; and
- The land-use, subdivision and development proposed.

The Development Plan encourages the development of a bulky goods retail / showroom area at the corner of Madigan Road and Dampier Highway.

The area to the south of the site is also zoned Development Plan Area and encompasses a transient worker accommodation facility owned and operated by CIVEO Property Pty Ltd on Lot 526, whilst Lot 525 is leased for the purposes of a transient worker accommodation facility operated by Woodside Energy Ltd, Kansai Electric Power Australia Pty Ltd, Woodside Burrup Pty Ltd and Tokyo Gas Pluto Pty Ltd. Once the terms of lease expires for the transient worker accommodation facility on Lot 525 and the CIVEO transient worker accommodation facility ceases operation, the southern portion of the Development Plan Area is expected to be subdivided and developed as a new residential expansion in Gap Ridge. A Development Plan will be prepared for these areas separately.

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TECHNICAL APPENDICES

3. Geotechnical Report
4. Traffic Impact Assessment
5. Traffic Technical Note 2014
6. Traffic Technical Note 2015
7. Lot 521 Madigan Rd, Karratha Bulky Goods Site Drainage Channel Advice
8. Assessment of Market Potential
9. Pump Station Servicing Strategy

TECHNICAL APPENDICES

Technical Appendix Number	Document Title	Nature of Document	Referral/Approval Agency	Summary of Document Modifications
3.	Geotechnical Study Proposed Industrial Development Lot 522 Dampier Highway, Karratha	Geotechnical Report	Galt Geotechnics	
4.	Traffic Impact Assessment	Traffic Impact Assessment	Shawmac Consulting Civil & Traffic Engineers, Risk Managers	
5.	Traffic Technical Note 2014	Technical Note	Shawmac Consulting Civil & Traffic Engineers, Risk Managers	
6.	Traffic Technical Note 2015	Technical Note	Shawmac Consulting Civil & Traffic Engineers, Risk Managers	
7.	Lot 521 Madigan Rd, Karratha Bulky Goods Site Drainage Channel Advice	Drainage Advice	Jim Davies & Associates Pty Ltd	
8.	Assessment of Market Potential	Market Analysis Report	Macro Plan Dimasi	
9.	Pump Station Servicing Strategy	Servicing Strategy	Cossill & Webley Consulting Engineers	

Part One
STATUTORY SECTION

ROWEGROUP

1. Development Plan Area

This Development Plan shall apply to Lot 522 on Plan 74182, and Lot 521 Madigan Road, Gap Ridge being the land contained within the inner edge of the line denoting the Development Plan boundary on Plan 1 – Development Plan.

This Development Plan may be amended or a new Development Plan prepared in relation to Lot 502 and Lot 525 on Plan 55670, Lot 526 and Lot 527 on Plan 74184 and Lot 509 and Lot 501 Madigan Road, Gap Ridge.

Specific focus is given on Lot 522 on Plan 74182, and Lot 521 Madigan Road, Gap Ridge, which forms the 'Service Commercial' Zone which will be developed in a two (2) stage process. The remaining land within the Development Area ('DA13' under TPS 8) will retain the existing 'Urban Development' zoning under the Scheme until this Development Plan is amended or a new Development Plan prepared and adopted.

2. Development Plan Content

This Development Plan comprises:

a) Part One - Statutory section

   This section contains the Development Plan map and statutory planning provisions and requirements.

b) Part Two – Non-statutory (explanatory) section

   This section to be used as a reference guide to interpret and justify the implementation of Part One.

c) Appendices – Technical reports and supporting plans and maps.

3. Interpretations and Relationship with the Scheme

Unless otherwise specified in this part, the words and expressions used in this Development Plan shall have the respective meanings given to them in the City of Karratha Town Planning Scheme No. 8 ('the Scheme') including any amendments gazetted thereto.

Plan 1 – Development Plan outlines land use, zones and reserves applicable within the Development Plan area. The zones will not have statutory effect as it is currently not included in the City's Scheme.

Pursuant to Clause 27 of Schedule 2 – Deemed Provisions for Local Planning Schemes under the Planning and Development (Local Planning Schemes) Regulations 2015:

a) A decision-maker for an application for development approval or subdivision approval in an area that is covered by a structure plan that has been adopted by the Commission is to have due regard to, but is not bound by, the structure plan when deciding the application.

4. Operation

In accordance with Clause 7.2.11.1 of the Scheme, this Development Plan shall come into operation when it is certified by the Western Australian Planning Commission (WAPC) pursuant to Clause 7.2.11.1(a) of the Scheme or adopted, signed and sealed by the Council pursuant to Clause 7.2.11.1(b) of the Scheme, whichever is the latter.

5. Land Use and Subdivision

Plan 1 – Development Plan outlines land use, zones and reserves applicable within the Development Plan Area. The zones will not have statutory effect as it is currently not included in the City's Scheme. The content of the Land Use Permissibility Table in this section is indicative only until such a time as the City includes (through a Scheme Amendment), the 'Service Commercial' Zone and the land use permissibility associated with the zone into the Scheme.

5.1 Urban Development Zone

5.1.1 Intent

The Urban Development Zone is intended to remain under the present zoning of land as classified under the Scheme. The provisions of the Scheme relating to the Urban Development Zone apply.

5.2 Parks, Recreation and Drainage Reserve

5.2.1 Intent

The Parks, Recreation and Drainage Reserve is intended to provide for high quality parks for public use and may include drainage and buffer areas, which is held by the Council.

5.3 Service Commercial Zone

5.3.1 Intent

The Service Commercial Zone is intended to provide for a wide range of showrooms, wholesaling and bulky goods uses, which by reason of their scale, character, operation and land requirements, are not generally appropriate to, or cannot conventionally or economically be accommodated within the Town Centre or Commercial Zones.

5.3.2 The objectives of the Service Commercial Zone are to:

a) encourage a range of land uses, particularly showrooms, warehouses and bulky goods uses which support the functions of the nearby City Centre and Commercial Zones;

b) identify appropriate locations for the orderly development of service commercial activities, having due regard to vehicle, cycling and pedestrian movement, car parking and the appearance of buildings and works;

c) provide for uses which combine the need for showrooms and facilities involving warehousing, wholesaling and distribution;

d) encourage the provision of landscaped areas in a manner that complements and enhances the setting within the surrounding area; and

e) provide for uses that will not compete with or detract from the City Centre Zone as the principal centre for retail and commercial activity.

5.4 Indicative Land Use Permissibility

Land use permissibility within the Development Plan Area shall be in accordance Table 1.

Until such a time that a Scheme Amendment is gazetted, the zones and land use permissibility under this Development Plan is indicative and does not have the force of TPS 8.

Table 1: Indicative Land Use Permissibility Table.

Land Use	Service Commercial Zone
RESIDENTIAL	
Aged or Dependent Persons Dwelling	X
Ancillary Accommodation	X
Caravan Park	X
Caretaker's Dwelling	X
Grouped Dwelling	X
Home Business	X
Home Occupation	X
Hotel	X
Motel	X
Multiple Dwelling	X
Park Home Park	X
Residential Building	X
Rural Settlement	X
Short Stay Accommodation	X
Single House	X
Tourist Resort	X
Transient Workforce Accommodation	X
INDUSTRY	
Abattoir	X
Aerodrome	X
Agriculture	X
Intensive Agriculture	X
Harbour Installation	X
Hire Service (Industrial)	X
Industry – Extractive	X
Industry – General	X
Industry – Light	X
Industry – Noxious	X
Industry – Rural	X
Industry – Service	X

Land Use	Service Commercial Zone
Industry – Resource Processing	X
Road Freight Terminal	X
Stockyard	X
Storage Facility / Depot / Lay Down Area	X
COMMERCE	
Animal Establishment	X
Display Home	X
Dry Cleaning Premises	SA
Market	X
Motor Vehicle and / or Marine Repair	IP
Motor Vehicle and / or Marine Sales & Hire	P
Motor Vehicle and / or Marine Service Station	SA
Motor Vehicle and / or Wrecking	X
Motor Vehicle Wash	SA
Office	IP
On-site Canteen	X
Outdoor Display	P
Reception Centre	X
Restaurant	X
Restricted Premises	SA
Shop	AA
Showroom	P
Take-away Food Outlet	X
Vehicle Store	X
Warehouse	P
HEALTH, WELFARE AND COMMUNITY SERVICES	
Car Park	AA
Child Care Premises	X
Community Use	X
Consulting Rooms	X
Corrective Institution	X
Education Establishment	X
Emergency Services	AA
Funeral Parlour	AA
Hospital	X

Land Use	Service Commercial Zone
Juvenile Detention Centre	X
Medical Centre	X
Nursing Home	X
Place of Public Meeting, Assembly or Worship	X
Minor Utility Installation	AA
Utility Installation	AA
Veterinary Centre	AA
ENTERTAINMENT, RECREATION AND CULTURE	
Equestrian Centre	X
Entertainment Venue	SA
Marina	X
Private Recreation	AA
Public Recreation	X
Tavern	X

6. Development

6.1 Development Provisions

6.1.1 Service Commercial Zone Development Provisions

The following provisions apply to all development within the Service Commercial Zone:

6.1.1.1 Architectural Character

(a) Building facades should be a minimum height of 5m.

(b) Facades must be designed to address the primary and secondary streets by providing visual interest, permeability and articulation.

(c) Buildings on corner lots must be designed to address their landmark location through the application of contemporary design, materials and finishes and/or other architectural elements and features.

(d) No blank walls or extensive service / loading areas are to be exposed to the primary street frontage.

6.1.1.2 Setbacks

(a) Buildings should provide primary setbacks in accordance with Plan 2 – Setback Plan.

(b) Side and rear setbacks to be as prescribed by the National Construction Codes (as amended).

6.1.1.3 Parking and Access

(a) The provision of car parking bays is to be in accordance with TPS 8 and be of a minimum width of 2.7 metres.

(b) Parking spaces and manoeuvring areas will be designed in accordance with the Australian Standard for off-street parking and paved, kerbed, drained and marked to the satisfaction of the City of Karratha.

(c) Access to parking areas should be provided within primary setback areas.

(d) Access should generally be provided in accordance with Plan 3 – Access Plan.

6.1.1.4 Loading and Service Areas

(a) Loading areas should be located to the rear of developments.

(b) Storage areas should be screened from view.

6.1.1.5 Signage

(a) All signage must meet the requirements contained in the Design Guidelines prepared by Landcorp which relate to the Karratha Bulky Goods Area. The provisions of any other adopted guidelines and relevant Scheme provisions also apply.

(b) Planning Approval may be required in accordance to the Scheme, relevant Local Laws and Local Planning Policies.

6.1.1.6 Landscaping

(a) Landscaping of the drainage reserves is to be undertaken on a stage by stage basis by the Developer.

(b) All lots require a 1.0m wide landscaping strip along primary and secondary setback areas, as illustrated on Plan 4 – Development Concept Plan.

6.1.1.7 Staging

(a) Staging of development is to generally occur in accordance with Plan 5 – Staging Plan.

(b) Access onto Dampier Highway is indicative only and will be subject to further investigation, consultation and approval with Main Roads Western Australia.

(c) A temporary cul-de-sac is to be provided at the developed extent of the road reserve within Stage 1. This cul-de-sac is to be removed once the road is extended as part of Stage 2.

(d) The Stage 2 area, as shown on Plan 5 – Staging Plan is not to be cleared of existing vegetation unless a Clearing Permit from the Department of Environment Regulation or a subdivision of land has

been approved by the Western Australian Planning Commission has been granted.

6.1.1.8 Retail Floorspace

(a) The amount of showroom floorspace Net Lettable Area (NLA) for the Development Plan should be in accordance with Table 2.

Table 2: Retail Floorspace Provision

Centre	Maximum Net Lettable Area	
	Stage 1	**Stage 2**
Karratha Bulky Goods Area	25,000m² NLA	*

* Prior to consideration of any additional showroom floorspace within Stage 2 that exceeds the floorspace proposed within Stage 1 the City will require the preparation of a Retail Sustainability Assessment.

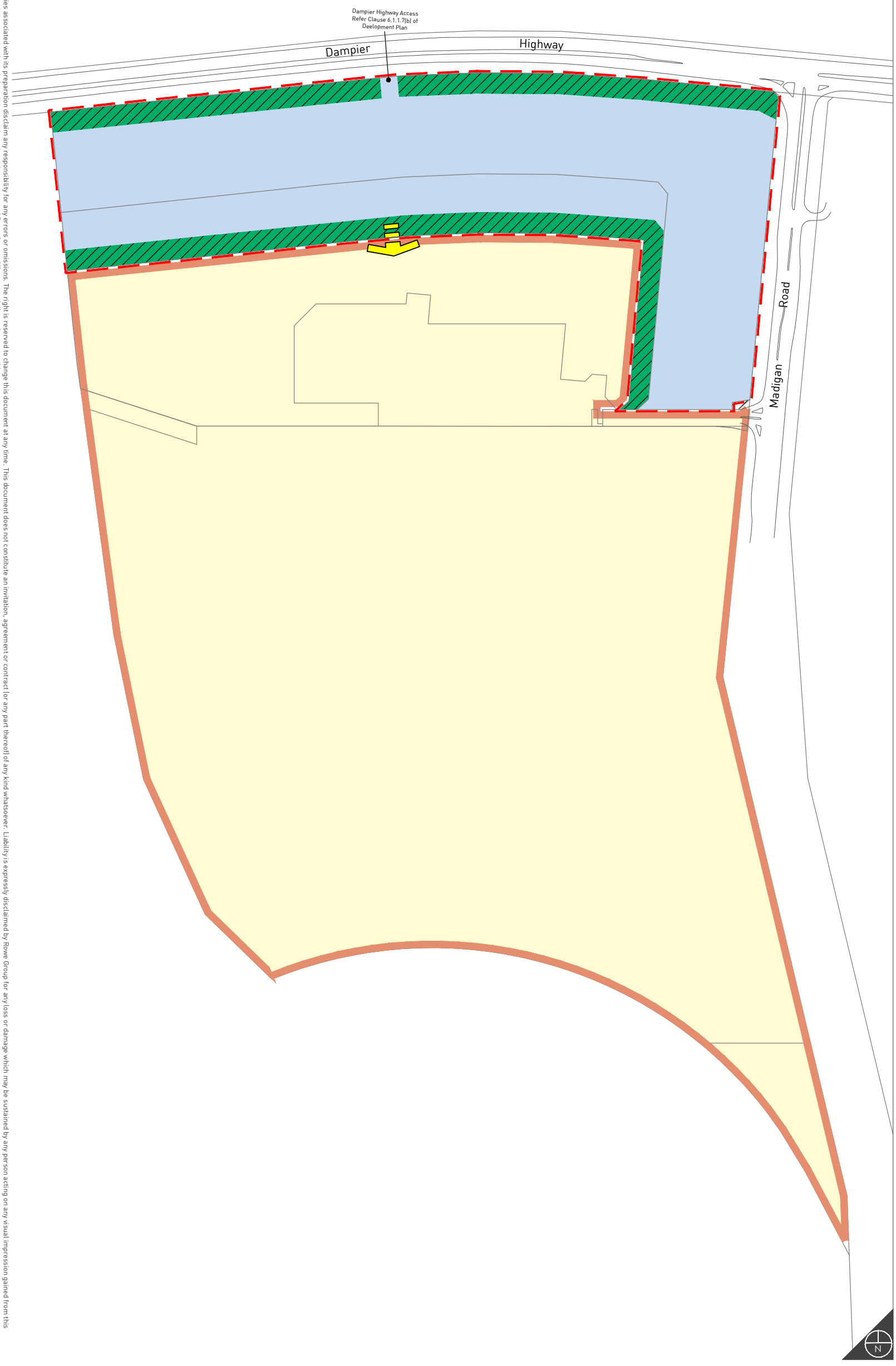
(b) For the purposes of this Development Plan, NLA shall mean the area of all floors confined within the internal finished surfaces of permanent walls but excludes the following areas:

- all, toilets, cleaners' cupboards, lift shafts and motor rooms, escalators, tea rooms and plant rooms, and other storage and service areas;
- lobbies between lifts facing other lifts serving the same floor;
- areas set aside as public space or thoroughfares and not for the exclusive use of occupiers of the floor or building;
- areas set aside for the provision of facilities or services to the floor or building where such facilities are not the exclusive use of occupiers of the floor or building.

6.1.1.9 Subdivision

(a) Subdivision is to be generally consistent with the layout as shown on Plan 6 – Indicative Subdivision Plan.

Planning Design Delivery



LEGEND

- Development Plan Area
- 7 Existing Lot Numbers
- Existing Lot Boundaries
- Urban Development
- Service Commercial
- Parks, Recreation and Drainage
- Possible Future Road Connection(s) (Exact Location to be Determined)

0 250 Metres

REVISIONS

Rev	Date	Drawn
B	2014.06.25	K. Trenberth
C	2014.12.09	M. Sullivan
D	2015.04.21	M. Sullivan
E	2015.07.22	M. Sullivan

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Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-FIG-02-E

Base Data supplied by Whelans

Development Plan

Corner Dampier Road & Madigan Road
Gap Ridge

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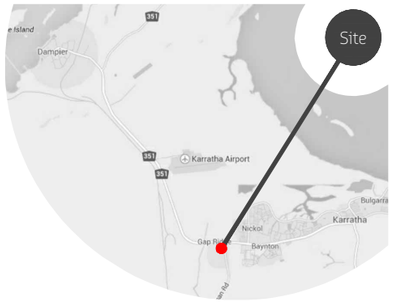
Matt Sullivan 22 July 2015

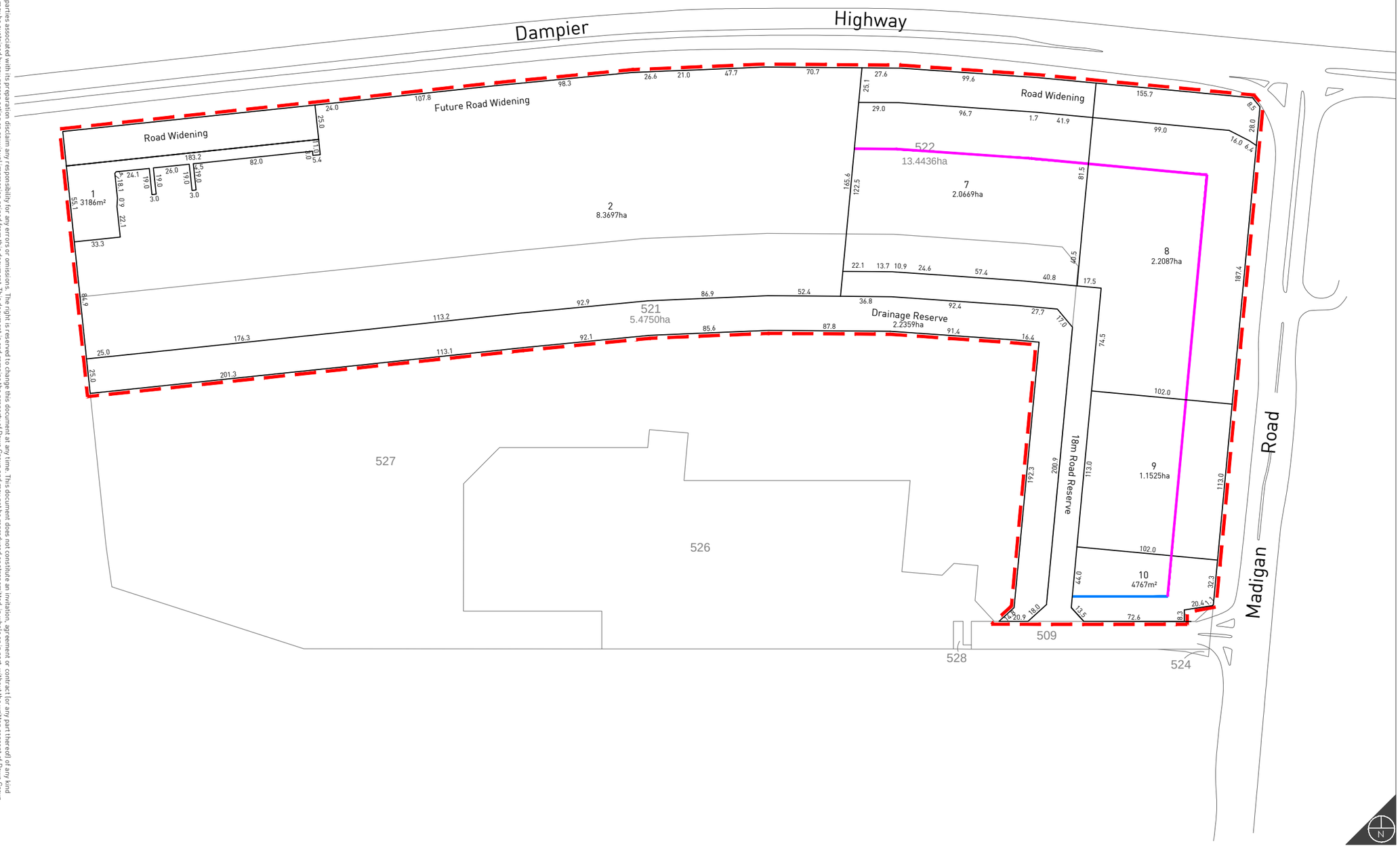
Planning Design Delivery



LEGEND

- Subject Site
- Proposed Boundaries
- 33.5m Setback
- 18m Setback

Note: All other setbacks to be in accordance with the NCC.



0 75 150 Metres

REVISIONS

Rev	Date	Drawn
B	2014.10.02	M. Sullivan
C	2014.12.17	M. Sullivan
D	2015.04.21	M. Sullivan
E	2015.11.24	M. Sullivan

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Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-FIG-07-E

Base Data Provided by WHELANS

Setback Plan - Stage 1

Corner Dampier Road & Madigan Road
Gap Ridge

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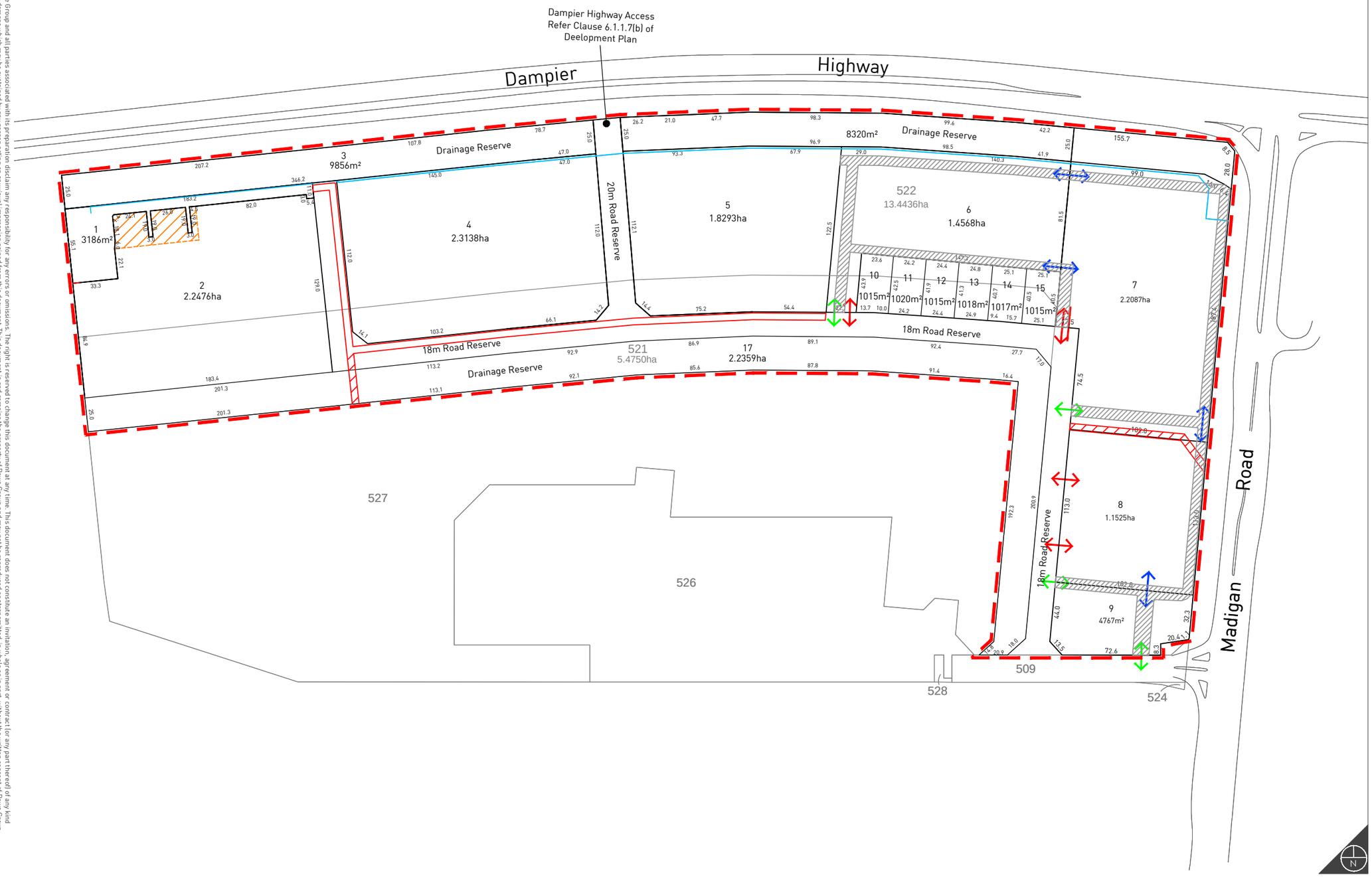
Matt Sullivan 24 November 2015



Access Plan - Stage 1

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Matt Sullivan 23 April 2015

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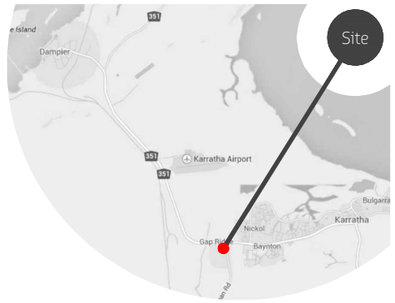

LEGEND

- Subject Site
- Proposed Boundaries
- Public Access
- Service Vehicle Access
- Internal Access Linkage
- Internal Access Areas

0 75 150 Metres

REVISIONS

Rev	Date	Drawn
A	2014.09.23	K. Trenberth
B	2014.10.02	M. Sullivan
C	2014.12.17	M. Sullivan
D	2015.04.21	M. Sullivan

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Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-FIG-08-D

Base Data Provided by WHELANS

Corner Dampier Road & Madigan Road
Gap Ridge

Development Concept Plan - Stage 1

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Matt Sullivan 21 April 2015

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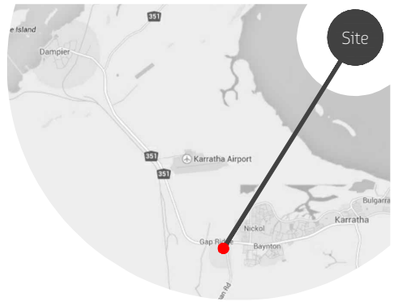

LEGEND

- Subject Site
- 7 Existing Lot Numbers
- Existing Boundaries
- Indicative Boundaries
- Building Outlines
- 1m Landscaping Strip
- Indicative Landscaping

0 75 150 Metres

REVISIONS

Rev	Date	Drawn
B	2014.09.23	K. Trenberth
C	2014.10.02	M. Sullivan
D	2014.12.17	M. Sullivan
E	2015.04.17	M. Sullivan

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Client:	Landcorp
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Projection:	N/A
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Base Data Provided by WHELANS

Corner Dampier Road & Madigan Road
Gap Ridge

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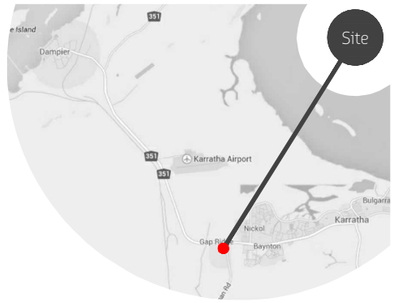

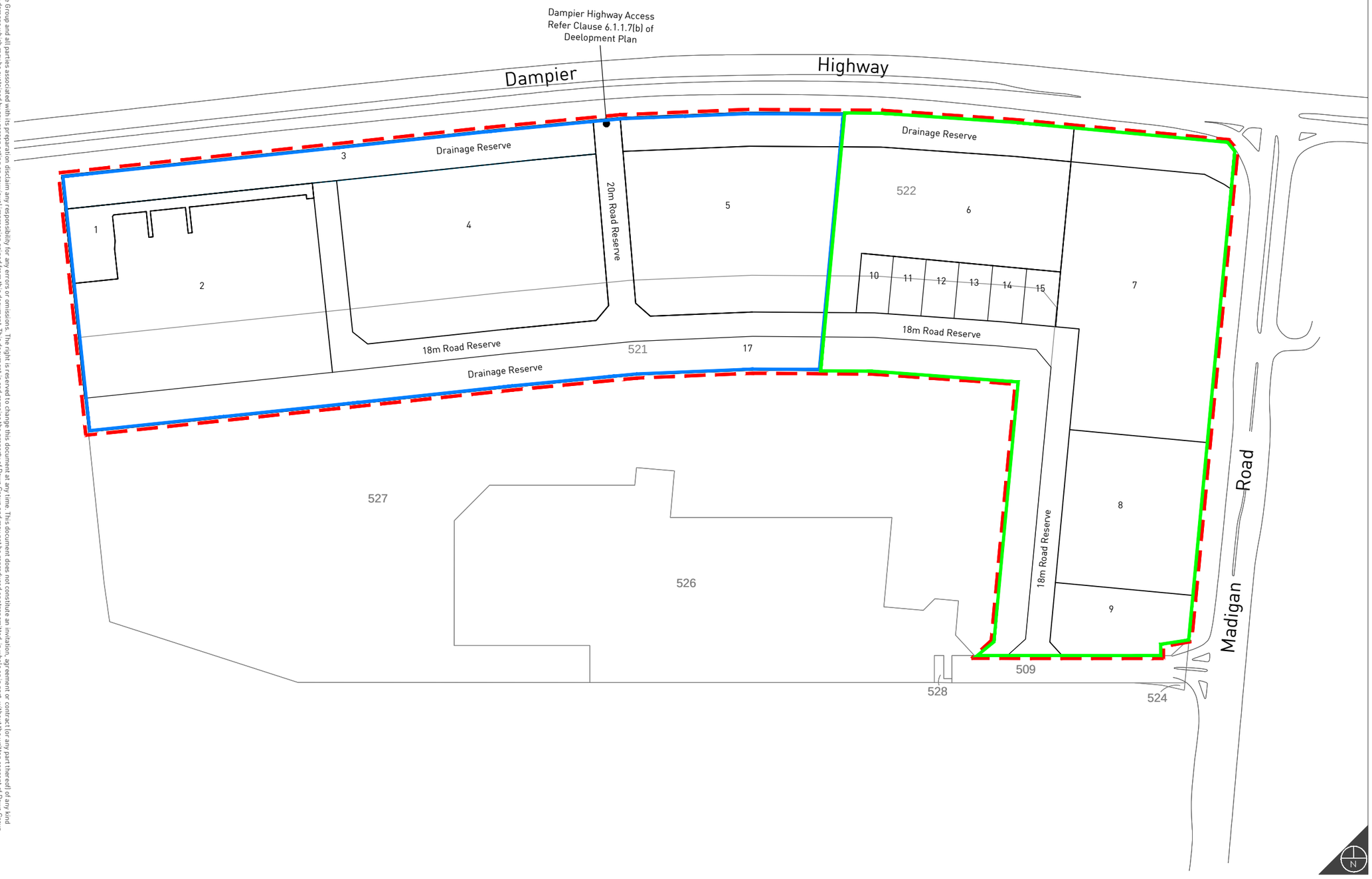

LEGEND

- Subject Site
- 7 Proposed Lot Numbers
- Proposed Lot Boundaries
- Stage 1
- Stage 2

0 75 150 Metres

REVISIONS

Rev	Date	Drawn
B	2014.09.23	K. Trenberth
C	2014.10.02	M. Sullivan
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E	2015.04.21	M. Sullivan

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Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-STG-01-E

Base Data Provided by WHELANS

Staging Plan

Corner Dampier Road & Madigan Road
Gap Ridge

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Matt Sullivan 21 April 2015

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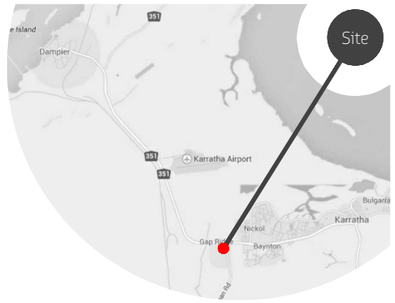

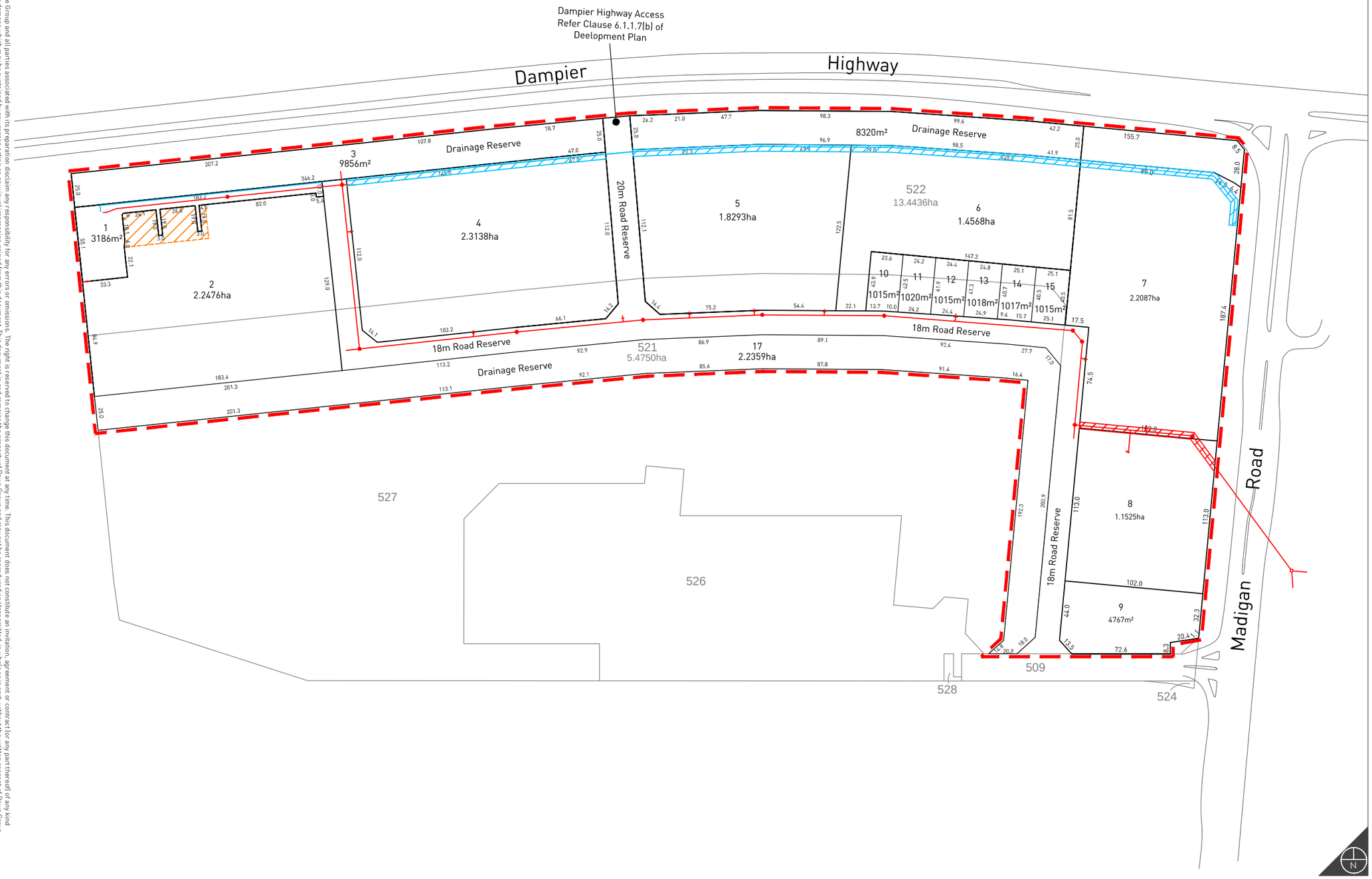

LEGEND

- Subject Site
- 7 Existing Lot Numbers
- Existing Boundaries
- Proposed Boundaries
- Sewer
- Sewer Easement
- Pressure Main Easement
- Pump Station Easement

0 75 150 Metres

REVISIONS

Rev	Date	Drawn
G	2014.09.19	M. Sullivan
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I	2014.12.17	M. Sullivan
J	2015.04.21	M. Sullivan

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Drawn:	M. Winfield
Projection:	N/A
Plan ID:	8123-SUB-01-J

Base Data Provided by WHELANS

Indicative Subdivision Plan

Corner Dampier Road & Madigan Road
Gap Ridge

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Matt Sullivan 22 April 2015

Part Two
EXPLANATORY SECTION

ROWEGROUP

01 Planning Background

1.1 Introduction and Purpose

Rowe Group acts on behalf of Landcorp, and various landowners of Lot 522 on Plan 74182, and Lot 521 Madigan Road, Gap Ridge ('the subject site').

This report has been prepared in support of a Development Plan which will guide the future development of the subject site under the provisions of the City of Karratha Town Planning Scheme No. 8 ('the Scheme').

1.2 Land Description

1.2.1 Location

The subject site is located in the Municipality of the City of Karratha approximately 5 kilometres west of the Karratha town centre.

Refer Figure 1 – Regional Location.

The subject site is situated in Gap Ridge and bound by Dampier Highway to the north, Madigan Road to the east, a transient worker accommodation facility to the south and vacant land to the west. All of the aforementioned roads are sealed, gazetted roads.

Refer Figure 2 – Local Location.

1.2.2 Legal Description and Ownership

The subject site comprises two (2) land parcels, being:

- Lot 521 on Certificate of Title Volume 2785 Folio 810; and
- Lot 522 on Certificate of Title Volume 2794 Folio 483.

The subject site has a total land area of approximately 19.275 hectares, with frontages of approximately 862.2 metres to Dampier Highway and approximately 360.7 metres to Madigan Road.

The Development Area ('DA13' under the Shire of Roebourne Town Planning Scheme No. 8) also includes a number of allotments further to the south of the subject site, being;

- Lot 501 on Certificate of Title Volume LR3145 Folio 902;
- Lot 502 on Certificate of Title Volume 3145 Folio 903;
- Lot 509 on Certificate of Title Volume LR3012 Folio 13;
- Lot 525 on Certificate of Title Volume LR3162 Folio 579;
- Lot 526 on Certificate of Title Volume 2812 Folio 336; and
- Lot 527 (74184) on Certificate of Title Volume LR3162 Folio 581.

Refer Figure 3 – Site Plan.

1.2.3 Existing Improvements

The subject site is largely vacant, with some remnant vegetation. Please note that there is a permit to clear native vegetation granted under Section 51(e) of the Environmental Protection Act 1986, which authorises Landcorp to clear, subject to certain terms, conditions and restrictions. These conditions include avoiding and minimising the amount of native vegetation to be cleared and weed control. The clearing permit will expire on 27 December 2016.

Refer Appendix 1 – Correspondence from the Department of Environment and Conservation.

1.3 Planning Framework

1.3.1 Zoning and Reservations

Under the provisions of Shire of Roebourne Town Planning Scheme No. 8 ('TPS 8'), the subject site is zoned 'Urban Development' and annotated as 'DA13', which relates to the provisions contained under Appendix 7 of TPS 8. The subject site is also located within the 'Airport Obstacle Height Limitation Area SCA'.

Refer Figure 4 - Zoning Plan.

Sub-Clause 6.4.1 of TPS 8 stipulates:

> *Before considering any proposal for subdivision or development of land within the Urban Development zone, the Council may prepare or require the preparation of a Development Plan for the entire development area or any part or parts as is considered appropriate by Council.*

Appendix 7 of TPS 8 stipulates the following conditions in relation to 'DA13':

1. *An approved Development Plan together with all approved amendments shall apply to the land in order to guide subdivision and development.*
2. *To provide for showroom, transient worker accommodation, recreation and future residential development.*
3. *The City may require any expansion of existing transient worker accommodation to be subject to the approval of a Development Plan illustrating how the development can be adapted for future permanent residential development.*
4. *The City may require a Development Plan addressing interface issues, shared access and servicing prior to approving any showroom development.*
5. *Land uses classified on the Development Plan apply in accordance with clause 7.2.11.4.*

The subject site is located within the 'Airport Obstacle Height Limitation Area SCA'. Sub-Clause 7.3(b) of TPS 8 states that application within this area shall be referred to the relevant airport managing authority for comment and that no development within the 'Airport Obstacle Height Limitation Area SCA' shall exceed 45m AHD.

The Development Plan has been prepared in accordance with the provisions contained within Appendix 7 and Appendix 8 of TPS 8. The Development Plan, once adopted by the Shire and endorsed by the Western Australian Planning Commission ('WAPC'), will ensure the subject site is developed in an orderly and proper manner.

1.3.2 Land Use Permissibility

It is noted that Note 1 under Zoning Table in Clause 3.2 of TPS 8 states that 'Showroom's are not permitted on land abutting Dampier Highway. In order to comply with this requirement, this Development Plan seeks to create separate land parcels (notated as 'Drainage Reserves' on the Development Concept Plan (Plan 4)) between the adjoining Dampier Highway road reservation and the future lots shown on the Indicative Subdivision Plan (Plan 6). Additionally, the intent of this requirement was to restrict vehicle access to lots directly adjacent Dampier Highway within the Karratha Town Centre. This Development Plan does not propose to allow direct vehicle access to lots via Dampier Highway. Therefore, the Development Plan is considered to be compliant with this requirement.

Furthermore, Condition 5 of 'DA13' under Appendix 7 of TPS 8 requires development and use of land to be in accordance with an endorsed Development Plan. Therefore a land use table has been incorporated into Part 1 of this Development Plan to guide the use of land at the subject site.

Condition 2 of 'DA13' under Appendix 7 of TPS 8 identifies 'Showroom', 'Transient Worker Accommodation', 'Recreation' and future residential development as preferred uses at the subject site. The proposed Development Plan encourages showroom and bulky goods uses at the subject site.

Additionally, Sub-Clause 7.2.11.4 of TPS 8 stipulates that under a Development Plan in the areas designated as zones, the permissibility of uses is to be the same as set in the Zoning Table as if those areas were zones under the Scheme having the same designation. It is noted that 'Service Commercial' is not a zone under TPS 8. It should be noted that the zones will not have statutory effect as it is currently not included in the City's Scheme. Until such a time that a Scheme Amendment is gazetted, the zones and permissibility under this Development Plan is indicative and does not have the force of TPS 8.

According to discussions with the City of Karratha, the subject site has been identified as 'Service Commercial' under the City's draft Local Planning Strategy which is currently being considered by the Department of Planning. In order to facilitate development for showroom uses, as identified under Condition 2 of 'DA13' under Appendix 7 of TPS 8, this Development Plan has incorporated the 'Service Commercial' Zone. The proposed land use permissibility reflects the discussions between LandCorp, Rowe Group and the City of Karratha Planning Staff.

The Development Plan proposes that the subject site be identified as 'Service Commercial' Zone. The remainder of the Development Area ('DA13' under TPS 8) will retain the existing 'Urban Development' Zone. The proposed Development Plan lists the land use permissibility relevant to the 'Service Commercial' Zone. This Development Plan can be amended or a new Development Plan prepared to facilitate development of the portion of land which will retain the 'Urban Development' Zoning under TPS 8. It is envisaged that this portion of land will be developed for residential purposes.

1.3.3 Local Planning Strategy and Technical Reports

The City of Karratha is yet to release a draft Local Planning Strategy ('the Strategy') for public viewing. The Shire has released a number of technical reports which will influence the Strategy. Therefore, the technical reports have been addressed as part of this Development Plan, as outlined below.

1.3.3.1 Technical Report 2 – Property Market Analysis

In preparing the City of Karratha Local Planning Strategy, the City of Karratha commissioned the preparation of a Property Market Analysis. This Property Market Analysis provides an understanding

of the current property market fundamentals in the City of Karratha and an understanding of the current retail supply of floor space in the Shire and the evident demand for such floor space.

The Property Market Analysis outlines that there is a demand for minimal bulky goods retail in the City of Karratha. However, the Property Market Analysis does not consider the lack of bulky goods retail uses within the wider Pilbara Region. As detailed in Section 3.7 of this Report, the proposed Karratha Bulky Goods Area will serve the entire Pilbara Region.

1.3.4 Local Planning Policies

1.3.4.1 Draft Development Design Guidelines

Landcorp has prepared draft Development Design Guidelines which will guide development within the 'Service Commercial' Zone. The City of Karratha may adopt the draft Development Design Guidelines as a Local Planning Policy upon further investigation and consideration of the draft Development Design Guidelines.

1.3.5 Other Regional Plans and Policies

1.3.5.1 Karratha Primary Trade Area Retail and Commercial Strategy

The Karratha Primary Trade Area Retail and Commercial Strategy ('the Commercial Strategy') was prepared by SGS Economics and Planning Pty Ltd in July 2009. The Commercial Strategy provides an analysis of the demand for retail and commercial floorspace in the City of Karratha and to prepare a retail and commercial development strategy for the area's principle towns of Karratha, Dampier, Wickham, Roebourne and Point Samson.

The Commercial Strategy advocates the development of a bulky goods precinct at the subject site with an initial retail floorspace of 5,500m^2. There is the potential for this retail area to be augmented by the future transfer of the retail floorspace (4,530m^2) from the Karratha Industrial Estate. It is envisaged that the GAP Ridge area would have a retail floorspace of somewhere in the order of 12,000m^2 after 2020.

Whilst the Development Plan will ultimately result in a total of bulky goods retail that would exceed the envisaged 12,000m^2, as stipulated by the Retail Strategy, the Development Plan proposes a restriction on the staged market driven release of bulky goods retail floorspace. This will ensure that the development at the subject site is developed as demand for bulky goods retail increases.

1.3.5.2 Karratha Area Development Strategy 1998

The Karratha Area Development Strategy 1998 ('the Strategy') identifies four major planning issues facing the City of Karratha and Western Australian State Government:

- Resolving land and water use conflicts;
- Accommodating the expansion and diversification of the local and regional economies;
- Accommodating population growth and associated community infrastructure; and
- Responding to local Aboriginal interests.

The Strategy identifies the subject site for future residential development. The Development Plan identifies Lot 520 and Lot 507 for transient worker accommodation in facilities in the short to medium term with options for permanent residential in the longer term.

1.3.5.3 Karratha City of the North Plan 2009

The Karratha City of the North Plan 2009 ('KCNP') is a three-phase strategy that will guide the development of future housing, open spaces, commercial activities, tourist accommodation, entertainment and retail areas as well as service infrastructure, transport, education and community facilities.

The subject site is located within the 'Gap Ridge / Seven Mile' Precinct. This Precinct is identified as a 'light industry/administration/accommodation' area by the KCNP. An area approximately corresponding to the area of Lot 505 is marked for bulky goods development; the remainder of the subject site is marked for transient workers accommodation.

The proposed Development Plan is considered to be consistent with the intentions of the KCNP.

1.3.5.4 Karratha Regional Hotspots Land Supply Update 2010

The Karratha Regional Hotspots Land Supply Update 2010 ('KRH') inform on availability of land for future residential, industrial and commercial uses and identifies the planning and infrastructure coordination needed to meet demand.

The KRH indentifies the frontages to Dampier Highway and Madigan Drive for commercial/logistics uses and is described as the 'Gap Ridge Bulky Goods Precinct'. The balance of the site area is identified for workforce accommodation (including workforce accommodation and tourism).

The proposed Development Plan is considered to be consistent with the intentions of the KRH.

1.3.5.5 Karratha Coastal Vulnerability Study

The Karratha Coastal Vulnerability Study involves a study of the impacts of future climate change (CZM), calculation of the hydrology around Karratha (JDA), assessment of the shoreline stability (Damara), modelling of the flooding from storm surge (GEMS) and modelling of the riverine flooding (JDA).

The potential impacts of this study have aided in determining a number of different scenarios for flooding. These include 100 yr ARI scenarios for the years 2010, 2060, 2110. The Shire has advised that it will observe the 2110 scenario in considering its assessment of future development proposals.

1.3.5.6 Karratha Western Bypass

The Karratha Western Bypass will form the a major north south connection bypass between Dampier Highway and Madigan Road and will run along the eastern boundary of the Gap Ridge Industrial Estate. The Karratha Western Bypass is expected to accommodate some 30,000 to 40,000 vehicles per day.

The Karratha Western Bypass will allow for continuous and uninterrupted heavy vehicle movement along Dampier Highway, between the Gap Ridge Industrial Estate and Dampier Harbor to the north. The proposed Karratha Western Bypass is a long term project and is not envisaged to be constructed until after 2020.

The proposed Development Plan incorporates a left-in left-out access onto Dampier Highway. This access is indicative only (as annotated on Plan 1 – Development Plan) and is subject to further investigation and consultation with and approval from Main Roads WA. This accessway is located approximately 600m from the Madigan Road and Dampier Highway signalised intersection and will not impact upon vehicle movements through this intersection.

02 Site Conditions and Constraints

2.1 Biodiversity and Natural Area Assets

The subject site in general terms is predominantly cleared of vegetation. The western portion of Lot 521 does show signs of small shrubs. The subject site shows no signs of significant fauna.

As discussed above, a permit to clear native vegetation granted under Section 51(e) of the Environmental Protection Act 1986, which authorises Landcorp to clear, subject to certain terms, conditions and restrictions.

2.2 Engineering and Servicing

The following information has been prepared by Cossill & Webley Consulting Engineers in support of this Development Plan.

2.2.1 Landform and Soils

The development area is underlain by a relatively thin layer of clay, likely alluvium, overlaying weathered granite.

A geotechnical investigation undertaken by Galt Geotechnics for the proposed development recommends a site classification of 'Class M' is applicable, provided their site preparation guidelines are adopted.

The topography of the site is relatively flat, steadily sloping from RL 9.5m AHD near Seven Mile Creek to RL 14m AHD near Madigan Road. The site will require significant import fill to raise the land above the flood plains achieving adequate grades and cover. Preliminary designs indicate lot levels will steadily slope from RL 15.2m AHD at Madigan Road to 11m AHD at the Seven Mile Creek interface.

2.2.1.1 Acid Sulphate Soils

The Department of Environment Regulation (DER) database identifies the site as having a low to very low risk of Acid Sulphate Soils (ASS). Galt Geotechnics have undertaken geotechnical investigations for the site and performed two bore holes, each 13.5m deep in the vicinity of the pump station site. Tests for Acid Sulphate Soils were conducted, with all samples containing net acidity concentration below the DER action criteria of 0.03% and therefore classified as non-acid sulphate soils (NASS). No ASS management will be required on this site.

2.2.2 Groundwater and Surface Water

2.2.2.1 Groundwater

Groundwater mapping indicates the water table underlying the site should be between 5m and 10m below ground level. Geotechnical investigations of the site indicate groundwater was encountered at approximately 5.5m to 6m below ground surface level at the eastern portion of the site near Seven Mile Creek. Test pits were also investigated throughout the remainder of the site; however no groundwater was encountered up to 2.5m below the existing surface levels. Experience in the area indicates that groundwater levels can rise significantly after a heavy rainfall event due to underground layers of rock forming fractured rock aquifers. During a recent extreme event, groundwater at a site approximately one kilometre south was observed to rise approximately 3m. A similar rise in groundwater at the

Subject site would result in groundwater rising to a level approximately 3m to 4m below finished surface level.

Seven Mile Creek abuts the site on the western boundary, and is usually dry year round except after heavy rainfall events.

The Karratha Coastal Vulnerability Study (August 2012) prepared by JDA indicates a significant portion of the site closest to Seven Mile Creek becomes inundated with water during various flooding and storm event scenarios. The site requires fill to raise levels above that susceptible to flooding.

Refer Technical Appendix 3 – Geotechnical Report.

2.3 Heritage

2.3.1 Aboriginal Heritage

There are two (2) sites of Aboriginal Heritage listed on the Department of Indigenous Affairs Register of Sites as follows:

GR10AS02 and GR10AS01

Both sites are listed on the Permanent Register of Sites with 'Open Access' and 'No Restriction'. Both sites are listed as having archaeological significance.

Consent under Section 18(3) of the Aboriginal Heritage Act 1972 has been provided by the Minister for Indigenous Affairs to allow the use of the subject site, which may impact on the known Aboriginal Heritage sites.

Refer Appendix 2 – Correspondence from the Minister for Indigenous Affairs.

2.3.2 European Heritage

There are no sites of European heritage significance listed for the subject site under the Commonwealth Heritage Lists, Heritage Council of WA or City of Karratha Municipal Heritage Inventory. As such the subject site is not constrained from development in this regard.

03 Land Use and Subdivision Requirements

3.1 Land Use

The Karratha Bulky Goods Area is exposed to high volumes of traffic along Madigan Road, with even higher volumes of traffic along Dampier Highway. This makes the corner location ideal for bulky goods / showroom uses which need high exposure rates to passing vehicles in order to be economically viable.

The Development Plan proposes a Parks, Recreation and Drainage Reserve between the Service Commercial Zone and the Urban Development Zone. This Reserve acts a buffer between the Service Commercial Zone and the Urban Development Zone.

The southern portion of the subject site has been intentionally zoned 'Urban Development', as per the guidance of TPS 8. Appendix 7 of TPS 8 stipulates that the subject site should accommodate future residential development and that the existing transient worker accommodation facility to be adapted to accommodate such future development. It is envisaged that once the existing Transient worker accommodation facility ceases operation, this Development Plan will be amended to implement provisions relating to residential subdivision and development which are contemporary to that time.

3.2 Parks, Recreation and Drainage

In addition to the proposed Parks, Recreation and Drainage Reserve between the Service Commercial Zone and the Urban Development Zone, a minimum of 10% of the Urban Development Zone which occupies the southern portion of the subject site will be set aside for 'Parks, Recreation and Drainage Reserve'. However this will not occur until such a time that the Development Plan has been amended for the purposes of including residential subdivision and development provisions.

Once land has been reserved for 'Parks, Recreation and Drainage', the land will then be ceded to the City of Karratha for purposes of maintenance and upkeep.

3.3 Residential

The southern portion of the Development Area DA13 is part of this Development Plan, however, Appendix 7 of TPS 8 identifies this portion of the subject site for future residential purposes, pending the existing Transient worker accommodation facility ceasing operation. Once there is increased demand for residential land in Karratha, this Development Plan can either be amended to incorporate residential subdivision and development provisions or a separate Development Plan can be prepared.

A preliminary dwelling yield assessment shows that between 250 and 300 dwellings can be accommodated within the 'Urban Development' zoned area of the subject site, with a portion of the subject site being ceded as public open space.

This Development Plan includes a future road access point to this area.

3.4 Movement Networks

The following information has been prepared by Shawmac Consulting Civil and Traffic Engineers, Risk Managers in support of this Development Plan.

Refer Technical Appendix 4 – Traffic Impact Assessment.

3.4.1 Trip Generation

Review of the proposed development of the Karratha Bulky Goods site located on the south side of Dampier Highway to the west of Madigan Road indicates that the site has the potential to generate between 1,556 vehicles per day (Stage 1) and 2,521 vehicles per day (Stage 2) (Refer Technical Appendix 4 – Traffic Impact Assessment).

Based on likely desire lines and access points on Dampier Highway and Madigan Road, the additional traffic could increase flows on Dampier Highway by up to 4,250 vehicles per day on Dampier Highway and 285 vehicles per day on Madigan Road. Flows on Madigan Road can increase by up to 5,400 vehicles per day should access not be provided on Dampier Highway.

3.4.2 Access

Based on a primary access point on Dampier Highway and a secondary access point on Madigan Road, modelling indicates that under peak flows expected following completion of the Stage 2 development, both the intersection of Dampier Highway and the Access Road and Dampier Highway and Madigan Road would be expected to function satisfactorily.

Sensitivity analysis indicates that the Madigan Road - Dampier Highway intersection would still function satisfactorily should flows increase by up to 50% over and above those modelled. Similarly, it is expected that the Dampier Highway – Access Road intersection would continue to function satisfactorily with an increase in flows by up to 25%.

Additional traffic would be directed to the intersection of Dampier Highway and Madigan Road increasing the stress on the signalised intersection should access not be provided on Dampier Highway. Should traffic increase at an annual rate of 10%, saturation is likely to occur within 4 to 5 years. However, with access provided on Dampier Highway, the intersection of Dampier Highway and Madigan Road is not predicted to reach saturation for another 3 to 4 years.

Refer Technical Appendix 5 – Traffic Technical Note 2014.

3.4.3 Parking

It is anticipated that parking would be provided in accordance with the TPS 8, including the requirement for the minimum width of parking bays to be 2.7 metres. Given that the development / land use is likely to be best categorised as 'bulky goods retail' it is considered that parking demand is most appropriately estimated under a land use category of 'Showroom'. Based on the TPS 8 requirement (1 bay for every 50m^2 NLA), likely demand is estimated at approximately 530 bays for Stage 1 and approximately 328 bays for Stage 2.

3.4.4 Consideration of Transient Workforce Accommodation Site

Following discussions between the City of Karratha and the land owners of the adjoining Transient Workforce Accommodation Site ('TWA Site') concerns were raised regarding the use of the access road via Madigan Road for the access for the Stage 1 development. The land owner of the adjoining TWA Site raised concerns that the assessment did not consider the current traffic generated by the TWA or any future expansion of the TWA which has a current approval in place for up to 1,276 persons.

The Local Authority voiced concern that should Stage 2 of the proposal not be taken up for some time and access rely on the existing access used by the TWA to Madigan Road then assessment of the intersection under that scenario should be undertaken to confirm its adequacy.

Given that the TWA caters largely for fly in fly out workers, it is expected that 80% of persons accommodated in the TWA will travel to various sites via a private bus service (assumed occupancy of 48) while the remaining 20% will travel via private vehicle (assumed average occupancy 1.5). It has been assumed that the bus service will be coordinated with the start and end of shifts such that all services travel loaded (i.e. a bus arriving with workers for finishing shift will then depart with workers from the start shift). All staff are assumed to arrive and depart during the assessed peak hour periods.

The following table summarises the maximum expected traffic flow generated by the TWA Site:

Personnel	**Trips**	**Private Vehicles (AM out)**	**Private Vehicles (AM in)**	**Bus (AM out)**	**Bus (AM in)**
1,276	276	155	100	18	18
Personnel	Trips	Private Vehicles (PM out)	Private Vehicles (PM in)	Bus (PM out)	Bus (PM in)
1,276	276	100	155	18	18

The intersection is predicted to operate at good levels of service both in the AM and PM peak periods.

Should the percentage of persons accommodated in the TWA travelling to various sites via a private bus service (assumed occupancy of 48) decrease to 60% with 40% travelling via private vehicle (assumed average occupancy 1.5 persons) it is expected that the maximum traffic flow generated by the site would be as shown below.

Personnel	**Trips**	**Private Vehicles (AM out)**	**Private Vehicles (AM in)**	**Bus (AM out)**	**Bus (AM in)**
1,276	340	200	140	16	16
Personnel	Trips	Private Vehicles (PM out)	Private Vehicles (PM in)	Bus (PM out)	Bus (PM in)
1,276	340	140	200	16	16

Refer Technical Appendix 6 – Traffic Technical Note 2015.

The assessment confirmed that with a 50% increase in total traffic entering the intersection, it is expected that the worst delay would move from 15 seconds to 27 seconds, the degree of saturation from 0.21 to 0.46 and the Level of Service on the worst leg (right turn from the Access Road) from "C" to "D". Under these conditions the performance of the intersection remains within an acceptable level.

The assessment has considered not only traffic from the proposed development but also traffic potentially generated from the full development of the existing Transient Workers Accommodation. As such, the assessment is considered to represent a worst case scenario. Notwithstanding this, a sensitivity analysis was carried out on a range of flows scaled from 100% to 150% and this confirmed a significant level of capacity on the intersection. As such there is confidence that the intersection will not become oversaturated and flows unstable in the unlikely event that worst case traffic volumes are realised.

3.5 Servicing

The following information has been prepared by Cossill & Webley Consulting Engineers in support of this Development Plan.

3.5.1 Noise Management

No noise studies have been carried out for the Subject site. With traffic noise from Madigan Road and Dampier Highway being the primary noise sources, it is envisaged that no site management or mitigation measures will be required within the site given that the subject site is zoned commercial.

Additionally, the 'Service Commercial' zone will act as a buffer between Dampier Highway and the future residential area. Noise studies may be required when the residential area is proposed to be subdivided and later, developed.

3.5.2 Local Water Management

Drainage within the site includes a shared future drainage reserve along the southern boundary that will service the proposed Subject site and the adjacent redevelopment of the existing transient worker accommodation facility to the south in the future. This drainage reserve grades into Seven Mile Creek to the west.

The site is also bounded by existing Main Roads Western Australia ('Main Roads') drains within proposed road reserve widenings to the north and east. The road widenings are required to accommodate existing Main Roads drains which have been constructed within the subject site. It is proposed that drainage from the subdivision lots and roads be discharged to the Main Roads drains via kerb openings and rock pitching. These drains grade out to Seven Mile Creek to the west.

Section 3.5.3.5 of this report provides the site details regarding drainage and water management strategies.

3.5.3 Infrastructure Coordination, Servicing and Staging

The following provides a summary of the infrastructure and servicing for the proposed Subject site. Sketch 6105-00-SK10 is appended for consultation with the below comments. The sketch outlines proposed installation of services to the proposed pump station at the north west corner of the site. These services are designed to be on the permanent alignment of the subdivisional road and as such avoid duplication or realignment of these services at the time the subdivision is constructed. The services are for the pump station and also to the future subject site.

The proposed pump station currently has an approved Engineering Summary Report with the Water Corporation and is pending detailed design. It is expected construction will commence later in 2014.

The ultimate intersection entrance for the subject site off Madigan Road was constructed in 2012 to access the existing transient worker accommodation facility to the south.

3.5.3.1 Water Supply

Water will be supplied from an existing 150mm diameter water reticulation pipe in the western road reserve of Madigan Road and within the ultimate entrance road to the site. It is anticipated there is sufficient capacity in the network to supply from Madigan Road. At the time of subdivision construction, the pump station will be supplied by water from the proposed connection with pipe work constructed on the ultimate alignment of the proposed spine road.

Many of the proposed subdivision lots can be supplied directly off this line. Reticulation extensions will be required to service the remainder of the site.

3.5.3.2 Sewer

The Water Corporation has planned for the site to be reticulated with an existing 300mm diameter gravity sewer main through the spine of the site, serving the recently completed Madigan Road Residential Estate immediately to the east. The sewer was constructed on the anticipated alignment of the future Bulky Goods subdivision road and is up to 6.5m deep at the downstream end of the catchment. Lot connections have been constructed on the gravity sewer to service future adjacent lots. Additional sewer extensions will be required at the time of subdivision construction.

The subdivision's sewer grades to the proposed pump station at the north west of the site before being pumped into an existing pressure main near the Dampier Highway and Madigan Road intersection.

3.5.3.3 Gas and Electricity

All lots within the site will be serviced with underground power, which will be fully developer funded. In servicing the proposed pump station, a high voltage cable is required to be installed from existing switchgear at the site entrance. A low voltage cable will also be installed in conjunction with services for the pumping station on the proposed future alignment of the spine road to service the proposed lots within the Subject site. Additional LV cable will be installed at subdivision stage to service any remainder lots within the estate.

We are currently in the process of gaining advice from Horizon Power about current capacity of the network or if network reinforcement will be required as a result of the subdivision.

There is no existing gas distribution or reticulation infrastructure in Karratha. Despite the large volumes of gas being produced on the Burrup Peninsular, there is unlikely to be demand for reticulated gas in Karratha.

3.5.3.4 Telecommunications

All lots within the site will be connected to NBN Co services, utilising the pit and pipe proposed to be installed during the construction of all other services within the road reserve.

Network connection can be made to the recently completed Stage 1 of the Madigan Road Residential Estate, by boring under Madigan Road to the east.

NBN Co will cable the development once civil construction has been completed and applications by individual lot owners have been made for service connections to their lots.

3.5.3.5 Drainage

An existing drainage channel moves in a west-east direction across the subject site. This includes the existing transient worker accommodation facility to the south of the drainage channel and approximately 75% of the future industrial areas to the west. The total catchment area for the drainage channel is approximately 27.2ha with no contributing external catchments. Runoff from the Pluto Camp to the south of the Subject site is contained within its own area and discharged to the west into Seven Mile Creek.

The design storms were calculated internally by the model with reference to the methodology in Australian Rainfall and Runoff (Institution of Engineers Australia, 2001). The rainfall temporal pattern was assumed to be spatially uniform across the catchment with storm durations ranging from 5 minutes to 72 hours. XP-Storm modelling produced a peak 100yr ARI flow of 10.3m^3/s outflow from the drainage channel flows westward towards Seven Mile Creek. Previous flood modelling of Seven Mile Creek was performed by GHD (2009) and indicated the 100yr ARI floodplain extended partly in to the western portion of the Subject site at a level of 10.4m AHD.

Further flood modelling has also been performed by JDA et. al. (2011) in the Draft Karratha Coastal Vulnerability Study to assess the impacts of future climate change, calculation of the hydrology, assessment of the shoreline stability, modelling of the flooding from storm surge and modelling of riverine flooding in Karratha.

Advice from the Department of Water indicates that the modelling scenario to be adopted for planning purposes is the 100 yr ARI current climate rainfall (2010) together with 20 yr ARI 2110 storm surge scenario. For this scenario, the 100yr ARI floodplain extent is similar to GHD (2009) with a flood level of 10.6m AHD.

This flood level has been conservatively adopted as the initial backwater condition in the drainage channel modelling.

Note that the Department of Water's Floodplain Management Strategy specifies that to ensure adequate flood protection is provided to development located outside of the 100yr ARI floodplain, a minimum building floor level of 0.50m above the adjacent 100yr ARI flood level is recommended. This is also recommended in the City of Karratha's Stormwater Design Guidelines.

Preliminary design drawings indicate the drainage channel is located within a 25m wide drainage reserve. The invert of the drainage channel outlet at the western lot boundary is 8.5m AHD.

However note that topographic data currently indicates that there is an approximately 1.5m high man made bund/spoil at this drainage outlet location that crosses the property boundary and may impede drainage channel function. For the purposes of this drainage modelling and to ensure the outlet of the drainage channel functions efficiently on site, it is assumed that this bund/spoil is removed and the area is graded consistent with surrounding natural surface levels.

Notwithstanding the above, if the bund / spoil is not removed, discharge from the drainage channel can still flow north around the bund / spoil and towards Seven Mile Creek as there is sufficient existing natural grade to facilitate this. However, this flow is required to pass through the south west corner of the currently vacant 'Possible Future Expansion Site' within the Subject site which may affect future development of this area.

The drainage channel was modelled with the Seven Mile Creek 100yr ARI flood level of 10.6m AHD to determine maximum food levels in the channel and with a free outfall to determine maximum velocity.

Results from the 100yr ARI modelling indicate that the flood depth in the channel ranges from approximately 0.42m upstream to 2.10m downstream, within the proposed channel design depth.

Note that both the Department of Water and City of Karratha recommend a minimum building floor level of 0.50m above the adjacent 100yr ARI flood level.

Maximum velocity at the downstream section of the channel is 2.7m/s, exceeding the City of Karratha's recommended 2.0m/s maximum velocity for erosion control. Erosion and sedimentation transport control measures such as drop structures and rock armouring should be adopted to reduce velocities.

The section of the drainage channel highlighted as 'Possible Drainage Design Refinement' represents an area where the Seven Mile Creek 100yr ARI backwater has less of an impact. Therefore there is an opportunity to reduce the width of the drainage channel to maintain 100yr ARI flood depths of approximately 1m. However, this will increase adjacent finished Lot levels to maintain the 0.50m clearance to the 100 yr ARI flood level in accordance with Department of Water and City of Karratha policies.

Refer Technical Appendix 7 – Lot 521 Madigan Rd, Karratha Bulky Goods Site Drainage Channel Advice.

In light of the above, a Local Water Management Strategy has not been prepared to accompany this Development Plan.

3.6 Educational Facilities

Assessment of land and lot yields for the southern portion (i.e. the Urban Development Zone) has indicated that the southern portion of the subject site can accommodate approximately 250 to 300 dwellings with areas of public open space also provided. Under Liveable Neighbourhoods, Primary Schools are required to serve up to three (3) neighbourhoods, whilst Secondary Schools are required to serve approximately 6,500 to 7,000 lots.

Given the recent expansion of the western areas of Karratha, two (2) new Primary Schools have been constructed, including Tambrey Primary School and Baynton West Primary School.

Whilst a Secondary School may not be necessarily required by the development of the Urban Development Zone, it is possible that the development of the Urban Development Zone may create the demand for a new Primary School.

Therefore when considering any amendment to the Development Plan which includes residential subdivision and development provisions, shall have due consideration for the provision of new educational facilities in Karratha.

3.7 Market Potential Assessment

A Market Potential Assessment has been undertaken by Macro Plan Dimasi in support of this Development Plan.

Refer Technical Appendix 8 – Assessment of Market Potential.

3.7.1 Trade Area Definition

Given the lack of bulky goods retail in Karratha and the surrounding region, it is likely that the trade area for the Karratha Bulky Goods Area is as follows:

- The primary sector encompasses the whole of the City of Karratha;
- The secondary east sector contains the Town of Port Hedland and the western parts of the Shire of East Pilbara; and
- The secondary south sector incorporates the Shire of Ashburton, including the towns of Onslow and Tom Price.

The trade area which is likely to be served by the Karratha Bulky Goods Area therefore encompasses the majority of the Pilbara region, including the two main towns of Karratha and Port Hedland. The Karratha centre is expected to successfully serve this region, given the Town's predominant role and the Karratha Bulky Goods Area being the only such facility in the region.

3.7.2 Competition

A limited number of bulky goods traders are provided in the Karratha City Centre, including:

- A small Harvey Norman store of around 1,300m^2 is located on Balmoral Road, a short distance north of Dampier Highway. At this size, the Harvey Norman store does not offer

the full range of products as compared to a full scale store which can be upwards of 5,000m^2. Indeed, the offer of Harvey Norman at Karratha is quite limited, even though a wide range of categories are represented, including furniture, whitegoods and appliances.

- A relatively dated Home Timber and Hardware store is located adjacent to the Harvey Norman and is estimated to be around 1,500m^2 in size.
- The immediate precinct also contains an independent sports operator named Adventure Sports, which offers camping, fishing, sporting and diving equipment. It is a freestanding store with an estimated total GLA of around 1,800m^2, including a mezzanine level. A small Carpet Court store is also located nearby on Sharpe Avenue.
- Centro Karratha is the main fully enclosed shopping centre for Karratha residents and is anchored by a full-line Kmart discount department store, and a smaller Target Country store, together with Coles and Woolworths supermarkets, supported by a range of specialty traders. The centre also incorporates a furniture and bedding store as well as a Retravision outlet.

The provision of bulky goods retail facilities in Karratha at present is very limited, both in terms of quantum of floorspace, and even more so, in terms of quality of the offer. Given the size of Karratha, and its growth profile, and given also the regional role which Karratha plays and is intended to play increasingly in the future, there is a clearly evident need for a dedicated, high quality bulky goods shopping alternative to be provided within the town.

Beyond Karratha, the other major town in the region is Hedland, located some 240km to the east, incorporating the urban areas of Port Hedland and South Hedland. South Hedland Shopping Centre is the second largest centre (behind Centro Karratha) serving the regional population base. It is anchored by a Kmart discount department store and a Coles supermarket, together with Retravision and about 25 – 30 specialty shops.

The provision of bulky goods traders is also very modest within the broader region, with the proposed Karratha Bulky Goods Area to be the only dedicated bulky goods location in the region.

3.7.3 Potential Impacts

Typically, the greatest impacts from any new development are absorbed by the closest comparable stores/centres. As already detailed in this report, at present within the Karratha City Centre the representation of comparable stores / facilities to those which would be provided at the new Karratha Bulky Goods Area is minimal. The Karratha Bulky Goods Area will not replace the retail goods provided in the great majority of City Centre retailers, which are focused around food and convenience, clothing and footwear, retail services, and a limited provision of household goods.

The provision of household goods retailing is restricted, within the City Centre retail core, to two (2) stores in Centro Karratha (Karratha Furniture and Bedding and Retravision) as well as the nearby Harvey Norman, Home Timber and Hardware, and Carpet Court stores.

Whilst some, or perhaps all, of these facilities could possibly migrate to the Karratha Bulky Goods Area over time, their absence from the Karratha City Centre would not reduce the City Centre's role, or its ability to grow. For example, two of these stores which are currently provided at Karratha Shopping Centre (Karratha Furniture and Bedding and Retravision) could be backfilled by other core retail uses (for example, other mini-majors, such as Best & Less).

The City Centre therefore would remain the primary hub for Karratha and broader area residents for their main shopping purposes.

3.7.4 Benefits for the Karratha City Centre

The Karratha Bulky Goods Centre facility is considered to result in a number of economic benefits for Karratha, including:

- The provision of a modern facility to locate retailers requiring large floorplates for their operation;
- Employment creation, both during construction and the ongoing operation of the centre, helping to achieve the aspirations of Karratha into a more diversified economy;
- Reduction in the level of escape expenditure, particularly in the bulky goods category; and
- Supporting and complementing the City Centre's role, both in terms of retail and in scale, in order for Karratha to remain the main regional destination for the Pilbara region.

In respect to employment creation, we estimate that the number of long term jobs accommodated by a Karratha Bulky Goods Area of approximately 20,000 – 25,000m^2 at Karratha would be in the order of 400-500 positions. Additional employment would obviously be created during the construction phase, while other multiplier benefits would accrue to the regional economy and the broader Western Australia economy as a result of the development.

Most importantly, however, the role of the new Karratha Bulky Goods Area will be to help improve the quality of life for Karratha residents. The beautification and ongoing development of the City Centre, and the resultant additional retail and food and beverage facilities which are expected to be provided within the City Centre over time, are helping and will further help to make Karratha an attractive place to live. The provision of a good range of bulky goods shopping facilities, conveniently located on the major highway, will further add to the appeal of Karratha as a place to live.

The creation of the proposed Karratha Bulky Goods Area will also strengthen the regional role of Karratha, throughout the Pilbara. By providing a one-stop facility for big ticket comparison shopping items for the home, the new Karratha Bulky Goods Area will attract residents not just from Karratha but also from the balance of the Pilbara, including to some degree from Hedland.

3.8 Development Staging

It is anticipated most of the site will be constructed as in two (2) stages, with the portion of site closest to Madigan Road to be developed first, followed by the western portion near Seven Mile Creek. An indicative development plan has been provided in Part 1 of this Development Plan. The second stage will only occur should there be demand for additional bulky goods / showroom uses in Karratha and the wider Pilbara Region.

Construction of the pump station, access track and all services within the proposed road reserve to the pump station site is anticipated to commence in late 2014.

Refer Technical Appendix 9 – Pump Station Servicing Strategy.

3.9 Developer Contribution Arrangements

The cost for the provision of service infrastructure, such as power, water, gas and sewer is to be borne by the landowner / developer.

04 Conclusion

This report describes the Development plan proposed to guide the subdivision and development of the subject site identified as Lot 522 on Plan 74182, Lot 521 Madigan Road, Gap Ridge ('the subject site').

The Development Plan is a requirement of the provisions of TPS 8, which requires the endorsement of a Development Plan prior to subdivision and / or development.

The objective of the Development Plan is to guide the subdivision and development of a Service Commercial district, where a range of showroom, warehouse and large format retail outlets will be established to meet the (bulky goods) retail needs of residents in the Karratha and wider Pilbara coast and surrounding regions. The Development Plans seeks to establish a bulky goods centre which is highly accessible from the existing regional road network and internally, is legible and safe for vehicles, cyclists and pedestrians alike.

It is expected that the Karratha Bulky Goods Area will comprise of approximately 25,000m^2 floorspace.

The Development Plan is designed to maximise exposure to passing trade – a prerequisite to the success of any Service Commercial – but to establish a pedestrian-friendly environment within the Development Plan where pedestrians can move freely between bulky goods outlets without conflict with cars and service vehicles.

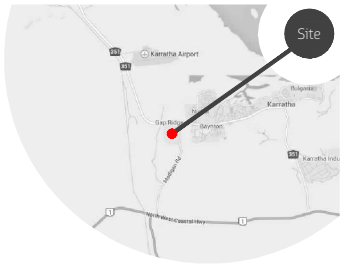
It is envisaged that a freehold title subdivision will occur to establish individual lots for anchor tenants. The exact position of lot boundaries is not shown on the Development Plan as it is subject to further negotiation with purchasers / tenants. An indicative subdivision plan has been provided. Regardless, all proposed lots will have legal frontage to a public road and all necessary easements and rights of carriageway will be registered on the Certificates of Title to ensure access in perpetuity over driveways, car parking areas and pedestrian paths.

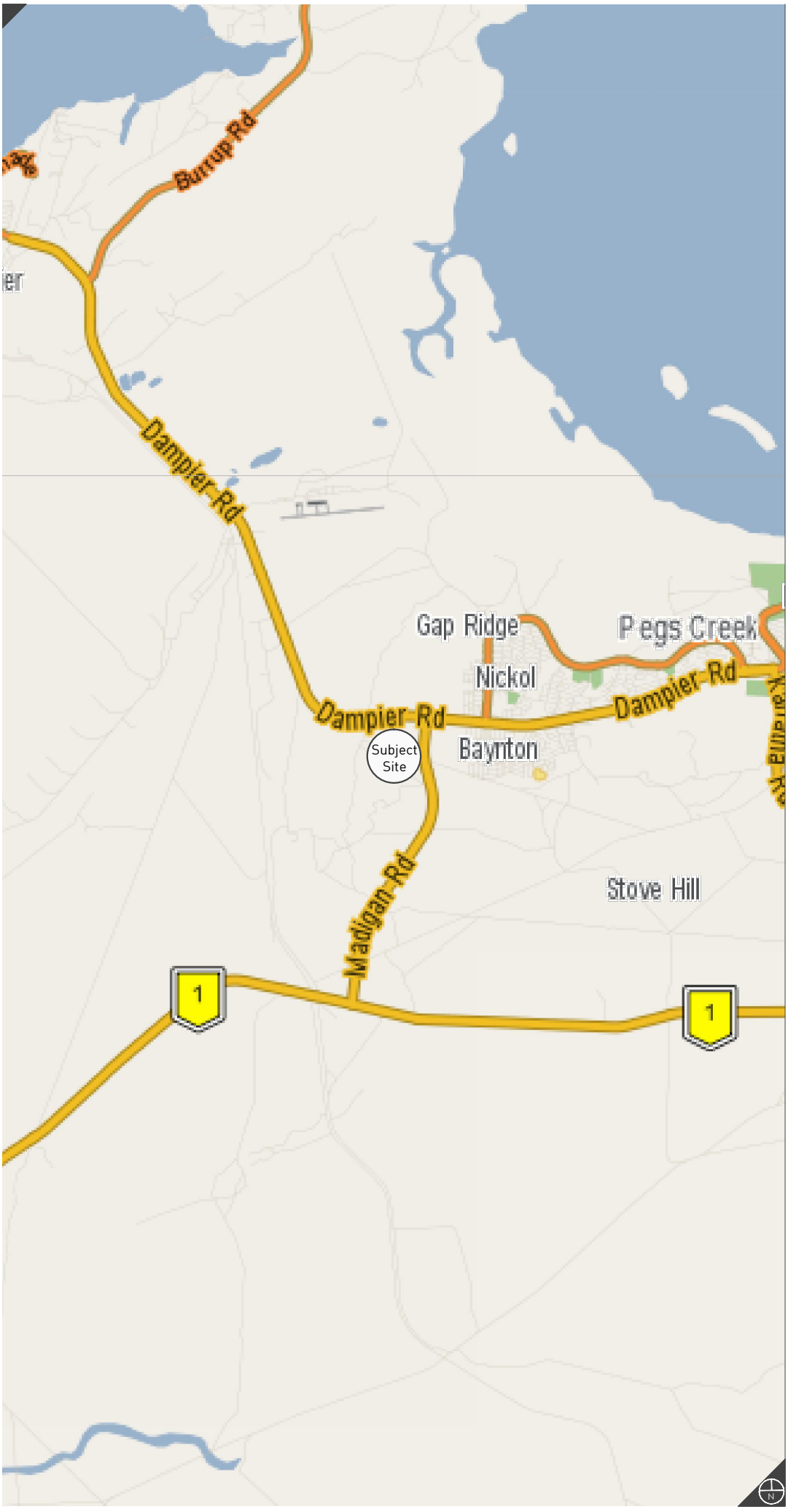
The Development Plan will ensure the subject site is developed in an orderly and proper manner.

FIGURES

ROWEGROUP

Planning Design Delivery





Regional Location

Lots 521 and 522 Madigan Road
Gap Ridge

\\GRA-FS\DATA\TOWN PLANNING\8000-8999\8123\DRAFTING\A-CAD\8123_FIG03A_20140625_DAMPIER (REGIONAL).DWG
Matt Sullivan 29 September 2015

REVISIONS

Rev	Date	Drawn
A	2014.06.25	K. Trenberth

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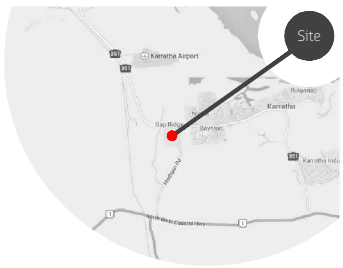
PLANNING DESIGN DELIVERY

w: www.rowegroup.com.au
e: info@rowegroup.com.au
p: 08 9221 1991

Date Drawn:	2014-6-25
Job Ref:	8123
Scale:	N.T.S. @ A4
Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-FIG-03-A

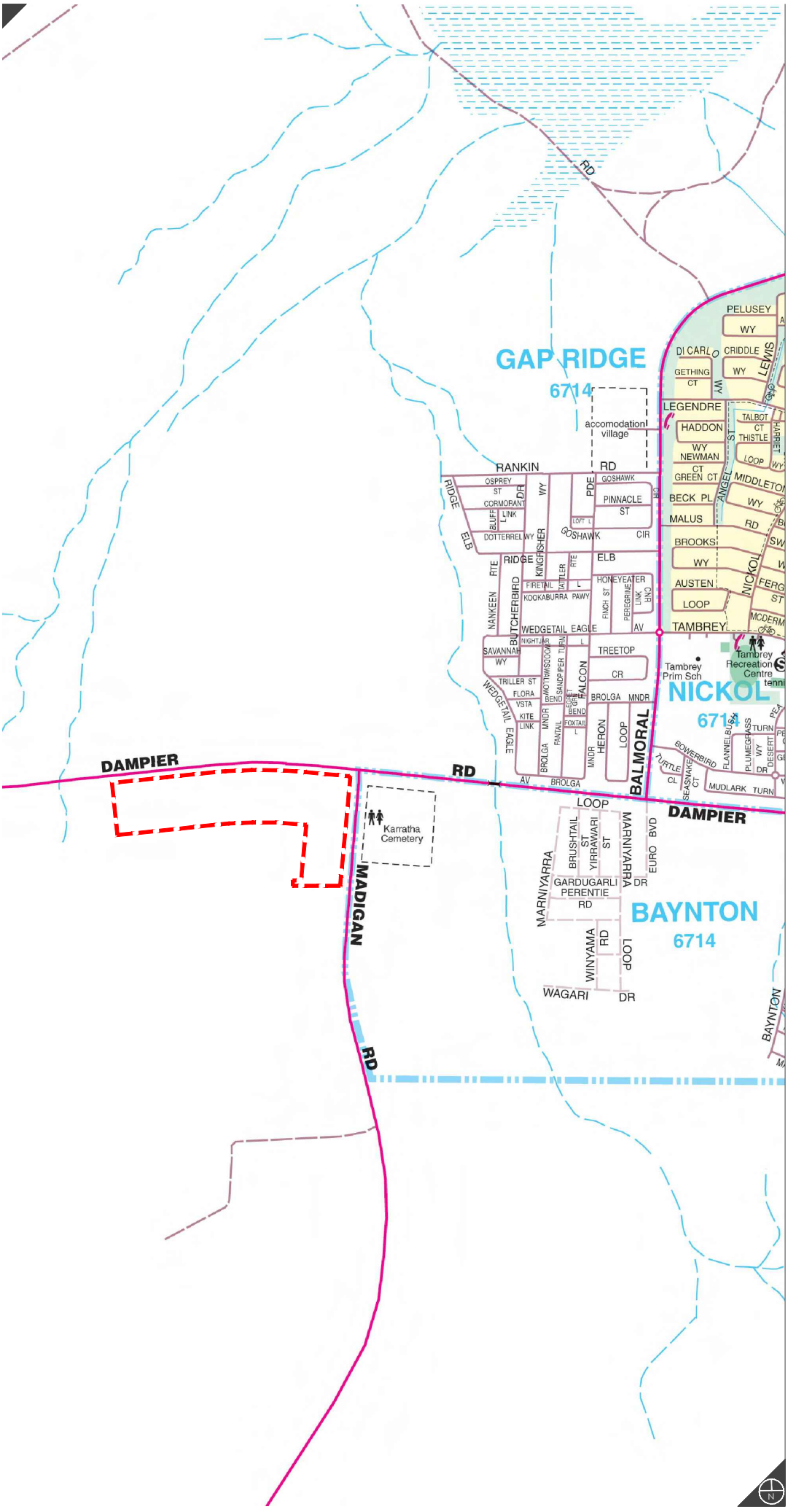
Map supplied by Street Directory

Planning Design Delivery



LEGEND

Subject Site



0 500 Metres

REVISIONS

Rev	Date	Drawn
A	2014.06.25	K. Trenberth

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e: info@rowegroup.com.au
p: 08 9221 1991

Date Drawn:	2014-6-25
Job Ref:	8123
Scale:	1:20,000@ A4
Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-FIG-04-A

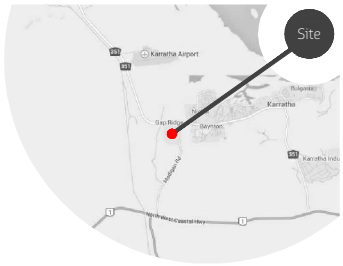
Map supplied by Streetsmart

Local Location

Lots 521 and 522 Madigan Road
Gap Ridge

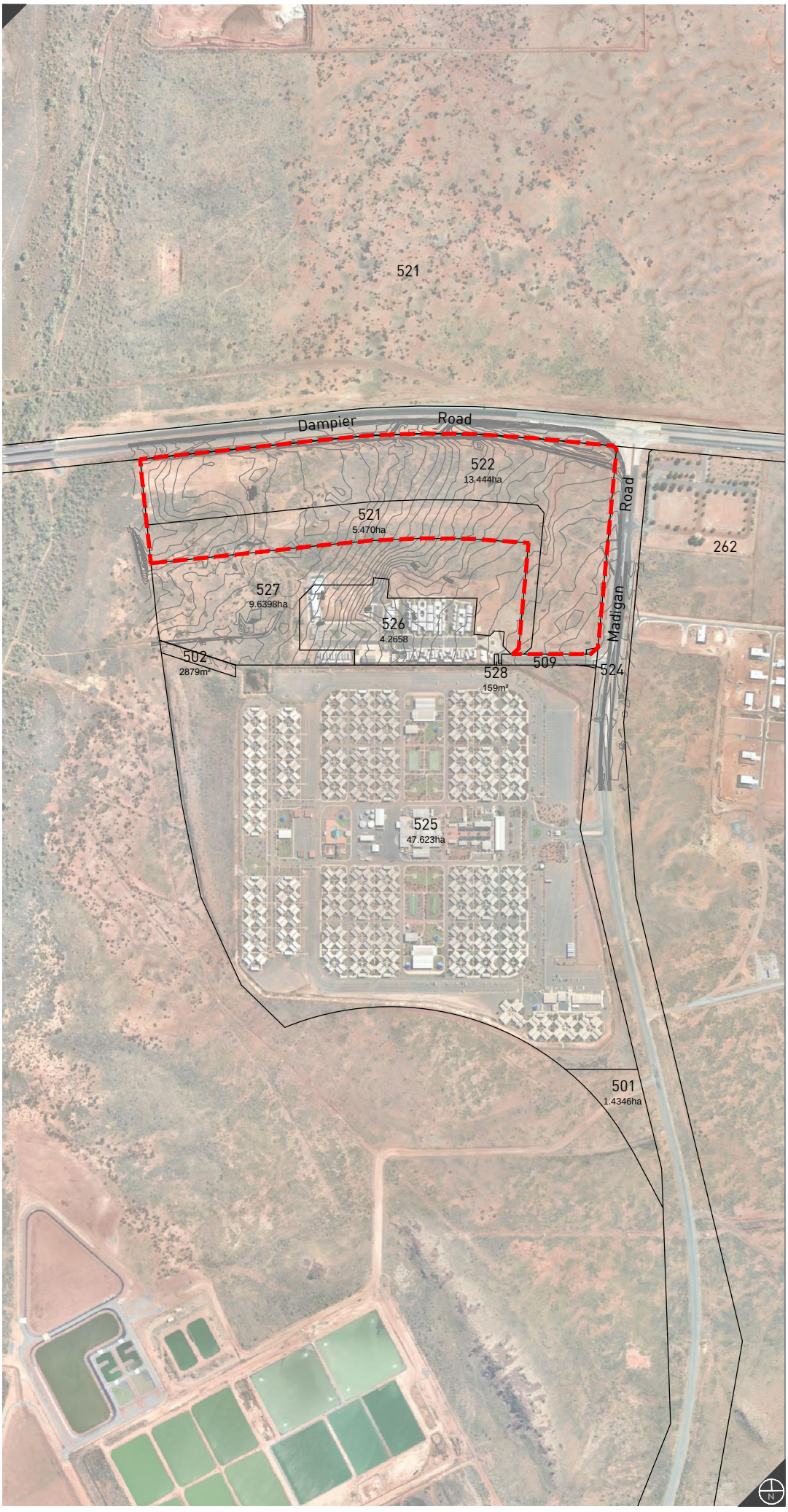
\\GRA-FS\DATA\TOWN PLANNING\8000-8999\8123\DRAFTING\A-CAD\8123_FIG04A_20140625_DAMPIER (LOCAL).DWG
Matt Sullivan 29 September 2015

Planning Design Delivery



LEGEND

- Subject Site
- Contours
- 522 Existing Lot Numbers
- Existing Boundaries



0 250 Metres

REVISIONS

Rev	Date	Drawn
A	2014.06.25	K. Trenberth
B	2015.09.29	M. Sullivan

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w: www.rowegroup.com.au
e: info@rowegroup.com.au
p: 08 9221 1991

Date Drawn:	2014-6-25
Job Ref:	8123
Scale:	1:10,000 @ A4
Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A
Plan ID:	8123-FIG-05-B

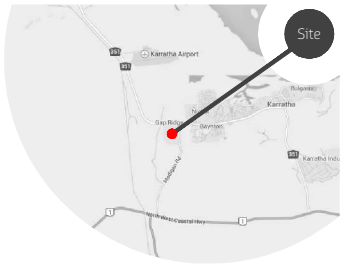
Aerial captured and supplied by Nearmap

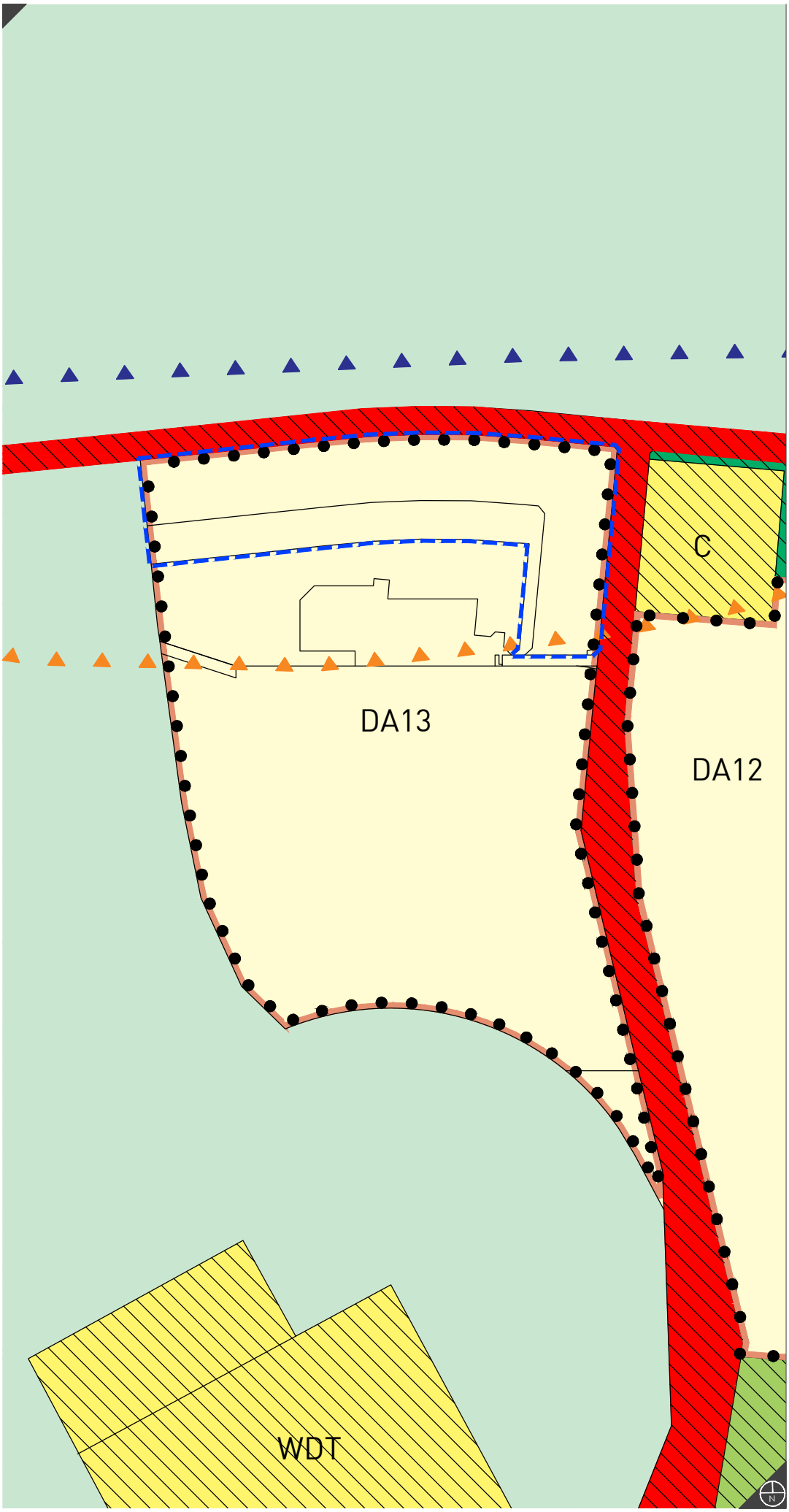
Site Plan

Lots 521 and 522 Madigan Road Gap Ridge

N:\TOWN PLANNING\8000-8999\8123\DRAFTING\A-CAD\8123_FIG05B_20150929_DAMPIER [SITE].DWG
Matt Sullivan 29 September 2015

Planning Design Delivery





LEGEND

- Subject Site

METROPOLITAN REGION SCHEME RESERVES

- Parks, Recreation & Drainage
- State & Regional Roads
- Conservation Recreation & Natural Landscapes
- Public Purposes
  Denotes As Follows:
  - C — Cemetery
  - WDT — Waste Disposal and Treatment

ZONES

- Urban Development
- Rural

OTHER

- Airport Noise Restriction SCA
- Airport Obstacle Height Limitation Area SCA
- DA13 — Sca Development Areas (See Scheme Text)

0 — 500 Metres

REVISIONS

Rev	Date	Drawn
A	2014.06.25	K. Trenberth
B	2015.09.29	M. Sullivan

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e: info@rowegroup.com.au
p: 08 9221 1991

Date Drawn:	2014-6-25
Job Ref:	8123
Scale:	1:20,000 @ A4
Client:	Landcorp
Designer:	N. Stewart
Drawn:	K. Trenberth
Projection:	N/A

Plan ID: 8123-FIG-06-B
Zoning supplied by WAPC

TPS Zoning

Lots 521 and 522 Madigan Road Gap Ridge

N:\TOWN PLANNING\8000-8999\8123\DRAFTING\A-CAD\8123_FIG06B_20150929_DAMPIER (TPS).DWG
Matt Sullivan 29 September 2015

APPENDIX 1

CORRESPONDENCE FROM THE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

ROWEGROUP

APPENDIX 2

CORRESPONDENCE FROM THE MINISTER FOR INDIGENOUS AFFAIRS

ROWEGROUP

Government of **Western Australia**
Department of **Environment Regulation**

Your ref:
Our ref: CPS 6302/1
Enquiries: Clare Ryan
Phone: 6467 5028
Fax: 6467 5532
Email: nvp@der.wa.gov.au

Mr Michael Marcello
Development Manager
Western Australian Land Authority trading as LandCorp
Locked Bag 5, Perth Business Centre
PERTH WA 6849

Dear Mr Marcello

PERMIT TO CLEAR NATIVE VEGETATION UNDER THE *ENVIRONMENTAL PROTECTION ACT 1986*

I refer to the Western Australian Land Authority's application to clear 10.25 hectares of native vegetation within Lot 521 on Deposited Plan 69961 and Lot 522 on Deposited Plan 74182, Gap Ridge, for the purpose of constructing a sewer pump station and access track (reference CPS 6302/1).

Please find enclosed the Western Australian Land Authority's permit to clear native vegetation granted under s.51E of the *Environmental Protection Act 1986*. This permit authorises the Western Australian Land Authority to clear, subject to certain terms, conditions or restrictions. A copy of this permit is now available for the public to view, as required by the regulations.

A copy of the Decision Report is attached for your information. The Decision Report is also available for the public to view.

Please read the permit carefully. If you wish to discuss the permit, please contact the Department of Environment Regulation (DER) immediately. Be aware that there are penalties for failing to comply with the requirements of your permit.

If you are aggrieved by this decision an appeal may be lodged with the Minister for Environment. If you choose to appeal, it must be in writing, clearly set out the grounds of your appeal, and be received by the Minister within 21 days of being notified of the decision. More information on lodging an appeal is available from the Office of the Appeals Convenor on telephone 6467 5190. Completed appeals should be posted or delivered to:

Office of the Appeals Convenor
Level 22 Forrest Centre
221 St George's Terrace, PERTH WA 6000
Tel: 6467 5190 Fax: 6467 5199
Email: admin@appealsconvenor.wa.gov.au
Web: www.appealsconvenor.wa.gov.au

Third parties may also appeal against the grant of this permit or its conditions.

Please note that clearing must not commence until the date stated on the permit, or in the event of an appeal, after the appeal has been determined and the Western Australian Land Authority have been notified that they may proceed.

Please also note that in determining the amount of native vegetation authorised to be cleared under this permit, the Permit Holder is to have regard to avoiding clearing, minimising clearing, and reducing the impacts of clearing on any environmental value.

Be aware also that compliance with the terms, conditions or restrictions of this permit does not absolve the Permit Holder from responsibility for compliance with the requirements of all Commonwealth, State and Local Government legislation.

It has been noted that this permit covers an area in which there exists one registered Indigenous Heritage Site. It is the responsibility of the proponent to ensure that no Aboriginal Sites of Significance are damaged through the clearing process. In implementing this permit please liaise with the Department of Aboriginal Affairs regarding your obligations under the *Aboriginal Heritage Act 1972*.

If you have any queries regarding this approval, please contact Clearing Regulation Officer Ms Clare Ryan on 6467 5028.

Yours sincerely

M Warnock
SENIOR MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

27 November 2014

Attached: Clearing Permit (CPS 6302/1), Plan 6302/1 and Decision Report.
Fact Sheet: Complying with your Clearing Permit

GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: 6302/1
File Number: 2012/004599-1
Duration of Permit: From 27 December 2014 to 27 December 2016

PERMIT HOLDER

Western Australian Land Authority TA LandCorp

LAND ON WHICH CLEARING IS TO BE DONE

Lot 521 on Deposited Plan 69961 (Gap Ridge 6714)
Lot 522 on Deposited Plan 74182 (Gap Ridge 6714)

AUTHORISED ACTIVITY

The Permit Holder shall not clear more than 10.25 hectares of native vegetation within the area hatched yellow on attached Plan 6302/1.

CONDITIONS

1. **Period in which clearing is authorised**
   The Permit Holder shall not clear native vegetation unless undertaking works within 3 months of the authorised clearing being undertaken.

2. **Weed control**
   When undertaking any clearing or other activity authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds*:
   (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
   (b) ensure that no *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
   (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

DEFINITIONS

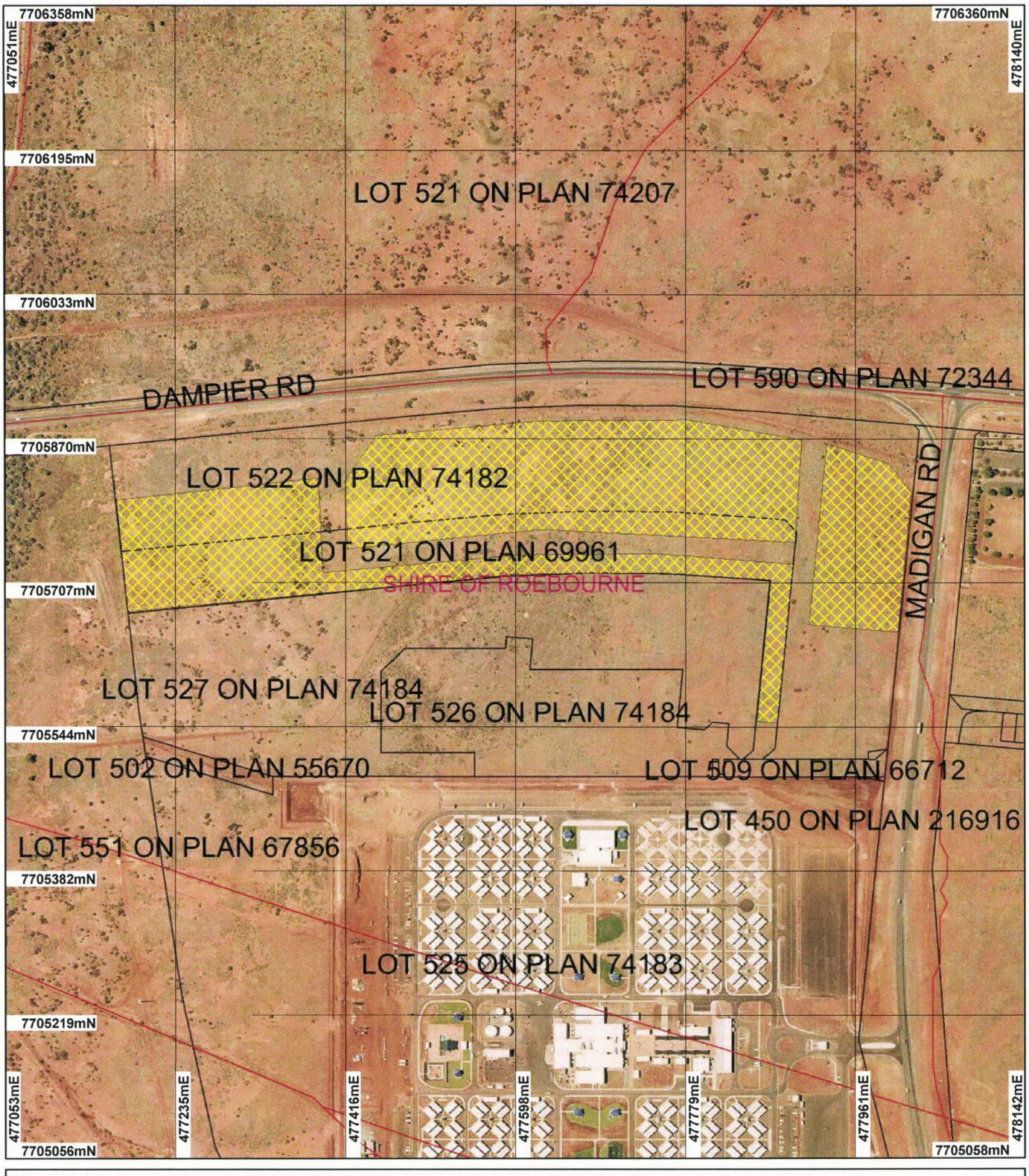
The following meanings are given to terms used in this Permit:
fill means material used to increase the ground level, or fill a hollow;
mulch means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;
weed/s means any plant -
(a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or
(b) published in a Department of Parks and Wildlife Regional Weed Rankings Summary, regardless of ranking; or
(c) not indigenous to the area concerned.

M Warnock
SENIOR MANAGER
CLEARING REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

27 November 2014

Plan 6302/1



LEGEND

- Cadastre for labelling
- Road Centrelines
- Local Government Authorities
- Clearing Instruments
- Areas Approved to Clear

Dampier and Extensions 50cm Orthomosaic - Landgate 2008

N

0 ~150 m

Scale 1:6000
(Approximate when reproduced at A4)

Geocentric Datum Australia 1994

Note: the data in this map have not been projected. This may result in geometric distortion or measurement inaccuracies.

Date 27/11/14

M Warnock

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

Information derived from this map should be confirmed with the data custodian acknowleged by the agency acronym in the legend.

Government of Western Australia
Department of Environment Regulation

GOVERNMENT OF WESTERN AUSTRALIA

Clearing Permit Decision Report

Government of Western Australia
Department of Environment Regulation

1. Application details

1.1. Permit application details

Permit application No.: 6302/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: West Australian Land Authority TA Landcorp

1.3. Property details

Property: LOT 521 ON PLAN 69961 (Lot No. 521 MADIGAN GAP RIDGE 6714)
LOT 522 ON PLAN 74182 (GAP RIDGE 6714)
Local Government Area: Shire of Roebourne
Colloquial name:

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
10.25		Mechanical Removal	Building or Structure

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 27 November 2014

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Beard vegetation association 589 is described as: mosaic: short bunch grassland - savannah / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft Spinifex (Shepherd et al 2001).	The proposed clearing of 10.25 hectares of native vegetation within Lot 521 on Deposited Plan 69961 and Lot 522 on Deposited Plan 74182, Gap Ridge, for the purpose of constructing a sewer pump station and access track.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994) To Completely Degraded: No longer intact; completely/almost completely without native species (Keighery 1994)	The vegetation description and condition was determined from supporting information supplied with the application (GHD, 2012) and from aerial imagery. The vegetation under application has been described as mosaic shrubland of Acacia spp. over low open shrublands of Indigofera monophylla, Corchorus walcottii, Senna notabilis, Ptilotus spp. and Aerva javanica over hummock grassland and scattered mixed herbs on gravelly sandy/clay plains (GHD, 2012). The majority of the vegetation under application is in excellent (Keighery, 1994) condition with degraded areas adjacent to existing tracks and previously cleared areas (GHD 2012).

3. Assessment of application against clearing principles

Comments

The application is to clear up to 10.25 hectares of native vegetation for the purpose of installing a sewer pump station and access track.

The vegetation under application has been described as mosaic shrubland of Acacia spp. over low open shrublands of Indigofera monophylla, Corchorus walcottii, Senna notabilis, Ptilotus spp. and Aerva javanica over hummock grassland and scattered mixed herbs on gravelly sandy/clay plains (GHD, 2012). The majority of the vegetation under application is in an excellent (Keighery 1994) condition (GHD 2012).

A flora survey of the area under application carried out in August 2011 did not identify any priority or rare flora species (GHD 2012). In addition, no threatened ecological communities were identified (GHD 2012).

The area under application is located approximately 900 metres from the Roebourne Plains Gilgai Grassland Priority Ecological Community (PEC) and is connected to this PEC through continuous vegetation.

The Biodiversity Audit of the Pilbara (McKenzie et al., 2002) classifies the Roebourne Plains coastal grassland, as being part of an ecosystem at risk, of vulnerable status with a declining condition rating and is not protected

in any reserves and therefore is a high priority for conservation. Clearing on a large scale has been occurring within the Karratha area and it is not known to what extent this PEC has been cleared. Therefore the continued development around this PEC such as the proposed clearing may cause further degradation through the spread of weeds. Weed management practices will assist in mitigating any adverse impacts to this PEC.

Numerous fauna species listed as rare or likely to become extinct under the Wildlife Conservation Act 1950 have been recorded within the local area (10 kilometre radius). A fauna survey of the application area identified one habitat type, Acacia shrublands/ hummock grassland flats (GHD 2012). The fauna survey identified 44 bird species, five reptiles and two mammal species using the area under application, no fauna of conservation significance were recorded within the application area(GHD 2012). The habitat type within the application area is well represented in the local area in similar or better condition, and no loss of significant habitat for fauna is expected.

A minor watercourse is located approximately 200 metres west of the area under application. Given the distance to the closest watercourse the clearing as proposed is not likely to be growing in association with a watercourse or impact upon surface water quality.

The clearing of 10 hectares of native vegetation may cause land degradation in the form of wind erosion. However, the impacts are likely to be short term, as the end land use will mitigate wind erosion.

The local area (10 kilometre radius) is highly vegetated within approximately 90 per cent vegetation cover. The clearing of 10 hectares of native vegetation is not likely to cause deterioration to the quality of groundwater or exacerbate flooding. No conservation areas are located within the vicinity of the application area.

The assessment of the proposed clearing identified that the clearing may be at variance to principle (g) and is not likely to be at variance to any of the remaining clearing principles.

Methodology

References
- Keighery (1994)
- GHD (2012)
- McKenzie et al (2002)

GIS Databases
- Mattiske Vegetation (1998)
- Dampier and esxtensions 50cm Orthomosaic (DLI 2008)
- SAC Biodatasets (accessed July 2012)

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments

The area under application is zoned urban development under the Shire of Roebourne Town Planning Scheme.

Two Aboriginal Sites of Significance are mapped within the area under application. The applicant will be notified of their obligations under the Aboriginal Heritage Act 1972.

Shire of Roebourne advice states that development approval from the Shire will not be necessary as the works on the area under application are required to service a subdivision approval on an adjoining lot (Shire of Roebourne 2012).

Methodology

References:
- Shire of Roebourne (2012)

4. References

GHD (2012) LandCorp, Lot 505 and 521 Madigan Road Karratha, Supporting documentation for Clearing Permit (area permit

Government of Western Australia (2013) 2012 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of October 2012. WA Department of Environment and Conservation, Perth.

Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

McKenzie N. L, May J. E and McKenna S, (2002) Bioregional Summary of the 2002 Bioregional Audit for Western Australia. CALM 2003.

Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth.

Shire of Roebourne (2012) Advice received from the Shire of Roebourne for CPS 5134/1 on 3/9/2012. DER Ref A541110. Shire of Roebourne.

Department of Environment and Conservation

NATIVE VEGETATION FACT SHEET 4

Complying with your permit to clear native vegetation

Under Part V of the *Environmental Protection Act 1986* (EP ACT)

A clearing permit allows you to legally clear native vegetation.

As the holder of a clearing permit, you are responsible for ensuring the requirements of the clearing permit are followed. This fact sheet is to assist you to understand your clearing permit.

Keep your clearing permit in a secure place where you can access it if you need to check the details.

If there are any particulars of the clearing permit that you do not fully understand please contact the Department of Environment and Conservation (DEC) Native Vegetation Conservation Branch (NVCB) on 9219 8744. If the clearing permit is for a mining or petroleum project please contact the Department of Mines and Petroleum (DMP) Native Vegetation Assessment Branch (NVAB) on 9222 3333.

Types of clearing permits

Your clearing permit will either allow you to clear a specific area (area permit) or for a specific purpose (purpose permit).

Area permits

An area permit will inform you how and where to undertake your clearing.

Land on which clearing is to be done: describes the land covered by the clearing permit. The clearing permit plan will show where on this land you are allowed to clear.

Authorised activity: describes how the clearing is to be carried out.

Purpose permits

Conditions set within the clearing permit will describe for what purpose you are allowed to clear and the areas in which you can clear.

Clearing permits may contain conditions

Area permits and purpose permits may be subject to conditions. The types of conditions that are placed on a clearing permit depend on the outcome of the environmental impact assessment. Conditions are used to prevent, control, abate or mitigate environmental harm or to offset the loss of the cleared vegetation.

Conditions may relate to record keeping, reporting, revegetating or other actions.

- **Record keeping and submitting reports**: If your clearing permit requires you to keep records or submit reports, ensure they are submitted by the due date or notify DEC or DMP if there is some reason why this is not possible.

- **Revegetating**: Some clearing permits require land to be revegetated. A range of companies and organisations provide advice and services to achieve this.

Some clearing permits will have no conditions attached.

Definitions: of terms specific to the conditions may be included to clarify what is required. Additional terms may be defined separately in the *Environmental Protection Act 1986*.

Contact DEC or DMP if you would like more information about terms used in your clearing permit.

When can you start clearing?

Check the commencement date on the clearing permit. Generally the start date is set a month after you have received your permit.

If your clearing permit is subject to an appeal, you will be notified by the Appeals Convenor and clearing must not commence until you are provided with notice of the outcome.

Clearing permits will expire—be aware of the entire **duration of the clearing permit** and plan your clearing to be completed within this period.

If you need further time:

- seek an extension of the clearing permit before it expires; or
- apply for a new clearing permit if your clearing permit has expired.

Version 3, NOVEMBER 2012

Are clearing permits publically available?

The *Environmental Protection Act 1986* clearing provisions require that the details of clearing permits are published. Anyone can obtain a copy of your clearing permit and the decision report.

Ensuring compliance

Monitoring of compliance: a range of technologies exist to monitor changes in vegetation. This information is cross analysed with clearing permits.

Compliance inspections: may be conducted to audit your clearing permit (refer **Fact Sheet 3**).

What if you breach the requirements or conditions of your clearing permit or clear an area or in a way not permitted?

You should:

1. Correct the breach as soon as possible to minimise the level of environmental harm
2. Notify DEC / DMP
3. Review your operating procedures to ensure that the breach does not occur again.

Expeditious notification will be considered as a mitigating factor if enforcement action is taken.

Refer to DEC's Enforcement and Prosecution Policy (2008) for further information about voluntary disclosure.

Will the clearing permit be affected by a breach?

If enforcement action is taken your clearing permit may be suspended or revoked. A Vegetation Conservation Notice may be given to the responsible person (such as the permit holder or land owner). The notice may specify measures to be undertaken to rectify the breach.

Can clearing permits be amended, transferred or surrendered during the duration of the clearing permit?

Clearing permits can be amended to correct issues such as clerical mistakes, administrative changes, the size of the areas to be cleared, and dates to comply with permit conditions. Applications (Form C4) for an amendment will need to be assessed.

The clearing permit holder, or any person, may appeal to the Minister for Environment against an amendment. The appeal must be lodged within 21 days of the clearing permit holder being notified of the amendment. Information on the appeal process and how to lodge an appeal can be found on the Office of the Appeals Convenor's website at <www.appealsconvenor.wa.gov.au>.

Area permits may be transferred to a new property owner by submitting a 'Notification of Change of Land Ownership' (Form C5). The clearing permit will not be valid until this transfer is completed.

If you no longer wish to clear or have completed clearing before the end of the permitted period an 'Application to surrender a clearing permit' (Form C6) may be submitted to end the clearing permit and any conditional requirements.

On completion of clearing or expiry of the clearing permit ensure all required records have been submitted.

More information

DEC provides a range of information at <www.dec.wa.gov/nvp>

Fact sheets provide basic information to cover the most common questions DEC receives about the EP Act clearing provisions

Application forms include guidance on what information is required to complete the form

Guides provide additional detail to what is covered in the facts sheets or forms

Environmentally sensitive areas can be viewed from the Native Vegetation Map Viewer at <www.dec.wa.gov.au/nvp> in the 'Data' section

Be clear before you clear – if you require assistance please contact DEC's Native Vegetation Conservation Branch on 9219 8744 or email <nvp@dec.wa.gov.au>

If your clearing relates to **mining or petroleum project** please contact **Department of Mines and Petroleum (DMP)** Native Vegetation Assessment Branch for assistance on 9222 3333 or visit: <www.dmp.wa.gov.au/nvabinfo>

Hon Peter Collier MLC
Minister for Education; Energy; Indigenous Affairs

Our Ref: 34-23096

Mr Matt Read
Business Manager - Pilbara
LandCorp
Level 6 Wesfarmers House
40 The Esplanade
PERTH WA 6000

Dear Mr Read

I refer to the section 18 notice (the Notice) dated 25 September 2012 submitted by LandCorp (the Applicant) on behalf of the Western Australian Land Authority (the Landowner) to the Aboriginal Cultural Material Committee (ACMC) pursuant to section 18(2) of the *Aboriginal Heritage Act 1972* (AHA). The Notice was considered at the 21 November 2012 ordinary ACMC meeting.

The Notice advised that you wish to use the land described in Item 4 of the Notice as Volume 2785 Fol 810 DP 69961 Lot 521, Madigan Road, Gap Ridge, Karratha (the Land), for the purpose described in Item 6 of the Notice as the construction of an open drain (the Purpose).

In accordance with my powers under section 18(3) of the AHA and following consideration of recommendations from the ACMC, I hereby grant consent to the use of the Land for the Purpose subject to the conditions set out below.

I am advised that based on current knowledge the Purpose will impact upon one Aboriginal site within the meaning of section 5 of the AHA (Site) on the Land. The Site is DIA 31565 (GR10AS02).

Level 10, Dumas House, 2 Havelock Street, West Perth Western Australia 6005
Telephone: +61 8 6552 6300 Facsimile: +61 8 6552 6301 Email: Minister.Collier@dpc.wa.gov.au

Conditions of Consent

That the Applicant (on behalf of the Landowner):

1. Provides a written report to the Registrar of Aboriginal Sites (the Registrar) within 60 days of the completion of the Purpose, advising whether and to what extent the Purpose has impacted on all or any Sites located on the Land. The final report should include a detailed description of:
   a. what extent the Purpose has impacted any Aboriginal Site on the Land;
   b. where any Aboriginal Site has been impacted, whether such Site has been partially or wholly impacted by the Purpose, and the level, effect and type of any such impact – preferably by the provision of photographs taken before and after the impact;
   c. where any Aboriginal Site has been subject to archaeological or cultural salvage, when and how such salvage took place, who was present at the salvage and where the material was re-located, the results of the salvage and any subsequent analysis conducted; and
   d. the results and findings of any monitoring of ground disturbing works associated with the Purpose.

The above condition is imposed in order to:

- protect and preserve, whenever possible, Western Australia's Aboriginal heritage;
- ensure the appropriate protection and preservation of the State's Aboriginal heritage; and
- ensure that important relevant information is recorded and the Register of Aboriginal Sites is updated.

The Registrar and the ACMC welcome any advice in writing on all or any of the matters outlined above at any time prior to the completion of the Purpose to bring about comprehensive and updated information about Sites, and objects within the meaning of section 6 of the AHA, in Western Australia.

Failure to comply with these conditions may constitute an offence under section 55 of the AHA. The Department of Indigenous Affairs (DIA) carries out routine checks on compliance with conditions of Ministerial consent.

Requests and Advice

The following information has been provided by the ACMC for the information and guidance of the Landowner (or authorised Agent) and does not constitute a condition of consent.

It is recommended that the Landowner (or authorised Agent):

- gives due consideration to requests made by the Aboriginal people consulted for the Notice with regard to the cultural salvage of material; and
- makes all persons employed or engaged in respect of the Purpose aware of their obligations under the AHA, especially in respect of skeletal material.

Right of Review of Decision

Where the Landowner (or authorised Agent) is aggrieved by a decision of the Minister made under section 18(3) of the AHA, the Landowner may apply to the State Administrative Tribunal for a review of the decision. The Tribunal's website is www.sat.justice.wa.gov.au.

Other Matters

This consent can only be relied upon by the Landowner (or authorised Agent). Any subsequent owner of the land within the meaning of the AHA must make their own application under the AHA.

Copies of the AHA, the *Aboriginal Heritage Regulations 1974* and the *State Administrative Tribunal Act 2004* may be viewed and downloaded from the website of the State Law Publisher at www.slp.wa.gov.au.

If you have any queries in relation to your application, please contact Ms Megan McCorry, DIA Senior Heritage Officer, on (08) 6551 8090.

Kind regards

Hon Peter Collier MLC
MINISTER FOR EDUCATION; ENERGY; INDIGENOUS AFFAIRS
- 9 JAN 2013

cc. Western Australia Land Authority
C/- Matt Read
Business Manager – Pilbara
LandCorp
Level 6 Wesfarmers House
40 The Esplanade
PERTH WA 6000

Part Three
TECHNICAL APPENDICES

ROWEGROUP

APPENDIX 3

GEOTECHNICAL REPORT

ROWEGROUP

APPENDIX 4

TRAFFIC IMPACT ASSESSMENT

ROWEGROUP

CONSULTING CIVIL & TRAFFIC ENGINEERS, RISK MANAGERS.

Project:	Karratha Bulky Goods Site, Dampier Road Karratha. Ver 4.
Client:	Landcorp
Job Number:	1405017
Author:	T Shaw
Date:	10/12/14

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Contents

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Tables

1 Assessment.

1.1 Background

Landcorp commissioned a review of transport impacts associated with the staged development of a bulky goods development on the corner of Madigan Road and Dampier Road in Karratha following negotiations with Main Roads WA with regard to access options.

The review also covers a further stage which considers the future use of the adjacent Temporary Workers Accommodation sites (MAC Village and Woodside Village) as medium to low density residential housing.

In order to address the development access issues, a two stage approach was adopted.

Stage 1 involved the estimation of traffic generation from the site and the distribution of traffic onto the adjacent road network in order to review a number of access options, model impacts and prepare a case for submission to Main Roads WA (MRWA) in support of the best fit access solutions. Stage 2 will entail the development of a detailed Transport Assessment to support Planning Documentation for the development.

1.2 Development Staging

Development staging is partly shown on Figure 1 and will consist of the following:

Stage 1	Development of the eastern portion of the bulky goods Site;
Stage 2	Development of the balance (western portion) of the bulky goods site;
Stage 3	Development of the residential cell to the south of the site.

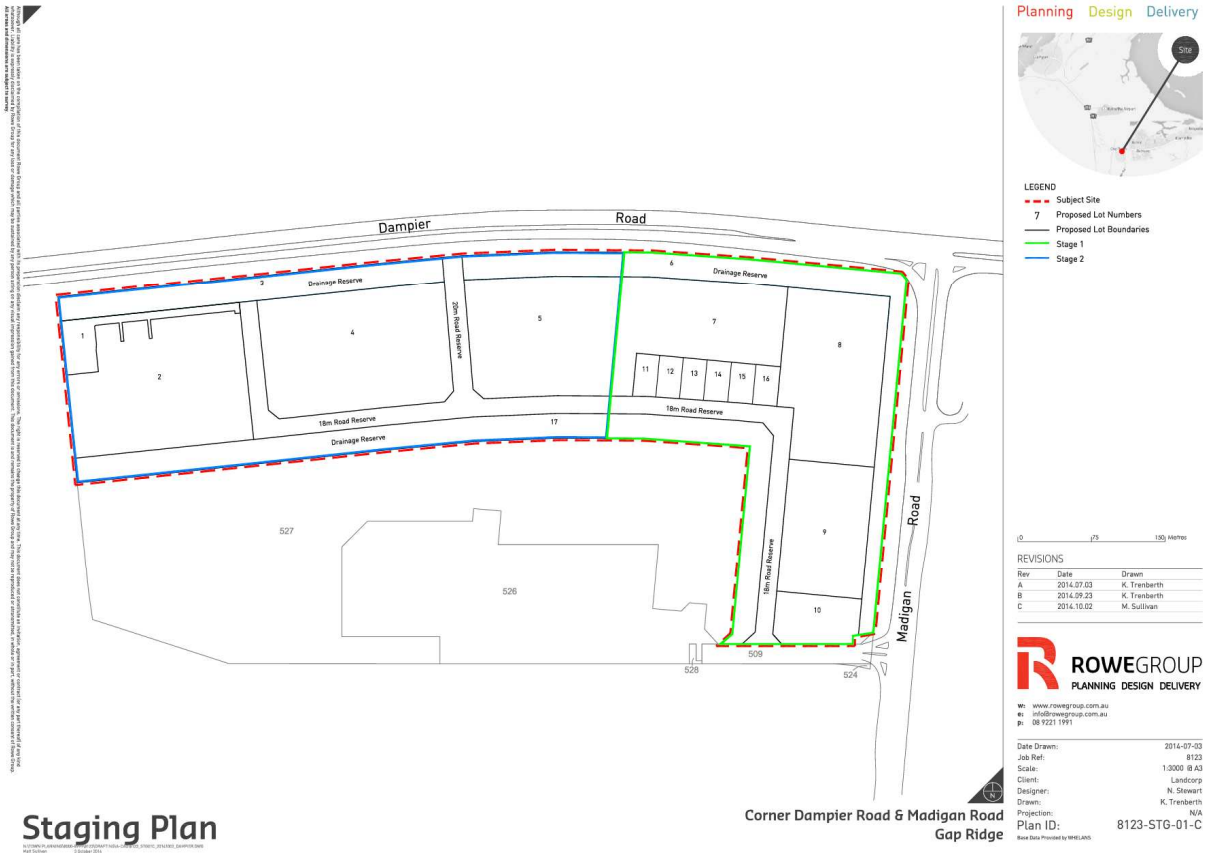

Figure 1. Stage 1 & Stage 2 Conceptual Layout

Based on the layout and indciative floor area as advised for Stage 1 and land areas shown in Figure 1, the following land use splits have been determined.

Land use	Stage 1	Stage 2	Stage 3	Total
Stores - bulky goods retail stores.	10,890 m^2			
Concenience	200 m^2			
Hardware - weekday	2,210 m^2			
Building Materials - weekday	1,715 m^2			
Bulky Goods.		25,560 m^2		
Residential dwellings.			350 dwelling units	350 dwelling units

Table 1. Staged Development – Land Use Quantum

Traffic generation from the development site was determined from industry rates for the 3 stages and this is summarised below. Traffic generated from the site was distributed onto the adjacent road network using modelling software QRS II. Distribution assumed a strong desire line between the site and Karratha (75%), a lesser desire line between the site and Dampier (20%) and a minor desire line between the site and Madigan Road.

1.3 Generation and Distribution

1.1.1 Stage 1

Stage 1 provides for the development of bulky goods retail stores and a hardware / home improvement store. Traffic generation from the site based on rates reported in the Institute of Transportation Engineers publication 'Trip Generation, 7th Edition' is shown on Table 2.

Land use	Generation rate			Unit	Quantum	Estimated Generation			Source
	ADT	AM Peak	PM Peak			ADT	AM Peak	PM Peak	
Stores - bulky goods retail stores.	5.00	0.50	0.75	GLA	10890	545	54	82	RTA Guide.
Convenience	43.00	2.00	2.00	GFA (m2)	200	86	4	4	ITE Guide
Hardware - weekday	55.00	1.15	5.15	GLA	2210	1216	25	114	ITE Guide
Building Materials - weekday	48.00	2.76	4.78	GLA	1715	823	47	82	ITE Guide
Total						**2669**	**131**	**281**	

Table 2. Traffic Generation – Stage 1 Development.

Distribution of traffic based on stated assumptions is as indicated below:

Dampier: (20%) 534 vpd.

Karratha: (75%) 2,001 vpd.

Madigan Road: (5%) 134 vpd.

Predicted distribution onto the adjacent road network as modelled using QRS II and is shown on Figure 2.

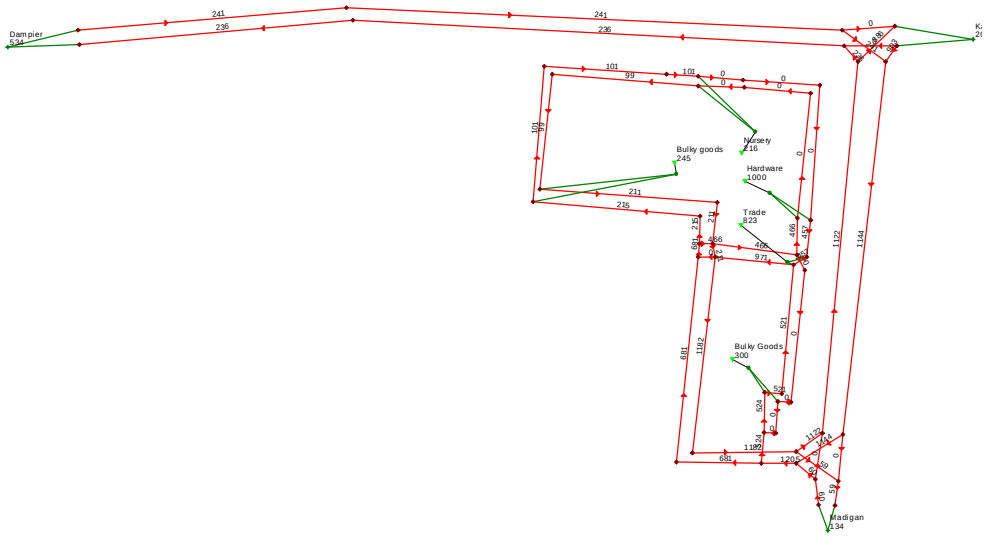

Figure 2. Traffic Distribution – Stage 1 Development

1.1.2 Stage 1 plus Stage 2

Stage 2 provides for Stage 1 land uses plus the development of further bulky goods retail stores (and / or car sales yards). Traffic generation from the site based on rates reported in the Road Traffic Authority (RTA) publication 'Guide to Traffic Generating Developments' and the Institute of Transportation Engineers (ITE) publication 'Trip Generation, 7th Edition' is shown on Table 3.

Land use	Generation rate			Unit	Quantum	Estimated Generation			Source
	ADT	AM Peak	PM Peak			ADT	AM Peak	PM Peak	
Stage 1.						2669	131	281	RTA Guide.
Stage 2 Stores - bulky goods retail stores.	5.00	0.50	0.75	GLA	25560	1278	128	192	RTA Guide.
Total						**3947**	**259**	**473**	

Table 3. Traffic Generation Stage 2 Development

Distribution of traffic based on stated assumptions is as indicated below:

Dampier: 789 vpd.

Karratha: 2,960 vpd.

Madigan Road: 198 vpd.

Predicted distribution onto the adjacent road network as modelled using QRS II and is shown on Figure 3.

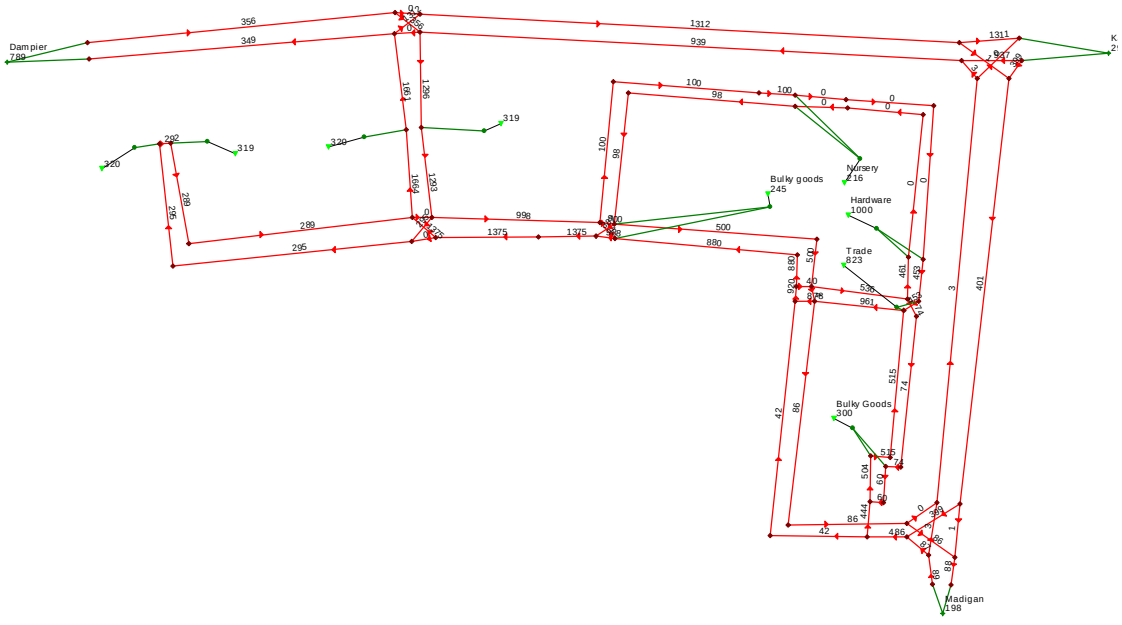

Figure 3. Traffic Distribution – Stage 2 Development

1.1.3 Stage 3

A stage 3 land use reflects Stages 1 and 2 with the addition of 350 residential dwelling units to the south of the bulky goods site. Traffic generation from the site is shown on Table 4.

Land use	Generation rate			Unit	Quantum	Estimated Generation			Source
	ADT	AM Peak	PM Peak			ADT	AM Peak	PM Peak	
Stage 1.						2669	131	281	RTA Guide.
Stage 2 Stores - bulky goods retail stores.	5.00	0.50	0.75	GLA	25560	1278	128	192	RTA Guide.
Residential.- Dwelling House	9.00	0.85	0.85	Dwelling	350	3150	298	298	RTA Guide.
Total						**7097**	**557**	**771**	

Table 4. Traffic Generation Stage 3 Development

Distribution of traffic based on stated assumptions is as indicated below:

Dampier: 1,419 vpd.

Karratha: 5,323 vpd.

Madigan Road: 355 vpd.

Predicted distribution onto the adjacent road network as modelled using QRS II and is shown on Figure 4.

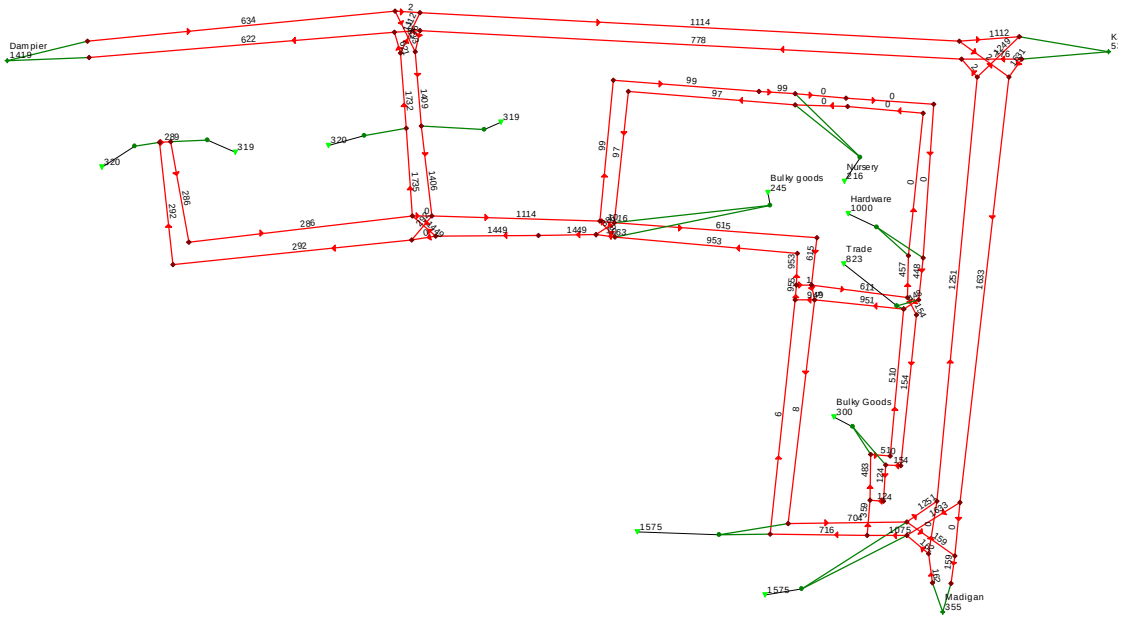

Figure 4. Traffic Distribution – Stage 3 Development

2 Dampier Road Site Access

2.1 Existing Traffic Flows

Current SCATS counts were obtained from Main Roads WA and were used to determine current peak hour movements through the Dampier Road – Madigan Road intersection (Refer Figure 5).

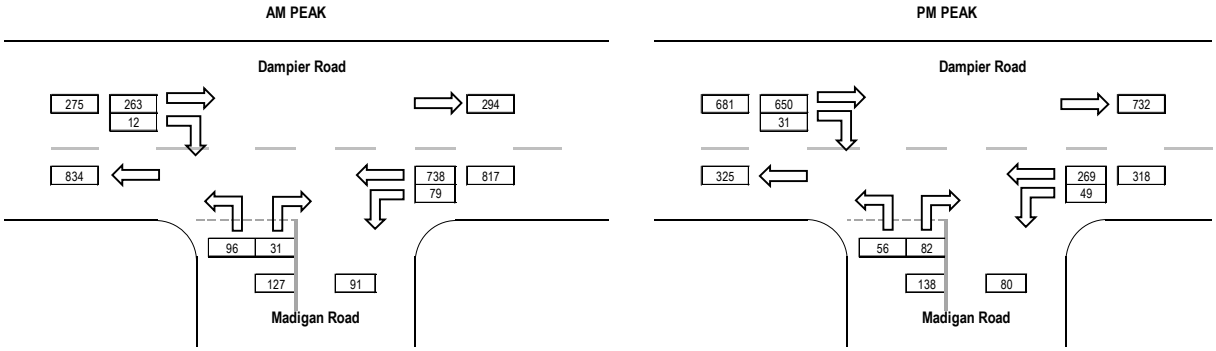

Figure 5. Current Turning Movements – Dampier Road – Madigan Road

24 hour counts were also sourced from Main Roads WA for Dampier Road and Madigan Road and these were used to confirm the integrity of the SCATS counts.

2.2 Proposed Access.

The assessment of access arrangements was predicated on the following:

1) Stages 1, 2 and 3 would be connected to the existing access from the TWA sites onto Madigan Road.
2) Stages 2 and 3 would have a primary access point located on Dampier Road approximately midway between Stages 1 and 2 and about 450 metres west of Madigan Road. The access intersection would be configured generally as indicated on Figure 6. Sufficient distance would be provided between Madigan Road intersection and the proposed intersection such that it would not adversely impact on traffic operation of the Madigan Road intersection or road safety in general.

Figure 6. Access Intersection – Concept Geometry

2.3 Stage 1 – Dampier Road Access

Under Stage 1 all access would be off Madigan Road.

2.4 Stage 2 – Dampier Road Access

Turning movements based on current traffic flows recorded by Main Roads WA on Dampier Road and estimated flows from the development were used to model the AM and PM peak turning movements shown on Figure 7.

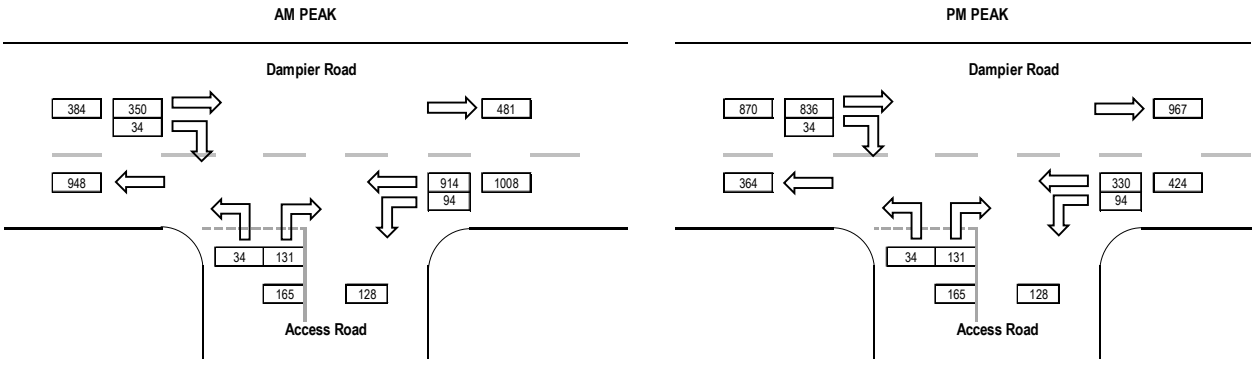

Figure 7. Dampier Road Access Stage 2 Turning Movements

Modelling the intersection as an unsignalised channelised “T” junction gave the following results.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access Road											
1	L	36	0.0	0.099	19.2	LOS C	0.3	2.3	0.72	1.00	40.3
3	R	138	0.0	0.319	19.7	LOS C	0.9	6.6	0.67	1.04	42.4
Approach		174	0.0	0.319	19.6	LOS C	0.9	6.6	0.68	1.03	41.9
East: Dampier Road											
4	L	99	0.0	0.053	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	962	5.0	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1061	4.5	0.255	0.8	NA	0.0	0.0	0.00	0.06	58.8
West: Dampier Road											
11	T	404	5.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	36	0.0	0.057	12.9	LOS B	0.2	1.6	0.66	0.84	44.4
Approach		440	4.6	0.107	1.1	NA	0.2	1.6	0.05	0.07	58.3
South West: Median (RT Stage 2)											
32	R	138	0.0	0.052	2.2	LOS A	0.4	2.2	0.48	0.38	28.6
Approach		138	0.0	0.052	2.2	LOS A	0.4	2.2	0.48	0.38	28.6
All Vehicles		1813	3.8	0.319	2.7	NA	0.9	6.6	0.11	0.18	55.7

Table 5. Dampier Road Access Stage 2 – AM Peak Performance

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access Road											
1	L	36	0.0	0.045	12.7	LOS B	0.2	1.1	0.43	0.89	45.2
3	R	138	0.0	0.183	14.9	LOS B	0.4	3.1	0.34	0.98	47.0
Approach		174	0.0	0.183	14.4	LOS B	0.4	3.1	0.35	0.96	46.5
East: Dampier Road											
4	L	99	0.0	0.053	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	347	5.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		446	3.9	0.092	1.8	NA	0.0	0.0	0.00	0.15	57.1
West: Dampier Road											
11	T	880	0.0	0.226	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	36	5.0	0.030	9.4	LOS A	0.1	0.9	0.45	0.64	47.2
Approach		916	0.2	0.226	0.4	NA	0.1	0.9	0.02	0.02	59.4
South West: Median (RT Stage 2)											
32	R	138	0.0	0.080	3.5	LOS A	0.5	2.9	0.69	0.59	27.0
Approach		138	0.0	0.080	3.5	LOS A	0.5	2.9	0.69	0.59	27.0
All Vehicles		1674	1.1	0.226	2.5	NA	0.5	3.1	0.10	0.20	56.1

Table 6. Dampier Road Access Stage 2 – PM Peak Performance

2.5 Stage 3 – Dampier Road Access

Turning movements based on current traffic flows recorded by Main Roads WA on Dampier Road and estimated flows from the development were used to model the AM and PM peak turning movements shown on Figure 8. These provide for all traffic generated to access and egress the site via a single access point on Dampier Road and another point on Madigan Road.

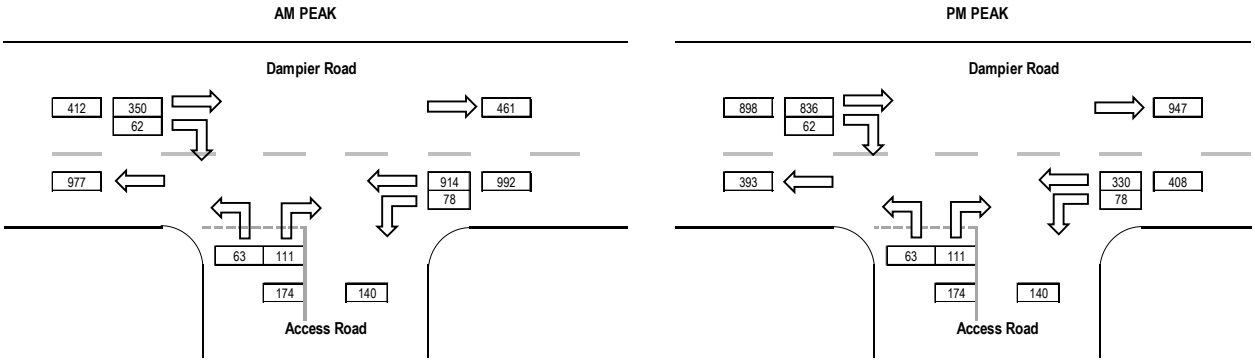

Figure 8. Dampier Road Access Stage 3 Turning Movements

Modelling the intersection as an unsignalised channelised "T" junction gave the following results.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access Road											
1	L	65	0.0	0.309	30.0	LOS D	1.1	7.5	0.87	1.04	33.8
3	R	117	0.0	0.417	25.6	LOS D	1.3	8.8	0.82	1.06	37.6
Approach		182	0.0	0.417	27.2	LOS D	1.3	8.8	0.84	1.05	36.0
East: Dampier Road											
4	L	819	0.0	0.441	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	962	5.0	0.255	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1781	2.7	0.441	3.8	NA	0.0	0.0	0.00	0.31	54.4
West: Dampier Road											
11	T	368	5.0	0.098	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	66	0.0	0.270	25.8	LOS D	1.0	7.0	0.90	0.99	35.2
Approach		435	4.2	0.270	3.9	NA	1.0	7.0	0.14	0.15	54.1
South West: Median (RT Stage 2)											
32	R	117	0.0	0.043	2.1	LOS A	0.3	1.8	0.45	0.36	28.8
Approach		117	0.0	0.043	2.1	LOS A	0.3	1.8	0.45	0.36	28.8
All Vehicles		2515	2.6	0.441	5.4	NA	1.3	8.8	0.11	0.34	52.1

Table 7. Dampier Road Access Stage 3 – AM Peak Performance

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Access Road											
1	L	65	0.0	0.082	12.8	LOS B	0.3	2.1	0.43	0.91	45.2
3	R	117	0.0	0.158	14.9	LOS B	0.4	2.7	0.34	0.98	46.9
Approach		182	0.0	0.158	14.1	LOS B	0.4	2.7	0.37	0.95	46.2
East: Dampier Road											
4	L	82	0.0	0.044	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
5	T	347	5.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		429	4.0	0.092	1.6	NA	0.0	0.0	0.00	0.13	57.5
West: Dampier Road											
11	T	880	5.0	0.233	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R	66	0.0	0.054	9.2	LOS A	0.2	1.7	0.45	0.65	47.2
Approach		946	4.6	0.233	0.6	NA	0.2	1.7	0.03	0.05	58.9
South West: Median (RT Stage 2)											
32	R	117	0.0	0.068	3.5	LOS A	0.4	2.5	0.68	0.58	27.0
Approach		117	0.0	0.068	3.5	LOS A	0.4	2.5	0.68	0.58	27.0
All Vehicles		1675	3.7	0.233	2.6	NA	0.4	2.7	0.11	0.20	56.0

Table 8. Dampier Road Access Stage 3 – PM Peak Performance

2.6 Access Performance Summary.

Modelled performance of the site under the various scenarios is summarised on Table 9.

	Worst leg LOS	V/C (Degree of Saturation)	Maximum Delay (Seconds)
Stage 2 AM	C	0.319	13.6
Stage 2 PM	B	0.226	14.9
Stage 3 AM	D	0.441	27.2
Stage 3 PM	B	0.233	14.9

Table 9. Summary of Performance Measures - Dampier Road Access

In order to address the possible increase in traffic on Dampier Road, the critical flow period (Stage 3 AM flows) was remodelled using a variable flow scale ranging from 100% to 125%. With a 15% increase in traffic, the access intersection is still predicted to operate satisfactorily - refer Figure 9.

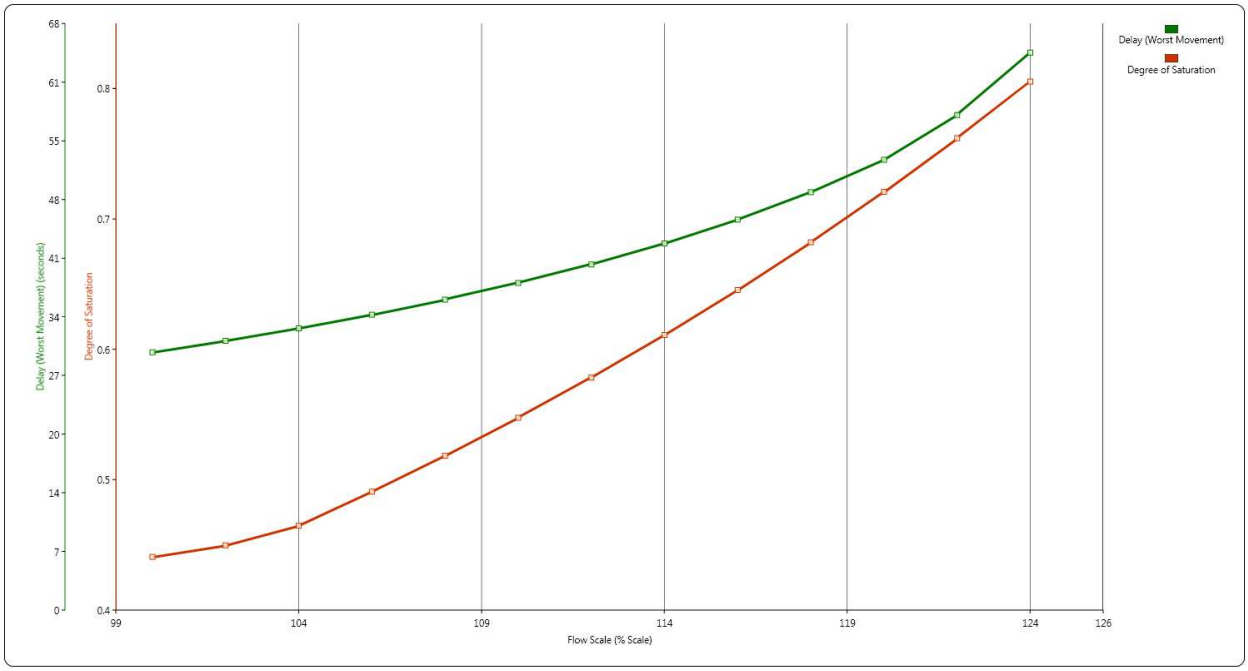

Figure 9. Dampier Road Access Stage 3 – AM Peak Variable Flow Assessment

In order to test the impact of restricted turns to and from Dampier Road and the site, the site access off Dampier Road was modelled as a left in – left out only access. The modelling indicated a shift of approximately 160 vehicles per hour from the access to the Dampier Road – Madigan Road intersection. Modelling of the Dampier Road intersection (see later section) determined that adequate spare capacity is available and the intersection would operate satisfactorily albeit with a longer average delay to vehicles moving through the intersection. In terms of providing more efficient travel time along Dampier Road, the less the delay through the Madigan Road intersection the more efficient the operation of Dampier Road becomes. As such it is considered more desirable to have unrestricted movements through the Dampier Road access as it potentially offers greater efficiency along Dampier Road.

3 Madigan Road – Dampier Road Intersection.

3.1 Basis of Assessment

Based on the traffic distribution modelling for the three scenarios outlined in section 2, the performance of the intersection of Madigan Road and Dampier Road was modelled using Sidra Intersection 5.1. Peak flows were assumed to be 10% of predicted daily flows and were added to existing traffic volumes to give estimated turning movements at the intersection. Stage 3 flows assumed residential generated traffic was in addition to existing traffic generated from the current Transient Worker Accommodation and as such is expected to

overstate actual volumes. However this provides a margin of error on future modelling and states a worst case scenario in terms of additional traffic generation. Given that Stage 3 flows present the worst case scenario, these were modelled on the basis that if the intersection performed satisfactorily under Stage 3 flows, it would perform satisfactorily under Stage 1 and 2 flows. Turning movements adopted for Stage 3 peak hour flows are shown on Figures 10 and 11.

3.2 Turning Movements

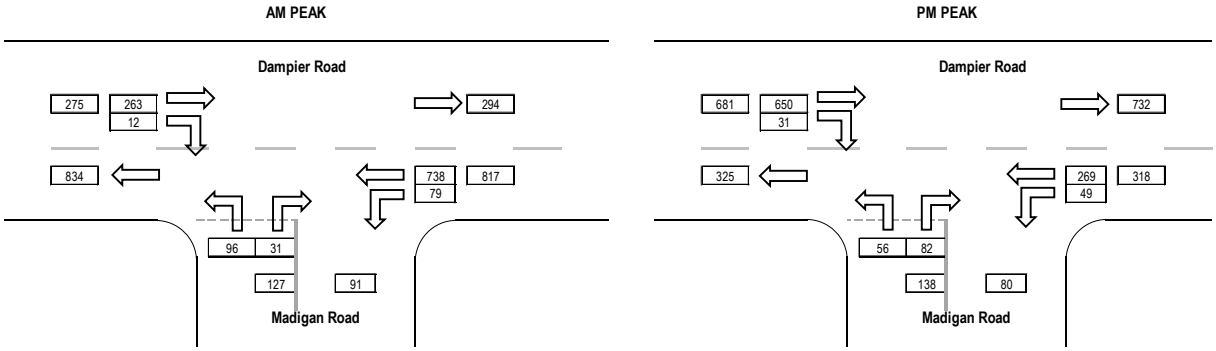

Figure 10. Current Turning Movements – Dampier Road – Madigan Road

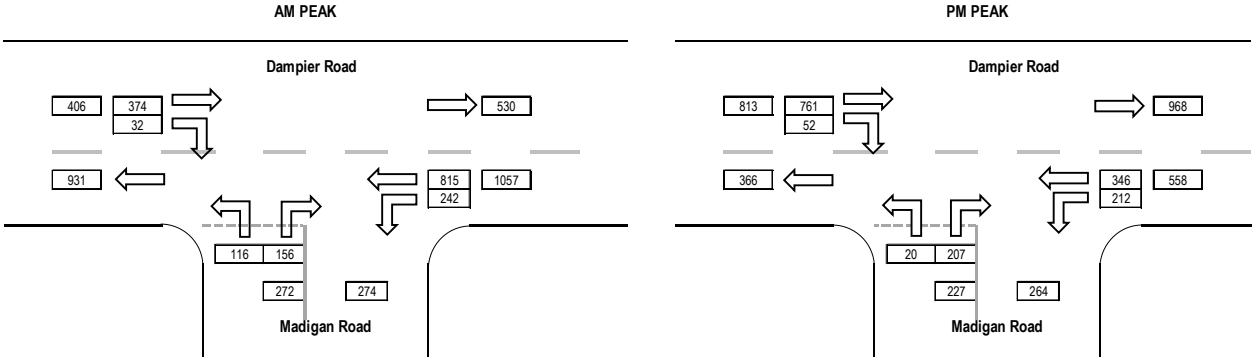

Figure 11. Stage 3 Turning Movements – Dampier Road – Madigan Road

3.3 Modelling Results

Modelling of existing AM and PM peak flows using Sidra Intersection 5.1 gave the following results.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	101	15.0	0.060	11.8	X	X	X	X	0.69	58.9
3	R	33	15.0	0.103	43.0	LOS D	0.5	3.9	0.92	0.70	33.6
Approach		134	15.0	0.103	19.4	LOS B	0.5	3.9	0.23	0.69	49.8
East: Dampier Road											
4	L	83	15.0	0.061	12.4	LOS B	0.3	2.1	0.20	0.71	57.5
5	T	775	15.0	0.628	20.2	LOS C	10.4	82.0	0.87	0.75	44.9
Approach		858	15.0	0.628	19.4	LOS B	10.4	82.0	0.81	0.75	45.9
West: Dampier Road											
11	T	277	15.0	0.107	3.0	LOS A	1.3	10.3	0.31	0.26	69.8
12	R	13	15.0	0.040	25.5	LOS C	0.2	1.8	0.82	0.69	44.2
Approach		289	15.0	0.107	4.0	LOS A	1.3	10.3	0.34	0.28	68.1
All Vehicles		1281	15.0	0.628	15.9	LOS B	10.4	82.0	0.64	0.63	50.0

Table 10. Dampier Road – Madigan Road Existing AM Peak Performance.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	59	15.0	0.035	8.0	X	X	X	X	0.60	49.8
3	R	86	15.0	0.161	25.0	LOS C	0.7	5.9	0.87	0.73	35.9
Approach		145	15.0	0.161	18.1	LOS B	0.7	5.9	0.52	0.67	40.5
East: Dampier Road											
4	L	52	15.0	0.041	9.1	LOS A	0.2	1.3	0.33	0.65	48.0
5	T	283	15.0	0.375	15.3	LOS B	2.4	19.1	0.88	0.70	39.8
Approach		335	15.0	0.375	14.4	LOS B	2.4	19.1	0.79	0.69	40.9
West: Dampier Road											
11	T	684	15.0	0.362	6.1	LOS A	3.8	30.2	0.61	0.52	48.9
12	R	33	15.0	0.064	14.6	LOS B	0.3	2.5	0.71	0.70	43.3
Approach		717	15.0	0.362	6.5	LOS A	3.8	30.2	0.61	0.53	48.6
All Vehicles		1197	15.0	0.375	10.1	LOS B	3.8	30.2	0.65	0.59	45.2

Table 11. Dampier Road – Madigan Road Existing PM Peak Performance.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	122	15.0	0.072	11.8	X	X	X	X	0.69	58.9
3	R	164	15.0	0.519	49.5	LOS D	3.1	24.5	0.99	0.77	30.8
Approach		286	15.0	0.519	33.4	LOS C	3.1	24.5	0.57	0.74	38.7
East: Dampier Road											
4	L	255	15.0	0.182	12.4	LOS B	0.9	7.1	0.20	0.72	57.5
5	T	858	15.0	0.560	17.6	LOS B	11.9	94.3	0.81	0.70	47.4
Approach		1113	15.0	0.560	16.4	LOS B	11.9	94.3	0.67	0.71	49.4
West: Dampier Road											
11	T	394	15.0	0.147	2.9	LOS A	2.0	16.0	0.30	0.25	70.1
12	R	34	15.0	0.124	30.0	LOS C	0.8	6.3	0.89	0.72	40.9
Approach		427	15.0	0.147	5.0	LOS A	2.0	16.0	0.35	0.29	66.4
All Vehicles		1826	15.0	0.560	16.4	LOS B	11.9	94.3	0.58	0.61	50.3

Table 12. Dampier Road – Madigan Road – Stage 3 AM Peak Performance.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	80	15.0	0.047	8.0	X	X	X	X	0.60	49.8
3	R	218	15.0	0.320	37.9	LOS D	3.6	28.2	0.91	0.78	29.6
Approach		298	15.0	0.320	29.9	LOS C	3.6	28.2	0.66	0.73	33.3
East: Dampier Road											
4	L	223	15.0	0.165	8.6	LOS A	0.8	6.2	0.20	0.65	48.7
5	T	364	15.0	0.294	20.8	LOS C	5.1	39.9	0.79	0.65	36.4
Approach		587	15.0	0.294	16.2	LOS B	5.1	39.9	0.57	0.65	40.3
West: Dampier Road											
11	T	801	15.0	0.317	6.1	LOS A	6.4	50.2	0.47	0.41	49.5
12	R	55	15.0	0.075	14.4	LOS B	0.7	5.7	0.53	0.71	43.4
Approach		856	15.0	0.317	6.6	LOS A	6.4	50.2	0.47	0.43	49.1
All Vehicles		1741	15.0	0.320	13.8	LOS B	6.4	50.2	0.54	0.55	42.5

Table 13. Dampier Road – Madigan Road – Stage 3 PM Peak Performance.

In order to test the sensitivity of the modelling, a variable flow scale of +50% was applied to the largest flow period (AM Peak) and critical performance measures graphed (see Figure 12). This indicated that delay on the worst leg of the intersection would not change significantly and while the degree of saturation would increase with increased traffic flows, the intersection would not reach saturation.

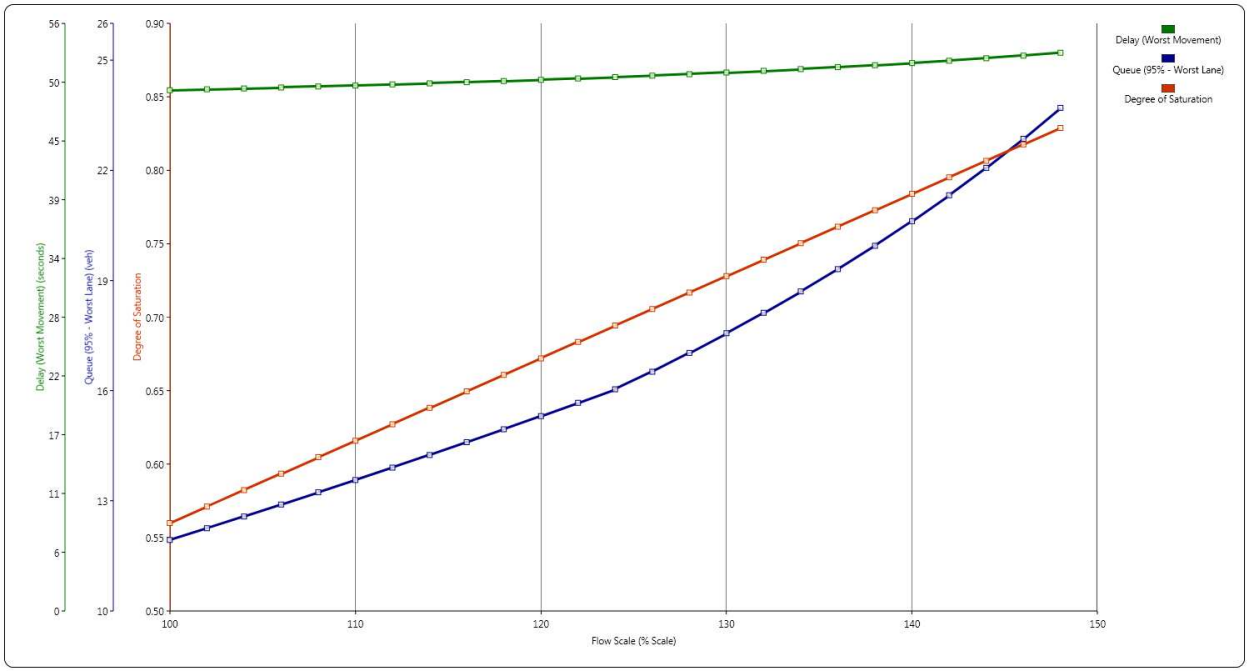

Figure 12. Impact of increased flows on the Intersection of Madigan Road and Dampier Road

Should all access be off Madigan Road, flows through the intersection would significantly increase and while the signalised intersection would likely accommodate the additional flows, it is expected that delays and queue lengths would be measurably higher compromising the efficiency of the intersection.

4 Parking.

It is anticipated that parking would be provided in accordance with the City of Karratha Town Planning Scheme 5 (TPS 5), and depending on the final detail of component land uses may vary from 1 bay for every 20 m^2 (NLA) for shops to 1 bay for every 100 m^2 (NLA) for warehouses. Given that the land use is likely to be best categorised as 'Bulky goods retail' it is considered that parking demand is most appropriately estimated under a land use category of 'Showroom'. Based on the TPS 5 requirement (1 bay for every 50 m^2 NLA), likely demand is estimated as shown on Table 14.

Land use	Stage 1	Stage 2	Stage 3	Total
Bulky Goods.	31,120 m^2	19,300 m^2		50,420 m^2
Residential dwellings.			350 dwelling units	350 dwelling units
Assumed NFA (85% GFA)	26,450 m^2	16,400 m^2		42,850 m^2
Bays	530	328	N/A	858

Table 14. Estimated Parking Requirements

5 Conclusion

Review of the proposed development of the Karratha Bulky Goods site located on the south side of Dampier Road to the west of Madigan Road indicates that the site has the potential to generate between 2,670 vehicles per day (Stage 1) and 7,100 vehicles per day (Stage 3).

Based on likely desire lines and access points on Dampier Road and Madigan Road, the additional traffic with ultimate development could increase flows on Dampier Road by between 1,420 and 5,320 vehicles per day and 355 vehicles per day on Madigan Road. Should access not be provided on Dampier Road, flows on Madigan Road could increase by in excess of 5,500 vehicles per day.

Based on a primary access point on Dampier Road and a secondary access point on Madigan Road, modelling indicates that under peak flows expected following completion of the Stage 3 development, both the intersection of Dampier Road and the Access Road and Dampier Road and Madigan Road would be expected to function satisfactorily.

Sensitivity analysis indicates that the Madigan Road - Dampier Road intersection would still function satisfactorily should flows increase by up to 50% over and above those modelled. Similarly, it is expected that the Dampier Road – Access Road intersection would continue to function satisfactorily with an increase in flows by up to 25%.

Should access not be provided on Dampier Road, additional traffic would be directed to the intersection of

Dampier Road and Madigan Road increasing the stress on the signalised intersection and increasing travel time for traffic moving along Dampier Road. Increased delays are considered to be undesirable, particularly for larger haulage vehicles using the road.

6 Recommendation.

Based on the assessment of the different scenarios the following is recommended:

1) That the development be supported on the basis of traffic assessment as:
    a. modelling of the various stages of development confirm that the road network can cater for predicted flows without unacceptable adverse impacts being experienced; and
    b. sensitivity modelling demonstrates that if the proposed access is not approved it would result in compromised efficiency of the signalled intersection of Madigan Road and Dampier Hwy.
2) That although the Stage 1 development indicates all access from Madigan Road, the provision of a second access off Dampier Road as part of the Stage 2 development is agreed to in principle.
3) That given the desirability in optimising efficiencies along Dampier Road, the provision of an unrestricted access from the site to and from Dampier Road is supported in favour of a left in – left out access.

APPENDIX 5

TRAFFIC TECHNICAL NOTE 2014

ROWEGROUP

Subject:	Karratha Bulky Goods Stage 1
Date:	02/09/14
Author:	T Shaw
Attention:	M Marcello

The amended proposal for stage 1 of the Karratha Bulky Goods access configuration (Stage 1) was modelled using QRS II with the result shown on Figure 1. This indicates daily flows of about 2,600 vpd entering and exiting the site via an access onto Madigan Road. Daily flows from the development are shown on Figure 1 while typical peak hour turning movements are shown on Figure 2.

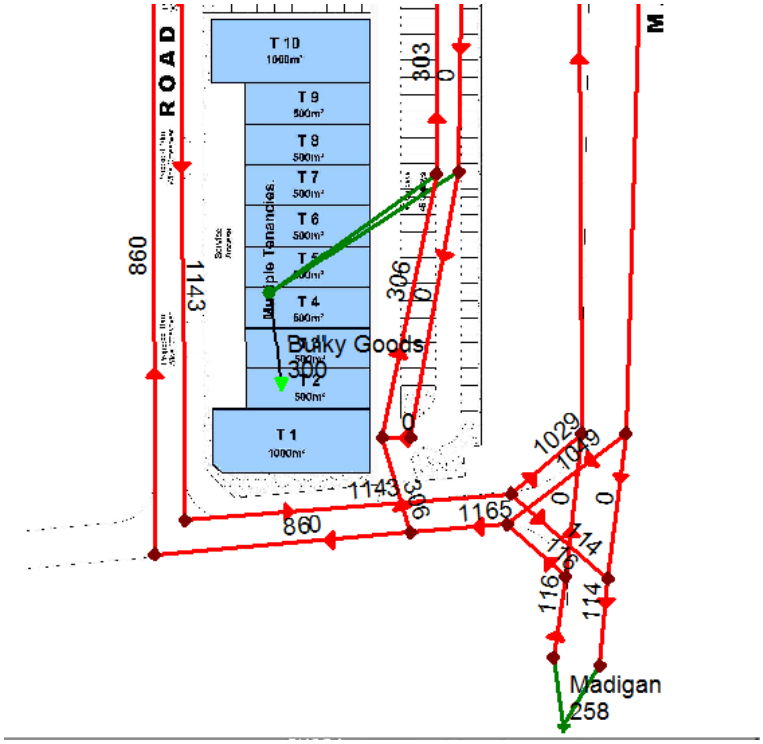

Figure 1 Stage 1 Access Flows

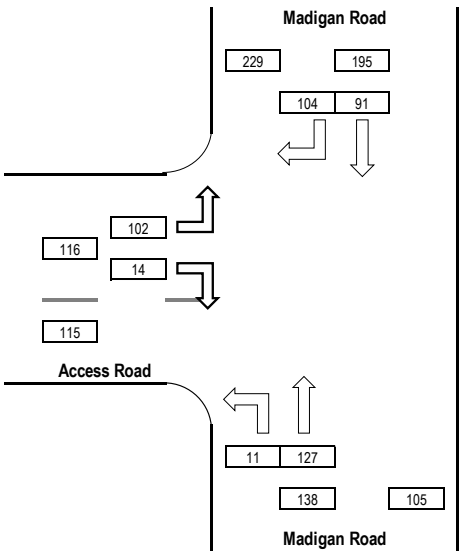

Figure 2 Typical Peak turning Movements

Sidra Intersection 5.1 was used to model the performance of the intersection under design flows and the results are shown on Figure 3. This indicates that the intersection will operate at a high level of service with minimal delay and negligible queuing.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	12	5.0	0.009	8.1	LOS A	0.0	0.3	0.21	0.55	48.6
2	T	134	5.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		145	5.0	0.035	0.6	NA	0.0	0.3	0.02	0.04	58.9
North: Madigan Road											
8	T	96	5.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	109	5.0	0.087	8.8	LOS A	0.4	2.6	0.25	0.62	47.9
Approach		205	5.0	0.087	4.7	NA	0.4	2.6	0.13	0.33	52.9
West: Access											
10	L	107	5.0	0.142	8.4	LOS A	0.4	2.9	0.26	0.59	48.4
12	R	15	5.0	0.028	11.9	LOS B	0.1	0.7	0.48	0.70	45.4
Approach		122	5.0	0.142	8.8	LOS A	0.4	2.9	0.28	0.60	48.0
All Vehicles		473	5.0	0.142	4.5	NA	0.4	2.9	0.14	0.31	53.1

Figure 3 Madigan Road – Access Road Performance.

It is intended to provide entry only to a carpark from the Access Road at a point located approximately 30 metres west of the Madigan Road – Access Road intersection. This intersection was also modelled using sidra Intersection 5.1 to ascertain whether or not queuing of right turn traffic would extend east to the point where it posed a hazard to traffic entering the Access Road from Madigan Road. Modelling indicated an average delay of 9 seconds for traffic turning right from the access road into the carpark with a 95% back of queue of less than one vehicle. As such, no impact on the operation of the Access Road – Madigan Road intersection is predicted.

APPENDIX 6

TRAFFIC TECHNICAL NOTE 2015

ROWEGROUP

Subject:	Karratha Bulky Goods Stage 1
Date:	17/04/15
Author:	T Shaw
Attention:	M Marcello

The amended proposal for stage 1 of the Karratha Bulky Goods access configuration (Stage 1) was modelled using QRS II in September 2014, with the result shown on Figure 1. This indicated daily flows of about 2,300 vpd entering and exiting the site via an access onto Madigan Road. Daily flows from the development are shown on Figure 1 while typical peak hour turning movements are shown on Figure 2.

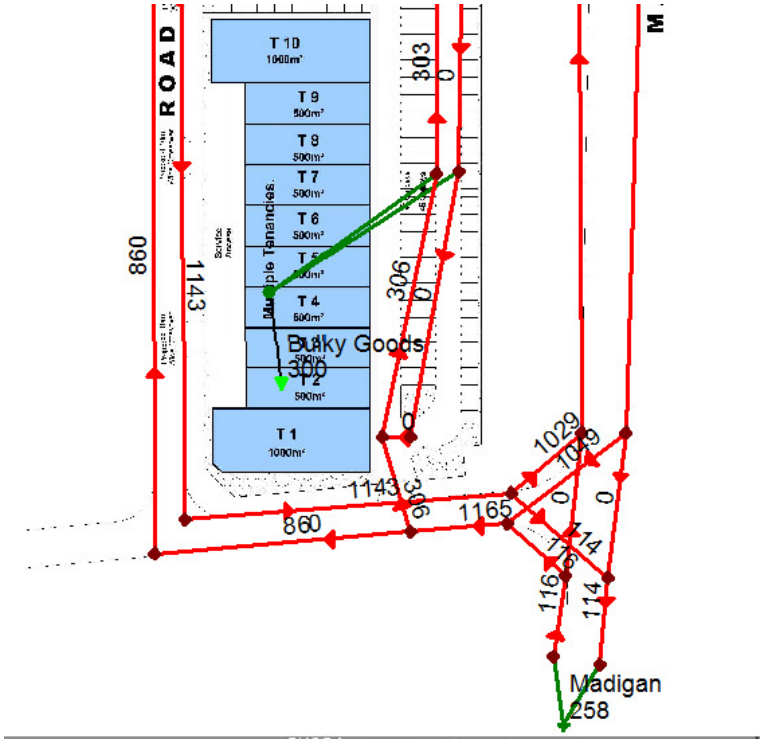

Figure 1 Stage 1 Access Flows

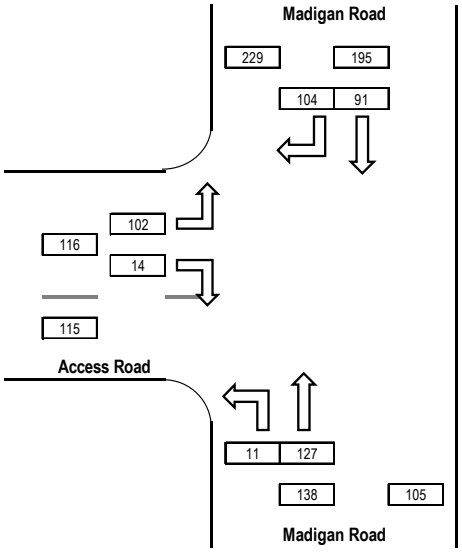

Figure 2 Typical Peak turning Movements

Sidra Intersection 5.1 was used to model the performance of the intersection under design flows and the results are shown on Figure 3. This indicated that the intersection will operate at a high level of service with minimal delay and negligible queuing.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	12	5.0	0.009	8.1	LOS A	0.0	0.3	0.21	0.55	48.6
2	T	134	5.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		145	5.0	0.035	0.6	NA	0.0	0.3	0.02	0.04	58.9
North: Madigan Road											
8	T	96	5.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	109	5.0	0.087	8.8	LOS A	0.4	2.6	0.25	0.62	47.9
Approach		205	5.0	0.087	4.7	NA	0.4	2.6	0.13	0.33	52.9
West: Access											
10	L	107	5.0	0.142	8.4	LOS A	0.4	2.9	0.26	0.59	48.4
12	R	15	5.0	0.028	11.9	LOS B	0.1	0.7	0.48	0.70	45.4
Approach		122	5.0	0.142	8.8	LOS A	0.4	2.9	0.28	0.60	48.0
All Vehicles		473	5.0	0.142	4.5	NA	0.4	2.9	0.14	0.31	53.1

Figure 3 Madigan Road – Access Road Performance.

It is intended to provide entry only to a carpark from the Access Road at a point located approximately 30 metres west of the Madigan Road – Access Road intersection. This intersection was also modelled using Sidra Intersection 5.1 to ascertain whether or not queuing of right turn traffic would extend east to the point where it posed a hazard to traffic entering the Access Road from Madigan Road. Modelling indicated an average delay of 9 seconds for traffic turning right from the access road into the carpark with a 95% back of queue of less than one vehicle. As such, no impact on the operation of the Access Road – Madigan Road intersection is predicted.

Subsequent to the September Report, the land owner of the adjoining Transient Workforce Accommodation (TWA) raised concerns that the assessment did not consider the current traffic generated by the TWA or any future expansion of the TWA which has a current approval in place for up to 1,276 persons. The Local Authority voiced concern that should Stage 2 of the proposal not be taken up for some time and access rely on the existing access used by the TWA to Madigan Road then assessment of the intersection under that scenario should be undertaken to confirm its adequacy.

Given that the TWA caters largely for fly in fly out workers, it is expected that about 80% of persons accommodated in the TWA will travel to various sites via a private bus service (assumed occupancy of 48) while the remaining 20% will travel via private vehicle (assumed average occupancy 1.5). It has been assumed that the bus service will be coordinated with the start and end of shifts such that all services travel loaded (i.e. a bus arriving with workers for finishing shift will then depart with workers from the start shift). All staff are assumed to arrive and depart during the assessed peak hour periods.

On that basis the maximum expected traffic flow generated by the site is as shown below. (Note, to build in a safety factor, the private vehicle trips assume a max of 30% of residents will use a private car)

Personnel	Trips	Private vehicles (AM out)	Private vehicles (AM in)	Bus (AM out)	Bus (AM in)
1,276	255	155	100	18	18
Personnel	Trips	Private vehicles (PM out)	Private vehicles (PM in)	Bus (AM out)	Bus (AM in)
1,276	255	100	155	18	18

Based on the above assessment, peak movements through the intersection are expected to be in the order of that shown below.

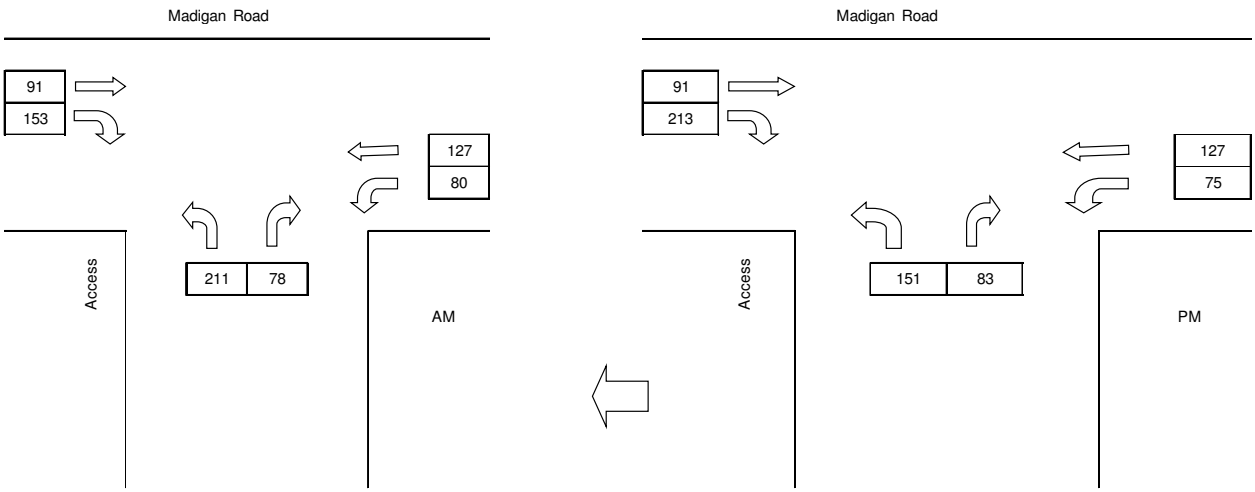

Figure 4 Predicted Volumes

Assessment of the predicted volumes using Sidra 5.1 gave the following results.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	84	5.0	0.069	8.4	LOS A	0.3	2.0	0.27	0.58	48.3
2	T	134	5.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		218	5.0	0.069	3.2	NA	0.3	2.0	0.11	0.22	54.8
North: Madigan Road											
8	T	96	5.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	161	5.0	0.127	8.9	LOS A	0.5	4.0	0.25	0.62	47.9
Approach		257	5.0	0.127	5.6	NA	0.5	4.0	0.16	0.39	51.8
West: Access											
10	L	222	5.0	0.297	8.7	LOS A	0.9	6.8	0.32	0.62	48.0
12	R	82	5.0	0.178	13.9	LOS B	0.7	5.1	0.57	0.83	43.6
Approach		304	5.0	0.297	10.1	LOS B	0.9	6.8	0.39	0.67	46.8
All Vehicles		779	5.0	0.297	6.7	NA	0.9	6.8	0.23	0.46	50.4

Figure 5 AM Peak performance (30% Private Vehicles)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	79	5.0	0.069	8.6	LOS A	0.3	2.0	0.33	0.60	48.0
2	T	134	5.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		213	5.0	0.069	3.2	NA	0.3	2.0	0.12	0.22	54.9
North: Madigan Road											
8	T	96	5.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	224	5.0	0.177	8.9	LOS A	0.8	5.8	0.27	0.63	47.8
Approach		320	5.0	0.177	6.2	NA	0.8	5.8	0.19	0.44	50.9
West: Access											
10	L	159	5.0	0.213	8.6	LOS A	0.6	4.6	0.30	0.61	48.1
12	R	87	5.0	0.210	15.1	LOS C	0.8	5.9	0.61	0.86	42.5
Approach		246	5.0	0.213	10.9	LOS B	0.8	5.9	0.41	0.70	46.0
All Vehicles		779	5.0	0.213	6.9	NA	0.8	5.9	0.24	0.46	50.2

Figure 6 PM Peak performance(30% Private Vehicles)

The intersection is predicted to operate at good levels of service both in the AM and PM peak periods.

Should the percentage of persons accommodated in the TWA travelling to various sites via a private bus service (assumed occupancy of 48) decrease to 60% with 40% travelling via private vehicle (assumed average occupancy 1.5 persons) it is expected that the maximum traffic flow generated by the site would be as shown below.

Personnel	Trips	Private vehicles (AM out)	Private vehicles (AM in)	Bus (AM out)	Bus (AM in)
1,276	340	200	140	16	16
Personnel	Trips	Private vehicles (PM out)	Private vehicles (PM in)	Bus (AM out)	Bus (AM in)
1,276	340	140	200	16	16

Based on the above assessment, peak movements through the intersection were modelled using Sidra software and gave the following results.

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	93	5.0	0.078	8.5	LOS A	0.3	2.3	0.30	0.59	48.1
2	T	134	5.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		226	5.0	0.078	3.5	NA	0.3	2.3	0.12	0.24	54.5
North: Madigan Road											
8	T	96	5.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	193	5.0	0.152	8.9	LOS A	0.7	4.8	0.26	0.62	47.9
Approach		288	5.0	0.152	5.9	NA	0.7	4.8	0.17	0.42	51.3
West: Access											
10	L	254	5.0	0.339	8.8	LOS A	1.1	8.0	0.34	0.62	48.0
12	R	96	5.0	0.220	14.7	LOS B	0.9	6.3	0.60	0.86	42.9
Approach		349	5.0	0.339	10.4	LOS B	1.1	8.0	0.41	0.69	46.5
All Vehicles		864	5.0	0.339	7.1	NA	1.1	8.0	0.26	0.48	50.0

Figure 7 AM Peak performance (40% Private Vehicles)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Madigan Road											
1	L	137	5.0	0.143	9.6	LOS A	0.6	4.2	0.46	0.69	47.3
2	T	198	5.0	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		335	5.0	0.143	3.9	NA	0.6	4.2	0.19	0.28	54.0
North: Madigan Road											
8	T	142	5.0	0.038	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R	379	5.0	0.319	9.4	LOS A	1.6	11.6	0.37	0.66	47.4
Approach		520	5.0	0.319	6.8	NA	1.6	11.6	0.27	0.48	50.3
West: Access											
10	L	282	5.0	0.390	9.7	LOS A	1.6	11.3	0.43	0.70	47.5
12	R	142	5.0	0.579	31.3	LOS D	3.0	22.2	0.86	1.11	32.3
Approach		424	5.0	0.579	17.0	LOS C	3.0	22.2	0.57	0.83	41.1
All Vehicles		1279	5.0	0.579	9.4	NA	3.0	22.2	0.35	0.55	47.6

Figure 8 PM Peak performance (40% Private Vehicles)

The intersection is predicted to operate at good levels of service both in the AM and PM peak periods.

Notwithstanding this, a sensitivity analysis was also undertaken on the worst performing period (PM Peak) by adjusting the model flow scale using an assumed private car usage of 30% and this gave the following result.

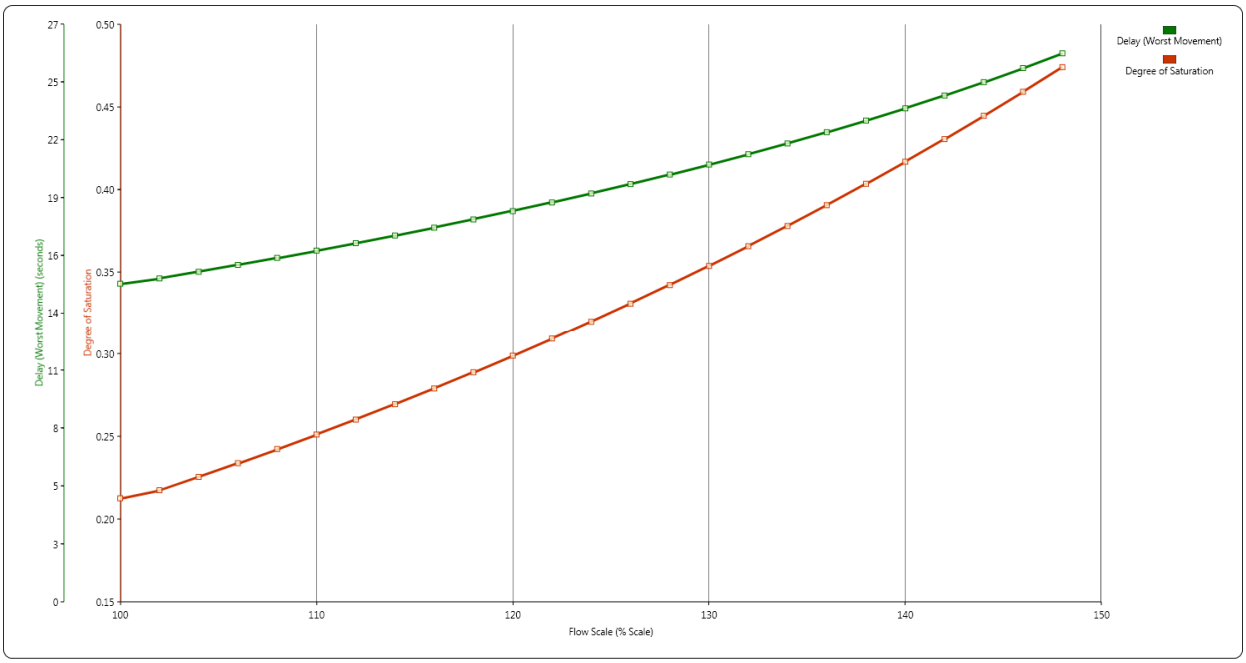

Figure 9 Performance under a Variable Flow Scale

This confirms that with a 50% increase in total traffic entering the intersection, it is expected that the worst delay would move from 15 seconds to 27 seconds, the degree of saturation from 0.21 to 0.46 and the Level of Service on the worst leg (right turn from the Access Road) from "C" to "D". Under these conditions the performance of the intersection remains within an acceptable level.

Conclusion.

Based on the assessment carried out it is concluded that the access from the site onto Madigan Road will operate at an acceptable level of service and without unacceptable delays or congestion. The assessment has considered not only traffic from the proposed development but also traffic potentially generated from the full development of the existing Transient Workers Accommodation. As such, the assessment is considered to represent a worst case scenario. Notwithstanding this, a sensitivity analysis was carried out on a range of flows scaled from 100% to 150% and this confirmed a significant level of capacity on the intersection. As such there is confidence that the intersection will not become oversaturated and flows unstable in the unlikely event that worst case traffic volumes are realised.

APPENDIX 7

LOT 521 MADIGAN RD, KARRATHA BULKY GOODS SITE
DRAINAGE CHANNEL ADVICE

ROWEGROUP

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To :	*Cossill & Webley*	**Date :**	22 June 2012
Attention :	*Peter Connell*	**Our Ref :**	J5201a
Email :	*Peterc@cosweb.com.au*	**Pages :**	4
cc :			

LOT 521 MADIGAN RD, KARRATHA
BULKY GOODS SITE DRAINAGE CHANNEL ADVICE

Peter,

Please find below summary report prepared by JDA Consultant Hydrologists providing hydrological advice for the proposed drainage channel within Lot 521 Madigan Rd, Karratha, herein referred to as the Study Area. The report is presented in the following sections:

- Background
- Catchment Hydrology
- Seven Mile Creek 100yr ARI Flood Level
- Drainage Channel Design

Background

The Study Area is located at the south west corner of Dampier Highway and Madigan Road intersection as shown Figure 1. JDA understand that a drainage channel is required to be constructed to service development of the area for a proposed Bulky Goods Site and MAC Services workers accommodation.

Hydrological advice for the design of the drainage channel is required to determine the width and depth of the channel to contain the critical 100yr ARI storm event taking into account any external catchments and the downstream receiving environment of Seven Mile Creek.

Note that this report does not include an assessment of the existing drainage reserves located along the northern and eastern boundaries of the Study Area that service runoff from Dampier Highway and Madigan Road respectively.

Catchment Hydrology

The contributing catchment areas for the drainage channel are presented in Figure 1. This includes the MAC services area to the south of the drainage channel and approximately 75% of the future industrial areas to the north and east. The total catchment area for the drainage channel is approximately 27.2 ha with no contributing external catchments. Runoff from the Pluto Camp to the south of the Study Area is contained within its own area and discharged to the west into Seven Mile Creek.

Estimated peak 100 yr ARI flows to the drainage channel were calculated using XP-Storm on the catchments supplied by Cossill & Webley. The design storms were calculated internally by the model with reference to the methodology in Australian Rainfall & Runoff (AR&R) (Institution of Engineers Australia, 2001). The rainfall temporal pattern was assumed to be spatially uniform across the catchment with storm durations ranging from 5 minutes to 72 hours.

XP-Storm modelling produced a peak 100yr ARI flow of 10.3 m^3/s with the following parameters:

- Critical storm being the 100yr ARI 1 hour
- Runoff assumed from 90% of the catchment area (24.5 ha)
- Initial Loss of 5mm
- Mannings 'n' value of 0.018
- Catchment slope of 1%

The Rational Method of flow estimation from Australian Rainfall & Runoff (AR&R) (Institution of Engineers Australia, 2001) was also used to confirm the peak flow estimate from XP-Storm. The Rational Method produced a similar estimated peak 100yr ARI flow of 8.3 m^3/s using the following parameters:

- Runoff assumed from 90% of the catchment area (24.5 ha)
- Main stream length of 0.9 km

Seven Mile Creek 100yr ARI Flood Level

Outflow from the Study Area drainage channel flows westwards towards Seven Mile Creek.

Previous flood modelling of Seven Mile Creek was performed by GHD (2009) and indicated the 100yr ARI floodplain extended partly in to the western portion of the Study Area at a level of 10.4 mAHD.

Further flood modelling has also been performed by JDA et. al. (2011) in the Draft Karratha Coastal Vulnerability Study to assess the impacts of future climate change, calculation of the hydrology, assessment of the shoreline stability, modelling of the flooding from storm surge and modelling of riverine flooding in Karratha.

Advice from the Department of Water (DoW) indicates that the modelling scenario to be adopted for planning purposes is the 100 yr ARI current climate rainfall (2010) together with 20 yr ARI 2110 storm surge scenario. For this scenario, the 100yr ARI floodplain extent is similar to GHD (2009) with a flood level of 10.6 mAHD (Figure 1).

This flood level has been conservatively adopted as the initial backwater condition in the drainage channel modelling.

Note that the DoW's Floodplain Management Strategy specifies that to ensure adequate flood protection is provided to development located outside of the 100yr ARI floodplain, a minimum building floor level of 0.50 metre above the adjacent 100yr ARI flood level is recommended. This is also recommended in the Shire of Roebourne's Stormwater Design Guidelines.

Drainage Channel Design

Preliminary design drawings indicate the drainage channel is located within a 25m wide drainage reserve. The drainage channel was modelled in XP-Storm with dimensions and inverts obtained from Cossill & Webley (Drawing 6105-00-SK02), with schematic cross section presented in Figure 1.

The invert of the drainage channel outlet at the western lot boundary is 8.5 mAHD.

However note that topographic data currently indicates that there is an approximately 1.5m high man made bund/spoil at this drainage outlet location that crosses the property boundary and may impede drainage channel function. For the purposes of this drainage modelling and to ensure the outlet of the drainage channel functions efficiently on site, it is assumed that this bund/spoil is removed and the area is graded consistent with surrounding natural surface levels.

Notwithstanding the above, if the bund/spoil is not removed, discharge from the drainage channel can still flow north around the bund/spoil and towards Seven Mile Creek as there is sufficient existing natural grade to facilitate this. However, this flow is required to pass through the south west corner of the currently vacant "Possible Future Expansion Site" within the Study Area which may affect future development of this area.

The drainage channel was modelled with the Seven Mile Creek 100yr ARI flood level of 10.6 mAHD to determine maximum food levels in the channel and with a free outfall to determine maximum velocity.

Results from the 100yr ARI modelling indicate that the flood depth in the channel ranges from approximately 0.42m upstream to 2.10m downstream, within the proposed channel design depth. Note that both the DoW and Shire of Roebourne recommend a minimum building floor level of 0.50 metre above the adjacent 100yr ARI flood level.

Maximum velocity at the downstream section of the channel is 2.7m/s, exceeding the Shire of Roebourne's recommended 2.0m/s maximum velocity for erosion control. Erosion and sedimentation transport control measures such as drop structures and rock armouring should be adopted to reduce velocities.

The section of the drainage channel highlighted as 'Possible Drainage Design Refinement', as shown on Figure 1, represents an area where the Seven Mile Creek 100yr ARI backwater has less of an impact. Therefore there is an opportunity to reduce the width of the drainage channel to maintain 100yr ARI flood depths of approximately 1m. However, this will increase adjacent finished Lot levels to maintain the 0.50m clearance to the 100 yr ARI flood level in accordance with DoW and Shire of Roebourne policies.

References

GHD (July, 2009) *Report for Karratha Support Industry Flood Study – Modelling Report* for LandCorp.

JDA et.al. (Nov 2011) *Draft Karratha Coastal Vulnerability Study* for LandCorp.

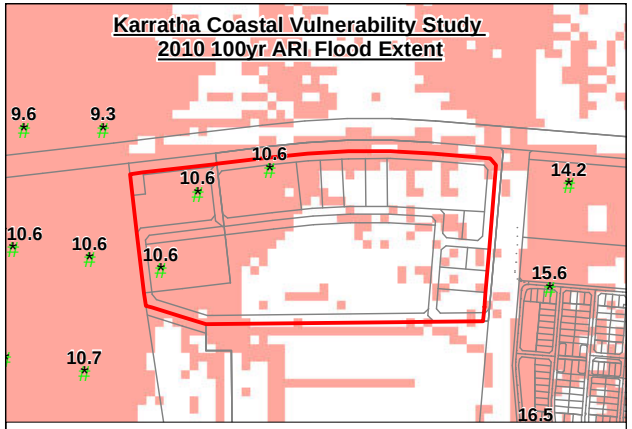
Institute of Engineers, Australia (2001) Australian Rainfall & Runoff

Should you have any queries on the above, please do not hesitate to contact Matthew Yan or Damien Slack.

Regards,

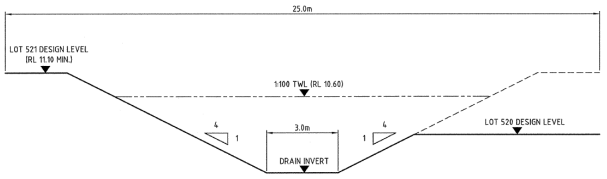
JDA CONSULTANT HYDROLOGISTS

Karratha Coastal Vulnerability Study
2010 100yr ARI Flood Extent



JDA et al. 2011 — Flood Elevation (mAHD)

Modelled Drainage Channel Cross Section

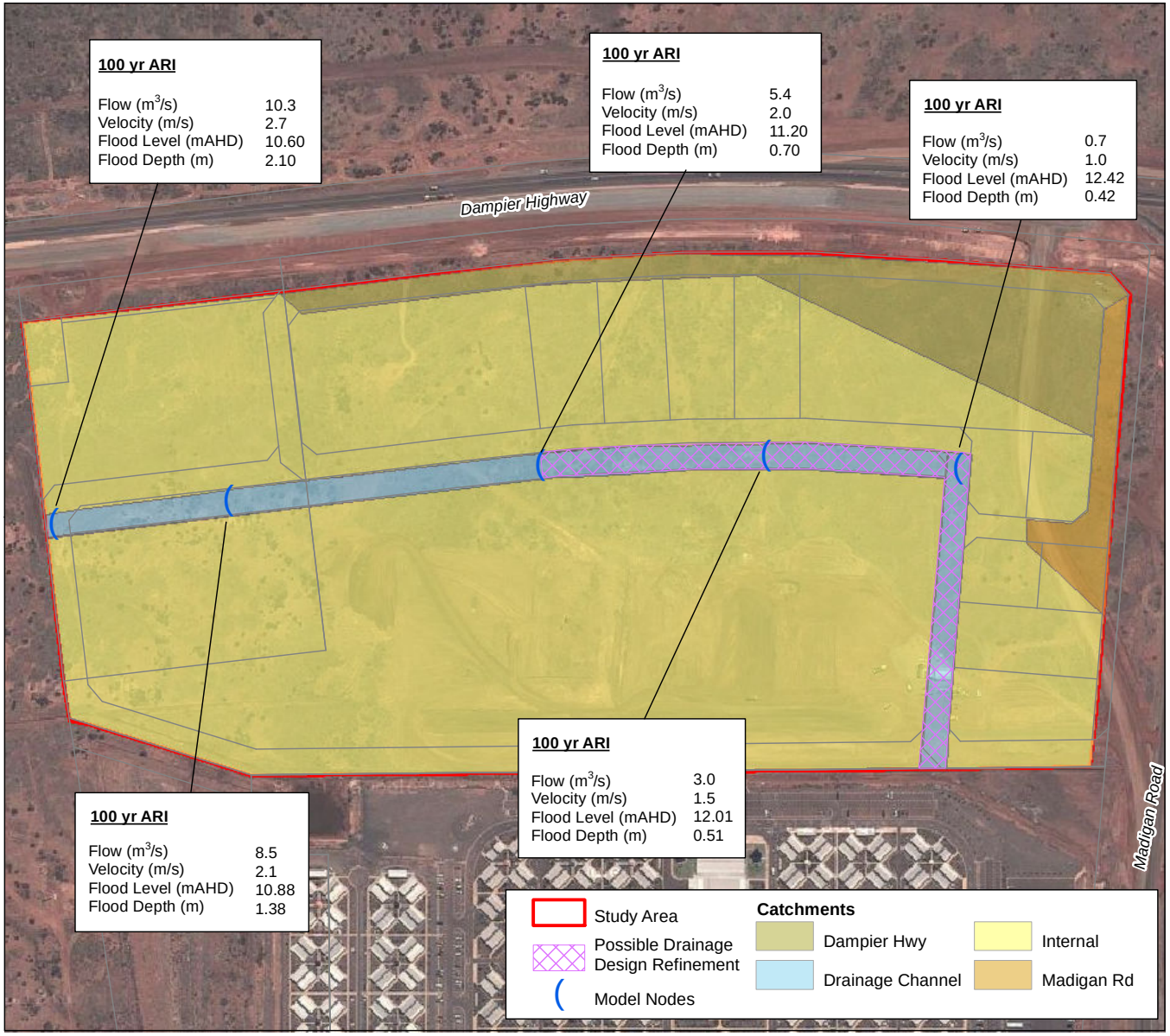


Adapted from Cossill & Webley DWG: 6105-00-SK02

Internal Catchment & Modelling Details

Total Area (ha)	27.2
Equivalent Impervious Area (ha)	24.5
Initial Loss (mm)	5.00
Critical Storm Duration (hrs)	1
Drain Manning's Roughness	0.018

Note:
Maximum Flow modelled with Seven Mile Creek Flood Level of 10.6 mAHD.
Maximum Velocity modelled assuming free outfall.



JDA Consultant Hydrologists

Job No. J5201
Scale: 1:5,000

0 100 200 300 400 500 Meters

Cossill & Webley
Lot 521 Madigan Rd, Karratha - Drainage Channel Advice
Figure 1: Location Plan & Drainage Design

APPENDIX 8

ASSESSMENT OF MARKET POTENTIAL

ROWEGROUP

Karratha Homemaker Centre, WA

Assessment of market potential

June 2014

DRAFT

MacroPlanDimasi

MacroPlan Dimasi

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Prepared for: LandCorp

MacroPlan Dimasi staff responsible for this report:

Tony Dimasi, Managing Director – Retail

Denis Chung, Senior Consultant

Rosalie Loong, Analyst

Table of contents

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Executive summary

i. Karratha is the largest city in the Pilbara region of Western Australia, located approximately 1,500 km north of Perth. The city services the accommodation and administrative needs of the major resource projects in the region, as well as the shopping needs of local and broader region residents, workers and businesses.

ii. Karratha is planned for substantial growth, underpinned by the resources sector, but also through broader revitalisation initiatives proposed for the region, in particular the *Karratha City of the North Plan,* which plans for an aspirational target population of 50,000 permanent residents for the city.

iii. The proposed Karratha Homemaker Centre is located on the south-western corner of Dampier and Madigan Roads, approximately 7 km west of the Karratha City Centre, and will have excellent visibility and be easily accessible for both local and broader-area residents.

iv. The defined Karratha trade area population is estimated at 55,580 residents, including 26,630 residents in the primary sector. This population is projected to reach around 65,700 residents by 2021 and around 71,600 residents by 2026, reflecting an average annual growth rate of 2.1% over the period to 2026.

v. The Karratha trade area population is dominated by traditional families in their early to mid life stages, who earn high income levels and are attracted by the employment opportunities in the mining and related sectors.

vi. Trade area spending per person is well above average across most retail categories, including by around 18% across the homemaker goods categories. The total homemaker goods market in the Karratha trade area is estimated at $178 million in 2014, and is expected to increase in real terms to $249 million by 2026, reflecting average annual real growth of 2.9% in the trade area.

vii. The provision of bulky goods retail facilities in Karratha and in the broader region at present is very limited, both in terms of quantum of floorspace, and even more so, in terms of quality of the offer.

viii. Given the size of Karratha, and its growth profile, and given also the regional role which Karratha plays and is intended to play increasingly in the future, there is a therefore need for a dedicated, high quality homemaker/bulky goods shopping alternative to be provided within the town.

ix. Based on our market share assessment, potential sales for the Karratha Homemaker Centre are estimated at around $90 million. The centre is projected to capture around 33%-35% of the available homemaker/bulky goods expenditure across the trade area, with that share increasing to 50% of primary sector spending.

x. The estimated sales volume for the centre would be able to be achieved through a provision of floorspace in the order of 23,000–25,000 sq.m (applying an appropriate retail turnover density for the centre).

xi. The homemaker centre will not replace the retail goods provided in the great majority of City Centre retailers, which are focused around food & convenience, clothing & footwear, retail services, and a limited provision of household goods. The role and ability to grow of the Karratha City Centre therefore would not be reduced, following the proposed addition of the homemaker centre.

xii. The new homemaker centre would result in job creation both during construction and the ongoing operation of the centre, helping to achieve the aspirations of Karratha into a more diversified economy.

xiii. The homemaker centre will help to improve the quality of life for Karratha residents. The provision of a good range of homemaker/bulky goods shopping facilities, conveniently located on the major highway, will further add to the appeal of Karratha as a place to live.

xiv. The creation of the proposed homemaker centre will also strengthen the regional role of Karratha, throughout the Pilbara. By providing a one-stop facility for big ticket comparison shopping items for the home, the new homemaker centre will attract residents not just from Karratha but also from the balance of the Pilbara, including to some degree from Hedland.

Introduction

This report presents an independent assessment of the need and demand for a proposed homemaker/bulky goods centre at Karratha in Western Australia. The report also examines the likely impacts of such a centre on the Karratha City Centre.

The report is presented in four sections as follows:

- **Section 1** examines the location and economic context of Karratha, the broader region of significance for the proposed centre, and the recent trends in bulky goods retailing.
- **Section 2** examines the trade area which is likely to be served by the proposed Karratha Homemaker Centre, including current and projected population and retail spending levels within the trade area. An assessment of the transient (i.e. fly in-fly out) population in Karratha is also provided, as part of the total need and demand assessment.
- **Section 3** addresses the competitive environment within which the proposed Karratha Homemaker Centre will operate.
- **Section 4** presents our assessment of the potential tenancy mix and estimated sales potential for the Karratha Homemaker Centre, as well as the likely benefits for Karratha and impacts on the Karratha City Centre.

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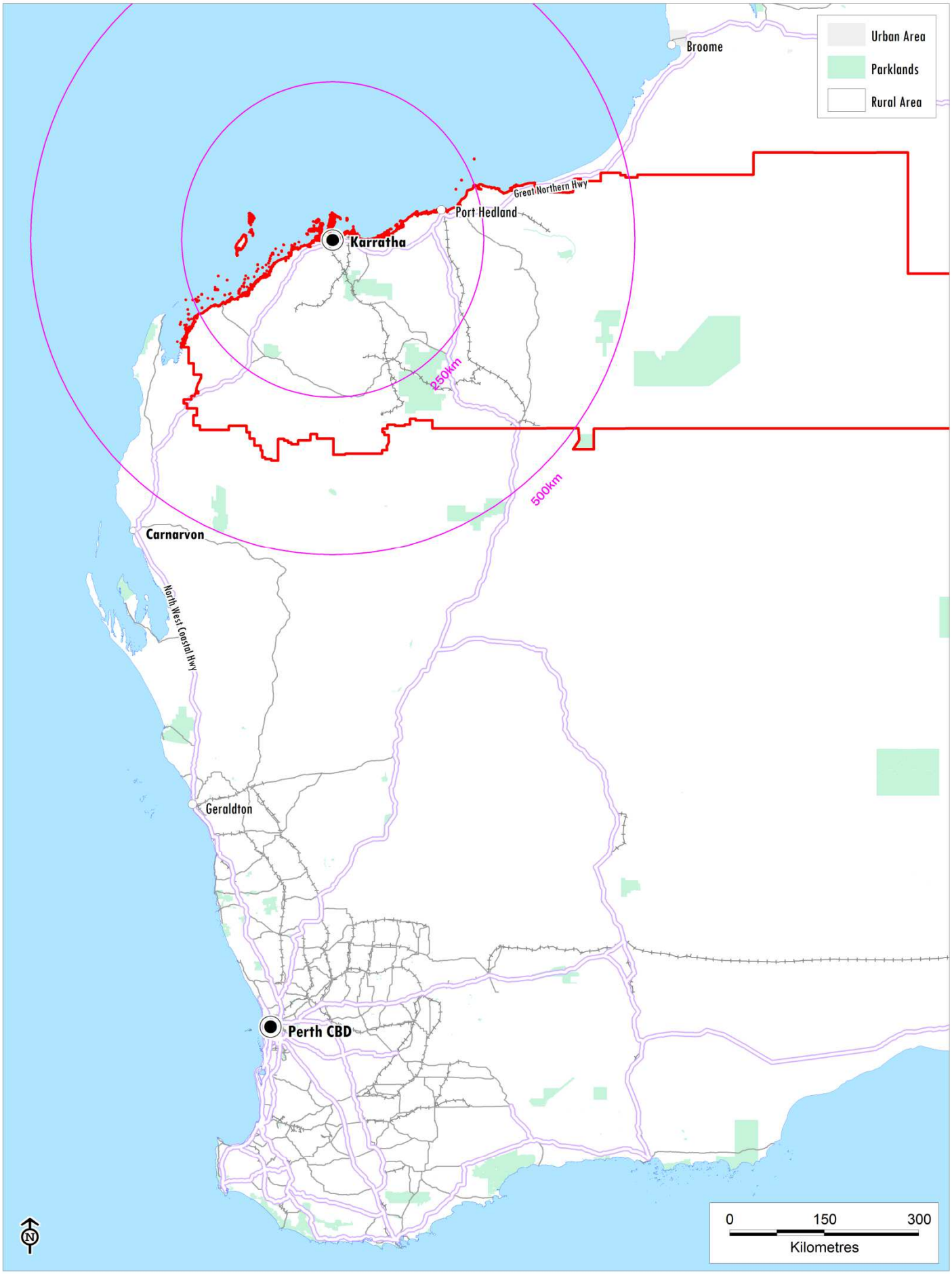
Section 1: Background

1.1 Site location and regional context

Karratha is the largest city in the Pilbara region of Western Australia, located within the Shire of Roebourne and approximately 1,500 km north of Perth (refer Map 1.1). In addition to Karratha, the Shire of Roebourne also contains the smaller towns of Dampier, Wickham, Roebourne, Point Samson and Cossack. The Shire is one of four local government areas making up the Pilbara, a resource-rich region which is a key driver of Australia's economic growth.

With a resident population of around 15,000 people, Karratha services the accommodation and administrative needs of the major resource projects in the Pilbara, as well as providing for the shopping needs of local and broader region residents, workers and businesses. Regional access to Karratha is provided by the North West Coastal Highway, which is the main carriageway in the region, while Karratha Airport is Western Australia's busiest regional airport for passenger movements, servicing the fly in-fly out (FIFO) worker population of the Pilbara.

Karratha has been growing rapidly over the past decade, both in population terms and in terms of capital infrastructure and development. The town's shopping and services offer, however, has not undergone any significant improvements over this period, although substantial beautification/landscape improvements have recently been delivered within the City Centre.



Map 1.1: Karratha

Regional Context

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Karratha is planned to grow very substantially, underpinned by a continued strength in the resources sector, but also through broader planning and revitalisation initiatives proposed for the region, in particular the *Karratha City of the North Plan*, which is detailed later in this section. Some of the other growth drivers in Karratha include the following:

- The Karratha Airport provides a vital air link to the Pilbara region with some 800,000 passengers passing through the terminal building each year. The airport carpark underwent a $6.9-million expansion and redevelopment in 2011 to improve services for all patrons. The new carpark now offers over 1,000 sealed parking bays within a five minute walk of the terminal.

- As an important asset there are current plans for the airport to undergo a major redevelopment through a $35 million upgrade which will see the airport terminal include new cafes, bar, combined arrivals and departure area, new toilet facilities and improved security screening and baggage reclaim. Construction is expected to begin in June 2014 and be completed by December 2015.

- The Karratha Leisure Complex, a state-of-the-art facility incorporating an aquatic centre, sports playing fields, indoor and outdoor courts, a fitness centre and other facilities has been completed. This complex was built in conjunction with the second stage of the Karratha Senior High School project and opened in July 2013.

- A number of community service facilities have added further to Karratha's growth momentum and attraction as a place to live. The Pam Buchanan Family Centre was completed in 2012, and provides a one-stop venue for the provision of family and child related services, such as a childcare centre, family counselling and other specialist health providers. The Frank Butler Community Centre was completed in May 2012, and provides for social functions, sporting club use, community group meetings and indoor sports such as dancing, martial arts, and fitness training.

- The Dampier Highway Streetscape Upgrade has been completed, transforming the western gateway to Karratha, including new public art and beautification of six roundabouts.

The main retail facilities in Karratha are provided at Centro Karratha in the city centre, which is the largest shopping centre in the Pilbara region. This centre is anchored by a Kmart discount department store, Target Country store, and Woolworths and Coles supermarkets, together with a reasonable provision of specialty traders.

The site for the proposed Karratha homemaker/bulky goods centre is located on the south-western corner of Dampier and Madigan Roads, approximately 7 km west of the Karratha City Centre (refer Map 1.2). Dampier Road is the major western entry into Karratha and also provides the main traffic route between the airport and the town centre; while Madigan Road connects with the North West Coastal Highway to the south. The subject site therefore enjoys excellent visibility and will be easily accessible for both local and broader-area residents.

In addition to the homemaker centre site at the western edge of the City Centre, and as also shown on Map 1.2, a neighbourhood centre site has been identified at Tambrey, between the homemaker centre site and the Karratha City Centre. This site is proposed to be developed to accommodate neighbourhood level shopping facilities and services to serve the rapidly growing western part of Karratha.

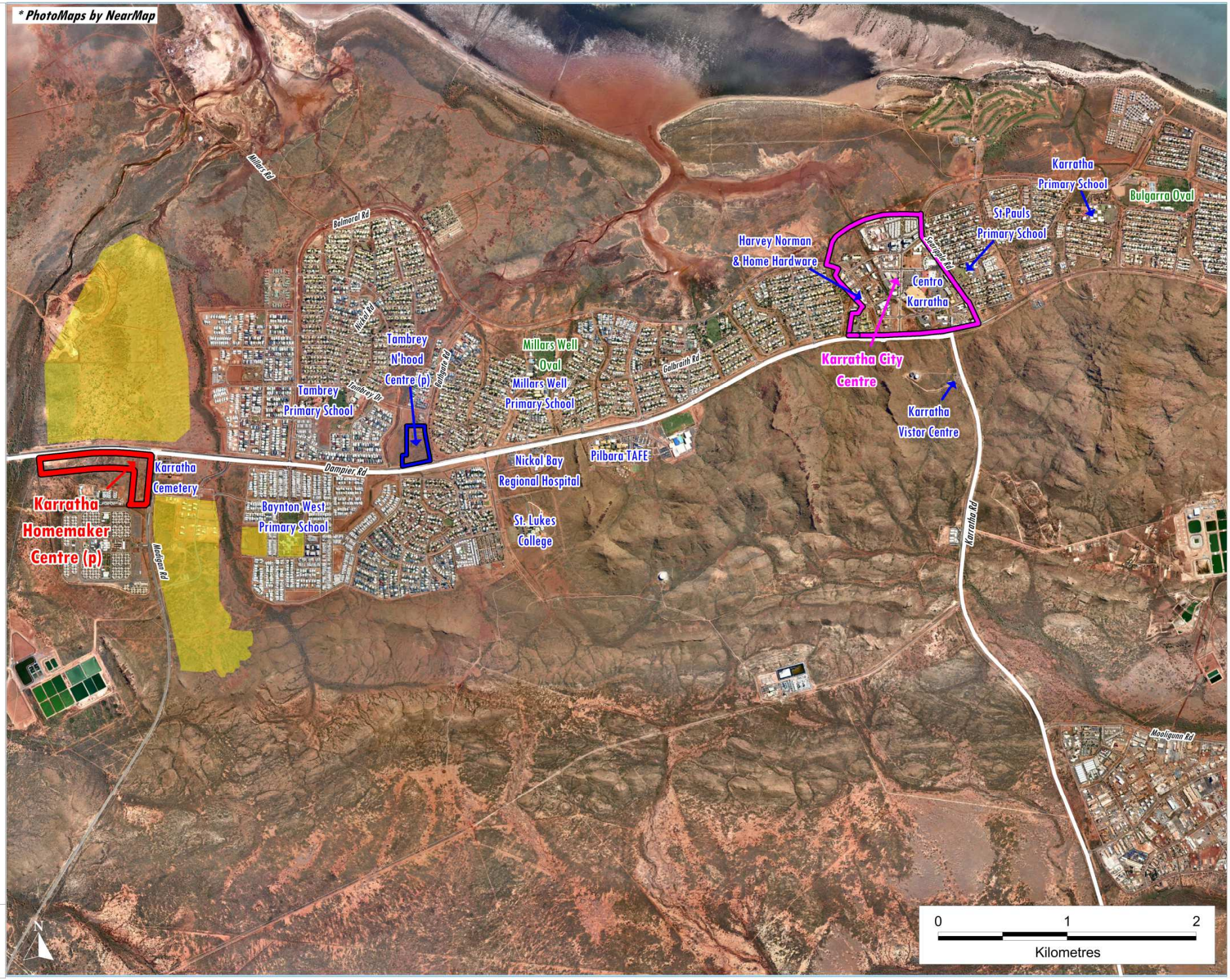
Map 1.2

Karratha Homemaker Centre

Site Location

Legend

- Site Location
- Future growth areas



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1.2 Western Australia's economy

Since 2008, the global economic environment has been volatile post the global financial crisis. Australia as a whole, however, and Western Australia in particular, have weathered the storm of international economic volatility well. Western Australia's real Gross State Product (GSP) grew by 5.1% in 2012-13, following 7.3% growth in 2011-12, and remains above the longer term annual average of 4.9% recorded over the past 10 years.

The Western Australian economy is primarily driven by the resources sector, with Western Australia now accounting for 48% of all Australian merchandise exports. The Department of State Development reported $149 billion of resource projects under construction or committed as at March 2014 in Western Australia, and a further $112 billion under consideration. However, the services sector in the state is also growing quickly in terms of employment, particularly driven by health expenditure.

Existing trends in Western Australia highlight that the state will continue to perform well in the mining and related sectors generating strong growth for the economy over the medium and longer terms. The state is expected to benefit widely from this continued growth, with population continuing to grow strongly.

1.3 Mining activity

Table 1.1 summarises the levels of engineering activity (which incorporates infrastructure projects as well as mining) for each state and territory of Australia. It details engineering work recently completed as well as activity underway but not yet complete (future work). Proposed activity is not included, as extensive data are not collated for future projects.

By far the majority of investment in mining continues to occur in Western Australia and Queensland. Some $43.7 billion or 34% of all engineering activity completed in FY12 was in Western Australia, and the state also accounts for $280.5 billion or 49% of all engineering activity underway but not yet complete. Queensland had $39.4 billion of engineering activity completed in FY12 (30% of the total) and accounts for 38% of engineering activity underway but not yet complete.

The mining industry continues to be a significant contributor to the Australian economy, particularly coal, iron ore and increasingly natural gas. The growth in the industry has led to substantial population growth in the mining centres around Australia, including Karratha, however it has also placed increasing pressure on infrastructure and housing prices.

The recent boom and current strong position of the mining industry have been/are being driven primarily by demand from the emerging economies of China, Japan and India. While historically resource booms in Australia have lasted around 15 years, it is expected that the current cycle will continue for much longer, albeit at levels lower than the historical peaks. Therefore, there are longer term positive implications for population growth in the larger mining centres, in particular Karratha.

Table 1.1

Building & engineering activity by state

	Population ERP 2013[1]		Engineering Activity[2]			
			Work done		Future work	
	('000)	%	FY12 $m	%	$m	%
Australia	**23,132**		**130,180**		**572,586**	
NSW	7,410	32%	24,151	19%	36,860	6%
Sydney	4,757					
Non-metro	2,653					
VIC	5,739	25%	11,113	9%	22,963	4%
Melbourne	4,348					
Non-metro	1,391					
QLD	4,657	20%	39,497	30%	218,153	38%
Brisbane	2,238					
Non-metro	2,418					
WA	2,519	11%	43,725	34%	280,577	49%
Perth	1,972					
Non-metro	547					
SA	1,671	7%	5,913	5%	8,648	2%
Adelaide	1,292					
Non-metro	379					
ACT	381	2%	789	1%	1,372	0%
Canberra	380					
Remainder	1.2					
TAS	513	2%	1,154	1%	2,527	0%
Hobart	218					
Non-metro	295					
NT	241	1%	3,839	3%	1,487	0%
Darwin	136					
Non-metro	105					

1. As at June

2. ABS - Engineering Construction Activity Australia Jun 2011, Cat. no. 8762.0

In recent years there has been enormous capital investment in a range of mining projects, with the majority occurring in regional Western Australia and Queensland. Generally during the construction period of projects, mining companies source a large proportion of their labour requirements from FIFO workers (at least 75%). The proportion of FIFO workers typically decreases during

the operational period, although it usually continues to remain a significant proportion of the total workforce.

The mining sector in both Western Australia and Queensland will continue to drive strong growth in a number of the key population centres around the mining regions in each state. The Pilbara is expected to be one of the main beneficiaries.

Mining is a key employment sector for Western Australia, and it will continue to be well into the future. Some of the major mining projects in the Pilbara have a remaining life span of about 15 years; while other existing and planned projects will continue for up to 80 years, providing long-term stability for the region.

However, one of the features of the mining industry is that while it attracts vast amounts of capital expenditure as noted in Table 1.1, it is not a huge generator relative to capital investment, of ongoing direct jobs over the long term. Large numbers of jobs are created during the construction and setup phase, however, the number of operational jobs created on a long term basis is relatively modest. In this regard, Table 1.2 attached shows Australia's employment patterns by industry, highlighting the fact that the mining sector accounts for approximately 261,000 jobs, or only around 3% of total employment. In contrast, mining contributes some 7.2% of Australia's gross domestic product.

In order for Karratha to continue to grow steadily, and to attain its goals under the *Karratha City of the North Plan*, other sectors of the economy will need to contribute, particularly in employment terms. The retail sector is the second largest employing industry in the Australian economy, and therefore, appropriate ongoing retail development to service the needs of Karratha and the Pilbara is an important avenue to delivering Karratha's future employment needs.

Table 1.2

Employment by industry (000's)*

	NSW/ACT		QLD		VIC		WA		SA		NT/TAS		Australia	
Industry	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total	No.	% of Total
Agriculture, Forestry and Fishing	60	2.2%	42	2.5%	69	3.5%	22	2.2%	34	6.3%	12	4.5%	238	2.9%
Mining	**37**	**1.4%**	77	**4.7%**	13	**0.6%**	112	**11.4%**	15	**2.8%**	**9**	**3.5%**	**261**	**3.2%**
Manufacturing	244	9.0%	149	9.1%	233	11.8%	77	7.8%	72	13.4%	20	7.7%	795	9.8%
Electricity, Gas, Water and Waste Services	37	1.4%	31	1.9%	38	1.9%	21	2.1%	9	1.6%	5	1.7%	139	1.7%
Construction	269	10.0%	204	12.4%	209	10.6%	117	12.0%	60	11.1%	30	11.3%	889	11.0%
Wholesale Trade	114	4.2%	54	3.3%	82	4.2%	34	3.5%	18	3.4%	8	3.0%	310	3.8%
Retail Trade	209	7.7%	144	8.8%	155	7.8%	68	7.0%	37	6.9%	19	7.2%	631	7.8%
Accommodation and Food Services	121	4.5%	59	3.6%	69	3.5%	36	3.7%	18	3.4%	12	4.6%	316	3.9%
Transport, Postal and Warehousing	145	5.4%	96	5.8%	117	5.9%	62	6.3%	33	6.1%	13	5.1%	465	5.7%
Information Media and Telecommunications	68	2.5%	22	1.4%	46	2.4%	12	1.3%	7	1.3%	4	1.3%	160	2.0%
Financial and Insurance Services	163	6.0%	39	2.4%	99	5.0%	30	3.0%	16	3.0%	5	1.9%	352	4.3%
Rental, Hiring and Real Estate Services	57	2.1%	33	2.0%	34	1.7%	21	2.2%	8	1.4%	4	1.6%	157	1.9%
Professional, Scientific and Technical Serv.	246	9.1%	127	7.7%	193	9.8%	83	8.4%	33	6.1%	15	5.5%	695	8.6%
Administrative and Support Services	74	2.7%	44	2.7%	58	2.9%	26	2.7%	11	2.1%	7	2.7%	220	2.7%
Public Administration and Safety	240	8.9%	125	7.6%	117	5.9%	68	6.9%	47	8.8%	33	12.6%	629	7.8%
Education and Training	177	6.6%	114	7.0%	147	7.4%	62	6.3%	39	7.2%	22	8.4%	561	6.9%
Health Care and Social Assistance	293	10.9%	176	10.7%	189	9.6%	77	7.9%	55	10.2%	30	11.3%	820	10.1%
Arts and Recreation Services	34	1.2%	23	1.4%	32	1.6%	12	1.2%	5	0.9%	4	1.6%	109	1.3%
Other	112	4.2%	84	5.1%	73	3.7%	42	4.3%	22	4.0%	12	4.4%	344	4.2%
Total	**2,699**	**100%**	**1,641**	**100%**	**1,971**	**100%**	**979**	**100%**	**538**	**100%**	**263**	**100%**	**8,091**	**100%**

**February Quarter 2014*

Source: ABS; MacroPlan Dimasi

1.4 Local economy

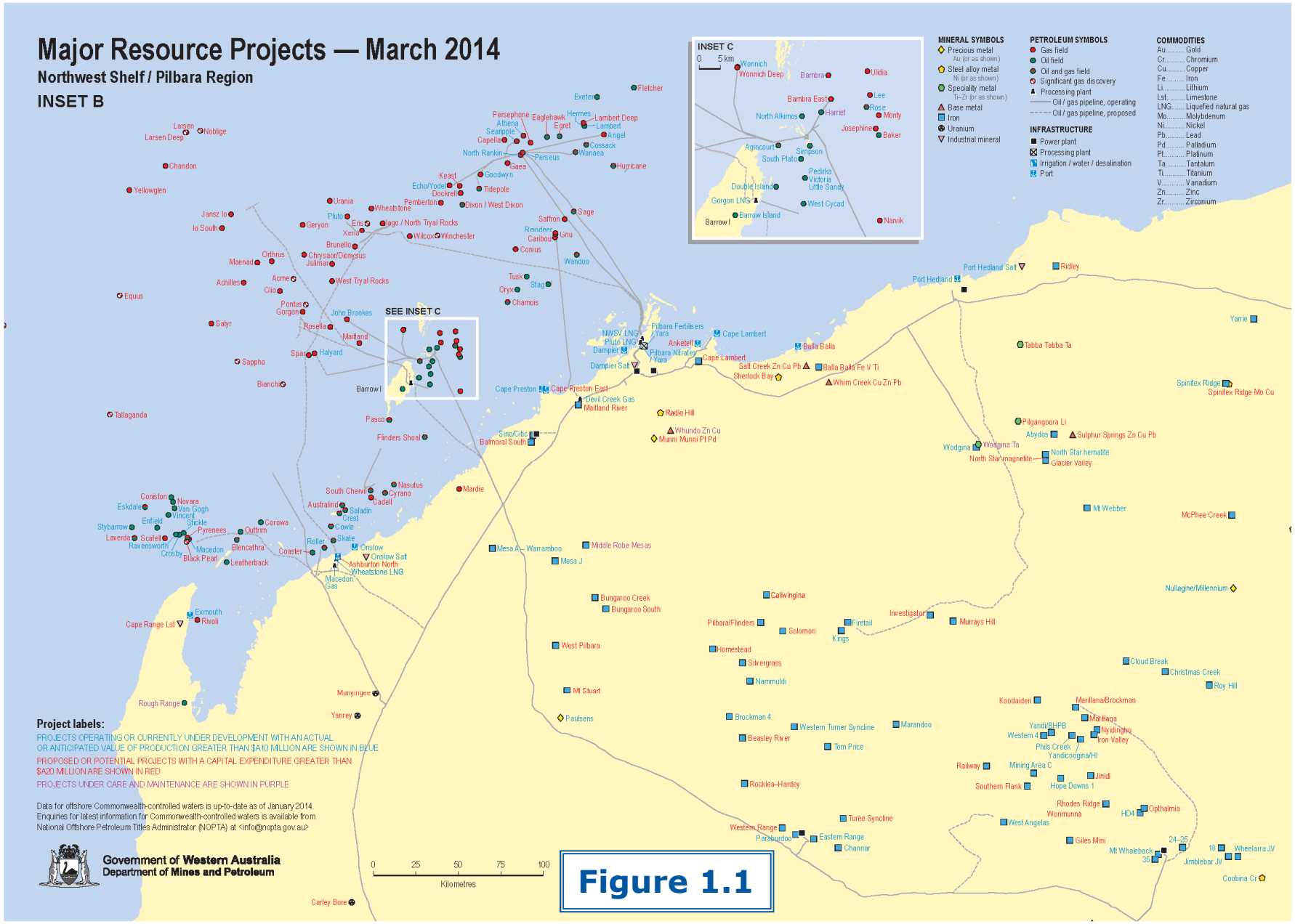
The latest Pilbara Regional Economy report from the Pilbara Development Commission estimates that the Gross Regional Product of the Pilbara is over $14 billion annually, with around $4.9 billion generated by the Shire of Roebourne. The report also indicates that large future investments in both Iron ore and LNG, along with associated investment in infrastructure, could result in a possible doubling of GRP within 5 years to 2017.

There is a range of very significant mining projects either under construction or planned in the Pilbara, and these projects are driving regional employment opportunities. Figure 1.1 following illustrates the locations of the various major resource projects in the Pilbara, as at March 2014, as sourced from the Department of State Development.

Some of the major projects in the region include the following:

- Gorgon LNG – GJV (estimated to cost $61 billion), committed: Around 6,250 direct jobs are estimated to be created during construction, and when operational some 300 permanent jobs are expected to be created.
- Wheatstone LNG – Chevron ($29 billion), under consideration: 6,500 jobs during construction, 400 operational jobs.
- Port Blending and Rail Yard Facilities – BHPB ($1.25 billion): 2,100 jobs during construction, and 720 operational jobs.
- West Pilbara Iron Ore Project – API Management ($7 billion), under consideration: 3,500 jobs during construction, 1,000 operational jobs.

A report prepared by PWC in November 2013 for the Pilbara Industry's Community Council (PICC) estimates that the total resource related workforce required to meet current growth plans for the resources sector in the Pilbara will peak at just over 65,000 in 2014, up from 51,000 in 2011 (an increase of 28.4%). A large portion of this growth is however expected to be filled by FIFO workers.


Major Resource Projects — March 2014
Northwest Shelf / Pilbara Region
INSET B
INSET C
SEE INSET C
MINERAL SYMBOLS
PETROLEUM SYMBOLS
COMMODITIES
INFRASTRUCTURE
Project labels:
PROJECTS OPERATING OR CURRENTLY UNDER DEVELOPMENT WITH AN ACTUAL OR ANTICIPATED VALUE OF PRODUCTION GREATER THAN $A10 MILLION ARE SHOWN IN BLUE
PROPOSED OR POTENTIAL PROJECTS WITH A CAPITAL EXPENDITURE GREATER THAN $A20 MILLION ARE SHOWN IN RED
PROJECTS UNDER CARE AND MAINTENANCE ARE SHOWN IN PURPLE
Data for offshore Commonwealth-controlled waters is up-to-date as of January 2014.
Enquiries for latest information for Commonwealth-controlled waters is available from National Offshore Petroleum Titles Administrator (NOPTA) at <info@nopta.gov.au>
Government of Western Australia
Department of Mines and Petroleum
Kilometres
Figure 1.1

The Pilbara workforce in 2020 is expected to be around 51,600, including nearly 43,000 FIFO workers.

One of the main constraints to population growth in the Pilbara, which is also the case in other mining centres in Australia, is housing, specifically the amount and price of suitable housing options for the workforce. The main inhibiting factor is that the much higher than average house prices deter workers from relocating to the region, while construction of additional housing is almost prohibitively expensive. Planning for sustainable residential growth is therefore critical to ensure long-term economic growth and diversity, and Karratha's plans for future housing needs are at an advanced stage, as detailed in the following sub-section.

1.5 Karratha City of the North Plan

The *Karratha City of the North Plan* (KCN) was released in June 2010 by the WA Government and the Shire of Roebourne, in response to the shared Pilbara Cities vision for Karratha. The KCN provides the broad guidelines and spatial strategies for the transformation of Karratha from a resource town into a regional city.

The KCN plans for an aspirational target population of 50,000 permanent residents for Karratha, which is well beyond current population forecasts. This population level is not based on population projections, but rather provides a key threshold in the transformation of the city. The planning for such a critical mass of people should ensure that the appropriate level of services and amenities and more normalised market conditions are reached in the region.

The KCN comprises three documents, namely the *Implementation Plan*, the *City Growth Plan* and the *City Centre Master Plan*. The City Growth Plan (CGP) incorporates a spatial plan for new industrial, commercial and residential growth areas for Karratha, together with the infrastructure requirements to enable that growth. The CGP, illustrated in Figure 1.2 following, is the most relevant document for the purposes of this report and is briefly summarised below:

- The Karratha City Centre is proposed to be expanded and revitalised with new vehicular links to facilitate access from throughout Karratha.

- New community facilities, including retail, leisure, sporting, education and heath, are proposed throughout Karratha to service the expected growing demand.

- A number of vehicular thoroughfares are proposed as part of the CGP, which will facilitate access to all parts of Karratha, including to/from the airport and other surrounding employment areas.

- A number of localities have been identified cater for the short to medium term population housing demands in Karratha. These areas are situated to the east and west of the Karratha urban area, and will accommodate expansions to existing neighbourhoods or the creation of new local communities.

- Longer-term residential growth areas are also designated to enable the successful transformation of Karratha into a regional city with a target population of 50,000.

The KCN therefore provides the necessary planning strategy and framework for Karratha to grow to a genuine regional city servicing the north-west region of Western Australia. In particular, the strategies in place should ensure that Karratha's economy is diversified in the future, to become less reliant on the mining industry. Such a transformation will promote Karratha as the primary city in the Pilbara, though Hedland also has its own growth aspirations which it will continue to pursue.

The proposed homemaker/bulky goods site at Karratha is recognised by Council as a strategic location for homemaker/bulky goods retailing at the western gateway to the city and within easy access of the surrounding regional population. It would potentially be the major bulky goods retail destination for the Pilbara region, serving residents of Karratha and Hedland, as well as the smaller towns.

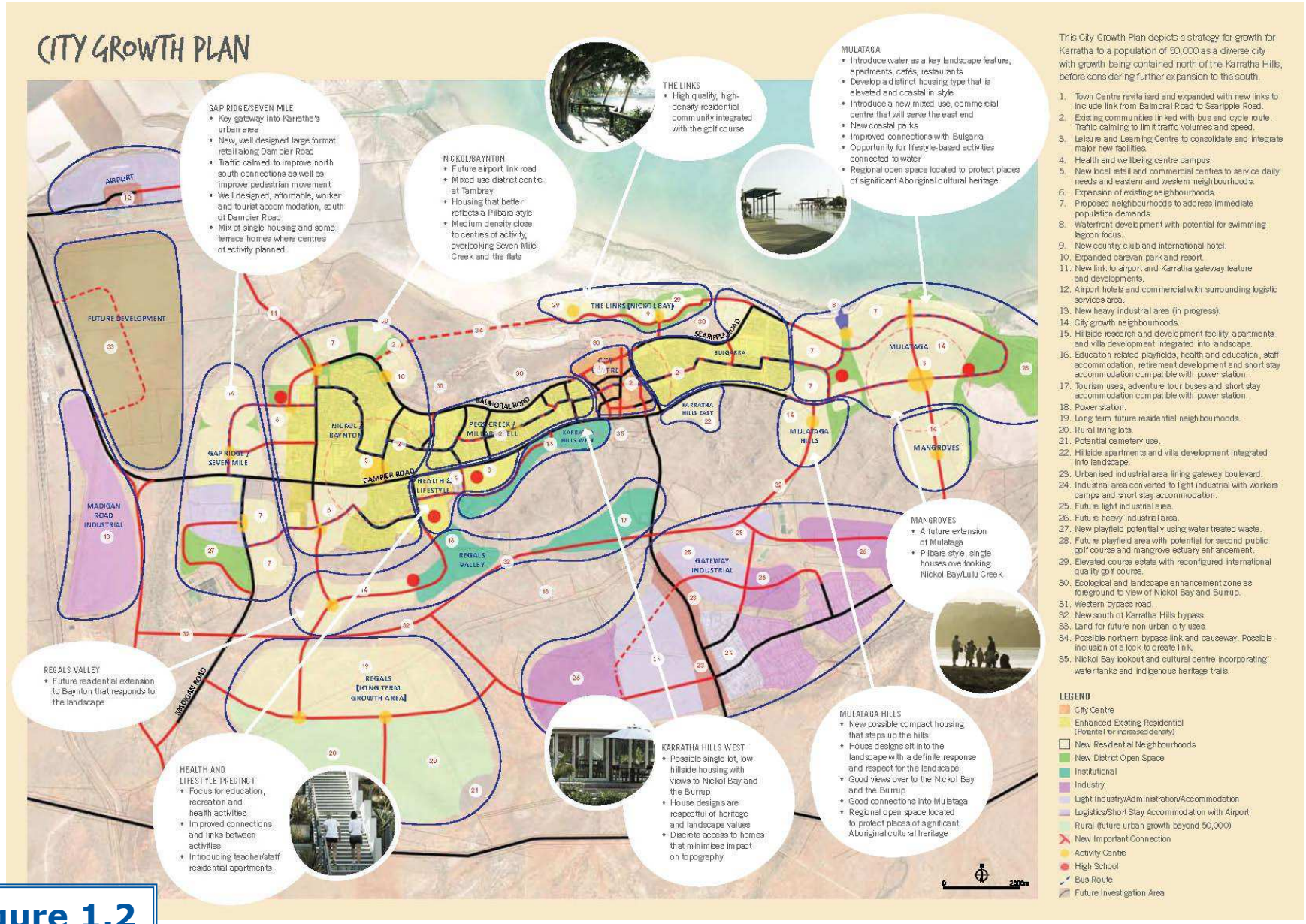

CITY GROWTH PLAN
GAP RIDGE/SEVEN MILE
• Key gateway into Karratha's urban area
• New, well designed large format retail along Dampier Road
• Traffic calmed to improve north south connections as well as improve pedestrian movement
• Well designed, affordable, worker and tourist accommodation, south of Dampier Road
• Mix of single housing and some terrace homes where centres of activity planned
NICKOL/BAYNTON
• Future airport link road
• Mixed use district centre at Tambrey
• Housing that better reflects a Pilbara style
• Medium density close to centres of activity, overlooking Seven Mile Creek and the flats
THE LINKS
• High quality, high-density residential community integrated with the golf course
MULATAGA
• Introduce water as a key landscape feature, apartments, cafés, restaurants
• Develop a distinct housing type that is elevated and coastal in style
• Introduce a new mixed use, commercial centre that will serve the east end
• New coastal parks
• Improved connections with Bulgarra
• Opportunity for lifestyle-based activities connected to water
• Regional open space located to protect places of significant Aboriginal cultural heritage
AIRPORT
FUTURE DEVELOPMENT
MADIGAN ROAD INDUSTRIAL
GAP RIDGE / SEVEN MILE
NICKOL / BAYNTON
PEGS CREEK / MILLARS WELL
KARRATHA HILLS WEST
DAMPIER ROAD
BALMORAL ROAD
SEARIPPLE ROAD
HEALTH & LIFESTYLE
REGALS VALLEY
GATEWAY INDUSTRIAL
KARRATHA HILLS EAST
MULATAGA
MULATAGA HILLS
MANGROVES
THE LINKS (NICKOL BAY)
BULGARRA
REGALS VALLEY
• Future residential extension to Baynton that responds to the landscape
MADIGAN ROAD
REGALS (LONG TERM GROWTH AREA)
HEALTH AND LIFESTYLE PRECINCT
• Focus for education, recreation and health activities
• Improved connections and links between activities
• Introducing teacher/staff residential apartments
KARRATHA HILLS WEST
• Possible single lot, low hillside housing with views to Nickol Bay and the Burrup
• House designs are respectful of heritage and landscape values
• Discrete access to homes that minimises impact on topography
MULATAGA HILLS
• New possible compact housing that steps up the hills
• House designs sit into the landscape with a definite response and respect for the landscape
• Good views over to the Nickol Bay and the Burrup
• Good connections into Mulataga
• Regional open space located to protect places of significant Aboriginal cultural heritage
MANGROVES
• A future extension of Mulataga
• Pilbara style, single houses overlooking Nickol Bay/Lulu Creek
0
2000m
This City Growth Plan depicts a strategy for growth for Karratha to a population of 50,000 as a diverse city with growth being contained north of the Karratha Hills, before considering further expansion to the south.
1. Town Centre revitalised and expanded with new links to include link from Balmoral Road to Searipple Road.
2. Existing communities linked with bus and cycle route. Traffic calming to limit traffic volumes and speed.
3. Leisure and Learning Centre to consolidate and integrate major new facilities.
4. Health and wellbeing centre campus.
5. New local retail and commercial centres to service daily needs and eastern and western neighbourhoods.
6. Expansion of existing neighbourhoods.
7. Proposed neighbourhoods to address immediate population demands.
8. Waterfront development with potential for swimming lagoon focus.
9. New country club and international hotel.
10. Expanded caravan park and resort.
11. New link to airport and Karratha gateway feature and developments.
12. Airport hotels and commercial with surrounding logistic services area.
13. New heavy industrial area (in progress).
14. City growth neighbourhoods.
15. Hillside research and development facility, apartments and villa development integrated into landscape.
16. Education related playfields, health and education, staff accommodation, retirement development and short stay accommodation compatible with power station.
17. Tourism uses, adventure tour buses and short stay accommodation compatible with power station.
18. Power station.
19. Long term future residential neighbourhoods.
20. Rural living lots.
21. Potential cemetery use.
22. Hillside apartments and villa development integrated into landscape.
23. Urbanised industrial area lining gateway boulevard.
24. Industrial area converted to light industrial with workers camps and short stay accommodation.
25. Future light industrial area.
26. Future heavy industrial area.
27. New playfield potentially using water treated waste.
28. Future playfield area with potential for second public golf course and mangrove estuary enhancement.
29. Elevated course estate with reconfigured international quality golf course.
30. Ecological and landscape enhancement zone as foreground to view of Nickol Bay and Burrup.
31. Western bypass road.
32. New south of Karratha Hills bypass.
33. Land for future non urban city uses.
34. Possible northern bypass link and causeway. Possible inclusion of a lock to create link.
35. Nickol Bay lookout and cultural centre incorporating water tanks and indigenous heritage trails.
LEGEND
City Centre
Enhanced Existing Residential (Potential for increased density)
New Residential Neighbourhoods
New District Open Space
Institutional
Industry
Light Industry/Administration/Accommodation
Logistics/Short Stay Accommodation with Airport
Rural (future urban growth beyond 50,000)
New Important Connection
Activity Centre
High School
Bus Route
Future Investigation Area

Figure 1.2

1.6 Recent trends in homemaker centre development

The supply of floorspace in the homemaker/large format retail category has grown very rapidly in Australia over the past decade and a half. This growth has been strongly correlated with increases in home prices, as well as general economic growth in Australia.

About 15 years ago, throughout most parts of Australia, there was minimal such floorspace, and so called homemaker centres were very rare, with only a handful of such facilities being available throughout the entire country. A long period of strong economic growth and house price increases commencing in the early 1990s, saw an explosion in demand for homemaker/bulk goods. At the same time, technology and innovation resulted in significant decreases in cost of purchase, particularly for home entertainment/electronic goods. The combination sparked enormous interest in the development of homemaker centres during the late 1990s and through to the 2008 GFC.

Homemaker centres developed as attractive destinations for consumers to visit in order to be able to conveniently shop for big ticket comparison items, in particular furniture, whitegoods, electronics, entertainment products and other similar items. These purpose built homemaker centres, typically developed on large sites with frontages to major highways, are highly visible and easily accessible by a regional population, where a range of like minded large format retailers can be conveniently provided. In addition, ample provisions of easily accessible carparking mean that the goods can be easily placed in the car direct from the store, if they are not delivered directly. The collection of a number of homemaker/bulky goods retailers at the one site makes comparison shopping easy for consumers, and also creates critical mass for the centre.

As a result, there are now more than 100 homemaker centres in Australia, in addition to many more highway located homemaker/large format retail precincts. The average amount of floorspace per capita nationally in such homemaker/bulky goods facilities is estimated to have increased from less than 0.2 sq.m to around 0.7 sq.m today, and subject to future trends, it can reasonably be expected that this provision will increase further at different times in the future.

Other factors which have also generated increases in the provision of homemaker/large format retail floorspace are the entry into the Australian market of new retailers and the emergence of new retail formats. The Bunnings format, which has grown enormously over the past 15 years, is one such example. While many Bunnings stores were initially built at 6,000 or 7,000 sq.m, or even less, it is now more typically the case that they are built at 12,000 – 14,000 sq.m.

Another example is the recent entry into the Australian hardware/homemaker market of Masters Home Improvement, a concept developed by Woolworths together with US home improvement chain Lowe's. These stores are usually at least 12,000 sq.m in size and more than 30 stores have opened in Australia since 2011. Woolworths is planning to have a network of 90 Masters stores open by the end of the 2016 financial year, and the Woolworths initiative has been one of the factors which has driven the increase in footprint size of Bunnings, as a competitive response.

In the period following the 2008 GFC, the Australian retail sector remained strong during 2009, but then weakened considerably in 2010 and 2011. The homemaker/bulky goods categories of the retail market were particularly impacted, reflecting consumers' changes in purchasing behaviour (as they sought to reduce borrowings, which had been extended enormously during the pre GFC growth period) and also a collapse in house prices. Over the past year, however, these factors have begun to stabilise, with house prices again beginning to grow, and consumer confidence beginning to return.

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Section 2: Trade area analysis

This section of the report details the trade area that is likely to be served by the proposed Karratha homemaker/bulky goods centre, including the population, spending levels and socio-demographic profile of permanent residents; as well as the contribution of the additional FIFO population.

2.1 Trade area definition

The extent of a trade area or catchment for any centre is shaped by a number of important factors, which are described as follows:

i. The relative attraction of the centre in question as compared with alternative retail facilities. The factors that determine the strength and attraction of any shopping centre are primarily the scale and composition of the centre, in particular the major trader (or traders) that are included within it; the layout, ambience and presentation of the centre; and carparking, including access and ease of use.

ii. While the strength and appeal of a centre directly impacts on the breadth of customer draw, the proximity and attraction of competitive retail centres serves to restrict a centre's ability to extend its trade area. Thus, the locations, compositions, quality and scale of competitive retail facilities all serve to define the extent of the trade area which the centre in question is effectively able to serve.

iii. The available road network and public transport service, and how they operate to effect ease of use and access to the centre in question, are also important factors impacting on a centre's relative attractiveness.

iv. Significant physical barriers which are difficult to negotiate or which take considerable time to cross can often act to delineate the boundaries of the trade areas able to be served by specific centres.

Taking all of the above into account, the Karratha trade area is influenced in particular by the following:

- The regional role of Karratha in the Pilbara, providing the major retailing, administrative and employment facilities for the surrounding population.
- The ease of access and high visibility of the subject site, reflecting its location on the corner of Dampier and Madigan Roads.
- The tenant mix which will be able to be delivered at the centre, expected to contain a range of attractive bulky goods retailers.
- The absence of any alternative bulky goods destination from the region, with the proposed Karratha centre being the first dedicated facility in the town as well as in the broader region.

The trade area likely to be served by the proposed Karratha homemaker/bulky goods centre has been defined to include a primary sector and two secondary sectors, as illustrated on the attached Map 2.1 and described as follows:

- The **primary sector** encompasses the whole of the Shire of Roebourne.
- The **secondary east** sector contains the Town of Port Hedland and the western parts of the Shire of East Pilbara.
- The **secondary south** sector incorporates the Shire of Ashburton, including the towns of Onslow and Tom Price.

The trade area which is likely to be served by the Karratha homemaker/bulky goods centre therefore encompasses the majority of the Pilbara region, including the two main towns of Karratha and Port Hedland. The Karratha centre is expected to successfully serve this region, given the town's predominant role and the homemaker centre being the only such facility in the region.

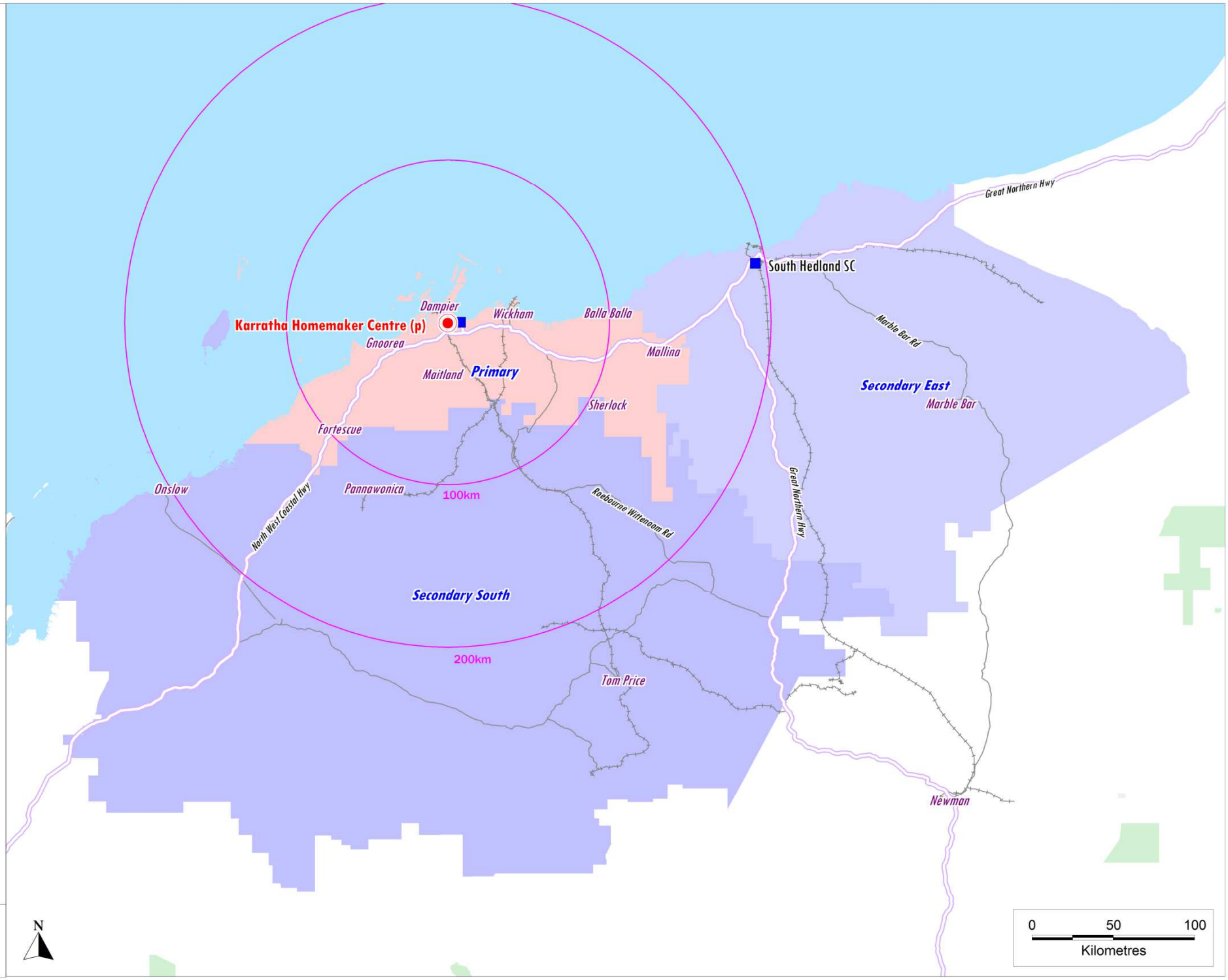
Map 2.1

Karratha Homemaker Centre

Trade Area

Legend *

- Sub-Regional SC



MacroPlan Dimasi
Understanding today, Anticipating tomorrow

2.2 Trade area permanent population

Table 2.1 details the existing and projected population levels within the defined Karratha trade area. The current trade area population is estimated at 55,580 residents, including 26,630 residents in the primary sector. The primary sector therefore contains around 48% of the trade area population, with the secondary east sector the next most populous sector, accommodating around 33% of the trade area population.

Population growth in the trade area has been high over recent years, averaging around 3.1% per annum. The majority of this growth has occurred in the primary sector, on the back of the strong mining sector which is the main driver of economic growth in the region.

In the short to medium term, a number of growth areas have been identified to facilitate the *Karratha City of the North Plan* and alleviate the immediate population growth demands. In particular, the areas to the immediate east of the homemaker centre site have been identified for future residential development as new or extensions of existing neighbourhoods. Other localities at the eastern edge of the Karratha urban area have also been designated to accommodate future neighbourhoods for the growing community.

The MAC accommodation village recently constructed on Madigan Road, immediately south of the homemaker centre site, now provides lodging to both resource and non-resource industry workers. Over time, the site is planned to be transformed gradually into a traditional housing estate.

Further growth areas have also been identified to enable the proposed transformation of Karratha into a regional city, with longer term residential areas designated at Gap Ridge, Seven Mile and Baynton situated at the western edge of the Karratha urban area.

Having regard to all of the above, the population of the Karratha trade area is projected to reach around 65,700 residents by 2021 and around 71,600 residents

by 2026. The average annual increase in the trade area population is expected to be around 1,445 people, or some 2.1% per annum, over the period to 2026.

The primary sector (particularly Karratha) will accommodate much of this growth, reflecting the continued strength of the resources sector and associated investment. While the population level in the primary sector is not projected to reach the aspirational target of 50,000 people over this timeframe, the strong commitment and planning support which are already in place for Karratha provide the necessary impetus to enable continued investment, and to drive sustained population growth. At 2026, therefore, the primary sector population is projected at around 37,600 people, accounting for some 53% of the trade area population in that year.

Table 2.1

Karratha Homemaker Centre trade area population, 2006-2026*

	Estimated population			Forecast population		
Trade area	2006	2011	2014	2016	2021	2026
Primary sector	20,050	23,630	26,630	28,630	33,630	37,630
Secondary sectors						
• East	14,320	16,890	18,270	19,070	20,820	22,320
• South	7,610	10,230	10,680	10,840	11,240	11,640
Total secondary	21,930	27,120	28,950	29,910	32,060	33,960
Main trade area	**41,980**	**50,750**	**55,580**	**58,540**	**65,690**	**71,590**

	Average annual growth (no.)				
Trade area	2006-11	2011-14	2014-16	2016-21	2021-26
Primary sector	716	1,000	1,000	1,000	800
Secondary sectors					
• East	514	460	400	350	300
• South	524	150	80	80	80
Total secondary	1,038	610	480	430	380
Main trade area	**1,754**	**1,610**	**1,480**	**1,430**	**1,180**

	Average annual growth (%)				
Trade area	2006-11	2011-14	2014-16	2016-21	2021-26
Primary sector	3.3%	4.1%	3.7%	3.3%	2.3%
Secondary sectors					
• East	3.4%	2.7%	2.2%	1.8%	1.4%
• South	6.1%	1.4%	0.7%	0.7%	0.7%
Total secondary	4.3%	2.2%	1.6%	1.4%	1.2%
Main trade area	**3.9%**	**3.1%**	**2.6%**	**2.3%**	**1.7%**

**As at June*

Source: ABS Census 2011; Western Australian Planning Commission, February 2012; MacroPlan Dimasi

2.3 Socio-demographic profile

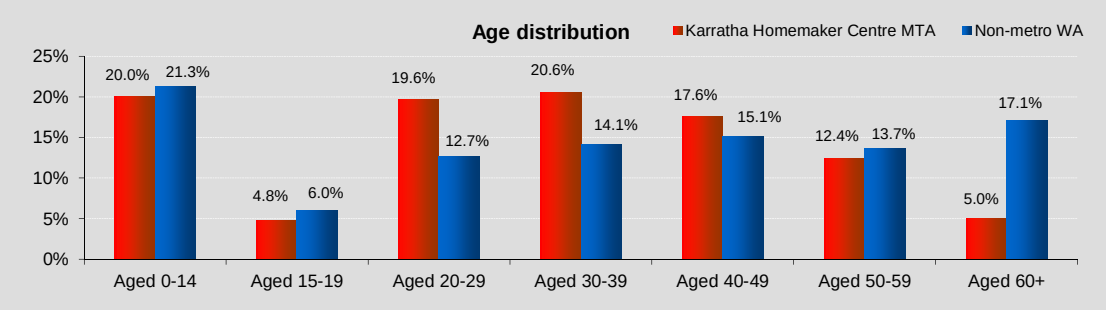
The attached Chart 2.1 and Table 2.2 detail the socio-demographic profile of the Karratha trade area population, based on the 2011 Census of Population and Housing, highlighting the following:

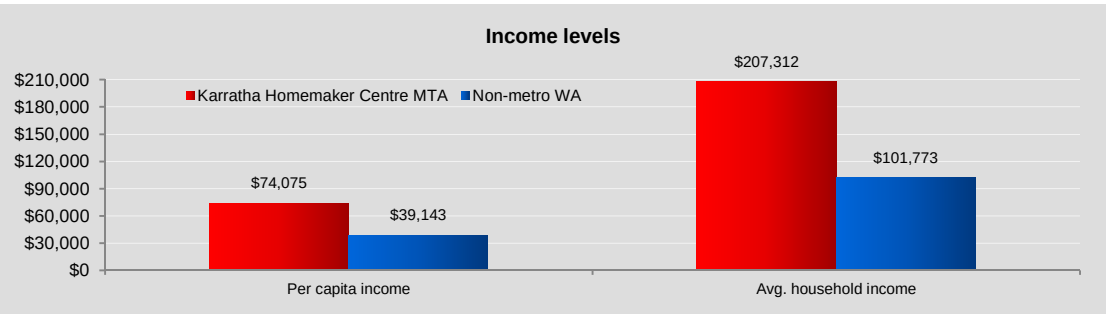
- The population within the trade area is generally much younger than the non-metropolitan Perth, with an average age of 31.9 years compared to 36.7.
- There is a much higher proportion of residents aged 20 to 49, in the Karratha trade area, reflecting a younger workforce in mining and construction related employment.
- A significant proportion of residents are renting which is reflective of the transient nature of the population and high levels of FIFO workers. Overall 75.2% of residents are renting compared with the non-metropolitan Perth average of 36.4%.
- There is a very high proportion of traditional families within the trade area with 55.4% of households categorised as a couple family with dependent children compared to the 45.4% non-metropolitan Perth average.
- Overall there are low proportions of lone person households and people over the age of 60 within the trade area.

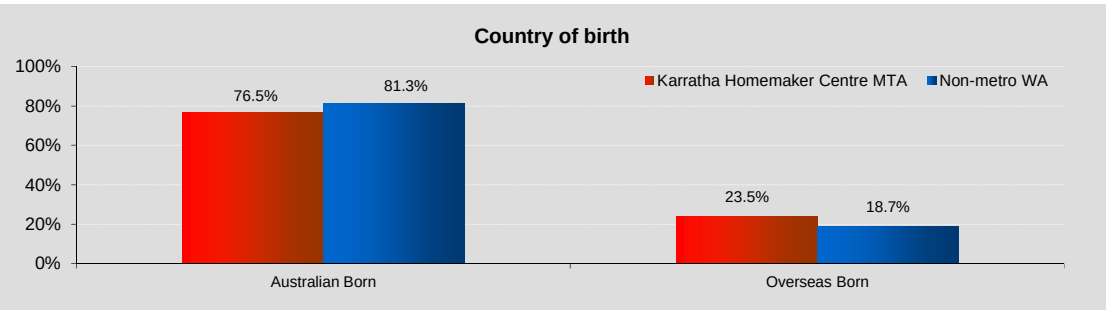
In summary, the Karratha trade area population is dominated by traditional families in their early to mid life stages, who earn high income levels and are attracted by the employment opportunities in the mining and related sectors.

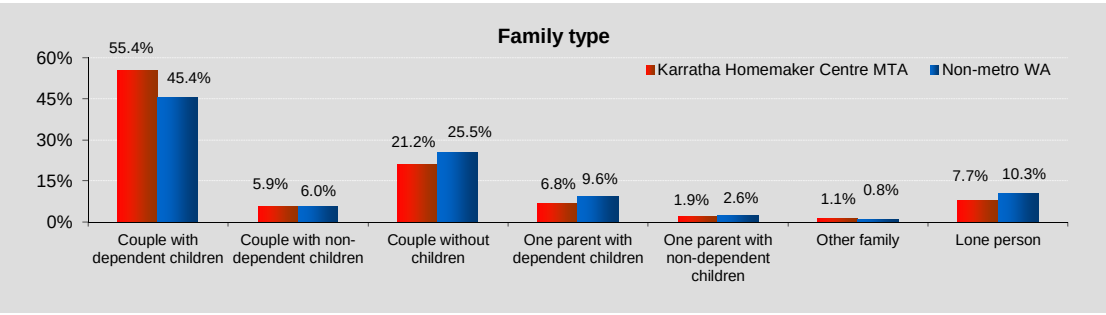
Chart 2.1

Karratha Homemaker Centre main trade area - socio-demographic profile, 2011









Source: ABS Census of Population & Housing, 2011; MacroPlan Dimasi

Table 2.2

Karratha Homemaker Centre main trade area - socio-demographic profile, 2011

Census item	Primary sector	Secondary sectors East	Secondary sectors South	Main TA	Non-metro WA avg.
Per capita income	$71,790	$68,842	$87,996	$74,075	$39,143
Var. from Non-metro WA benchmark	*83.4%*	*75.9%*	*124.8%*	*89.2%*	
Avg. household income	$201,911	$192,834	$243,161	$207,312	$101,773
Var. from Non-metro WA benchmark	*98.4%*	*89.5%*	*138.9%*	*103.7%*	
Avg. household size	2.8	2.8	2.8	2.8	2.6
Age distribution (% of population)					
Aged 0-14	20.5%	20.6%	17.9%	20.0%	21.3%
Aged 15-19	5.2%	5.4%	2.8%	4.8%	6.0%
Aged 20-29	18.6%	20.6%	20.4%	19.6%	12.7%
Aged 30-39	20.6%	19.4%	22.7%	20.6%	14.1%
Aged 40-49	17.8%	15.9%	19.7%	17.6%	15.1%
Aged 50-59	12.3%	12.4%	12.6%	12.4%	13.7%
Aged 60+	5.0%	5.7%	3.9%	5.0%	17.1%
Average age	31.8	31.7	32.6	31.9	36.7
Housing status (% of households)					
Owner (outright)	10.2%	10.6%	9.1%	10.1%	31.3%
Owner (with mortgage)	15.1%	17.6%	3.1%	13.5%	31.3%
Renter	73.5%	70.7%	86.6%	75.2%	36.4%
Other	1.3%	1.1%	1.2%	1.2%	1.1%
Birthplace (% of population)					
Australian born	75.1%	77.8%	77.4%	76.5%	81.3%
Overseas born	24.9%	22.2%	22.6%	23.5%	18.7%
• Asia	7.2%	4.8%	2.7%	5.5%	2.9%
• Europe	7.7%	6.6%	7.8%	7.3%	9.4%
• Other	10.0%	10.8%	12.1%	10.7%	6.5%
Family type (% of households)					
Couple with dep't children	56.1%	51.2%	60.5%	55.4%	45.4%
Couple with non-dep't child.	6.8%	6.4%	2.9%	5.9%	6.0%
Couple without children	21.6%	21.6%	19.3%	21.2%	25.5%
One parent with dep't child.	5.7%	8.7%	6.4%	6.8%	9.6%
One parent w non-dep't child.	1.9%	2.4%	1.4%	1.9%	2.6%
Other family	1.0%	1.6%	0.6%	1.1%	0.8%
Lone person	6.9%	8.1%	9.0%	7.7%	10.3%

Source: ABS Census of Population & Housing, 2011; MacroPlan Dimasi

2.4 Trade area spending

Chart 2.2 presents estimates of the per capita retail spending levels for residents of the Karratha trade area in 2013/14, compared with the respective benchmarks for non-metropolitan Western Australia. All retail spending estimates detailed in this report include GST. Trade area spending per person is well above average across most categories, including by around 18% across the homemaker goods categories.

The estimated retail expenditure capacity of the Haynes SC main trade area population is based on information sourced from MDS Market Data Systems, which utilises a detailed micro-simulation model of household expenditure behaviour for all residents of Australia. The model takes into account information from a wide variety of sources, including the regular ABS Household Expenditure Survey, National Accounts Data, Census Data and other information.

The MarketInfo product from MDS starts with the household expenditure survey, a comprehensive exercise conducted by the ABS every five years, where a large sample of households across Australia are asked to provide complete details of their spending over specified periods.

In addition to a thorough interview, each member of the household in question over the age of 15 is required to keep a diary of every expenditure made over a two week period. Complete financial and social information about the entire household is also provided.

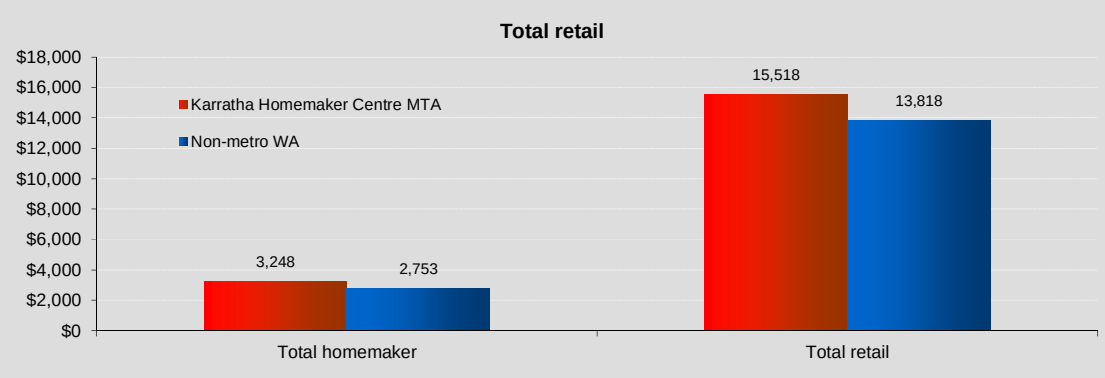
All of these data are then matched with the Census, Centrelink, National Accounts and other data collected by state and national governments to create a model of spending that is at the heart of MarketInfo. Micro-simulation techniques are the method by which these detailed calculations are performed.

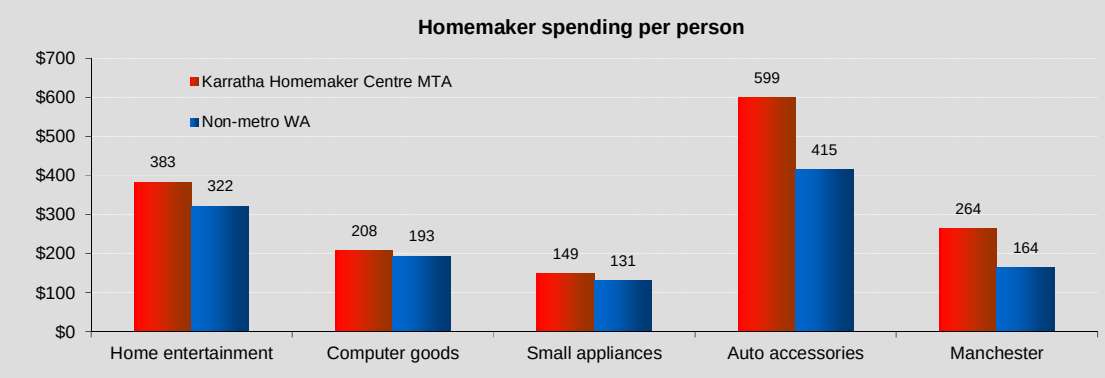
MarketInfo calculates spending levels down to the Statistical Area Level 1 (SA1), the smallest defined area used by the ABS. MarketInfo is able to drill down to this level because it starts with the unit records from the household expenditure survey and then uses the spending and other information from all of the surveyed

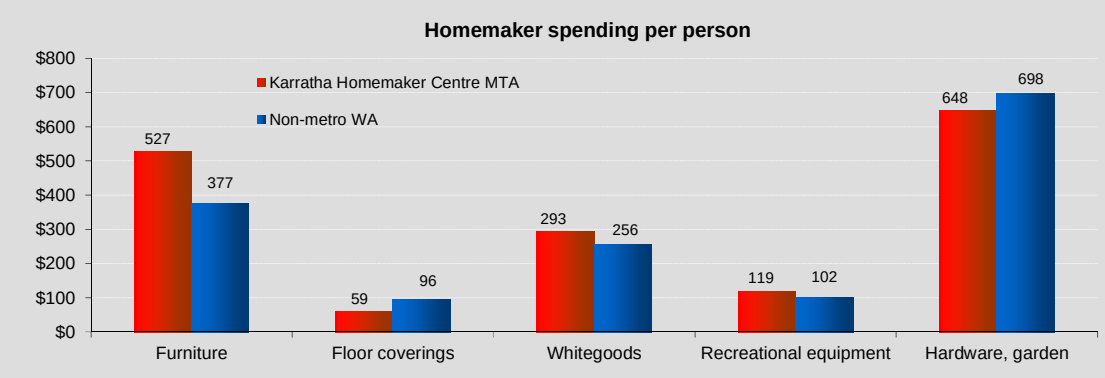
households as the basis for modelling these actual results to the broader community.

Chart 2.2

Karratha Homemaker Centre trade area - retail spending per person, 2013/14*







**Including GST*

Source: MarketInfo; MacroPlan Dimasi

Table 2.3 presents a more detailed comparison of the per capita retail spending levels within the homemaker goods market. As shown, the homemaker retail category accounts for around 21% of the total retail expenditure of trade area residents.

Trade area residents spend considerably more on homemaker goods compared with the non-metropolitan Perth benchmark. In particular, residents expenditure in 2013/14 is around 61% more on Manchester than the respective benchmark, 44.5% more on auto accessories and 40% more on furniture.

Table 2.3

Karratha Homemaker Centre main trade area - per capita homemaker expenditure ($), 2013/14*

Category	Primary sector	Secondary sectors East	Secondary sectors South	Main TA	Non-metro WA Avg.	MTA vs benchmark
Homemaker market						
Home entertainment	376	387	394	383	322	19.0%
Computer goods	219	211	175	208	193	7.4%
Small appliances	153	144	145	149	131	13.3%
Auto accessories	653	617	438	599	415	44.5%
Manchester	269	284	216	264	164	60.9%
Furniture	543	529	482	527	377	39.9%
Floor coverings	66	60	37	59	96	-39.0%
Whitegoods	280	294	324	293	256	14.5%
Recreational equipment	114	116	135	119	102	16.8%
Hardware, garden	666	661	580	648	698	-7.2%
Total homemaker	**3,340**	**3,303**	**2,927**	**3,248**	**2,753**	**18.0%**
Total retail spend	15,849	15,664	14,453	15,518	13,818	12.3%
H'maker % of total retail	21.1%	21.1%	20.2%	20.9%	19.9%	

**Including GST*

Source: MarketInfo; MacroPlan Dimasi

Table 2.4 presents estimates of the total homemaker/bulky goods expenditure market generated by trade area residents over the forecast period to 2026. Spending projections are expressed in constant 2013/14 dollar terms, i.e. excluding inflation.

The total homemaker goods market in the Karratha trade area is estimated at $178 million in 2014, including $87 million in the primary sector. These spending levels are expected to increase in real terms to $249 million and $134 million respectively by 2026, reflecting average annual real growth of 2.9% in the trade area.

Table 2.4

Karratha Homemaker Centre main trade area - homemaker expenditure ($M), 2014-2026*

Year ending June	**Primary sector**	**Secondary sectors** East	South	**Main TA**
2014	87.2	59.6	31.0	177.8
2015	91.0	61.3	31.5	183.9
2016	94.9	62.9	31.9	189.7
2017	98.6	64.5	32.3	195.5
2018	102.4	66.0	32.7	201.2
2019	106.4	67.6	33.2	207.2
2020	110.6	69.2	33.6	213.5
2021	115.0	70.9	34.1	220.1
2022	119.1	72.6	34.6	226.2
2023	122.6	74.1	35.1	231.8
2024	126.3	75.7	35.6	237.5
2025	130.1	77.3	36.1	243.4
2026	133.9	78.9	36.6	249.4
Average annual growth ($M)				
2014-2026	3.9	1.6	0.5	6.0
Average annual growth (%)				
2014-2026	3.6%	2.4%	1.4%	2.9%

**Constant 2013/14 dollars & including GST*
Source: MarketInfo; MacroPlan Dimasi

2.5 Fly-in-Fly-out population

As outlined previously, FIFO (Fly-in-Fly-out) workers generally account for a large proportion (at least 75%) of the workforce required during the construction phase of resource projects. That proportion typically decreases during the operational period, though it usually continues to be a significant amount of the workforce.

In general, FIFO workers reside in purpose-built temporary accommodation, with all basic needs, such as food or peripheral requirements such as work uniforms, provided on site by the mining company. As a result, the expenditure of FIFO workers is not generally directed to the retail facilities located within the mining town. In particular, it is not expected that FIFO workers would direct a sizable proportion of their expenditure on homemaker/bulky goods to the available facilities.

However, the mining companies which employ these workers would typically spend on behalf of the FIFO workers for the provision of their requirements. This amount of business therefore would be additional to the business generated by the resident population.

There are difficulties in estimating employment numbers by resource companies due to their variable nature and other confidentiality issues. The December 2010 *Karratha Regional Hotspots* report estimates that transient workers (including FIFO) accounts for a significant proportion of the local population, adding between 10% and 25% to the resident population, with FIFO workers estimated at around 4,000-6,000 people in Karratha.

Data from the PICC indicates that, at a regional level, resource related employment is projected to grow from 51,000 in 2011 to 65,500 in 2015 (excluding construction workers), an increase of 28.4%. The report estimates total resource sector employment to settle at around 55,000 from 2018. The report suggests that the majority of new employment is FIFO workers which continues to be the dominant workforce type in the Pilbara.

The number of FIFO workers in Karratha is therefore expected to grow strongly in the short to medium term. On this basis, it is estimated that the additional contribution (direct and indirect) to the homemaker market which can be attributable to the FIFO workers could generally be in the order of 20%.

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Section 3: Competition

This section of the report considers the competitive environment within which the proposed Karratha Homemaker Centre will operate. Table 3.1 summarises the competitive facilities in the region, while the previous Map 1.2 and Map 3.1 following illustrate their locations.

Table 3.1

Karratha Homemaker Centre - schedule of competing retail facilities

Centre	Retail GLA (sq.m)	Major traders	Dist. by road from Karratha Homemaker Centre (km)
Karratha			
Centro Karratha	23,000	Kmart, Woolworths, Coles, Target Country Karratha Furniture & Bedding, Retravision	7
Bulky goods/other		Harvey Norman, Home Hardware, Adventure Sports, Carpet Court, Mitre 10, Tradelink Thrifty Link, Autopro, Repco	
Headland			240
South Headland SC	15,000	Kmart, Coles, Retravision	
Port Headland Bld	6,000	Woolworths, Harvey Norman, Retravision	
Bulky goods/other		Autopro, Home Hardware, Repco, Clark Pools & Spas Smirkeys Sports	
Carnarvon		Retravision, Repco, Home Hardware	650
Broome		Retravision, Clarke Rubber, Bunnings	830

Source: Property Council of Australia; MacroPlan Dimasi

Map 3.1

Karratha / Port Hedland

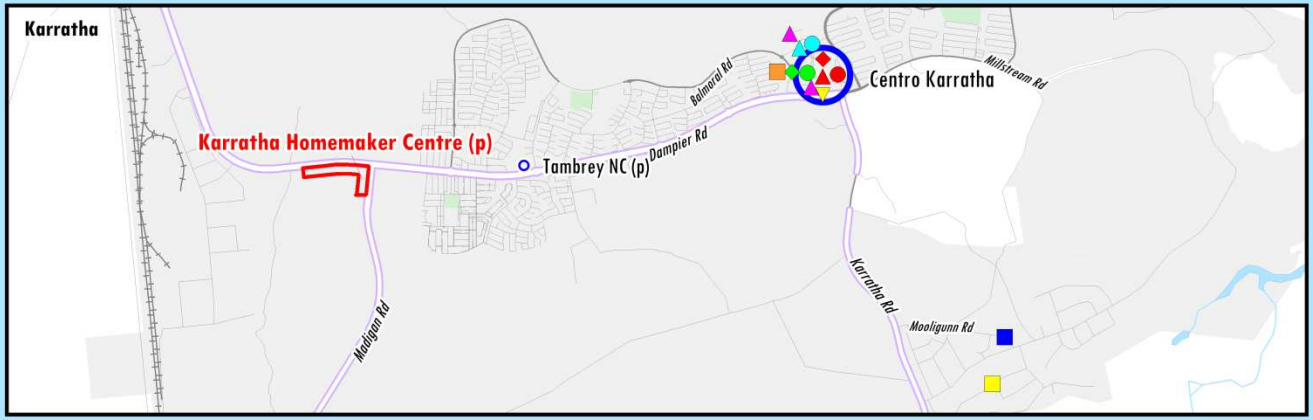
Bulky Goods Retailers

Legend *

- Sub-Regional Centre
- Kmart
- Target Country
- Woolworths
- Coles
- Supa IGA / IGA
- Other Smkt (inc. Foodworks, IGA Express etc.)

- Mitre 10
- Home Hardware
- Thrifty Link
- Harvey Norman
- Retravision
- Autopro
- Repco
- Carpet Court

** Hollow symbols indicate proposed stores*



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3.1 Within Karratha

There is no dedicated bulky goods centre within Karratha or in the broader region. A limited number of bulky goods traders are provided in the Karratha City Centre, including the following:

- A small Harvey Norman store of around 1,300 sq.m is located on Balmoral Road, a short distance north of Dampier Road. At this size, the Harvey Norman store does not offer the full range of products as compared to a full scale store which can be upwards of 5,000 sq.m. Indeed, the offer of Harvey Norman at Karratha is quite limited, even though a wide range of categories are represented, including furniture, whitegoods and appliances.

- A relatively dated Home Timber & Hardware store is located adjacent to the Harvey Norman and is estimated to be around 1,500 sq.m in size.

- The immediate precinct also contains an independent sports operator named Adventure Sports, which offers camping, fishing, sporting and diving equipment. It is a freestanding store with an estimated total GLA of around 1,800 sq.m, including a mezzanine level. A small Carpet Court store is also located nearby on Sharpe Avenue.

- Centro Karratha is the main fully enclosed shopping centre for Karratha residents and is anchored by a full-line Kmart discount department store, and a smaller Target Country store, together with Coles and Woolworths supermarkets, supported by a range of specialty traders. The centre also incorporates a furniture & bedding store as well as a Retravision outlet.

Overall therefore, the provision of bulky goods retail facilities in Karratha at present is very limited, both in terms of quantum of floorspace, and even more so, in terms of quality of the offer. Given the size of Karratha, and its growth profile, and given also the regional role which Karratha plays and is intended to play increasingly in the future, there is a clearly evident need for a dedicated, high quality homemaker/bulky goods shopping alternative to be provided within the town.

3.2 Beyond Karratha

Beyond Karratha, the other major town in the region is Hedland, located some 240 km to the east, incorporating the urban areas of Port Hedland and South Hedland. South Hedland SC is the second largest centre (behind Centro Karratha) serving the regional population base. It is anchored by a Kmart discount department store and a Coles supermarket, together with Retravision and about 25 – 30 specialty shops.

The main shopping centre in Port Hedland is Port Boulevard, which is anchored by a Woolworths supermarket and a Harvey Norman store.

Other bulky goods retailers in Hedland include Home Hardware, Repco, Autopro, Clark Pools & Spas and Smirkeys Sports.

There are also some bulky goods retailers provided within the broader region, including Retravision, Home Hardware and Repco at Carnarvon to the south-west; and Retravision, Clark Rubber and Bunnings at Broome to the east.

In summary, therefore, the provision of bulky goods traders is also very modest within the broader region, with the proposed Karratha Homemaker Centre to be the only dedicated bulky goods location in the region.

Section 4: Bulky goods centre potential

This final section of the report presents the estimated future sales potential for the proposed Karratha Homemaker Centre in 2017, as well as discussing the likely impacts on the Karratha City Centre.

4.1 Estimated sales potential

The estimated sales potential for the Karratha Homemaker Centre is based on a market share assessment, which takes into account the analysis provided in the previous three sections. The key considerations to note are as follows:

- Karratha is the largest and most important town within the Pilbara region, servicing the accommodation and administrative needs of the major resource projects in the region, as well as providing for the shopping needs of local and broader-area residents.
- Over time, Karratha is planned to become the major city and economic centre for the Pilbara, underpinned by the resources sector, as well as through planning and revitalisation initiatives proposed for the region, in particular the *Karratha City of the North Plan*.
- The trade area which is likely to be served by the proposed Karratha Homemaker Centre incorporates most of the Pilbara region, including the two main towns of Karratha and Port Hedland.
- The current trade area population is estimated at some 55,600 residents, including 26,600 residents in the primary sector. The majority of primary sector residents live in Karratha, within close proximity of the bulky goods site.
- The population of the Karratha trade area is projected to reach around 65,700 residents by 2021 and over 71,000 residents by 2026. The primary sector population is projected to increase to around 37,600 residents in 2026.

- The total homemaker goods market generated by Karratha trade area residents is estimated at $178 million in 2014, including $87 million in the primary sector. These spending levels are projected to increase in real terms to $249 million and $134 million respectively by 2026, reflecting average annual real growth of 2.9% in the trade area.

- Businesses and FIFO workers also contribute to the homemaker/bulky goods expenditure able to be served by Karratha retailers, adding an estimated 20% to the resident market expenditure pool.

- The existing provision of bulky goods traders is poor within the broader region, with the proposed Karratha Homemaker Centre therefore to be the only such centre in the region.

Taking the above into account, Table 4.1 provides a summary of the estimated market share and sales potential which could be achieved by the proposed Karratha Homemaker Centre in 2016/17. Potential sales for the centre are estimated at around $90 million.

The centre is projected to capture around 33%-35% of the available homemaker/bulky goods expenditure across the trade area, with that share increasing to 50% of primary sector spending. The market share achieved by the centre across the combined secondary sectors is estimated to be lower, at 17%.

In addition, it is estimated that around 20% of total centre sales would be generated from beyond the trade area, reflecting direct and indirect sales generated through FIFO workers, as well as some business from residents in towns such as Carnarvon and Broome, and some sales to businesses (as opposed to residents).

This analysis is based on the view that Karratha Homemaker Centre would become the primary destination for homemaker/bulky goods retailing in the trade area, through the provision of a modern integrated facility anchored by an attractive mix of large format retailers. On this basis, the majority of residents' homemaker/bulky goods expenditure could then be retained within the Pilbara, with the Karratha Homemaker Centre capturing relatively high market shares,

particularly from the primary sector. It is assumed in these estimates that no other homemaker centre is built elsewhere in the trade area over the forecast period.

Table 4.1

Karratha Homemaker Centre - Estimated sales potential and market shares, 2016/17*

Trade area	Homemaker spend ($M)	Est. sales ($M)	Market share
Primary sector	98.6	49.3	50.0%
Secondary sectors			
• East	64.5	6.4	10.0%
• South	32.3	9.7	30.0%
Total secondary	96.8	16.1	16.7%
Main trade area	**195.5**	**65.5**	**33.5%**
Business from beyond TA (@ 20%)		16.4	
Total homemaker sales		**81.8**	
Plus ancillary sales (@ 10%)		9.1	
Total sales potential		**90.9**	

**Constant 2013/14 dollars & including GST*
Source: MacroPlan Dimasi

4.2 Potential centre scale and tenants

Having determined the estimated sales potential which the proposed Karratha Homemaker Centre could achieve in 2017 based on the market share analysis above, the indicative scale of the centre can also be determined. To translate the estimated retail turnover potential into an estimate of bulky goods retail floorspace, an appropriate retail turnover density (RTD) is applied to the available sales estimate to generate an indicative estimate of floorspace that can be supported at the centre.

The approach taken to selection of appropriate RTDs is to adopt levels which enable retail facilities to be sustainable, and over time to make reasonable profits, but also enable the widest range of provision for the benefit of consumers, which is a key objective from both an economic and social point of view.

The RTDs are based on our extensive knowledge of actual trading performances by many thousands of retail stores across each of the retail categories. MacroPlan Dimasi monitors retail trading performance monthly, with some 250 shopping centres across Australia report actual performance, by retail category. We have also prepared estimates of sales potential, and economic impact assessments, for many centres built throughout Australia over the past 25 years.

The RTDs vary across retail categories, typically ranging from a low of $4,000 per sq.m for the household goods category to a high of $9,000 per sq.m for take-home Food, Liquor & Groceries, covering supermarkets and all other specialty food stores.

For bulky goods and large format retailers, the average trading level for those retailers across an entire centre is typically in the range $2,500–5,000 per sq.m. Therefore, applying the midpoint of this range (say $3,500–4,000 per sq.m) to the potential sales volume of $90 million for the Karratha Homemaker Centre gives an indicative size for the centre in the order of 23,000–25,000 sq.m of retail floorspace.

However, different types of retailers will trade at different productivity levels, with some retailers achieving a higher than average trading level and others trading at below average levels. Therefore, the scale of centre which can be supported at Karratha will ultimately depend on the mix of homemaker/bulky goods retailers and other tenants.

Notwithstanding the above, the applied sales productivity levels are considered to be appropriate trading averages for a typical homemaker centre, which would be achieved through the provision of a typical mix. In this regards, Table 4.2 following provides a list of potential tenants which could be considered for inclusion at the proposed Karratha Homemaker Centre, together with an indication of their typical sizes.

Table 4.2

Karratha Homemaker Centre bulky goods centre - list of potential tenants

Tenants	Indicative GLA (sq.m)
Furniture/electrical	
Harvey Norman*	4,000 - 6,000
The Good Guys	2,000 - 3,000
Fantastic Furniture	1,500 - 2,000
Snooze	1,000 - 1,500
Early Settler	1,000 - 1,500
Freedom	1,000 - 1,500
Forty Winks	1,000 - 1,500
Betta Electrical	400 - 800
Recreation/lifestyle	
Anaconda	2,500 - 3,500
Adventure Sports*	1,500 - 2,000
BCF	1,000 - 1,500
Ray's Outdoors	1,000 - 1,500
Hardware	
Bunnings/Masters	7,000
Home Hardware*	1,000 - 3,000
Mitre 10*	1,000 - 3,000
Floor coverings	
Carpet Choice	300 - 500
Carpet Court*	300 - 500
Auto	
Super Cheap Auto	700 - 1,000
Workwear/equipment	
Totally Workwear	800 - 1,500
RSEA	800 - 1,500
Other	
Officeworks	2,000 - 3,000
Spotlight	1,500 - 4,000
Barbeques Galore	750 - 1,000
Petbarn	700 - 1,000
Beacon Lighting	400 - 800
Curtain Wonderland	300 - 500
Cafe	100 - 300
Non-retail	
Kids recreation centre	
Reece Plumbing	
Tradelink*	
Marine/boat dealership	

**Existing store in Karratha*

Source: MacroPlan Dimasi

A few of the identified potential tenants in Table 4.2 are already located at Karratha, but could be interested in locating to a new and more modern facility than their current stores. Furthermore, it is our understanding that expressions of interest have already been sought with a number of large format retailers and other types of commercial or non-retail uses requiring large floorplates, with strong indication that the respondents would be likely to locate at the Homemaker Centre over the short to medium term.

It is evident from the list of potential tenants identified in Table 4.2 that the number of such tenants currently represented in Karratha is very small. This is the first pointer to the fact that a homemaker centre of this nature, if built and able to be successfully leased, would add to the range of retail options available in Karratha, rather than redirect existing retail facilities away from the Karratha City Centre to the new facility.

4.3 Potential benefits and impacts on the Karratha City Centre

The impacts that would result on the surrounding network of activity centres from the development or expansion of any one particular centre will depend on a range of factors. For the proposed Karratha Homemaker Centre, the most important ones are considered to be the following:

- The distance of the City Centre, by road, from the new development.
- The size of the new centre, in terms of total relevant retail floorspace, and the anchor tenant(s) within the relevant centre.
- The respective role and function of each centre. In this regards, the City Centre is planned to remain the main focus for retailing (including higher order retailing), as well as employment, leisure and civic purposes; while the new Karratha Homemaker Centre would service only the homewares/bulky goods market.
- The relative accessibility and convenience of the City Centre compared with the Karratha Homemaker Centre.

- The estimated performance of the centre (in current sales) and projected future performance. This accounts for any future developments in the region that might also impact on the future sales of existing centres.

Typically, the greatest impacts from any new development are absorbed by the closest comparable stores/centres. As already detailed in this report, at present within the Karratha City Centre the representation of comparable stores/facilities to those which would be provided at the new homemaker centre is minimal. The homemaker centre will not replace the retail goods provided in the great majority of City Centre retailers, which are focused around food & convenience, clothing & footwear, retail services, and a limited provision of household goods.

The provision of household goods retailing is restricted, within the City Centre retail core, to two stores in Centro Karratha (Karratha Furniture & Bedding and Retravision) as well as the nearby Harvey Norman, Home Timber and Hardware, and Carpet Court stores.

Whilst some, or perhaps all, of these facilities could possibly migrate to the new homemaker centre over time, their absence from the Karratha City Centre would not reduce the City Centre's role, nor its ability to grow. For example, two of these stores which are currently provided at Centro Karratha (Karratha Furniture & Bedding and Retravision) could be backfilled by other core retail uses (for example, other mini-majors, such as Best & Less).

The City Centre therefore would remain the primary hub for Karratha and broader area residents for their main shopping purposes.

On the other hand, the development of the new homemaker facility is considered to result in a number of economic benefits for Karratha, including:

- The provision of a modern facility to locate retailers requiring large floorplates for their operation;
- Employment creation, both during construction and the ongoing operation of the centre, helping to achieve the aspirations of Karratha into a more diversified economy;

- Reduction in the level of escape expenditure, particularly in the homemaker goods category; and

- Supporting and complementing the City Centre's role, both in terms of retail and in scale, in order for Karratha to remain the main regional destination for the Pilbara region.

In respect to employment creation, we estimate that the number of long term jobs accommodated by a homemaker centre of approximately 20,000 – 25,000 sq.m at Karratha would be in the order of 400-500. Additional employment would obviously be created during the construction phase, while other multiplier benefits would accrue to the regional economy and the broader Western Australia economy as a result of the development.

Most importantly, however, the role of the new homemaker centre will be to help improve the quality of life for Karratha residents. The beautification and ongoing development of the City Centre, and the resultant additional retail and food & beverage facilities which are expected to be provided within the City Centre over time, are helping and will further help to make Karratha an attractive place to live. The provision of a good range of homemaker/bulky goods shopping facilities, conveniently located on the major highway, will further add to the appeal of Karratha as a place to live.

The creation of the proposed homemaker centre will also strengthen the regional role of Karratha, throughout the Pilbara. By providing a one-stop facility for big ticket comparison shopping items for the home, the new homemaker centre will attract residents not just from Karratha but also from the balance of the Pilbara, including to some degree from Hedland.


MacroPlanDimasi


MacroPlanDimasi

APPENDIX 9

PUMP STATION SERVICING STRATEGY

ROWEGROUP

DAMPIER ROAD

PROPOSED 25.0m ROAD WIDENING

1 IN 3 BATTER TO EXISTING

8.0m WIDE PUMP STATION ACCESS ROAD

PROPOSED PUMP STATION

1 IN 2 BATTER WITH ROCK PROTECTION

PROPSED 5.0m WIDE UNSEALED ACCESS TRACK OUTSIDE OF FUTURE 18.0m ROAD RESERVE

18.0m

EXISTING GRAVITY SEWER ON 3.5m ALIGNMENT WITHIN FUTURE 18.0m ROAD RESERVE

3.5m ALIGNMENT

FUTURE BULKY GOODS SITE

PROPOSED PRESSURE MAIN ON 1.5m ALIGNMENT WITHIN 3.0m WIDE EASEMENT

1.5m ALIGNMENT

1.5m EASEMENT

3.0m PM

PROPOSED POWER ON 0.6m ALIGNMENT AND PROPOSED COMMUNICATIONS ON 1.5m ALIGNMENT WITHIN FUTURE 18.0m ROAD RESERVE

PROPOSED WATER MAIN ON 2.1m ALIGNMENT WITHIN FUTURE 18.0m ROAD RESERVE

FUTURE 25.0m WIDE DRAINAGE RESERVE

NEW SUBSTATION
STANDARD INSTALLATION
ONE INSTALLATION COMPRISING OF SWITCHGEAR, TRANSFORMER AND SITES MAIN SWITCHBOARD.

NEW HV CABLE TO BE INSTALLED IN TEMPORARY EASEMENT REFER TO DETAILS 'A' AND 'B' FOR INSTALLATION OPTIONS

520 (MAC SERVICES)

FUTURE 23.0m WIDE DRAINAGE RESERVE

PROPOSED 15.0m ROAD WIDENING

MADIGAN ROAD

PROPSED 6.0m WIDE UNSEALED ACCESS TRACK AND TURNAROUND FOR TANKERING LOCATION

APPROXIMATE LOCATION OF EXISTING SUBSTATION

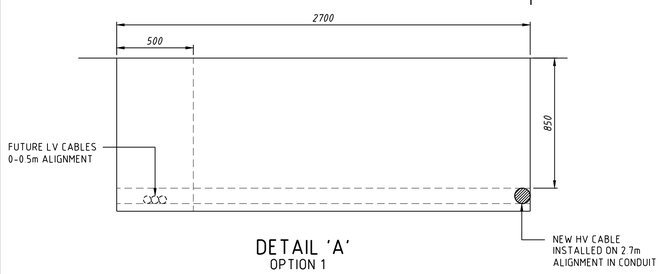
PROPOSED LOCATION OF BULKY GOODS SUBSTATION

EXISTING 20.0m ROAD RESERVE

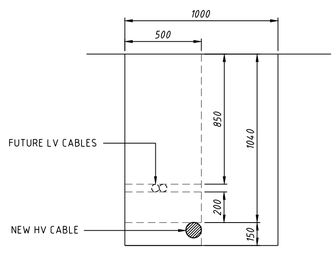
20.0m

EXISTING SWITCHGEAR CONNECT TO SPARE SWITCH

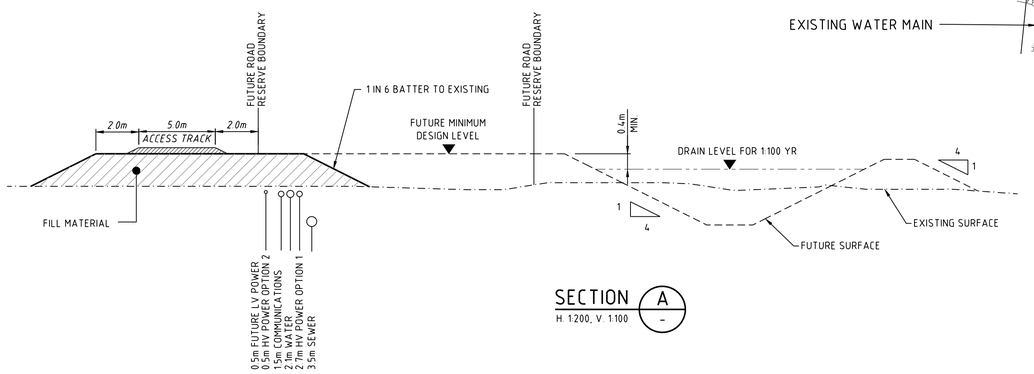
EXISTING WATER MAIN



DETAIL 'A'
OPTION 1



DETAIL 'B'
OPTION 2



SECTION A
H. 1:200, V. 1:100

LEGEND

- EXISTING SEWER MAIN
- FUTURE SEWER MAIN
- PROPOSED LV POWER
- PROPOSED HV POWER
- PROPOSED WATER MAIN
- FUTURE WATER MAIN
- PROPOSED COMMUNICATIONS

0m 25 50 75m
1:1250

No.	DATE	DRAWN	CHECKED	AMENDMENT
D	04.12.13	DP	PC	ISSUED FOR INFORMATION
C	03.12.13	DP	PC	ISSUED FOR INFORMATION
B	27.11.13	DP	PC	ISSUED FOR INFORMATION
A	20.11.13	DP	PC	ISSUED FOR INFORMATION

This plan is not to be used for construction unless issued as rev 0 or higher and signed as "Approved"

CLIENT: LANDCORP

DESIGNED	CHECKED	APPROVED
DP	PC	
DRAWN	CHECKED	
DP	PC	

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PROJECT: BULKY GOODS KARRATHA

TITLE: BULKY GOODS KARRATHA
PUMP STATION SERVICING STRATEGY

SCALE	DRAWING NUMBER	ISSUE
1:1250	6105-00-SK10	D