

CITY OF KARRATHA

Local Planning Strategy



Endorsed by the
Western Australian Planning Commission

2nd February 2021

Disclaimer

This is a copy of the Local Planning Strategy at the date of endorsement produced from an electronic version of the Strategy held by the Department of Planning Lands & Heritage. Whilst all care has been taken to accurately portray the current Strategy provisions, no responsibility shall be taken for any omissions or errors in this documentation.

Consultation with the respective Local Government Authority should be made to view a current legal version of the Strategy.

Please advise the Department of Planning Lands & Heritage of any errors or omissions in this document.

Department of Planning
Gordon Stephenson
House
140 William Street
Perth WA 6000

Locked Bag 2506
Perth WA 6001

website: www.dplh.wa.gov.au
email: corporate@dplh.wa.gov.au
tel: 08 6551 9000
fax: 08 6551 9001
National Relay Service: 13 36 77
infoline: 1800 626 477

City of Karratha Local Planning Strategy

PART A: October 2020



Preamble

The City of Karratha is poised for sustained economic and population growth as a result of global demand for the Pilbara region's resources. State Government investment in the concentration of regional health, education and community services in Karratha will support this growth.

The City's vision to be *Australia's most liveable regional City* recognises and supports the growth and development of the City. This Local Planning Strategy ('Strategy') sets goals focused on realising this vision. Strategies and actions have been set to achieve these goals.

It is a statutory requirement under the *Planning and Development Act 2005* to prepare a Local Planning Strategy as the strategic basis for the preparation of a local planning scheme. There is currently one local planning scheme which applies to the City. The City of Karratha Local Planning Scheme No. 8 was gazetted on 22 August 2000 and is now due for review.

This Strategy performs a key role within an integrated suite of documents that collectively form the City's planning framework. This consists of the City's Community Plan; The Local Planning Strategy; the Local Planning Scheme and Local Planning Policies.

This Strategy is a guiding document that can be amended as needed in response to changes in policy and factors influencing the City's growth and development. By its nature, it is dynamic and provides flexibility rather than prescription to achieve the City's, and ultimately the community's, aspirations.

The Strategy consists of two components:

Part A –Local Planning Strategy incorporates the strategy maps and actions required to implement the Strategy

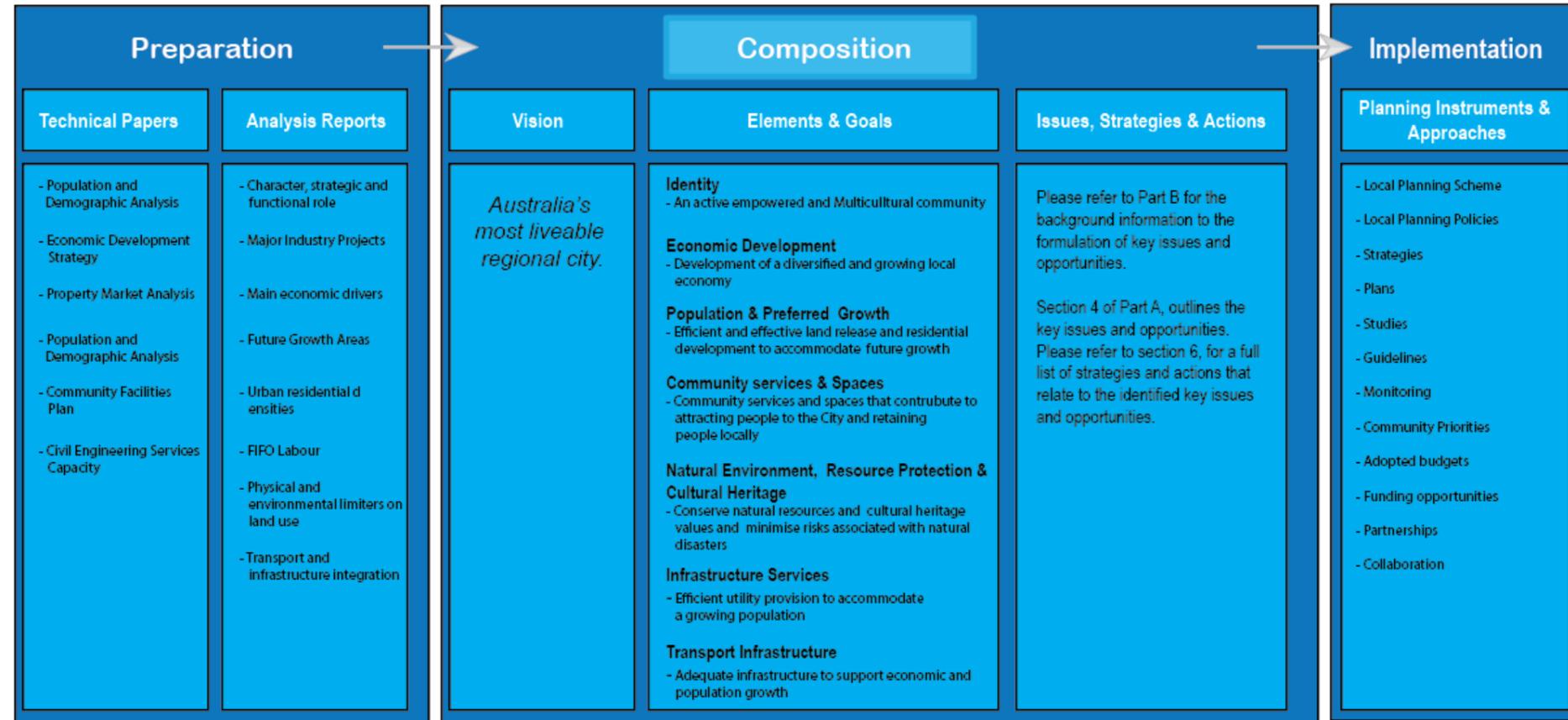
Part B – Local Profile and Context Analysis provides the relevant background to the Strategy, including analysis of information and the rationale for the Strategy.

Part A comprises a City wide Strategy Map, Strategy maps for each of the City's settlements. Settlement level Strategy maps have been provided for the major population centres that will play a key role in accommodating future population growth, including Karratha, Dampier, Roebourne, Wickham and Point Samson.

The Strategy Map for Karratha demonstrates Karratha's primary role in accommodating the majority of the City's future residential, commercial and industrial needs. Section 6 includes strategies and actions that support the strategic plan.

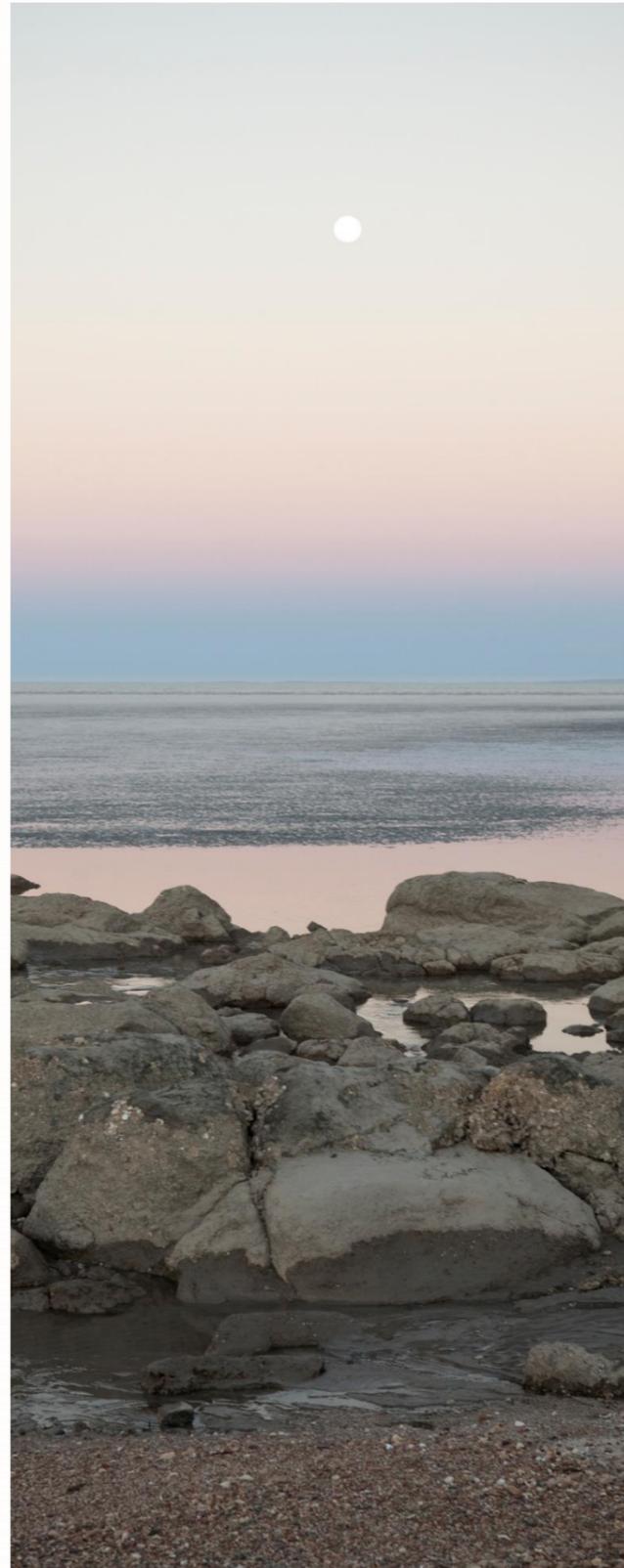


Local Planning Strategy



Contents

Preamble	2
1.0 Introduction	4
1.1 General City Profile	4
1.2 Strategic Framework	6
2.0 Vision, Objectives and Goals	7
3.0 Population & Land Supply	8
3.1 Projected Population	8
3.2 Land Supply	9
4.0 Issues and Opportunities	10
4.1 Population and Housing	10
4.2 Community Facilities, Recreation and Open Space	10
4.3 Economy and Employment	11
4.4 Retail, Commercial and Industrial	11
4.5 Tourism and Visitors	12
4.6 Physical Environment, Climate and Natural Resource Management	12
4.7 Urban Design, Character and Heritage	13
4.8 Rural Land	13
4.9 Infrastructure Services	13
4.10 Transport	14
5.0 Settlements	15
Karratha District	15
Eastern Corridor	15
5.1 Preferred Growth Pattern	19
5.2 Built Form Pattern	19
5.2.1 Urban Consolidation & Renewal	19
5.2.2 Housing Diversity	20
5.3 Karratha Overview	21
5.4 Dampier Overview	31
5.5 Roebourne Overview	38
5.6 Wickham Overview	42
5.7 Point Samson Overview	47
5.8 Cossack Overview	51
5.9 Minor Settlements and Aboriginal Communities	54
6.0 Strategies & Actions	55



1.0 Introduction

This is the City's first Local Planning Strategy and represents the land use planning direction that will help achieve the City's strategic and community aspirations.

Under the *Planning and Development (Local Planning Schemes) Regulations 2015* a local planning strategy must:

- a) Set out the long-term planning directions for the local government; and
- b) Apply any State or regional planning policy that is relevant to the Strategy; and
- c) Provide the rationale for any zoning or classification of land under the local planning scheme.

The Strategy provides both short to medium term outcomes and long-term opportunities. The Strategy is based upon a 10-15 year planning horizon with the capacity to accommodate an anticipated population of 26,045 by 2031 (WA Tomorrow) and the ability to expand to accommodate an aspirational population of 50,000. The Strategy will be subject to periodical review and update, this is especially important given the current global circumstances.

As the City continues to move forward, the Strategy will set the framework and direction to achieve the best possible regional outcomes, while creating a lifestyle which will make Karratha an attractive lifestyle option. The challenge is to continue to grow the City in a sustainable way and create a sense of place which is appreciated and admired by all who visit and choose to live within the City.

This Strategy has been designed to ensure the City can grow as required in a coordinated and timely way respecting cultural aspects of the area and building vibrancy, uniqueness, and pride in the community. This Strategy will guide strategic planning decisions and facilitate informed investment decisions.

The Strategy may be used to partner with State and Federal Government on strategies and actions that have shared priorities, acknowledging that implementation may extend beyond local jurisdiction alone. Some matters will require coordination on development infrastructure and service provision. A collective and coordinated forward planning approach by all levels of government is required to build investor confidence and deliver a sustainable economy underpinned by a diverse community.



1.1 General City Profile

The City of Karratha is one of four local government areas within the Pilbara region. Located approximately 1,500km from Perth, the City is bordered by the Town of Port Hedland to the east, and the Shire of Ashburton to the south (see Figure 1: City of Karratha Local Government Area).

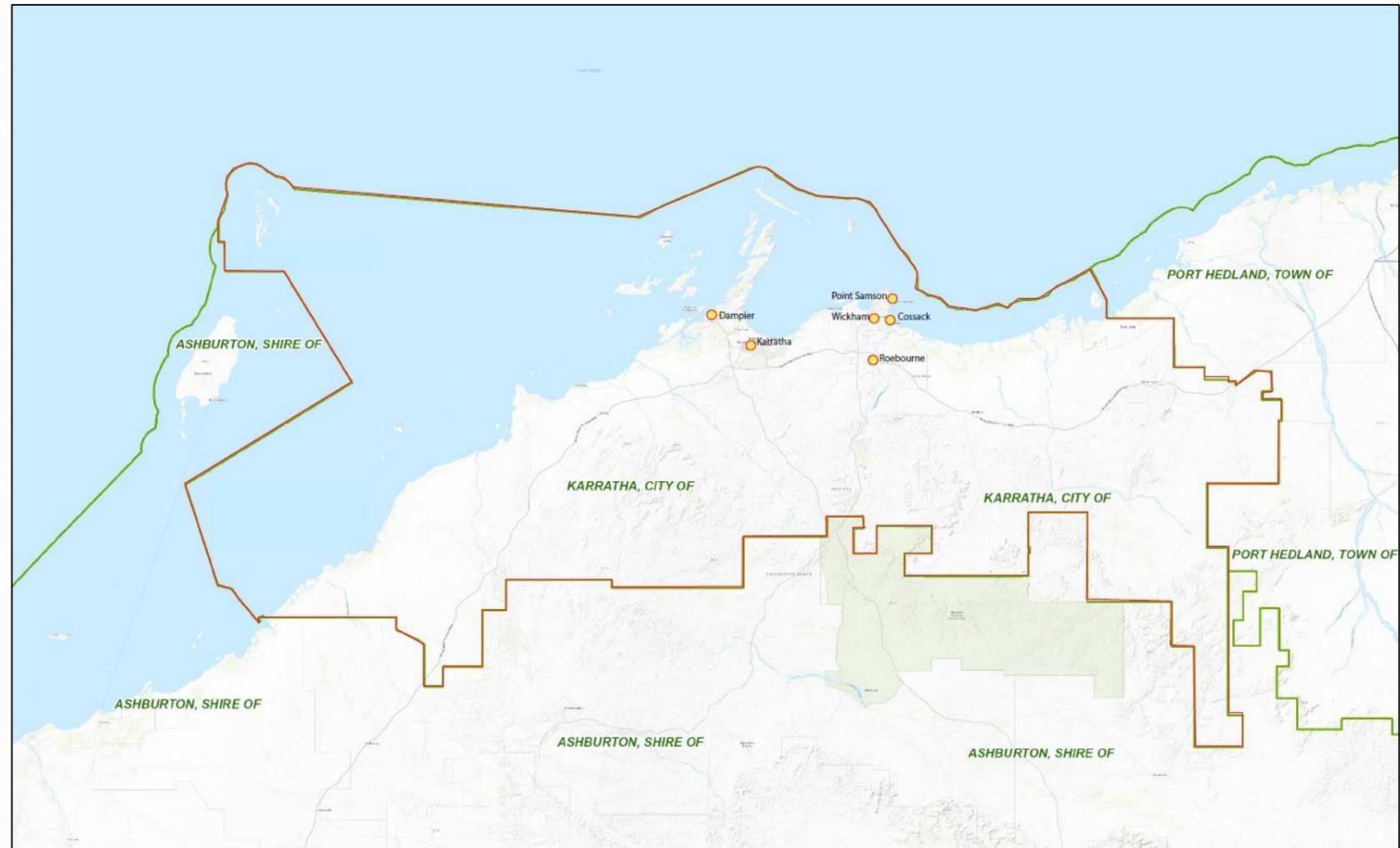


Figure 1: City of Karratha Local Government Area

Karratha is located on the coast, as are the Dampier, Point Samson and Cossack settlements. Wickham is located in close proximity to the coast with Roebourne located inland along the Harding River.

The Ngarluma/Yindjibarndi people are recognised as the traditional owners of a significant portion of land in the City and the Yaburara Aboriginal language group are recognised as the original inhabitants of the Burrup Peninsula and Dampier Archipelago. This, along with the post-contact European and Indigenous history of settlement and development of the land has shaped the

identity of Karratha.

The Montebello Islands, Dampier Archipelago and Burrup Peninsula are exceptionally valuable natural and recreational assets for the City, offering undisturbed habitat for numerous threatened species.

The Burrup Peninsula and the Dampier Archipelago are significant for their cultural heritage, containing the world's richest known concentration of petroglyphs (rock art). These assets afford substantial opportunity for recreation and tourism, and need to be managed with care to preserve ecological and cultural values.

It is an expansive local government area, covering approximately 15,278km² which is dominated by vast, raw landscapes and sweeping Spinifex plains. These areas are widely untouched but accommodate pastoral and mining purposes. The City also has an extensive coastline, running approximately 350km facing north and west to the Indian Ocean. The coastline is made up of sandy beaches, rocky outcrops, mudflats and mangroves.

The Burrup Peninsula Conservation Reserve and Murujuga National Park have been established to protect and preserve the wide diversity of native fauna and flora and cultural heritage values found within the City's boundaries. A World Heritage nomination is currently being prepared to have the unique cultural, spiritual and archaeological values of Murujuga recognised internationally at the highest level. In January 2020, the Murujuga Cultural Landscape was added to the World Heritage Tentative List, which is the first step in the World Heritage nomination process.

A Marine Management Area is in place for the Cape Preston and Gnoorea (40 Mile) coastal waters southwest of Dampier as well as the Dampier Marine Park. There is the further potential for the marine environment of the Dampier Archipelago and Montebello Islands to be protected as a Marine Park(s).

Cleaverville, Gnoorea (40 Mile) and Fortescue River are other important recreation and tourism nodes with popular coastal access and camping areas.

Considering the broader regional context around the City, the Pilbara region is recognised internationally as a major resources hub, with a reputation as the powerhouse of the nation, accounting for 35% of the mineral and petroleum production and 23% of merchandise exports. Continued growth is forecasted with continued long-term demand from across the globe for local resources.

In total, the resource extraction industry in the Pilbara totals more than \$77 billion worth of exports. The City of Karratha, with a GDP of \$7 billion (2019), primarily from the resources sector, is the highest in the Pilbara, second highest in WA and sixth in Australia. The City of Karratha is one of the region's two major service and extraction hubs where Government and Industry infrastructure such as ports, rail, freight and commerce intersect. The City's various ports function in support of the resources sector and are significant in the evolution of its permanent settlements and their associated amenity.

Karratha has evolved to become the major service centre of the region (see Figure 2: Regional Setting). The Karratha City Centre has become a true destination for visitors to the Pilbara region. The satellite settlements of Dampier, Wickham, Roebourne, Point Samson and Cossack each have their own unique character and have good access to the Karratha City Centre. While the supporting settlements are expected to continue to grow and develop, Karratha is anticipated to continue to grow as the primary settlement within the municipality. Together, Karratha and its satellite settlements represent a vibrant and diverse community and City of the North.

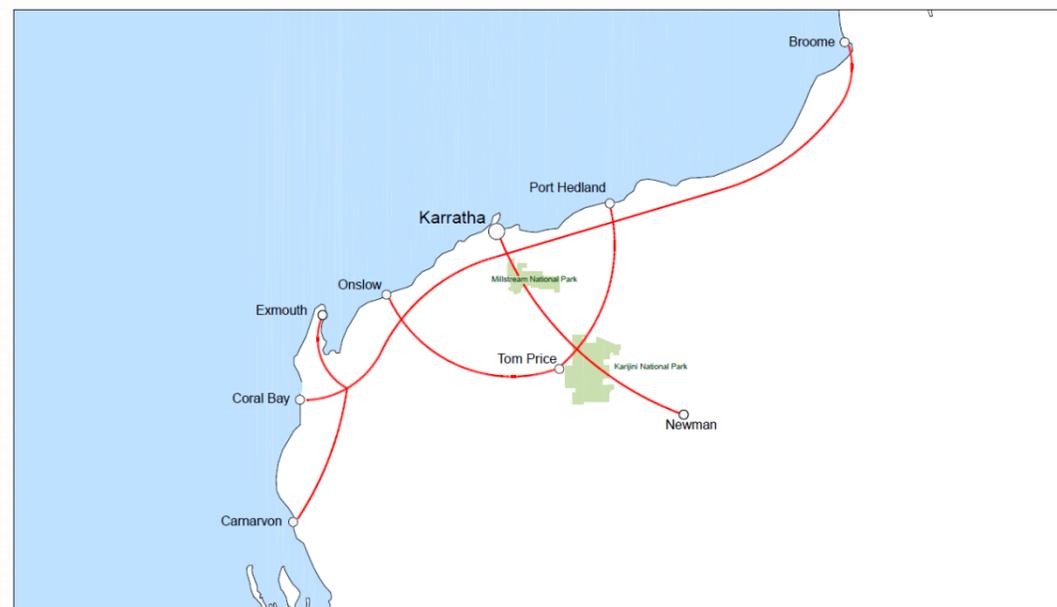
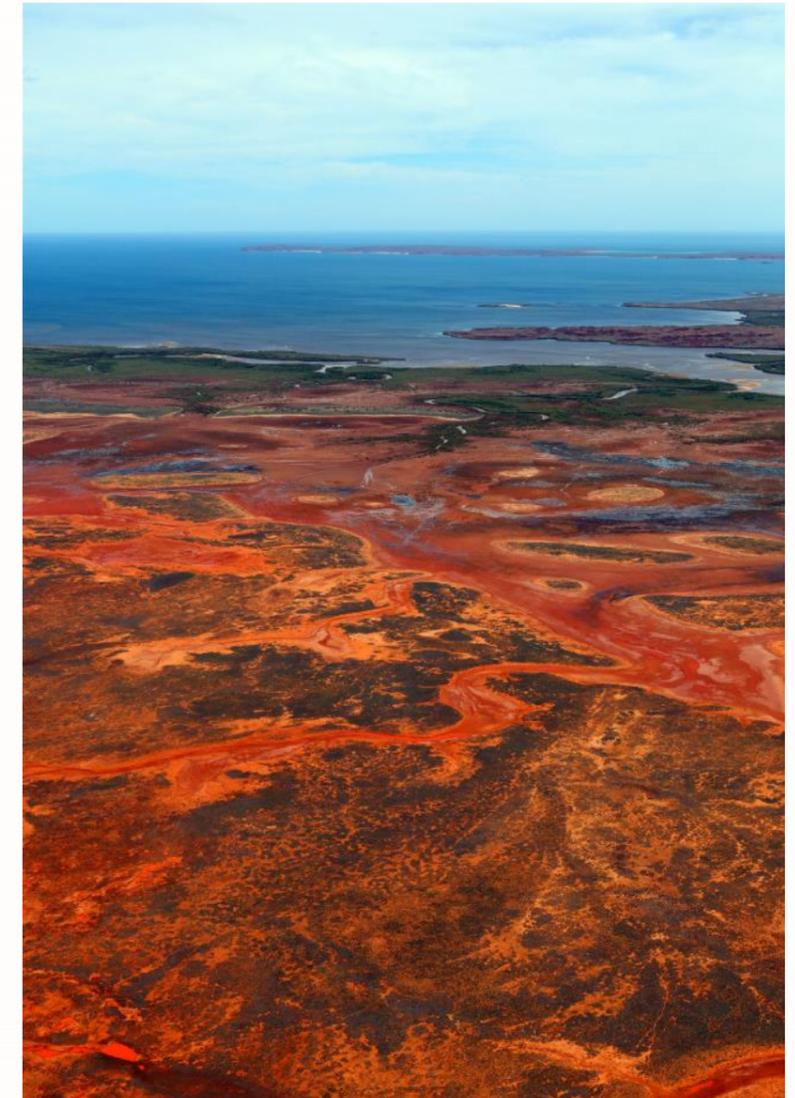


Figure 2: Regional Setting

1.2 Strategic Framework

The primary strategic planning document for the region (following the State Planning Strategy) is the *Pilbara Planning and Infrastructure Framework (WAPC 2012)* (see **Error! Reference source not found.**, this establishes the following settlement hierarchy within the City:

- Pilbara City – Karratha
- Major Town – Wickham;
- Towns – Dampier & Roebourne;
- Village – Point Samson, Cossack; and
- Aboriginal Communities – Weymul, Mingullatharndo & Cheeditha.

A fundamental element of this Strategy is that Wickham, Roebourne, Point Samson and Cossack form what is referred to as the *Eastern Corridor*. The intent of this grouping of settlements is to ensure the provision of local services and facilities is framed at a corridor level rather than viewing each settlement separately. This approach gives order to the provision of facilities and services whilst avoiding unnecessary duplication.

A minor departure from the *Pilbara Planning & Infrastructure Framework* settlement hierarchy is the identification of the following minor settlements being:

- Fortescue River (comprising Fortescue Roadhouse and the Fortescue River Mouth recreation area); and
- Whim Creek (as represented by the Whim Creek Hotel).

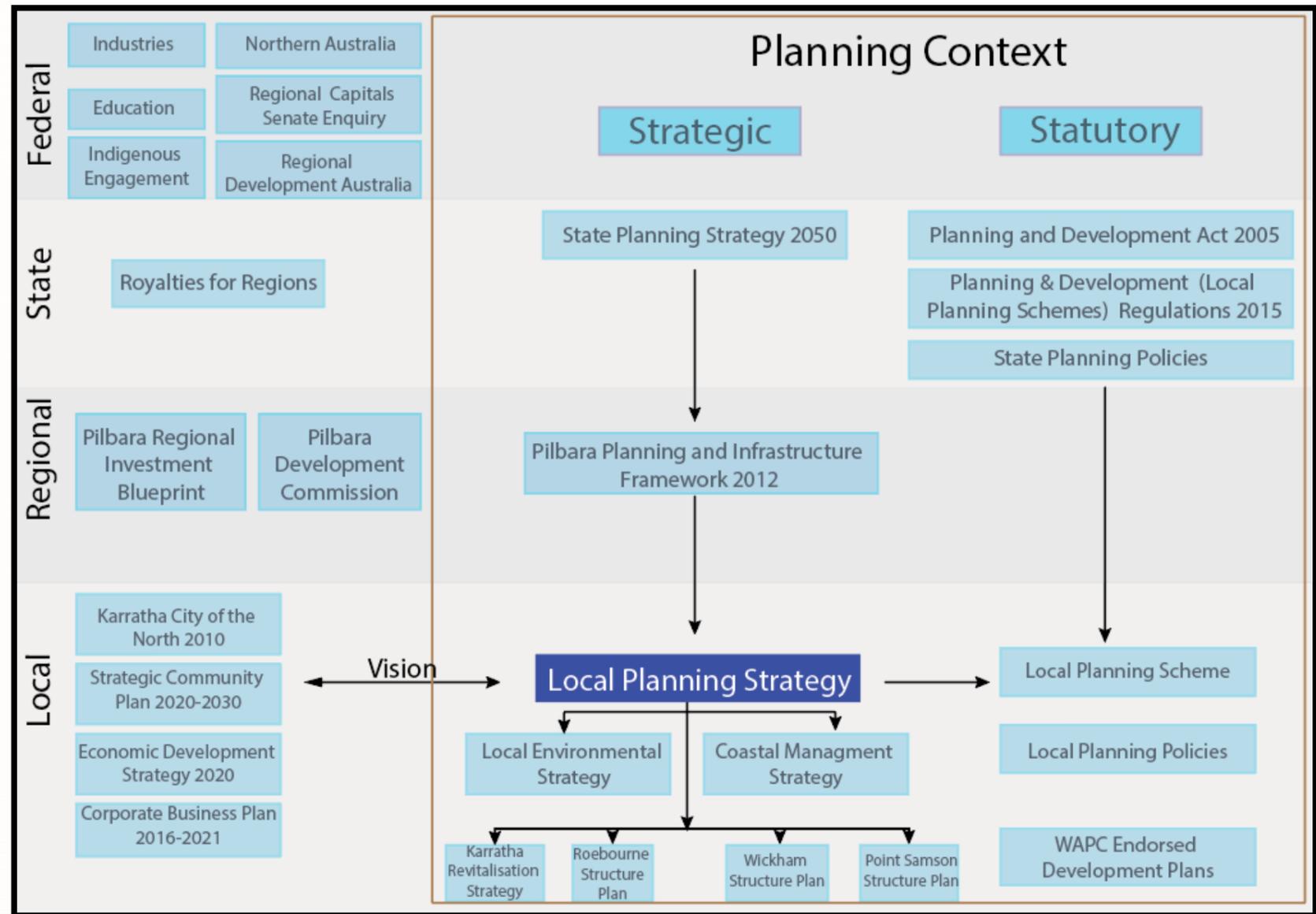
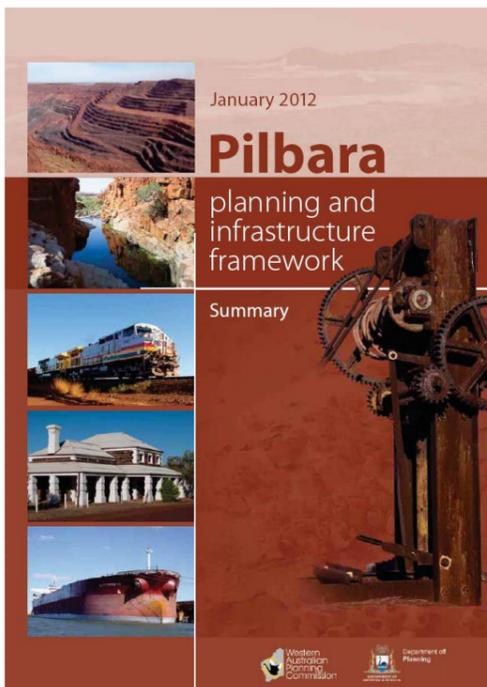
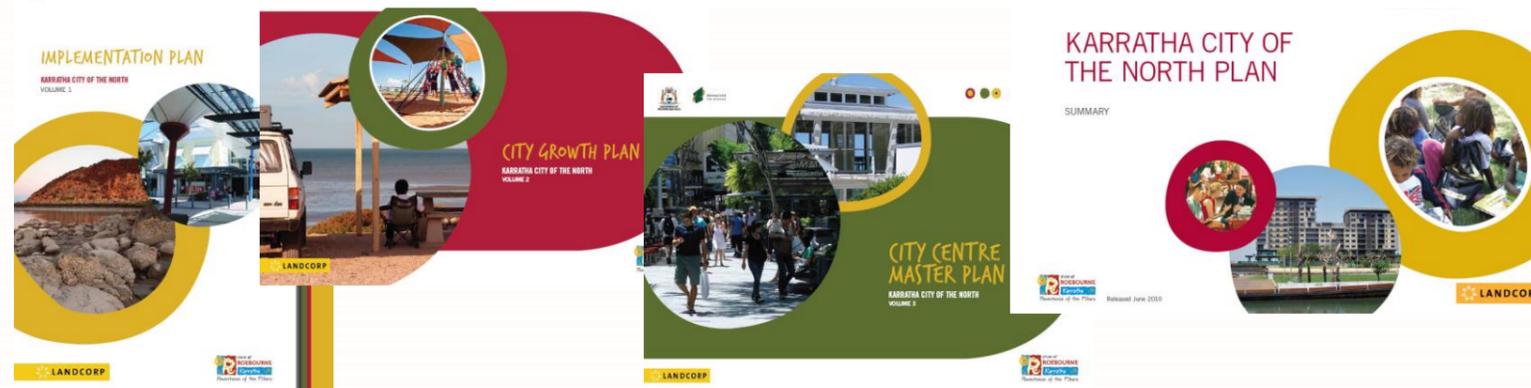


Figure 3: Planning Context



2.0 Vision, Objectives and Goals

The City's *Strategic Community Plan 2020-2030* identifies Council's vision for the City as:

"Australia's most liveable regional city."

The overall objective of this *Strategy* is to provide a City-wide strategic plan to guide growth and development in the City over the next 10-15 years. More specific goals and objectives for each key theme are set out below:

Identity

Goal:

An active empowered and multicultural community.

Objectives:

- To create a planning framework that recognises the City's unique character and sense of place.
- Guide the future sustainable development of the City of Karratha, characterised by a diverse permanent residential population and stable workforce.

Economic Development

Goal:

The development of a diversified and growing local economy.

Objectives:

- Position the City as the main service centre for North Western Australia.
- To foster local economic development and diversification of the existing economic base.
- To expand the retail and commercial offering of the City to strengthen the City's position as the major regional service centre of the Pilbara.
- To support and develop tourism as a key component of the City's economy.
- To facilitate the growth and development of Industry and the creation of jobs.



Population & Preferred Growth Pattern

Goal:

Efficient and effective land and residential development to accommodate future growth.

Objectives:

- To identify a settlement strategy to meet the needs for a population of 26,045 by 2031, whilst allowing for and considering an ultimate population of over 50,000.
- To provide appropriate Pilbara housing options to accommodate a range of demographic groups.

Community Services and Spaces

Goal:

To enable community services and spaces that contribute to attracting people to the City and retaining people locally.

Objectives:

- Provide a variety of community services, facilities and recreational areas that contribute to maintaining a desirable lifestyle, promote liveability whilst enhancing the public health of the community.

Natural Environment, Resource Protection & Cultural Heritage

Goal:

The conservation of natural resources and cultural heritage values and minimise risks associated with natural disasters.

Objectives:

- To encourage appropriate recognition and consideration of the City's climate and natural environment.



- To promote and celebrate the City's unique natural and manmade heritage, character and sense of place.
- To ensure planning of rural and environmentally sensitive land enables appropriate use of land and its resources.

Infrastructure Services

Goal:

Efficient utility provision to accommodate a growing population.

Objectives:

- To plan for utility and service delivery to support the City's population growth and urban development.

Transport Infrastructure

Goal:

Adequate infrastructure to support economic and population growth.

Objectives:

- Anticipate demands and enable the provision of infrastructure to ensure timely provision.
- To provide transport infrastructure that achieves efficient connectivity between and within settlements in the City and the Pilbara Region and limits freight traffic through settlements.



3.0 Population & Land Supply

The Australia Bureau of Statistics Estimated Residential Population for the City was 22, 716 at June 2019.

Settlements are located in the northern coastal area of the City generally between Dampier and the Harding River. The City's major settlements are:

- Karratha – with approximately 80% of the population, Karratha is the primary service centre for North Western Australia;
- Dampier – a port town developed by Hamersley Iron to support its iron ore export operations with growing tourism, coastal and marine recreation use;
- Eastern Corridor comprising:
 - Wickham (major town) - Service town for Rio Tinto's recently expanded Cape Lambert Port;
 - Roebourne (townsite);
 - Point Samson (village); and
 - Cossack (historic townsite).

A handful of other outlying communities and townsites comprise a very small proportion of the overall population.

Outside of the main townsites, which are considered in detail by the subsequent Settlement section and land use plans, the key planning purposes of the City's lands are to:

- Protect key areas of natural significance;
- Support cultural and natural resource use of lands;
- Support ongoing pastoral activities; and
- Facilitate diversification of the economy through tourism and other appropriate development.



3.1 Projected Population

The population of the City of Karratha is highly dependent on the level of economic activity in and around the City. Karratha has grown considerably since its inception and has weathered sudden and substantial changes in population growth in the past. Cycles associated with the resource sector make forecasting population growth less certain than in many other locations. Given the City's historical population pattern, it is important that forecasts that underpin this strategic planning document are monitored and regularly reviewed to make sure the strategies and actions are reflecting and responding to current circumstances.

There are several sources of population projection for the City of Karratha and these vary between agencies and demographic experts which have undertaken forecasts of population growth.

This Strategy is based on population projections prepared for the WA Tomorrow (2019), which were the most recent forecasts at the time of preparation of this Strategy.

As outlined in the Table 1: Population projection (Band E WA Tomorrow, 2019), the latest population projections for the City are that it will grow to 26,045 (under Band E of WA Tomorrow) by 2031.

Table 1: Population projection (Band E WA Tomorrow, 2019)

POPULATION	2011	2016	2021	2026	2031
City of Karratha	23,630	22,160	23,535	25,000	26,045

In addition to the City's population in 2031 an estimate for long term (FIFO) workers also needs to be considered. Based on previous work Syme Marmion & Co (2014) estimated FIFO numbers in the order of 2000 to 2500 in 2031, as follows:

- Woodside (300)
- Rio Tinto (600 – 650)
- Others (1,000 – 1,500)

The above figures will be subject to change and will need to be reviewed periodically. Operations at Cape Preston and Anketell may increase the amount of FIFO by approximately another 1,000, but this will depend on a variety of factors, in particular final workforce arrangements. Accordingly these additional FIFO workers have not been included in the estimates.

While the Strategy plans for a population of 26,045 by 2031 it also provides the enabling framework to allow the City to expand to a population of 50,000 and beyond in the future.

The distribution of projected population growth to 2031 and beyond is shown in Table 2: Distribution of projected population growth below. These are the figures which underpin the preferred approach to accommodating population growth in this Local Planning Strategy.

Table 2: Distribution of projected population growth

POPULATION	2016	2021	2026	2031	Long term
City of Karratha	22,165	23,525	25,000	26,045	50,000
Karratha District	16,325	17,420	18,650	19,705	
Dampier	1,146	1,176	1,243	1,321	
Wickham/Point Samson	2,381	2,414	2,473	2,543	
Roebourne/City Remainder	2,313	2,525	2,634	2,476	

Source: WA Tomorrow (2019), ID Consulting Projection (City of Karratha); Syme Marmion

From this forecast it can be seen that:

- Karratha retains its dominance, and will be the primary focus of urban growth;
- The largest growth outside Karratha will likely be in Wickham;
- Roebourne is expected to have minor growth; and
- Dampier is expected to have minor growth unless townsite constraints are addressed.

The short term focus of the Strategy is to ensure infrastructure and residential land supply is in place to support the population at 2031. The long term focus is to ensure an adequate supply of Urban Expansion land in addition to reserves of Development Investigation Areas for future consideration. The Strategy seeks to be prepared to accommodate increased demand quickly without flooding the market with new residential lots and new dwellings.

The cost of developing land in the City is very high when compared to other parts of the State. The high cost is due to a range of factors including:

- The dominance of Crown land;
- Lengthy lead times;
- Native Title resolution;
- Transportation costs;
- Labour costs; and
- Construction standards associated with a cyclone prone area.

The intent of this Strategy is to prepare for waves of development so the City is able to accommodate the growth to 2031.

As much as possible infrastructure and investment should anticipate growth waves generated by changes in resource industry cycles. The City will continue to monitor and review the situation to identify potential changes and work with

While the strategy plans for a population of 26,045 by 2031 it also provides the broad context of planning decisions for the City to expand to a population of 50,000 and beyond in the future.

3.2 Land Supply

This Strategy has considered the amount of available land supply of different zones of land, as well as the implications of areas identified for future investigation on overall land supply.

A large body of work has recently been progressed which has considered land supply in the City of Karratha. Assessments recently completed by the Department of Planning, Lands & Heritage in 2020 include:

- The Karratha Regional Land Supply Assessment (KRLSA): Provides a detailed assessment of the Karratha urban area by assessing land for future residential, industrial and commercial uses. The assessment provides context for the land use planning and infrastructure provision required to meet demand across selected regional centres in Western Australia.
- The Karratha Land Capacity Analysis (KLCA). Provides a broad assessment of land zoned for residential, rural residential, industrial and commercial uses. The assessment calculates the amount of zoned land that is developed and capable of substantial further development for the whole local government area.

Ultimately both assessments established that there is a sufficient supply of land (both currently zoned and identified for future development/investigation) to cater for population growth in the medium to longer term.

RESIDENTIAL

The Karratha urban area has approximately 840ha of land for 'residential' purposes with approximately 760ha of land for 'future residential'. Within Roebourne approximately 180ha of 'residential' land exists, whilst Wickham contains approximately 155ha of 'residential' land with 10ha of 'future residential' land. A relatively smaller amount of land exists in Dampier with approximately 100ha of 'residential' land and 20ha of 'future residential'. Point Samson has the smallest supply, with approximately 23ha of 'residential' land and 27ha of 'future residential' (KLCA, 2020).

INDUSTRIAL

The City contains a sufficient stock of industrial land to cater for further industrial expansion. In total there is approximately 3000ha of currently zoned 'industrial' land within the City's settlements (this number excludes the large amount of the Strategic Industry zone outside of the City's settlements) (KLCA, 2020).

The KLCA identifies approximately 630ha of current 'industrial' zoned land within the Karratha urban area and approximately 1,240ha of 'future industrial' land. The KLCA further identified that there is approximately 2300ha of 'industrial' land surrounding Dampier, this number is however mostly made up of the 'Strategic Industry' zone. Within Roebourne, there is 16ha of 'industrial' zoned land and 14ha of 'future industrial' land. Wickham currently has 8ha of 'industrial' zoned land and 20ha of 'future industrial' land. Point Samson has the smallest supply of 5ha of 'industrial' zoned land.

COMMERCIAL

There is sufficient stock of commercial land in the City to cater for commercial expansion.

The KLCA has identified that the Karratha urban area has approximately 77ha of zoned 'commercial' land and approximately 34ha of 'future commercial' land. Within Wickham there is currently 49ha of 'commercial' zoned land whilst Roebourne has 27ha of currently zoned 'commercial' land with 10ha of 'future commercial' identified. Point Samson currently has 1ha of 'commercial' land with 1ha identified for 'future commercial'.

LAND SUPPLY CONCLUSIONS

There are sufficient stocks of residential land in the Karratha urban area to accommodate population growth to address the current investment cycle and into the long term.

The Karratha Land Supply Assessment notes that land identified for residential development within the Karratha urban area has the capacity to support a population of approximately 28,000. This capacity is premised on population growth anticipated by WA Tomorrow and a hypothetical temporal land supply of 49 years.

It is important to note that the KLCA assessment estimates potential population yield from areas determined to be capable of substantial further development by broadly considering a range of density scenarios. This was undertaken for all settlements in the City. This is a theoretical and strategic analysis for the purposes of longer-term scenario planning which adds to the detailed work that has been undertaken by the KRLSA.

There is also sufficient stock of industrial land to cater for industrial expansion. Within the Karratha urban area, 94 hectares of industrial expansion land is available within the Gap Ridge Industrial Estate.

Outside of the Karratha urban area, approximately 12,700 hectares of industrial land has been identified for industrial expansion in the suburbs of Maitland, Mount Anketell, Roebourne and Wickham. The two largest of these sites are part of the Maitland Strategic Industrial Area and the Anketell Strategic Industrial Area and are to accommodate large scale industries such as gas or petroleum processing and downstream processing, mineral resource processing and export, as well as general industrial activity (Karratha Land Supply Assessment, DPLH 2020).

There is significant land amount of land zoned for industrial use (3488 hectares) on the Burrup Peninsula that is presently being utilised by the Pilbara Port Authority, Woodside, Rio Tinto, Dampier Salt and Yara Pilbara. Key projects that are currently underway or under advanced consideration on the Burrup Peninsula are Woodside's Burrup Hub (Pluto Train 2, Scarborough Development and the North-West Shelf Refurbishment and Browse Development) as well Project Destiny (Perdaman's Urea Plant).

In total land zoned for industrial development in the City amounts to 15,327 hectares. The Strategic Industry zone accounts for most of this zoned land (94 per cent), while land zoned as Industrial Development and Industry account for 4 per cent and one per cent respectively.

There is sufficient stock of commercial land in the City to cater for commercial expansion. Approximately 75 hectares of land is available principally within the

Karratha City Centre and in the suburbs of Nickol, Gap Ridge, Stove Hill, Pegs Creek and the Karratha Industrial Estate.

There is significant land adjacent to the Karratha airport which may have capacity to cater for long-term service commercial use and emerging renewable energy based industries adjacent to the airport (Karratha Eco Hub project). This is subject to further investigation, including the long-term tenure arrangements of Crown land.

4.0 Issues and Opportunities

The key issues and opportunities provide the background and context for the formulation of strategies that will guide land use change and development in the City over the lifetime of the Strategy. Key issues and opportunities are highlighted below with a more comprehensive assessment found within Part B. The numbers do not reflect a level of priority and have been used to assist in establishing the connection between the issues/opportunities, strategies and actions.

4.1 Population and Housing

With a potentially volatile population growth in the future, the intent of this Strategy is to prepare for the next wave of development activity so that a population of up to 50,000 can potentially be accommodated in the future. Several issues and opportunities were identified in Part B of this Strategy and are listed below:

1. The speed, scale and sustainability of growth depends largely on the extent to which the economy diversifies around its very strong base in the minerals and energy sector. Resource projects alone are not sufficient enablers of sustainable employment and population projections.
2. Analysis of comparable resource dependent settlements suggests that the likely growth pattern will be the mid growth scenario. It should be noted that growth is unlikely to be linear and more of a 'stepped' progression.
3. A decline in the level of construction activity, increase in services activity and general diversification of the existing economic base are projected to impact the composition of the workforce as follows:
 - Reduction in FIFO numbers as major construction project are completed;
 - Stabilisation of the operational workforce;
 - Growth of the service population (particularly for consumer services);
 - High increases in the retail, education services and health services sectors;
 - Possible growth of producer services;
 - Some increase in knowledge intensive producer and consumer services; and
 - Workforce changes will in turn affect the following demographic changes:
 - Increasing proportions of school-age children; and
 - Decreasing proportions of those aged 20-49.
4. Workforce and demographic changes will likely be accompanied by changes in income patterns, with an increase in the proportion of lower and middle income households. This will put pressure on all aspects of affordability in the City. Unless workers of moderate incomes can be accommodated in the City, in large numbers, the opportunities for

economic diversification that underpin the higher population scenario will not be realised. There has been pressure on housing affordability for some time and all relevant agencies need to continue to focus on affordability with increasing intervention such as subsidised key worker accommodation.

5. After experiencing significant house price growth from 2000-2012 dwelling sales and prices fell significantly. Since the second quarter of 2017 there has been a slow recovery in the medium dwelling sale price to \$420,000 as of Q1 2020.
6. Over 76% of dwellings in the City are rented, therefore supply of rental properties to the market is an important consideration. The average weekly rent in Karratha peaked in 2007 at \$2,180 per week. As of Q2 2019 the average weekly rent was \$585 which was 38% higher than June 2019.
7. Based on 2016 ABS data, the City has an existing dwelling stock of approximately 9,759, with approximately 79% of this located in Karratha. The City's preference is for more permanently based residents with home ownership in the City encouraged. The City will require approximately 950 new dwellings and up to 9,500 dwellings by 2031 under the mid and high growth scenarios respectively. The estimated housing mix required comprises 75 – 80% single / low density, 10 – 12% grouped dwellings / medium density, 5 – 8% multiple dwellings / high density and 2 – 4% short-stay accommodation.
8. As at 2016 four or more bedroom houses were the predominant housing typology in the City, making up 42% of the total occupied dwelling stock at the time. Three bedroom houses made up 39.8% of the dwelling stock. Data for the Karratha urban area indicates that 50% of occupied private dwellings (approximately 3,700) are under-utilised in that they have one or more extra bedrooms than required.
9. Karratha has the greatest capacity for additional dwellings on land that already has some development, but there is also a significant capacity for additional dwellings on built lots in Dampier. In terms of vacant residential land, Karratha has the greatest capacity for dwellings followed by Roebourne, Wickham and Dampier. The age of existing dwelling stock, with 45% of dwellings constructed between 1970 and 1988 presents opportunities for redevelopment. The City will monitor land supply requirements to facilitate affordable residential accommodation.
10. Other opportunities for infill development exist in the form of surplus public open space and town centre redevelopment. Opportunities and community appetite for infill are greatest in and around Karratha's central suburbs as per the Karratha Revitalisation Strategy and in Dampier.
11. Urban expansion areas when combined with infill development will be able to achieve additional dwelling supply requirements. Current Development Plans/Structure Plans for Mulataga, Madigan Estate and Nickol West in Karratha, NASH in Roebourne and Wickham South have the capacity to supply an additional 4,587 dwellings collectively. Recent land supply assessments note sufficient land has been identified for long term residential supply.

12. There are significant opportunities for infill development and redevelopment in Dampier. One urban expansion area is identified (The Lookout). Nonetheless, appropriate planning, and particularly resolution of infrastructure requirements, is needed to facilitate infill.
13. Point Samson's projected additional dwelling demand at in the short term is low, with growth considered to be negligible until the long term. Urban expansion will, however, be required to meet longer term growth in Point Samson.
14. There is a need to continuously engaged with the community throughout the planning process to better inform the City's decision making.

4.2 Community Facilities, Recreation and Open Space

To support the high population projection implicit in the Pilbara Cities vision the City will need to contain a rich mix of community facilities and services to support its population in happiness and prosperity. The following issues and opportunities have been identified:

15. The majority of population growth, and therefore demand for community facilities and services will be in Karratha. The population growth in other settlements, will justify demand for some increase in services and facilities. These are of a local nature in general and should not substitute for larger and more regionally based facilities that will be required in Karratha. The City will continue to monitor community facility thresholds and have regard to the Community Facilities Plan when planning for additional facilities.
16. There is a wide range of community facilities across the City. While many facilities require upgrades or expansion to adequately service the population, others are high quality, providing valuable service to the community.
17. An ongoing consideration for the City will be maintenance and management of community facilities, which have ongoing costs.
18. There is a need to ensure that education services are maintained at a high level to keep people in place longer, including better quality secondary school education and upgraded tertiary education with development of regional research specialties.
19. Identification of suitable retirement sites for the future.
20. Opportunity for the co-location of health services within a precinct that meets all of the health needs of all the community, including aged care and specialist facilities.
21. A richer cultural life, with a wide variety of cultural activities.
22. Well supported and vibrant community groups.
23. The City has a wide range of formal and informal sporting/recreation opportunities.
24. Places for people to meet – Where practical and reasonable community facilities should be within/adjacent to activity centres, this means paying

attention to the liveability of the major centres, particularly the Karratha City Centre.

25. The *Karratha Leisureplex* performs a regional, district and local level function for sport, recreation and leisure uses. Programming and use of this space must be maximised. Its provision of court space will likely generate substantial increase in participation in basketball and netball due to the latent demand suppressed by the former *Karratha Entertainment Centre* facility.
26. The *Karratha Cultural Precinct* also performs a regional, district and local level function. The precinct addresses the immediate gaps in community facilities, particularly since the closure of the Walkington Theatre in 2011.
27. Lazy Lands, the *Dampier Townsite Redevelopment and Revitalisation Strategy*, and the newer Dampier Townsite & Foreshore Enhancement Plan have identified under-utilised or surplus open space which could be repurposed.
28. The City currently meets or exceeds benchmark requirements for provision of district and local public open space, including playing fields, parks and playgrounds. Despite this, continued rapid growth of the City will necessitate provision of new public open space, and will particularly require new playing fields in Mulataga, Baynton East and Nickol West for Karratha. Clubroom / clubhouse facilities to serve all new oval facilities are essential. There is also need for upgrading of existing clubhouse facilities which fall below assessed service standards.
29. There may be need to provide for additional rectangular pitch sports (predominantly soccer) which is currently experiencing significant growth across the State above population growth. There may also be need to provide hockey facilities. Assessment is required to consider whether this infrastructure would be viable.
30. Public open space for the purpose of drainage is a vital consideration of urban design in the Pilbara environment, which is subject to severe rainfall patterns, cyclonic events and coastal inundation. There is the potential for staged enhancement of drainage reserves within the City.
31. An increased understanding of coastal processes and flood risk has, however, allowed identification of 61 parcels of public open space in Karratha that are surplus to the required drainage network. Infill development of this surplus public open space will be an important component of increased dwelling supply in Karratha.
32. The ecological integrity of regionally significant open space found along the City's coast is increasingly impacted by industry and recreation uses associated with the growth of the City. Active management of coastal areas, in accordance with *SPP 2.6*, should be a priority for the City. The *Foreshore Management Plans* completed for 40 Mile, Karratha, Point Samson, Gnoorea, Hearson Cove, Wickham Boat Beach and Cleaverville demonstrate measures underway to achieve successful coastal management. The City should seek to prioritise implementation of these plans.

33. Additional regional open space around major landscape and environmental features inland from the coast also warrant conservation and preservation. A proposal to create a recreation and nature reserve over the Karratha Hills provides means to ensure protection and enhancement of this significant landscape feature.

4.3 Economy and Employment

The City's economy is highly dependent on the resource sector, which can be subject to short term global impacts. In this context, the medium to long term growth and the City's economy must be viewed with equal caution. The City must identify medium to long term opportunities for diversification of the economy and must factor in lower growth rates in the region of 1.5% between 2021 and 2031. Key economic and employment issue and opportunities which have been identified include:

34. Major industry will continue to provide a base for the City's economy however there is a need to encourage diversification.
35. Establishment of Karratha as the primary regional centre for the North West, enhancing its competitive position and attractiveness for residential workforce.
36. The City has a large supply of zoned and serviced industrial and commercial land, this needs to be monitored to ensure it is sufficient for the long term.
37. Facilitating the development of small and medium enterprises (SMEs) in statutory planning.
38. Facilitating the provision for land for small business, including incubation projects, clustering.
39. Ensuring the needs of agri-business enterprises are accounted for in strategic planning.
40. Identifying sites and infrastructure to support Karratha SHS as a centre of excellence and the establishment of tertiary education facilities and services in the City.
41. Promote the development of Anketell and Maitland Strategic Industrial Areas.
42. Expansion of the health campus with incorporation of areas of specialisation.
43. The expansion of aged care services and facilities in the City, including NGO support.
44. Regional-level recreation / sports facilities can create employment whilst also providing for additional economic activity.
45. Implementation of the Karratha Airport Master Plan (as revised 2013), including regular international services.
46. Accommodation for expanded government services and increased defence presence.
47. Affordable accommodation and diversity of supply, for both residential and commercial accommodation.

Additional studies and strategies are required to support the objectives of the *Local Planning Strategy*:

- Formulating a digital strategy to enable remote and tele-working, improved e-health and e-education opportunities, and improved viability of regional services and administration.
- Promoting cultural activities and facilities.
- Expanded secondary school, including boarding facilities;
- Placement of accommodation for FIFO workers (especially operational FIFO) to enable community engagement.

4.4 Retail, Commercial and Industrial

The majority of the City's retail and commercial floorspace is provided for within the Karratha urban area. This Strategy supports the Karratha urban area offering retail and commercial services to the regional catchment, with retail and commercial floorspace in other settlements generally supporting the local community only. The following issues and opportunities have been identified:

48. Karratha is, and will remain, the primary retail and commercial centre for the City, with other settlements providing local level services and facilities to residents and visitors. Overall, the retail offering of the City should be able to provide for a minimum 80% of the population's retail floor space needs.
49. Based on a medium population growth scenario, it is expected retail floor space demand (including bulky goods) will largely be accommodated within Karratha as it will continue to act as the regional service hub for the Pilbara. However, future demand for retail floorspace should be closely monitored to assess demand amongst emerging online retailers and services which may diminish the need for a physical store front. It is expected that Karratha will be able to accommodate short to medium term demand.
50. The Karratha City Centre and surrounds will continue to act as the major hub for bulky goods land uses, while Dampier, Roebourne and Wickham will provide for a smaller share of bulky goods floor space area. Additional floorspace demand should be closely monitored against the future expansion of complementary industrial land uses.
51. There is sufficient stock of commercial land in the City to cater for commercial expansion. Approximately 75 hectares of land is available principally within the Karratha City Centre, and in the suburbs of Nickol, Gap Ridge, Stove Hill, Pegs Creek and the Karratha Industrial Estate.
52. Demand for commercial related land uses decreased between 2003-2019. It is estimated short to medium term demand can be met with existing land supply. Additional commercial land should be carefully considered in association with monitoring of long term demand for the land use.
53. Areas are needed to cater for large format retail/bulky goods and showrooms, it is recommended that the 'service commercial' zone be included in the local planning scheme; 53

54. The current provision of Light / General Industry land is estimated to be sufficient to meet demands to the medium term, but additional land may be required to accommodate industry growth beyond 2031. It is anticipated this will be provided for adequately through planned projects, including Karratha Industrial Area expansion and Gap Ridge North in the first instances, although these areas require comprehensive planning prior to development. To a lesser extent, additional light industrial land will also be available in Wickham and Roebourne.
55. Existing and planned industrial areas should be appropriately zoned for light, general or strategic industry in recognition of their primary function to prevent encroachment of incompatible uses.
56. Zoning of existing and planned Strategic Industrial Areas should include off-site buffer areas or appropriately define buffer areas within designated Special Control Areas.
57. The local planning scheme should maintain freight accessibility to Strategic Industrial Areas and associated ports with infrastructure corridor reservations.

4.5 Tourism and Visitors

Karratha's tourism sector is in its relative infancy. There is a substantial opportunity for the City to take advantage of its significant assets in order to increase tourism as a proportion of the total economy from its currently fairly low base. Several issues and opportunities have been identified:

58. The City has several world-class quality tourism attractions to form the basis for a larger and viable tourism industry. In addition the City has approximately 81.18 ha of land zoned for tourism related land uses. These areas are strategically located within close proximity to coastal areas and existing townships. However, despite the natural amenity and land availability, tourist facilities amenity is currently inconsistent and not highly developed.
59. Improvements to accessibility, particularly inter-State and international flight connections with the expansion of Karratha Airport will be important to opening up the tourism market. Intra-State flights are currently prohibitively expensive to the tourism market, and promotions or package deals that provide for discount tourist flights may provide another means to increase tourism.
60. Lack of accessibility, affordability and diversity for tourist accommodation is currently a critical limiting factor, as FIFO workforce drive demand and prices up. The range and scale of tourist accommodation currently offered is a fraction of that available in other similar regional localities. Demand for accommodation is expected to ease with the winding up of the construction phase of major projects, and there may be an opportunity to re-use or re-orient existing workforce accommodation camps and short stay accommodation facilities in and around the City's major settlements for tourism accommodation.
61. A key challenge in relation to attraction and retention of tourism/hospitality workforces is the availability of affordable housing options for staff.

62. Tourist activities are comparatively undeveloped in the City and have also experienced crowding out by the resource industry. Expansion of adventure tourism activities, including fishing and diving in the Dampier Archipelago and Montebello Islands, present good opportunity for the City. Such activities would be based out of Dampier and Point Samson. A future marina development at Dampier could provide a strong base for adventure tours and could potentially accommodate cruise ship docking. There is also strong demand for a high quality tourist park in Dampier.
63. Aboriginal arts and cultural tourism also present valuable opportunities for expansion of the tourism sector. This may combine with expansion of ecotourism through initiatives such as cultural bush tours or Burrup rock art viewing with the Traditional Custodians.
64. A measure of success for the tourism industry in the City would be for it to be able to regularly house industry and academic conferences, including international conferences, of some size. If it could do this it would demonstrate that it has the requisite accommodation, facilities and transport connections to also appeal to a wider tourist market.
65. There is potential for the development of an overall coordinated City tourism strategy which could build upon work previously undertaken through the Pilbara Tourism Activation Infrastructure Report (PDC, 2016) – this could expand to a regional strategy for the Pilbara with the involvement of the PDC and RDA Pilbara:
 - Skills development;
 - Promotion;
 - A link with other areas (e.g. Broome, Exmouth) for packages; and
 - Additional accommodation and accommodation upgrades.
 - Longer term expansion of infrastructure will also be important to fostering the City's tourism sector. Projects include:
 - Dampier marina – a base for adventure tours and a cruise ship docking point; and
 - International airport – direct links to Asian capital cities.
66. Longer term expansion of infrastructure will also be important to fostering the City's tourism sector. Projects include:
 - Dampier marina – a base for adventure tours and a cruise ship docking point; and
 - International airport – direct links to Asian capital cities.

4.6 Physical Environment, Climate and Natural Resource Management

In order for the City's growth into the future to be sustainable and meet the objectives of State policy, there are several unique physical environmental, climate and natural resource management factors that need to be considered. Several issues and opportunities have been identified including:

67. Low-lying coastal locations of major settlements present vulnerability to coastal processes. Several areas of existing development in Karratha, Dampier, Roebourne and Point Samson are confirmed to be inundated

by 1:100 or 1:500 year ARI events. Impacts of climate change have the potential to further increase coastal vulnerability. Climate change projections suggest increased occurrence and severity of tropical cyclones for the City area into the future. Future planning is to have due regard, to the City's Coastal Management Strategy, Coastal Foreshore Management Plans, CHRMAP and SPP 2.6 to minimise risk associated with coastal processes.

68. The City's CHRMAP should be reviewed to ensure it remains a contemporary document.
69. There is sufficient long term availability of potable water supply in the City. The establishment of the effluent Reuse System has reduced demand on the City's water supply scheme. There is a need however to ensure long term protection and sustainable use of the City's water resources. Public Drinking Water Supply areas are to be identified and protected throughout for the City, particularly those relatively close to settlements.
70. Native vegetation of the Abydos Plain vegetation type occurs in the locality of the City's major settlements and may provide habitat for conservation significant fauna. Urban expansion and development investigation areas will need to be cognisant to avoid disturbance of significant native vegetation and fauna habitat areas. Disturbance around identified *Priority Ecological Communities* and their buffers should also be avoided.
71. Aspects of the natural landscape, particularly hills and views are important character features, which be preserved into the long term. This natural visual amenity is important to preserve for its natural value and also the benefits it provides to the City's residents.
72. Coastal environments of the City are highly valued for their (often competing) aesthetic, recreational, cultural, economic and ecological values. Coastal planning needs to identify appropriate areas for sustainable use of the coast for tourism, recreation and industry uses, while also protect, conserve and enhance areas of landscape, ecosystem and cultural significance. Mangroves and turtle nesting beaches are particularly significant coastal habitats, which need to be protected from disturbance and future development.
73. There is a need to ensure conservation and environmental values of the Dampier Archipelago Nature Reserves, Burrup Peninsula Conservation Reserve and Murujuga National Park are preserved and balanced with the impacts of adjacent industry on the Burrup Peninsula. Residual impacts of industrial uses to protected marine waters, particularly Dampier Archipelago Marine Park and Cape Preston Marine Management Area, also need to be mitigated.
74. Spinifex grassland fuels create potential for risk of wildfires. The map of bushfire prone areas notes that much of the City is within a Bushfire Prone Area. In line with SPP 3.7, planning and development proposals are to be supported by appropriate bushfire planning.
75. The impacts of noise are to be considered at each planning stage, where relevant, consistent with the relevant State planning policies and EPA guidance.

4.7 Urban Design, Character and Heritage

The City seeks to enhance its urban design and character in line with the policy objectives of *State Planning Policy 7 Design of the Built Environment*. Further this Strategy seeks to recognise and protect the highly valued heritage assets within the City's local government area. Several issues and opportunities have been identified:

76. Existing housing character and typology is widely characterised by aging single dwelling stock that suffers from a lack of unique character or climate appropriate design. There is a demonstrated desire from the community for more locally appropriate and environmentally sustainable housing. Affordable ways to deliver such product need to be considered and implemented.
77. Each of the City's major settlements demonstrates its own unique aspects of character. These unique attributes are largely defined by the differing roles of each settlement, from the major regional service centre down to the coastal tourism and fishing village, as well as the unique history of each settlement. Existing character, including heritage, is an essential consideration for the future enhancement of character within each of the City's settlements.
78. Place-making design and investment into the City Centre's streetscapes, public spaces, public art and street furniture will help to improve amenity, stimulate investment, and accommodate a wide range of uses.
79. Aboriginal cultural heritage is a critical component of future planning, with Aboriginal heritage sites are prominent across the City. These are often located within and around major settlement areas. Development should avoid disturbance of any Aboriginal heritage site where possible. Where unavoidable detailed investigation of the significance of Aboriginal heritage sites must be undertaken and consent of the Minister must be sought under Section 18 of the *Aboriginal Heritage Act 1972* prior to disturbance. The City will continue to support the World Heritage nomination of the Murujunga Cultural Landscape.
80. Heritage sites listed on the City's Heritage Inventory should be conserved wherever possible, and planning provisions that encourage preservation of heritage significance should be applied to maintain and enhance heritage character. Heritage character, particularly concentrations of heritage buildings in Cossack and Roebourne present opportunities for tourism sector expansion, and a focus to ensure the amenity of these heritage character areas should be employed. The Heritage Inventory should be reviewed periodically.
81. Aspects of the existing landscape, particularly hills and views are important character features, which planning should seek to preserve. These unique characteristics make essential contributions to visual amenity both within the City's major settlement's and across its vast landscapes.
82. Enhanced built form and urban design present opportunities to improve existing character and shape a distinctive and sustainable built environment responsive to the unique environment, climate, culture and lifestyle of the City. The design principles of *State Planning Policy 7 - Design of the Built Environment* and the *Pilbara Vernacular* and

Karratha Vernacular put forward the basis for this. Consistent statutory measures for implementation are now required to achieve the vision of those documents.

4.8 Rural Land

The vast majority of the City local government area consists of rural land, used primarily for pastoral grazing and the harvesting of natural resources. The majority of rural land remains in Crown ownership with very limited freehold rural land within the City. Several issues and opportunities have been identified:

83. The City supports the continued use of pastoral leases for agricultural purposes.
84. Extensive areas of the City comprise unallocated Crown land, which is affected by several types of land tenure; Native Title, Pastoral Leases and Mining Tenements. Land tenure considerations, particularly Native Title and Mining Tenements, is a critical consideration to urban expansion that must be addressed and resolved early in the planning process to progress expansion in a timely manner.
85. Economic diversification, particularly in the form of tourism that celebrates the unique environmental setting of the City, without compromising existing pastoral operations is an area of significant potential.
86. The City has three established Aboriginal communities outside of its major settlements. Coordination of planning for infrastructure and services to sustain these remote populations is an important aspect of planning for rural areas.
87. There is potential for irrigated agriculture within the City, further research is warranted to better define suitable areas, water resources and crops.
88. The City provides an ideal environment for algae production, with abundant sunlight and carbon dioxide outputs. This presents a valuable opportunity for economic diversification and development of an extensive land area for this purpose should be encouraged.
89. Appropriate planning needs to be applied to reduce pressures associated with high demand of BRM resources. Cost of fill currently critically constrains housing affordability. Access to BRM is currently limited and a comprehensive strategy to secure BRM supply is required. Additionally, current Western Australian development practices, largely reliant on retaining walls, flat building sites and compacted sand pads reinforce the need for BRM. Flexible planning provisions allowing alternative building techniques may be effective in reducing need for sand fill and retaining walls in dealing with flood and other site constraints.
90. Major Heavy and Special Industrial land uses located at the Burrup Peninsula, Cape Lambert, Cape Preston and future Anketell Port must be managed appropriately so as to enable growth of the City's minerals and energy sector, while also protecting amenity for surrounding sensitive land uses. *SPP 4.1* and industry regulation must be applied

consistently to mitigate gas, noise, dust, fumes, and odour emissions, which affect air quality, health and safety standards, and amenity.

4.9 Infrastructure Services

While previously there was a number of critical infrastructure constraints for the City that delayed development, in general these have been addressed through significant capital investment to upgrade services. Dampier, however, still remains critically constrained from growth by its aged infrastructure, which is nearing maximum capacity. Several issues and opportunities have been identified:

91. Most of the key infrastructure within the City is protected through designations in the Local Planning Scheme, however the City will need to monitor and ensure that key infrastructure continues to be protected into the future.
92. There has been significant investment to ensure infrastructure capacity is matched to growth, the City will continue to monitor all infrastructure requirements.
93. The City will continue to implement the City of Karratha Water Management Strategy.
94. Wastewater recycling and reuse projects, such as the Karratha Treated Waste Water System, will help to reduce the consumption of scheme water, while also providing for the 'greening' of the urban environment. Given the constraints on water supply, wastewater recycling and reuse should be made a priority.
95. Encouraging the private sector to invest in infrastructure or to provide more open access to existing infrastructure will help to spread the investment cost and reduce the potential for duplication and redundancy. This is particularly relevant to power infrastructure, where major resource companies frequently supply and reticulate their own power independent of the NWIS.
96. Infrastructure, such as wastewater treatment plants and power stations, also present adverse impacts for surrounding residential and sensitive land uses. Buffers, in accordance with *SPP 4.1* must be incorporated, but should not preclude all land uses. Strategic Resource Areas should be used to encourage collocation of compatible land uses. This may include solid waste and wastewater recycling facilities, renewable energy facilities, other public utilities, industry, agriculture, research facilities, public open space and nature conservation reserves.
97. The City's natural environment affords significant potential for wind and solar renewable energy generation. There is a need to further investigate this potential with exploration, mapping and monitoring of renewable energy resources so that these alternative power resources can be implemented in future. Any coordination of the NWIS system through the Pilbara Power Project Board should incorporate planning for future renewable power resources.
98. Waste production in the City has remained relatively stable over the past five years. The City aims to continually increase the amount of

waste diverted from landfill, to enable this further a comprehensive waste recycling and disposal plan is needed. The City will ensure facilities are upgraded as needed and investigate emerging waste technologies to improve the City's waste management practices to be more sustainable. The City will ensure sensitive receptors do not encroach towards waste facilities.

99. High speed telecommunications connectivity, including enhancement of mobile voice and data network coverage enhance the ability of the City to diversify its economy and remain competitive with other areas of the State.

4.10 Transport

The City's transport infrastructure needs align with its role as Regional City. Several issues and opportunities have been identified:

100. A number of strategic transport issues for the Pilbara region have been identified in State Government planning studies, but most of those items are outside of the direct control of the City of Karratha and beyond the scope of this *Local Planning Strategy*. The City can only manage or control development on privately owned (or non-State Government owned) land. The City needs to be an informed partner in the wider mining and industrial development of the City and in State Government policy development that has implications for the City.
101. Most of the transport-related challenges and opportunities for the City relate to roads rather than the other types of transport infrastructure. Previous reports for Karratha, in particular, have identified a range of transport-related challenges and opportunities relevant to the City, which also relate to the principles of land use / transport integration.
102. The previous upgrading of Dampier Highway to dual carriageway standard from Karratha to Burrup Road was required for the current traffic volumes of 10,000 to 12,000 vpd on this road. The future Karratha Western Bypass is indicated as a long term project. It is recommended that the threshold of 10,000 vpd be used as a realistic threshold for determining when road upgrading to dual carriageway is required in this regional context.
103. At Roebourne a bypass (around the southwest side of town) may be further considered upon the generation of sufficient traffic demand.
104. Based on the traffic modelling previously undertaken for this *Local Planning Strategy* it is anticipated that a number of road links may be constructed or upgraded by 2031, depending on future demand.
105. Continued provision of public transport in Karratha and between centres is seen as an essential service. Continuation of the service is required in order to provide non-car-based access from the other towns to Karratha's regional facilities.
106. At Dampier the proposed Dampier Marine Services Facility involves a new jetty and land-backed wharves to accommodate increased cargo movements. The proposed Dampier Marina project will be a significant recreational boating facility with residential and tourist accommodation.

Both would place additional demand on transport links and access in this area.

107. In all towns provision and upgrading of pedestrian, parking and bicycle facilities is strongly recommended. The WAPC's Liveable Neighbourhoods policy provides appropriate guidance, including a network of shared paths alongside the busier roads and footpaths alongside most other local roads.
108. A proposal to transport 90% of waste to Port Hedland for processing and return of ash to City will result in a significant increase in truck movements between Karratha and Port Hedland which have not currently been factored into road network strategy, which may necessitate a review in future.
109. The Karratha Airport Masterplan sets out the long term framework for the development of all facilities within the airport site. The City will ensure opportunities for future development within and surrounding the airport are consistent with this Masterplan.
110. It is important that the City continues to protect rail corridors from the encroachment of incompatible land uses and promote grade separated crossings.

5.0 Settlements

The City's preference is for future growth to be accommodated within its five primary existing settlements, where planning frameworks and infrastructure exist (and can be viably expanded over time), see Figure 4. Strategic Map 1 City of Karratha Overview, provide an overview of the entire Local Government Area.

Uncontrolled growth of minor settlements is not supported as it is often unco-ordinated and results in demands for community services in the absence of a supporting rate-base.

There are no plans for the creation of new settlements. The creation of any new settlements would be considered on their merit in the context of a regional planning framework and from a community development viewpoint.

Karratha District

The Karratha District covers both Karratha and Dampier (see Karratha District - Map 2) is envisaged as the City of North Western Australia accommodating over 75 per cent of the City's total population. Karratha will continue to grow and broaden its role as the primary service centre for the Pilbara and North Western Australia. Diversity in housing, services and facilities will attract people from a broad demographic profile to live in the City for the long term.

Dampier is envisaged as a coastal town that supports the appeal of Karratha. Existing infrastructure constraints i.e. wastewater will take some time to overcome and substantial growth will be constrained until this is addressed. Excellent recreation and tourism opportunities are plentiful in this coastal location and Dampier is planned to further develop as the gateway to the Dampier Archipelago.

Eastern Corridor

The **Eastern Corridor** is an important concept within this Strategy (see Karratha Eastern Corridor - Map 3). This concept seeks to ensure the provision of local services and facilities is framed at a corridor level rather than viewing each settlement independently. The approach involves the coordination of community infrastructure commercial centres and other land uses, so that they are complementary and financially viable by avoiding unnecessary duplication.

The Eastern Corridor comprises the settlements of Roebourne, Wickham, Point Samson and Cossack, each with its own identified role and character which, when considered together, provide a complete offering of local level services, facilities and opportunities. A broad overview of anticipated roles are summarised below:

Roebourne will continue to be a centre of arts and cultural based community facilities, with its heritage character celebrated through tourism;

Wickham, with a larger population base and Rio Tinto's presence to drive growth, will provide the main retail and community facilities servicing the population of the Eastern Corridor;

Point Samson will maintain its coastal village form, focussing on coastal tourism with opportunity for population growth over time; and

Cossack will remain a coastal heritage centre with opportunities to develop compatible tourism facilities.

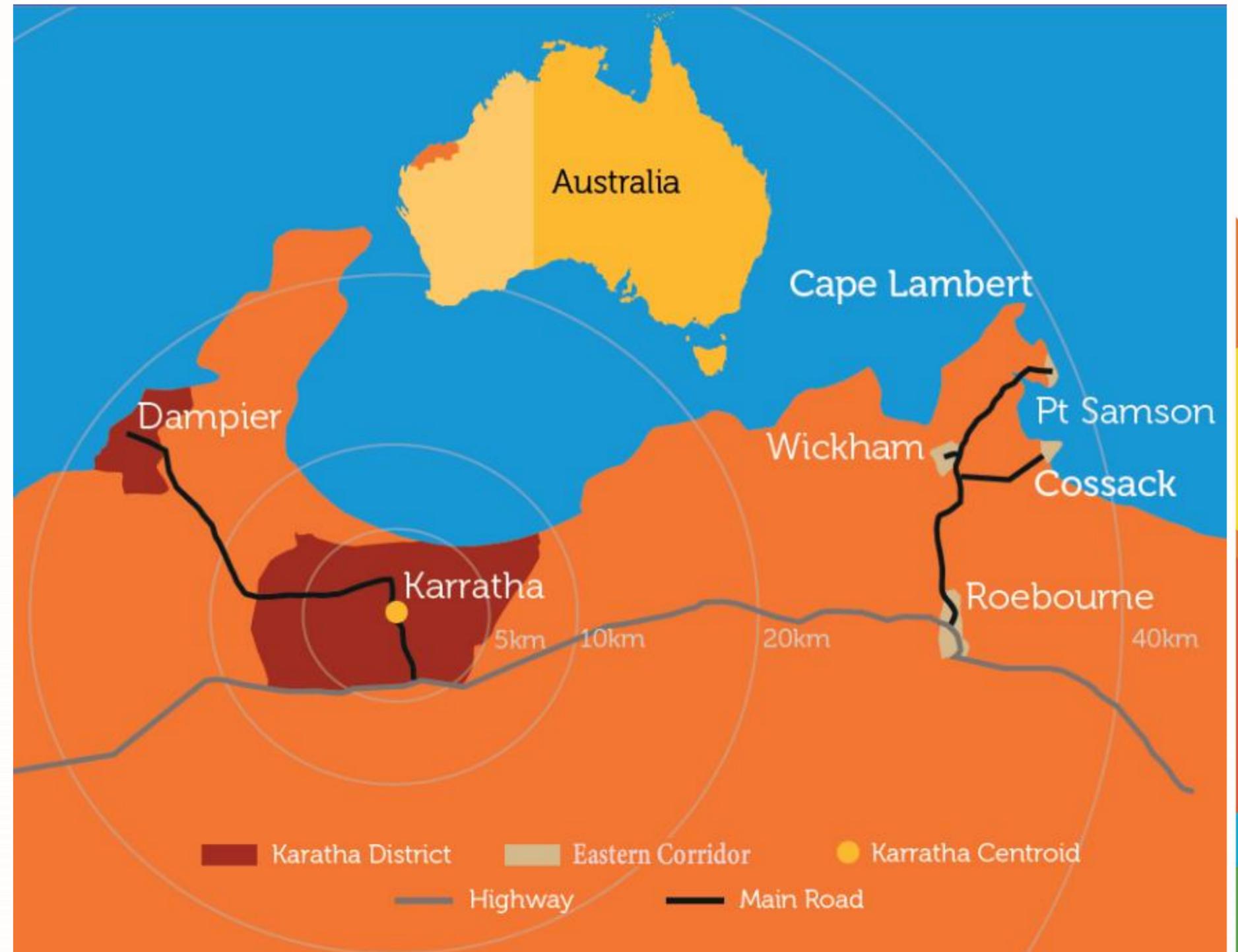
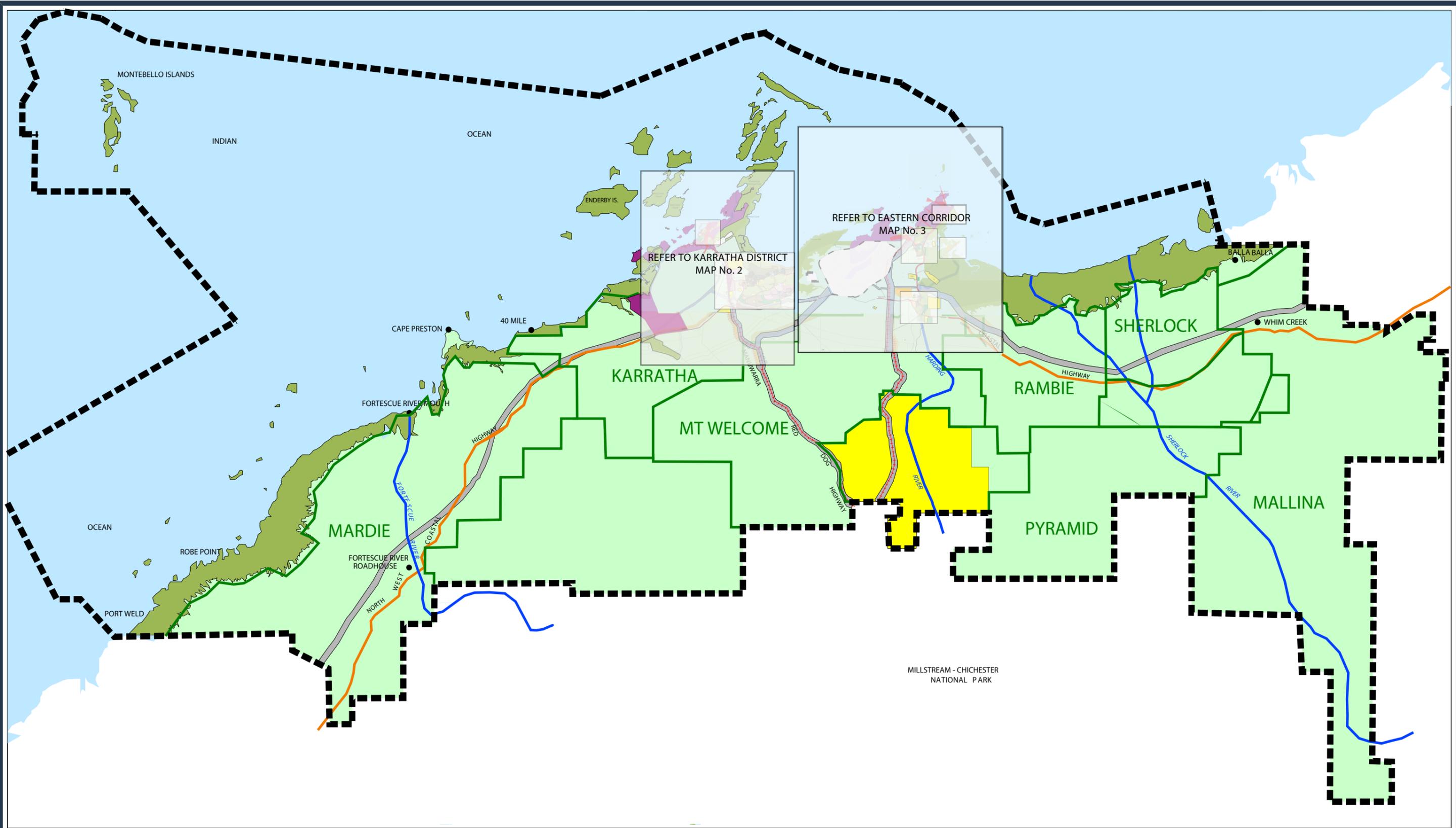


Figure 4: Karratha District and Eastern Corridor



CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555



SCALE: 1:750 000 @ A3
 DATE: OCTOBER 2020



LEGEND:

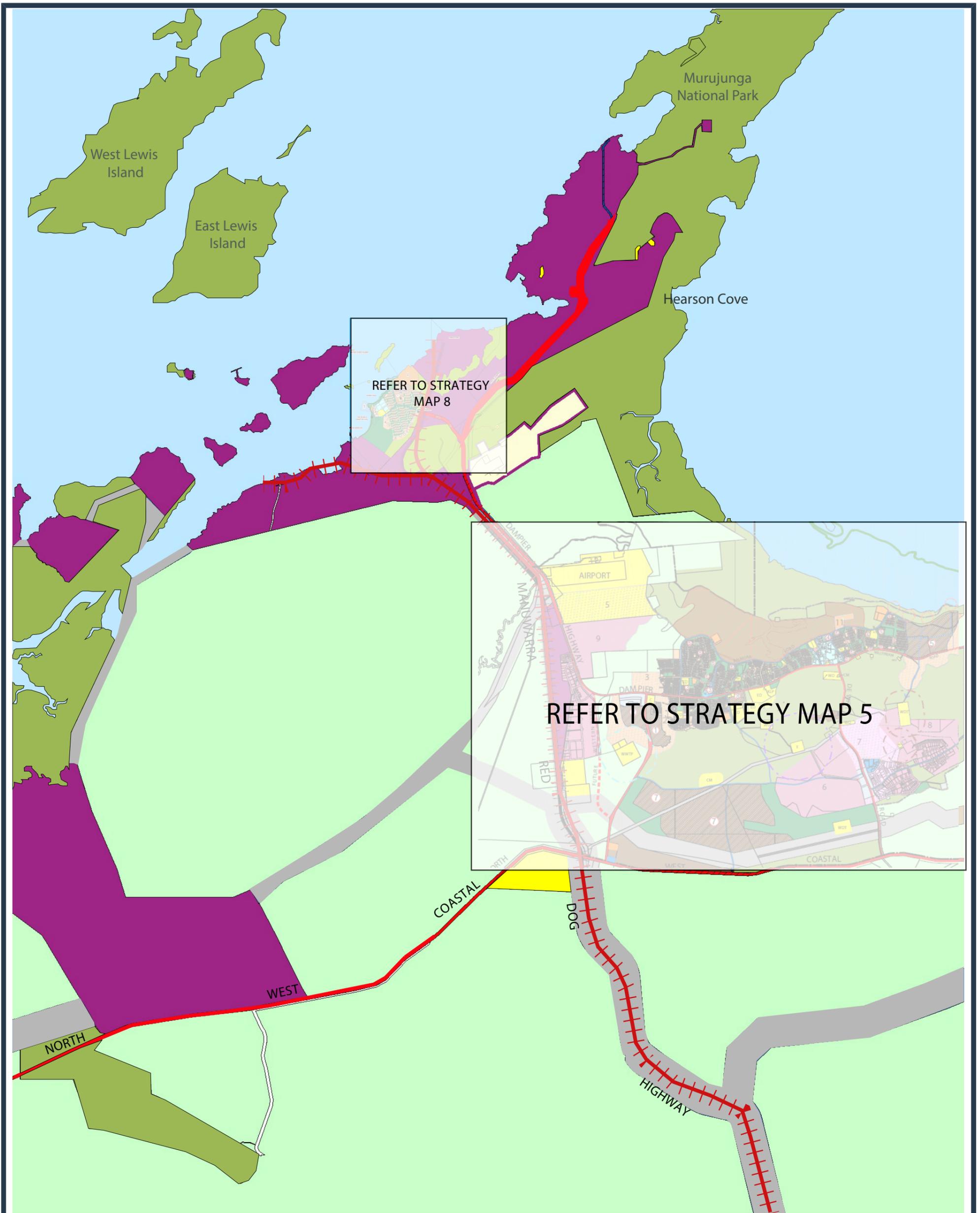
- Public Open Space
- Environmental Conservation
- Public Purposes
- Infrastructure Corridor
- Strategic Industry
- Railways

- Rural
- Ocean
- River
- Major Road Network
- Pastoral Stations
- Approximate Local Government Boundary

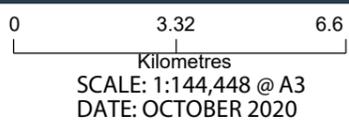
**CITY OF KARRATHA
 LOCAL GOVERNMENT AREA**

1 OF 16

CITY OF KARRATHA



CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555

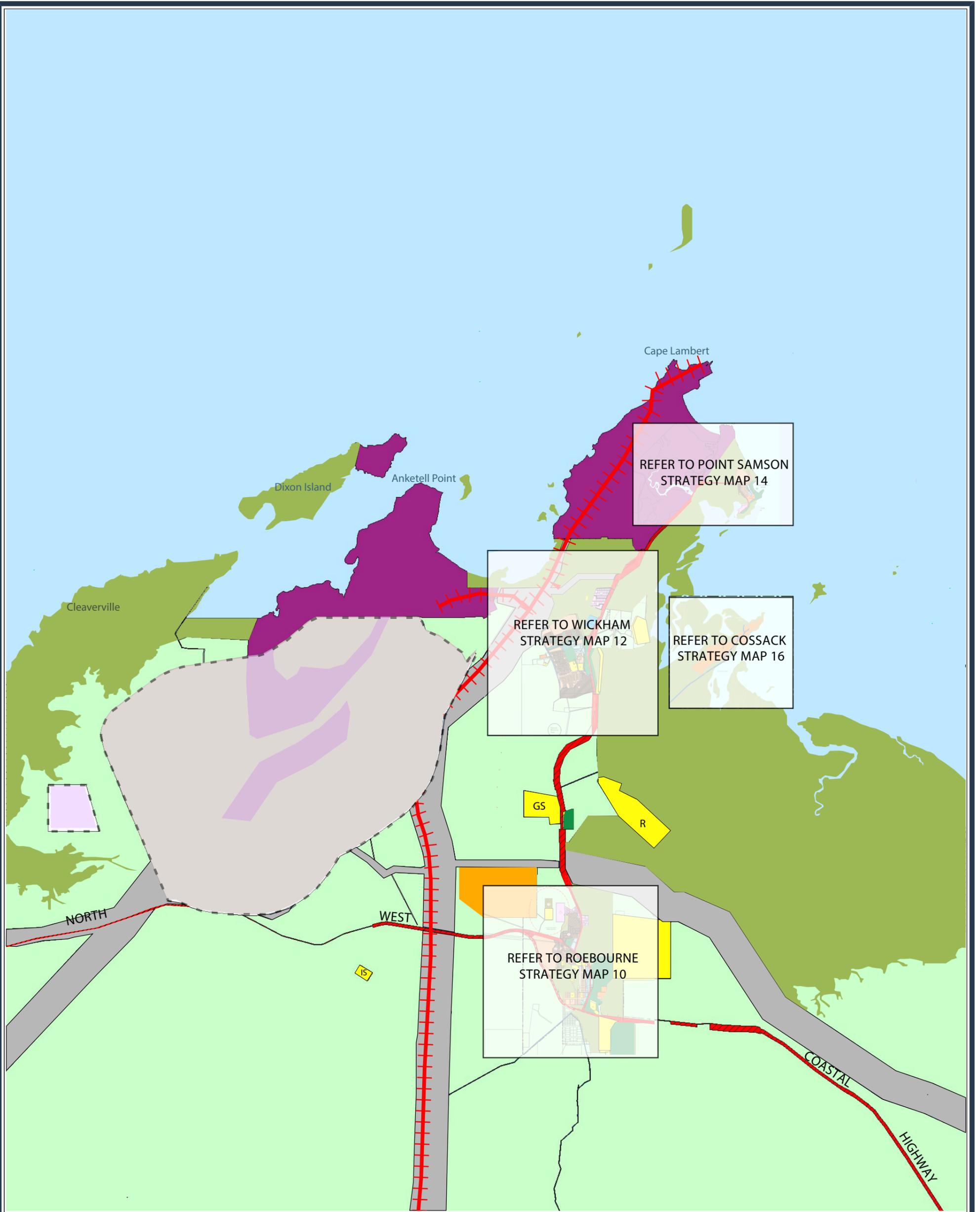


LEGEND:

Public Open Space	Rural
Environmental Conservation	Ocean
Public Purposes	Primary Distributor
Infrastructure Corridor	District Distributor
Strategic Industry	
Industrial Development	
Railways	

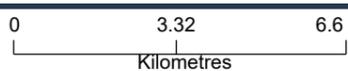
KARRATHA DISTRICT
 2 OF 16

CITY OF KARRATHA



CITY OF KARRATHA

LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
PH:(08) 9186 8555



SCALE: 1:144,448 @ A3
DATE: OCTOBER 2020



NORTH



LEGEND:

- Public Open Space
- Environmental Conservation
- Public Purposes
(GS - Government Services, R - Recreation, IS - Infrastructure Services)
- Infrastructure Corridor
- Strategic Industry
- Railways
- Subject to Anketell Strategic Industrial Area Improvement Scheme No. 1
- Rural
- Ocean

EASTERN CORRIDOR

3 OF 16

CITY OF KARRATHA

5.1 Preferred Growth Pattern

This Strategy sets out the preferred growth pattern for the City and builds upon the previous direction set in the *Karratha City of the North Plan (2010)*. The majority of the future population growth and economic development is anticipated to occur in Karratha with a lesser amount occurring in Dampier and the Eastern Corridor. Within the Eastern Corridor, Wickham is anticipated to accommodate the majority of anticipated growth and development. Strategic Map 1 City of Karratha Overview, notes land use outside of the City's key settlements.

This Strategy seeks to encourage development within existing residential areas in recognition of the efficiencies associated with infill development and benefits to local communities. There is considerable potential for an increase in density codes within established areas that were investigated through the *Karratha Revitalisation Strategy (KRS, 2017)* this will be further considered through the preparation of the review of Local Planning Scheme No. 8.

This Strategy discourages proposals that seek to subdivide or develop sites at densities significantly below what the applicable R-Code would allow, as inefficient use of existing and planned infrastructure would result.

There is potential for the preparation of Local Planning Policy to investigate the provision of alternative acceptable development provisions for the Residential Design Codes which may provide a liveable and climate responsive model for urban development. A separate investigation may also explore opportunities for conveniently located Common Boat and Caravan Storage Areas to encourage alternatives to storage of large recreational vehicles on private lots.

5.2 Built Form Pattern

5.2.1 Urban Consolidation & Renewal

The City, following the direction previously set by the *Karratha City of the North (2010)* has a strong preference for a proportion of growth to be accommodated within established areas in recognition of the important service and community infrastructure efficiencies that can be gained from infill development.

Overall theoretical capacity exists for approximately 1,000 dwellings across the City on serviced lots that have been developed below available density designations provided in the City's LPS 8 (DPLH Karratha Land Supply Assessment, 2020). Karratha has the greatest capacity for additional dwellings on land that already has some development, and there is also some capacity for additional dwellings on built lots in Dampier.

In terms of vacant residential land, Karratha has the greatest capacity for additional dwellings, followed by Roebourne and then Wickham.

The age of existing dwelling stock presents significant opportunities for redevelopment. It has been researched that 45% of dwellings across the City were constructed between 1970 and 1989,

Approximately 59 hectares of surplus drainage reserves have been identified through the Karratha Lazy Lands project. Assuming flooding issues constrain

only 50% of this land, conservative estimations identify a capacity for a further 440 dwellings.

Stage 1 of the Lazy Lands project proposes the creation of 200 additional dwellings over seven parcels of surplus drainage reserve. All Stage 1 sites have been rezoned for residential development pursuant to the implementation of the Lazy Lands project.

Permitting compatible and appropriate mixed use development within residential areas is supported by this Strategy provided they do not adversely affect the residential amenity.

The *Karratha Revitalisation Strategy (KRS, 2017)* recognises significant potential for redevelopment in the Karratha urban area and represents this potential through a proposed Density Plan which selectively increases density codes within the study area (see Figure 5: Proposed density plan (Karratha Revitalisation Strategy, 2017)).

Key outcomes of the revitalisation strategy include recommendations for 'blanket' up-coding of existing suburbs from R20 to R25 and selective up-coding of lots with high amenity and/or activity to R40. This up-coding has been proposed to encourage redevelopment which is expected to revitalise housing stock and streetscapes.

The highest densities are promoted on land abutting the proposed 'Green Spine' that seeks (in part) to improve intra-neighbourhood connections and enhance the amenity of the primary internal pedestrian link through the suburbs. The Green Spine is envisaged to be a high amenity shared movement corridor with extensive landscaping which may facilitate private sector investment and redevelopment of nearby properties in response to the attractiveness of the public realm.

Public domain design guidelines have also been produced as part of stage 2 of the Revitalisation Strategy, these guidelines inform the City in decision making, design and staging of the public realm.

The natural attractions of Dampier, including the coastline and established streetscapes, are anticipated to sustain the attraction of this town as desirable place to live. The age of the housing stock and aging demographic are considered to lay the foundation for the attraction of new residents to the town and the redevelopment of existing housing stock.

The limited capacity of the Dampier waste water treatment plan to accommodate growth results in limited potential for widespread subdivision within Dampier. As such, it is considered that the existing provision of large lots will largely be retained with some subdivision occurring. When considered in light of the attractiveness of the town and the potential for 'Aging in Place' principles to be achieved, there is considered to be potential for the provision of high standard housing within Dampier on large lots within existing areas.

Roebourne is anticipated to have some renewal of existing housing stock with the majority of growth accommodated within new development areas, primarily the NASH development.

Wickham and Point Samson are anticipated to have some renewal of existing housing stock with the majority of growth accommodated within new development areas, primarily Wickham South.

This Strategy recognises the review of public open space (POS) being undertaken by the City to enable the development of surplus POS identified as suitable for rationalisation and reinvestment processes.



Figure 5: Proposed density plan (Karratha Revitalisation Strategy, 2017)



5.2.2 Housing Diversity

This Strategy targets a gross residential density between 10 and 15 dwellings per hectare across existing 'Urban' and 'Urban Expansion' areas. Variations in gross residential density to reflect local character and site specific constraints will be considered to ensure appropriate flexibility in lot provision.

Recent years has seen an increased popularity in the development of Multiple Dwellings and there are numerous examples, predominantly within established suburbs, of Multiple Dwellings. The standard of Multiple Dwellings is generally high and the City is accustomed to consideration of planning concerns associated with this form of development. It is now considered that there is community understanding of the difference in this form of accommodation compared to historic examples of poor apartment style development.

Design WA Stage 1 suite of documents (including State Planning Policy 7) will provide further guidance on the importance of design quality across the whole built environment.

As of 2016 four or more bedroom houses were the predominant housing typology in the City, making up 42% of the total occupied dwelling stock at the time. Three bedroom houses made up 39.8% of the dwelling stock. Houses of three or more bedrooms therefore comprise the considerable majority of the City's existing dwelling stock (ABS, 2016).

Activity in medium and high density dwellings in the City (i.e. townhouses, duplex units and apartments) was significantly lower than for detached dwellings. This is attributable to a lack of these dwelling types being available, rather than a preference from residents.

Continued creation of greater housing diversity, in particular greater number and variety of smaller households, is critical to accommodating future demand associated with the following demographic trends:

- The promotion of vibrant alternative inner city lifestyle and housing choices, and avoiding the continued creation of homogenous residential suburbs;
- Addressing housing affordability, without which there is little prospect of reaching a higher resident population scenario (and associated benefits in terms of enhanced service provision);
- First home owner opportunities essential to accommodating staff involved in the lower paid service industry and the tourism/hospitality sector; and
- Aging-in-place opportunities (facilitating retention of the significant increase in older residents, and negating continued exodus of the City's youth).

This Strategy seeks to ensure a mix of housing types and density options generally as follows:

- a. 75 per cent low to medium housing with a wide range of lot sizes;
- b. 15 per cent medium to high density grouped dwellings; and
- c. 10 per cent apartment buildings.

It is noted that the housing industry and private market are responding to the Pilbara Vernacular Handbook and the Karratha Vernacular Handbook and that climate responsive housing design and construction methods have been included within recent accommodation types. In this regard, it is noted that verandahs are returning to the local housing product which is understood to be in response to shading properties. The propensity for community interaction is noted given the concentration of pedestrian movements during cooler parts of the day resulting from long hot periods during the day.



This Local Planning Strategy is based upon the medium growth forecasts for the City which assumes some diversification of the current resources led economy, resulting in a total population of 26,045 by 2031.

5.3 Karratha Overview

ROLE IN THE SETTLEMENT HIERARCHY

Karratha is recognised in the *Pilbara Planning & Infrastructure Framework* as one of two Pilbara Cities. This Strategy promotes Karratha to become the City of North Western Australia accommodating key administration and service centre functions for the northern portion of the state and an integral link in Northern Australia.

This Strategy implements many of the recommendations from the Karratha City of the North Plan (KCN), whilst also identifying future land requirements which will accommodate forecast population growth out to 2031. Importantly the Strategy also ensures that the City is capable of accommodating large spikes in economic and population growth with a vision of ultimately achieving a population exceeding 50,000.

POPULATION & DISTRIBUTION

The Karratha urban area is predicted to have a population of approximately 19,700 residents by 2031, see Table 3: Forecast population for the Karratha Urban Area (WA Tomorrow, 2019).

Table 3: Forecast population for the Karratha Urban Area (WA Tomorrow, 2019)

	Target Population	Approximate Dwelling Requirement	Existing Dwellings (2016 Census)	Estimated Additional Dwellings Required
2031				
Karratha	19,705	8,093	7,495	598

KEY CONSTRAINTS FOR GROWTH

Karratha is constrained by a number of environmental considerations. Storm surge and flooding are critical issues. The extent of these constraints is known and can be factored into planning (see Map 4 - Karratha opportunities and constraints). To the south, the Karratha Hills are a valued landscape feature which restricts expansion. Urban expansion opportunities are therefore confined to the west and east of town, with longer term opportunities further south of the Karratha Hills (see Karratha Strategy Map - Map 5).

Further constraints to growth include the need to accommodate potential buffers between non-compatible land uses, ensuring that essential infrastructure is protected. An example of this is ensuring that non-compatible land uses do not encroach around the airport, waste water treatment plants or the power station. There is also the need to ensure that future development does not impact on strategic freight and traffic routes as per *State Planning Policy 5.4 - Road and Rail Noise*.

The opportunities and constraints mapping notes existing special control areas (airport noise & building height and Dampier Salt special control areas) that are in Local Planning Scheme No. 8, as well as other constraints on growth.

The Karratha Strategy Map (Map 5) notes potential special control areas which are proposed to be included within Local Planning Scheme No.8 or through a scheme review. These relate to potential buffers around the power station and waste water treatment plants.

RESIDENTIAL GROWTH (URBAN EXPANSION AREAS)

Karratha will remain the focus of population growth within the City. It is the City's intention to ensure there is an adequate supply of land able to accommodate sharp rises in population growth if and when needed. Future urban expansion areas are to be inclusive of a range of housing types suitable for the City's broadening population demographics.

This Strategy identified a new urban growth area to the east of the City Centre at Mulataga (UEA 5) providing opportunities to connect the City with the coast. Extensions to the existing urban area are also identified to the west in the West Nickol and Madigan areas overlooking Seven Mile Creek and the adjacent coastal flats. The Strategy map (Map 5) further identifies the old hospital site for future urban expansion, this will enable a future development opportunity in close proximity to established suburbs and infrastructure.

Regals (UEA 7) has been identified as a long-term growth area as per the current scheme provisions.

This Strategy supports KCN's previous objective of promoting infill development of existing vacant sites, plus the investigation of surplus drainage reserve/open space land as means to facilitate additional housing diversity (these are identified as UEA 6, some have development plans approved).

This Strategy recommends that priority be given to development of the following areas in order to accommodate forecast growth to 2031 and allow for flexibility should it be needed. Numerically referenced to the Urban Expansion Areas (UEA) identified on the Karratha Strategy Map, the estimated dwelling yield for each area (Karratha Land Supply Assessment) appears in Table 4: Karratha Urban Expansion Areas below.

Table 4: Karratha Urban Expansion Areas

Map ID No.	Urban Expansion Area	Approx. Area (ha)	Estimation of Dwelling Yield
1	Madigan Road Estate	53	560
2	Gap Ridge	48	775
3	Tambrey Primary School & Neighbourhood Centre	12	207
4	City Centre	7	420
5	Mulataga	160	1,360
6	Lazy Lands Project	44	990
7	Regals (Long Term Growth Area)	675	5,400
8	Old Hospital Site (Urban Growth Area)	19	100
9	Stove Hill (Tourism)	20	-
TOTALS		1038	9,812

Supplementary growth which will reduce pressure for new greenfield sites is expected to emanate from the outcomes of the *Karratha Revitalisation Strategy (2017)*, which identifies additional land within the Pegs Creek, Millar Wells and Bulgarra areas of the City for future infill development. As noted above, there are a number of Lazyland sites identified on the Karratha Strategy Map (UEA 6) for future development, some of which already have development plans approved.

Development of these Lazyland sites and large scale urban renewal are envisaged to occur when market conditions are favourable and following the implementation of the proposed residential up-codings formalised through the future review of Local Planning Scheme No.8.

WORKFORCE ACCOMMODATION

Local Planning Policy DP10 outlines the City's position as it relates to Workforce Accommodation (WA). The City acknowledges the critical role of WA, the need for a base level supply of WA beds, and potential future need of short-term TWA camps for specific construction projects. However, The overarching objective of this policy is to manage the development of workforce accommodation with a longer term aim to maximise the resident workforce and ensure that where workforce accommodation is provided, this it is designed appropriately and contributes to the City's vision of Australia's most liveable City.

ACTIVITY CENTRES

Karratha offers by far the most significant amount of retail floor space in the City, with most retail and commercial land uses located within the Karratha City Centre.

The Karratha Land Use and Employment Survey (KLUES), see Table 5: Existing floorspace within the Karratha Urban Area (KLUES, 2020) below, identified the following floorspace in the Karratha urban area:

Table 5: Existing floorspace within the Karratha Urban Area (KLUES, 2020)

Category	Karratha
Entertainment	25,442
Health	108,665
Manufacturing/Processing Fabrication	40,420
Office	43,888
Primary-Rural	45,652
Residential	64,480
Other Retail	38,622
Service Industry	77,789
Shop/Retail	35,351
Storage/Distribution	52,984
Utilities/Communications	64,713

Vacant Floor Area	41,926
Total	639,932

This Strategy promotes development of the City Centre as the primary retail and trade centre for Karratha and the surrounding regional area. One neighbourhood centre (Tambrey) is identified on the Karratha Strategy Map (Map 5) & The Karratha City Centre Map (Map 6), there is also long term potential for another neighbourhood centre in Mulataga (however as this is long term and subject to further planning, it is not included on the Strategic Plan). It is also noted that there are several local centres (with a greater focusing on convenience retail and local employment generation based on 400m walkable catchments) within the City's urban area.

Revitalisation of the City Centre is steadily progressing in accordance with the previous *Karratha Revitalisation Strategy*. The effect is an evolving change to the character of the City Centre pursuant to the vision of becoming a pedestrian oriented and vibrant area with a main street focus.

Since release of the City Centre Master Plan issues have emerged that have necessitated adjustment to both the proposed City Centre road layout and distributions of land use. The most notable of these is the decision to locate the Karratha Health Campus within the City Centre.

Neighbourhood Centres

Neighbourhood centres are important local focal points that provide for daily to weekly household shopping needs, community facilities and a small range of other convenience services. They are also a focus for medium density housing. These centres play an important role in providing walkable access to services and facilities for local communities. As noted above one neighbourhood centre is identified on the Karratha Strategic Plan (Tambrey), with long term potential for a neighbourhood centre in Mulataga. Future development of the neighbourhood centres will be subject to future detailed planning consistent with the State Planning Framework to facilitate integrated commercial, retail, community, open space and medium to multi storey residential unit development. The timing of these developments will need to have regard for potential impacts on continued development and intensification of the City Centre.

MIXED USE

This Strategy encourages mixed use development throughout the majority of the City Centre (see Karratha City Centre - Map 6), but in particular as a transition between the City Centre and adjoining residential areas. Potential for mixed use development is also identified in and around other Activity Centres, notably the Tambrey Neighbourhood Centre.

COMMERCIAL & SERVICE COMMERCIAL

Several existing commercial areas (in addition to the City Centre) are reflected on the Karratha Strategy Map (Map 5).

The preparation and application of suitable land use and development control provisions will be required to ensure the activities associated with Service

Commercial areas identified by this Strategy do not unduly affect the role, and development, of the *Karratha City Centre*.

It is recognised that the City's future Local Planning Scheme will need to be clear on the appropriate location of typical Service Commercial land uses, namely bulky goods showrooms, large format retail and medium format retail, so as not to adversely affect the preferred commercial centres hierarchy.

It is noted that both large and medium format retail may be appropriate on the periphery of the Karratha City Centre provided built form objectives are satisfied and car parking provision is appropriate.

TOURISM

Considerable potential exists to increase the City's role as the tourist hub of the Pilbara and gateway to North Western Australia. However a shortage of tourist accommodation regularly occurs due to ongoing competition for short stay accommodation.

Tourism associated land uses are encouraged within the City Centre. The construction of a hotel at the Quarter is supported by the City.

The *KCN Growth Plan* previously had identified land to the north of the City Centre encompassing the local golf course for future tourist and short-stay uses. Concepts have previously been prepared for this area including a range of short-stay accommodation options and associated recreational activities, however further investigation is required to address coastal and bushfire related issues. The area is therefore designated as a Development Investigation Area (11 - Searipple Tourism & Recreation Precinct).

A further site is identified on the Karratha Strategy Map (Map 5) (UEA 9 - Stove Hill), for tourism. This site reflects the existing 'Development Area 42' within Local Planning Scheme No. 8.

The City will monitor tourism land supply to ensure an adequate amount of land is available for tourism usage.

RURAL RESIDENTIAL

This Strategy acknowledges rural lifestyle opportunities and identifies the existing, but as yet undeveloped area adjacent North West Coastal Highway. This area requires careful consideration as part of any forthcoming development proposal, due to its highly exposed position at the south west entrance to the District.

INDUSTRY

Infrastructure and industrial areas are generally co-located in Karratha, either around the *Karratha Industrial Estate (KIE)* south of Karratha or the *Gap Ridge Industrial Estate* west of Karratha.

This Strategy identifies new industrial investigation areas to the west, east and north of the existing KIE consolidating these uses to the south of the Karratha Hills away from sensitive land uses and in proximity to regional transport routes. In this area there exists approximately 640ha of zoned industrial land. DevelopmentWA's Gap Ridge Industrial Estate, comprising 114 lots already has substantial General Industry activity in place, with 94ha of industrial expansion land available.



Industrial Development Investigation Areas are identified numerically on the Karratha Strategy Map (Map 5) and reflect planned industrial growth areas. Further investigation of these areas will need to be undertaken to determine the appropriate industrial zones to be used.

Table 6: Karratha Industrial Development Investigation Areas

Karratha Strategic Plan		
DIA #	Name	Approx. Area (ha)
6	Karratha Industrial Area Expansion West (General Industry)	495
7	Karratha Gateway (Light Industry)	200
8	Karratha Industrial Area East (General Industry)	250
9	Gap Ridge North (General Industry)	270

Some industrial activities and service infrastructure have the potential to create adverse impacts necessitating buffers to sensitive land uses. This Strategy encourages the clustering of compatible nuisance uses within buffer areas.

The planning for the *Anketell* and *Maitland Strategic Industrial Areas* is an important consideration to the co-ordination of industrial land within the City. These areas will be significant employment generators for the City's existing and future population, generating the need for additional housing. The City believes these strategic industrial areas should not provide for industries that can be accommodated in the Karratha Industrial Estate or Gap Ridge. This will ensure the primacy of Karratha as the principal centre for economic activity in the City and support Karratha in reaching Regional centre status.

In May 2014 the WAPC resolved to prepare *Improvement Plans* to facilitate the delivery of project-ready strategic industrial land over the *Anketell* and *Maitland Strategic Industrial Areas*, these were gazetted in 2015 and 2016 respectively. The Improvement Scheme for Anketell was gazetted in 2017. DevelopmentWA and JTSI are preparing the Improvement Scheme to guide development within the Maitland Strategic Industrial Area. The Improvement Schemes will guide the

WAPC in making decisions of land use and development in these Improvement Plan areas

SPECIAL CONTROL AREAS

The Strategic Plans do not identify existing special control areas (existing special control areas are found on the Opportunities and Constrains mapping), the Strategic Plans focus on potential SCA's that may be included into the Local Planning Scheme No.8 through either amendment or review. The potential for additional special control areas relating to buffers for waste water treatment plants and the power plant have been identified on the Karratha Strategy Map (Map 5). The purpose of these buffers is to mitigate impacts from conflicting land uses. These potential special control areas will be subject to further investigation prior to being incorporated into the operating local planning scheme.

KEY INFRASTRUCTURE

AIR

Karratha is currently WA's busiest regional airport for passenger movements with over 470,000 passengers in 2019, an increase of 6% compared to 2018. The Passenger Terminal Upgrade project was completed in 2015. The \$35 million upgrade provided new cafes, a bar, other lettable concessional areas, additional toilets, combined arrivals and departures lounge, security enhancements and baggage claim to enhance amenity for passengers.

The *Karratha Airport Master Plan & Land Use Plan (2013)* sets out a long-term framework for the development of facilities within the airport site. It also sets out requirements and restrictions on land surrounding the airport site, to ensure that airport development and operations are not restricted. As discussed in the previous constraints section; special control areas have been established in LPS 8 to ensure that building heights (based on the obstacle limitation surface) and noise do not adversely affect operation of the airport (see Karratha Opportunities and Constraints Map, Map 4). The opportunities and constraints mapping also notes N70 contours for frequency of noise events louder than 70dB(A) based on the forecast number of improvements to 2031-32, and an extended runway (2,500m in total length). This contour could also potentially inform a future special control area, however this should be subject to further investigation.

Also included within the Airport Masterplan is an ultimate land use plan for the total site that initially promotes complementary development of available land north of the runway, expanding on existing activities (largely aviation-related with potential for some non-aviation retail and/or commercial).



The Karratha Strategy Map (Map 5) identifies additional land south of the airport for both aviation and non-aviation commercial uses i.e. freight. This land, subject to detailed investigation, may leverage upon activity generated by a centrally positioned Passenger Terminal (see DIA 5 on the Karratha Strategic Plan). The use of surplus land for non-airport related operations requires further investigation particularly in the context of land use suitability, nearby planned uses and the need to ensure future uses do not detract from other planned centres.

The Airport Masterplan is recognised for its long term development potential in the context of the short to medium term development of the Gap Ridge area.

RAIL

Within the City of Karratha there are a number of private heavy haulage rail lines that transport iron ore to the ports of Dampier and Port Walcott (Cape Lambert). These rail lines carry the vast majority of the substantial iron ore volumes exported from the City. These rail lines are privately owned and operated.

There is the potential for new railway lines to link the planned new Anketell Port and Strategic Industrial Area. As per existing rail lines, these routes require protection inclusive of sufficient buffers from encroaching development in accordance with State Planning Policy 5.4 – *Road and Rail Transport Noise and Freight Considerations in Land Use Planning*.

At-grade rail crossings on the regional road network can cause delays for traffic where iron ore trains can be in excess of 1.4km and require several minutes to pass over the road. The City supports grade separated rail crossings as exemplified through the recently constructed overpass on the North West Coastal Highway. This crossing allows increasing numbers of trains to access Cape Lambert without disrupting traffic on the Highway

ROADS

The primary road system within the City of Karratha falls under the control of Main Roads Western Australia. These roads serve the resources industry that contributes so substantially to the State and National economy, as well as providing access for a growing number of tourists. It is important that these roads are maintained at a suitable standard for these purposes.

State Planning Policy 5.4 Road and Rail Noise (SPP5.4) seeks to ensure that the community is protected from unreasonable levels of transport noise, whilst also ensuring the future operations of these transport corridors. The SPP 5.4 notes that the City contains Strategic freight and or major traffic routes, future development within the City will have to ensure that the requirements of SPP 5.4 are adequately addressed.

This Strategy recognises the importance of Primary Roads in maintaining freight accessibility to *Strategic Industrial Areas* and the associated ports. In this regard the City's *Freight Strategy* identifies suitable road reservations which will be represented in the forthcoming local planning scheme.

A potential future road connection between Mulataga, the *Karratha Industrial Area* and the North West Coastal Highway will provide more convenient access from Bulgarra to the KIE and Anketell

CONSERVATION & OPEN SPACE

Karratha is surrounded by open space valued for its conservation, recreation and landscape qualities. To the north is the coastline and Karratha foreshore. To the south are the Karratha Hills. Access to these open spaces must be managed so as to encourage recreational enjoyment, but avoid degradation of the natural environment and landscape amenities.



Karratha Airport is currently WA's busiest regional airport for passenger movements with over 470,000 per year.

New open space reservations should be located on land which is low-lying and unconstrained in regard to Aboriginal cultural heritage or environmental significance. These open space areas, which may incorporate natural creek lines, are intended to be multi-purpose providing recreational opportunities. The management of drainage associated with major storm events may also feature prominently.

Currently there is an oversupply of smaller recreational space, particularly in the Baynton, Tambrey, Nickol and Nickol West areas of the townsite. The provision, quality and accessibility of the public open space network is currently under review with potential rationalisation and associated redevelopment of open space facilities with higher levels of amenity being considered.

New district level open space facilities are proposed at Mulataga, and Gap Ridge to meet the future needs of the population and address a potential over-reliance upon existing district level open space facilities in Bulgarra and Millars Well.

COMMUNITY FACILITIES

Karratha contains the majority of community services, particularly those of a higher order. This includes the regional hospital, the North Regional TAFE, two high schools, a number of primary schools and a number of Federal and State Government regional offices.

There is a need to ensure that education services are maintained at a high level to keep people in place longer, including better secondary school education and upgraded tertiary education with development of regional research specialities.

Further, there is a need to ensure that health services are available that meet all of the health needs of all the community, including aged care and specialist facilities.

Existing civic, community and recreational land uses are located throughout both the City Centre and within existing residential areas. The City's *Community Facilities Plan and Matrix* provides guidance for the strategic planning for community facilities, taking into consideration levels of service benchmarks based on population. For a broad analysis of the benchmarks and estimated requirements at 2031 please see Table 7 below and section 5.6 of Part B of this Strategy. The City will continue to monitor community infrastructure needs in line with the *Community Facilities Plan and Matrix*.

Table 7: Anticipated community facility needs Karratha 2031

Community Facilities	Existing	Required by 2031	Anticipated Location	Commentary
Regional Open Space	3	-	-	Bulgara & Karratha Leisureplex sufficient for forecast growth
District Open Space	3	2	Mulataga	New Facility
			Tambrey	Upgrade of existing Neighbourhood Park
Neighbourhood Parks	17	1	Jingarri	New Facility
Local Parks	5	-	-	Existing facilities sufficient for forecast growth
Skate Park	2	1	Bulgarra	New Facility
Boat Ramps	2	-	-	In combination with Dampier existing facilities are sufficient for forecast growth
Libraries	1	-	Cultural Precinct	Proposed to be incorporated into Cultural Precinct and increased to 800m ²
Cultural Centre	1	-	Cultural Precinct	Red Earth Arts Precinct
Senior & Aged Care	-	1	Co-located with Seniors Aged Care Facility	New District Level Facility
Community Centres	7	1	Tambrey Pavilion	New Neighbourhood Level Facility
Youth Centres	1	-	-	Existing facilities sufficient for forecast growth
Family Support	16	2	Incorporated in Community Centres/Hubs	New Childcare Facilities
Community Health	2	-	-	Existing facilities sufficient for forecast growth



The extent of new provision required to service the population growth based purely on a standard benchmark figure can often be excessive. It may not fully take into account the multi-function use of current and future infrastructure resulting in a mixture of service levels. This is particularly relevant in Karratha when considering the needs of pitch space and community centre provision.

Another important consideration is the relatively young demographic profile of the City population meaning a greater demand (than the typical capita based benchmark) for childcare and other family support facilities. Playgroups should therefore be incorporated within community centres wherever possible.

The *Red Earth Arts Precinct* also performs a regional, district and local level function. The Precinct contains a 476 seat theatre that can operate as a cinema or a flat floor auditorium, an outdoor rooftop function space, two rehearsal rooms, dressing rooms and art spaces within the foyers. There are also hospitality areas on both floors. The precinct has gone a long way to addressing the previous gaps in community facilities, particularly performing arts since closure of the Walkington Theatre in 2011.

This facility complements the Karratha Leisureplex which is a significant community facility servicing the region. The Karratha Leisureplex is regional Western Australia's premier sport and leisure facility featuring a fitness centre, aquatic centre, indoor and outdoor courts as well as playing fields.

The Karratha Health Campus project was successful in bringing a new hospital to the Karratha City Centre. The project was the largest expenditure on a single health infrastructure project in regional Australia to date, and has significantly improved the City's existing health services.

An area has been designated as an *Education Precinct* to support coordination and partnerships in secondary and tertiary education development (see DIA 10 on the Karratha Strategy Map, Map 5). A university research centre that could expand into a larger university campus (with space for future growth) could be incorporated into this precinct.



Karratha-Cultural-Precinct-(2014)1



MOVEMENT NETWORK

This Strategy advocates the Green Spine (see Figure 6), previously referenced in the Karratha Growth Plan and Karratha Revitalisation Plan, which would improve connections within the study area which comprises Bulgarra, Millars Well, and Pegs Creek. The Green Spine will provide connectivity between existing residential areas and reduce reliance upon the Distributor Roads for local traffic movements. The Green Spine will provide a low-speed, high amenity environment suitable for bus services at a future time.

The detailed design of the Green Spine Road will include a variety of traffic calming methods and design response to slow traffic and encourage pedestrian and cyclist movement (see Figure 7). A high density of tree planting within the verge and the provision of on-street parking will emphasise the Green Spine as 'high friction' shared movement environment.

The Green Spine will connect destinations of activity and amenity including: primary schools; public open space; and community facilities. The Green Spine will have direct connection to the Karratha City Centre, including Sharpe Avenue, via an enhanced Karratha Terrace.

New growth areas are to be serviced by a permeable shared movement network that provides good connections to existing urban areas and the broader movement network.

The Karratha Western Bypass (see Figure 8) is one future road link which will be an important new road link for heavy vehicle traffic. This bypass will reduce the use of Madigan Road for use by heavy vehicle traffic.

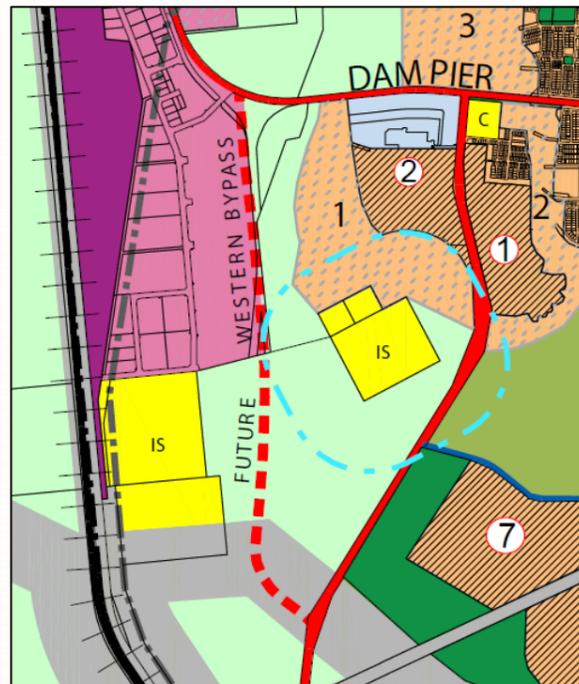


Figure 8: Proposed western bypass



Figure 6: Karratha proposed Green Spine



Figure 7: Proposed new east-west connections (Karratha Revitalisation Strategy, 2017).

DEVELOPMENT INVESTIGATION AREAS

Areas requiring further investigation to address constraints, determine appropriate areas for development, yield potential and land use designations have been defined on the Karratha Strategy Map (Map 5) as 'Development Investigation Areas'.

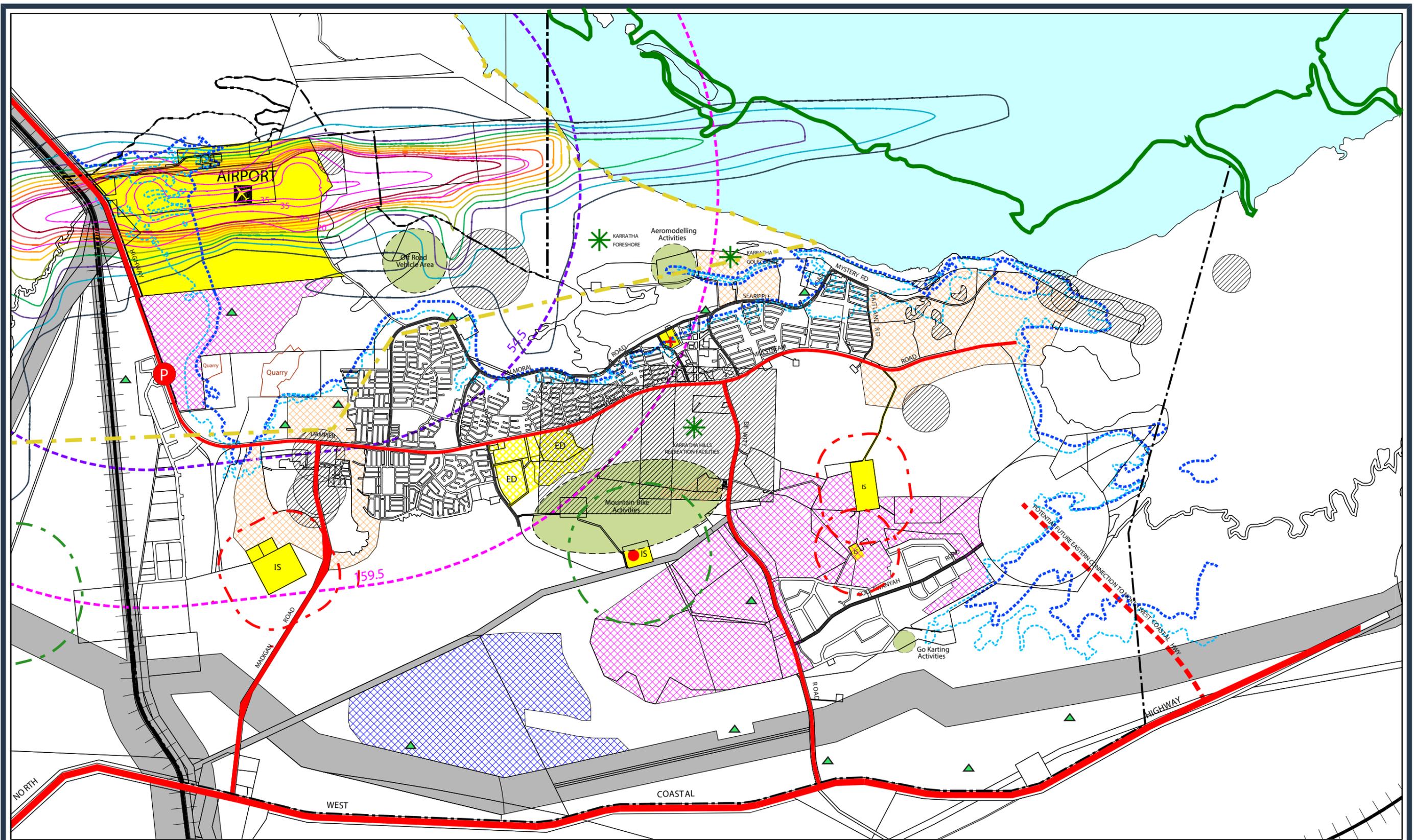
Despite not being required to accommodate forecast growth, this Strategy advocates progressive investigation and identification of Development Investigation Areas. This will allow the creation of a land supply 'pipeline' for future upswing in economic activity and as a key means of addressing housing supply over the longer term.

To ensure efficiency is realised from serviceable urban land, a benchmark gross density of 12 dwellings per hectare is recommended for the planning of new urban areas.

The following Development Investigation Areas (see Table 8) are numerically referenced on the Strategy Map and should be progressively investigated to ensure viability for future land release. It must be re-iterated that these are investigation areas only, and that there is no guarantee that the extents identified on the Strategy Map are capable of development.

Table 8: Karratha Development Investigation Areas

Karratha Strategic Plan		
DIA #	Name	Approx. Area (ha)
1	Gap Ridge (Urban)	105
2	Madigan Estate Extension to Baynton West (Urban)	61
3	Gap Ridge / 7 Mile (Urban)	65
4	Mulataga (Urban)	500
5	Airport (Airport Related Industry)	311
6	Karratha Industrial Expansion West (General Industry)	496
7	Karratha Gateway (Light Industry)	200
8	Karratha Industrial Area East (General Industry)	250
9	Gap Ridge North (General Industry)	270
10	Karratha Foothills (Institutional)	22
11	Searipple Tourism & Recreation Precinct	15



CITY OF KARRATHA

LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
PH:(08) 9186 8555



SCALE: 1:55 000 @ A3
DATE: OCTOBER 2020



NORTH



LEGEND:

- Shire Boundary
- Townsite Boundary
- Railways
- Primary Distributor
- Primary Road
- Tourism / Recreation Attraction
- Hospital / Health Centre
- Power Station
- Infrastructure
- Public Purposes (IS - Infrastructure Services)

CONSTRAINTS

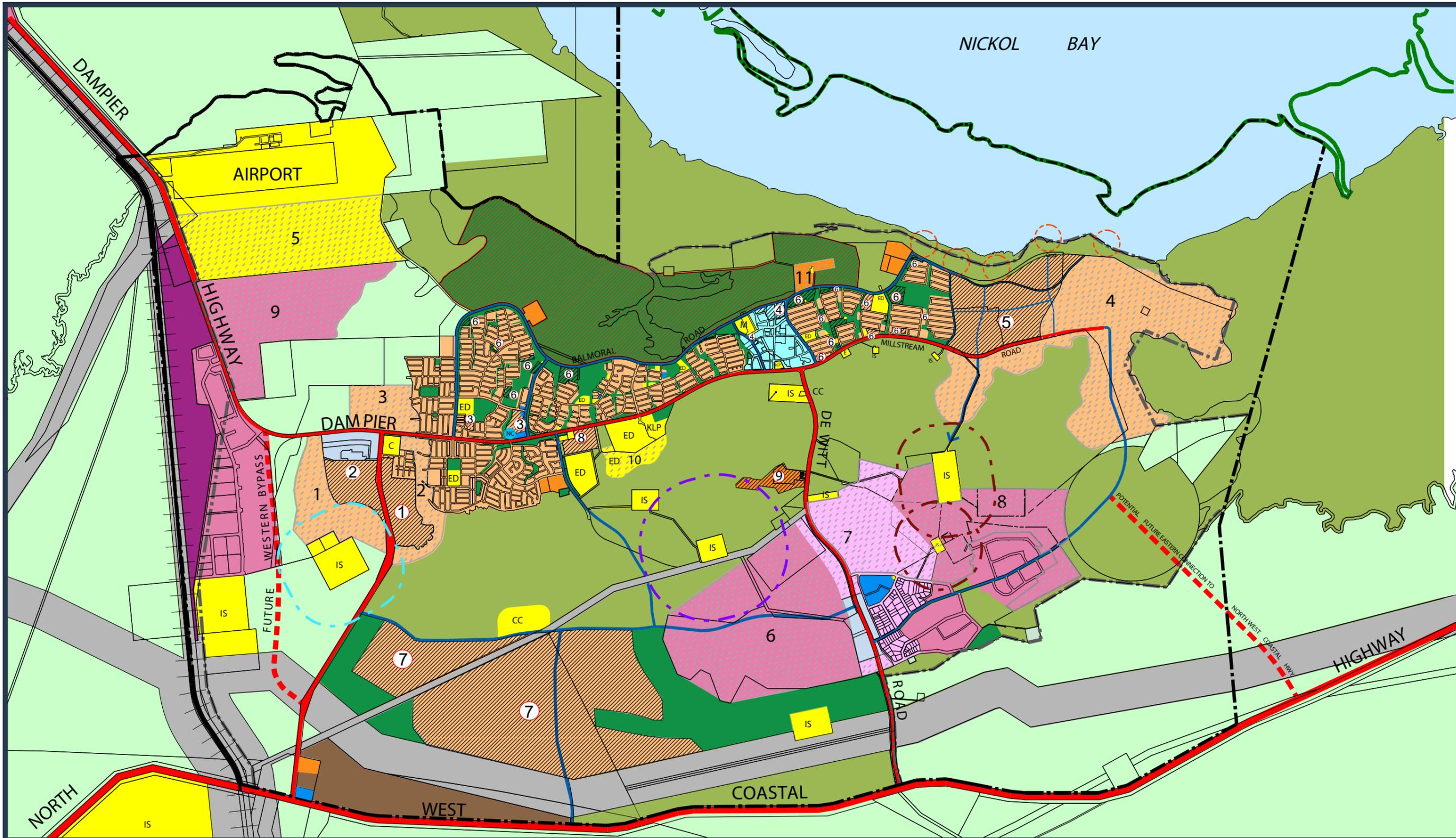
- Aboriginal Heritage Sites
- WWTP and 500m Buffer
- 800m Power Station Buffer
- 1:100 Year Storm Surge
- 1:500 Year Storm Surge
- Inner Horizontal Surface Line
- Outer Horizontal Surface Line
- Proximity to Threatened or Priority Ecological Community
- ANEF 25
- N70
- PRIORITY INTERSECTION - EASTERN ACCESS
- Special Control Area Airport Noise Restriction

OPPORTUNITIES

- Long Term Investigation Area
- Industrial Expansion Opportunities (short & long term)
- Urban Expansion Opportunities (short & long term)
- Education Precinct Opportunity
- Future Road Link

**OPPORTUNITIES AND CONSTRAINTS
4 OF 16**

KARRATHA
CITY OF KARRATHA



CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555



SCALE: 1:55 000 @ A3
 DATE: OCTOBER 2020

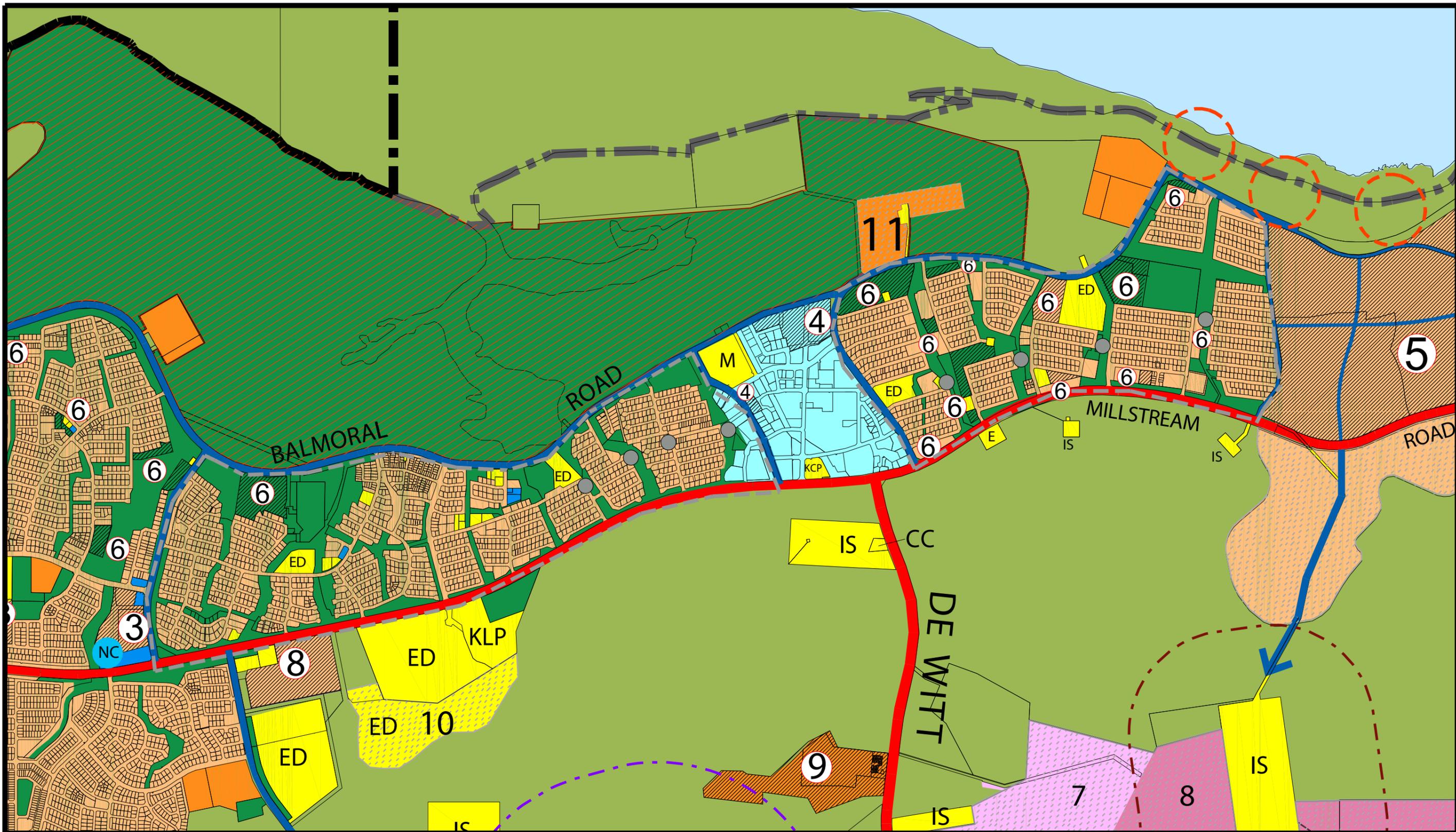


LEGEND:

- | | | | |
|---|-----------------------|--|---|
| Shire Boundary | Urban | Rural Residential | Ocean |
| Railway | City Centre | Tourism | Potential Special Control Area - Wastewater Treatment Buffer 500m |
| Existing Townsite Boundary | Commercial | Environmental Conservation | Potential Special Control Area - Power Station Buffer 800m |
| Proposed Townsite Boundary | Service Commercial | Infrastructure | Proposed WWTP 500m Buffer |
| Primary Distributor | Future Light Industry | Strategic Industry | Future Urban Expansion Areas |
| District Distributor | General Industry | Public Purpose, CC - Civic & Community, C - Cemetary, ED - Education, M - Medical Services | Development Investigation Areas |
| Potential Future Alignment | Rural | KLP - Karratha Liesurplex, KCP - Karratha Cultural Precinct, IS - Infrastructure Services | |
| Neighbourhood Centre | Public Open Space | | |
| Coastal Nodes | | | |
| Area subject to Foreshore Management Plan | | | |

KARRATHA STRATEGY MAP
 5 OF 16

- | | |
|--|---|
| 1. Madigan Road Estate | 7. Karratha Gateway (Light Industry) |
| 2. Gap Ridge | 8. Karratha Industrial Area East (General Industry) |
| 3. Tambrey Primary School & Neighbourhood Centre | 9. Gap Ridge North (General Industry) |
| 4. City Centre | 10. Karratha Foothills (Institutional) |
| 5. Mulataga | 11. Searipple - Tourism & Recreation Precinct |
| 6. Lazy Lands Project | |
| 7. Regals (Long Term Growth Area) | |
| 8. Old Hospital Site (Urban Growth Area) | |
| 9. Stove Hill (Tourism) | |



CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555

0 200 400 600 800 1000 1200 1400m

SCALE: 1:20 000 @ A3
 DATE: October 2020

NORTH

City of Karratha

LEGEND:

Shire Boundary	Urban	Tourism	Ocean
Railway	City Centre	Environmental Conservation	Potential Special Control Area - Wastewater Treatment Buffer 500m
Existing Townsite Boundary	Commercial	Public Purpose, CC - Civic & Community, C - Cemetary, ED - Education, M - Medical Services	Potential Special Control Area - Power Station Buffer 800m
Proposed Townsite Boundary	Future Light Industry	KLP - Karratha Liesurplex, KCP - Karratha Cultural Precinct, IS - Infrastructure Services	Proposed WWTP 500m Buffer
Primary Distributor	General Industry	Area subject to Foreshore Management Plan	Future Urban Expansion Areas
District Distributor	Public Open Space	Karratha Revitalisation Strategy Study Area Boundary	Development Investigation Areas
Potential Future Alignment	Potential East West Connections	Neighbourhood Centre	Tambrey Primary School & Neighbourhood Centre
Coastal Nodes		City Centre	Mulataga
		Lazy Lands Project	Old Hospital Site (Urban Growth Area)
		Stove Hill (Tourism)	Karratha Gateway (Light Industry)
			Karratha Industrial Area East (General Industry)
			Karratha Foothills (Institutional)
			Searipple - Tourism & Recreation Precinct

KARRATHA CITY CENTRE AND SURROUNDS
 6 of 16

5.4 Dampier Overview

ROLE IN THE SETTLEMENT HIERARCHY

This Strategy, consistent with the *Pilbara Planning and Infrastructure Framework* and the *Karratha City of the North*, views Dampier as a Town.

Dampier is recognised as an emerging town, first established to accommodate the mining industry workforce in the early 1960's. Historically a relocation of services to Karratha has occurred however it is envisaged that some services will return to Dampier aided by the establishment of the Dampier Community Hub, completed in 2016.

Dampier is a major shipping port in Australia with export facilities of Rio Tinto, Dampier Salt, and the North-West Gas Shelf Project surrounding the Dampier townsite (see Figure 9: Port Facilities around Dampier). Additionally, the townsite also contains a small quantity of residential dwellings and commercial uses.

This Strategy recognises the maritime focus of Dampier and recommends that the town strengthen its role as the gateway for emerging recreation and tourism opportunities. There exists a strong history of enjoyment of the Burrup Peninsula and the waters of the Dampier Archipelago which may be further developed.

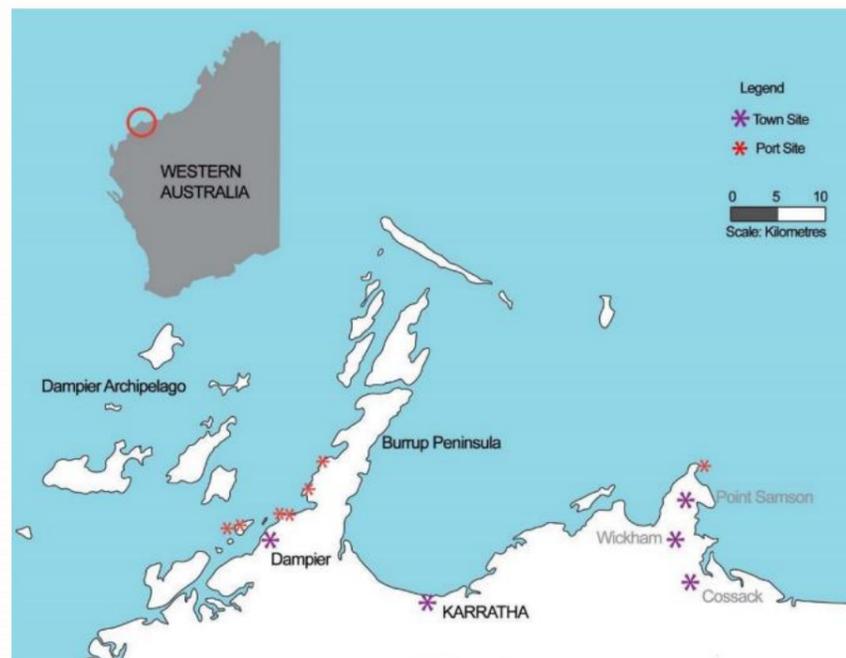


Figure 9: Port Facilities around Dampier

POPULATION & DISTRIBUTION

At the 2016 Census Dampier had a population of 1,104. Forecasts using medium population (WA Tomorrow Band E) projections show that Dampier is predicted to have a population of approximately 1,363 residents by 2031. Currently it is considered that there is enough residential land/dwellings within the Dampier townsite to cater for this growth.

KEY CONSTRAINTS FOR GROWTH

The growth potential of Dampier is physically constrained by surrounding by existing infrastructure related to strategic industrial development and the environmental factors of the landscape - primarily geological and drainage in nature (see Dampier Opportunities and Constraints map (Map 7) and Figure 10 below), as well as the significant surrounding cultural landscape and registered heritage places, see Figure 11.

The most significant constraint to the growth of Dampier is the current limitations in capacity of its wastewater treatment plant (WWTP) and infrastructure. This WWTP is operated by Rio Tinto and represents a legacy of Dampier from its mining town origins.

Rio Tinto has advised that the current WWTP is fit for purpose to support the current town and has some limited capacity to support new dwellings. An initial assessment in 2014 suggested this was around 150 new dwellings and as such there are no plans to upgrade or relocate the WWTP. Relocation of the plant was studied by Rio Tinto in 2013. Any replacement would have a high capital cost. Furthermore, at the time it was noted that the town's existing sewer system would require upgrading at a further capital cost to allow for new dwellings. It is however noted that the wastewater situation does present a constraint on future growth in the townsite, to support expansion of the townsite the WWTP will need upgrading or relocation.

The extent that the WWTP constrains development is uncertain as the identification of an appropriate buffer will be subject to a separate investigation. It is acknowledged that the prospective buffer would include a large portion of the Dampier town centre and existing residential areas.

Drainage reserves also need to be remediated to reduce the risk from flooding events. The City has undertaken a drainage study and will work with Rio Tinto, the community and state government agencies to implement its recommendations.



Figure 10: Areas of exposed, rocky landscape

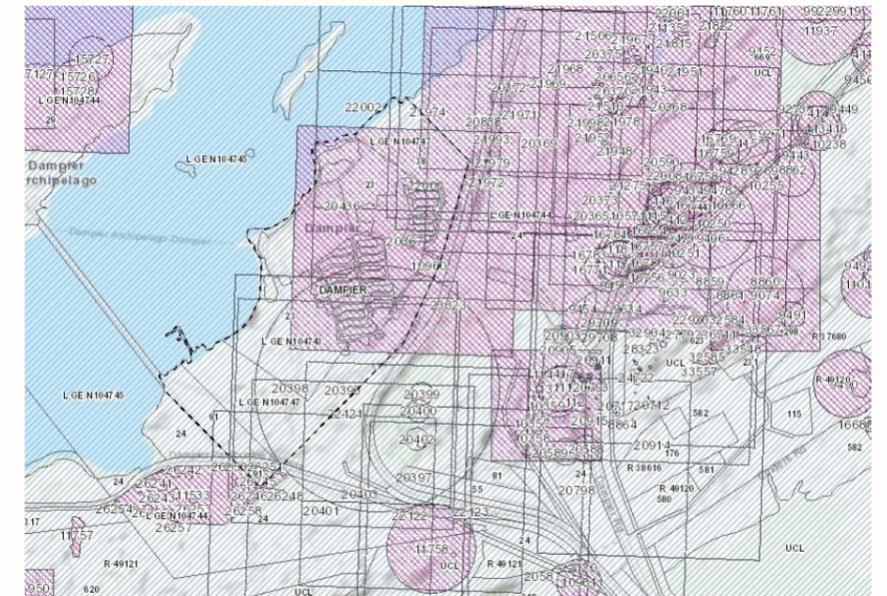


Figure 11: Registered & Lodged Heritage Places

WORKFORCE ACCOMMODATION

In 2015 Rio Tinto relocated its approximately 200 fly in, fly-out workers from Peninsula Palms Dampier to Searipple Village in Karratha. The relocation to Karratha had a localised impact on businesses which placed a high reliance on the FIFO workforce. In 2019, Rio Tinto announced its refurbishment of the aging Peninsula Palms FIFO accommodation with an estimated budget of \$30 to \$50 million. The refurbishment will include renovation and redevelopment of accommodation rooms, dining hall, shower blocks, gymnasium, transit lounge, reception area and function room facilities. Once operational the dining facilities are expected to be open to Dampier residents and other locals within the City. Refurbishment works are expected to be completed by the summer of 2020/2021.

RESIDENTIAL DEVELOPMENT

Demand for housing with Dampier has consistently been strong with above average prices within the local market reflecting the amenity attractions of the town and its coastal location. Dampier has established neighbourhoods with mature trees and a high level of amenity.

In light of surrounding constraints the future redevelopment scenario for Dampier is based on consolidation and renewal with relatively minor expansion. A coordinated approach to redevelopment following orderly and proper planning should be undertaken, with delivery to be on a precinct by precinct basis.

Consideration should be given for the potential for a variety of dwelling types to be provided as alternatives to the dominance of the single detached dwellings. Given the age of housing and demographic base of the town's population it is anticipated that over time existing residents will downsize dwelling size if there are viable local accommodation options available in line with 'Aging in Place'

principles. As consequence, the renewal of housing stock is envisaged to occur as ownership patterns change and new residents are attracted to town.

This Strategy recognises that the replacement of existing housing stock with larger houses is likely to occur to reflect current market demands. It is further recognised that ‘high end’ housing stock may be constructed in response to the amenity character and attraction of the town and its coastal location. This would be supported by the City as further diversification of accommodation types and diversity of town character.

Under-utilised lots on Huon Street (number 8 and 2) are also seen as redevelopment opportunities within Dampier.

The Dampier Strategy Map (Map 8) identifies an urban expansion area of approximately 20ha at the Lookout site, see Table 9 below. This site however has a number of constrains that will need to be address through subsequent planning stages prior to development.

Table 9: Dampier Urban Expansion Area

Map ID No.	Urban Expansion Area	Approx. Area (ha)
1	The lookout (Urban)	20
TOTALS		20

TOWN CENTRE

At present the Town Centre includes a small retail centre with gross lettable area of approximately 4,418m². This Strategy recommends that the provision of community and commercial facilities and services in Dampier continue to be limited to local needs and conveniences, with residents being directed to the nearby *Karratha City Centre* for broader needs.

The redevelopment of the Dampier Town Centre precinct is encouraged through the *Dampier Townsite and Foreshore Enhancement Plan (2015)*. The Plan envisions improved connectivity between key focal points, commercial and community nodes (see Figure 12). The redevelopment and enhancement of the Dampier townsite will improve key public infrastructure and result in streetscape enhancements. The enhancement of the town centre provides an unique opportunity to adapt and utilise existing facilities within the town centre for new tourism related landuses and attractors, while also potentially co-locating community facilities with the centrally located Dampier Primary School to capatilise on the sharing of facilities.



Figure 12: Dampier amenity strategy plan (Townsite and Foreshore Enhancement Project, 2015)

TOURISM

Expansion of the tourism industry is currently limited by a lack of amenity, attractions and quality accommodation. This is largely due to competition for accommodation from peak FIFO workforces. The City's long term vision is to identify and establish a tourism precinct at the northern edge of the Townsite which encompasses the Peninsula Palms facility, the caravan park, Pilbara Camp School while also capitalising on the proximity of the town centre.

The *Dampier Townsite and Foreshore Enhancement Plan (2015)* identifies four separate nodes for amenity enhancements. The amenity of the townsite and foreshore will be improved over time to ensure Dampier's appeal to residents and visitors.

It should also be noted that once an access road is completed to the northern Burrup area, further tourism opportunities may be realised such as camping options.

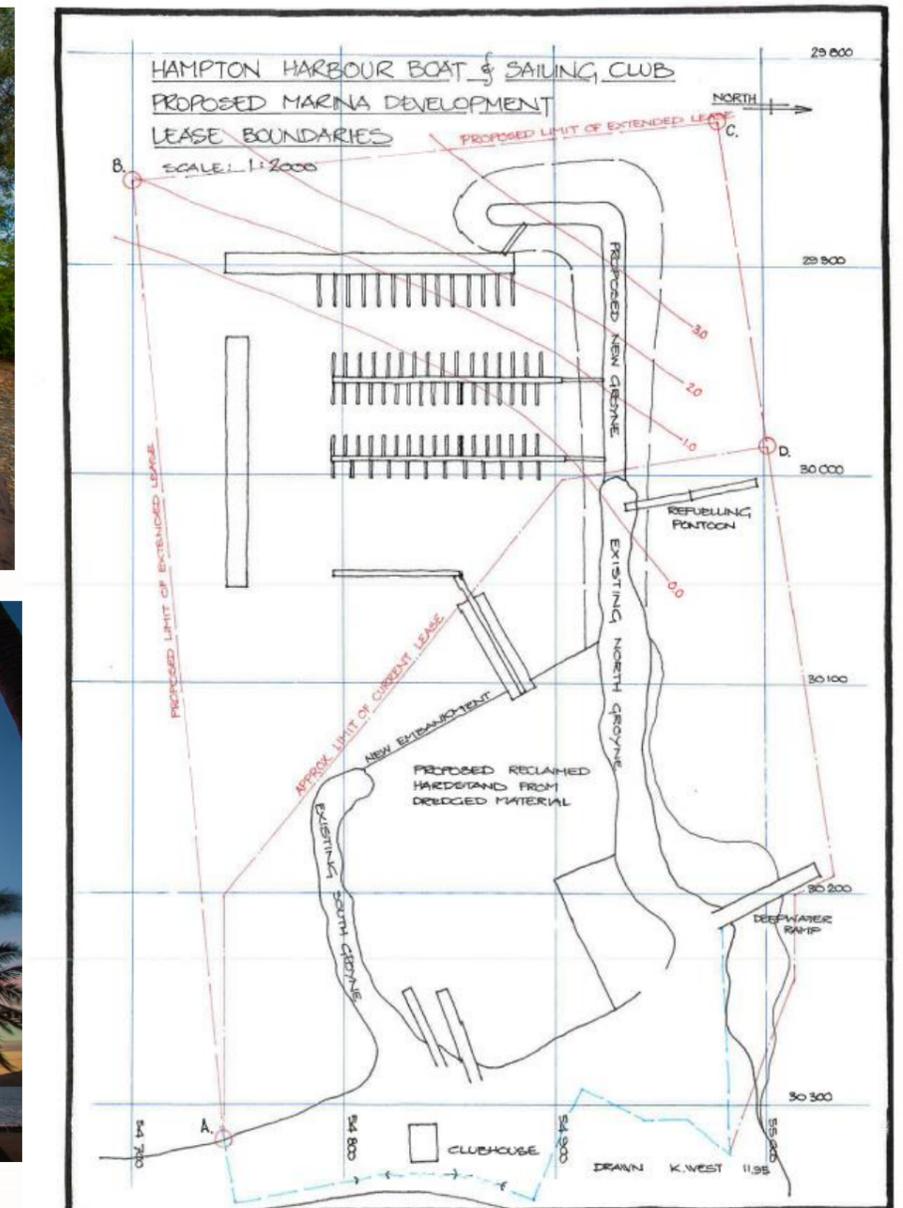
MARINA

There is a considerable history to the investigation of a potential marina at Dampier. This Marina would have the capacity to generate a number of benefits to residents and increase visitors to the town.

A long term vision to establish a waterfront commercial strip is recognised in the form of a *Marina Development Investigation Area* (see Dampier Strategy Map - Map 8) located directly adjacent the Coastal Village Precinct. Development of a recreational marina at Dampier is a key catalyst project to harness Dampier's potential as a hub for marine recreation. A marina will improve accessibility to the Dampier Archipelago and general marine recreation activities. This Strategy recognises this site as *Development Investigation Areas* for marina/tourism purposes.

The commencement date and expected completion date for the Dampier Marina is still being investigated. It is estimated that the proposal will cost an estimated \$30 million to complete.

In the interim there is scope for some limited growth of Hampton Boat Harbour (private marina). Recent investigations by the Hampton Harbour Boat and Sailing Club have identified a potential marina design which will not require the relocation of the existing Waste Water Treatment Plant. Investigations to transfer land, and extend lease boundaries to accommodate the proposed marina, have commenced.



INDUSTRY & KEY INFRASTRUCTURE

Dampier Port is a major regional export port servicing the mining and resources industry in the Pilbara and offshore LNG operations, and facilitates the nationally significant export of iron ore, LNG and salt. The port and exporting activities are located immediately north east of Dampier town and to the west on East Intercourse Island port. Buffers relating to dust and rail movements involved in these operations form notable constraints to expansion of the Townsite.

Approximately 2.5km to the south-east of the Dampier Townsite is the Cinders Road Industrial Development Area. This land is considered to be inappropriate for long term industrial or recreational land uses unless a structure plan is prepared. A structure plan is necessary to: co-ordinate development; respond to land constraints; identify service provision; and identify access and connection of lots to a public road reserve.

In addition to key port servicing infrastructure, the upgrade of the 132 kilovolt transmission line between Karratha and Dampier will replace 200 hundred wooden poles with steel poles. This upgrade will ensure uninterrupted supply between the Karratha terminal sub-station to the Dampier sub-station and support the growing demand for energy within the Burrup Strategic Industrial Area. Upgrade works are expected to be completed by the end of 2020, ahead of the 2020/21 cyclone season.

CONSERVATION & OPEN SPACE

Dampier townsite is enveloped to the west by 'Parks, Recreation and Drainage' reserves and to the east by a 'Conservation and Natural Landscapes' zone. Expansion of the townsite beyond its current footprint is therefore highly constrained. The surrounding environmental context is that the townsite is situated in close proximity to both the Dampier Archipelago and the Murujuga National Park.

Environmental Conservation areas depicted on the Dampier Strategy Map (Map 6) relate to both current zoning (Conservation, Recreation and Natural Landscapes) within Local Planning Scheme No. 8, and the National Heritage Listing of the Dampier Archipelago and Burrup Peninsula. There is opportunity for further investigation of additional areas to be zoned Environmental Conservation relating to the National Heritage areas in the forthcoming Local Planning Scheme review.

Windy Ridge oval ridge is recognised as the active playing fields within Dampier. In the longer term, the site is also identified for the investigation of indoor sports. In addition, the precinct incorporates a number of coastal amenities within its foreshore area, most notably the town boat ramp. This boat ramp is subject to a high level of use.

The recently redeveloped Hampton Park Precinct is recognised as having significant value for both passive and active recreation. In addition to accommodating rectangular field sports, the precinct regularly accommodates a variety of community gatherings and festivals. The recent redevelopment caters for a wide range of activities including land and water based activities as well as community and commercial uses while consolidating the existing sporting facilities such as the Town's tennis courts and bowls club.

COMMUNITY FACILITIES

Dampier's community facilities currently consist of a library, civic centre, a separate AFL oval and football (soccer) pitch, bowling club, Hampton Harbour Boat & Sailing club, a high standard skate park, the Dampier Primary School, Dampier Playgroup, St Peter's Catholic Church, and a police station.

The *Dampier Community Plan 2014-19* identified the retention, regaining and development of additional local services and facilities. The completion of the *Dampier Community Hub Project* in 2016 has assisted in achieving this outcome. The project included the refurbishment of the existing community hall and playgroup, the development of additional child care and the development of community meeting areas.

The *Dampier Community Hub Project* contains a number of indoor and outdoor spaces including an early learning centre, public library, multipurpose meeting rooms and community spaces and a refurbished community hall. The Dampier Community Hub provides a community focus for the town and has assisted in the gradual stimulation of development nearby. Future consolidation of government services (the police station and fire station) into one development near the community hub is also highly encouraged.

Table 10 below notes key facilities that are expected to be required based on the ratios set out in the City's *Community Facilities Plan and Matrix (2011)* and forecast population growth out to 2031.

Table 10: Estimated community facility requirements 2031

Community Facilities	Existing	Required by 2031	Anticipated Location	Commentary
Regional Open Space	-	-	-	Serviced by Karratha
District Open Space	1	-	-	Windy Ridge Oval sufficient for forecast growth
Neighbourhood Parks	2	-	-	Existing facilities sufficient for forecast growth
Local Parks	1	-	-	Existing higher level facilities sufficient for forecast growth
Skate Park	1	-	-	Existing facilities sufficient for forecast growth
Libraries	1	-	-	To be incorporated into Community Hub
Cultural Centre	-	-	-	Serviced by Karratha
Senior & Aged Care	-	-	-	Serviced by Karratha
Community Centres	2	-	-	Existing facilities to be enhanced (Dampier Hub)
Youth Centres	-	1	Coastal Village	To be collocated with the Community Hub
Family Support	3	-	-	Existing facilities sufficient for forecast growth
Community Health	-	-	-	Serviced by Karratha

MOVEMENT NETWORK

The City has undertaken an assessment to identify improvements to the existing movement within Dampier (Figure 13). The majority or recommended improvements are aimed at improving permeability and legibility within the Town Centre.

A truck lay-over area (accessed via either Parker Point Road or East Intercourse Island Road) is proposed to address truck movement and parking concerns.

A drainage study has also been undertaken to identify shortfalls in the existing drainage network. The City has progressively been upgrading the culverts within Dampier road reserves to improve drainage function and ensure the existing road reserves do not erode as a result of malfunctioning culverts.



Figure 13: Dampier movement network

DEVELOPMENT INVESTIGATION AREAS

The City envisions a diverse range of infill housing development within Dampier, from a mix of apartments and town houses to grouped housing, cottage (400m²+). Where topographical constraints are present the City will consider the provision of larger lots (700m²+).

This Strategy (Map 8) identifies 5 Development Investigation Areas (see Table 11 & Figure 14) recognising that there are constraints to the development of these sites. A number of sites may offer opportunities for accommodating growth in the future should constraints be overcome.

The following Development Investigation Areas are identified numerically on the Dampier Strategy Map (Map 8) and require further detailed investigation.

Table 11: Dampier development investigation areas

Dampier Strategic Plan		
DIA #	Name	Approx. Area (ha)
1	Marina	4
2	Peninsula Palms (Tourism)	31
3	Beachside (Urban)	3
4	Hampton Views (Urban)	8
5	Hill Road	13

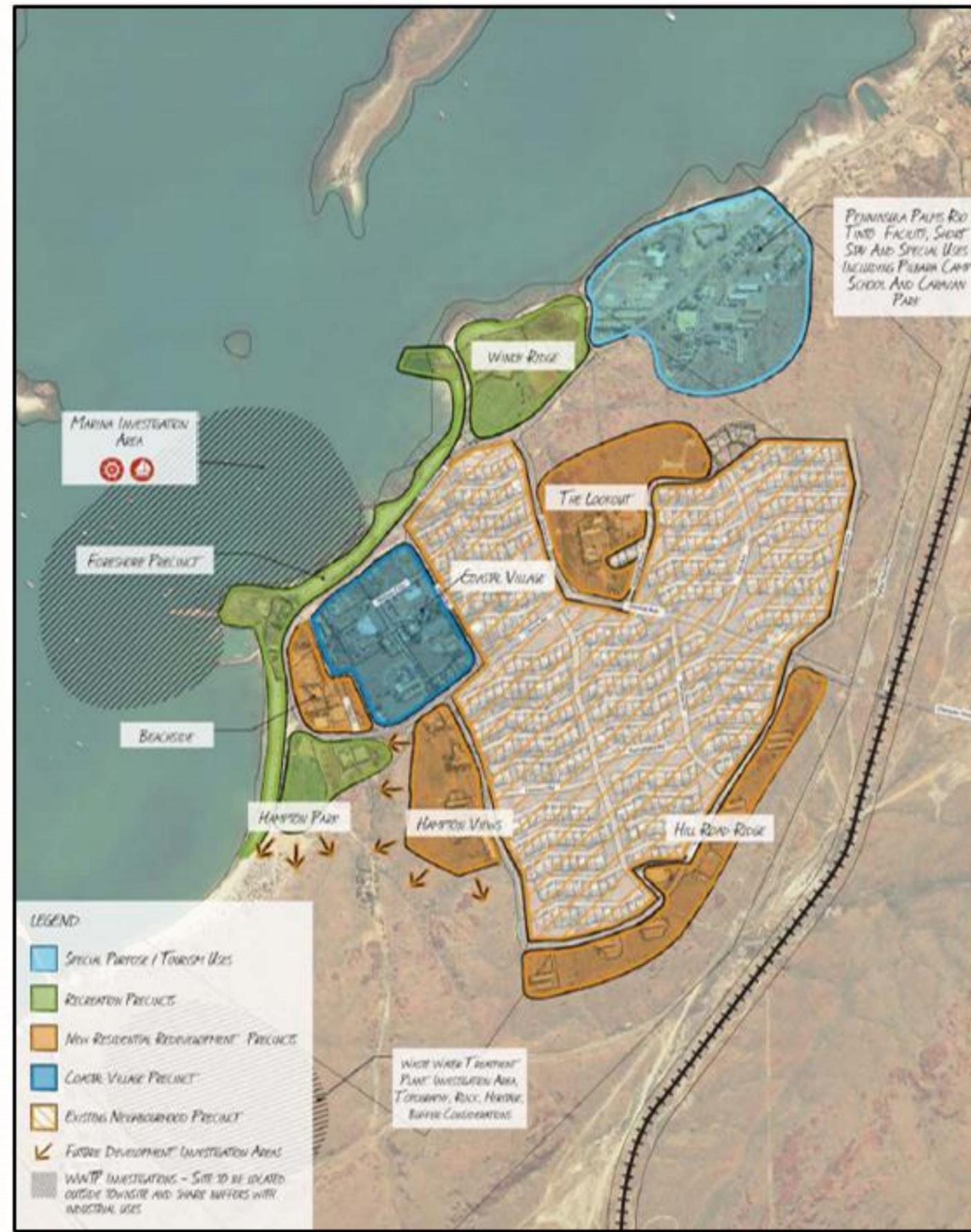
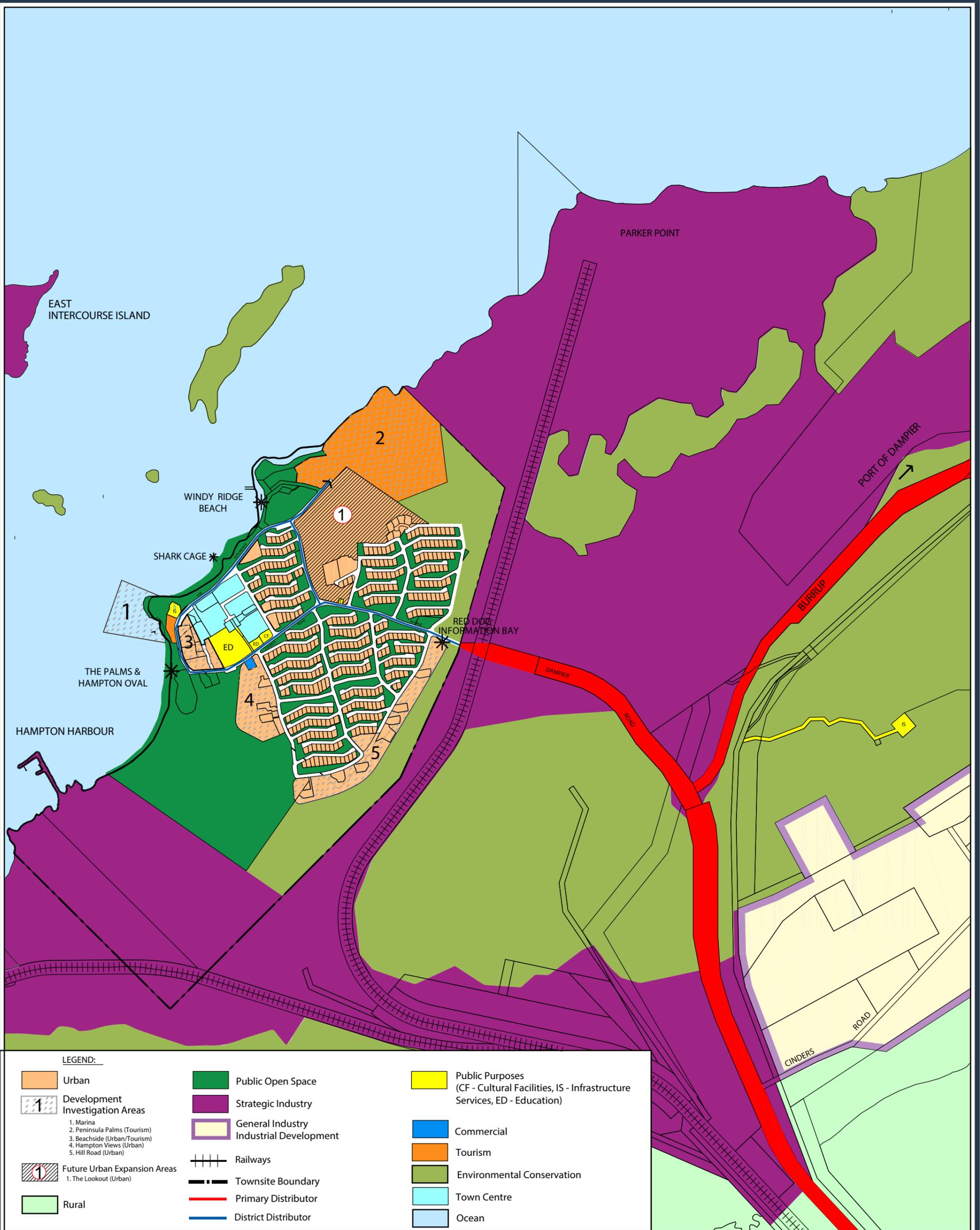
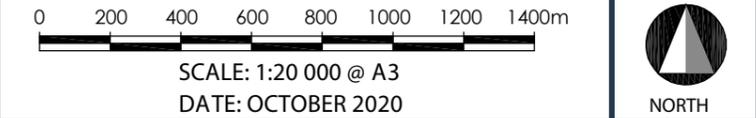


Figure 14: Dampier development investigation areas



CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 209, KARRATHA
 PH:(08) 9186 8555



DAMIER STRATEGY MAP
 8 OF 16

CITY OF KARRATHA

5.5 Roebourne Overview

ROLE IN THE SETTLEMENT HIERARCHY

Roebourne is situated within the *Eastern Corridor* of settlements comprising Roebourne, Wickham, Cossack, and Point Samson. Roebourne has a significant history as a European settlement in the 1880's. Roebourne is now a significant focus for Aboriginal people and provides an important centre of Aboriginal enterprise. Roebourne is home to a number of Aboriginal Corporation offices which provide services to the Indigenous communities within the City and broader region.

In terms of Roebourne's role within the *Eastern Corridor*, the focus will be on facilitating the development of Roebourne informed by the previous *Roebourne Structure Plan (2014)* endorsed by Council under the City's Local Planning Scheme No. 8. Roebourne contributes to the industrial land supply of the *Eastern Corridor*.

POPULATION & DISTRIBUTION

At the 2016 Census Roebourne (Urban Centre) had a population of 627. WA Tomorrow (2019, Band E) forecasts an average annual growth rate of between 1.5-2.05% for Roebourne to 2031. Previous forecasts estimated that an additional 160 (approximate) dwellings may be required within the Roebourne townsite by 2031. The City will continue to monitor growth within Roebourne.



KEY CONSTRAINTS ON GROWTH

Roebourne is bounded to the east by the Harding River which is subject to infrequent flooding. The Harding River is also affected by major storm surge events, see Roebourne Opportunities and Constraints map (Map 9). Flooding and storm surge modelling highlights parts of Roebourne should not be developed and areas where mitigation measures should be incorporated into development proposals. Steep ridge lines west of townsite also pose significant limitations to future expansion.

The waste water treatment plant to the north of the townsite also will mean that sensitive land uses should not encroach into this area.

WORKFORCE ACCOMMODATION

It is recommended that no further residential development, including workforce accommodation (WA) camps, be permitted within either the *Commercial Precinct* or the industrial area. This is also referenced within the previous *Roebourne Structure Plan (2014)*.

This Strategy considers Roebourne town as unsuitable for further WA camp development and recommends WA proposals not be supported within the townsite boundary of Roebourne.

RESIDENTIAL GROWTH (URBAN EXPANSION AREAS)

It is unlikely that there will be a demand for additional residential land beyond that identified in the Roebourne Structure Plan, within the next 20 years. Given the low population growth forecast for Roebourne current zoned land is considered sufficient to meet demand.

Any program for renewal over the existing urban area is to be sensitive to buildings of cultural heritage significance in and around the Town Centre.

Two areas are identified as Urban Expansion Areas on the Strategy maps, these include the Ngarluma Aboriginal Sustainable Housing (NASH) project and 'West of the Water Pipeline', see Table 12 below. These two areas will cater for population growth in Roebourne into the long term, as shown in the table below:

Table 12: Roebourne urban expansion areas

Roebourne Strategic Plan			
UEA #	Name	Approx. Area (ha)	Estimated Dwelling Yield
1	NASH	15	225
2	West of Water Pipeline	7	105

TOWN CENTRE

Being the only settlement located directly on the North West Coastal Highway route, Roebourne acts as a service centre to passing traffic. Despite this role, Roebourne presently has limited commercial and retail offering, with a total occupied gross lettable commercial floor area of approximately 10,720m² of which the general store encompasses some 780m². The largest use by floorspace occupation within Roebourne is the Health sector which occupies approximately 30% of total floorspace. In comparison Shop and Retail occupy approximately 1% of total floorspace. Roebourne currently has approximately 2,090m² of gross vacant lettable commercial floor area. The City will monitor floorspace demand to ensure an adequate supply into the future.

The Strategy (See Roebourne Strategy Map - Map 10) envisions the *Roebourne Centre Precinct* as the principal retail, commercial and community services hub for Roebourne, with Wellard Street to form an intimate scale main street featuring the primary retail and commercial offerings. Key re-development projects that have recently been identified or completed which will encourage a stronger economy and community include:

- Ganalili Centre - Key Commercial, Community Services, Hotel & Tourist Accommodation
- Roebourne Cultural Complex - Cultural Performance Area
- NAC Community Centre – Focus of Community Development
- Key sites in Roe and Padbury Street – Mixed Use Development
- General Store – Nucleus of Retail Functions
- Yaandina Centre – Indigenous Services

SERVICE COMMERCIAL

A *Service Commercial Precinct* is also identified at the corner of North West Coastal Highway and Roebourne-Point Samson Road. Development within this precinct is expected to be constrained to light industrial uses and associated commercial uses that do not compete with the existing retail centre, such as motor vehicle accessories, tyre store or car wash services.

This precinct is expected to form a transition zone to more intensive industrial activity further north. The timing of this development is likely to be influenced by the fluctuations in the resources industries.

MIXED USE

Mixed Use development is encouraged throughout the *Roebourne Centre Precinct* (see Roebourne Strategy Map - Map 10), with an initial focus on Padbury Street, where development will be encouraged to maintain an activated street level while providing office space on first levels and above.

TOURISM

Tourism land uses are encouraged within the *Heritage Precinct* located at the southern edge of town, which includes a large number of historic buildings dating back to European settlement in the 1880's.

The potential for development of low key tourist accommodation was also recognised in the *Roebourne Structure Plan* within the existing caravan park to

the east of the town. Due to the high risk of inundation, damage and temporary isolation as a result of riverine flooding, development potential is limited to that which is temporary and relocatable, with an Emergency Management Plan and compliance with the State Planning Framework regarded as an essential component of any development proposal for this land.

INDUSTRY

The rezoning of the existing Mixed Business development to an Industry Zone will allow development of a more intensive nature within what is referred to as the *Industry Precinct* is supported. This area is expected to service the mining industry as well as logistics, mechanical and other light industries related to the residential needs of Roebourne. Expansion of this area westward, where it will form a compatible use within the 500m buffer of the waste water treatment plant is also supported. Such expansion will need to be designed in such a way as to manage drainage from local catchment runoff. This area is expected to service the mining industry as well as logistics, mechanical and other light industries related to the residential needs of the Town.

Roebourne has approximately 16ha of Industrial land and 14ha of Future Industrial land capable of development which will be able to provide for future demand (KLCA, 2020).

COMMUNITY FACILITIES

Centred on the school (including North Regional TAFE) and key recreational facilities in town, the *Community and Education Precinct* will provide for Roebourne's leisure and educational services which enhance opportunities to foster life and artistic skills, encouraging traditional, contemporary and cultural activities.

The State Government has recently announced a \$42 million investment into the Roebourne District High School which will see the school receive a total redevelopment from kindergarten through to the secondary school areas.

Table 13 below notes the key facilities that are expected to be required based on the ratios set out in the City's *Community Facilities Plan and Matrix (2011)* and forecast population growth out to 2031.

Table 13: Estimated community facility requirements Roebourne

Community Facilities	Existing	Required by 2031	Anticipated Location	Commentary
Regional Open Space	-	-	-	Service by Wickham
District Open Space	1	-	-	Existing facilities sufficient for forecast growth
Neighbourhood Parks	2	-	-	Existing facilities sufficient for forecast growth
Local Parks	1	-	-	Existing facilities sufficient for forecast growth
Skate Park	-	1	Community & Education Precinct	New Facility
Libraries	1	-	-	Existing facilities sufficient for forecast growth
Cultural Centre	-	1	Community & Education Precinct	New Sub-District Level Facility
Senior & Aged Care	1	-	-	Existing facilities sufficient for forecast growth

Community Centres	1	-	-	Existing facilities to be enhanced.
Youth Centres	2	-	-	Existing facilities sufficient for forecast growth
Family Support	1	1	Community & Education Precinct	New Playgroup Facility
Community Health	1	-	-	Existing facilities sufficient for forecast growth

The *Recreation Sub-Precinct* is a City-led, ten year re-development program over three sites. This project will feature sports and leisure amenities with the aquatic centre, kiosk, community outdoor kitchens, meandering interactive skatescape, community hall and meeting rooms.

The important and emerging role of Aboriginal Corporations in community development and cultural awareness are captured in developments such as the Ganalili Centre and the Roebourne Cultural Complex.

Due in part, to there being a high indigenous population in the *Eastern Corridor* needing preventative health care, it is important that sub-district health centres such as the Mawarnkarrra Health Centre be retained (and where possible enhanced), rather than these services being diminished or absorbed within the *Karratha Heath Campus*.

CONSERVATION & OPEN SPACE

Mount Welcome is the dominant land feature in the locality. It is a regional landmark and is worthy of protection.

There is currently limited provision of open space within the built-up areas of the Roebourne townsite, with the function of a number of existing reserves being dominated by water management requirements. The Strategy supports a program of gradual enhancement of the open space and recreational values of the Harding River which was identified by the previous *Roebourne Structure Plan* including the provision of seating, shade and other facilities. Future review of Local Planning Scheme No. 8 could also include amending/reviewing the appropriateness of local reserves along the Harding River.

MOVEMENT NETWORK

The movement network is a critical component of the *Roebourne Structure Plan*. Key improvements include construction of a southern 'truck-only' bypass to reduce heavy vehicle traffic through the settlement. This initiative would only be triggered by significant traffic increases along this section of North West Coastal Highway (see Roebourne Opportunities and Constraints map - Map 9).

It is also recommended that consideration be given to the realignment of the North West Coastal Highway around the Education and Recreation Precinct, so as to free-up space, and negate potential expansion of those facilities on the northern side of the road (see Roebourne Opportunities and Constraints map - Map 9). A number of intersection upgrades are also recommended, as well as the establishment of a heavy vehicle breakdown area, possibly at the junction of the heavy vehicle diversion route to the west of town.

Foremost is the need to focus on the provision of a safe and connected environment for pedestrians. This will require the formalisation of a number of important informal pathways through and around the town. The formal construction of these pedestrian links will improve the linkages between

residential areas, services, the town centre and the river. The *Roebourne Structure Plan* suggests these pathways be formalised incorporating shade, lighting, seating and signage.

SPECIAL CONTROL AREAS

The Water Corporation currently operates a Waste Water Treatment Plant (WWTP) located to the north-west of Roebourne. Future gravity and pressure sewers and two new pump stations are planned within this area for the proposed Ngarluma development north of the North West Coastal Highway.

Future expansion of the WWTP should consider need for the creation of a Special Control Area to protect the WWTP buffer from encroachment of surrounding sensitive land uses, see Roebourne Strategic Plan for the proposed SCA extent (based on a generic distance of 500m which would be subject to further studies and refinement).

An existing special control area 'Roebourne Flood Management' SCA currently applies to eastern sections of the townsite (see opportunities and constraints map for Roebourne).

The Roebourne opportunities and constraints mapping notes the drinking water source area to the south east of the townsite. Future investigations are recommended to appropriately protect this area through updated scheme provisions.

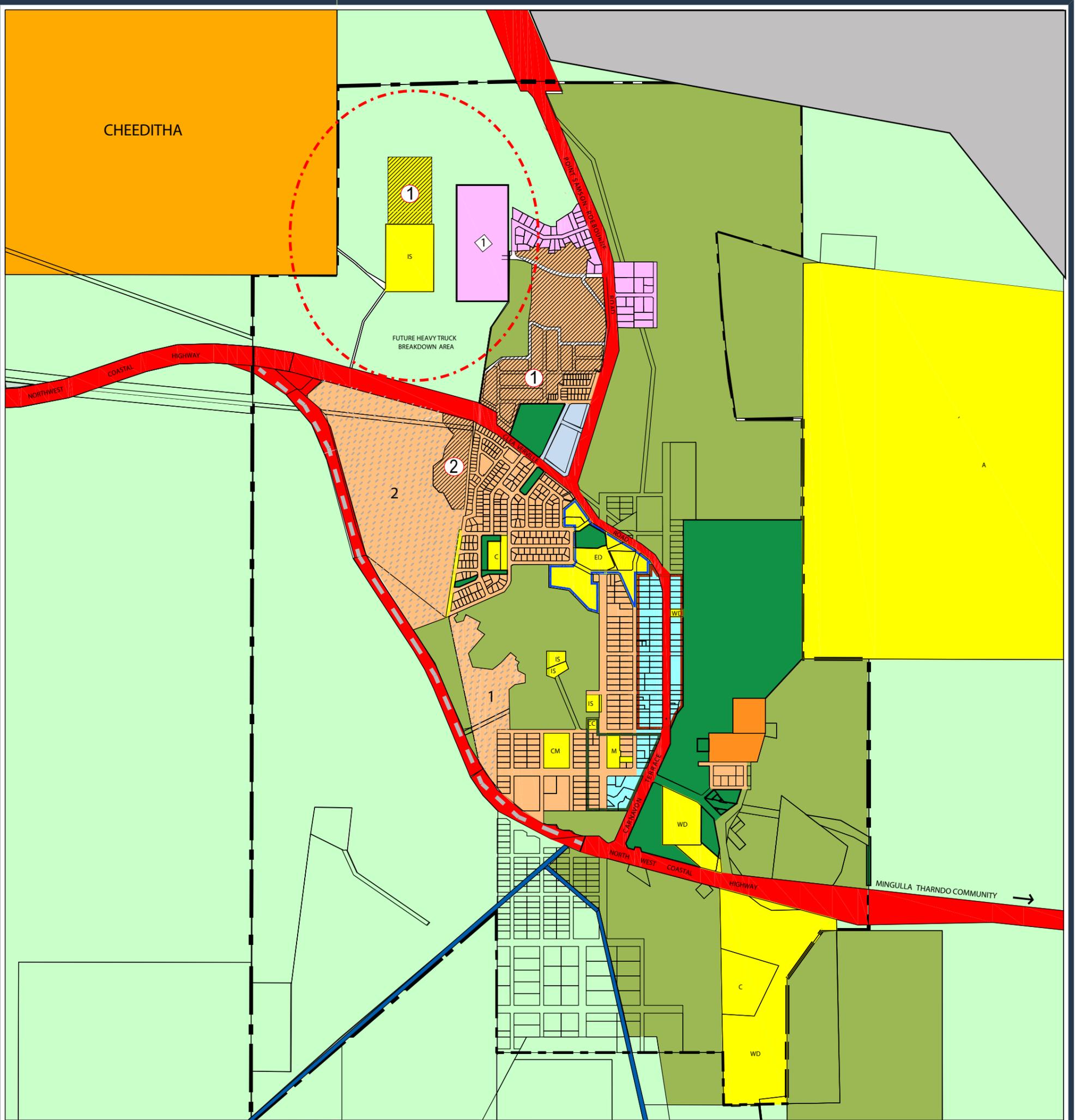
DEVELOPMENT INVESTIGATION AREAS

Notwithstanding the above, the *Roebourne Structure Plan* promotes the staged release of additional residential land in Roebourne, with development investigation areas (unconstrained by the Harding River floodplain) identified on the northern and western peripheries of the settlement. The potential for a limited number of large lots or semi-rural lots on the east side of the Harding River is also identified.

Expansion into the south-western areas identified on the Roebourne Strategy Map (Map 10) is unlikely to occur for a considerable period unless demand for large residential lots can be established. The potential of this land requires further investigation to determine the appropriate lot size, as it relates to the management of potential contamination (asbestos). These areas are identified as *Development Investigation Areas* on the Strategy Plan and are intended for the long term (see Table 14 below).

Table 14: Roebourne development investigation areas

Roebourne Strategic Plan		
DIA #	Name	Approx. Area (ha)
1	Back of Mount Welcome	14
2	West of Water Pipeline (Urban)	59



LEGEND:

- | | | | |
|--|--|---------------------------|--|
| Townsite Boundary | Rural | Future Service Commercial | Public Purposes
A - Airstrip, C - Cemetery, CC - Civic & Community, ED - Education, M - Medical Services, WD - Water & Drainage, IS - Infrastructure Services |
| Urban | Town Centre | Future Light Industry | Future Public Purposes
1. Expansion of Waste Water Pumping Station |
| Development Investigation Areas
1. Back of Mt Welcome
2. West of Water Pipeline | Public Open Space | Tourism | Potential Future Roebourne Bypass |
| Urban Expansion Areas
1. NASH
2. West of Water Pipeline (Urban) | Community, Education & Recreation Precinct | Settlement | Infrastructure Corridor |
| Industrial Expansion Areas
1. West of Existing Mixed Business Area (Light Industry) | Roebourne Centre Precinct | Primary Distributor | Potential Special Control Area - Waste Water Treatment Plant Buffer - 500m |
| | Heritage Precinct | District Distributor | |
| | Environmental Conservation | | |

CITY OF KARRATHA

LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
PH:(08) 9186 8555



SCALE: 1:20 000 @ A3
DATE: OCTOBER 2020



**ROEBOURNE
STRATEGY MAP
10 OF 16**

CITY OF KARRATHA

5.6 Wickham Overview

ROLE IN THE SETTLEMENT HIERARCHY

Wickham is a town within the *Eastern Corridor* and is the largest settlement in the City outside of Karratha. The primary role of the settlement is to provide accommodation and facilities to support Rio Tinto's iron ore processing and shipping operations at Cape Lambert.

This Strategy recognises the role of Wickham as a mining town servicing the needs of the resource sector and also providing local community and commercial facilities to Point Samson and Cossack.

Reflective of its higher population base which is projected to grow over the long term, Wickham will provide the main retail facilities servicing the *Eastern Corridor* population.

POPULATION & DISTRIBUTION

Wickham's (State Suburb) population at the 2016 Census was 2,295. This Strategy seeks coordinated growth in the eastern corridor settlements (to achieve a threshold population to provide for local level services), it is estimated that Wickham will contain between 8-10% of the City's population by 2031. This will result in limited expansion of the existing population in Wickham and therefore having limited additional dwelling requirements.

Previous forecasting for the Wickham Townsite noted that there may be an additional dwelling requirement of up to 440 dwellings. This requirement may in reality be lower by 2031. The City will continue to monitor growth within the Wickham townsite.



Wickham Townsite Aerial (2012)

KEY CONSTRAINTS ON GROWTH

Rio Tinto is the dominant landowner (Crown Land under Special Lease) and the primary infrastructure provider. As a result Wickham's growth is closely tied to the expansion of Rio Tinto's Cape Lambert operations.

The surrounding topography, road and rail infrastructure physically constrain growth of Wickham beyond the existing areas identified for urban development (see the Wickham Opportunities and Constraints - Map 11). Further some areas of the townsite may be at risk from the 100 year ARI storm flood events and 100 year ARI storm surge events (Karratha District Water Management Strategy, 2016).

WORKFORCE ACCOMMODATION

High quality, operational FIFO facilities operate at the western end of the Town along Wickham Drive and on the other side of Wickham Drive on Cajuput Way.

The City's preference is that as much as possible Wickham's residents are in the town on a permanent basis forming part of an active local community.

RESIDENTIAL GROWTH (URBAN EXPANSION AREAS)

This Strategy notes that Wickham has considerable capacity for urban expansion to the south in the long term, this is consistent with previous planning documents that have identified this area such as the *Wickham Townsite Structure Plan (2011)* and the *Wickham South Development Plan (2011)*.

Residential consolidation opportunities are also identified for central Wickham (generally along Wickham Drive and south of the Town Centre). Central Wickham and Wickham South will accommodate the anticipated level of growth out to 2031. The Urban Expansion Areas identified on the Wickham Strategy Map (Map 12) are listed in Table 15 below:

Table 15: Wickham urban expansion areas

Wickham Strategic Plan			
UEA #	Name	Approx. Area (ha)	Estimated Dwelling Yield
1	Wickham South	41	615
2	Surplus Drainage Reserve	4	60

TOWN CENTRE

Despite having the greatest amount of gross lettable retail floor area outside the Karratha City Centre, Wickham's current offering is relatively modest at approximately 2,600m². This includes a small shopping complex with a Woolworths supermarket, liquor store, pharmacy, snack bar, newsagency and post office. The City will monitor demand for retail and commercial floorspace to ensure an adequate supply for the long term.

Wickham has a well located central community land use pattern, however it is currently underutilised. The Strategy supports objectives previously identified within the *Wickham Townsite Structure Plan* to revitalise the Town Centre area to meet the needs of its growing population. In doing so it is also expected that the Town Centre will diversify the offering of local services for the greater *Eastern Corridor*.

Consolidation of the Town Centre area will also facilitate the revitalisation of community elements associated with the town by providing an important community hub and meeting place. The *Wickham Structure Plan* emphasises connectivity to the Town Centre in order to facilitate ease of access and encourage the local population to frequent community areas.

There is a development site on unconstrained land at the entry to town see Wickham Strategy Map (Map 12) - Town Centre Expansion. This high exposure site may provide an opportunity to new business and improve the entry to town.

MIXED USE

Mixed Use development is encouraged within the Town Centre, particularly in the eastern sector. The eastern sector is where the introduction of medium to high density residential and mixed uses is recommended.

INDUSTRY & INFRASTRUCTURE

Industrial uses are predominantly located at Cape Lambert approximately 10 kilometres north of Wickham. Demand and scope exists to expand the light industry area north east of town (see Wickham Strategy Map - Industrial Expansion Area 1), which has a distinct function from the Karratha and Gap Ridge industrial estates, providing local services and employment for the broader *Eastern Corridor*. A large portion of this area would require rezoning from its current zone of 'mixed business'. It is noted that expanding the Wickham Light Industry area will take considerable time and resources to make available.

It is also recommended that Lot 178 Sturt Pea Road be rezoned either through a future amendment or through the future scheme review to Light Industry to better reflect the on ground use of the land.

It is noted that the Anketell Strategic Industrial Area will influence the provision of Industrial land in the Eastern Corridor, particularly Industrial land suitable for General Industry.

Expansion of production out of Cape Lambert augers well for continued growth and improvements, in particular the creation of a greater number and wider provision of accommodation and recreational facilities.

It is the City's preference that direct connection to Anketell be provided from Karratha rather than Wickham.

Anketell Port is currently being planned as a deep-water, multi-user port capable of exporting in excess of 350 million tonnes of iron ore per annum, with provision for the export of other bulk commodities and importation of fuel and general cargo.

COMMUNITY FACILITIES

Wickham has recently had significant upgrades with the completion of the Wickham Community Hub and Wickham Recreational Precinct with funding provided by Rio Tinto, City of Karratha and Lotterywest. The Community hub now provides a modern and efficient community facility that addresses the climatic conditions of Wickham and meets the identified functional needs of the community integrated within the Wickham Recreational Precinct.

The following key facilities (see Table 16) are expected to be required based on the ratios set out in the City's *Community Facilities Plan and Matrix (2011)* and forecast population growth out to 2031:

Table 16: Estimated community facility requirements for Wickham

Community Facilities	Existing	Required by 2031	Anticipated Location	Commentary
Regional Open Space	1	-	-	Wickham Sporting Complex sufficient for forecast growth
District Open Space	3	-	-	Existing facilities sufficient for forecast growth
Neighbourhood Parks	2	-	-	Existing facilities sufficient for forecast growth
Local Parks	-	-	-	Existing higher level facilities sufficient for forecast growth
Skate Park	1	-	-	Existing facilities sufficient for forecast growth
Boat Ramps	-	-	-	Nearby Port Walcott, Balla Balla & Point Samson facilities sufficient for forecast growth.
Libraries	1	-	-	To be incorporated into Community Hub
Cultural Centre	-	-	-	Serviced by Roebourne
Senior & Aged Care	-	1	Co-located with Community Centre	New Sub-District Level Facility
Community Centres	3	-	-	Existing facilities to be enhanced.
Youth Centres	1	-	-	Existing facilities sufficient for forecast growth
Family Support	3	1	Incorporated in Community Centre/Hub	New Playgroup Facility
Community Health	1	-	-	Existing facilities sufficient for forecast growth

As identified on the Wickham Strategy Plan there is potential to undertake redevelopment of the land previously occupied by the Wickham Medical Centre. A new medical centre is now proposed to form part of the planned Community Hub which will release the medical centre site for other Town Centre and urban uses in the future.

Population allocations for the *Eastern Corridor* have been based upon the creation of a population catchment sufficient to support a secondary school. The

existing primary school site is capable of expansion as population growth occurs. The High School is no longer operational and the building is currently being used for a variety of temporary community uses, including the City's library and playgroup. These uses will be accommodated in the new Community Hub.

The Wickham Community Hub includes:

- New public Library;
- Water Playground;
- Early learning centre;
- Multipurpose meeting rooms;
- Not-for-profit and community spaces;
- Refurbished community hall;
- Landscaped courtyard;
- Youth Centre and external space; and
- Skate park.

CONSERVATION & OPEN SPACE

Areas identified as public open space and for drainage are identified on the Wickham Strategic Plan, and are consistent with those previously identified in the Wickham Townsite Structure Plan. Drainage has generally been depicted along the main access streets which run in a north-south direction. Areas of local open space are generally located centrally within residential population catchments in order to maximise the accessibility of POS to residents (400m walkable catchments), see Figure 15-16.



MOVEMENT NETWORK

The *Wickham Townsite Structure Plan* depicts the location of future possible local distributor roads and major local access streets in a grid layout (Figure 15). This layout is generally based upon a north-south and east-west alignment which is advantageous for solar orientation.

The grid configuration provides for ease of access to the Town Centre Area, primary recreation area and the regional road network. The road network is well integrated with existing constructed roads which generally return to Wickham Drive at the heart of the town. The broader road network takes into consideration existing constraints and reacts accordingly to natural aspects, such as topography.

A more attractive street environment is another important aspect of revitalising the town, with soft landscaping, pedestrian paths, street parking embayments, road carriageway realignments all promoted within the *Wickham Townsite Structure Plan*.

The City has undertaken a street and tree landscape project to improve the amenity of the street network of Wickham.

DEVELOPMENT INVESTIGATION AREAS

Longer term population growth may be accommodated within undeveloped zoned land to the north of Wickham. The potential of this area has been identified as a Development Investigation Area (see Table 17).

The development of the northern area may be constrained by servicing and proximity to recently upgraded rail facilities. This area has therefore been identified as a *Development Investigation Area* to allow for further consideration of the extent of suitable land for any long term expansion.

A portion of Wickham North has been identified on the *Wickham Townsite Structure Plan* for future urban and town centre uses which includes medium density residential. These areas have been identified on the Wickham Strategy Map (Map 12) as *Development Investigation Areas* as outlined below:

Table 17: Wickham development investigation areas

Wickham Strategic Plan		
DIA #	Name	Approx. Area (ha)
1	Wickham North (Urban)	33
2	Town Centre & Urban/Medium Density Residential	16

SPECIAL CONTROL AREAS

The Wickham Strategic Plan notes the potential for a buffer associated with the waste water treatment plant located east of the townsite. This could be included within the LPS8 or through a scheme review.

This buffer could be potentially included as a special control area, with the purpose being to ensure sensitive land uses do not encroach on the waste water treatment plant (see Wickham Strategy - Map 12). A generic distance of 500m has been placed on the Wickham Strategy Map, however this distance will be subject to further study and refinement.

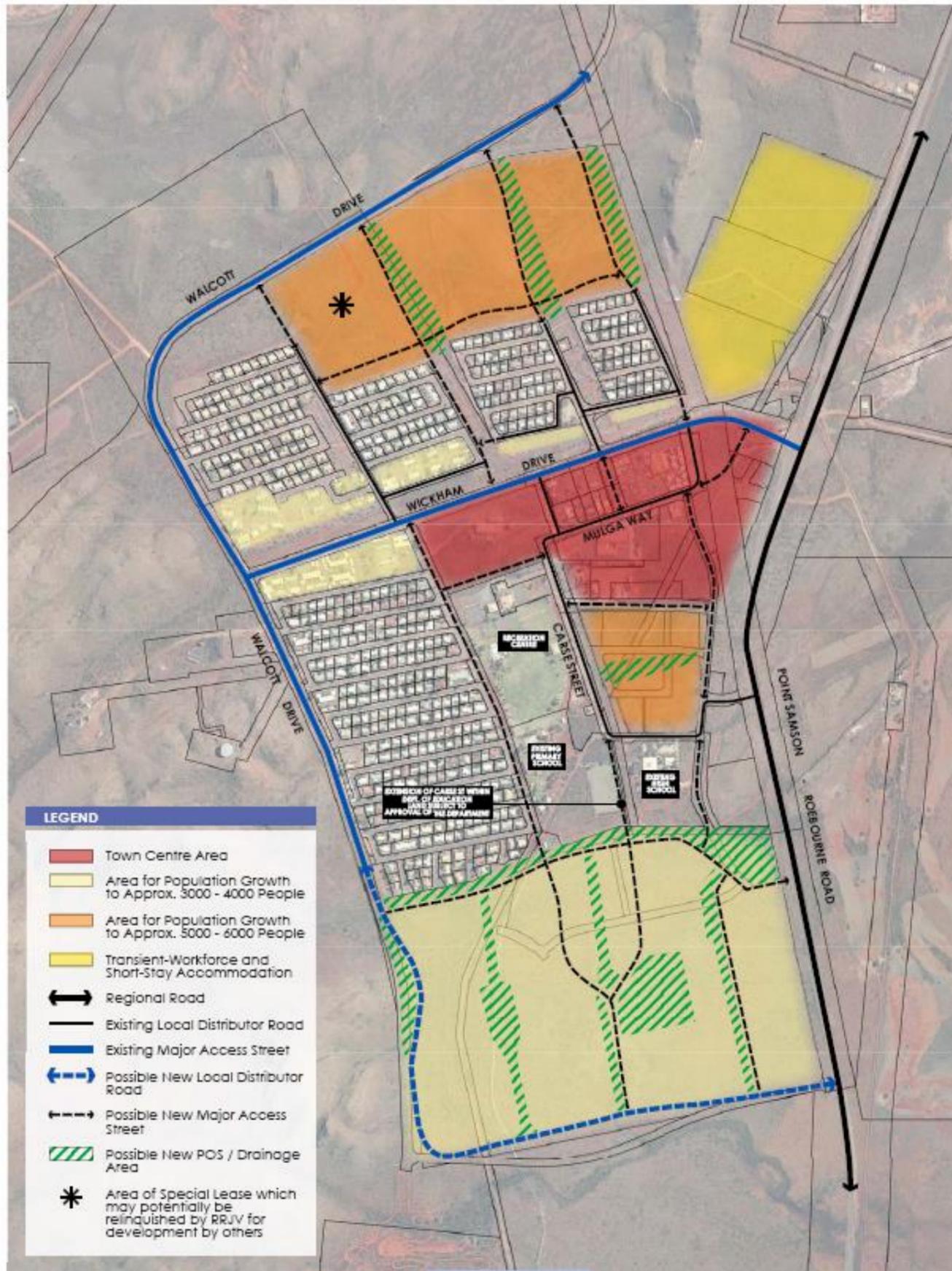
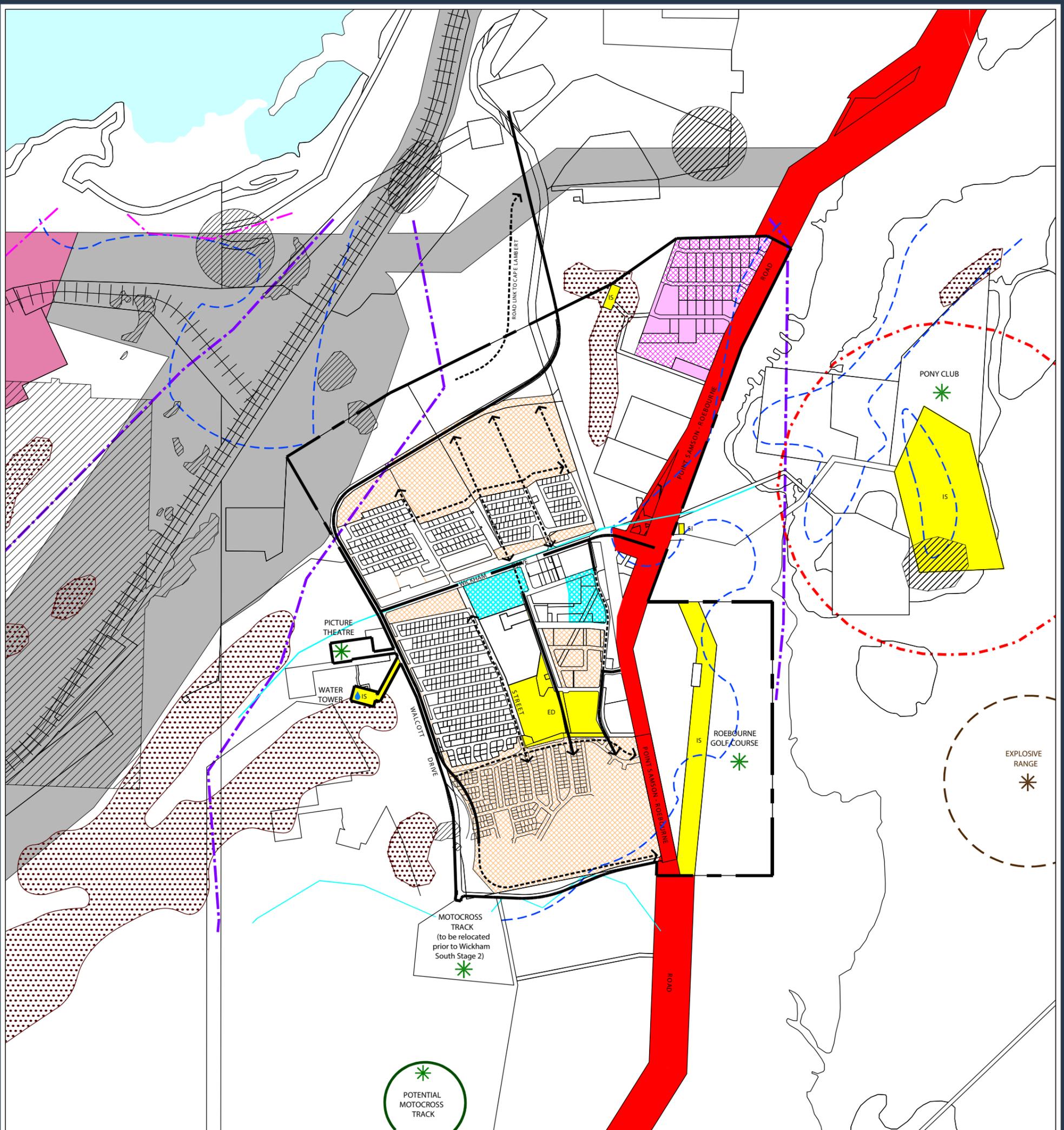


Figure 15: Wickham townsite structure plan (2011)



Figure 16: Wickham south development plan (2011)



LEGEND:

- Townsite Boundary
- Primary Distributor
- Primary Road
- Railway
- Recreation / Community Centre
- Water Tower
- Tourism / Recreation Attraction
- Infrastructure
- Public Purposes (ED - Education, IS - Infrastructure Services)
- Strategic Industry

CONSTRAINTS

- Power Lines
- 1:100 Year Storm Surge
- Aboriginal Heritage Sites
- Oil and Gas Line
- Water Course
- 500m WWTP Buffer
- Key Topographical Features

OPPORTUNITIES

- Urban Expansion Opportunities
- Industrial Expansion Opportunities (short & long term)
- Town Centre Expansion Opportunities
- Future Roads Linking Urban Cells

CITY OF KARRATHA

LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
PH:(08) 9186 8555

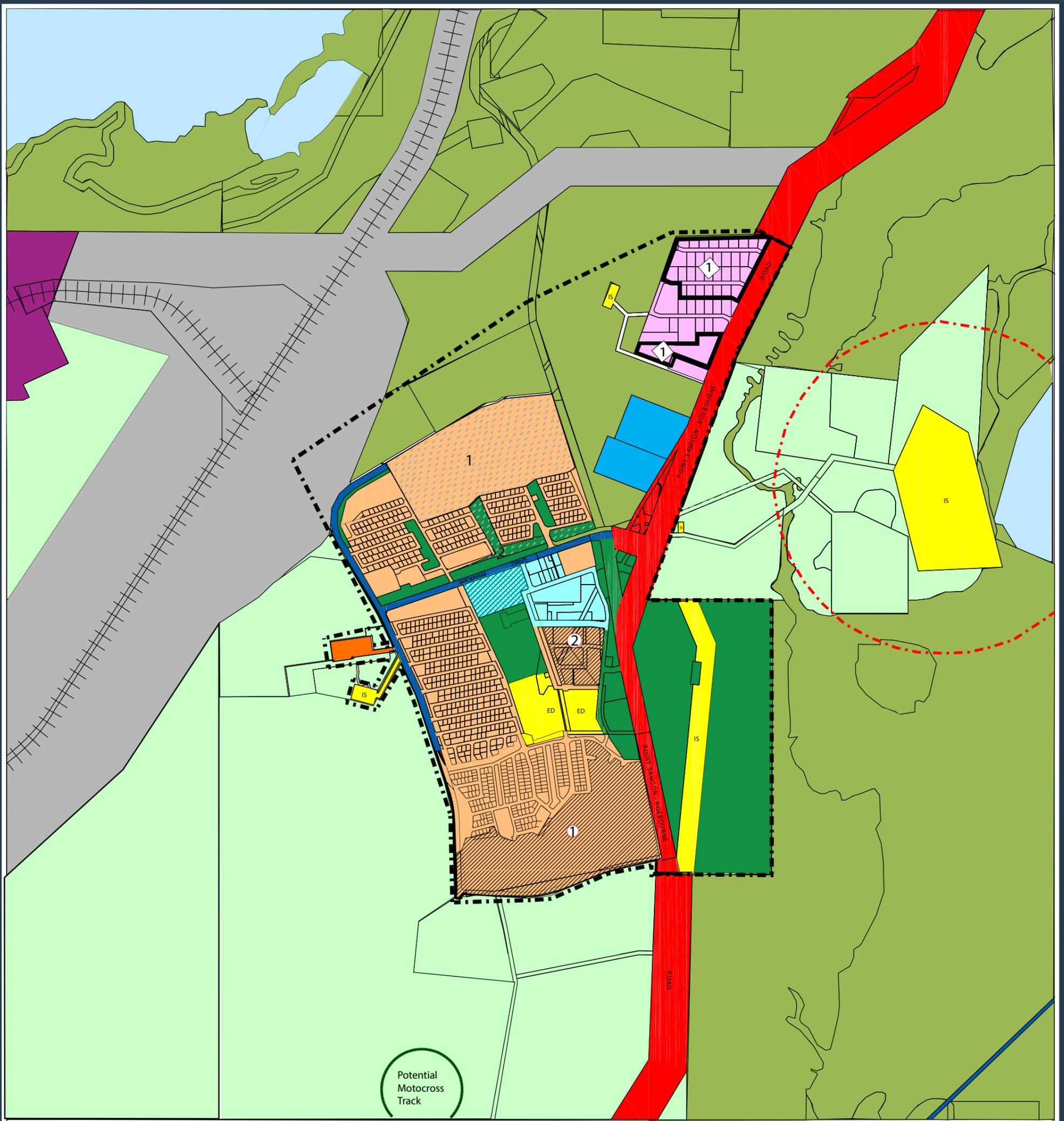
0 200 400 600 800 1000 1200 1400m

SCALE: 1:20 000 @ A3
DATE: OCTOBER 2020



**OPPORTUNITIES
AND CONSTRAINTS
11 OF 16**

**WICKHAM
CITY OF KARRATHA**



LEGEND:			
	Railways		Town Centre Expansion
	Urban		Town Centre
	Development Investigation Areas		Strategic Industry
1. WICKHAM NORTH			Infrastructure
2. Surplus Drainage Reserve			Environmental Conservation
	Urban Expansion Areas		Mixed Use
1. WICKHAM SOUTH			Public Purposes
2. TOWN CENTRE & URBAN / MEDIUM DENSITY RESIDENTIAL		ED - Education, IS - Infrastructure Services	
	Industrial Expansion Areas		Future Light Industry
1. WICKHAM LIGHT INDUSTRIAL AREA			General Industry
			Ocean
			Rural
			Public Open Space
			Tourism
			Primary Distributor
			District Distributor
			Potential Special Control Area
		500m WWTP Buffer	
			Townsite Boundary

CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555

0 200 400 600 800 1000 1200 1400m

SCALE: 1:20 000 @ A3
 DATE: OCTOBER 2020

NORTH

WICKHAM STRATEGY MAP
 12 OF 16

CITY OF KARRATHA

5.7 Point Samson Overview

ROLE IN THE SETTLEMENT HIERARCHY

Point Samson had a population of 231 at the 2016 Census (State suburb). It is a popular tourist destination, offering quality fishing and swimming spots, along with a variety of accommodation options and restaurants for locals and tourists. Point Samson is known for its 'coastal lifestyle' with a significant focus on the coastal environment and marine recreation.

This Strategy recognises the role of Point Samson as a coastal tourist node providing lifestyle, residential living and tourist accommodation for the West Pilbara region. In terms of its role within the *Eastern Corridor*, the focus of Point Samson is as a coastal tourism and fishing village with potential for growth and development once infrastructure constraints are overcome.

POPULATION & DISTRIBUTION

This Strategy recognises Point Samson as a coastal settlement capable of accommodating a population of approximately 500 people, with the potential of accommodating up to 1,000 people, in a planned and staged manner. This is consistent with previous planning undertaken as part of the *Draft Point Samson Structure Plan (2015)*.

This Strategy aims to facilitate the development of Point Samson as a sustainable tourist node and enable additional residential land release. It is estimated that if the population were to increase to approximately 500 by 2031, approximately 75 new dwellings would be needed.

The development of the Town Centre with a coastal aspect and the retention of the 'fishing village' atmosphere of Point Samson are relevant considerations.

KEY CONSTRAINTS ON GROWTH

The future growth potential of Point Samson is heavily constrained by infrastructure capacity and the risk of storm surge and inundation (see the Point Samson Opportunities and Constraints Map 13).

Point Samson is supplied with potable water via a gravity-fed main from a storage facility nine kilometres away at Wickham. An upgrade to this main is critical in providing additional capacity to serve Point Samson as the network is presently at capacity.

Point Samson has no reticulated sewerage. Wastewater service provision is hampered by proximity to sensitive receiving environments. This includes coastal areas in the north east, mangrove forests in the south west, site specific geology (potential presence of rock in some central and western areas), and hydrogeology constraints (achieving separation to groundwater).

Current practices of disposing waste water onsite in compliance with Department of Health requirements are anticipated to continue which has implications for the development potential of future growth areas. It is recommended that consideration be given to innovative ways of disposing of treated wastewater for prime town centre and tourism sites to enable their full development potential to be realised.

The power supply for Point Samson currently comes from the Cape Lambert sub-station which has a capacity of 1.5 MVA. The current summer peak load reaches 1.2 MVA. On this basis, power supply is adequate at present and there is some spare capacity to accommodate moderate growth. An upgrade of infrastructure is required to accommodate new development areas.

RESIDENTIAL GROWTH

The dominant land use in Point Samson will remain residential with tourism accommodation i.e. short stay accommodation, becoming an increasingly important land use activity. This Strategy recognises the importance of retaining Point Samson's coastal fishing village character which should be enhanced into the future.

This Point Samson Strategy Map (Map 14) identifies approximately 5 hectares of land west of the existing residential areas as Urban Expansion Area 1. Urban Expansion Area 1 is based upon 'precinct 3' within the Draft Point Samson Structure Plan (2015), and is partially covered by DA18 within the City's LPS 8 (Table 18). As previously identified, there are considerable constraints that will need to be addressed prior to future development of the area.

Table 18: Point Samson urban expansion area

Number	Name	Area
1	Honeymoon Road	5ha

TOWN CENTRE

Point Samson has a small commercial precinct at Bartley Court, incorporating a general store, restaurant and tavern with a collective gross lettable retail floor area of approximately 900m².

Point Samson's commercial and retail offering is anticipated to be limited in the short to medium term. Limited growth targeting local convenience and tourist needs is envisaged. Residents are expected to continue travelling to Wickham for services not provided in Point Samson, and to Karratha for needs not serviced locally.

A Commercial & Retail Property Analysis undertaken on behalf of the City by Imani Developments in late 2013 recommends that should a viable retail business case be presented by a prospective investor that this be given full consideration as it would strengthen the community.

TOURISM

Point Samson is a popular tourism and holiday destination with a range of accommodation options from camping and caravan parks, to boutique bed and



breakfasts, holiday homes and two four-star hotels. It has an attractive coastline, including quality fishing and swimming spots such as Town Beach and Honeymoon Cove.

An existing tourism zone is located south of the Town Centre with some lots capable of further development for this use (see Point Samson Opportunities and Constraints).

John's Creek Boat Harbour serves the local commercial fishing industry as well as providing launching facilities for recreational boating. This Strategy promotes the expansion of the harbour to create a marina with an emphasis on the integration of tourism and recreation activities development (in particular Marine recreation tourism, see Point Samson Opportunities and Constraints (Map 13) and Point Samson Strategy Map (Map 14)).

HARBOUR

A Harbour Special Control Area is proposed over the area currently zoned 'Industry' and 'Conservation recreation and natural landscapes' within Town Planning Scheme No.8. The proposed Harbour Special Control Area is intended to accommodate existing uses within the area whilst recognising the opportunity for the harbour and its surrounding area to accommodate growth in tourism and recreational uses.

SPECIAL CONTROL AREAS

Three potential Special Control Areas have been identified within Point Samson (see Point Samson Strategic Map (Map 14)). The three Special Control Areas correspond to the boundaries of the town centre zone, the tourism zone, and the proposed harbour special control area.

Under TPS8, if a Special Control Area is shown on the Scheme Maps, the provisions of the Special Control Area apply. The inclusion of the proposed Special Control Areas into TPS8 will necessitate the preparation of a Local Development Plan demonstrating a co-ordinated approach to development prior to subdivision or development.

COMMUNITY FACILITIES

Point Samson is characterised by minimal community facilities and public open space. The Point Samson Community Hall is the primary community facility, located within the Town Centre zone.

Due to the small population, continued reliance by residents on Wickham for community services and facilities is expected to continue, as detailed in Table 19 below:

Table 19: Estimated community facility requirements Point Samson (2031)

Community Facilities	Existing	Required by 2031	Anticipated Location	Commentary
Regional Open Space	-	-	-	Served by Wickham
District Open Space	-	-	-	Served by Wickham & Roebourne
Neighbourhood Parks	1	-	-	Existing facilities sufficient for forecast growth
Local Parks	1	-	-	Existing facilities sufficient for forecast growth
Skate Park	1	-	-	Existing facilities sufficient for forecast growth
Boat Ramps	2	-	-	Existing facilities sufficient for forecast growth
Libraries	-	-	-	Neighbourhood Facility provided in Wickham
Cultural Centre	-	-	-	Served by Roebourne
Senior & Aged Care	-	-	-	Served by Wickham
Community Centres	1	-	-	Served by Wickham
Youth Centres	-	-	-	Served by Wickham
Family Support	-	-	-	Served by Wickham
Community Health	-	-	-	Served by Wickham

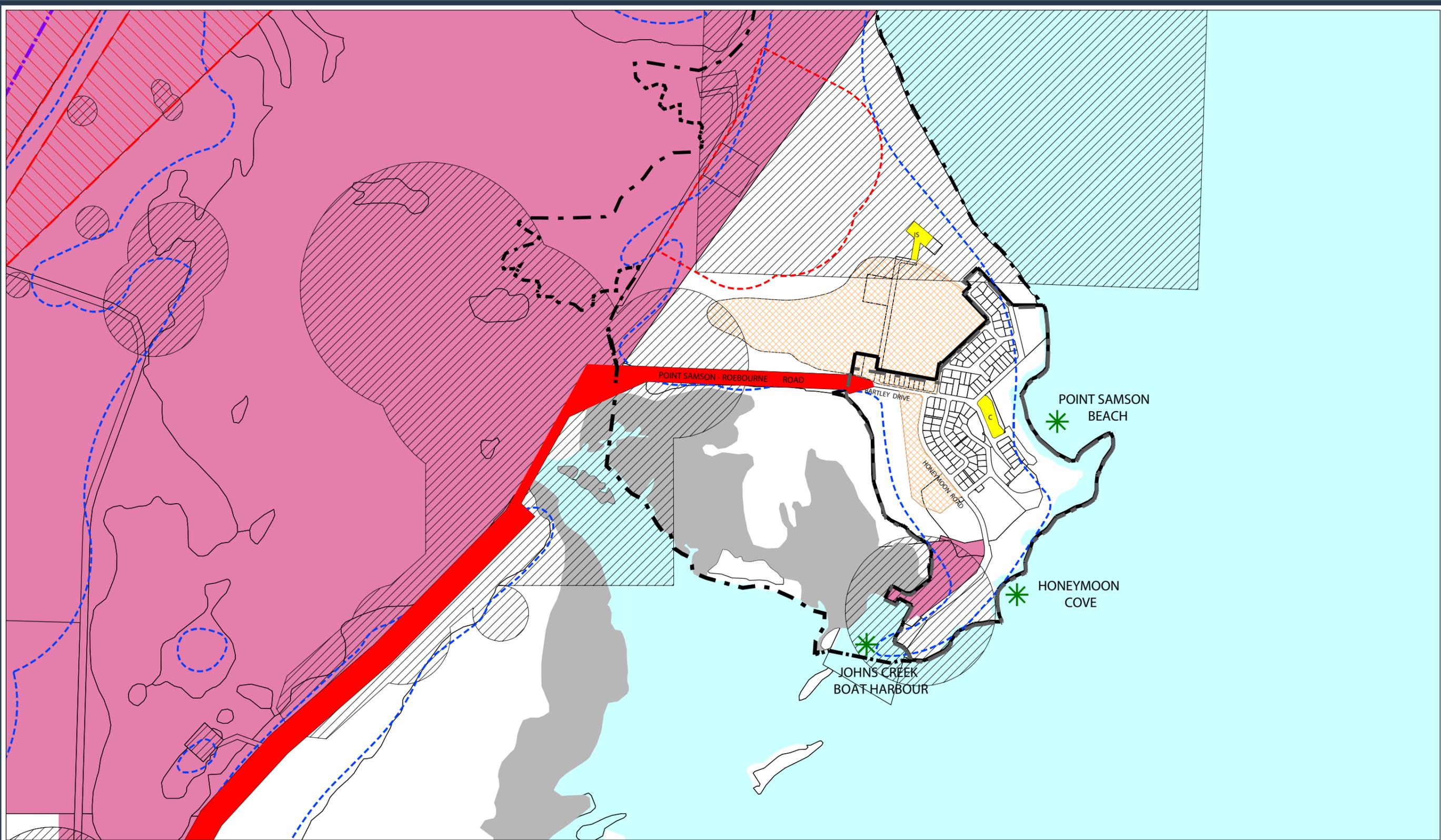
DEVELOPMENT INVESTIGATION AREA

One area has been identified for further investigation to determine yield potential and appropriate land use designations as part of future investigation feasibility studies (See Point Samson Strategic Map (Map 14)). This is the area west of Fisher St and has an approximate area of 36ha Table 20.

Table 20: Development Investigation Areas Point Samson

Point Samson Strategic Plan		
DIA#	Name	Approx. Area (ha)
1	Bartley Dr	36





CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555

0 200 400 600 800m

SCALE: 1:15 000 @ A3
 DATE: OCTOBER 2020

NORTH

LEGEND:

- Proposed Townsite Boundary
- Existing Townsite Boundary
- Primary Distributor
- Primary Road
- Public Purposes (C - Community, IS - Infrastructure Services)
- Tourism / Recreation Attraction
- Strategic Industry

CONSTRAINTS

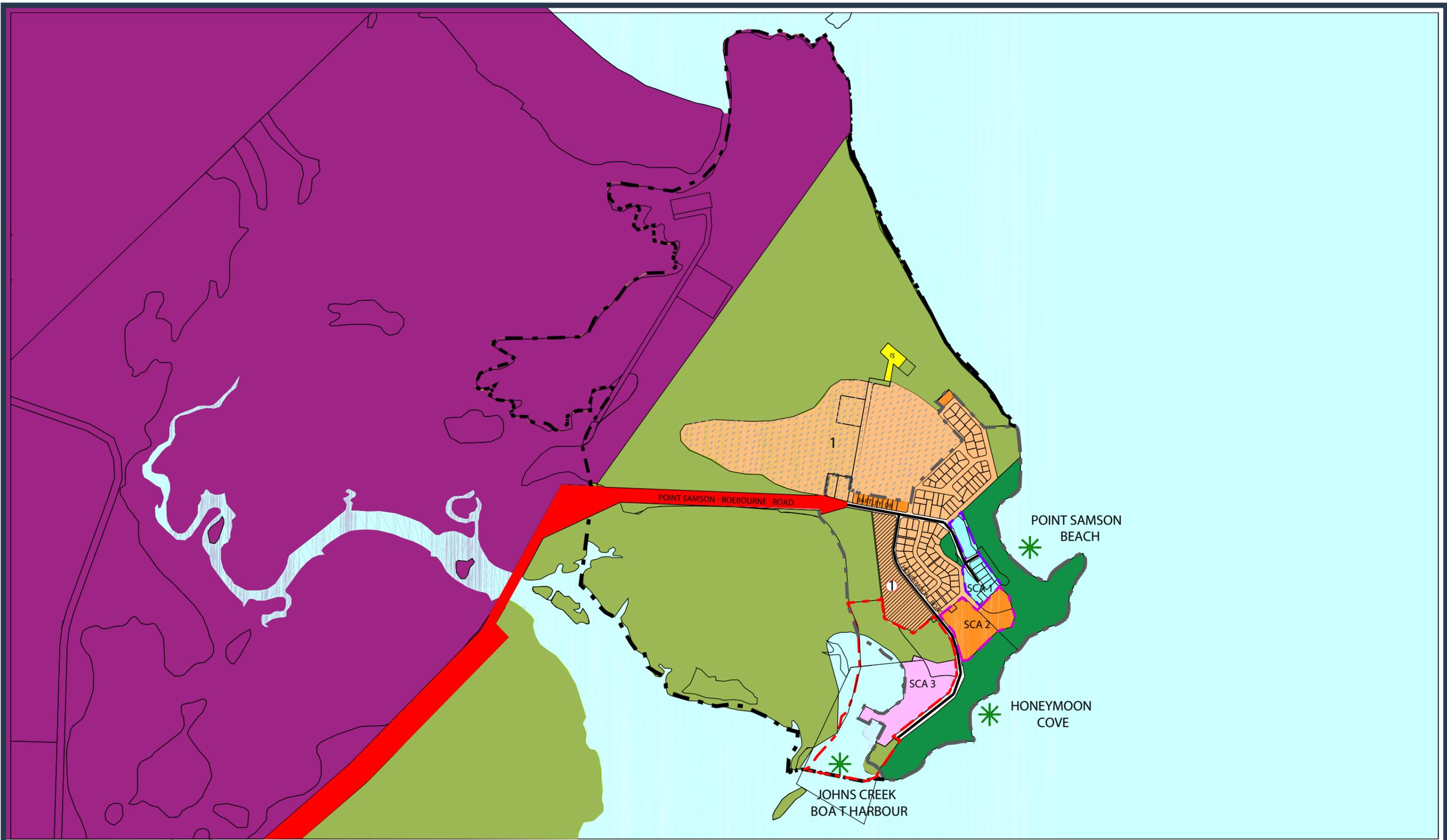
- Power Lines
- 1:100 Year Storm Surge
- Mangroves
- Aboriginal Heritage Sites
- Contaminated Sites
- Sand mine Buffer

OPPORTUNITIES

- Urban Expansion Opportunities
- Future Mixed Use Hub (Tourism, short term accommodation, residential & retail)

OPPORTUNITIES AND CONSTRAINTS
 13 OF 16

POINT SAMSON
 CITY OF KARRATHA



CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555

0 200 400 600 800m
 SCALE: 1:15 000 @ A3
 DATE: OCTOBER 2020

NORTH

City of
Karratha

LEGEND:

- Proposed Townsite Boundary
- Existing Townsite Boundary
- Railways
- Urban
- Urban Expansion Areas
 1. HONEYMOON ROAD
- Development Investigation Areas
 1. BARTLEY DRIVE
- Town Centre
- Strategic Industry
- Light Industry
- Public Purposes
 (IS - Infrastructure Services)
- Environmental Conservation
- Public Open Space
- Tourism
- Rural
- Tourism / Recreation Attraction
- Local Distributor
- Primary Distributor
- Potential Special Control Area 3 - Harbour Zone
- Potential Special Control Area 2 - Tourism Zone
- Potential Special Control Area 1 - Town Centre

**POINT SAMSON
 STRATEGY MAP**
 14 OF 16

CITY OF KARRATHA

5.8 Cossack Overview

ROLE IN THE SETTLEMENT HIERARCHY

Cossack is a small historic settlement at the mouth of the Harding River that is still a popular recreation destination. Established in 1872 Cossack was the first port in the area, though the town itself failed to flourish due to devastation by two separate cyclones. Today, several significant heritage buildings exist, accommodating an art gallery, hospitality and craft centre uses.

Aboriginal cultural heritage is strong in Cossack with surrounding lands containing identified shell midden sites, rock art, and other evidence of the continued cultural association of the Ngarluma people within this unique landscape, over a significant period.

The remnant civic buildings of Cossack are important references to its rich, layered history, relating to its pearling, agricultural, merchant and industrial past. This history gives Cossack a unique character that cannot be replicated.

This Strategy recognises the role of Cossack as an attractive historic townsite with well restored heritage buildings providing unique tourism opportunities.

KEY CONSTRAINTS ON GROWTH

Cossack is heavily constrained by its location, which is impacted by a range of issues including coastal hazards, bushfire and Native Title considerations, preservation of heritage, steep terrain and has limited access to infrastructure services (see Cossack Opportunities and Constraints - Map 15). Future proposals will need to address these constraints within the context of the State Planning Framework.

TOURISM

Cossack is a secluded hamlet capable of offering a broad range of tourism experiences to promote and enhance the natural, cultural and recreational values, taking advantage of the settlement's unique history and character of the place.

In addition to serving as a day-tourist destination, the townsite also hosts the Cossack Art Awards, recognised as the largest art event in regional Australia and as the most isolated acquisitive art exhibition in the world.

It is recommended that future tourism development be of a low impact nature that must be sensitive to and integrate with the unique heritage and environmental character of the townsite. Sensitive development at Cossack will need to preserve and enhance heritage town buildings and infrastructure.

DEVELOPMENT INVESTIGATION AREA

A 'place' responsive development approach is considered necessary to afford a feasible, environmentally sensitive, and socially-rich experience.

The State through Department of Planning, Lands & Heritage is investigating future options for Cossack, informed by the previous Cossack Visioning Study, which sought to further establish Cossack as a significant tourism destination for the region

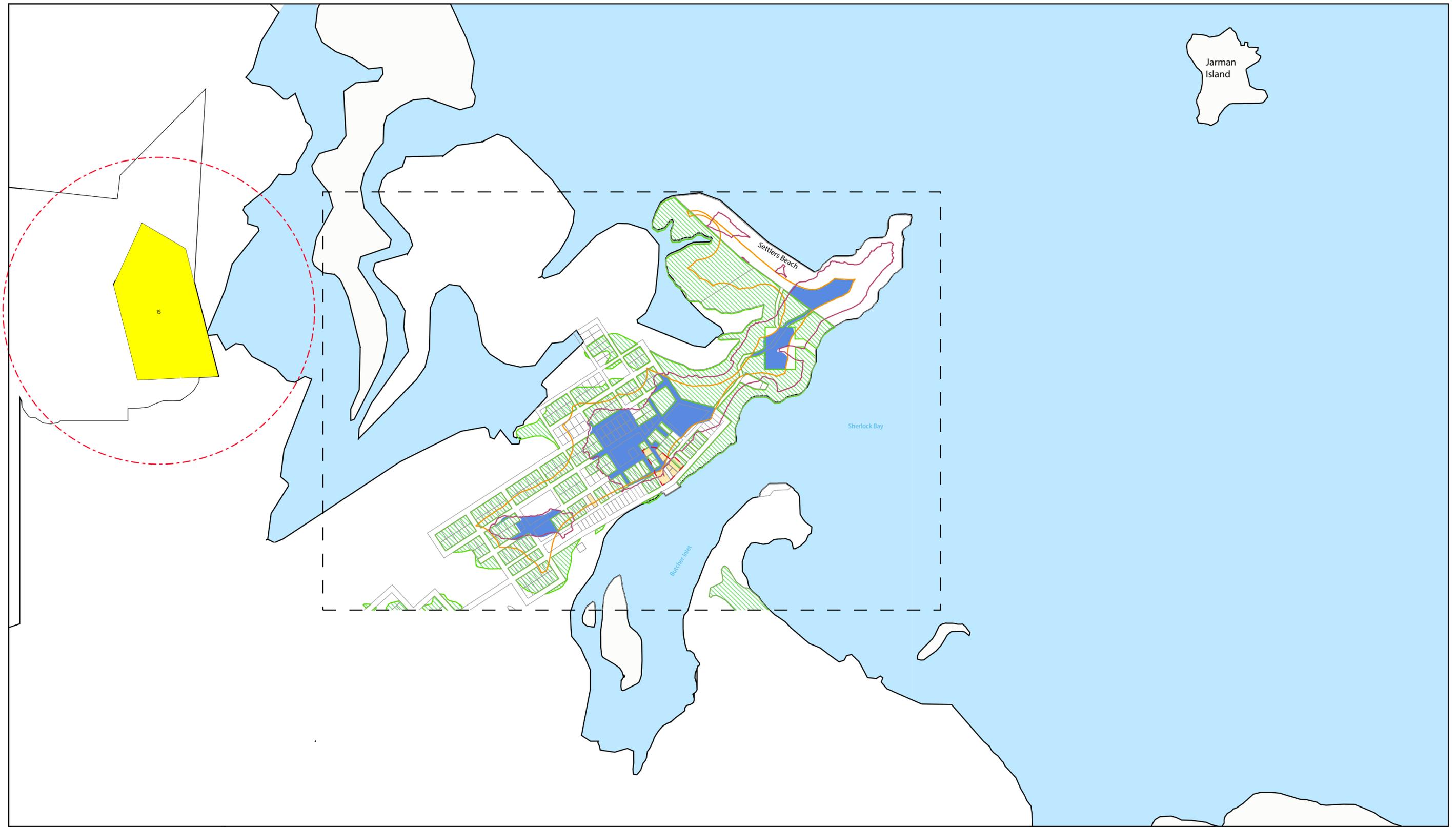
The DIA noted on the Cossack Strategy Map (Map 16) and in Table 21 is currently being investigated to support low impact tourism development by the

Department of Planning, Land & Heritage, subject to constraints being appropriately addressed and managed. In order to facilitate future development, the preparation of suitable technical studies and management plans consistent with the State Planning Framework will be required.

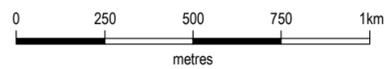
Table 21: Cossack development investigation areas

Cossack Strategic Plan		
DIA #	Name	Approx. Area (ha)
1	Cossack development investigation area	80





CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555



DATE: NOVEMBER 2020



NORTH



LEGEND:

- Cadastre
- Lots with Buildings
- Ocean
- Area of interest
- Public Purposes (IS - Infrastructure Services)

CONSTRAINTS

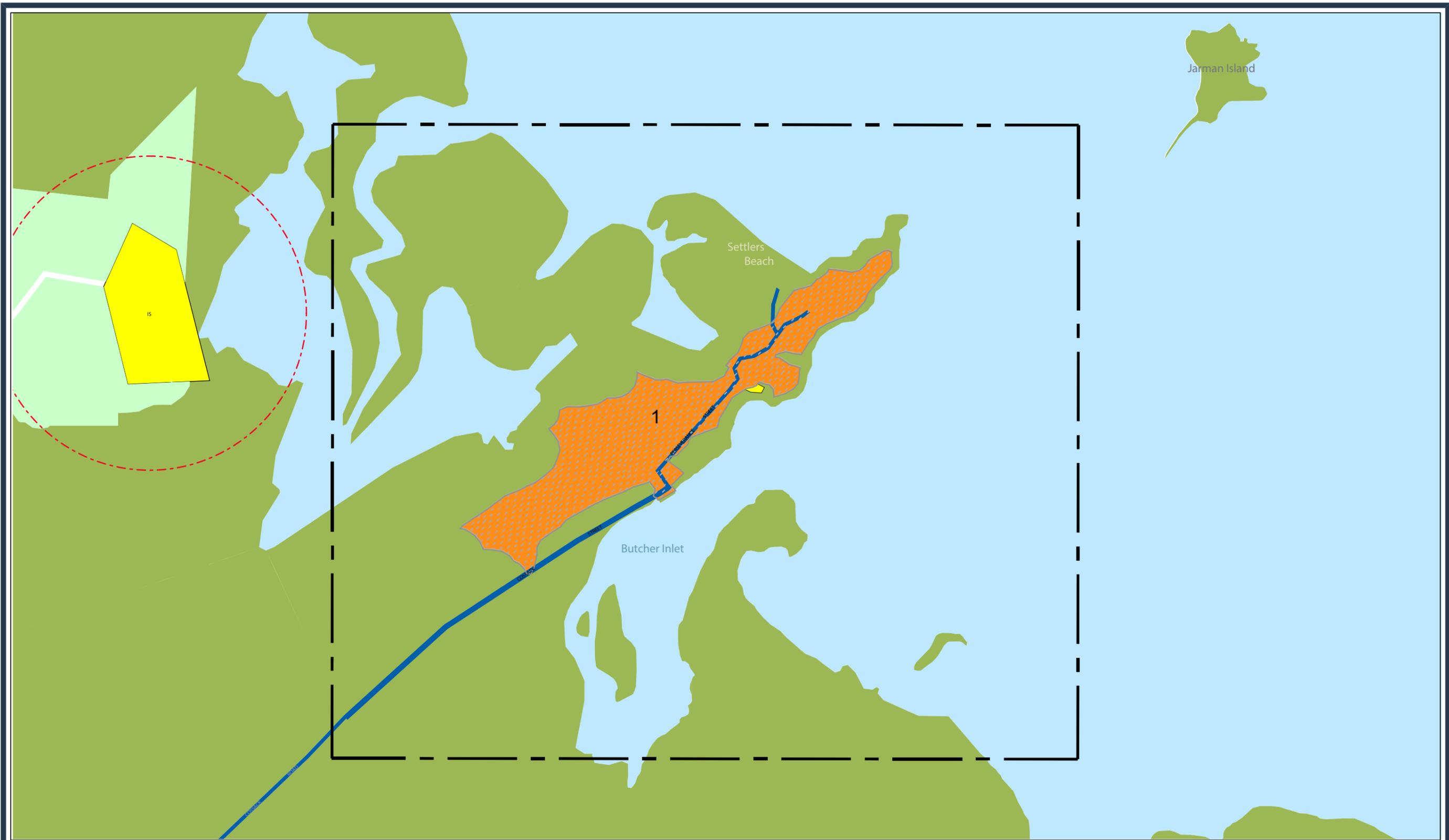
- 100m Setback Distance from Edge of Riparian Vegetation
- 2041 Erosion Hazard Line (S1, S2 & S3 as per State Planning Policy 2.6)
- Native title exists (non-exclusive)
- 500m WWTP Buffer

OPPORTUNITIES

- Land Potentially Suitable for Development
- Heritage Places activation opportunity area

OPPORTUNITIES AND CONSTRAINTS
 15 OF 16

COSSACK
 CITY OF KARRATHA



Jarman Island

Settlers Beach

Butcher Inlet

IS

1

CITY OF KARRATHA
 LOT 1083 WELCOME ROAD, PO BOX 219, KARRATHA
 PH:(08) 9186 8555

0 200 400 600 800 1000 1200 1400m

SCALE: 1:20 000 @ A3
 DATE: OCTOBER 2020

NORTH

LEGEND:

- Townsite Boundary
- District Distributor
- Rural
- Tourism
- Ocean
- Environmental Conservation
- Public Purposes
(C - Cemetery, IS - Infrastructure Services)
- Development Investigation Area
1. Cossack Townsite - Future Tourism & Recreation
- Potential Special Control Area -
500m WWTP Buffer

COSSACK STRATEGY MAP
 16 OF 16

CITY OF KARRATHA

5.9 Minor Settlements and Aboriginal Communities

The remaining settlements within the City are expected to maintain current population levels or reduce in size with relocation of residents to permanent settlements. The role played by each of these minor settlements is briefly discussed below.

WHIM CREEK

The historic mining settlement of Whim Creek is now represented by the Whim Creek Hotel which acts as a convenient stop for people travelling between Karratha and Port Hedland. Opportunities exist to develop and enhance the Whim Creek Hotel as a small tourist node. Potential land uses include tourist accommodation, a function centre, a service station and interpretative tours of nearby areas.

FORTESCUE RIVER

There are two activity nodes on the Fortescue River. The first is the existing roadhouse (comprising accommodation and a workers camp) on North West Coastal Highway and the second is the informal area at the Fortescue River Mouth. The roadhouse represents a minor service centre for travellers, mining activity at Cape Preston, and the remote western portion of the City. There is potential to enhance the range of services and accommodation available at this location, subject to demand.

The Fortescue River Mouth is an un-serviced recreational area without ablution or other facilities. The City's Coastal Management Strategy (2011) identifies the Fortescue River Mouth as one of ten coastal nodes requiring a Management Plan to address various issues. These issues include: the formalisation of access and campsite areas; protection of biodiversity; fragile ecosystems; station owner rights; and the provision of basic amenities such as ablution facilities.

MINGULLATHARDO, WEYMUL & CHEEDITHA

Aboriginal settlements within the City house Yindjibarndi and Ngarluma people whose ancestors have been living in the Pilbara for over 30,000 years. As per the definitions within State Planning Policy 3.2 Aboriginal Settlements, there are two small Aboriginal settlements within the City of Karratha, Mingullathardo, Weymul, and one community being Cheeditha. These Settlements and community are serviced and administered by State Government agencies.

The continuation of the existing state-led process for the management of Aboriginal communities is supported by this Strategy.

In accordance with State Planning Policy 3.2 all Aboriginal settlements within the City are to have a Layout Plan endorsed by the Western Australian Planning Commission. Mingullathardo and Weymul both currently have Community Layout Plans that have been endorsed by the WAPC in accordance with SPP3.2 (see Figure 17 & Figure 18). These layout plans provide a framework for the community on land use planning matters.

The future for these communities will depend on decisions by the State Government in relation to Aboriginal communities more broadly.

It is recommended that through the review of LPS8, Cheeditha is rezoned to more appropriately reflect the current usage of the land and the future planning needs of the community.



Figure 17: Mingullathardo Community Layout Plan

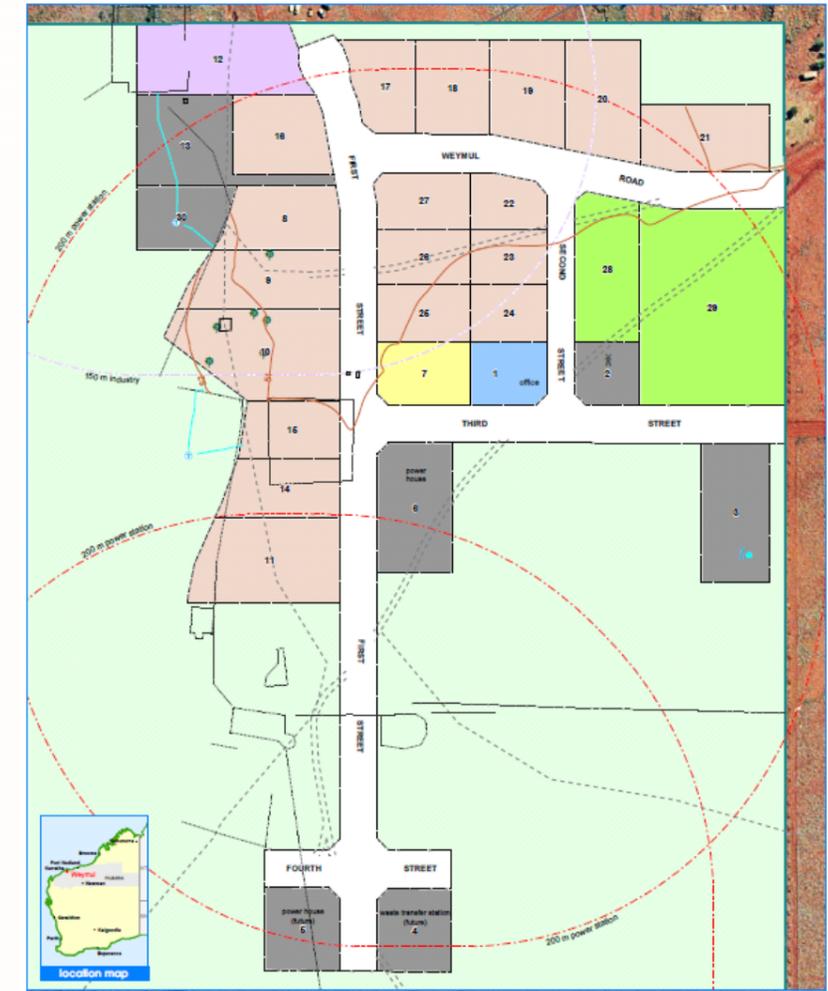


Figure 18: Weymul Community Layout Plan

6.0 Strategies & Actions

Opportunities/Issues Category	Strategy	Action	Related Issue/Opportunity
Population and Housing	Engage with community members and associations which are actively participating in making the City of Karratha a great place to live.	Continuously review and improve community engagement as part of planning processes to better inform the City's decision making.	14
	Promote and enable permanent residency as an attractive and healthy accommodation option for workers and their families	Anticipate land supply requirements to facilitate affordable private accommodation.	4,5,6,7,9
		Facilitate the accommodation of workforces in permanent forms of town-based accommodation wherever possible, preferably dwellings integrated into existing neighbourhoods.	4,7
	Facilitate the provision of sufficient amounts of Urban land ready for zoning, subdivision, and development in anticipation of growth periods.	Facilitate provision of sufficient unconstrained, and appropriately zoned land to accommodate population growth up to 26,045 by 2031 allowing for significant industry-led boom periods.	2
		Identify sufficient land for each settlement as Development Investigation Areas to accommodate population growth to at least 50,000 in the long term (post 2031).	2
		Implement the land use planning recommendations from the various Townsite Structure Plan/Masterplans in relation to urban expansion areas and development investigation areas.	9-14
		Prioritise the assessment, review, approval, and clearance of structure plans and subdivision proposals to facilitate timely release of urban land to match industry-led high demand periods. Continue to advise the Western Australian Planning Commission and relevant state authorities aware of land supply priorities.	5, 11
		Support industries whose operational workforce models are based on a permanent residential workforce being accommodated within the City of Karratha, consistent with the preferred growth pattern of this Strategy.	1, 3, 4, 7
		Facilitate timely resolution with Native Title groups for identified Urban Expansion and Development Investigation Areas.	9-13
	Consolidate housing activity by encouraging development in existing (or identified) residential areas	Identify and provide for redevelopment opportunities.	8, 10
		Implement the land use planning and density coding recommendations of the <i>Karratha Revitalisation Strategy (2015)</i> for Bulgarra, Millars Well and Pegs Creek.	10
		Review density codes as part of the preparation of Local Planning Scheme No.9 with a view to identifying appropriate areas for upcoding and redevelopment.	10
		Facilitate the development of identified Lazy Land sites.	10
	Facilitate the provision of diverse, high standard housing options to accommodate a range of demographic groups and respond to demographic trends.	Enable the development of surplus Public Open Space identified as suitable for rationalisation and reinvestment processes.	10
		Target a gross residential density between 10 and 15 dwellings per hectare across existing 'Urban' and 'Urban Expansion' areas. Apply variations in gross residential density to reflect local character and site specific constraints.	7
		Ensure a mix of housing types and density options generally as follows: a. 75 per cent low to medium density with a wide range of lot sizes; b. 15 per cent medium to high density grouped dwellings; and c. 10 per cent apartment buildings.	3, 4, 6, 7, 8
Require high quality Worker Accommodation developments which are integrated with neighbourhood environments for operational FIFO workers in accordance with Local Planning Policy DP10 Worker Accommodation.		3	
Regulate and incentivise the implementation of the Pilbara Vernacular handbook and the Karratha Vernacular handbook		7, 9	
Work with DevelopmentWA, Department of Communities and others to explore alternative and innovative lot typologies which respond to the housing needs of the growing community.		6, 8	
Community Facilities, Recreation and Open Space	Embrace and promote Karratha's strengths as a diverse and multicultural community with a wide variety of cultural and entertainment activities.	Plan for and provide spaces that are suitable for festivals and/or events which enable: - Collective celebration of the City's cultural diversity; - Celebrations by groups with common cultural background(s); and - Public art exhibits, food festivals and markets.	21, 22, 24, 26
		Monitor population growth in relation to community facility thresholds across all settlements within the City.	15, 27

	Ensure appropriate provision, management and maintenance of community facilities and open space across the City.	Continue to progress the development of POS land parcels that have been identified as surplus to the requirements of the drainage network. 31	31
	Promote liveability of the City by developing a variety of community services, facilities and recreational areas to support the forecast population growth.	Have regard to the <i>Community Facilities Plan (2013)</i> in planning for the provision of land to accommodate community facilities required to meet the needs of the forecast population.	15, 16, 17
		Pursue reservation and management orders for the <i>Karratha Hills Nature and Recreation Reserve</i> .	33
		Plan, monitor and implement foreshore management within the City.	32
		Ensure, where practical and reasonable, that community facilities are located within/adjacent identified Activity Centres.	24
	Provide an appropriate balance of local, district and regional open space to meet needs for passive and active recreation, conservation and drainage functions	Have regard to the <i>Community Facilities Plan (2013)</i> in planning for Public Open Space areas to meet the needs of the forecast population.	28
		Prepare a <i>Drainage Reserve Upgrade Plan</i> to consider staged enhancements to drainage reserves.	30
	Ensure equitable sharing of costs for new community facilities between the City and development industry	Prepare a Developer Contribution Plan and Developer Contribution Scheme based on the <i>Community Facilities Matrix</i> .	17
	Enable a broad range of education and youth facilities to be developed.	Promote coordination of land use for allied secondary and tertiary education development (including the provision of boarding facilities to service secondary education needs of North West Australia) incorporating the expansion of the Karratha District High School and Pilbara Institute Campus as identified on the Strategy Maps.	18, 40
		Monitor the population level for the 'Eastern Corridor' and assess the threshold needed to support a new Wickham High School.	15
		Plan for a range of attractive youth facilities and spaces accessible outside standard business hours as part of key community sites.	23-26, 29
	Facilitate the provision of a diverse range of quality health and aged care services and accommodation types for the population.	Investigate and identify sites appropriate for retirement villages, aged care and respite centres to enable aging in place.	19, 20, 43
		Establish a Health Precinct that encourages complimentary and specialist health services to co-locate in the vicinity of the <i>Karratha Health Campus</i> , including aged care accommodation.	20
		Facilitate a variety of dwelling options across the Karratha urban area close to services and facilities that will enable 'Aging in Place'.	7
Economy & Employment	Position Karratha as Administrative Hub for the Pilbara and strive to develop a concentration of government offices and agencies for North-West Australia to establish improved collaboration practices between public and private sectors.	Continue to support the federal and state government investment in making the Karratha City Centre the administrative hub of North-West Australia	35
		Continue to provide and monitor the amount of zoned land that is available to support small and medium enterprise, and enable new industry.	37-39
		Continue to advocate for an increased defence presence within the City as well as increased Government workforce.	1, 34, 46
		Support the expansion of the health campus with incorporation of areas of specialisation.	1, 42
		Continue implementation of the Karratha Airport Masterplan.	45
		Identify sites and infrastructure to support Karratha SHS as a centre of excellence and the establishment of tertiary education facilities and services in the City.	1, 18, 40
	Investigate opportunities to develop oil and gas support services.	Continue to build upon the City's competitive advantage and work undertaken to ensure there is sufficient land supply and servicing to support development of a permanent high quality supply and logistics hub for LNG and marine related support services.	36
		Promote investment in LNG and Marine sector through provision of quality research, information and market analysis. 34	34
		Lobby for the expansion of strategic marine industry infrastructure.	34
		Promote the City of Karratha as the preferred location for the processing and servicing of new oil and gas supplies both onshore and offshore i.e. Canning Basin.	34
Leverage Karratha's competitive advantages of assets, location, lifestyle pursuits, and recreational opportunities to attract businesses, residents and visitors.	Implement the recommendations of the City's <i>Operational Economic Development Strategy 2014-2016</i> .	1	
	Provide an ample supply of serviced land for future development in accordance with the 'Strategic Plans' of this Strategy. Continue to deliver well planned consolidated settlements and suburbs and attractive neighbourhoods.	1, 44, 47	
Retail, Commercial & Industrial	Promote the City as an Industrial Hub on an international scale.	Promote the development of Anketell & Maitland Strategic Industrial Areas.	41

	Ensure the Karratha City Centre retains the largest amount of commercial activity in North-West Australia whilst increasing the provision of entertainment and hospitality services within the City Centre.	Monitor demand for commercial and retail floorspace within the Karratha City Centre and enable expansion commensurate with orderly and proper planning.	51-52
		Implement the settlement hierarchy noted within this Strategy that promotes the primacy of Karratha City Centre.	48
	Facilitate sufficient land supply to accommodate demand for the full spectrum of industrial land uses i.e. 'Strategic Industry', 'General Industry', and 'Light Industry'.	Identify and zone additional land for light industrial expansion to the north of Wickham (Industrial Expansion Area 1 on the Wickham Strategic Plan)	54
		Identify <i>Development Investigation Areas</i> to expand areas zoned 'General Industry' and 'Light Industry (DIA areas 7-9 on the Karratha Strategic Plan) and facilitate investigations to enable future rezoning and structure planning.	54
		Not support expansion of industrial uses outside industrial zoned areas.	55
		Not support the rezoning of land on Tom Price Road to Industry and only allow for additional uses to be approved where appropriate.	55
		Support the State Government actions that are aiming to enable the provision of land to facilitate 'Strategic Industry' and/or industry of state importance i.e. Improvement Plans and Improvement Schemes for Anketell and Maitland.	55
		Recognise and implement buffers to industry and infrastructure uses in accordance with <i>State Planning Policy 4.1 - State Industrial Buffer</i> policy.	56
		Maintain freight accessibility to <i>Strategic Industrial Areas</i> and the associated ports with infrastructure corridor reservations in the Scheme.	57
		Expand commercial services within the City.	Facilitate expansion of commercial and retail floorspace through the provision of sufficient land appropriately zoned and serviced, ready for commercial / retail land uses.
Include a 'Service Commercial' zone to primarily cater for Large Format Retail / bulky goods and showrooms as depicted on the Karratha Strategic Plan.	53		
Monitor demand for additional commercial land requirements within the Karratha Urban Area.	49-50		
Tourism & Visitors	Position Karratha as the 'Gateway to North-West Australia Tourism'	Ensure an adequate supply and diversity of tourist accommodation through relevant statutory controls.	58-61
		Monitor the amount of tourism zoned land to ensure there is an adequate supply.	58
		Implement various land use planning initiatives advocated within the relevant 'Preferred Growth Pattern' and 'Built Form Pattern' sections of this Strategy to address housing affordability challenges in recognition of the relationship between housing affordability and the attraction & retention of tourism/hospitality workforces.	61
		Support the role of an upgraded Karratha Airport as a hub for tourism. Support businesses utilising Karratha airport to connect to tourist destinations of North-West Australia and aviation reliant tourism.	59, 66
		Within an infrastructure provision framework, investigate road network upgrades for improved vehicular access to tourism destinations i.e. the extension of the bitumen road to Millstream National Park.	59
	Increase tourism opportunities and activities within the City.	Support the development of marine-based tourism including enhancing existing coastal/island eco-tourism, a marina at Dampier and increasing tourist access to the Dampier Archipelago.	62, 66
		Identify areas where there is potential for additional tourism land use and ensure the Local Planning Scheme enables these opportunities.	58
		Implement relevant recommendations of the <i>State Aboriginal Tourism Strategy</i> and support initiatives in the development of Indigenous tourism.	63
Physical Environment, Climate & Natural Heritage	Support conservation, protection and management of natural resources and native vegetation where possible, to enhance soil and land quality, water quality, biodiversity, fauna habitat, landscape, amenity values and ecosystem function.	Continue the implementation of the City's Local Biodiversity Strategy	70
		Investigate best means to recognise and protect significant landscape features such as the Karratha Hills, including consideration of inclusion in the Conservation Estate with joint management responsibility between the City and Traditional Owners.	71
		Identify, where possible and appropriate, opportunities in structure planning, subdivision and development to establish: a. reserves for locally significant bushland and habitat; and b. cultural and environmental corridors to provide connectivity between environments.	70, 72
		Support inclusion of regionally significant vegetation identified in Mardie, Karratha and Pyramid Pastoral Leases within the Conservation Estate.	70, 72

	Conserve natural heritage for the benefit of visitors and future generations.	Work with Murujuga National Park Management Group to protect, provide guided access to and effectively manage the Murujuga National Park.	73
	Preserve the pristine coastline and marine environment.	Engage with community, traditional owners, State and Federal Governments, non-government organisations, industry and developers to improve facilities, management and use of coastline.	72
	Consider access, infrastructure requirements and management of coastal recreation activities to enable environmental conservation and protection of natural heritage values of coastal reserves.	Implement the land use planning recommendations of the City's <i>Coastal Management Strategy</i> .	67, 72
		Implement the Coastal Foreshore Management Plans for coastal nodes i.e. Point Samson, Dampier, Cossack and Cleaverville.	67
	Where appropriate in the planning process, utilise the coastal hazard risk management and adaption planning measures provided for by State Planning Policy 2.6 - <i>Coastal Planning Policy</i> to minimise risk associated with coastal processes.	Ensure land use decision making has due regard for the recommendations of the <i>Karratha 2D Flood Study and Local Water Management Framework (2013)</i> .	67
		Implement the City's <i>Coastal Hazard Risk Management and Adaption Plan</i> to reflect the best available information using the most recent predictions for sea level rise and coastal processes, to provide for up-to-date storm surge and flood risk information.	67
		Conduct a review of the City's Coastal Hazard Risk Management and Adaption Plan to ensure the document remains contemporary.	68
	Plan for Bushfire risk management to protect people, property and infrastructure.	Strategic planning proposals, subdivision and development applications within designated bushfire prone areas relating to land that has or will have a Bushfire Hazard Level above low and/or where a Bushfire Attack Level rating above BAL-low are to comply with the policy measures of State Planning Policy 3.7 - Planning In Bushfire Prone Areas.	74
	Ensure land use and development growth is commensurate with reliable, dependable and sustainable sources of potable and non-potable water.	Investigate the establishment <i>Special Control Areas</i> in the Scheme that encompass water source protection areas.	69
		Ensure that land use and development is compatible with the protection and long-term sustainable management of water resources for water supply.	69
		Work with Water Corporation and Department of Water and Environmental Regulation to secure long term potable water supplies for population growth.	69
		Ensure continued delivery of the Effluent Reuse Scheme in accordance with the 'Utilities' section of this Strategy to reduce the drawing of water from natural sources.	69
Ensure future development adequately addresses noise and air quality impacts	Consistent with draft State Planning Policy 4.1 Industrial Interface (2017) and <i>EPA Guidance Statement 3 Separation Distances between industrial and Sensitive Land Uses</i> (EPA, 2005) the City will ensure that the impacts of noise and air quality are considered were relevant at each stage of the planning process.	75	
Urban Design, Character and Heritage	Provide a liveable and climate responsive model for urban development.	Review Local Planning Policy DP7 Residential Frontages and adopt expanded acceptable development provisions of the Residential Design Codes.	77
		Investigate opportunities for conveniently located Common Boat and Caravan Storage Areas as an alternative to private lot storage.	76
		Ensure design quality and built form is consistent with State Planning Policy 7 - Design of the Built Environment and follows the design principles of the Pilbara Vernacular and Karratha Vernacular.	77, 82
		Invest in City Centre streetscapes, public spaces, public art and street furniture to improve amenity, stimulate investment, and accommodate a wide range of uses.	78
		Permit compatible and appropriate mixed use development close to activity centres and services within residential areas on the basis that they do not adversely affect the amenity of the residential areas.	76
	Ensure the recognition, protection, enhancement and promotion of places of Aboriginal and European heritage significance and exemplary local character.	Periodically review the City's Heritage Inventory as part of the development assessment process. Recognise the significance of this area in relation to aboriginal heritage and consult with appropriate agencies, groups and representatives as part of the planning process.	80
		Prepare design guidelines for heritage precincts and introduce appropriate Scheme provisions to preserve and enhance the character of heritage sites within the City. Encourage the utilisation of heritage buildings for active purposes, such as tourism related activities.	80
		Provide a planning framework that supports the establishment of precincts, centres, and buildings that promote Aboriginal and European heritage.	77
		Protect heritage sites through reference to the Aboriginal Heritage Act, preparation of the City of Karratha Heritage List, and undertaking heritage surveys as part of the Native Title process.	79
		The City will continue to support the World Heritage nomination of the Murujunga Cultural Landscape	79

	Facilitate development of the Karratha City Centre towards a pedestrian-friendly, high amenity urban environment that attracts investment and accommodates an attractive night-time economy.	Review Local Planning Policy DP1 - <i>City Centre Development Requirements</i> to facilitate developments which address the street at the human scale with activated ground floor frontages and contribute to a vibrant pedestrian environment.	78	
		Ensure that all demographic groups are considered in the design of City Centre spaces, including specific spaces for young adult activity outside standard business hours.	76, 77, 82	
		Investigate the best means to recognise and protect significant landscape features such as the Karratha Hills, including consideration of inclusion in the Conservation Estate with joint management responsibility between the City and Traditional Owners.	71, 81	
	Conserve areas of heritage significance and where appropriate, consider complimentary land uses.	Update the City's Municipal Heritage Inventory and enable the co-location or occupation of heritage buildings with appropriate land uses.	80	
Rural Land	Ensure planning and management of rural land enables appropriate use of the land and its resources in accordance with State Planning Policy 2.5 - Rural Planning	Support the continued use of Pastoral Leases for agricultural purposes.	83	
		Ensure identification of land tenure constraints early in the planning process in relation to urban expansion areas on rural land.	84	
		Support diversification of uses on Pastoral Leases to facilitate development of alternative rural and tourism enterprises that celebrate the unique environmental setting of the City.	85, 88	
		Support further research to identify the potential for irrigated agriculture within the City.	87	
		Ensure appropriate separation of conflicting land uses on Rural land through the use of buffers or other appropriate statutory controls.	90	
		Assess and coordinate planning for infrastructure and services to Aboriginal Communities.	86	
		Investigate a comprehensive Basic Raw Material Assessment of the City to determine BRM locations and the best avenues for protection of these assets.	89	
Infrastructure Services	Ensure that essential infrastructure (and their associated corridors) servicing industrial areas are identified and protected to avoid conflict between industry and/or essential infrastructure and sensitive land uses.	Protect key infrastructure including: a. 330kv electrical transmission network; b. Other high order power infrastructure using the <i>Pilbara Power Project Board</i> as a resource; c. Dampier to Bunbury Natural Gas Pipeline; and d. Balla Balla Pipeline.	91	
		Apply a <i>Community and Public Purpose</i> reservation to relevant infrastructure.	91	
		Support the initiatives of the <i>Pilbara Power Project Board</i> to oversee procurement of power from the private sector and coordinate management/ownership of the existing fragmented <i>North West Interconnected System</i> transmission network. 95	95	
		Recognise and implement buffers to industry and infrastructure uses in accordance with <i>State Planning Policy 4.1 - State Industrial Buffer</i> policy.	96	
		Include and revise Special Control Areas in the Scheme to reflect the buffers required for the Karratha Power Station and Waste Water Treatment Plants.	96	
		Align infrastructure service planning to staging of growth to meet predicted supply demands.	Facilitate and monitor provision of key service infrastructure required for economic development and diversification.	92
			Encourage planning for water utility infrastructure in increments of 5,000 people to stage expansion to match demand.	92
	Work with the Department of Water and Environmental Regulation, the Water Corporation, and other stakeholders to ensure an adequate water supply for future growth.		92, 93	
	Design and implement integrated water management strategies consistent with State Planning Policy 2.9 - Water Resources for all settlements.		93	
	Attend to urgent infrastructure expansion requirements. Prioritise investigations into relocation and upgrading of the wastewater treatment plant to enable Dampier to support Karratha long term growth.		92	
	Work with service providers to make sure upgrades in public utility capacity are staged well ahead of demand-driven requirements.		92	
	Monitor power supply schemes to ensure timely upgrade of distribution network as required to facilitate development.		92	
	Monitor, coordinate and plan for infrastructure and services to sustain remote Aboriginal communities.	86, 92		
	Plan for and invest in sustainable systems for energy and water provision	Enhance the sustainability of the City's water supply by: a. Investigating alternative long term water supply options for the City with the view to secure a supply option in the immediate future; and b. Investigating opportunities for wastewater recycling and other non-potable water sources to meet industry needs and relieve demand on the West Pilbara Water Supply Scheme (e.g. mine dewatering).	92-94	
		Adopt scheme provisions that encourage and facilitate alternative power supply opportunities.	97	

		Ensure scheme provisions encourage water sensitive urban design, water-wise retrofitting and increased wastewater recycling for Public Open Space irrigation, horticulture and other non-potable uses, consistent with WAPC Guidelines for Better Urban Water Management.	94, 95
		Investigate alternative power supplies, and their potential locations, to meet future power needs of the City's assets.	97
		Continue to facilitate the continued delivery of the Effluent Reuse Scheme.	94
		Support the development of a solar farm at the airport and the consideration of solar infrastructure at other community facilities i.e. Karratha Leisureplex.	97
	Improve telecommunication infrastructure to support economic development.	Support enhanced mobile phone coverage in the City, especially highways.	99
		Promote the continued installation of advanced telecommunications infrastructure.	99
	Facilitate an effective drainage network that provides additional amenity.	Use the City's flood modelling information and upgrade the drainage network to reduce flooding risk.	93
		Identify parts of the drainage network that can be upgraded to function as high amenity public open space. Prepare and implement enhancement plans.	93
		Implement the City's Water Management Strategy.	93
		Prepare local planning policies to guide the use of drainage reserves in residential areas.	93
	Centralise waste management services.	Promote the City's Seven Mile waste facility as a suitable central point for most waste services including Class 2 and future Class 3 waste facilities.	98
		Encourage new industries and mine operations to utilise the City's existing waste facilities. 98	98
	Facilitate coordinated, timely upgrade and extension of the service infrastructure networks in line with forecast population growth and in accordance with the Economic Development and Tourism Strategies and ensure the equitable sharing of public works infrastructure in new development and redevelopment areas.	Prepare a Development Contribution Plan for new infill development areas which identifies necessary public works as a result of additional development and gazette a <i>Development Contribution Scheme</i> as a funding mechanism for the necessary works.	92
	Transport	Develop a transportation network which accommodates a variety of transportation modes within the City Centre and provides an appropriate supply of car parking to support local businesses and facilitate investment.	Implement and monitor the <i>City Centre Parking Strategy</i> and City Centre Parking Policy to ensure parking supply best meets parking demands of a growing city centre.
Require City Centre parking areas to be designed in a manner which is appropriately integrated with the streetscape i.e. sleeved development.			107
Create a high amenity street environment through landscaping and implement the City's <i>Footpath Strategy</i> .			107
Ensure sufficient parking for motorbikes, bicycles, loading bays, universal access parking, and larger vehicle parking.			107
Promote the continued provision of public transport within the City.			105
Encourage compatible development and appropriate support industries in proximity to the Karratha Airport.		Implement the airport operations related land use planning recommendations from the <i>Karratha Airport Masterplan & Land Use Plan 2013 - 2033</i> .	109
		Identify the southern part of the Airport Reserve as 'Development Investigation Area - Airport' on the Strategy Plan and investigate the potential for complimentary use of land not required for airport operations under the <i>Karratha Airport Masterplan & Land Use Plan 2013-2033</i> .	109
Support port upgrades which stimulate economic development and deliver community benefits.		Continue to work with the State Government, the Pilbara Port Authority and industry to plan, protect and utilise port facilities as an important part of the local, State and National economy.	100
		Encourage the concentration of investment on key port infrastructure.	106
		Encourage common user and general cargo port(s) / berth(s) which facilitate diversification of the local economy.	100
Protect Rail Corridors that from the encroachment of incompatible uses.		Implement land use controls to protect rail functions.	110
		Promote the addition of grade separated rail crossings on the regional road network.	110
Encourage the continued investment into inter-regional and intra-regional roads to provide safer and more		Promote construction of a regional road connection between the eastern extent of Millstream Road, the Karratha Industrial Estate and North West Coastal Highway (avoiding low lying tidal flats) as the preferred link between Karratha and Anketell.	101
		Support the upgrade of North West Coastal Highway to a four-lane divided road between the future Anketell Port and Karratha.	101

efficient regional road connections to North Western Australia, and within the Pilbara.	Subject to agreement with Main Roads regarding acquisition, create Scheme reservation for the Western Bypass Road within Karratha.	102
	Advocate for the provision of formalised and well maintained truck breakdown facilities.	101
	Continue to monitor the performance of the local road network and determine priority upgrades and the costs of those upgrade works (traffic model).	101-104, 108
	Develop the concept design for the East West Spine Road in Karratha, including a staging plan and construct stages as funding becomes available.	101
	Monitor the traffic demand in Roebourne to determine the need for the Roebourne bypass.	103
	Facilitate implementation of the movement network initiatives outlined in the LPS <i>Supplementary Transport Paper</i> (2014).	104
	Progressively review the traffic demand forecasts to confirm long term future transportation needs are appropriately provided for.	104
	Prioritise the planning of the <i>Western Bypass</i> and road connections between Mulataga and the <i>Karratha Industrial Area</i> in accordance with the Strategy Plan.	102

CITY OF KARRATHA

LOCAL PLANNING STRATEGY

CERTIFICATION FOR ADVERTISING

Certified for advertising by the Western Australian Planning Commission on **24 February 2016**

COUNCIL RECOMMENDED / SUBMITTED FOR APPROVAL

Supported for submission to the Western Australian Planning Commission for endorsement by resolution of **City of Karratha** at the **Ordinary Meeting of Council** held on the **11 December 2017**



MAYOR



CHIEF EXECUTIVE OFFICER

ENDORSEMENT OF LOCAL PLANNING STRATEGY

Endorsed by the Western Australian Planning Commission on **2 February 2021**



DELEGATED UNDER S.16 OF

THE *PLANNING AND DEVELOPMENT ACT 2005*

City of Karratha Local Planning Strategy

PART B: October 2020



Contents

1.0 Introduction	3		
1.1 Role & Purpose of the Strategy	3		
1.2 Strategy Preparation & Structure	3		
1.3 Consultation & Engagement Methodology	3		
2.0 State & Regional Planning Context	5		
2.1 State Planning Strategy 2050	5		
2.2 State Planning Framework	5		
2.3 State Planning Policies	5		
2.4 Regional Strategies	7		
2.5 Operational Policies	7		
2.6 Other Relevant Strategies, Plans & Policies	8		
2.7 Guidelines, Forecasts & Reports	9		
3.0 Local Planning Context	11		
3.1 Local Government Vision & Mission Statements	11		
3.2 Local Government Strategic Plans	11		
3.3 Townsite Structure Plans/Masterplans	11		
4.0 General City Profile	12		
5.0 Theme 1: Community	13		
5.1 Local Profile: Population & Housing	13		
5.2 Demographics	16		
5.3 Housing Demand	20		
5.4 Housing & Land Supply	21		
5.5 Key Issues: Population & Housing	24		
5.6 Community Facilities, Recreation & Open Space	25		
5.7 Key Issues: Community Facilities, Recreation & Open Space	27		
6.0 Theme 2: Economy	28		
6.1 Local Profile: Economy & Employment	28		
6.2 Key Issues: Economy & Employment	31		
6.3 Local Profile: Retail, Commercial & Industrial	32		
6.4 Key Issues: Retail, Commercial & Industrial	36		
6.5 Local Profile: Tourism & Visitors	37		
6.6 Key Issues: Tourism & Visitors	39		
7.0 Theme 3: Environment	40		
7.1 Local Profile: Physical Environment, Climate & Natural Resource Management	40		
7.2 Key Issues: Physical Environment, Climate & Natural Resource Management	47		
7.3 Local Profile: Urban Design, Character & Heritage	48		
		7.4 Key Issues: Urban Design, Character & Heritage	50
		7.5 Local Profile: Rural Land	51
		7.6 Key Issues: Rural land	53
		8.0 Theme 4: Infrastructure	54
		8.1 Local Profile: Infrastructure Services	54
		8.2 Key Issues: Infrastructure Services	56
		8.3 Local Profile: Transport	57
		8.4 Key Issues: Transport	62
		9.0 Opportunities & Constraints Mapping	63
		9.1 References	63

1.0 Introduction

1.1 Role & Purpose of the Strategy

A Local Planning Strategy sets out the long term strategic planning direction for the local government and guides Council and the community on where growth should occur and how it will be managed. It provides a strategic framework for future development and the rationale for land use zoning defined within the Local Planning Scheme.

The City of Karratha Local Planning Strategy provides a local government-wide strategic framework to guide growth and development over the next 15 years. The Local Planning Strategy fills a distinct gap in the current strategic planning framework, which focuses either broadly on the Pilbara Region as a whole or locally on individual settlements within the City only.

A Local Planning Strategy is a prerequisite to updating a Local Planning Scheme. The City of Karratha Local Planning Scheme No. 8 (LPS8) was gazetted in August 2000 and is due for review. This Strategy will therefore inform a forthcoming review of LPS8.

The purpose of the City of Karratha Local Planning Strategy is to:

- Interpret the State and regional planning framework to guide planning for the City of Karratha;
- Identify strategic land uses and infrastructure requirements to service future population growth and economic activity to create a sustainable future for the City of Karratha;
- Identify land suitable for future development based on opportunities and constraints presented;
- Provide the background context for zones, reservations and statutory provisions to be implemented through the local planning scheme; and
- Propose implementation, monitoring and review actions to ensure the objectives of the Local Planning Strategy are achieved.

1.2 Strategy Preparation & Structure

Preparation of the Local Planning Strategy has involved comprehensive review of the existing literature and extensive background technical and evidential analysis to supplement gaps in the existing information (see **Error! Reference source not found.**). Five *Technical Reports* and nine *Evidential Analysis Papers* were prepared by the consultant team in the preliminary stages of the Local Planning Strategy preparation.

Subsequent to that work the City commissioned further studies looking specifically at environmental and transport considerations. These documents contain further analysis and detail beyond the summarised version of background information and analysis contained in the Strategy document itself.

Early preparation involved input from a Project Steering Committee and Project Reference Group each established specifically to provide strategic guidance and direction for the project. At appropriate stages it has also involved consultation with key stakeholders and the City of Karratha community.

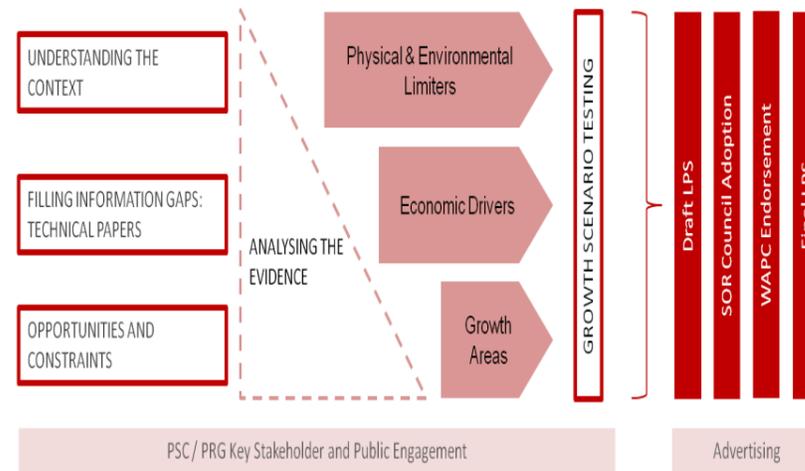


Figure 1: Strategy Preparation

The *Planning and Development (Local Planning Schemes) Regulations 2015 (The Regulations)* contain the statutory requirements in respect to preparation, consultation and endorsement of a Local Planning Strategy. *The Regulations* require local governments to prepare a Local Planning Strategy as a basis for any new Local Planning Scheme.

Regulation 11 of *The Regulations* states:

- (2) A Local Planning Strategy must –
- (a) set out the long term planning directions for the local government; and
 - (b) apply any State and regional planning policy that is relevant to the strategy; and
 - (c) provide the rationale for any zoning or classification of land under the local planning scheme.

Once the Western Australian Planning Commission (WAPC) has certified the Local Planning Strategy is consistent with Regulation 11(2), the Local Planning Strategy is advertised for comment to the public, relevant agencies and stakeholders. The Local Planning Strategy is then reviewed in light of comments received prior to submission to the WAPC for endorsement.

Regulation 13 sets out the procedure for advertisement, endorsement and final publication of the notice of a Local Planning Strategy, which are summarised graphically in Error! Reference source not found..

The WAPC *Local Planning Manual* sets out the structure and content requirements for a Local Planning Strategy. While Part 1 contains the actual strategy, addressing the strategic vision, objectives and actions to be implemented, **Part 2 provides the relevant background to the Strategy.**

It includes the following sections of analysis, which form the Strategy rationale:

- State & Regional Planning Context;
- Local Planning Context;
- Local Profile & Analysis of Key Issues; and

- Opportunities & Constraints Mapping.

1.3 Consultation & Engagement Methodology

Preparation of the Local Planning Strategy has been underpinned by a robust consultation and engagement process. The agreed Communication Plan and Consultation Strategy involved five key components or stages, including:

- Stage 1: Media releases and ongoing communication of project deliverables;
- Stage 2: Data collection and information consultation;
- Stage 3: Aboriginal community consultation;
- Stage 4: Scenario development workshops; and
- Stage 5: Statutory consultation.

Communication with the public has been ongoing throughout the project, with a three-staged media release programme. The first stage introduced the project, the second stage invited stakeholders and community to attend the scenario development workshops and provide feedback, and the third stage reported on findings of Aboriginal community consultation and scenario development workshops. The City's Local Planning Strategy webpage has been the primary mode of communication for these project milestones.

Some targeted consultation with key stakeholders was necessary to inform background technical analysis, and thus a data collection and information consultation process allowed engagement with key stakeholders early in the project. This stage of consultation was undertaken through one-on-one meetings and teleconferences between the consultant team and key stakeholders. All key stakeholder engagement from this stage has been documented with meeting findings summarised in a *Targeted Key Stakeholder Consultation Summary*.

Targeted consultation with the City's Aboriginal community was undertaken through facilitated sessions with key Aboriginal Corporations. Engagement sessions took place over two stages, in the form of Aboriginal Corporation board meetings and one-on-one discussions. Engagement focused on understanding aspirations for growth, housing, economic development and community to inform a well-grounded Local Planning Strategy. An *Aboriginal Engagement Outcomes Report* documents the findings of this stage of consultation.

Scenario Development Workshops provided the main opportunity for general stakeholder and community engagement. Three workshops took place in September 2013. Two workshops were held in Karratha and one was held in Perth to enable participation of key stakeholders and government agencies based in Perth. Discussions at the Perth workshop were structured to feed off the findings from engagement with the local community and stakeholders at the Karratha workshops. Workshops consisted of facilitated focus group sessions discussing the important issues around future growth of the City. An initial briefing presentation by the consultant team provided a baseline for facilitated focus group sessions.

As identified in the *Workshop Outcomes Report*, a number of matters clearly of importance to stakeholders of the City of Karratha community were identified. All outcomes of the workshops have helped inform and guide the preparation of

the Local Planning Strategy, and have been considered having regard to the various opportunities and constraints identified for the City.

During the drafting of the LSP, it became evident that additional targeted consultation was required with key agencies who have a pivotal role in the delivery of housing and services, and management of growth in the City of Karratha. The additional consultation was required in order to fill gaps, confirm previous advice and obtain updated information to inform the strategy, given that much of the consultation via the workshops was undertaken in 2012/13. This additional targeted consultation involved phone conversations and meetings with key City officials (executive and staff), Department of Planning, PDC, LandCorp, Water Corp, DAFWA and DSD in September, October and November 2013 and has been incorporated into this draft.

The statutory consultation process follows Council adoption and WAPC certification of the *Draft Local Planning Strategy*. Formal advertising provides an opportunity for the public, relevant stakeholders and agencies to provide feedback on the draft before the strategy is finalised. Formal advertising was undertaken in accordance with *The Regulations*. Comments from advertising have been reviewed and incorporated as appropriate into the final *Strategy*.



2.0 State & Regional Planning Context

The *Strategy* has been prepared with due consideration to the existing State and regional level planning framework. The following section contains an overview of the key State and Regional Planning Strategies, Plans, Policies and Reports relevant to the City of Karratha. Policy and planning measures requiring implementation at the local level are highlighted to illustrate how the City's *Strategy* incorporates State and regional level planning principles and priorities. It is also important to recognise that State Agreements (SA) operate within the City. The SA's are unique and can include provisions that remove or amend the power of local governments, so that the operations of companies under a SA are not interfered with or interrupted. For more information on State Agreements see <https://itsi.wa.gov.au/what-we-do/manage-state-agreements/list-of-state-agreements>.

2.1 State Planning Strategy 2050

The *State Planning Strategy 2050* (SPS 2050) provides an overarching strategic plan for Western Australia. It is a broad strategic plan with a vision for coordinated and sustainable development of the State. The key principles of the State Planning Strategy intended to guide all levels of planning decision making are as follows:

- **Community** – Enable diverse, affordable, accessible, and safe communities;
- **Economy** – Facilitate trade, investment, innovation, employment and community betterment;
- **Environment** – Conserve the State's natural assets through sustainable development;
- **Infrastructure** – Ensure infrastructure supports development;
- **Regional Development** – Build the competitive and collaborative advantages of the regions; and
- **Governance** – Build community confidence in development processes and practices.

The guiding principles for the City of Karratha Local Planning Strategy are structured similarly around four pillars: Community, Economy, Natural and Built Environment, and Leadership. The specific principles under each pillar have been established to be consistent and to assist in achieving the overall principles and objectives of *SPS 2050*.

SPS 2050 puts forward a number of key considerations for the future of the North West of the State, which encompasses the City of Karratha. One of the main challenges it identifies is balancing the conservation of the region and economic development. It recognises the need for a local construction industry and higher education to facilitate the growth of the resources sector and diversification of the economic base. This Local Planning Strategy provides a planning tool to assist in overcoming these identified challenges in order to facilitate coordinated and sustainable growth, in line with the vision of *SPS 2050*.

2.2 State Planning Framework

The *State Planning Framework* is an overarching integrative document, encompassing all State and Regional Plans, Policies, Strategies and Guidelines which apply to land use and development in Western Australia.

It provides a central decision-making framework to guide land use and development in Western Australia. The *State Planning Framework* is the overarching Statement of Planning Policy, under which all other State Planning Policies fall. This *Strategy* has been prepared taking into account the State Planning Framework and all underlying State Planning Policies.

The *State Planning Framework* identifies six key principles to guide planning decision-making. The principles are based around the themes community, economy, environment, infrastructure, regional development and governance.. The Local Planning Strategy guiding principles demonstrate consistency with the key principles of the State Planning Framework.

2.3 State Planning Policies

The following *State Planning Policies* (SPP's) are applicable to the City of Karratha (see Table 1). The SPP's are intended to provide guidance for planning strategies, schemes and general land use and development decision-making. They present specific measures that should be applied for preparation of planning strategies, and are therefore pertinent to the development of this *Strategy*.

Table 1: State Planning Policies relevant to the City of Karratha

State Planning Policy	Application to the City of Karratha
SPP 2.0: <i>Environment and Natural Resources</i>	SPP 2 aims to integrate conservation of the environment and sustainable natural resource management with broader land use planning and decision-making. It identifies the need to protect, conserve and enhance the natural environment, and to facilitate wise and sustainable use and management of natural resources. The City of Karratha's natural environment is important for its environmental, cultural and recreational values. Meanwhile, its natural resources make a fundamental contribution to the City's mining and resources based economy. Accordingly, it is critical that the Local Planning Strategy incorporate measures to plan for appropriate balance between conservation of the environment and sustainable natural resource management.
SPP 2.5: <i>Rural Planning</i>	SPP 2.5 seeks to protect agricultural land resources, whilst minimising land use conflict and providing for economic opportunities and rural settlement where appropriate. To this end, SPP 2.5 contains primary objectives relating to rural land. These objectives include the protection of rural land from incompatible uses, the promotion of regional development through ongoing economic opportunities, the promotion of sustainable settlement in and adjacent to urban areas, and the protection and improvement of environmental and landscape assets. A further primary objective is the minimisation of land use conflicts.

State Planning Policy	Application to the City of Karratha
	SPP 2.5 provides that the WAPC will continue to promote rural zones in Local Planning Schemes as highly flexible zones that cater for a wide range of rural land uses that can support primary production, value adding, small-scale tourism, environmental protection and biodiversity conservation. The differing needs of regions are recognised and regional variations may be considered where they meet the stated objectives of the policy, are evidence-based, and supported in Local Planning Strategies and Schemes.
SPP 2.6: <i>State Coastal Planning</i>	SPP 2.6 aims to ensure appropriate and sustainable use and development of coastal areas. It seeks to ensure development takes into account coastal processes, landform stability, coastal hazards, climate change and biophysical criteria. Coastal hazard risk management and adaptation planning are important measures of SPP 2.6 that must be implemented in areas at risk of being affected by coastal hazards. The City comprises 350kms of Indian Ocean coastline. With settlement largely focused around the coast, coastal areas cater for residential, tourism, maritime industry, energy and minerals industries and other commercial activities. Low-lying areas of the City are extremely vulnerable to inundation and storm surge during tropical cyclones, storms and tsunami events. As such, it is essential the Local Planning Strategy adhere to the requirements of SPP 2.6 in regard to coastal planning.
SPP 2.7: <i>Public Drinking Water Source Policy</i>	SPP 2.7 addresses land use and development in public drinking water source areas. It aims to protect these areas from incompatible land use and pollution, and to provide effective long-term management of water resources for public water supply. The West Pilbara Water Supply Scheme serves all settlements in the City, and is nearing yield capacity. The scheme is supplied by entirely climate-dependent surface (Harding Dam) and groundwater (Millstream Aquifer) sources. The City faces limitations to adequate water supply in the face of a changing climate with increasingly unpredictable rainfall events. The Local Planning Strategy must take into account measures of SPP 2.7 for protection of existing and future water supply areas to address this constraint.
SPP 2.9: <i>Water Resources</i>	SPP 2.9 seeks to protect, conserve and enhance water resources by promoting their sustainable use and management. The City of Karratha comprises 350kms of Indian Ocean coastline. It contains groundwater aquifers, water courses and surface water catchments, all of which are highly climate dependent. These water resources are worthy of protection for the economic, environmental, cultural and recreational values they afford the City. The Local Planning Strategy, accordingly, incorporates the objectives and measures of SPP 2.9 for sustainable use and management of water resources.

State Planning Policy	Application to the City of Karratha
SPP 3.0: <i>Urban Growth and Settlement</i>	<p>SPP 3 sets out the principles and considerations that apply to planning for sustainable, responsive, coordinated and locally appropriate urban growth and settlement in Western Australia. It seeks to manage growth in response to climatic, environmental, heritage and community values. It aims to build on local and regional economies, coordinate timely provision of infrastructure and services, and provide for a wide range of housing, employment, recreation facilities and open space to enhance quality of life in Western Australian communities.</p> <p>The City of Karratha has experienced significant growth in recent years and is projected to continue growing over the coming 15 years. The Local Planning Strategy plans for the growth of the City to a population of 38,000 by 2031, inclusive of strategies and actions that promote and do not preclude a longer term aspiration of 50,000+. Managing urban growth to achieve liveable communities is therefore an important consideration for the Local Planning Strategy. The objectives of SPP 3 reflect closely the principles and objectives of the Local Planning Strategy.</p>
SPP 7.3: <i>Residential Design Codes Volume 1</i>	<p>SPP 7.3 provides the basis for the control of residential development throughout Western Australia. It is a comprehensive tool utilised by local government to regulate built form and density. While not a strategic planning policy document, SPP 7.3 has been considered in preparation of the Local Planning Strategy in relation to residential density nomination.</p>
SPP 3.2: <i>Aboriginal Settlements</i>	<p>SPP 3.2 aims to ensure the recognition of Aboriginal settlements through local planning schemes and strategies and to plan for the orderly and coordinated development of Aboriginal settlements. Three currently exist within the City:</p> <ul style="list-style-type: none"> • Weymul; • Cheeditha; and • Mingullatharndo. <p>These are acknowledged in the Local Planning Strategy, along with the need to use a collaborative approach to manage their orderly and coordinated future growth.</p>
SPP 3.4: <i>Natural Hazards and Disasters</i>	<p>SPP 3.4's objectives are to ensure all planning documents include provisions for natural disaster planning. The aim to doing so being to minimise negative impacts of natural disasters on communities, the economy and the environment.</p> <p>Of particular relevance to the City is the high risk of tropical cyclones, and associated storm surge and inundation. The Local Planning Strategy recognises this risk and identifies areas at risk of inundation during storm events so that adverse impacts of this specific natural hazard can be avoided and mitigated.</p>

State Planning Policy	Application to the City of Karratha
SPP 3.5: <i>Historic Heritage Conservation</i>	<p>SPP 3.5 sets out the principles of sound and responsible planning to conserve and protect Western Australia's historic cultural heritage. The policy promotes and facilitates effective conservation, use and management of State and local heritage assets. Aboriginal heritage is protected separately under the <i>Aboriginal Heritage Act 1972</i>, and as such the policy does not apply to Aboriginal heritage sites except where listed on a State or Local Heritage Register.</p> <p>The City of Karratha Local Government Heritage Inventory consists of 73 sites of heritage significance. In particular, the Cossack Heritage Precinct is a site of national archaeological significance, providing evidence of a multicultural past as well as the impact of European settlement on Aboriginal cultures. It contains notable well restored public buildings. Roebourne settlement also has a number of heritage sites that hold great importance to both the Aboriginal and European histories of the area.</p> <p>It is vital that the Local Planning Strategy support the policy measures of SPP 3.5 so that the rich heritage of the City is appropriately protected and celebrated into the future.</p>
SPP 3.6: <i>Development Contributions for Infrastructure</i>	<p>SPP 3.6 sets out the form, content and process to be followed in providing for development contributions for the provision of infrastructure. The policy promotes efficient and effective provision of public infrastructure. It provides certainty to developers, infrastructure providers and the community in regard to applicable charges and how funds are to be spent by requiring local governments to prepare development contribution plans.</p> <p>Development contribution plans require a strategic basis, which can be identified through local planning strategies and strategic infrastructure plans.</p> <p>The City of Karratha Local Planning Strategy aims to provide the initial strategic basis around the requirement for development contribution plans in the City. In doing so, the Local Planning Strategy takes into account the policy objectives and measures of SPP 3.6.</p>
SPP 3.7: <i>Planning in Bushfire Prone Areas</i>	<p>SPP 3.7 seeks to reduce the risk of bushfire to people, property and infrastructure by encouraging a conservative approach to strategic planning, subdivision, development and other planning decisions proposed in bush-fire prone areas.</p> <p>The SPP is supplemented by <i>Guidelines for Planning in Bushfire Prone Areas version 1.3</i> that assist interpretation and provide advice on how bushfire risk is to be addressed when designing or assessing a proposal within a bush-fire prone area.</p> <p>A critical public safety issue, it is important that the Local Planning Strategy support and seek to implement the policy measures and requirements of SPP 3.7. The preparation of regional Bushfire Hazard Mapping by the Department of Fire and Emergency Services is an important first step in this process.</p>

State Planning Policy	Application to the City of Karratha
SPP 4.1: <i>State Industrial Interface (Draft)</i>	<p>SPP 4.1 aims to avoid land use conflicts between industry and/or essential infrastructure and sensitive land uses. It applies to proposals seeking to provide new industrial uses and/or essential infrastructure, or proposals for sensitive land uses in proximity to existing industry areas. It seeks to protect industry and infrastructure from encroachment, minimise risk to sensitive land uses and promote compatible uses where off-site buffers are required. <i>EPA Guidance Statement No. 3 – Separation Distances between Industrial and Sensitive Land Uses</i> provides guidelines for generic buffer distances.</p> <p>The City of Karratha has a considerable amount of industrial land uses with the potential to create off-site impacts. The Local Planning Strategy has considered in detail the issue of existing and future land use separation distances in accordance with SPP 4.1. It recognises site specific technical analysis is required to understand the most appropriate buffer distance and account for potential cumulative impacts.</p>
SPP 5.2: <i>Telecommunications Infrastructure</i>	<p>SPP 5.2's objective is to facilitate the provision of telecommunications infrastructure in an efficient, cost-effective and environmentally responsible manner to meet community needs. The policy provides a framework for the preparation, assessment and determination of applications for planning approval for telecommunications infrastructure.</p> <p>The need for high-speed telecommunications in the City is vital to achieving a standard of living competitive with the rest of Australia. The Local Planning Strategy aims to address the need for telecommunications infrastructure and supports the provisions of SPP 5.2 for its efficient provision.</p>
SPP 5.4: <i>Road and Rail Noise</i>	<p>SPP 5.4 aims to promote an integrated system of sustainable land use and transport with efficient freight network design and best practice development. Protecting people from unreasonable levels of transport noise and protecting major transport corridors from incompatible urban encroachment are the mechanisms to achieve this aim.</p> <p>Road and rail transportation, for both everyday domestic usage and freight transport, are central to development in the City. New road and rail connections will be required to facilitate future growth of the population and economy.</p> <p>New residential areas will also be required to accommodate growth, and both must consider implications of transport noise. Noise criteria, management and mitigation provisions of SPP 5.4 are incorporated in the Local Planning Strategy to safeguard residential amenity and efficient transport operations.</p>

2.4 Regional Strategies

Pilbara Planning and Infrastructure Framework (2012)

The *Pilbara Planning and Infrastructure Framework (PPIF)*, prepared by the WAPC, details a settlement-focussed regional development approach for the Pilbara. The *PPIF* has been developed under the banner of the *State Planning Strategy* as a regional strategy. It provides a basis for local planning strategies and schemes over the next 25 years. It contains detailed planning for higher order Pilbara Region settlements, identifying Karratha as a vital regional service centre. Its vision is:

“By 2035, the region will have a resident population of more than 140 000, based on a more diverse economy that has capitalised on its competitive advantages. As part of the Pilbara Cities vision, the Pilbara will have two cities: Karratha and Port Hedland, each with a population of 50,000. These would be supported by the Newman sub-regional centre with a population of 15,000 and the major towns of Tom Price, Onslow and Wickham.

Higher levels of population in the region’s main urban centres will support a wider range of employment opportunities; greater housing choice; higher levels of amenity; and access to higher standards of education, health, recreational and other community services. The natural and cultural heritage assets of the Pilbara, such as the coastline, Karijini and the Burrup Peninsula’s rock-art galleries will be conserved, celebrated and cherished.”

The *PPIF* identifies major community, utility and transport infrastructure priorities in order to sustainably develop the Pilbara in the context of a rapidly growing population (see Figure 2). It also recognises the need to foster environmental and cultural priorities across the Pilbara Region.

The *PPIF* provides guidance for how the City of Karratha fits into the Pilbara Region, and how this role can be expected to evolve, particularly with the development of Karratha into a regional city servicing the West Pilbara Region.

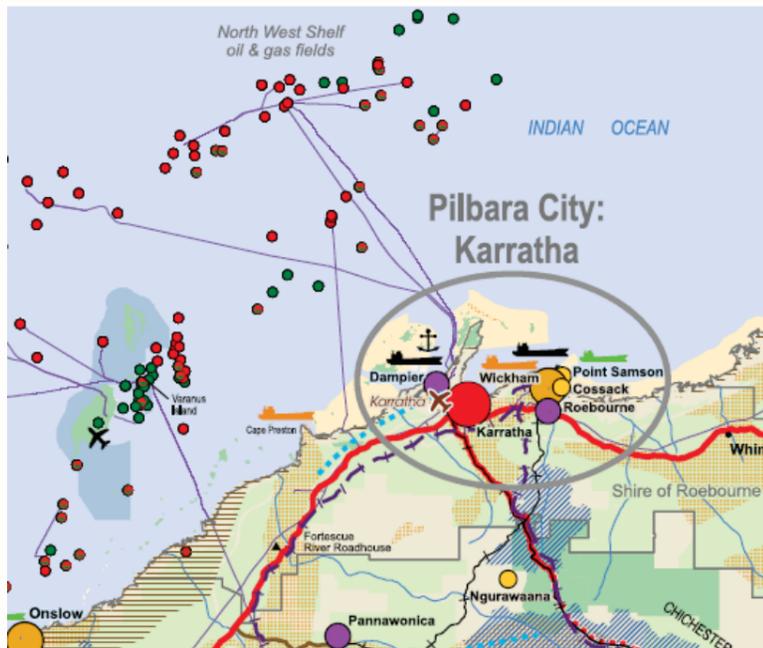


Figure 2: Pilbara Planning and Infrastructure Framework Map Extract

2.5 Operational Policies

Liveable Neighbourhoods (2015)

Liveable Neighbourhoods is an operational policy used for the design and assessment of structure plans and subdivision. It is applicable to both greenfield and large areas of infill development throughout Western Australia. The purpose of *Liveable Neighbourhoods* is to facilitate development of sustainable communities in accordance with the direction of the *State Planning Strategy*. The integrated document replaces issues-based development control policies. It covers eight elements, including community design, movement networks, lot layout, public parkland, urban water management, utilities, activity centres and employment, and schools.

The City of Karratha Local Planning Strategy is written to be consistent with the objectives and requirements of *Liveable Neighbourhoods*, recognising the policy’s purpose for the development of sustainable communities.

Development Control Policies

The WAPC has adopted a range of operational Development Control Policies (DCP’s) to guide its decision-making on structure planning, subdivision and development applications. A number of these policies have effectively been superseded by *Liveable Neighbourhoods*, and where there is a conflict between existing operational policies, *Liveable Neighbourhoods* typically prevails unless it can be demonstrated that it can or should not apply. The following DCP’s have some relevance to the City of Karratha and have been taken into consideration in the preparation of this Strategy to ensure no inconsistencies:

- DCP 1.1: Subdivision of Land – General Principles;
- DCP 1.2: Development Control – General Principles;
- DCP 1.3: Strata Titles;
- DCP 1.5: Bicycle Planning;
- DCP 1.6: Planning to Support Transit Use & Transit Orientated Development;
- DCP 1.7: General Road Planning;
- DCP 2.2: Residential Subdivision;
- DCP 2.3: Public Open Space in Residential Areas;
- DCP 2.4: School Sites;
- DCP 2.5: Special Residential Zones;
- DCP 2.6: Residential Road Planning;
- DCP 3.4: Subdivision of Rural Land;
- DCP 4.1: Industrial Subdivision; and
- DCP 4.2: Planning for Hazards & Safety.

Planning Guidelines & Manuals

Various guidelines and manuals have also been prepared by the WAPC to support operational policies and provide guidance on a range of planning issues.

These guidelines and manuals are generally applicable to the City and should be utilised to assist with future planning where relevant. The following manuals and guidelines have some relevance to the City of Karratha and have guided the preparation of this Strategy:

- Tourism Planning Guidelines (May 2014);
- State Coastal Planning Policy Guidelines (July 2013);
- Rural Planning Guidelines (December 2016)
- Guidelines for Preparation of Integrated Transport Plans (May 2012);
- Local Planning Manual (March 2010);
- Better Urban Water Management (October 2008);
- Visual Landscape Planning in Western Australia (April 2008);
- Designing Out Crime Guidelines (June 2006);
- Coastal Planning & Management Manual (February 2005);
- Structure Plan Framework (October 2015);
- Transport Impact Assessment Guidelines (August 2010);
- The Design & Geometric Layout of Residential Roads (June 1998);
- Acid Sulfate Soils Planning Guidelines (April 2009);
- Basic Raw Materials Applicants’ Manual (February 2009);
- Planning in Bushfire Prone Areas (December 2015);
- Holiday Homes (September 2009);
- Reducing Crime & Anti-Social Behaviour in PAW’s (October 2009)
- Road & Rail Noise (September 2019);
- Aboriginal Settlement (AS) Guideline 1 – Layout Plan Provisions (July 2012);
- AS Guideline 2 – Provision of Housing & Infrastructure (March 2012);
- AS Guideline 3 – Layout Plan Exclusion Boundaries (July 2012); &
- IPWEA Subdivision Engineering Guidelines Edition 2.2 (August 2012).

2.6 Other Relevant Strategies, Plans & Policies

Pilbara Cities (2010)

Pilbara Cities is a regional level strategy prepared by the Pilbara Development Commission to encourage more people to live and settle in the Pilbara. It is supported by \$1.2 billion from the *Royalties for Region Scheme*. The initiative focuses on the effective integration and facilitation of infrastructure expansion, land availability and development, community projects, and economic diversity. It promotes Karratha and Port Hedland as cities with populations exceeding 50,000 each. The plan aims to develop regional centres that promote strong local communities, diversified from the resources sector, with modern amenities and culture.

The Local Planning Strategy is developed to generally be consistent with Pilbara Cities, as it aims to transform Karratha into a vibrant and diverse regional centre, with local community, culture and amenities. Reflective of the most recent population projections prepared by ID Forecast however, this *Strategy* plans for a population of 38,000 across the entire City by 2031, with the capacity to achieve a population of 50,000 and beyond. The major population centre of the City will remain Karratha, and the *Strategy* prioritises the need for a threshold population in Karratha to necessitate regional level services and facilities, consistent with the Pilbara Cities strategic direction.

Karratha City of the North (2010)

Karratha City of the North (KCN) is a growth plan for Karratha released by the City of Karratha and LandCorp as part of the Pilbara Cities initiative. It describes its vision as:

“A liveable, compact, Regional City of 50,000+ people, with a diversified economy, a healthy local community which demonstrates demographic balance, affordability, high quality amenity, and infrastructure. It is a place of choice, to work, visit, grow up, raise families and age gracefully.”

The *KCN* is designed as a three-part integrated plan, comprising an *Implementation Plan*, a *City Growth Plan* and a *City Centre Master Plan*, which collaboratively aim to facilitate the growth and development of Karratha into a Regional City.

Much of the town centre revitalisation and urban expansion provided for by the *KCN* is now underway. Additional storm surge and inundation mapping undertaken following preparation of the *KCN* however, uncovered risks for some areas previously identified to accommodate expansion. This *Strategy* revisits *KCN* to review at the high level how growth might be distributed appropriately given the latest information on environmental constraints.

Dampier Townsite Redevelopment & Revitalisation Strategy (DRAFT - 2013)

The *Draft Dampier Townsite Redevelopment and Revitalisation Strategy* is a State Government initiative, prepared in collaboration with the City and Rio Tinto, to strategically plan for growth and revitalisation of Dampier. The *Draft Revitalisation Strategy* calls for government, industry and community to work together to provide the investment and infrastructure required to realise growth. It incorporates a land use plan, identifying future development opportunities, as well as recommended initiatives for revitalisation. It positions Dampier to reach a future residential target population of 3,500 beyond the timeframe of this Strategy, and supports (but does not rely on) the future marina development proposed for Dampier. It has been tested through community and stakeholder engagement, and is anticipated to be adopted as a Longer Term Townsite Strategy.

It is recognised that consistency between the *Dampier Revitalisation Strategy* and City wide *Local Planning Strategy* is of utmost importance to ensure a robust strategic planning framework with respect to Dampier. The principles, objectives and initiatives proposed by the *Draft Dampier Revitalisation Strategy* have been reviewed and incorporated consistently into the City-wide *Strategy*, taking into consideration the population growth for Dampier expected in the timeframe of this Strategy and the current constraints to achieving an ultimate 3,500 population.

Pilbara Development Commission Strategic Plan 2010-2013

The *Pilbara Development Commission Strategic Plan (PDC Strategic Plan)* is a high level strategic plan, which sets the direction for the Pilbara Development Commission advocating for the Pilbara Region and influencing government policy and funding opportunities to enable the sustainable development of the region. The *PDC Strategic Plan* is centred around four major matters facing the Pilbara region. These include:

- An integrated approach to the economy, key services, and private sectors;
- Increasing investment and economic opportunities;
- Creating a more permanent residential population through social and cultural infrastructure; and
- Ensuring the equality of opportunity and enjoyment for all who live and work in the area.

The *Local Planning Strategy* takes into consideration the *PDC Strategic Plan* and aims to work together with the Pilbara Development Commission to create a liveable and prosperous future for the Pilbara.

Pilbara Workforce Development Plan 2013-2016 (2013)

The *Pilbara Workforce Development Plan 2013-2016* is a regional plan formulated jointly by the Pilbara Workforce Development Alliance and Department of Training and Workforce Development to address the demand for skilled and semi-skilled labour. In developing effective strategies to meet current and future workforce development, the plan presents an overview of the region's economics and demographics. It also examines the labour market and its supply to create an action plan for development of the region's workforce.

Karratha Area Development Strategy (1998)

The *Karratha Area Development Strategy (KADS)* is a sub-regional land and water use strategy for the development of Karratha and its surrounds (Cape Preston to Cape Lambert) over 25 years. Prepared by the WAPC its intent was to create a strong plan for integrated State, regional, and local planning, which considers a wide range of significant factors for the City. Some of the key areas identified as crucial in the development of Karratha include cultural and social infrastructure initiatives around secondary and tertiary education, health and training, the need for aesthetic upgrading of the town, and the ongoing promotion of a strong local identity.

A structure plan forms part of the *KADS*, accommodating a projected growth of Karratha to 37,000 people, 20,000 of which could reside in future areas north and south of the hills. *KADS* informed the review of the then *Shire of Roebourne Town Planning Scheme No.7* in the same way that this Local Planning Strategy will now inform the review of *Local Planning Scheme No. 8*.

Pilbara Regional Water Plan 2010-2030 (2010)

The *Pilbara Regional Water Plan* is a strategic document prepared by the Department of Water that focuses on sustainable water resource management for the Pilbara to 2030. It presents the challenges that the region faces, with possible responses to ensure water security. It includes an action plan with priority actions (2010-2014) required to meet a set of long-term outcomes. The *Pilbara Regional Water Plan* is informative in outlining the major issues for water resource management in the region, which need to be reflected and addressed in this *Strategy*.

Pilbara Regional Plan 2012-2017 (2012)

The *Pilbara Regional Plan* is a regional strategy created under the auspices of Regional Development Australia. It focuses on four central priorities:

- The development of leadership and inclusive planning;
- Creation of strong communities;
- Sustaining the natural environment; and
- Maintenance of a resilient economy.

The *Pilbara Regional Plan* presents a broad strategy that examines key areas of importance to the Pilbara region. These include: utilities, transport, health, sport and recreation, accommodation, communication, education, cultural tourism, and land. The document provides a wealth of information on the region and strategies and priorities at the regional level. This *Strategy* has been prepared with consideration of the *Pilbara Regional Plan* and builds on the strategies and priorities identified by this regional level document.

2.7 Guidelines, Forecasts & Reports

Pilbara Framework: Regional Profile (2009)

The *Pilbara Framework: Regional Profile* is a spatial planning profile that provides the background and rationale for the *Pilbara Planning and Infrastructure Framework*. It offers wide-ranging description of the local settlements, canvassing the range of environmental, cultural, demographic, and economic aspects of the region.

Pilbara Infrastructure Priorities (2012)

Pilbara Infrastructure Priorities was prepared under direction of the WAPC's Infrastructure Coordination Committee, to inform the State Government on infrastructure priorities in the Pilbara. The report provides an overview of limitations that will impact on the future medium to long term growth of Karratha. These include:

- Adequate water supply;
- Consistent power supply;
- Availability of affordable housing; and
- Sources of basic raw materials.

As such, planning, design, funding and approvals to enable water and power infrastructure, affordable housing and sourcing of raw materials are critical issues, which this *Strategy* seeks to address.

Pilbara State of the Environment Report (2013)

The *Pilbara State of the Environment Report (SOE Report)* is a document delivered by Regional Development Australia Pilbara, comprising a review of the quality of the natural environment and key issues for environment related decision making across the Pilbara.

The *SOE Report* aims to provide information to improve understanding of risks and facilitate effective management of the Pilbara environment. The report was prepared in consultation with all affected Local Governments and other relevant agencies. It covers themes of air, water, land, biodiversity, coasts, marine environment, heritage and built environment, identifying drivers of change and key pressures for each. Following this it provides indicators and suggested responses for future.

For the City of Karratha, the *SOE Report* identifies water supply to be a critical pressure, which is improving. Conservation of biodiversity and recreational and port impacts to coastline are other critical pressures, which are still declining and requiring management attention. Preparation of this *Strategy* has considered the various issues identified in the *SOE Report* in detail, furthermore it seeks to plan for sustainable environmental management to address pressures on the City's environment.

Karratha Land Supply Assessment (2020)

The *Karratha Land Supply Assessment*, prepared by the WAPC, provides information on the availability of land supply for future residential, industrial, and commercial uses. It also identifies the planning and infrastructure coordination needed to meet demand, based on the status of major projects, and current and anticipated lot creation activity. The document provides valuable information around key issues constraining growth of Karratha, which have informed this *Strategy*.

Pilbara Housing & Land Snapshot (October 2019)

The *Pilbara Housing and Land Snapshot* is an overview of data presented by the Pilbara Development Commission. Produced quarterly, it details figures relating to key areas of:

- Advertised residential and commercial properties for rent and sale;
- Land for sale;
- Average house settlement prices;
- Government public housing; and
- Development proposals.

The document provides another important source of information that has informed planning to enable future growth and development in this *Strategy*. Extracts from the most recent report, released in October 2019 appear below in Figure 3 & Figure 4.

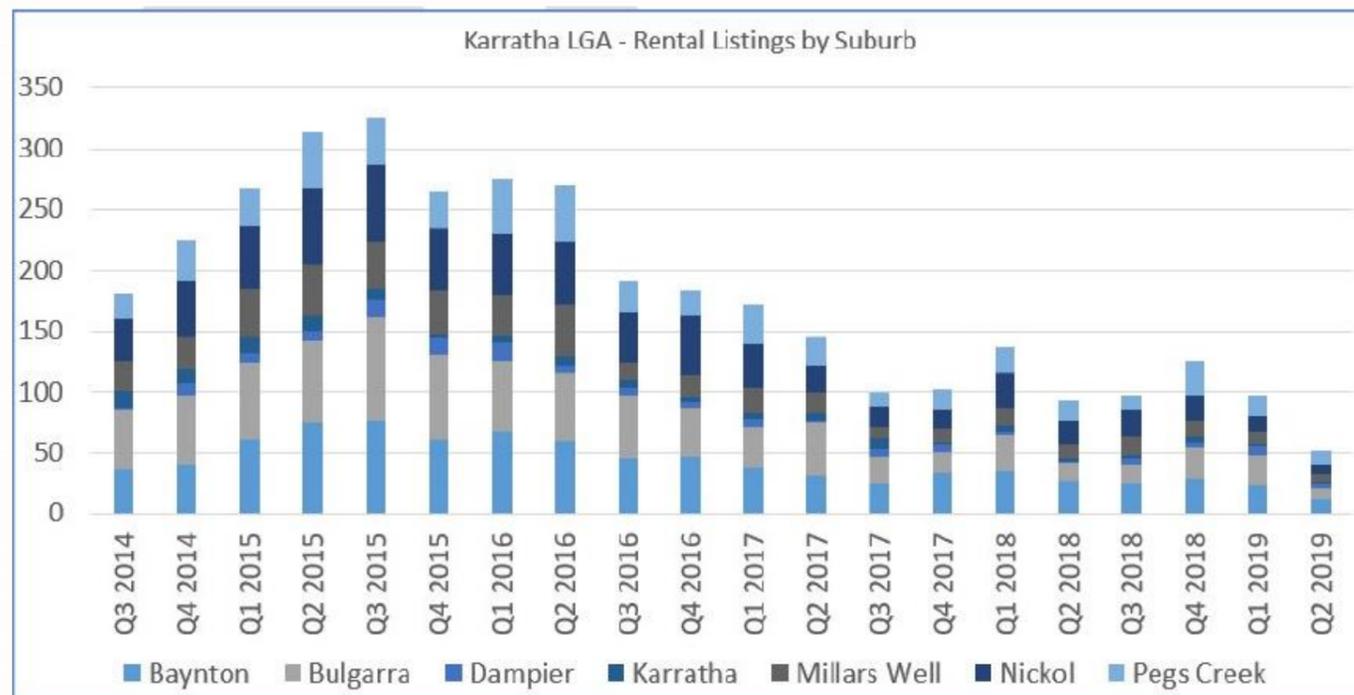


Figure 3: Advertised Residential Rental Listing by Suburb

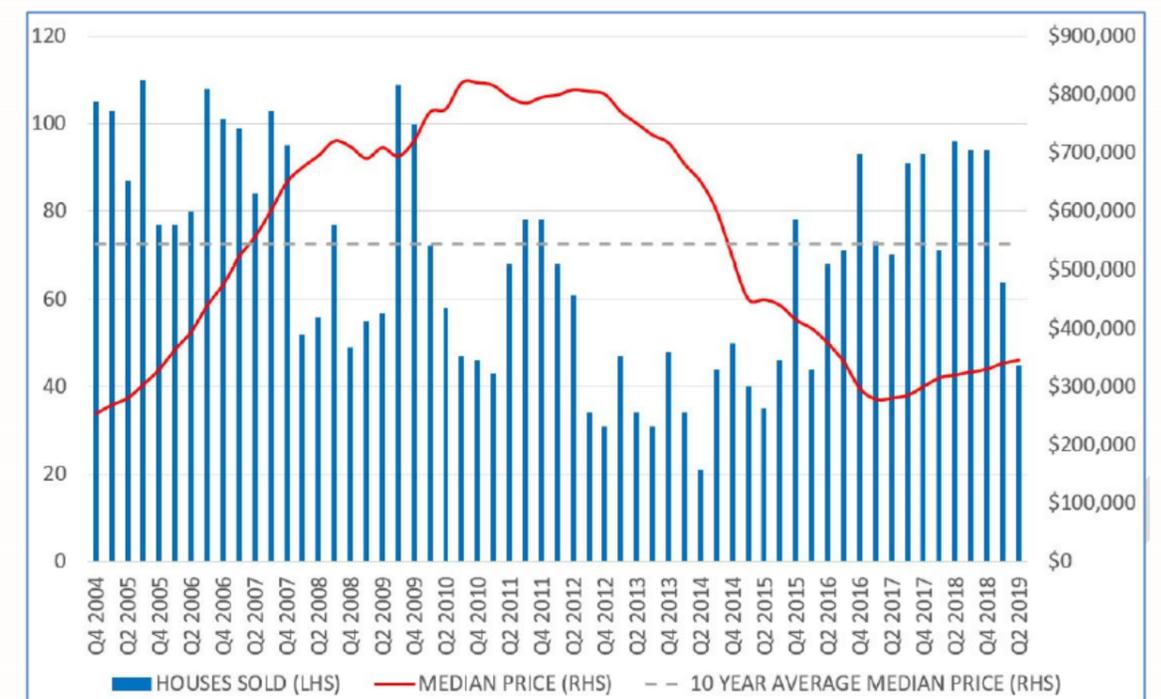


Figure 4: Dwelling Sales Volumes, City of Karratha (2019)

Karratha Economic Development Strategy (2018)

The Economic Development Strategy is a source of information for potential investors, funding agencies, entrepreneurs, small-to-medium business owners, families and others wanting to share in the City's future growth.

Economic development is an evolutionary and ongoing process. The strategy builds on the core concepts and direction of our previous work to continue to make the most of the City's strategic advantages, while taking into consideration changes in the external environment.

Karratha Land Capacity Analysis (2020)

The Regional North Land Capacity Analysis provides a broad overview of the existing and future land capacity of the settlements in the City of Karratha with respect to forecast population growth. In particular, it examines land identified for residential, rural residential, commercial and industrial use that is capable of substantial further development

Karratha Land Use and Employment Survey (2019)

The Land Use and Employment Survey examines all commercial, industrial, public purpose and recreational land uses in the City of Karratha. Information from this analysis identifies significant patterns, themes and emerging trends occurring within the City.

Summary of Housing, Land & Accommodation Initiatives in the Pilbara 2009-2015 (2009)

The *Summary of Housing, Land, and Accommodation Initiatives in the Pilbara 2009-2015* is a report prepared jointly by the Pilbara Development Commission and the Department of Housing, offering a response to the housing, land requirements, and infrastructure needs in the Pilbara for 2009-2015. It addresses the need to "improve the quantity, quality, appropriate mix and affordability of housing" in the Pilbara, in the circumstances of low, modest, and high growth scenarios. This *Strategy* seeks to improve the housing situation for the City, and has therefore taken this report into consideration.

WA Tomorrow: Population Report No. 11, 2016-2031 (2019)

WA Tomorrow is a WAPC report that presents a best-estimate of future population size based upon the continuation of current trends in fertility, mortality and migration. It differs from other forecasts in that it aims to meet "the requirement and room for future population growth while maintaining local environments and valued quality of life", not an "aspirational target".

The *WA Tomorrow* population forecasts include five banded simulations to 2031, with Band A containing the lowest population forecast and Band E the highest. The Band E population forecast of 26,000 by 2031 is considered a low population projection for the City in the context of planning for a population of 38,000 by 2031. This indicates that significant economic growth and diversification will be necessary to achieve both the target population, and the longer term aspiration target of 50,000 on which this *Strategy* has been based.

2015- 2015 Western Australian Resources Sector Outlook (2014)

The Resources Sector Outlook is a report prepared by the Chamber of Minerals and Energy of Western Australia. The report details projected growth and demand in the resources sector to 2025 across the State. It aims to provide an integrated outlook on industry development intentions and government policy, and to update and understand demand profiles and implications under changing market conditions. It notes key factors applicable to the Pilbara:

- Employment will decline by 14,300 workers by 2020, from a base of 63,900 in 2012, as the industry moves into the operational phase.
- Water abstraction to 2020 in the Pilbara will increase 40%.
- To 2025, Pilbara ports will represent 80-95% of new trade volume in WA. 90% of all WA exports depart from Port Hedland and Dampier Ports.
- Self-generation, primarily through natural gas, will remain the predominant source of electricity supply in the Pilbara.
- Expansion plans will require an emphasis on the issue of connectivity of roads in the Pilbara.

The details of the report around the declining construction workforce of the Pilbara as the resources sector moves into an operational phase has important implications for the City, and are considered in this *Strategy*.

Planning for Resources Growth in the Pilbara: Employment & Population Projections to 2020 (2008)

This report, prepared by Heuris Partners for the Pilbara Industry's Community Council focuses on detailing the population and employment impacts of current and future resource projects in the Pilbara. It shows potential impact on employment and population growth to 2020, and especially emphasises the potential service demands for 2015-2020. The report contains important context for population and employment planning to inform this *Strategy*. It is again identified that the City will experience a significant decline in construction workforce unless major new projects are commenced.

Pilbara Vernacular (2012)

The *Pilbara Vernacular* is a planning and design document prepared for LandCorp to guide regionally specific design responses for future development in Pilbara towns. Its objectives are to:

- Ensure high quality buildings and public realm and enhance the interface between the two.
- Provide a contemporary design response to the Pilbara context including logistic and economic considerations.
- Evoke a sense of place which reflects the local landscape, environment, climate and culture.

The *Pilbara Vernacular* identifies a key challenge to this process is a disconnect between the minimal but influential heritage built form and lightweight metal construction, minimal shading and insulation short-term builds that are at the end of their life spans. A coherent contemporary development style overview is vital for the future design of Pilbara built communities. This *Strategy* aims to

ensure the objectives and principles of the *Pilbara Vernacular* are realised to enhance public realm and built form environments.

Karratha Vernacular (2011)

The *Karratha Vernacular* is a design principles document, prepared for LandCorp, similar to the Pilbara Vernacular, but specific to Karratha. Its purpose is to "outline a set of design principles that developers will need to address for new developments within the City Centre and residential estates." The document emphasises that:

Current development practices are not delivering the required social benefits for the community of Karratha that will secure its transformation from a resource town into a City of the North. A key objective for this paradigm shift is to set a new benchmark for "beauty" and "excellence" in design, built form and service delivery.

The *Karratha Vernacular* is intended to guide all future development in Karratha, despite its focus on the City Core and Mulataga. This *Strategy* takes into consideration the provisions of the *Karratha Vernacular* and supports the need for design principles to create a local appropriate built form and environment (see Figure 5 & Figure 6).



Figure 5: Sense of Karratha Palette (Karratha)



Figure 6: Buildings & Technology

3.0 Local Planning Context

The City of Karratha *Local Planning Strategy* reflects the strategic vision and direction of the City established within existing local government strategic planning. The *Strategy* also takes into consideration the current planning context set by draft and adopted structure plans for individual settlements. The following section addresses the existing strategic direction and planning context of the City, and discusses how the *Strategy* fits into this context.

3.1 Local Government Vision & Mission Statements

The City's *Strategic Community Plan 2020-2030* identifies Council's vision for:

"Australia's most liveable regional city."

It also states the City Council's mission as being:

"To provide community leadership and excellent local government services in an innovative and efficient manner to enhance our City's social, cultural, economic and environmental wellbeing."

This *Strategy* has been prepared with due regard to Council's established vision and mission statement, and its ultimate goal is to achieve this vision.

3.2 Local Government Strategic Plans

Strategic Community Plan 2020-2030

The City of Karratha *Strategic Community Plan* provides a ten year strategic direction for the City. It was created based upon extensive community consultation and is focused around four strategic themes, being community, economy, natural and built environment, and leadership. It identifies the following goals under each of these themes:

- **Community (Inclusive and Engaged)** – To activate safe, healthy and liveable communities.
- **Economy (well managed and diversified)** – Attract diverse and sustainable business and employment opportunities.
- **Natural and Built Environment (Thriving and sustainable)** – To protect our natural and built environment;
- **Leadership (Responsive and accountable)** – To provide accessible, transparent and responsive leadership.

The *Strategic Community Plan* goes on to specify outcomes, responses and indicators to achieve each of its goals.

The Part B analysis section of this *Strategy* has been prepared to be consistent with the *Strategic Community Plan* and adopts the same four strategic themes as a quadruple bottom line approach for its guiding principles.

Karratha 2020 Vision & Community Plan (2009)

The *Karratha 2020 Vision and Community Plan (Karratha 2020)* was prepared by Geographia in association with CCS Strategic Management. It is a facilities and services plan which assesses Karratha's infrastructure and service needs in

response to future population growth. The plan combines demographic analyses, comparative profiling of other regional towns, one-on-one interviews, literature review and community surveys to identify and prioritise community needs.

Karratha 2020 identifies the shifting role for Karratha from a principally resource driven settlement to a sustainable, economically diverse regional city of 30-50,000 people by 2020. *Karratha 2020* advocates for a number of projects now currently complete, still underway, or needing to be incorporated in this *Strategy* as future priorities.

Karratha Revitalisation Strategy (2016)

The *Karratha Revitalisation Strategy (KRS)* aims to identify opportunities and key actions required to improve the liveability of the suburbs of Pegs Creek, Millars Well and Bulgarra, as Karratha grows towards its goals of becoming a Pilbara City.

The objectives of the KRS are:

- Provide the opportunity to develop additional dwellings of sufficient diversity to meet future housing demand. This housing will need to reflect the local climate and contribute to enhanced liveability;
- Provide a better connected movement network that reduces travel distances and improves safety for residents irrespective of how they travel;
- Develop a hierarchy of parks and connected spaces with high quality facilities that are within reasonable, safe and pleasant walking distance of all dwellings; and
- Enhance the local character and amenity of streetscapes and swales to improve liveability and community pride.

The revitalisation works identified involve a variety of actions to be undertaken by a range of bodies and people, including landowners, the City of Karratha, other government agencies and the community. The *KRS* sets no strict timeframe for implementation, acknowledging that it will be influenced by market forces, priorities and available resources. Its implementation however, will ensure that future individual developments (Greenfield and infill sites), redevelopment and improvements are guided by a longer term strategic vision, consistent with the intent of the *KCN* and this *Local Planning Strategy*.

The *KRS* recognises that the City and Western Australian Planning Commission, through its decisions on planning, subdivision and development applications, as well as the City's governing maintenance and development of parks, pathways, roads and swales, revegetation and other amenity improvements will be major influences on its successful implementation.

3.3 Townsite Structure Plans/Masterplans

Point Samson Structure Plan (DRAFT – 2015)

The *DRAFT Point Samson District Structure Plan (2015)* seeks to establish an appropriate framework for future growth of the Townsite to accommodate an ultimate population of up to 1,000 people. The plan recognises a number of

significant constraints that make short-to-medium implementation unlikely. As a result, this *Strategy* makes use of the Structure Plan in identifying future growth areas, but forecasts the majority of growth occurring outside its 2031 planning horizon.

Roebourne Structure Plan (2014)

The *Roebourne Structure Plan* identifies capacity for significant growth in Roebourne (up to a population of 3,000), as well as a number of crucial development issues that must be addressed in order for Roebourne to be reinvigorated as a safe, amenable, attractive and vibrant place to live and work.

The *Roebourne Structure Plan* incorporates both infill and urban expansion opportunities to accommodate growth. It also highlights two key activity clusters; one with a community focus at the northern end of the town centre, and one with a heritage building and business focus to the south. The proposed development framework, and development capacity identified have been important in informing the growth areas of this *Strategy*, taking into consideration the population growth expected for Roebourne in the timeframe of this *Strategy*.

Wickham Townsite Structure Plan (2011)

The *Wickham Townsite Structure Plan* was prepared by Taylor Burrell Barnett for Rio Tinto and has been adopted by the City of Karratha. The plan was the result of agreement between Rio Tinto and the City to collaborate to address growth and development options for Wickham in light of Rio Tinto's planned expansion of operations at Cape Lambert. The Structure Plan advocates a staged approach to residential development, based on two forecast growth population thresholds (3-4,000 and 5-6,000), with the following forming Key Principles of the *Wickham Townsite Structure Plan*:

- To consolidate and expand the pattern of land use for Wickham based on the existing zoned 'footprint' of the town.
- Improve and build upon the road network existing within the town.
- To achieve functional areas of POS.
- To provide a focal point for entry into, and revitalise the Town Centre Area.
- To achieve sustainable growth for the urban environment.
- To provide diversity of housing types and land ownership.
- To guide the preparation of future Development Plans so that coordinated planning outcomes can be achieved.
- To identify areas for potential development by third parties.

The *Wickham Townsite Structure Plan* is given due consideration and incorporated in the City-wide *Strategy*, taking into consideration the population growth expected for Wickham in the timeframe of this *Strategy*. Construction of the first stage of urban expansion to the south of the existing townsite has recently been completed. Analysis of this current planning and development trajectory in Wickham has played an important role in the formulation of this *Strategy*.

4.0 General City Profile

The City of Karratha is one of four local government areas in the Pilbara region. Located approximately 1,200km from Perth. It is an expansive local government area, dominated by vast raw landscapes and sweeping Spinifex plains, covering approximately 15,278 km², see Figure 7.

The City is bordered by the Town of Port Hedland to the east, and the Shire of Ashburton to the south. It consists of approximately 350 km of Indian Ocean coastline, made up of sandy beaches, rocky outcrops, mudflats and mangroves.

The Ngarluma/Yindjibarndi people are recognised as the traditional owners of a significant portion of land in the City and the Yaburara Aboriginal language group are recognised as the original inhabitants of the Burrup Peninsula and Dampier Archipelago. This, along with the post-contact European and Indigenous history of settlement and development of the land has shaped the identity of Karratha.

The vast land area is characterised by minimal settlement, except in the northern coastal area generally between the Burrup Peninsula and Cape

Lambert. All of the City's major settlements are congregated in this coastal area, with the major transport connection being the North West Coastal Hwy

The Montebello Islands, Dampier Archipelago and Burrup Peninsula are exceptionally valuable natural and recreational assets for the City, offering undisturbed habitat for numerous threatened species.

The Burrup Peninsula and the Dampier Archipelago are significant for their cultural heritage, containing the world's richest known concentration of petroglyphs (rock art). These assets afford substantial opportunity for recreation and tourism, and need to be managed with care to preserve ecological and cultural values.

The Burrup Peninsula Conservation Reserve and Murujuga National Park have been established to protect and preserve the wide diversity of native fauna and flora found within the City's boundaries.

A Marine Management Area is in place for the Cape Preston and Gnoorea (40 Mile) coastal waters southwest of Dampier as well as the Dampier Marine Park. There is the further potential for the marine environment of the Dampier Archipelago and Montebello Islands to be protected as a Marine Park(s).

Cleaverville, Gnoorea (40 Mile) and Fortescue River are other important recreation and tourism nodes with popular coastal access and camping areas.

Its location in the economic powerhouse region of the Pilbara is an important aspect to the future planning of the City of Karratha. The economic imperative of the region has instigated a wealth of State government funding and associated regional level planning in recent years. The robust regional level planning framework establishes a trajectory for the future of the City within the Pilbara region-wide context. The planning aspires for Karratha and Port Hedland to become robust and diverse liveable regional cities of the Pilbara. This Local Planning Strategy supports this vision and seeks to coordinate planning for growth of the City of Karratha to achieve Regional Centre status for the Pilbara.

The City's major settlements include Karratha, Dampier, Wickham, Roebourne and Point Samson. The majority of future population growth and development is anticipated to occur in Karratha with a lesser amount in Dampier and the Eastern Corridor settlements. Karratha has evolved to become the major service centre of the region (see Figure 8). The Karratha City Centre has become a true destination for visitors to the Pilbara region. The satellite settlements of Dampier, Wickham, Roebourne, Point Samson and Cossack each have their own unique character and have good access to the Karratha City Centre. While the supporting settlements are expected to continue to grow and develop, Karratha is anticipated to continue to grow as the primary settlement within the municipality. Together, Karratha and its satellite settlements represent a vibrant and diverse community and City of the North.

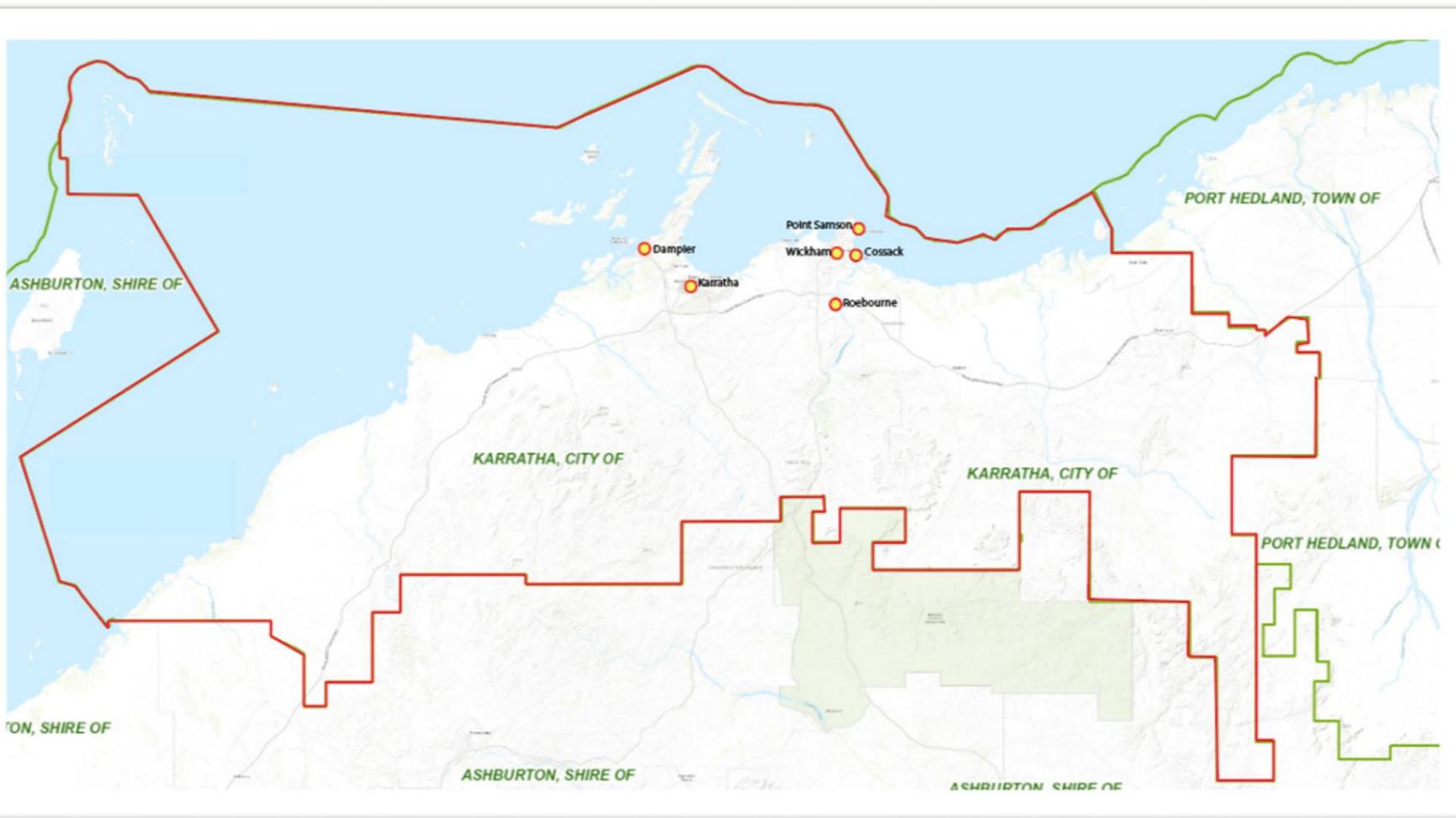


Figure 7: City of Karratha Local Government Area

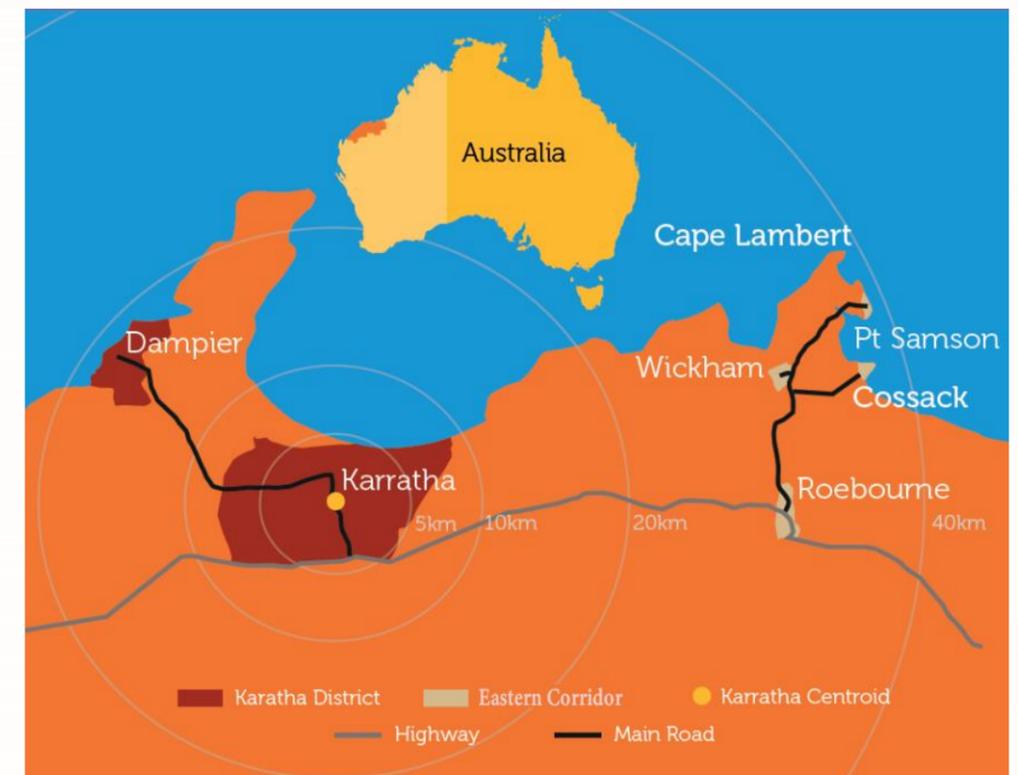


Figure 8: Karratha District and Eastern Corridor

5.0 Theme 1: Community

5.1 Local Profile: Population & Housing

Current and Projected Population

There are several sources of population projection data available for the City of Karratha. These show some variation. For reference, the 2016 Census reports 21,473 residents (Place of Usual Residence) in the City and the ABS Estimated Resident Population for the City in 2018 was 22,407 and 22,716 at June 2019. From 2017, the estimated resident population growth rate for the Karratha urban area has been stronger than the State average and is trending upwards.

The population of the City of Karratha is highly dependent on economic activity in the City. It is therefore closely linked to an Economic Development Strategy (2018) and the success of various elements of that strategy.

Three scenarios were identified to guide this *Strategy* (Table 2: City of Karratha: Low (Band C), Mid (Band E) & High Population Scenarios):

- 1 Low: (WA Tomorrow, Band C) - The low scenario, based on the medium WA Tomorrow Scenario assumes limited economic diversification and no substantial new resources projects.
- 2 Mid: (WA Tomorrow, Band E) - The mid scenario is based on Band E of WA Tomorrow (2019) projections.
- 3 High: The high scenario consistent with the *Karratha City of the North and Pilbara Cities* strategy, as reflected in the *Pilbara Planning and Infrastructure Framework*. It aims for a population of 50,000 in Karratha / Dampier in 2035. It assumes significant economic diversification and growth.

Under the mid and high growth scenarios, by 2031 the population of the City will be between 26,045 and 48,800. This compares with a current population of around 23,000. Both scenarios therefore forecast growth in the current population within the planning timeframe. The speed and scale of this depends in large measure on the extent to which the economy diversifies around its very strong base in the minerals and energy sector.

This *Strategy* seeks to facilitate significant local economic development and diversification, in a manner that would allow the high population forecast to be achieved. Its immediate focus however, is on accommodating growth in line with the mid growth scenario by 2031, which reflects the most recent population growth forecasting by WA Tomorrow's Band E (high growth) forecast.

Table 2: City of Karratha: Low (Band C), Mid (Band E) & High Population Scenarios

Year	High (ERP)	Mid	Low
2011	23,630	23,630	23,360
2016	30,503	22,160	22,160
2021	35,560	23,535	22,075
2026	41,733	25,000	23,160
2031	48,864	26,045	23,890

2036	57,424		
------	--------	--	--

Source: Syme Marmion; WA Tomorrow 2019

The Figure below shows the Estimate Residential Population annual growth rates for the Karratha urban area, the City, the Pilbara region and Western Australia. From 2009 to 2012, the Karratha urban area, the City and the

Pilbara region recorded annual growth rates higher than the State average. This is commensurate with the significant opportunities for employment generated by the resource boom. From 2013, annual growth rates dropped significantly below the State average, as major resource projects moved from a construction phase to an operational phase, which typically requires fewer workers. From 2017, the ERP annual growth rate for the Karratha urban area has been stronger than the State average and is trending upwards, see Figure 9.

FIFO

Fly-in-Fly-Out (FIFO) workers are a significant and variable component of the population within the City of Karratha. Exact figures are difficult to obtain as Census data is reported by place of usual residence, on which the ERP is based, and place of enumeration. The latter reports the population of a particular location at the time of the Census.

It is important to note that for most locations there are only relatively minor aggregate differences between the place of residence and place of enumeration data. The difference in the City of Karratha however, is large. This points to the relatively large numbers of FIFO workers in the City at various times. This number fluctuates over time. This is illustrated in the table below.

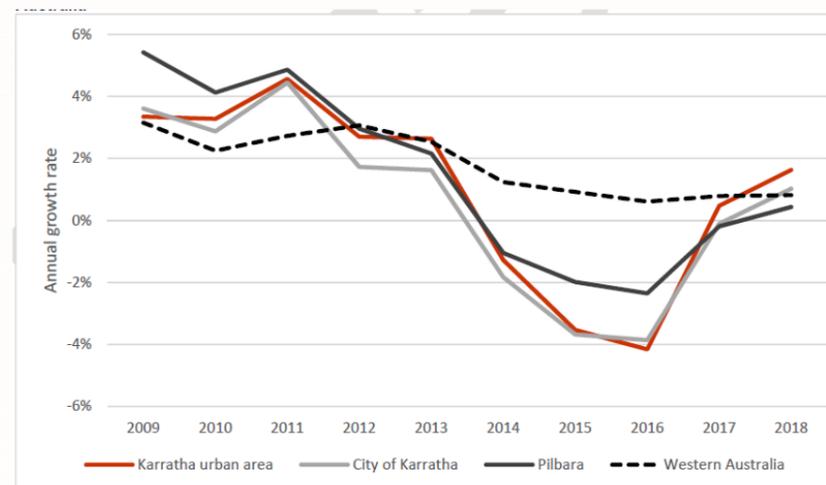


Figure 9: Estimated Residential Population Annual Growth Rate

Table 3: City of Karratha: Place of Residence vs Enumeration

	2006	2011	2016
Place of Usual Residence	16,423	22,900	21,473
Place of Enumeration	19,352	29,968	25,261
Difference	2,929	7,068	3,788

Source: ABS Census Cat 2001.0 Table B01 and Cat 2003.0 Table T01 / Syme Marmion

The difference between the three totals (i.e. approximately 2,929 in 2006, 7,068 in 2011 and 3,788 in 2016) gives an indication of the approximate scale of the FIFO workforce in the City. Note that the very substantial increase between 2006 and 2011 is likely to be predominantly **construction**-related.

A comprehensive study by the AEC Group in 2012, estimates a 2012 City FIFO population of 10,719. A report by Syme Marmion & Co estimates a long-term FIFO operations workforce of around 2,000 – 2,500 broken down as follows:

- Woodside: 300
- Rio Tinto: 600-650
- Others: 1,000-1,500

Depending on the final arrangement for Cape Preston operations this may be a little higher, but is unlikely to exceed 3,000 – 3,500.

The issues surrounding the impact of FIFO on the housing sector and demands for community infrastructure are discussed later in this report.

Assessing the Scenarios

To enable planning and infrastructure decision to be made some assessment of the scenarios is useful. There are several ways in which they can be assessed, including investigating the drivers of growth and by reference to the history of similar communities. Drivers of Growth

For a small and remote community such as the City of Karratha, population dynamics are strongly linked to economic activity. The City currently has a relatively narrow but very robust economic base. It is:

- a processing, port and service base for off-shore LNG;
- a port and service base for in-land iron ore (high-quality hematite) operations;
- a port and processing base for iron ore (magnetite) mining operations;
- a producer of selected other minerals (e.g. salt); and
- an administration and regional government centre.

The vast majority of the population is directly or indirectly dependent on this economic base. The core industries (LNG and iron ore) have experienced a period of very substantial construction, commencing in the early 2000s. All evidence is that this is now largely completed,

Similar to the last investment cycle, the current wave of investment in the Pilbara is driven by the iron ore and LNG sectors, which are investing heavily to maintain throughput capacity.

The iron ore industry has \$12 billion worth of new projects under construction and an additional \$33 billion under consideration to replace mines closing. The LNG industry is constructing \$6 billion worth of projects and considering projects worth a further \$54 billion. In addition to backfilling existing capacity, LNG companies are looking at developing new LNG trains at Pluto. There are also several projects under construction or consideration in emerging industries, such as mineral processing, petrochemicals, renewables and hydrogen.

Together, projects already under construction in the Pilbara are expected to create 10,000 construction jobs and directly employ 3,000 workers during their operations. If all projects under consideration were to proceed, the total number of jobs created would reach more than 32,000 in construction, and 10,000 in operation. Reaching this level of job creation however is uncertain as some of the projects under consideration may not proceed in the medium term because of market conditions, finances, skills shortages and technology development.

These new projects are expected to require many fly-in and fly-out (FIFO) workers, albeit less than during the previous investment cycle, because the construction phase will be less labour intensive, and a larger share of the workforce will be based locally.

The City's Economic Development Strategy (2018) recognises the need for significant diversification of the economic base if the City is to avoid the fluctuations common to communities that are dependent on the resources industry alone. It identifies four main areas of potential for expansion as means of diversification:

- Tourism;
- Agribusiness;
- Regional and Specialist Education and Research; and
- Regional Services.

While each one of this has potential in the City, each also has barriers to overcome. There is therefore a wide variation in estimates of the contribution each will make to the economic life of the City.

On the other hand, there are several factors that will put downward pressure on the further growth of the City. These include:

- **The steady introduction of remote operations technology**

Rio Tinto Iron Ore has an active program to introduce remote operations technology to its mining and logistics operations,. While much of this applies to the mine site, it also applies to transport and logistics, with the result that increased production volumes will not be linearly correlated with labour demand.

- **A reduction in FIFO workers in the City**

The CME / PWC report estimates the indirect employment multiplier of FIFO construction employment worker of up to 1.97. This is based on the indirect employment multiplier for resident workers. There is little research on this and the FIFO multiplier must be taken as an upper bound. Nevertheless, FIFO employment does have spin-off effects to the local economy and thus the multiplier is greater than 1. However, the relationship is not symmetrical – increased economic activity and thus indirect employment resulting from increases in FIFO numbers does not equate to an equal reduction in indirect employment numbers when FIFO number decrease. Still, there will be a

decrease in spin-off economic activity as FIFO numbers decrease and thus a dampener on population growth generally.

Growth Rates in Other Resource-Economy Communities

In addition to the various forecasts provided for the City the growth rates and patterns for other comparable resource communities have been examined. The recent population history (from 1991 to 2012) of some other communities in Australia in which resources mining forms an important or dominant part of the economy is shown in the table below.

The pattern observed across these remote resource dependant settlements is one of many fluctuations in population growth, particularly:

- The City of Karratha had no growth at all in the period prior to 2002 and then has grown at 4.4% p.a. in the 10 periods from 2002.
- Port Hedland grew at 0.7% p.pa. prior to 2008 and at 3.1% p.a. in the 4 subsequent periods
- Kalgoorlie grew at 1.8%p.a. in 7 periods from 1991, then declined at -0.2% p.a. until 2006 and grew at 1.6% p.a. to 2012.
- Isaac, containing the Bowen Basin Coal mines in Queensland, declined in population at a rate of -2.1% p.a. from 1991 to 2001 and then grew at 2.4% p.a. in the 11 years to 2012.
- Mt Isa has shown an overall decrease in population from 1991 to 2012, declining at a rate of -1.6% p.a. in the 13 years to 2004 and then growing at 1.6% p.a. in the 8 years to 2012.
- Broken Hill's population declined at a rate of -1.2% p.a. between 1991–2012.
- Broome, which has a diverse economy (pearling, a strong tourism industry, fishing, agriculture, aquaculture, pastoral and off-shore exploration industries) has grown at 3.5% p.a. in the 21 periods to 2012.

It is interesting to note the consistent growth pattern of Broome of 3.5% over 21 years. This is driven by the diverse local economy.

The average annual growth rates for each of the above settlements is shown in **Table 4** below.

Table 4: Growth (AAGR), Selected Resource Communities (ABS, 2020)

	Period	AAGR	# periods	Period	AAGR	# periods	Period	AAGR	# periods	Period	AAGR	# period
Roebourne	1991 - 2012	2.1%	21	1991 - 2002	0.0%	11	2002 - 2012	4.4%	10			
Port Hedland	1991 - 2012	1.1%	21	1991 - 2008	0.7%	17	2008 - 2012	3.1%	4			
Kalgoorlie	1991 - 2012	1.0%	21	1991 - 1998	1.8%	7	1998 - 2006	-0.2%	8	2006 - 2012	1.6%	6
Isaac	1991 - 2012	0.3%	21	1991 - 2001	-2.1%	10	2001 - 2012	2.4%	11			
Mount Isa	1991 - 2012	-0.4%	21	1991 - 2004	-1.6%	13	2004 - 2012	1.6%	8			
Broken Hill	1991 - 2012	-1.2%	21									
Broome	1991 - 2012	3.5%	21									

Long term growth the City will be in the context of overall population growth in Western Australia, and particularly outside of the Perth metropolitan area. The ABS has recently provided long term population projections for Australia, including for areas of Western Australia outside of Perth.

There are three series. Each shows modest growth (between 1.4% and 1.6%) in the period 2017 to 2042 and reduced growth, or even a population decline in the period 2042 to 2066. These are shown in the table below.

For reference, the 'rest of WA' is expected to grow at approximately 1.002% p/a for the period 2017-2066.

Table 5: Population Growth (AAGR), Western Australia (ABS, 2020)

	Projected Population		
	2027 '000	2042 '000	2066 '000
Series A	2,935	3,667	4,926
Series B	2,941	3,652	4,760
Series C	2,928	3,572	4,493

Concluding Comments on Population Forecasts

Karratha and other remote resource towns have weathered sudden changes in population growth in the past, so it is important that the aspiration target population of 50,000 also be used when considering planning decisions for growth over the next 15 years. Opportunities to accommodate this figure will not be closed.

The cost of developing land in the City is very high when compared to other parts of the State and due to the dominance of Crown land lead times can also be very high.

The intent of this *Strategy* is to prepare for the next wave of development so that a population of 50,000 can be accommodated at some point in the future while the infrastructure to meet the other needs of the population can more closely follow forecast population patterns. With such a potentially volatile population growth it is important that this strategic planning document is frequently reviewed and the population growth patterns including distribution of the growth is closely monitored.

One of the lead indicators of population growth is the broadening of employment patterns away from the current domination of the construction and mining industries. The City will continue to monitor the Estimated Residential Population for the City of Karratha and ensure that population projections are reviewed on a regular basis.

Population Distribution

The population within the City is distributed primarily over the five key settlement areas (Karratha, Dampier, Roebourne, Wickham and Point Samson). Figure 10 shows the distribution of the settlement areas within the City of Karratha.

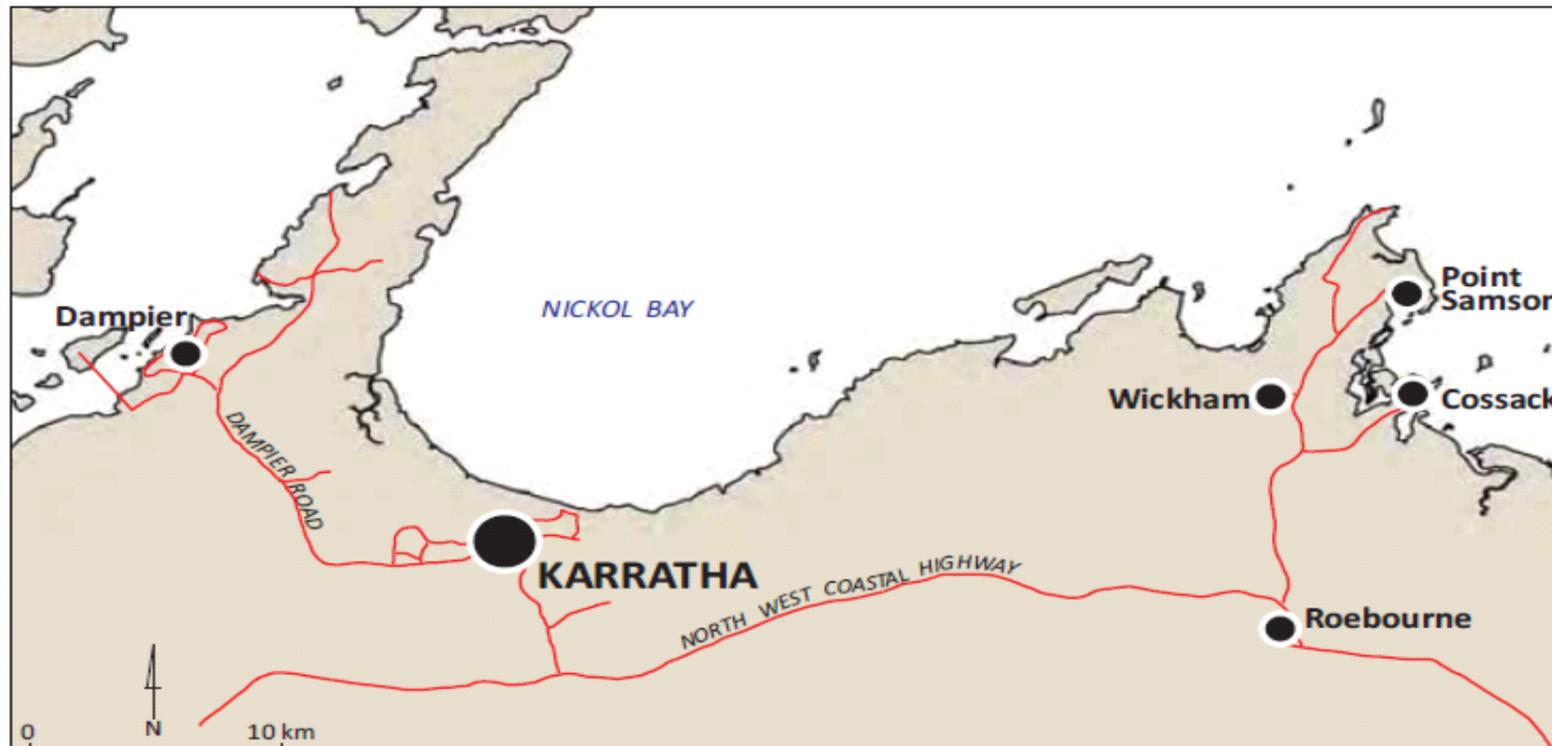


Figure 10: City of Karratha settlements

Source: Karratha City of the North (2010)

Karratha

The town of Karratha has developed into the largest and most economically diverse community in the Pilbara. Karratha has higher order services, facilities (education and training, government offices and health services) and the largest and most diverse shopping centre in the Pilbara. All facilities and services are concentrated in the town centre.

Karratha is the City's major population centre and had an ABS Census population figure around 16,000 in 2016 (estimated residential population of 17,100 in 2019). Karratha is expected to continue to accommodate the majority of the City's population and be the major focus of future residential development.

Dampier

Dampier is in the process of transferring its services and facilities historically run by Hamersley Iron (Rio Tinto) to be operated by usual government agencies. The City of Karratha now administers the town, with private home ownership

increasing, primarily through Hamersley Iron's home purchasing scheme. Based on ABS Census data, Dampier had a population of around 1,100 in 2016.

Roebourne

Roebourne is located 39km east of Karratha on the banks of the Harding River. Roebourne continues to develop and is a thriving hub for Aboriginal enterprise and culture. Roebourne had a population of about 630 in the 2016 Census.

Wickham

Wickham is located 8km north of Roebourne. It has a close relationship with Cossack, Roebourne and Karratha. Residents of Wickham are likely to use Point Samson and Cossack for recreational purposes and Karratha for higher order services. Wickham had a population of around 2,300 in 2016.

Point Samson

Point Samson is a coastal community sited about 4km east of Cape Lambert. The population of Point Samson in 2016 was approximately 230 people.

Population Projections by Settlement

Table 6 shows the projected population in the settlement areas under the mid population scenario (WA Tomorrow Band E), indicating that:

- In 2016 around 26% of the City's population was located in the settlement areas outside of the Karratha District;
- By 2031 the population within the Karratha District is expected to increase by at least 20%; and
- By 2031 only 24% of the population will reside outside the Karratha District.

Table 6: Population Projections by Settlement Area – Mid Scenario

Year	2016	2021	2026	2031
Karratha District	16,325	17,420	18,650	19,705
Dampier	1,146	1,176	1,243	1,321
Wickham - Point Samson	2,381	2,414	2,473	2,543
Roebourne / City Remainder	2,313	2,525	2,634	2,476
City Total	22,165	23,525	25,000	26,045

As the City plans for a growing population, consideration must be put to how this population might be distributed. Development capacities of each settlement, current settlement level redevelopment and structure planning initiatives have been considered to identify how the high population growth scenario might best be distributed across the City. The distribution pattern was also tested through key stakeholder and community consultation. Broad agreement on the following distribution (as also depicted in **Error! Reference source not found.**) under the high growth scenario by 2031 was reached:

- Karratha remaining the major population and service centre of the City, accommodating 75-80% of the City's population;
- Redevelopment of Dampier to harness its tourism and residential amenity opportunities with growth of its population approximately 1,300 by 2031; and
- Coordinated growth of the eastern corridor settlements (to achieve a threshold population to provide for local level services, while avoiding unnecessary duplication) as follows:
 - Wickham/Point Samson approximately 10% of City's total population (approximately 2,500 by 2031)
 - Roebourne/City remainder approximately 10% of City's total population (approximately 2,500 by 2031)

5.2 Demographics

Age Distribution

The age distribution of the projected population for the City is likely to change over time. Figure 11 below shows the most recently forecast demographic change for residents in the City out to 2031.

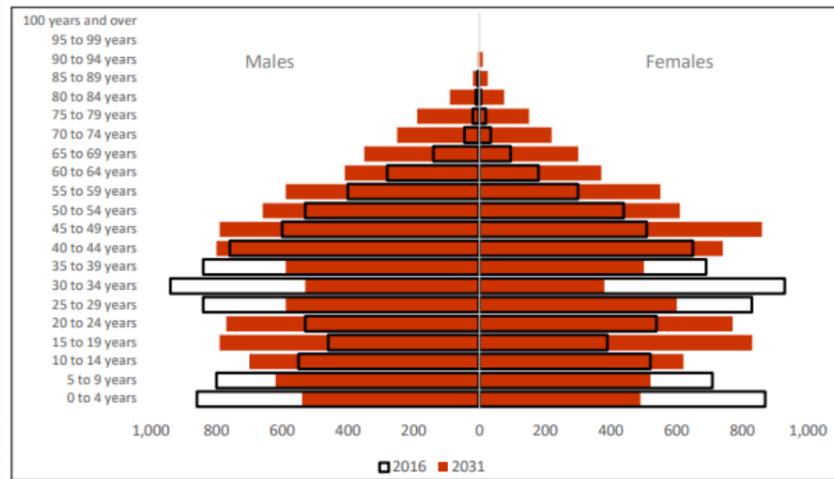


Figure 11: Age by sex profile 2016 and 2031 (Band C forecast) - Karratha urban area

Key Projections

The projections indicate that by 2031, the population of the City will include:

- An increase in the 10-24 year old group: by 2031 there will be over approximately 6000 in the 10 – 24 age groups, compared with around 3050 in 2016;
- Increasing numbers, but a decreasing proportion of people aged between 25 – 40, and
- A substantial increase in over 50 age groups: by 2031 there will be over 3,600 people aged over 60 in the City, compared with around 1,000 in 2011.

Population and the Workforce

Changes in the City’s economy over time will result in workforce changes and consequent demographic changes. The main labour force scenario is for:

- Reduction in FIFO numbers as construction activity is completed;
- Stabilisation of operational workforce;
- Growth of service population (consumer services);
- Possible growth of producer services; and
- Some increase in knowledge intensive producer and consumer services.

The gender balance in the City is currently heavily skewed towards males both on measures excluding FIFO (place of usual residence) and those including the FIFO workforce (place of enumeration). This balance is expected to move closer to 50:50 over time as construction projects wind down and services employment increases.

Household Composition

The projection of household composition for the City shows little change in relative proportions of household types over time, as depicted in Figure 12.

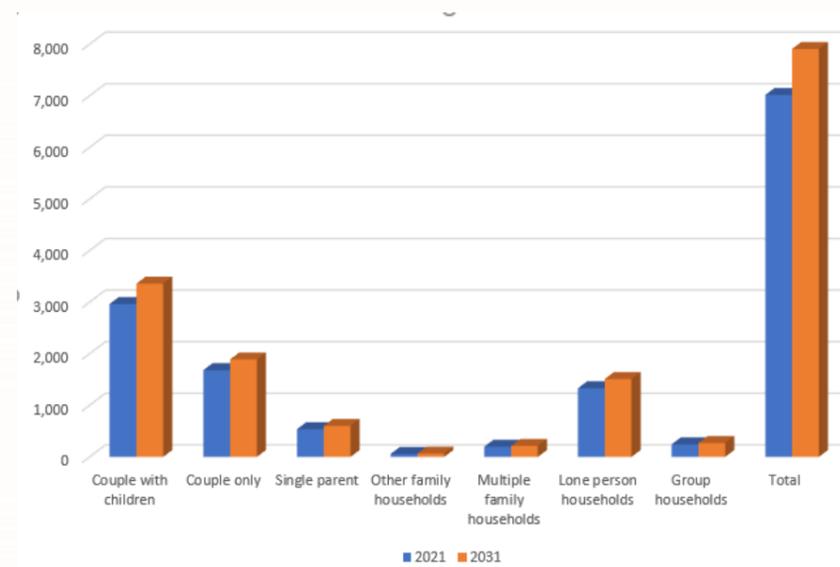


Figure 12: Forecast Change in Household Types

The conclusion from this data is that absolute number of the various household types will move with population change, as shown in Table 2.

Existing Dwelling Stock

Overall the *Census (2016)* identifies 9,759 dwellings within the City.

Age of Dwelling Stock

The existing dwelling stock in the City shows two distinct construction phases:

- **1970 – 1989:** representing 45% of the current stock of dwellings in the City; and
- **2000 – 2017:** 42% of the City's residential dwellings were constructed between 2000 and 2017.

Over the last eight financial years to June 2019, approvals were issued for the construction of 1,101 houses and 596 dwelling units. Overall, dwellings approvals peaked in the 11/12 financial year at the top of the previous investment cycle driven by the high number. The Figure 13 below notes the fluctuations in dwelling approval activity between 11/12 and 18/19. A four year \$55 million refurbishment program is also underway which will modernise 400 properties relating to North-West Shelf project homes. It is expected that this program will conclude in 2020



Source: Australian Bureau of Statistics (2019) Building Approvals, Australia. Catalogue No. 8731.0

Figure 13: Total dwelling approvals - City of Karratha

Housing Types & Densities

As at 2016 four or more bedroom houses were the predominant housing typology in the City, making up 42% of the total occupied dwelling stock at the time. Three bedroom houses made up 39.8% of the dwelling stock. Houses of three or more bedrooms therefore comprise the considerable majority of the City's existing dwelling stock.

The ABS has captured data on housing suitability for the first time as part of the 2016 Census as shown in the table below. Housing suitability presents a comparison between the number of bedrooms required and the actual number of bedrooms in a dwelling. Data for the Karratha urban area indicates that 50% of occupied private dwellings (approximately 3,700) are under-utilised in that they have one or more extra bedrooms than required.

This under-utilisation can be attributed to a mis-match of family size to housing being provided to skilled workers; the aging of households which results in children leaving home; tenants choosing to stay in a home due to their connection to a suburb as well as a lack of suitable alternatives and due to public housing stock itself being dominated by family sized homes with 3 or more bedrooms (see Table 7).

Table 7: Housing suitability - Karratha urban area

	Extra bedroom(s) needed	No bedrooms needed or spare	Bedroom(s) spare	Unable to determine	Not stated	Not applicable	Total
Karratha SA2	124	702	3,752	166	88	2,674	7,516
Western Australia	20,600	111,968	683,028	33,221	17,961	206,945	1,073,723

Source: Australian Bureau of Statistics (2016) Census of Population and Housing, 2016, Table Builder.
Note: The 'not applicable' category comprises of unoccupied private dwellings, non-private dwellings, dwellings in migratory, offshore.

As depicted by Figure 14, over half of the lots in the City are located on land zoned for low density development, predominantly R20 and a small amount are zoned R10. Medium density zones (R30, R40, R50, and R60) collectively accommodate 12% of lots within r-coded areas with most zoned R30. In addition to dwellings located on land with an R-Code the remaining 36% of lots within the City are located on land that does not have an R-Code. These dwellings may be located within the Urban Development zone, City Centre zone or other non-residential zonings.

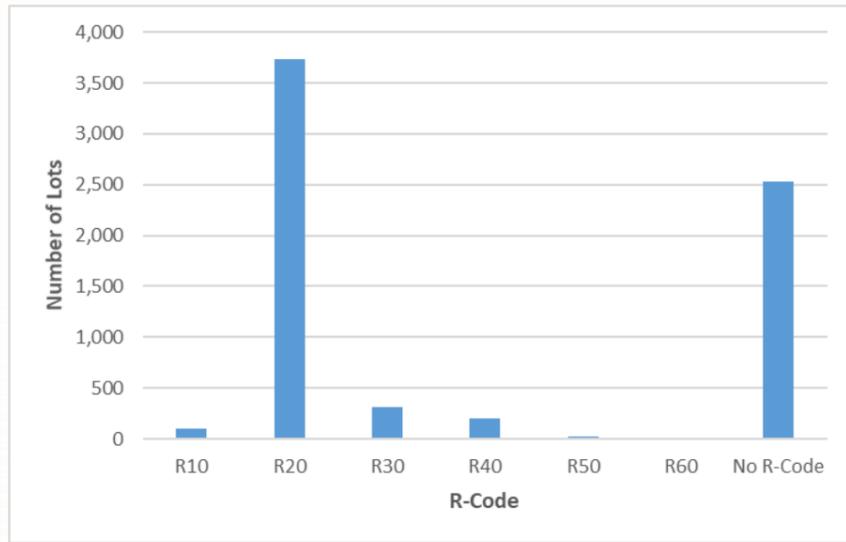


Figure 14: Number of lots per R-code - City of Karratha

Source: Department of Planning, Integrated Land Information Database (2020)

Home Ownership

The tenure of dwelling stock in the City is significantly different by comparison to the broader Western Australia housing market. This is largely due to significant proportions of dwellings being rented by employers to house staff as part of their employment package (i.e. 76% of all dwellings in the City were being rented). In 2016 only 20.7% of all occupied dwellings in the City were either owned outright or were being purchased (i.e. owner-occupied), see Figure 15. This is less than half the average for Western Australia indicating a transient population base.

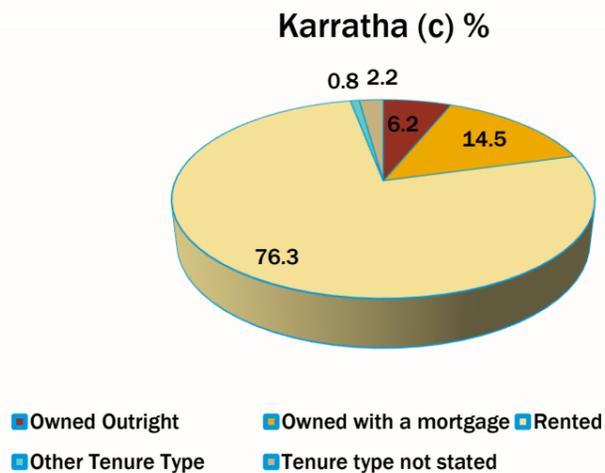


Figure 15: Dwelling Stock by Tenure

Housing Affordability

A key constraint to population growth in the City is the amount and price of suitable housing options for the workforce. There are many factors that relate

this, including labour and material shortages. This raises construction and maintenance costs and limits the pace of development. Builders and trades people are in short supply, as many were attracted to the region during the previous investment cycle and have since left following the sharp decline in activity.

Secondly, the cost of developing new dwelling stock is prohibitive when compared to the sales prices achieved for new homes. As at December 2019, building costs in the City are estimated at \$550,000-\$600,000 but the end market value of these dwellings is only between \$420,000 and \$450,000.

Thirdly, insurance and financing costs appear to be barrier to property development in the City. Financial institutions now are more prudent given the decline in property values since the last investment cycle and the number of investors and owner-occupiers who were impacted by this decline.

In the short to medium term, it is expected that cost of building new homes in the City will become financially viable. The involvement of DevelopmentWA and other developers in the City in partnership with a renewed Pilbara building industry, better access to finance and enhanced property values will provide the impetus future new housing growth. There is opportunity for this growth to be guided by suitable Government initiatives to ensure a sustainable pipeline of residential development.

Income Profiles

A comparison of current income profiles for the City against averages for Western Australia indicates a major difference between the very high and the very low income earners (Refer Table 8). The medium personal income for each of the towns is shown in Figure 16.

Table 8: Comparison of Personal Weekly Income (ABS Census, 2016)

Percentage	City of Karratha	Pilbara Region	Western Australia
Less than \$500 pw	11.2%	17%	36%
\$500 - \$999 pw	12%	14%	30%
\$ 1,000 - \$1,999 pw	24.3%	15%	15%
\$ 2000 pw or more	26.5%	54%	19%
Other	26%		
Total	100%	100%	100%

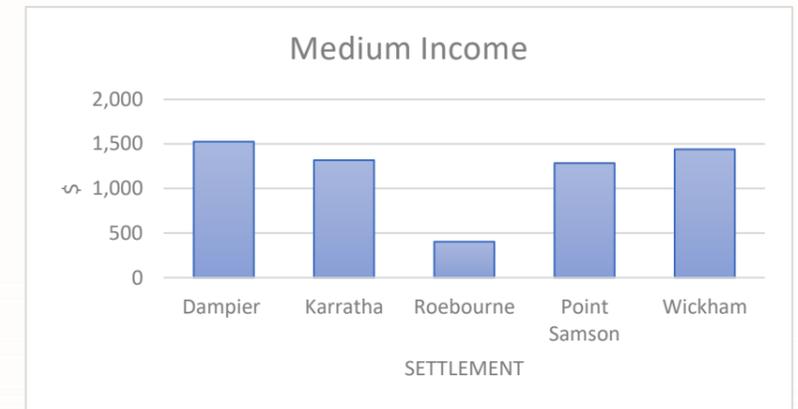


Figure 16: Comparison of Personal Weekly Income per settlement

The breakdown of income patterns for each of the City's settlements shows similar income profiles across Dampier, Wickham, Point Samson and Karratha. Incomes in the Roebourne settlement are distinctly different to that of the rest of the City.

Currently there is substantial difference in income patterns between Pilbara local government areas and between communities in the City of Karratha communities, with very high proportions of individuals earning high income (above \$1,500 per week and of that group more than two-thirds are earning above \$2,000 per week) in Karratha, Dampier and Wickham. This is likely to moderate over time. It is likely that the individual income profile will come to resemble that of places such as Kalgoorlie over time as the occupation mix changes. There would still be a high proportion of high income earners, but some growth in the proportion of lower and middle income earners. This will result in added pressure on housing affordability, and emphasizes the need to provide moderately priced accommodation in greater numbers.

Unless large numbers of workers of moderate incomes can be accommodated in the City the opportunities for economic diversification that underpin the higher population scenarios will not be realised. There has been pressure on housing affordability for some time and all relevant agencies need to continue the focus on affordability and interventions such as subsidised key worker accommodation. The alternative is a continuation of the current situation, with a larger than average proportion of very high income residents, but no real population growth or economic diversity.

Land & Housing Prices

There is a notable variation in both the value of land and the value in housing within the City due to the differences in locality between settlements.

Dwelling sales have been relatively subdued recently until early 2017. Since the second quarter of 2017 there has been a slow recovery in the medium dwelling sale price to \$342,500 as of June 2019, see Figure 17.

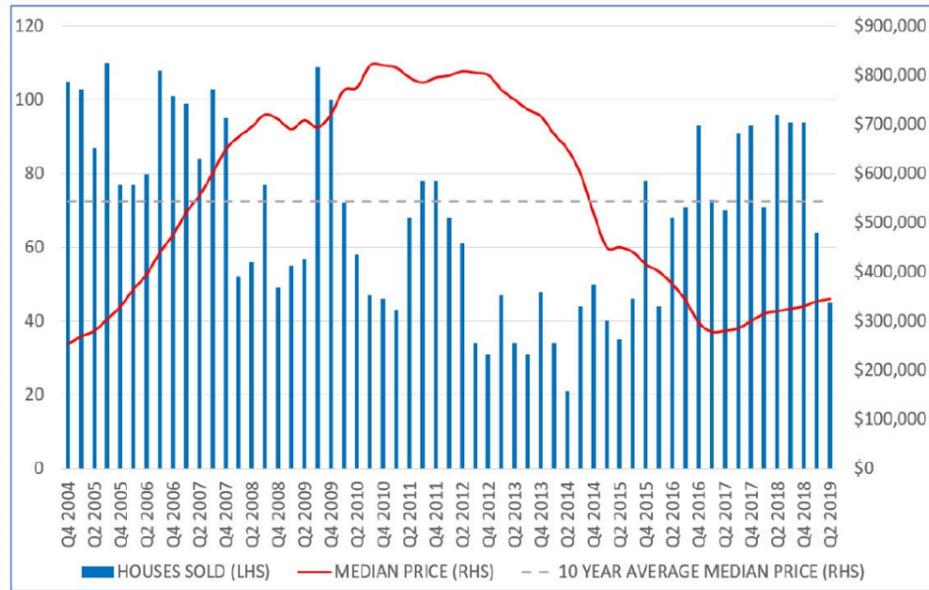


Figure 17: Dwelling sales City of Karratha

Over the same period there has been a decline in median weekly rents within the City. Figure 18 notes 469 dwellings were leased in the 6 months to June 2019, and increase of 132 when compared to the same period in 2018. The median rent was \$420 per week for the 6 months to June 2019, which is 2% higher when compared to the same period in 2018.

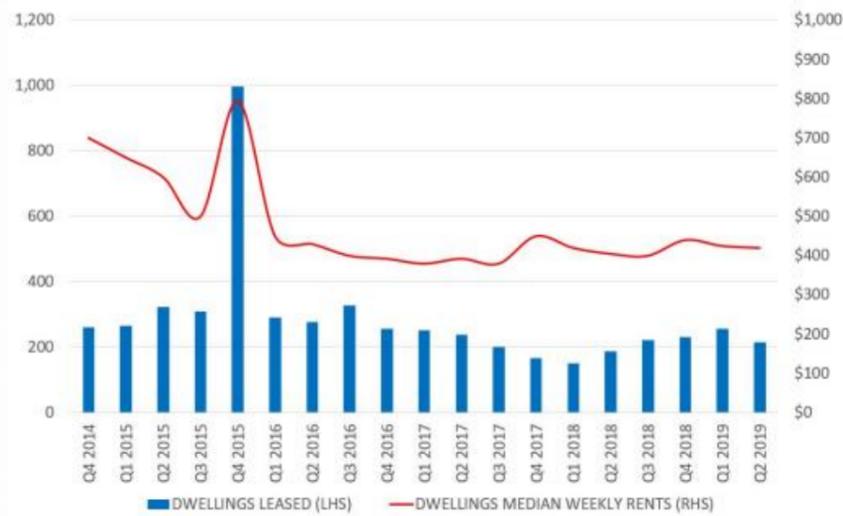


Figure 18: Dwellings leased - City of Karratha

5.3 Housing Demand

Property Market

Since 2012, the demand for dwellings within the City has significantly decreased. As evidenced in the previous section, currently the residential property market in Karratha is the weakest it has been in many years following the end of the construction boom related to resource projects; royalties for regions projects and other government agency developments.

House sales activity in the City of Karratha experienced two quarters of decreasing sales over the 6 months to June 2019. The number of houses sold decreased by a total of 58 transactions, or 34%, for that reporting period, down from 167 transactions recorded over the 6 months to June 2018 (see Figure 19).

The total of house transactions settled in 6 months to June 2019, at a medium sale price of \$342,500. This represents an increase of 7.3% in a medium sale price against the same period last year. Recent data indicates that the medium sale price has risen further to approximately \$420,000 in Q1 2020 (an approximate 20% increase).

Unit sales activity in the Karratha market has also experienced a decrease over the 6 months to June 2019. Down from both H1 and H2 2018. A total of 19 unit sales settled at a medium sale price of \$143,750 were recorded in Q2 2019, see Figure 19.

Since 2000, the proportion of market activity in the settlements of Dampier and Roebourne has increased as these areas have captured some of the excess demand not able to be accommodated in Karratha.

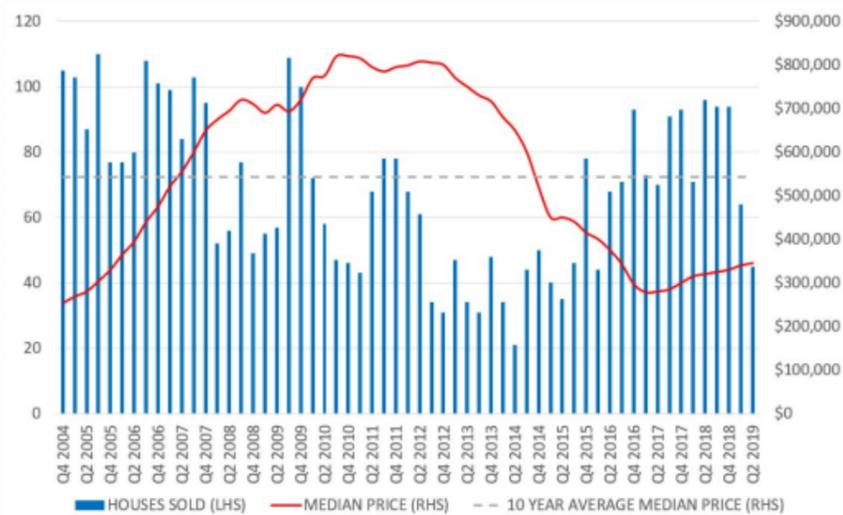


Figure 19: Housing sales & prices - City of Karratha

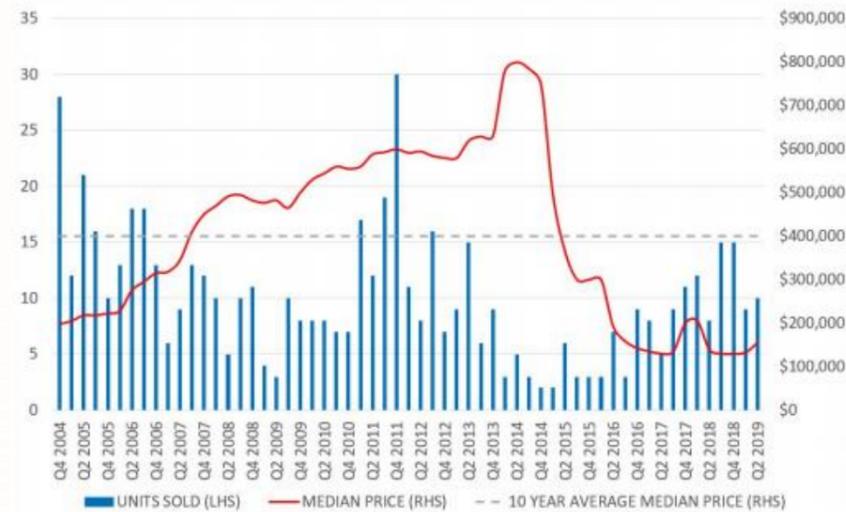


Figure 20: Unit sales and prices - City of Karratha

Population Effect on Housing Demand

The fundamental driver for housing demand is sustainable population growth, which when divided by the prevailing household size provides the number of houses required to cater for future growth. The average household size has reduced only slightly (2.8 persons per dwelling from 2.9) in the City between the census years of 2011 and 2016.

As at 30 June 2019 there were 22,716 residents (estimated) in the City with Karratha housing around 70% of this population. Population growth averaged 6.3% per annum between 2006 and 2011, however the City experienced negative growth of 1.2% p/a from 2011-2016. Between 2016 and 2019 the City has experienced a growth rate of approximately 1.15% p/a. The majority of this growth has been occurring in Karratha.

Forecasts considering the medium population (WA Tomorrow Band E) projections, show that the City currently has enough land capable of substantial further development to cater for the forecast population growth and dwelling requirements. Within the medium population projection the City will have an additional 3,329 residents by 2031, which would require an additional 936 new dwellings (2.8 residents per dwelling and a dwelling occupancy rate of 85%). For the high population scenario, it is estimated that approximately 9,300 new dwellings would be required, with the higher population also likely to be accompanied by some reduction in average residents per dwelling.

To arrive at an estimate of the mix of housing types that would be required, an analysis has been undertaken that considers:

- Current housing type mix;
- A comparison with other Australian communities that have some similarities to the City of Karratha;
- An analysis of the relationship between household type and housing type; &
- Projections of household mix based on the medium and high population projections.

Results of analysis are displayed in **Table 9**, which shows the estimated total dwelling commencement requirements to 2031 under the medium and high population projections.

Table 9: Projected Housing Mix & Dwelling Commencement Required

Housing Type	Proportion	Medium Population Growth	High Population Growth
Single residential	75% - 80%	1,040 - 1,110	7,500 - 8,000
Medium density	10% - 12%	138 - 166	1,000 - 1,200
Apartments	5% - 8%	69 - 111	500 - 800
Short-stay and other	2% - 4%	27 - 55	200 - 400

Source: Syme Marmion

New and hybrid accommodation types (for example lifestyle villages and park homes) are generally substitutes for single residential or medium density accommodation and would fit into those categories. Based on the targeted population ranges for each settlement under the mid growth scenario, the distribution of dwellings across the City's major settlements for the medium term are estimated as displayed in (these estimates take into account a 2.8 residents per dwelling and a dwelling occupancy rate of 85% **Table 10**).

Table 10: Projected Maximum Additional Dwelling Requirements by Settlement

	Target Population	Approximate Dwelling Requirement	Existing Dwellings (2016 Census)	Maximum Additional Dwellings Required
2031				
Karratha	19,705	8,093	7,495	598
Dampier	1,321	542	557	-15
Roebourne (City Remainder)	2,476	1,016	501	515
Wickham/Point Samson	2,543	1,044	1,206	-162
2031 Total:				936

Source: ABS Census (2016)

Workers Accommodation

The implication of the analysis on economic growth in the City is that there is no general demand for new Workers Accommodation (TWA) camps, unless new major infrastructure projects commence. There may be some project-specific requirements for temporary construction worker accommodation for specific projects during their construction phase. This particularly applies to projects at Cape Preston and the Balla Balla project at Whim Creek. It is likely that the Anketell port project will proceed in relatively modest phases, with some limited requirements for short-term TWA accommodation during construction.

The encroachment into industrial land by residential uses (i.e. TWA camps) is a particular issue for the City of Karratha and should be avoided to maintain the efficient functioning and supply of the primary industrial land use.

It is possible that there will remain a FIFO workforce of around 3,000 – 4,000 in the City over the long term. This would largely be a mixture of long term operations (principally LNG and port operations) and short term maintenance workers. A high proportion of these could be located in and around the main settlements. This would be consistent with City's policy on TWA accommodation. The evidence is that a large, relatively short-term influx of temporary workers, as might be found in a construction boom, can have a disruptive effect on a host community and some separation is not only justified but preferable for construction camps. Long term operations workers however, can have a degree of involvement in the community (purchasing local goods and services, involvement in community activities), if they are appropriately located. This supports a policy direction for operational FIFO accommodation within the urban centres, not in separate bespoke camps.

5.4 Housing & Land Supply

Urban Expansion and Land Supply

Over the 12 year period 2000 to 2012 the number of lots sold in the City increased significantly, in line with population growth. On average approximately 157 land sales were recorded per annum, with the highest number of sales recorded in 2011 (400 sales). Over that 12 year period there was annual growth of 15.3% per annum.

The sales volumes of land have been very low since 2013. As of June 2016, the median price was \$100,000. In the second quarter of 2019, the median price has improved to approximately \$150,000 (Figure 21). This is essentially showing a decreased demand for vacant land in the latter half of the decade.

Table 11 details the current area (ha) of land capable of substantial further development as identified through the Department of Planning, Lands and Heritage's Land Capacity Analysis (2020).

The analysis noted that based on the current extents of zoned residential land and land identified for future residential purposes, there is a sufficient amount of land capable of substantial further development to cater for the population growth anticipated in the Western Australia Tomorrow 2031 population forecasts for the City of Karratha (see Table 12).

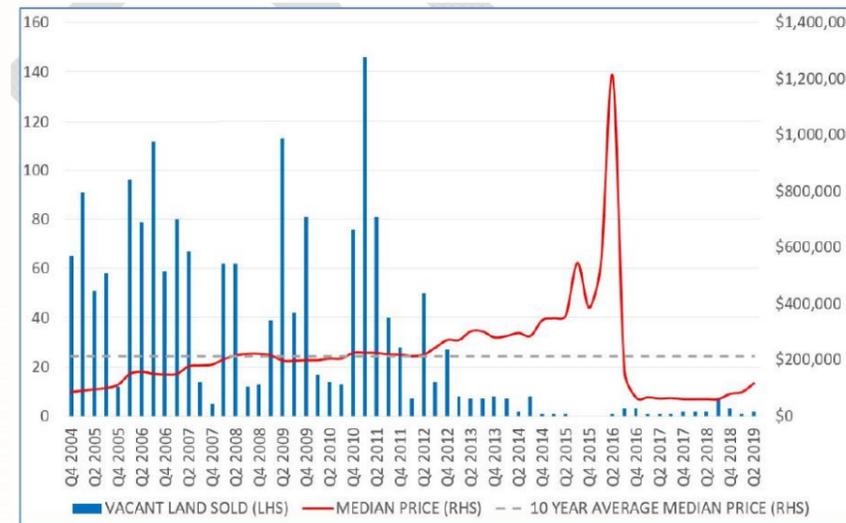


Figure 21: Vacant land sales & prices - City of Karratha

Table 11: Amount of zoned land capable of substantial further development (City of Karratha Land Capacity Analysis, 2020)

Settlement	Land use type	Total (ha)	Developed (ha)	Capable of substantial further development (ha)
Karratha	Residential	837	466	371
	Future Residential	764	0	764
	Residential and Future Residential	1,601	466	1,135
Dampier	Residential	103	77	26
	Future Residential	22	0	22
	Residential and Future Residential	125	77	48
Roebourne	Residential	178	35	143
	Future Residential	0	0	0
	Residential and Future Residential	178	35	143
Wickham	Residential	156	54	102
	Future Residential	10	0	10
	Residential and Future Residential	166	54	112
Point Samson	Residential	23	16	7
	Future Residential	27	0	27

	Residential and Future Residential	50	16	34
--	------------------------------------	----	----	----

Table 12: City of Karratha – Estimated additional residential land requirements to accommodate population forecasts (Karratha Land Capacity Analysis, 2020)

WA Tomorrow forecast bands	Additional population	Current and future land capable of substantial further development (ha) ²	Residential ¹					Surplus (ha) ⁴
			R10 average density Estimated land required to accommodate additional population (ha) ³	Surplus (ha) ⁴	R20 average density Estimated land required to accommodate additional population (ha) ³	Surplus (ha) ⁴	R30 average density Estimated land required to accommodate additional population (ha) ³	
WA Tomorrow – Band A	-399	1,480	0	1,502	0	1,491	0	1,488
WA Tomorrow – Band B	896	1,480	49	1,431	25	1,456	16	1,464
WA Tomorrow – Band C	1,476	1,480	81	1,399	41	1,440	27	1,453
WA Tomorrow – Band D	2,221	1,480	122	1,358	61	1,419	41	1,440
WA Tomorrow – Band E	3,631	1,480	200	1,281	100	1,381	67	1,414

¹ These estimates assume that all population growth occurs on residential and future residential land that has been identified as being capable of substantial future development in this analysis. To keep the calculations relatively straightforward, they do not consider additional population being accommodated on rural residential or rural smallholdings lands, nor do they take into account potential increases in population occurring due to infill development. They therefore likely overestimate residential land requirements.

² Total area of current and future residential lands capable of substantial further development for entire local government area.

³ A 35 per cent allowance from gross land areas to support land requirements for public open space and streets (*Liveable Neighbourhoods*, 2007) and a population yield per dwelling of 2.8 people per dwelling unit (average people per household for the Average people per household for the East Pilbara (S) LGA + Ashburton (S) LGA + Karratha (C) LGA + Port Hedland (T) LGA – Australian Bureau of Statistics, 2016 Census) have been factored into the estimated areas of residential land required to accommodate forecast additional populations.

⁴ A positive figure in this column indicates that the additional population under the relevant population forecast should be able to be accommodated within the areas of residential and future residential land currently identified, without additional residential land being required. A negative figure represents the shortfall in the identified areas of residential lands with respect to that required to accommodate the additional population.

Infill Potential

As a result of the relatively low densities achieved to date in the R20, R30 and R50 zones, a significant number of lots remain under-developed and could under the right circumstances become viable for further subdivision.

In terms currently zoned residential land that is capable of further development Karratha has the greatest capacity for additional dwellings followed by Roebourne town site and then Wickham (see Table 11).

In addition to the capacity for additional dwellings under existing R-Code zonings, there is potential for rezoning to increased densities at strategic sites. Increased density should generally be focused around town centres, key transportation links, public open space, or other facilities and amenities. Opportunities for split density coding over strategically located sites may also be utilised to encourage redevelopment to higher densities subject to improved built form, affordability components or environmentally sustainable design. Dwelling yields as a result of increased R-Code zonings will be dependent on the extent of rezoning, as well as development take-up rates.

Increased residential density codings would be appropriate in the Karratha City Centre, or the future Tambrey Neighbourhood Centre. This opportunity should also be used to encourage redevelopment of aging dwelling stock in Bulgarra, Millars Well and Pegs Creek (as per the Karratha Revitalisation Strategy). Similar rezoning opportunities to encourage infill redevelopment may also be appropriate to apply to central sites in Dampier, Roebourne and Wickham.

Karratha Revitalisation Strategy

The *Karratha Revitalisation Strategy (KRS)* seeks to achieve the *Karratha City of the North* objective of delivering compact neighbourhoods and diversity of housing in Karratha's inner suburbs. Accordingly, *KRS* recommends residential re-codings which allow for an increase in density on strategic locations, and assist in creating more diverse housing stock and streetscapes.

The key tool proposed to achieve this is a split coding technique whereby density restrictions for house lots under 1,000m² in area (i.e. single lots) are typically maintained at a lower level, whereas the application of a higher code requires the amalgamation of properties. For example, in an R20/40 split coded area, single lots receive no increase in permissible density, except where they may be amalgamated to create a grouped housing site at R40.

The allocation of higher residential codings are based on a preference for increased density within the walkable catchment of community nodes and centres, future 'transit' and key sources of amenity (see Figure 22). The highest densities (R80) are reserved for areas within immediate proximity of the Karratha City Centre (R80), whilst the walkable catchments of the community nodes in Pegs Creek, Millars Well and Bulgarra allow for redevelopment up to R60.

To offset the loss of a number of Lazyland sites that upon further scrutiny have proven too constrained as to likely be developed for residential purposes, *KSR* identifies a number of additional sites, including four major sites for which it includes schematic concepts that it puts forward as catalysts for the rejuvenation of surrounding land.

KSR provides supplementary detail on the ability to develop and potential dwelling yield that might be generated. In reality redevelopment will be slow and sporadic, hence it is expected that only low proportions of properties will be amalgamated to enable more significant density within the 2031 planning horizon of this *Local Planning Strategy*.



Figure 22: Proposed R-Codes within Karratha Revitalisation Strategy

Future Dwelling Delivery & Population Growth

This Strategy anticipates that future population growth will occur largely within the Karratha urban area and minor growth occurring across Dampier, Wickham, Roebourne and Point Samson. Under the Strategy's mid growth scenario (which reflects the WA Tomorrow Band E high growth forecast), the City's population is estimated to be approximately 26,000 and require approximately 950 new dwellings by 2031. The high growth scenario; which is highly dependent on the economy's operation and growth rate, sets an aspirational target of up to 48,000 people and would require approximately 9,500 new dwellings.

Future dwelling delivery and population growth has been informed by investigations undertaken by the City and Forecast .id in 2012 and analysis via the Karratha Land Supply Assessment (DPLH, 2020).

New urban growth is planned in Mulataga to the east of the City Centre to connect the City to the coast.

Extensions to the existing urban area are also identified to the west, mainly in the suburbs of Gap Ridge, Nickol, and Baynton.

Of the urban expansion land, the eastern corridor expansion site in Mulataga adjacent to the suburb of Bulgarra is the most significant and is expected to yield approximately 180 dwellings in the short term (0-5 years) and 180 dwellings in the medium term (6-10 years) and 1000 dwellings in the long term (10+years). The finalisation of a revised version of the Mulataga District Structure Plan will provide a better indication of the development opportunity available in this location.

The site within Gap Ridge also has substantial capacity. With appropriate structure planning it has the potential to yield 775 dwellings in the long term. Land identified as Lazy Lands has the notional capacity of accommodating 580 dwellings, subject further investigation and rezoning for residential use.

In total this Strategy and the Karratha Land Supply Assessment have noted that there can be up to 839 dwellings for short term development (0-5 years), as well as 931 for medium term development (6-10 years) and 2,729 dwellings in the long term (10+ years) in the Karratha urban area alone. Most of these projected dwelling yields are to be realised from the suburbs of Mulataga, Gap Ridge, Baynton and Bulgarra.

In addition to the projected dwelling yields shown in Figure 23, there is capacity for residential development to occur in the City Centre as part of future mixed-use development proposals. This represents additional dwelling capacity for land within the Karratha urban area and theoretically would result in a higher population carrying capacity.

To ensure that long term growth can be adequately accommodated there is a need to identify development investigation areas within the City. This Strategy identifies land for development investigation in the suburbs of Gap Ridge, Mulataga and Stove Hill. Despite some of these areas being zoned as 'Urban Development' under LPS 8, all require further investigation to determine yield potential and appropriate land use designations as part of future investigation feasibility studies.

The Karratha Land Supply Assessment (2020) and the Karratha Capacity Analysis (2020) indicate that in consideration of the mid growth scenario, and all

land identified for urban expansion and investigation areas, that there is a large temporal land supply which will accommodate population growth into the long term, see Figure 23.

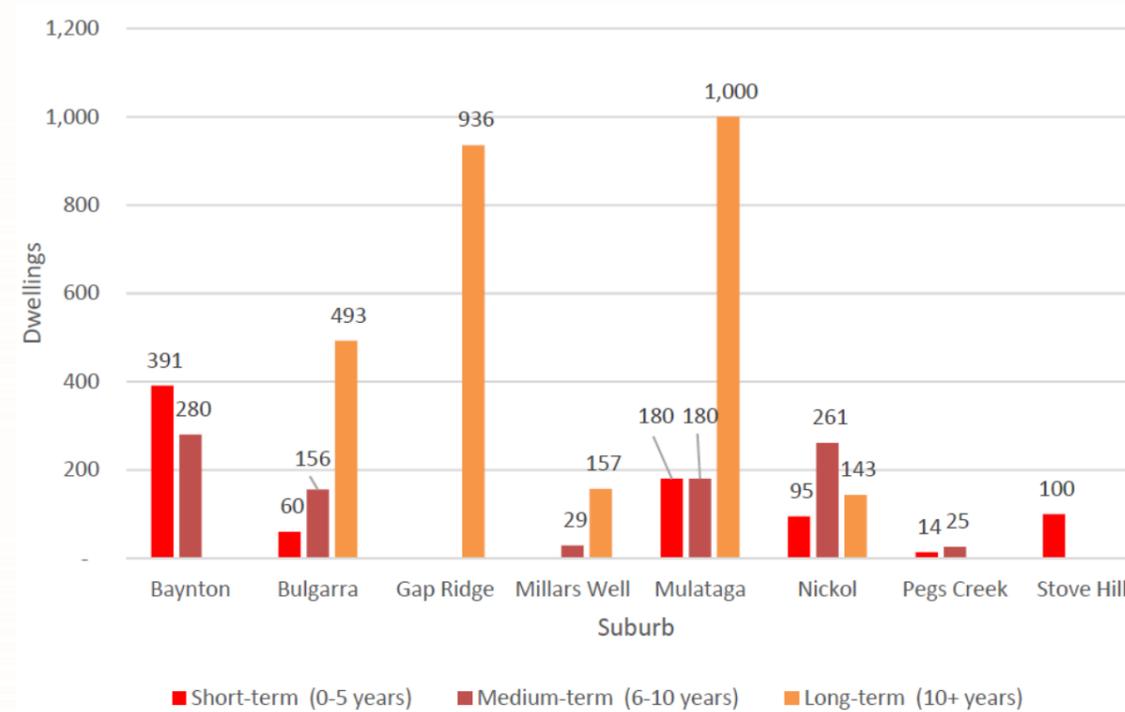


Figure 23: Projected dwelling yields by suburb (Karratha Land Supply Assessment, 2020)

5.5 Key Issues: Population & Housing

- The intent of this LPS is to prepare for the next wave of development so that a population of up to 50,000 can be accommodated at some point in the future while the infrastructure to meet the other needs of the population can more closely follow the forecast population patterns.
- With such a potentially volatile population growth it is important that this strategic planning document is frequently reviewed and the population growth patterns including distribution of the growth is closely monitored.
- Under the mid and high growth scenarios by 2031 the population of the City will be between 26,000 and 48,800. Compared with the current population of about 22,716 (June, 2019), these scenarios suggest there is a reasonable expectation for a significant increase in the current population within the 15 year planning timeframe.
- The speed, scale and sustainability of growth depends largely on the extent to which the economy diversifies around its very strong base in the minerals and energy sector. Resource projects alone are not sufficient enablers of sustainable employment and population projections.
- Analysis of comparable resource dependent settlements suggests that the likely growth pattern will be aligned to the mid growth scenario. It should be noted that growth is unlikely to be linear and will take more of a 'stepped' progression.
- A decline in the level of construction activity, increase in services activity and general diversification of the existing economic base are projected to impact the composition of the workforce as follows:
 - Reduction in FIFO numbers as major construction project are completed;
 - Stabilisation of the operational workforce;
 - Growth of the service population (particularly for consumer services);
 - High increases in the retail, education services and health services sectors;
 - Possible growth of producer services; and
 - Some increase in knowledge intensive producer and consumer services.
 - Workforce changes will in turn affect the following demographic changes:
 - Increasing proportions of school-age children; and
 - Decreasing proportions of those aged 20-49.
- The above workforce and demographic changes will likely be accompanied by changes in income patterns, with an increase in the proportion of lower and middle income households. This will put pressure on all aspects of affordability in the City. Unless workers of moderate incomes can be accommodated in the City, in large numbers, the opportunities for economic diversification that underpin the higher population scenario will not be realised. There has been pressure on housing affordability for some time and all relevant agencies need to continue to focus on affordability with increasing intervention such as subsidised key worker accommodation.
- After experiencing significant house price growth from 2000-2012 dwelling sales and prices fell significantly. Since the second quarter of 2017 there has

been a slow recovery in the medium dwelling sale price to \$420,000 as of Q1 2020,

- Over 76% of dwellings in the City are rented, therefore supply of rental properties to the market is an important consideration. The average weekly rent in Karratha peaked in 2007 at \$2,180 per week. As of Q2 2020 the average weekly rent was \$585 which was 38% higher than June 2019.
- Based on 2016 ABS data, the City has an existing dwelling stock of approximately 9,759, with approximately 79% of this located in Karratha. The City's preference is for more permanently based residents with home ownership in the City encouraged. The City will require approximately 950 new dwellings and up to 9,500 dwellings by 2031 under the mid and high growth scenarios respectively. The estimated housing mix required comprises 75 – 80% single / low density, 10 – 12% grouped dwellings / medium density, 5 – 8% multiple dwellings / high density and 2 – 4% short-stay accommodation.
- As at 2016 four or more bedroom houses were the predominant housing typology in the City, making up 42% of the total occupied dwelling stock at the time. Three bedroom houses made up 39.8% of the dwelling stock. Data for the Karratha urban area indicates that 50% of occupied private dwellings (approximately 3,700) are under utilised in that they have one or more extra bedrooms than required. This suggests a potential existing market shortfall of one and two bedroom dwellings.
- Karratha has the greatest capacity for additional dwellings on land that already has some development, but there is also a significant capacity for additional dwellings on built lots in Dampier. In terms of vacant residential land, Karratha has the greatest capacity for dwellings followed by Roebourne, Wickham and Dampier. The age of existing dwelling stock, with 45% of dwellings constructed between 1970 and 1988 presents opportunities for redevelopment.

- Other opportunities for infill development exist in the form of surplus public open space and town centre redevelopment. Opportunities and community appetite for infill are greatest in and around Karratha's central suburbs and in Dampier.
- Urban expansion areas when combined with infill development will be able to achieve additional dwelling supply requirements. Current Development Plans for Mulataga, Madigan Estate and Nickol West in Karratha, NASH in Roebourne and Wickham South have the capacity to supply an additional 4,587 dwellings collectively. Recent land supply assessments note sufficient land has been identified for long term residential supply.
- Opportunities for infill development and redevelopment are greater in Dampier than expansion options. One urban expansion area is identified (The Lookout). Nonetheless, appropriate planning, and particularly resolution of infrastructure requirements, is needed to facilitate infill.
- Point Samson's projected additional dwelling demand at 2021 is low, with growth considered to be negligible until the long term. Urban expansion will, however, be required to meet longer term growth in Point Samson.



5.6 Community Facilities, Recreation & Open Space

Existing Facilities

Community facilities and services are essential to offer a competitive standard of living which attracts a broad demographic profile to live in the City for the long-term. There is a wide range across the City in the current level and quality of community facilities provision. While many facilities require upgrades or expansion to adequately service the population, others are high quality, providing valuable service to the community, such as the Red Earth Arts Precinct and the Karratha Leisureplex. The Pilbara Cities initiative and Royalties for Regions, as well as mining company funding has resulted in the City benefiting from substantial community infrastructure investment in the last few years. Much of the investment has been focused in Karratha, with major projects such as the Leisureplex and City Centre Revitalisation.

Wickham has recently had significant upgrades with the completion of the Wickham Community Hub and Wickham Recreational Precinct with funding provided by Rio Tinto, City of Karratha and Lotterywest. The Community hub now provides a modern and efficient community facility that addresses the climatic conditions of Wickham and meets the identified functional needs of the community integrated within the Wickham Recreational Precinct.

Future Provision Requirements

A detailed assessment of community facilities requirements for the City of Karratha is contained in the *Community Facilities Report*, incorporated as *Technical Report 4* supporting this *Local Planning Strategy*.

A comparison of the future community facilities demand indicates the impact of different population projections. Table 13 provides a summary of the demand for future facilities under the mid and high population scenarios based on the outcomes of the City's Community Facilities Report (2013).

Under any scenario the majority of population growth, and therefore demand for community facilities and services will be in Karratha. The population growth in other settlements, Wickham in particular, will justify demand for some increase in services and facilities there, but these are in general of a local nature and should not substitute for larger and more regionally based facilities that will be required in Karratha.

Although capital works for new facilities are a major issue, an additional consideration for the City will be maintenance and management of community facilities, which have ongoing costs.

Education - Primary Schools

There are eight Government primary schools in the City:

- Karratha Primary School (includes the newly amalgamated Karratha Education Support Centre);
- Millars Well Primary School;
- Pegs Creek Primary School (Independent Public School 2013);
- Tambrey Primary School;
- Baynton West Primary School (Independent Public School 2013); &
- Dampier Primary School;

- Wickham Primary School;
- Pilbara Camp School (specialising in nautical experiential learning).
- There is one non-Government primary school:
- St Paul's Primary School.

Primary school provision will need to expand in line with population growth, and new primary schools will be required in the urban expansion areas of Karratha in the medium to long term.

Table 13: Projected Mid & High Growth Community Facility Requirements

Facilities	Service Level	Ratio	Current	Required 2031		Difference
				Mid (26,045)	High (48,864)	High - Low
Active Recreation Space (ha)	ha/1,000 population	2	48	54	98	13
Active Recreation Space Standards						
Playing Fields	City	25,000	1	1	2	-
Playing Fields	District	10,000	2	2	5	1
Playing Fields	N'hood / Local	5,000	6	5	10	2
Aquatic Centre	City	50,000	1	1	1	-
Aquatic Centre	District	20,000	2	1	2	-
Indoor Recreation Centre	City	50,000	-	1	1	-
Indoor Recreation Centre	District	20,000	1	1	2	-
Skate Park	City	35,000		1	1	-
Skate Park	District	7,000	2	4	7	1
Skate Park	Local	3,500	2	8	14	2
BMX Track	City	30,000	1	1	1	-
BMX Track	District	10,000	1	3	5	1
Passive Recreation Space Standards						
Combined Passive & Active Spaces		N/A	7			
Local Parks & Playgrounds	Local	1,000	28	26	49	7
Specific Standards						
Sports Change rooms	Local	5,000	4	5	10	2
Clubrooms	District	10,000	2	3	5	1
Clubrooms*	Local	5,000		5	10	2
Golf Course	District	25,000	2	1	2	-
Beach Facilities	District	-				
Social/Cultural						
District Community Centre	District	10,000	1	3	5	1
Local Community Centre/Neighbourhood Centre*	Local	5,000	4	5	10	2
Library	District	20,000	1	1	2	-
Library	Local	5,000	3	5	10	1
Youth Centre	District	15,000	2	2	3	-
Seniors Centre	District	20,000		1	2	-
Childcare Centre	District	7,500	2	4	7	1
Childcare Centre	Local	5,000	4	5	10	2
Health						
Community Health Clinic	District	10,000	4	3	5	1

*Local community centre and local clubrooms should be collocated as one project

Source: Adapted from Syme Marmion & Co. Community Facilities Plan 2013; City of Karratha 2020

Secondary Schools

There are two Government secondary schools in the City; Karratha Senior High School and Roebourne District High School. There are no plans for additional government secondary schools in the short and medium terms. There is one non-Government secondary school, which is St Luke's College.

There is interest to develop Karratha Senior High School into a leading secondary school for the region. This may include boarding facilities to accommodate students from regional areas. Planning for Roebourne District High School includes arts based specialisation. A specialist arts program presents an opportunity for the school to provide a unique offering to the Pilbara Region and to encourage engagement of students through alternative pathways. The State Government has recently announced a \$42 million investment into the Roebourne District High School which will see the school receive a total redevelopment from kindergarten through to the secondary school areas.

Tertiary Education

The *North Regional TAFE* has campuses in Karratha and Roebourne, offering apprenticeship and traineeship programs in a limited range of fields. It also offers public training programs in industrial skills training, occupational health and safety, business, computer and education training, and lifestyle courses through its Pilbara Skills Centre. A new National Disability Insurance Scheme (NDIS) Training Centre has also recently been opened at the Karratha campus, the facility includes simulated in-home care training environments to support NDIS-related training.

A valuable opportunity exists for the City in expanding the quality and scope of its tertiary education offering. Tertiary education opportunities within the City are currently very limited, and expanding both technical training through TAFE and apprenticeship programs, as well as university level education presents an opportunity to train the City's population in situ, rather than relying on population leaving the City to receive higher levels of education and training, with the risk they will not return.

In the longer term, tertiary education may be developed to a level that will also attract population to the City to study in areas of regional specialisation. Expansion of tertiary education is therefore not only an element of community infrastructure, but an important component to the development and diversification of the City's local economy.

A site of no more than 4 hectares can be expected to easily accommodate the long term expansion requirements for tertiary education. While the Karratha City Centre has been identified as one possible location, there would also be benefit to co-locating a future university campus with the existing Pilbara Institute site in Karratha. Land in the locality of the Pilbara Institute campus will be available with the relocation of Karratha's hospital to the City Centre.

Health Services

Hospitals for the City are currently located in Karratha and Roebourne. The Karratha Health Campus project was successful in bringing a new hospital to the Karratha City Centre. The project was the largest expenditure on a single health infrastructure project in regional Australia to date, and has significantly improved the City's existing health services. Karratha's GP Super Clinic has also

contributed to the expansion of existing healthcare services. Aged care and specialist facilities will be important complementary services that may be collocated with the Karratha Health Campus and GP Super Clinic.

Police & Emergency Services

The following police and emergency services are in place in the City:

- Karratha Police Station;
- Dampier Police Station;
- Roebourne Police Station;
- Wickham Police Station;
- Roebourne Regional Prison;
- Karratha Fire and Rescue Service;
- Dampier Fire and Rescue Service;
- Roebourne Fire and Rescue Service;
- Wickham Fire and Rescue Service;
- Point Samson Bush Fire Brigade;
- Karratha State Emergency Service;
- Roebourne / Wickham State Emergency Service;
- Karratha St John Ambulance;
- Roebourne St John Ambulance; &
- Wickham St John Ambulance.

The Karratha facilities of each are likely to require upgrades and expansion as the population increases. Rationalisation of services may be appropriate where duplication exists between neighbouring settlements. Consolidation of an eastern corridor emergency services centre should be a future consideration.

Table 14: Active Recreation Open Space Provision – Analysis of Current Situation

Activity	Current Situation
AFL Ovals	AFL oval exist at Bulgarra, Leisureplex, Millars Well, Roebourne (2), Wickham, Dampier, Additional provision at Mulataga and potential expansion of Millars Well will ensure that needs are accommodated beyond 2023. All facilities will need to ensure appropriate clubhouse infrastructure is provided to serve sports needs.
Rugby Union / League	Current provision satisfies needs and potential capacity for growth (league use).
Diamond Pitch Sports	Incorporated within oval development and complementary to Football provision. No additional infrastructure required.
Soccer Pitches	Potential pressure point as growth in sport and junior provision exceeds population growth. Provision of approximately 9 to 11 pitches may be required to 2023. Provisions at Leisureplex (3), Pegs Creek, Tambrey Oval, Nickol West, Baynton East, Wickham, Dampier are likely to satisfy needs. An ongoing review of the demand will need to be undertaken.
Cricket Ovals	Cricket infrastructure caters for current need and growth.

Athletics (Grass & Synthetic)	Need for synthetic provision not proven – case would need to be assessed post 2023.
Hockey Pitches (Grass, Synthetic, Alternatives)	Demand for hockey is increasing, forming an emerging requirement which will be required to be addressed.

Source: Adapted from Syme Marmion & Co, Community Facilities Plan, 2013

District & Local Open Space

It is Western Australian practice for 10% of gross subdivisible area to be given up free of cost as public open space. Such public open space may be inclusive of both district and local open space, and should include a minimum of 8% allocated for active and passive recreational purposes.

District level open space within the City consists of open space recreation facilities and playing fields used district wide, generally for multiple sporting purposes. For the purposes of this assessment it also includes playing fields identified to be used City wide. There are currently three playing fields of district level significance in the City and two golf courses, located at Karratha and Wickham. This provision satisfies current demand, but will need to grow in line with population.

Local open space includes active and passive recreation spaces such as ovals, parks and playgrounds. It also includes areas not used for recreation, but reserved for drainage, or areas that may serve dual purposes for both recreation and drainage. Drainage is a vital consideration of urban design in the Pilbara environment, which is subject to severe rainfall patterns, cyclonic events and coastal inundation.

The City is relatively well provided for in respect to public open space, with a current excess of local open space overall. There are 28 local parks and playgrounds in the City. Based on the recommended service provision ratio of 1:1000 and a current population of approximately 25,000, the current requirement would be for 25 local parks and playgrounds, resulting in a moderate surplus of 3. Drainage areas are also generously provided for, particularly in Karratha, Dampier and Wickham.

The Lazy Lands project has identified 61 parcels of surplus land reserved for parks, recreation and drainage. An increased understanding of coastal processes and flood risk has confirmed these pieces of land are either not subject to flooding, or can be designed to mitigate flooding. Accordingly, the surplus open space is slated to be developed for residential infill to assist in increasing dwelling supply for Karratha. The *Dampier Townsite Redevelopment and Revitalisation Strategy* similarly proposes opportunities where pockets of land currently reserved for parks, recreation and drainage may be utilised for infill residential development.

Local level playing fields currently exist in all settlements other than Point Samson, which has a population well below the 1 per 5000 people benchmark threshold. With continued rapid expansion in Karratha, Mulataga, Baynton East and Nickol West however, oval developments are considered essential to meeting projected playing field requirements. There is also a pressure point on provision of rectangular playing fields for soccer and a need to assess viability of provision for hockey. Table 14 identifies the current situation of the City with respect to playing fields and recreational activities.

Regional Open Space

The majority of the coastline of the City of Karratha, as well as its islands, is reserved under LPS8 for conservation, recreation and natural landscapes. Coastal areas of the City comprise sites rich in environmental and cultural value.

Coastal reserves contain mudflats, mangroves, rocky outcrops and beaches of environmental significance, which provide habitat to a diversity of species. In particular the Burrup Peninsula and islands of the Dampier Archipelago provide significant habitat and are recognised as environmentally sensitive areas. The Burrup Peninsula also contains the world's richest known concentration of rock art, and is therefore a site of international significance. The regionally significant *Burrup Peninsula Conservation Reserve*, *Dampier Archipelago Nature Reserves* and *Murujuga National Park* have been established over these areas to protect their ecological and cultural significance.

Outdoor sporting and recreation activities associated with the coast, including boating, fishing, diving, camping and 4-wheel driving are exceedingly popular, and place pressure on the coastal environment. Thus, active management of coastal areas is important to preserving these regionally significant areas of open space. *Foreshore Management Plans* have recently been prepared for 40 Mile Beach, Karratha and Point Samson foreshores. A *Foreshore Management Plan* is already in place for Cleaverville.

Other regionally significant open space is located inland around key environmental features in the vicinity of the City's settlement areas. Inland areas of regional significance for conservation, recreation and natural landscapes include:

- The Karratha Hills;
- Rocky outcrop areas to the east of Dampier;
- Mount Welcome (Roebourne); and
- The Harding River.

There is some impetus from within the community to increase the environmental and recreational significance for the Karratha Hills through a *Karratha Hills Recreation and Nature Reserve*.



5.7 Key Issues: Community Facilities, Recreation & Open Space

- Community facilities and services are essential to offer a competitive standard of living which attracts a broad demographic profile to live in the City for the long-term.
- There is a wide range of community facilities across the City. While many facilities require upgrades or expansion to adequately service the population, others are high quality, providing valuable service to the community.
- An ongoing consideration for the City will be maintenance and management of community facilities, which have ongoing costs.
- There is a need to ensure that education services are maintained at a high level to keep people in place longer, including better quality secondary school education and upgraded tertiary education with development of regional research specialties;
- Identification of suitable retirement sites for the future;
- Ensuring that health services are available that meet all of the health needs of all the community, including aged care and specialist facilities;
- A richer cultural life, with a wide variety of cultural activities;
- Well supported and vibrant community groups;
- A wide range of formal and informal sporting/recreation opportunities; and
- Places for people to meet – this means paying attention to the liveability of the major centres, particularly the Karratha City Centre.
- The majority of population growth, and therefore demand for community facilities and services will be in Karratha. The population growth in other settlements, Wickham in particular, will justify demand for some increase in services and facilities. These are of a local nature in general and should not substitute for larger and more regionally based facilities that will be required in Karratha.
- The *Karratha Leisureplex* performs a regional, district and local level function for sport, recreation and leisure uses. Programming and use of this space must be maximised. Its provision of court space will likely generate substantial increase in participation in basketball and netball due to the latent demand suppressed by the former *Karratha Entertainment Centre* facility.
- The *Red Earth Arts Precinct* also performs a regional, district and local level function. The *Concept Design Report* released in February 2014 proposed development of a 450 seat theatre and performing arts centre, a new library, rooftop cinema, art gallery, outdoor amphitheatre and local history museum which has now been completed. The precinct has gone a long way addressing the immediate gaps in community facilities, particularly performing arts since closure of the Walkington Theatre in 2011.
- Lazy Lands and the *Dampier Townsite Redevelopment and Revitalisation Strategy* have identified under utilised or surplus open space which could be repurposed.
- The City currently meets or exceeds benchmark requirements for provision of district and local public open space, including playing fields, parks and playgrounds. Despite this, continued rapid growth of the City will necessitate provision of new public open space, and will particularly require new playing

fields in Mulataga, Baynton East and Nickol West for Karratha. Clubroom / clubhouse facilities to serve all new oval facilities are essential. There is also need for upgrading of existing clubhouse facilities which fall below assessed service standards.

- There may be need to provide for additional rectangular pitch sports (predominantly soccer) which is currently experiencing significant growth across the State above population growth. There may also be need to provide hockey facilities. Assessment is required to consider whether this infrastructure would be viable.
- Public open space for the purpose of drainage is a vital consideration of urban design in the Pilbara environment, which is subject to severe rainfall patterns, cyclonic events and coastal inundation. An increased understanding of coastal processes and flood risk has, however, allowed identification of 61 parcels of public open space in Karratha that are surplus to the required drainage network. Infill development of this surplus public open space will be an important component of increased dwelling supply in Karratha.
- The ecological integrity of regionally significant open space found along the City's coast is increasingly impacted by industry and recreation uses associated with the growth of the City. Active management of coastal areas, in accordance with *SPP 2.6*, should be a priority for the City. The *Foreshore Management Plans* recently drafted for 40 Mile, Karratha and Point Samson demonstrate measures underway to achieve successful coastal management. The City should seek to prioritise implementation of these plans.
- Additional regional open space around major landscape and environmental features inland from the coast also warrant conservation and preservation. A proposal to create a recreation and nature reserve over the Karratha Hills provides means to ensure protection and enhancement of this significant landscape feature.



6.0 Theme 2: Economy

6.1 Local Profile: Economy & Employment

A Global Context

The economy of the City of Karratha is largely driven by the global commodity market. The global economy is still fragile following the GFC and the COVID-19 Pandemic. The International Monetary Fund (IMF) expects economic growth in Australia to rebound despite the global economy facing a downturn. The IMF is forecasting the global economy to fall by 3.0 per cent in 2020 which compares to a fall of 0.1 per cent in 2009 at the height of the financial crisis. Economic growth in Australia is projected by the IMF to fall by 6.7 per cent in 2020 as the world deals with the economic fallout from the coronavirus. However, the IMF is forecasting Australia to grow by 6.1 per cent in 2021, faster than the economies of the United States, Canada, Japan, France, Germany and the United Kingdom. In this context, the medium to long term growth and the City's economy must be viewed with equal caution. The City must identify medium to long term opportunities for diversification of the economy and must factor in lower growth rates in the region of 1.5% between 2021 and 2031.

Pilbara Regional Economy

The City of Karratha is a significant economy within the Pilbara Region. The region has immense reserves of natural resources, which provide massive direct export sales and also fuel a thriving economy of support services. The Pilbara's economy is strongly dominated by the mining and petroleum industries and the area is considered to be the State's premier mining region. These industries have grown at a considerable rate in recent years, but growth is likely to slow over the next 10-20 years and require fewer workers to support economic activity as construction is completed and operation commences.

The largest export commodity in Australia is iron ore and approximately 95% of this is produced in the Pilbara. Demand for iron ore principally comes from Japan, China and other rapidly developing Asian nations. In 2019, approximately \$77 billion worth of iron ore was exported from the Pilbara. New projects are continually being proposed and developed in the region as extensive geological research is uncovering more resources. The iron ore commodity market is part of the global economy and prone to fluctuation in a highly competitive market.

The region also produces 70% of Australia's natural gas. This is sourced from the Carnarvon Basin off-shore and is serviced and processed onshore from within the City of Karratha at Dampier. In addition to iron ore and natural gas, 85% of Australia's crude oil and condensate comes from the Pilbara. The Pilbara also produces a range of other minerals having a total 2019 value of AU\$2 billion. This is led by:

- Gold and silver at \$945 million,
- Copper at \$242 million,
- Manganese and salt at \$639 million; and
- Other minerals at \$272 million.

While the City of Karratha contributes a relatively small proportion of this resource value, it is one of the region's major service and extraction hubs where port, rail, government and industry intersect. Other industries include manufacturing, tourism, sheep and cattle, fishing and aquaculture. All figure prominently in the economy of the region, providing a diversity of activity – and a range of business opportunities. A number of projects aimed at economic diversification are also currently being trialled across the region, including solar energy production and algae production for biofuel and protein.

Local Economy

The City of Karratha is one of the four local government areas that make up the Pilbara region of Western Australia along with the Shire of Ashburton, Shire of East Pilbara and Town of Port Hedland. The City of Karratha had a Gross Regional Product (GRP) of \$7 billion in 2019 which ranks the municipality second to the City of Perth out of 139 LGAs in WA. Karratha also represents 16.64% of the Pilbara Region's GRP of \$38 billion (PDC, 2019).

The economy of the City is heavily dependent on the minerals and energy sector. The mining sector accounts for approximately 60% of total output, with the oil and gas and iron ore components comprising 63% and 34% respectively of the total value to the City (Remplan, 2020). Construction, the next largest sector measured by value added and the largest employment sector, is overwhelmingly directly related to mining and resources projects.

There are three major resource companies operating in the City (Rio Tinto, Woodside Energy Ltd and Citic Pacific Mining). Each company is currently operating or rolling out mining and energy extraction infrastructure investments worth an estimated \$60 billion. Significant projects underway or under advanced consideration are within Table 15 below:

Table 15: City of Karratha Major Construction Projects (Pilbara Development Commission 2020)

Status	Total Investment (AUD \$M)	New Construction Jobs	New Production Jobs
Under Advanced Consideration - Oil and Gas			
Burrup Hub - North West Shelf Refurbishment and Browse Development - Pluto Train 2 and Scarborough Development	52,000	2,500	460
BBI Group Integrated Iron Ore Operation	3,000	1,500	300

(City of Karratha Component)			
Chemical Production and Processing			
Perdaman Urea Plant - Project Destiny	4,500	2,500	200
BCI Minerals - Mardie Salt and Potash	425	200	100
Committed - Other Industries			
Murujuga Living Knowledge Centre	32	-	-
The Quarter Hotel	20	50	45
Under Construction - Other Industries			
Tambrey Village Shopping Centre	17	-	150
Yara Pilbara - Ammonia Plant Upgrades	700	-	65
Total	60,694	6,750	1,320

The City contains a very high proportion of the Pilbara employment – around 33% of all regional employment and between 30% and 60% of most services. However, it has only 13% of resident employees in the mining sector. It has a higher proportion than the regional average of employment in the following sectors:

- Electricity, Gas, Water & Waste Services
- Public Administration & Safety
- Construction
- Professional, Scientific & Technical Services
- Retail Trade
- Rental, Hiring & Real Estate Services
- Financial & Insurance Services
- Manufacturing
- Transport, Postal & Warehousing

- Information Media & Telecommunications
- Education & Training
- Wholesale Trade
- Health Care & Social Assistance
- Administrative & Support Services
- Other Services

Regional & Local Growth Prospects

Minerals & Energy Sector Economic Outlook

Western Australia is the largest iron ore producer and exporter in the world, accounting for approximately 37% of global production and 57% of global seaborne exports in 2019 (JTSI, 2020). The demand for iron ore is expected to grow; one of the biggest drivers of demand is the growth of China. The Bureau of Resources and Energy Economics forecasts that iron ore world demand will continue to grow up to nearly 2,000 mtpa by 2025. Primary risks to the growth of the Pilbara iron ore industry are:

- Change in the Chinese economic outlook;
- Cost pressures;
- Lack of skilled workers;
- International competition from Brazil and West Africa; and
- Infrastructure constraints, ports, roads, housing, power, water.

In 2019 global LNG trade was 354 million tonnes a 13% increase from 2018, Western Australia by itself accounted for 12 per cent of global LNG exports and 59 per cent of Australia's LNG exports in 2019. Due to its location, the growth in the Asia Pacific region is most important to Pilbara LNG. The value of Western Australia's LNG sales rose 2 per cent to 27.4 billion in 2019. Demand for LNG in the region was expect to continue to increase at a 6% yearly average. Primary risks to the growth of the Pilbara LNG industry are:

- Demand for skilled labour will outstrip supply;
- Increase in capital and labour costs;
- Development of alternative fuel sources; and
- Competition from other suppliers.

However, these risks may be offset by a slowdown in the employment growth of the iron ore sector, providing that skill sets can be transferred from one industry to another. The transfer of jobs will assist the local LNG industry which is changing from an traditionally exported resource to more of a 'hubbing' product through facilities on the Burrup Peninsula and using gas locally for trucks, supply vessels, trains and local supply contracts.



Major Industry Projects Economic Outlook

The major industry projects in the City and in the Pilbara generally provide a very strong economic underpinning. The prospects are for some growth in operations expansion for iron ore and other minerals in the Pilbara and wider region with forecast increased export bulk. However, only a few of these new projects are in the City and operational stages require a smaller, more skilled workforce than the construction stage. Opportunities will therefore be in value chain goods and services to remaining ongoing and future construction and operational phases. Karratha is already a centre for this, with a number of small and medium enterprises marketing into the resource sector value chain.

Similarly, LNG generally shows growth prospects. However, the extent to which this will flow on specifically to the City of Karratha is uncertain. There are prospects for on-shore support to future processing of any floating LNG platforms. However, it is unlikely this will lead to large increases in operational labour demand.

With a solid and expanding LNG industry, opportunities for businesses in the City will be likely to utilise the existing skill base in LNG and offshore servicing to expand to other areas. However, it is noteworthy that the current preferred site for a common user facility that might be a focus for the expansion of businesses servicing the off-shore industry is at Port Hedland. There is likely to be a rapid increase in the level of knowledge of FLNG technology and capturing this in the City, possibly via some specialised research projects, to the extent it is possible will provide a knowledge base that can be applied elsewhere.

In addition to LNG, a number of emerging industries are gaining momentum, enhancing business and employment opportunities in the area. Gold, lithium, zinc and cobalt projects are currently being developed across the Pilbara and the City is the epicentre of this growth. Innovative technologies and our proximity to established operations provide opportunities for magnesium and urea processing opportunities in the City.

Regional Services Economic Outlook

The City aims for an increased regional role for Karratha as the main service centre for the Pilbara, becoming the Primary Centre in the Pilbara for high end and specialist services, particularly in meeting demand for:

- Education services;

- Health services; and
- Administration (private and public sector).



Competitive position

Generally, investment in and development of major projects (private and public) is cyclical in nature with periods of highs and lows. There are prospects for new large projects and the City must position itself to participate in them. However, energy and impetus for new economic growth in the City, particularly for significant diversification, will come from within the community. Growth and diversification will come from a large number of small projects and from diversity in the economy, rather than the relatively small number of very large projects that has been typical in the past. It is most efficient to build on the strengths of existing initiatives and land use activities, of which there are many.

The establishment of Karratha City Centre as a primary regional administrative hub is in the interests of improved efficiencies and government models. The creation of this hub will result in improved services and facilities for industries and communities of North Western Australia. To pursue this objective it is recommended that the merit of establishing a broader range of government offices and agencies based within the City be further investigated. The City also supports the relocation of existing government offices from adjoining regions to Karratha.

Table 16: Comparative Strengths & Weaknesses for the City of Karratha Economy and Table 17 summarise the comparative economic strengths and weaknesses of the City and its economy, which have been the focus of the preparation of the Local Planning Strategy.

An Economic Development Strategy has recently been prepared for the City which details how the City might use its competitive position to successfully achieve economic growth and diversification. The Economic Development Strategy will assist in the implementation of the objectives arising from this Local Planning Strategy.

Table 16: Comparative Strengths & Weaknesses for the City of Karratha Economy

Comparative Strengths	Comparative Weaknesses
<ul style="list-style-type: none"> Home to large-scale world-class economic activity, including world-class purchasers. Skills and experience of marketing to major purchasers; Exportable goods or services that may be applicable to in other similar international markets; The biggest centre in the region, housing the greatest diversification, scale and range of regional services and is most likely to contain the mix of community, cultural and social facilities that will keep attract and keep a wider population mix; The location of the regional office for a number of government agencies. This provides a base for further attraction of government and private enterprises Good variety of lifestyle attractions around the Nickol Bay area generally; Very strong local and regional economy, with forecast continuing expansion; and Natural features for a range of economic activity, including solar radiation, flat land and a large quantity of industrial by-product. Opportunity to expand on the region's natural assets for tourism related activity and attraction 	<ul style="list-style-type: none"> A high cost base (this is common in many resource-based communities): Labour costs are high, on all national and international comparisons; General costs of doing business are high, including high utilities and services costs; Costs of commercial and residential accommodation remain relatively high, although these are starting to moderate; Local market is still relatively small (scale is not yet there); There is 'crowding out' of tourism activity by FIFO worker demand – this is expected to reduce fairly quickly from 2014; Human capital rankings (educational attainment, skilled labour) are relatively low compared with other Australian regions; High proportions of services are imported from other centres, principally Perth; Competing centres (e.g. Geraldton and Bunbury) are seen to have better lifestyle amenity and a lower cost base; and The region competes with others (Kimberley, Northern Territory, North Queensland) for political attention.

Source: Syme Marmion | Economic Drivers Evidential Analysis Paper
RDA | Pilbara Plan | Economic Development Strategy

Table 17: Key Existing, Completed & Potential Projects in the City of Karratha

Project	Strategic Impact
Major Infrastructure Projects (Cape Lambert, Gap Ridge)	Supports expansion of economic base.
Airport Expansion	Business and general tourism. Karratha as an administrative centre for major projects.
Dampier as High Amenity Residential & Tourist Location	Increases residential choice. General tourism – opportunity for resort development.
Dampier as a General Cargo & Marine Servicing Base	Marine servicing base for SMEs servicing economic base activity.
Anketell – General Cargo Capacity and associated General Industrial Land	Infrastructure for diversified economy and for further servicing of economic base.
Tertiary Education, Research base and associated Accommodation	Support for knowledge economy.
Telecommunications Infrastructure	Support for digital economy.
Excellence in secondary education	Karratha as a centre of high quality education.
Health Specialities / Aged Care	Regional services. Increased residential amenity.
Youth Facilities / Childcare	Increased residential amenity.
Urban Amenity - Karratha City Centre	Regional services. Increased residential amenity.
Waste Recycling / Re-use	Industry development building on economic base by-product.
Algae Farm/pilot Renewable Energy Projects	Illustration of a major diversification project.
Hotel/Tourism Projects	Business and general tourism. Karratha as an administrative centre for major projects.

Source: Syme Marmion | Economic Drivers Evidential Analysis Paper
RDA | Pilbara Plan

Employment

Karratha has a relatively low unemployment rate, sitting at 2.02 per cent in March 2018 (compared to the Western Australian rate at the same period being 6.2 per cent). The 2019 Land Use and Employment Survey (LUES) recorded a total of 10,266 persons employed within the City of Karratha. Between the 2011 to 2016 ABS Census years the City saw a shift from a high level of employment in 'construction' to more growth within the mining sector. Table 18 evidences this change within industry sector employment between the 2011 and 2016 census years, where a sharp reduction in the 'construction' category is seen, significant increases are seen in the technology, administration, health care and education categories.

Employment has exponentially grown within the City of Karratha. The 1996 LUES recorded a total employment of 2,721 persons. This figure grew by 53 per cent with a total of 4,176 persons employed in 2003. Since 2003, the number of employees within the City has more than doubled, increasing by 146 per cent to 10,266. This growth in employment is intertwined with a significant population increase and expansion in both 1996 and 2003. The categories which demonstrated an increase in the total share of employment from 1996 to 2019 were the health/welfare/community services and service industry by planning land use category, see Figure 24.

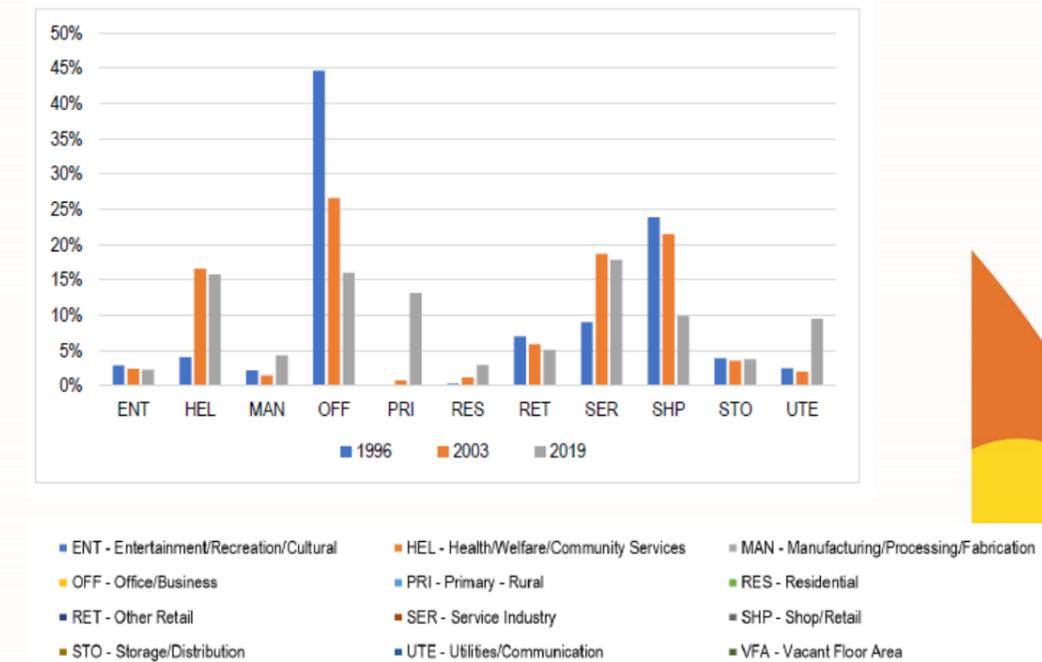


Figure 24: Proportion of total employment by land use and year

Economic activities driving employment around the main settlement areas are regional services and administration, LNG production, port and port-related transport operations and salt mining (Table 18). Given the City is considered the regional administrative hub of the Pilbara high employment in administrative professions is expected. This is evident through the office/business category, where State, Local Government and businesses specialising in employment services were the top three employers within the City.

Table 18: City of Karratha Employment 2011 & 2016 (ABS Census)

Industry Sector	2011	2016
Agriculture, Forestry, Fishing	23	21
Mining	2,713	2,851
Manufacturing	493	344
Electricity, Water, Waste Services	205	220
Construction	2,642	959
Wholesale Trade	228	197
Accommodation and Food Services	641	657
Transport, Postal, Warehousing	772	581

Information Media and Telecommunications	48	698
Financial and Insurance Services	62	51
Rental, Hiring and Real Estate Services	287	60
Professional, Scientific and Technical Services	451	273
Administrative and Support Services	387	479
Public Administration and Safety	654	656
Education and Training	639	751
Health Care and Social Assistance	478	590
Arts and Recreation Services	30	74
Other Services	351	370
Total Industries	11,660	10,085

The Karratha townsite is larger in population and encompasses a greater variety of land uses, consequently, eighty seven per cent of persons were found to be employed in Karratha with the remaining townsites all recording five and four per cent of the total employment (Figure 25 **Figure 24**). Of the four townsites, the largest growth in employment from 1996 to 2019 was observed in Roebourne. Total employment in Roebourne increased by 570 per cent from 81 to 543 persons. In comparison, Karratha's total employment increased to 267 per cent Wickham by 250 per cent and Dampier by 161 per cent.

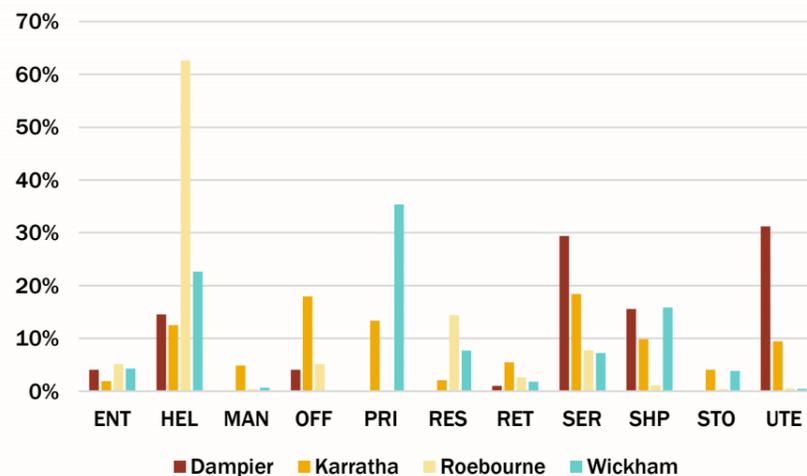


Figure 25: Employment by Townsite (LUES)

As the City's economy is underpinned by the mining sector, and the export of iron ore and LNG, it is vulnerable to changes driven by the global economy and commodity prices. The mining sector will continue to be the predominant driver of economic and employment growth in the region, however, there are aspirations for a more diversified economy to ensure the region's long-term economic viability in times of vulnerable commodity markets as well as changes to the world economy. This is to be achieved through further development of knowledge-based industries and increases in the capacity of export goods and services.



Fly-in-fly-out (FIFO) workforce

A significant challenge faced together by Pilbara towns and the resources sector has been the increase in fly-in-fly-out (FIFO) employment. This has resulted from responses to employment shortages as well as employee preferences as opposed to residentially based employment. It remains a significant proportion of the workforce employed in the Pilbara and there is no indication that this will change markedly. However, there are good indications that a very high proportion of the current FIFO workforce is in the construction sector and that the current high rate of short-term accommodation demand is driven by construction activity for major projects.

Syme Marmion and Co previously forecast that there will remain a FIFO workforce of around 2,500 in the City over the long term. This would largely be a mixture of long term operations (principally LNG and port operations) and short term maintenance workers.

While major centres in the City are not close to most of the Pilbara operational mines – some FIFO workers may use Karratha, Roebourne and other settlements as a FIFO / Drive-In Drive-Out (DIDO) residential base to work elsewhere in the Pilbara. This may partly be the result of the indigenous employment programs of Fortescue Metals Group and Rio Tinto. There is some evidence of this – the 2016 census shows in the three employment sectors of mining, construction and manufacturing, employment self-containment of 79% and 90 and 79% respectively, with almost 2,269 workers in the mining and 758 within the construction industry having their main residence in the City but their place of employment elsewhere. These will have the reverse effect on demand for community facilities to the incoming FIFO workers.

Information provided by Rio Tinto however, shows that the numbers of workers using Karratha as a residential base is far eclipsed by other locations: amongst regional WA, Rio FIFO workers are far more likely to have Busselton, Geraldton and Broome as a home base than Karratha. This is an area of opportunity for the City to attract a more permanent population by offering regional services and an attractive, affordable lifestyle.

6.2 Key Issues: Economy & Employment

Key economic and employment issues for the Local Planning Strategy include:

- Major industry will continue to provide a base for the City's economy however there is a need to encourage diversification.
- Establishment of Karratha as the primary regional centre for the North West, enhancing its competitive position and attractiveness for residential workforce.
- Ensuring there is sufficient zoned and serviced industrial and commercial land;
- Facilitating the development of small and medium enterprises (SMEs) in statutory planning;
- Facilitating the provision for land for small business, including incubation projects, clustering;
- Ensuring the needs of agri-business enterprises are accounted for in strategic planning;
- Identifying sites and infrastructure to support Karratha SHS as a centre of excellence and the establishment of tertiary education facilities and services in the City;
- Expansion of the health campus with incorporation of areas of specialisation;
- The expansion of aged care services and facilities in the City, including NGO support;
- Regional-level recreation / sports facilities;
- Implementation of the Karratha Airport Master Plan (as revised 2013), including regular international services;
- Accommodation for expanded government services; and
- Affordable accommodation and diversity of supply, for both residential and commercial accommodation.

Additional studies and strategies are required to support the objectives of the *Local Planning Strategy*:

- Formulating a digital strategy to enable remote and tele-working, improved e-health and e-education opportunities, and improved viability of regional services and administration.
- Promoting cultural activities and facilities.
- Expanded secondary school, including boarding facilities;
- Placement of accommodation for FIFO workers (especially operational FIFO) to enable community engagement.

6.3 Local Profile: Retail, Commercial & Industrial

Function & Hierarchy

Retail and commercial facilities for the City are concentrated primarily in Karratha. Retail and commercial floor space in other settlements generally services the local community only.

Centro Karratha is the main shopping centre for Karratha and surrounding area residents. Centro Karratha is a fully enclosed shopping centre anchored by a Kmart and Target Country discount department stores, and Coles and Woolworths supermarkets. It also contains over 50 specialty stores.

Dampier shopping centre requires refurbishment, with the only operating retail facility being an IGA express supermarket. Its major tenant is the Australian Border Force Pilbara Regional Office. Other commercial and retail offerings in Dampier include a hotel with restaurant, a sports club and a restaurant at the bowling club.

There are very limited retail services in the settlement of Roebourne. The Harding River Caravan Park has a small convenience store, and there is a small tourist shop at the Visitor's Centre and Old Gaol Museum. The only other retail amenities are a service station on the highway, a general store, and post office. A number of NGOs and government services are based in Roebourne.

Wickham has the most substantial retail offering outside of Karratha. It has a medium sized shopping centre with a Woolworths supermarket and a few small retail outlets, including a newsagent, service station, ATM and post office.

Point Samson has a modern well-serviced caravan park, an older and smaller caravan park, tavern, fish and chip shop, liquor and grocery store, and two short stay self-service accommodation facilities. Point Samson also has a seafood factory servicing the settlement's commercial fishing industry.

The 2019 Land Use and Employment Survey (LUES) prepared by the Department of Planning, Lands and Heritage (DPLH) provides a quantitative indication of the total floorspace by land use by estimating retail floor space based on Net Lettable Floor Area (NLFA). The survey indicated a total floorspace of 862,410m², of which 94% was occupied at the time of the survey. It determined that the Karratha townsite accounted for 74 per cent of the total recorded floorspace. Wickham townsite recorded a 17 per cent portion of total floorspace, followed by Roebourne (5 percent) and Dampier townsites (4 per cent). Table 19 below identifies the NLFA per category by settlement in the City as at 2019. Figure 26 depicts the percentage of land use by townsite, whereby it can be seen Karratha has the most even spread of land use compared to the other townsites.

Table 19: Gross Lettable Floor Area (m²) in City of Karratha (2019)

Category	Karratha	Dampier	Wickham	Roebourne	Total
Entertainment	25,442	4,050	9,270	4,230	42,992

Health	108,665	6,390	7,720	17,970	140,745
Manufacturing/Processing/Fabrication	40,420	0	150	180	40,750
Office	43,888	960	0	2,300	47,148
Primary-Rural	45,652	0	2,900	0	48,552
Residential	64,480	13,080	108,280	9,187	195,027
Other Retail	38,622	60	1,550	480	40,712
Service Industry	77,789	2,380	2,920	1,580	84,669
Shop/Retail	35,351	5,518	2,980	500	44,349
Storage/Distribution	52,984	550	1,750	3,420	58,704
Utilities/Communications	64,713	381	270	700	66,064
Vacant Floor Area	41,926	172	5,090	5,510	52,698
Total	639,932	33,541	142,880	46,057	862,410

Source: DPLH LUES 2019

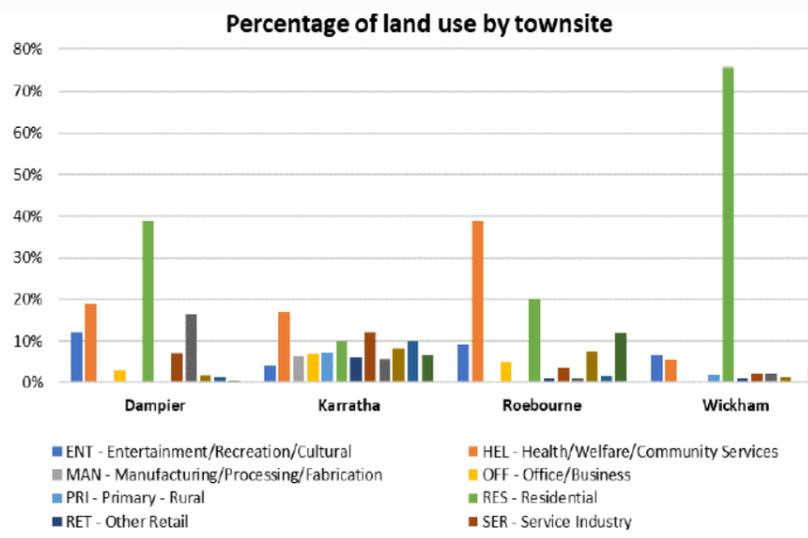


Figure 26: Percentage of Land Use by Townsite (LUES)

Drivers of Demand

There are several drivers for retail demand, these include:

- Increase in household, family and individual incomes (particularly disposable income)
- Savings habits
- Age structure of the population
- Ratio of females to males
- Shopping habits
- Population growth
- FIFO workforce.

The size and related potential dollar spend of the population will be the main determinant of demand for future retail and commercial services.

Retail and Bulky Goods Demand

From 1996 to 2003, the amount of recorded floorspace within the City increased by 58 per cent (DPLH 2019). From 2003 to 2019, floorspace increased by a further 256 per cent. Such a significant increase in floorspace is attributable to the rapid expansion of the mining industry on the Burrup Peninsula and in Dampier and Karratha and the flow through effect to commercial, industrial, retail and other sectors within the City.

The majority of retail and bulky goods functions are located within Karratha given it is considered the regional hub of the Pilbara region, providing administrative, industrial, retail, educational, health, commercial and recreational services.

The majority of future population growth and shop/retail and other retail floorspace demand will be directed towards Karratha which will continue to act as regional service hub for the wider Pilbara region. Future floorspace requirements will rely on a number of factors including innovation and the online vs instore ratio. Karratha will be able to provide for future retail demand noting it currently has the largest amount of vacant gross lettable floor area at 41,926m².

Given the changing retail environment including online services and direct to customer options, the availability of retail and bulk goods floorspace will need to be monitored by the City to ensure supply continues to meet demand.

Table 20 below provides an overview regarding the location of shop and retail uses within the City by relative floorspace area in m². As discussed above, the majority of shop, retail and other retail land uses are largely centred around the Karratha Town Centre.

Table 20: Floorspace (m2) within the Commercial Complexes - City of Karratha (LUES 2019)

Location	Shop/Retail	Other Retail
Isolated Uses Karratha	1,600	0
Karratha Town Centre	31,041	8,134
West Karratha	0	500
Road House	0	400
Dampier Town Centre	4,418	60
Roebourne Commercial	500	120
Wickham Commercial	2,030	650
Cossack	50	0
Point Samson Commercial	900	0

(Note: Other Retail consists of activities not normally accommodated within a shopping centre. By virtue of their scale and special nature the goods of these activities separate them from the Shop/Retail category. For example car sales yard or carpet showroom).

The allocation of floor space type provided within the City should have regard to the nature of the area and the potential for particular uses to be located within the City. In particular this should consider the critical mass required to provide for larger anchors stores and bulky goods and the relative isolation of the area.

Overall, it is considered that at least 80% of the total retail floor space needs of the City population should be provided within the Local Government area. It is noted retailers will also likely serve FIFO workers and visitors in addition. The remaining 20% represents expenditure which would escape (in net terms) to facilities located outside the City. This escape expenditure would be directed primarily to the roles of higher order centres located outside the study area (e.g. facilities within the Perth metropolitan area). Of course, if the local provision can be higher, local residents would benefit from such an outcome.

Across the various store types and retail categories, the level of self-containment of retail expenditure will fluctuate, reflecting the different roles of each type of retailer. Thus, for example, it is anticipated that a very high proportion all of food and grocery retailing should be catered for by retail facilities provided within the City (95 per cent). On the other hand, for the more discretionary types of retail expenditure, the level of self-containment is assumed to be lower. Overall, this is considered to be a conservative assessment as the extent of self-containment of non-food retail expenditure could potentially be higher than estimated.



Commercial Demand (Office)

Land zoned for commercial development is predominately located within the Karratha City Centre and in the towns of Dampier, Wickham, Point Samson and Roebourne. For the whole local government area there is approximately 220ha of land specifically zoned as 'Commercial', of this 120ha is currently developed. There is approximately 110ha in Karratha, 19ha in Dampier, 49ha in Wickham, 37ha in Roebourne, and 2ha in Point Samson.

As at November 2019 within the Karratha urban area, there was 272 hectares of land which had a zoning allowing for commercial development (LPS 8 provides for commercial development through the following zones: City Centre, Commercial, Mixed Business, Tourism, and Town Centre).

Within the Karratha Urban Area there is a total of 108 lots zoned suitable for commercial related development covering a total of 101 hectares. 82 hectares (81 per cent) is developed; four hectares (four per cent) is undeveloped; and 15 hectares (15 per cent) is unrated.

There is also significant and substantial stock of land adjacent to the Karratha Airport which may have capacity to cater for long-term service commercial use and emerging renewal energy-based industries i.e. the Karratha Eco Hub project.

The Karratha City Centre is the focal point for commercial development. The Karratha City Centre Master Plan has been implemented to deliver the Pilbara Cities vision to create a vibrant, active and diverse city centre for the City of Karratha and broader region. The Master Plan provides for expanded retail and

hospitality land uses, supported by high density accommodation and employment functions.

Recent examples of development within the City centre include the new Health campus and the Quarter and Pelago mixed use development projects as well as the Red Earth Arts Precinct which have added commercial floor space to the City of Karratha. The construction of the Hilton Garden Inn at the Quarter will also contribute commercial floor space within the City Centre.

There is currently approximately 75 hectares of land available for commercial expansion principally within the Karratha City Centre and in the suburbs of Nickol, Gap Ridge, Stove Hill, Pegs Creek and the Karratha Industrial Estate. Based on the current supply of zoned land, the recent completion of the Quarter and Pelago projects and the allocation of commercial expansion sites, it is expected that the current supply of zoned land for Commercial use will be capable of meeting demand in the short to medium term.

Between 2003 and 2019, the City saw an overall decline in demand for commercial land uses. This is evidenced by Figure 27 which shows that demand for commercial and retail land uses generally saw a decline while residential land uses saw a proportionally large increase in floorspace compared to its growth between 1996 and 2003.

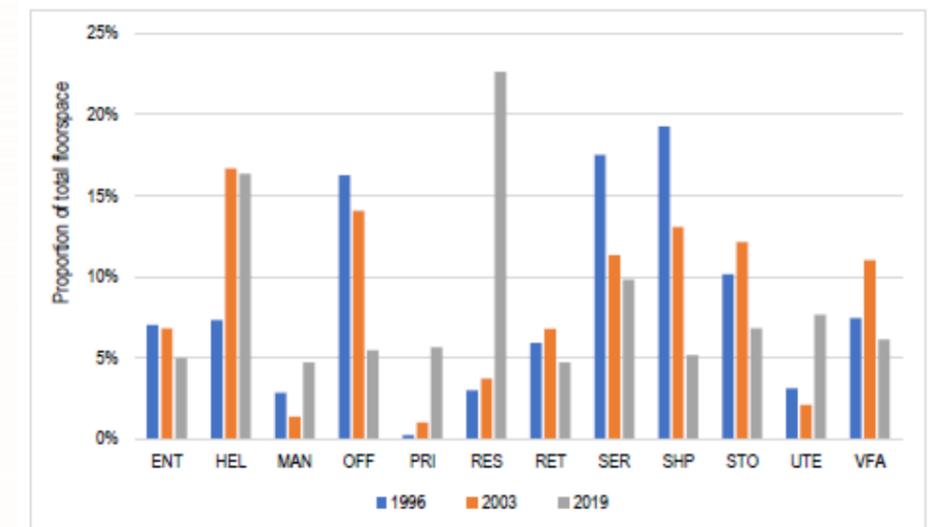


Figure 27: Comparison of Land Use Floorspace in the City of Karratha by Category (Karratha LUES)

Employment within the City of Karratha has grown exponentially between 1996 to 2019. This growth in employment is intertwined with a significant population increase and expansion within the mining sector. Office/business contained one of the largest shares of total employment in both 1996 and 2003. In 1996 office/business recorded an 45 per cent share. This dropped to 27 per cent in 2003 and 16 per cent in 2019 Figure 28.

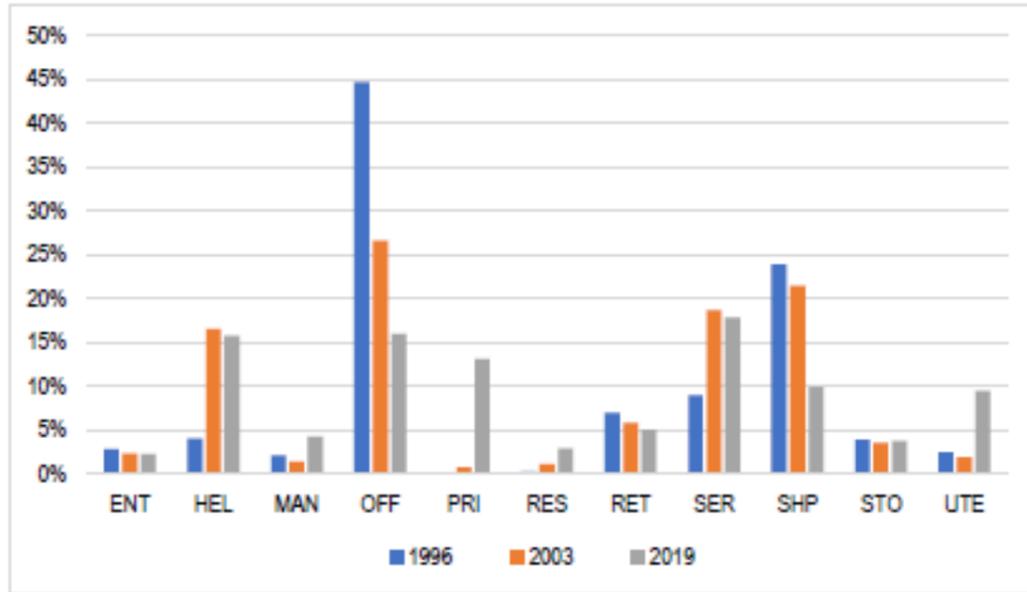


Table 21: City of Karratha Existing Industrial Areas

Location	TPS 8 Zoning	Primary Function Existing / Proposed	Role
Karratha, Dampier & Surrounds			
Karratha Industrial Estate	Industry; Mixed Business	Existing General Industry	General and light industry. Lower standard and specification of services / utilities compared to Gap Ridge.
Karratha Industrial Estate West (DIA7)	Development Area 17	Currently Vacant General Industry, subject to further investigation	Medium and long term General Industry development.
Karratha Industrial Estate North (DIA 8)	Conservation, Recreation & Natural Landscapes reserve, Recreation & Drainage reserve Rural	Currently Vacant Proposed to be future light industrial, subject to further investigation	Medium and long term Light Industry development.
Karratha Industrial Estate East (DIA 9)	Conservation, Recreation & Natural Landscapes reserve	Currently Vacant Proposed to be future general industry, subject to further investigation.	Medium and long term General Industry development.
Gap Ridge Industrial Estate	Strategic Industry; Industrial Development	Existing General Industry Light Industry	Stage 1 designed primarily for transport and logistics. Stage 2 marketed for service provider and maintenance uses. Stage 3 marketed for General Industry. Stage 4 marketed for Light Industry.

Location	TPS 8 Zoning	Primary Function Existing / Proposed	Role
Gap Ridge Industrial Estate North (DIA 10)	Rural	Vacant/ Extractive Industry Proposed general industry, subject to further investigation.	General and Light Industry lots responding to market requirements.
King Bay Industrial Estate	Strategic Industry	Existing Strategic Industry & Harbour	Leased to Chevron, BP, Shell, Japan Development Australia, Woodside Energy, BHPB, Yara
Cinders Road Industrial Estate	Industrial Development	Existing Industry Extractive Industry	Future land for industrial development.
Dampier Salt	Rural	Existing Industry	Industrial land for Dampier Salt.
West Intercourse Island	Strategic Industry; Infrastructure reserve; Conservation, Recreation & Natural Landscapes reserve	Vacant	Future land for industrial development. Reserve 49120 and 49121 vested to DPLH with no other registered interests.
Maitland Strategic Industrial Area	Strategic Industry	Mostly Vacant Proposed Strategic Industry & Downstream Processing Operations	Long term future supply of strategic industrial land. EDL currently operating a Micro LNG Facility
Cape Preston Port	Conservation, Recreation & Natural Landscapes reserve Rural	Existing Wharf & Railway Haulage	Strategic industry for Sino Steel magnetite facility, power generation, and wharf.
Eastern Corridor			
Cape Lambert (Point Samson)	Strategic Industry	Existing Strategic Industry & Wharf	Leased to North Mining Ltd, Mitsui Iron Ore Development Pty Ltd, Sumitomo Metal Australia Pty Ltd, Robe River Mining Co Pty Ltd, Nippon Steel Australia Pty Ltd.
Anketell Strategic Industrial Area	Strategic Industry	Proposed Strategic Industry & Port	Anketell Point multi-user Port Facility (State Port). Strategic Industry for resource companies, support industries.
Johns Creek Boat Harbour & Laydown	Industry	Existing Industry & Harbour	Leased to Westug Pty Ltd.
Wickham Industrial Area (Wilson Way)	Industry	Existing general Industry	General Industrial development, no Heavy Industry (evident).
Wickham Mixed Business Area	Mixed Business	Vacant	P Future land for Mixed Business development
Roebourne Mixed Business Area (Jager Street, Hall Street)	Mixed Business	General Industry	E Location for industrial activity, including servicing for mining industry, logistics and other mechanical.

Source: TPS 8 (2020); Roebourne Masterplan Plan (2014)

Figure 28: Proportion of Total Employment by Land Use and Year (Karratha LUES)

Industrial Snapshot

Industrial development has occurred in various locations throughout the City. Within the Karratha urban area, industrial land is located at the Karratha Industrial Estate and the Gap Ridge Industrial Estate. Within the eastern corridor of the City, industrial zoned land is in Wickham, Roebourne, the Anketell Strategic Industrial Area (strategic industry) and Cape Lambert (Strategic Industry). To the west and north of the Karratha urban area, industrial zoned land is in Maitland Strategic Industrial Area and on the Burrup Peninsula (Strategic Industry). The location of industrial land has been driven by the need to address local industrial land shortages, demand for suitable strategic industrial land, and also for capitalising upon natural advantages for industrial requirements (such as proximity to workforce, deep water port facilities, service corridors and road/rail connections to resources). To maximise appropriate use of industrial land the various functions and principal roles of the various industrial locations should be rationalised, which can be undertaken through an appropriate zoning framework in the Scheme to ensure the objectives and purposes of the zoned land reflect the intended purpose of the industrial location. Whilst encouraging the appropriate and orderly development of identified industrial locations, it will be necessary to discourage industrial uses from operating or establishing outside of these locations, without a strong and compelling planning rationale to support such a proposal. For example, establishment or agglomeration of industry along Tom Price Road / Warlu Road (i.e. Toxfree and Transpacific are currently established on Warlu Road) is not supported by the Strategy.

Table 21 provides a snapshot of the existing industrial areas within the City, as well as their primary function and current role.

Industrial Demand

A key determinant of demand for industrial land is the size, composition and structure of the industrial economy. The City has a particularly unique industrial economy given its remote location and its position servicing the major projects of the mining and resources industry of the region. Blue collar workers (trade persons, intermediate production and transport workers, and labourers) represent the primary employees in an industrial zone. Change in the size and location of 'blue collar' occupations is likely to provide an indication as to the quantum and requirements of industrial land.

The majority of the industrial zoned land in the Karratha urban area lies within the Karratha and Gap Ridge industrial Estates. Of this, 94 hectares of land has been identified to cater for industrial expansion. In addition, outside the Karratha urban area, approximately 12,700 hectares of land has been identified for industrial expansion within Maitland, Mount Anketell, Roebourne and Wickham.

Key projects that are currently underway or under advanced consideration on the Burrup area:

- Woodside's Burrup Hub (Pluto Train 2, Scarborough Development and the North-West Shelf Refurbishment and Browse Development); and
- Project Destiny (Perdaman's Urea Plant)

Table 22 indicates that there is sufficient future industrial land supply to cater for industrial expansion within the settlements of Karratha, Wickham, Dampier and Roebourne. Point Samson has the smallest supply of land available for future industrial expansion with approximately 4ha already developed and 1ha available for future expansion.

Table 22: City of Karratha Industrial Land Supply (DPLH - Regional North Land Capacity Analysis August 2020)

Development Status of Land	Total (ha)	Developed (ha)	Capable of Substantial Further Development (ha)
Karratha			
Industrial	624	362	262
Future Industrial	1,238	0	1,238
Total	1,862	362	1,500
Wickham			
Industrial	8	2	6
Future Industrial	20	0	20
Total	28	2	26
Roebourne			
Industrial	16	0	16
Future Industrial	14	0	14
Total	30	0	30
Point Samson			
Industrial	5	4	1

Future Industrial	0	0	0
Total	5	4	1
Dampier			
Industrial	2,301	85	2,216
Future Industrial	0	0	0
Total	2,301	85	2,216
Subtotal - Industrial Land within the City of Karratha			

There have been changes in the City's employment over the period 1991 to 2016. Over this period the proportion of workers in 'blue collar' occupations has grown relative to total employment. This is reflected in employment growth in the service sector, particularly for mining related occupations. Estimates for future industrial land requirements have a high variability. Forecasts are based upon trends in land use efficiency, floorspace efficiency and locational preferences of various industrial typologies.

In total land zoned for industrial development in the City amounts to 15,327 hectares, The Strategic Industrial zone accounts for 94 per cent (14,427 hectares), followed by the Industrial Development zone four per cent (688 hectares) and the Industry zone one per cent (212 hectares), Figure 29 below depicts stock of industrial zoned by locality.

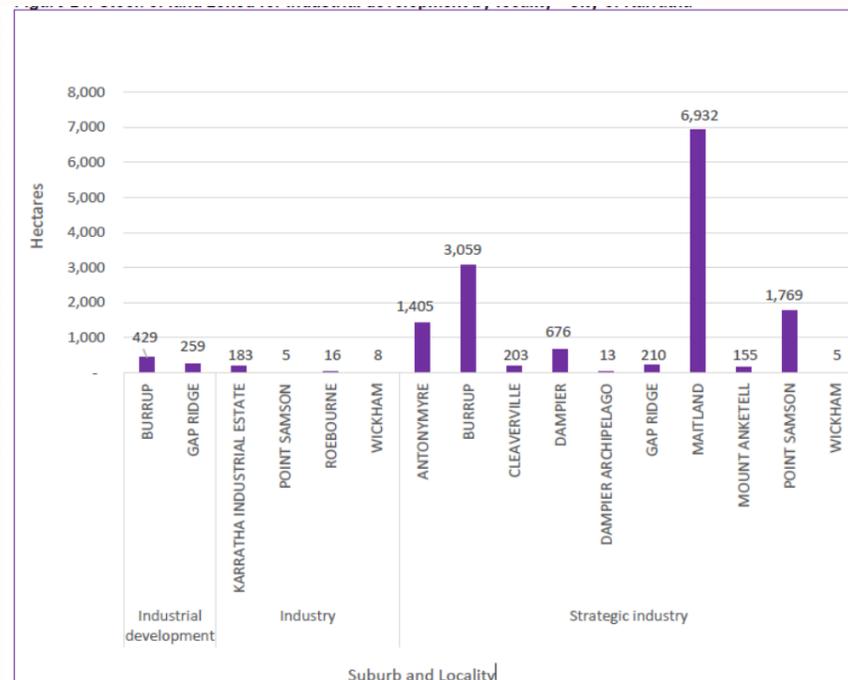


Figure 29: Stock of Land Zoned for Industrial Development by Locality

In addition to land zoned Strategic Industry, Industry and Industrial Development, a further 7,944 hectares of land in the locality of Mount Anketell is subject to an Improvement Scheme. The Anketell Strategic Industrial Area Improvement Scheme No. 1 was gazetted in November 2017. The Scheme identifies two heavy strategic industrial areas and a general industrial area, as well as an industry protection area. An Improvement Scheme is also currently being prepared for the Maitland Strategic Industrial Area which is 4,698 hectares. There is sufficient industrial zoned land to supplement growth to 2031.

Heavy / Special industry demand is highly variable and subject to external project influences, making future demand difficult to accurately predict. The City, however, has a large supply of Strategic Industry zoned land currently unutilised, which should be sufficient to meet demand throughout the planning timeframe. In regard to Light / General Industrial land requirements, analysis indicates that the existing Karratha and Gap Ridge Industrial Estates will be sufficient to meet the bulk of light and general industrial land demand to the medium term. Major new industrial areas to meet future demand include:

- Anketell Strategic Industrial Area - (planning instruments relevant to this area include Anketell Improvement Plan and Scheme)
- Maitland Strategic Industrial Area - (planning instruments relevant to this area include the Improvement Plan and Scheme)
- Gap Ridge North
- Karratha Industrial Estate Northern, Eastern and Western Expansion
- Karratha Airport industrial areas.

Industrial land at Roebourne and Wickham will also form an element of Light / General industrial land supply. These industrial areas will provide local services and employment to eastern corridor communities.



6.4 Key Issues: Retail, Commercial & Industrial

- Karratha is, and will remain, the primary retail and commercial centre for the City, with other settlements providing local level services and facilities to residents and visitors. Overall, the retail offering of the City should be able to provide for a minimum 80% of the population's retail floor space needs.
- Based on a moderate population growth scenario, it is expected retail floor space demand (including bulky goods) will largely be accommodated within Karratha as it will continue to act as the regional service hub for the Pilbara. However, future demand for retail floorspace should be closely monitored to assess demand amongst emerging online retailers and services which may diminish the need for a physical store front. It is expected that Karratha will be able to accommodate short to medium term demand
- The Karratha Town Centre and surrounds will continue to act as the major hub for bulky goods land uses, while Dampier, Roebourne and Wickham will provide for a smaller share of bulky goods floor space area. Additional floorspace demand should be closely monitored against the future expansion of complementary industrial land uses.
- There is sufficient stock of commercial land in the City to cater for commercial expansion. Approximately 75 hectares of land is available principally within the Karratha City Centre, and in the suburbs of Nickol, Gap Ridge, Stove Hill, Pegs Creek and the Karratha Industrial Estate.
- Demand for commercial related land uses decreased between 2003-2019. It is estimated short to medium term demand can be met with existing land supply. Additional commercial land should be carefully considered in association with monitoring of long term demand for the land use.
- The current provision of Light / General Industry land is estimated to be sufficient to meet demands to the medium term, but additional land may be required to accommodate industry growth beyond 2031. It is anticipated this will be provided for adequately through planned projects, including Karratha Industrial Area expansion and Gap Ridge North in the first instances, although these areas require comprehensive planning prior to development.
- Existing and planned industrial areas should be appropriately zoned for light, general or strategic industry in recognition of their primary function to prevent encroachment of incompatible uses.
- Zoning of existing and planned Strategic Industrial Areas should include off-site buffer areas or appropriately define buffer areas within designated SCAs.



6.5 Local Profile: Tourism & Visitors

The Tourism category is an amalgam of activities across various industry sectors such as retail, accommodation, cafes and restaurants, cultural and recreational services. The main leisure visitor market for the Pilbara region continues to be the self-drive traveller. The tourism industry sector services the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited.

The tourism industry currently employs over 800 people in the City of Karratha and accounts for 5.3% of total employment in the City. As a composition of total employment, the tourism sector grew from 2.9% in 2007 to 5.3% in 2016 (Karratha Destination Management Plan, 2018). This is a much lower proportion than in tourist-oriented localities such as the Shire of Augusta-Margaret River, where one sub-category of tourism employment such as accommodation and food services accounts for over 13% of City employment.

There are many opportunities to increase tourism as a proportion of the total economy from its current fairly low base. The City has recently prepared a Destination Management Plan (DMP) in 2018 which identifies opportunities and strategies for strengthening the local tourism industry and growing the visitor economy overall. The City will continue to implement the DMP.

The City has approximately 81.18ha of land zoned for tourism related uses. These areas are strategically located within close proximity to coastal areas and existing townships. In investigating how opportunities to increase tourism to these areas might be achieved, it is useful to look at the five 'A's of tourism, namely: attractions, amenity, access, accommodation and activities.

Attractions

A number of tourist attractions are identified in the City or directly accessed through the City:

- Cossack Heritage Townsite
- Cossack Heritage Trail
- Old Roebourne Gaol
- Yaburara Heritage Trail
- Millstream National Park
- Karijini National Park
- Mt Herbert, Chichester Ranges
- Burrup Peninsula
- Murujuga National Park
- Burrup Rock Art
- Stairway to the Moon (Hearson's Cove)
- The Dampier Archipelago
- The Montebello Islands

Attractions relate to the coastal and inland environment, as well as Aboriginal and European heritage. Many of these are world-class. In addition, the City has an unique opportunity to diversity and grow additional destination attractions to leverage on the regions natural assets such as:

- Higher quality destination holiday parks
- Island or coastal glamping facilities
- Dampier Marina as a hub for water-based recreation

These attractions can form the basis of a viable and larger tourist industry within the City. While these unique attractions will assist in developing a wider tourism industry for the city, it is important that they are also safeguarded and protected from any future development impacts and over commercialisation.

The City's Destination Management Plan identifies a range of actions and development opportunities to attract investment and to assist in growing the visitor economy on a sustainable basis within a regional economy that is very heavily mining and resource based.

Amenity

Tourist amenity in the way of services and facilities is variable across the City. It is not as advanced or comprehensive as some of its competitor locations. Interpretive facilities and information services are generally not widely available or well established. The City, however, has exceptional and unique natural amenity that provides opportunities to generate high amenity tourism destinations and experiences.

Access

In comparative terms accessibility to the Pilbara is very good. It has good regional road connections and, importantly, a busy airport with a range of interstate and intrastate connections, as well as prospects of international connections. However, airfares are comparatively high and if a discount airline were to operate the route it would be a tourist advantage.

Accommodation

The City is not a major established tourist destination in the way that, for example, Broome or Exmouth are. Lack of affordable, accessible tourist accommodation is a major contributing factor limiting the City in this sense. Challenges with respect to tourist accommodation include:

- The effects of a FIFO workforce making accommodation difficult to get and expensive;
- A lack of promotion as a tourist destination;
- Limited tourist-oriented resorts and facilities, with a small 'resort' and caravan parks at Point Samson being the notable exception – but these are a small fraction of the range and scale of tourist accommodation that is available in other similar localities. By comparison, Broome has a wide and extensive range of tourist accommodation and therefore gets much more attention; and
- Accommodation shortages have led a major component of the self-drive market, namely the 'grey nomad' caravan and camping trade, to by-pass Nickol Bay and travel direct from Broome to Exmouth.

A recent audit of existing accommodation stock within the city found a high proportion of hotel and motel accommodation clustered around the Karratha CBD with a limited amount of accommodation dispersed in other parts of Karratha, aside from camping grounds.

The City's existing accommodation stock falls within the 2-3 star category. There are gaps in the higher-quality accommodation segment of 3.5 star and above. The opportunity exists to consider:

- introducing a new internationally branded and higher quality hotel

- higher quality destination holiday parks; and
- small-scale boutique eco-glamping operations to capitalise on natural assets.

Activities

Tourist activities are comparatively underdeveloped in the City. In large measure they have been crowded out by the activities of the resource industries. An example is the very low availability of boats for tourist operations to off-shore islands in preference for resources off-shore work. This is an opportunity for expansion.

The City already undertakes or sponsors a range of events for the local community which are increasingly becoming drawcards for tourists, including:

- Cossack Art Awards
- Red Earth Arts Festival
- NAIDOC Week
- Karratha Community Celebration
- FeNaCLNG Festival

Following the path of the Warlu, or Dreamtime sea serpent from the shores at Ningaloo, through the lush oases, soaring gorges, rugged ranges and ancient Aboriginal art of the Pilbara and Kimberley regions to Broome, the Warlu Way is proving a highly popular route that poses considerable tourism potential (see Figure 30).



Tourism Sector Expansion

There are many opportunities for expansion of the tourism sector:

- Improvements and increases to provision of facilities for the caravan and camping segment. There is an opportunity to examine the possible re-use or re-orientation of existing TWA camps or, at least, the various short stay accommodation facilities which are in and around major centres in the City.
- Expansion of adventure tourism – glamping, fishing and diving – in the Dampier Archipelago and Montebello Islands. This would be based out of Dampier and Point Samson.
- Business tourism. There is potential to increase visitation to the City in relation to business and industry, including conferences and training relevant to the regions mining and resources specialisation.

- Capturing 'Industrial tourism' – This is a niche sector, which could be expanded and developed. This sector of the tourism market relates to leisure visitors with an interest in industry who seek out these facilities.

Cultural Tourism

The City of Karratha has a strong Aboriginal cultural base that could be used to greater extent to expand tourism.

Roebourne town is a centre for numerous Aboriginal language groups, all of whom have unique traditional practices. Roebourne is home to the Roebourne Art Group and the Yinjaa-Barni Art Group which both have nationally and internationally renowned artists working and displaying art. Roebourne's outdoor amphitheatre is part of a developing cultural centre and the venue for local cultural events dance, music and theatre. A growing external appreciation of this artistic expression has begun to create a tourist attractor for Roebourne.

Two of the most visited cultural tourist sites in the area are the Burrup Peninsula and Dampier Archipelago. Both places hold great significance to the Traditional Custodians. The Murujuga Aboriginal Corporation (MAC) is currently looking at tourism prospects in this area through a Cultural Management Plan.

Ecotourism also presents a valuable opportunity for the City, and may be closely associated with Aboriginal cultural tourism through initiatives such as cultural bush tours. Some of these sorts of opportunities have already begun to emerge at a limited scale.

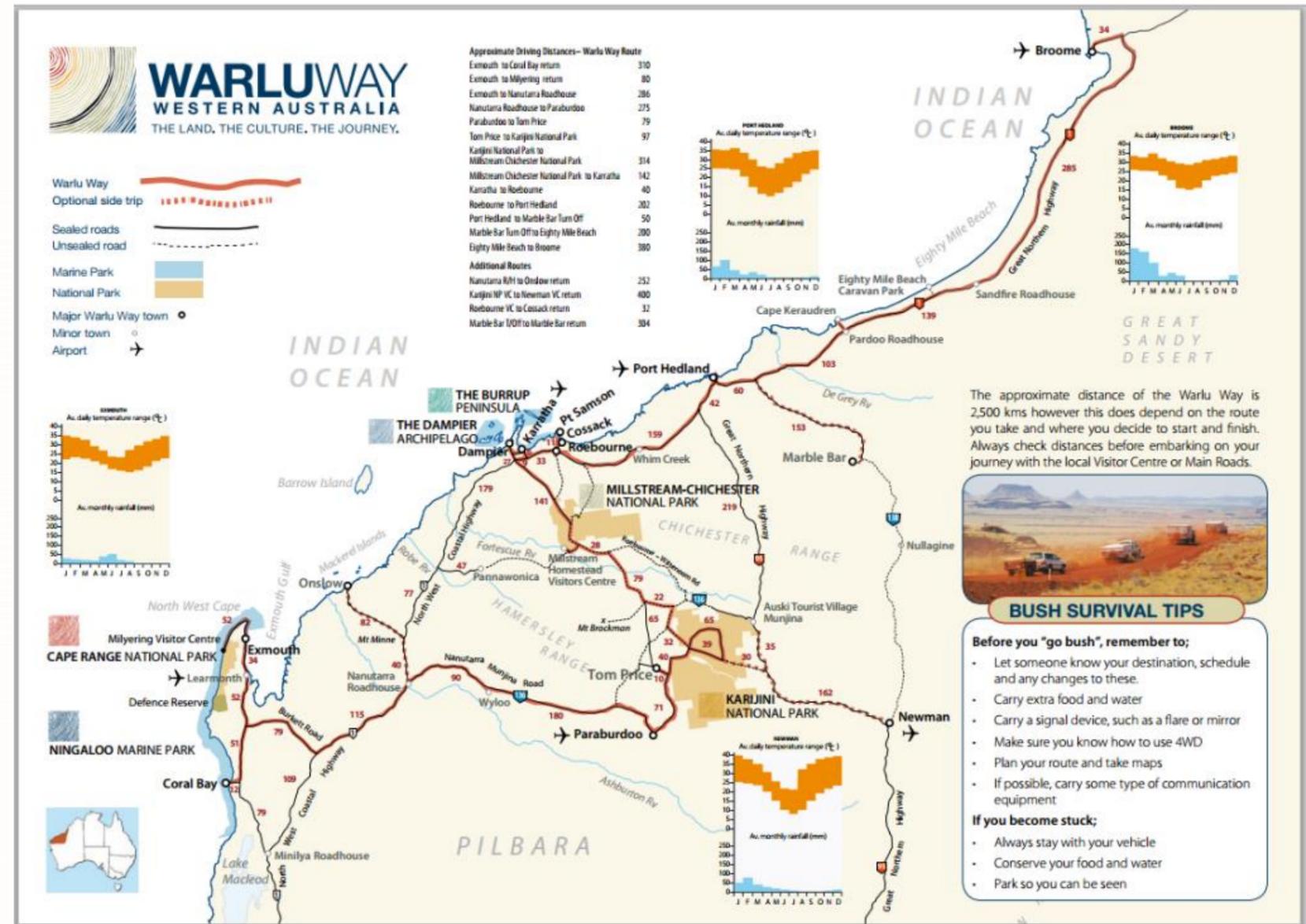


Figure 30: Warlu Way

6.6 Key Issues: Tourism & Visitors

- The City has several world-class quality tourism attractions to form the basis for a larger and viable tourism industry. In addition the City has approximately 81.18 ha of land zoned for tourism related land uses. These areas are strategically located within close proximity to coastal areas and existing townships. However, despite the natural amenity and land availability, tourist facilities amenity is currently inconsistent and not highly developed.
- Improvements to accessibility, particularly inter-State and international flight connections with the expansion of Karratha Airport will be important to opening up the tourism market. Intra-State flights are currently prohibitively expensive to the tourism market, and promotions or package deals that provide for discount tourist flights may provide another means to increase tourism.
- Lack of accessibility, affordability and diversity for tourist accommodation is currently a critical limiting factor, as FIFO workforce drive demand and prices up. The range and scale of tourist accommodation currently offered is a fraction of that available in other similar regional localities. Demand for accommodation is expected to ease with the winding up of the construction phase of major projects, and there may be an opportunity to re-use or re-orient existing TWA camps and short stay accommodation facilities in and around the City's major settlements for tourism accommodation.
- Tourist activities are comparatively undeveloped in the City and have also experienced crowding out by the resource industry. Expansion of adventure tourism activities, including fishing and diving in the Dampier Archipelago and Montebello Islands, present good opportunity for the City. Such activities would be based out of Dampier and Point Samson. A future marina development at Dampier could provide a strong base for adventure tours and could potentially accommodate cruise ship docking. There is also strong demand for a high quality tourist park in Dampier.
- Aboriginal arts and cultural tourism also present valuable opportunities for expansion of the tourism sector. This may combine with expansion of ecotourism through initiatives such as cultural bush tours or Burrup rock art viewing with the Traditional Custodians.
- A measure of success for the tourism industry in the City would be for it to be able to regularly house industry and academic conferences, including international conferences, of some size. If it could do this it would demonstrate that it has the requisite accommodation, facilities and transport connections to also appeal to a wider tourist market.
- Provision of adequate infrastructure to cater for the self-drive traveller.
- An overall coordinated City tourism strategy – this could expand to a regional strategy for the Pilbara with the involvement of the PDC and RDA Pilbara:
 - Skills development;
 - Promotion;
 - A link with other areas (e.g. Broome, Exmouth) for packages; and
 - Additional accommodation and accommodation upgrades.
 - Longer term expansion of infrastructure will also be important to fostering the City's tourism sector. Projects include:
 - Dampier marina – a base for adventure tours and a cruise ship docking point; and
 - International airport – direct links to Asian capital cities.

7.0 Theme 3: Environment

7.1 Local Profile: Physical Environment, Climate & Natural Resource Management

Climate

The City of Karratha is described in the *Environmental Strategy* (Essential Environmental 2013) to have a tropical climate along the coastal areas, transitioning to an arid climate throughout the central and eastern parts.

An average climate profile for the City appears at Figure 31. Results indicate the hottest months occur between October and April, a period which experiences average maximum temperatures ranging from 35°C–37°C. Temperatures between May and September are milder, with average maximum temperatures ranging from 26–31°C. The City experiences cooler nights between May and September, with minimum temperatures ranging from 13–18°C. Diurnal temperature range increases with increasing distance from the sea. This results in more extreme maximum and minimum temperatures at inland locations.

Coastal areas receive higher rainfall, in comparison to the more arid desert areas in the central east of the Pilbara region. Rainfall is generally low (270-400mm) variable and over 50% of rainfall received is from cyclonic events during summer. The Pilbara coastline (Broome to Exmouth) receives tropical cyclones with a frequency and severity higher than anywhere else in Australia, with an average of two tropical cyclones crossing the Pilbara coastline each year.

The City experiences long dry periods and overall the region experiences the highest annual evaporation rate in Australia (Van Vreeswyk et al 2004, Essential Environmental 2013), which has implications amongst other things for water resources.



Predicted Climate Change

The Bureau of Meteorology (BoM 2020) has mapped changes in average temperature and rainfall since 1970. Since 1970, the BoM research indicates that the Pilbara region has experienced increasing temperatures and changing rainfall patterns, with declining rainfall in coastal areas and increasing rainfall inland. It is considered the increased rates of rainfall inland are related to an increased number of cyclones passing through the Pilbara. There is a trend of less frequent but more significant rainfall events. With long dry periods, soils become more hydrophobic whereby there is minimal retention of rainfall within the landscape and this can result in high velocity run-off (Essential Environmental 2013).

Various climate change models project an increase in temperature of slightly over 1°C by 2030, which will increase the rate of evapotranspiration in the region. Decreases in rainfall of approximately 4% across both summer and winter periods are projected, which may affect water availability. Projections for 2070 indicate a temperature increase of around 3°C compared with 1990 and a decrease in rainfall during the winter period (Loechel et al. 2011b).

Loechel et al. (2011b) also projects an increase in the severity of extreme weather events and storms, including an increase in the strength of tropical cyclones impacting the Pilbara. An increase in tropical cyclone intensity not only increases the degree of destruction at the centre of the cyclone but also the geographic area over which the cyclonic winds and flooding rains impact.

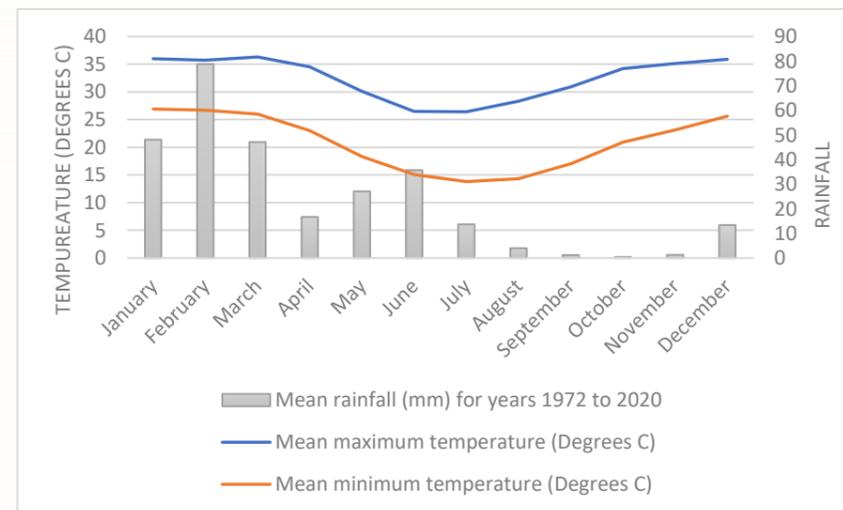


Figure 31: City of Karratha Average Monthly Climate Statistics

Cyclone intensity and frequency will have significant implications for the City. Extreme weather events can lead to damage to buildings, property and infrastructure, and lead to loss of life in the community as well as livestock, flora and fauna. Disruption to oil and gas tanker schedules and disruption to exploration and production rigs will have broad-ranging economic implications. Operating costs for emergency services and emergency response are predicted to increase in relation to responding to more extreme weather events.

The coastal areas of the City are potentially vulnerable to changing ocean levels (astronomical tidal ranges, storm surges, wave set-up, sea level rise, tsunami). A study by the Department of Climate in 2009 found that:

- increased temperatures would result in a loss of work productivity;
- sea level rise would lead to increased flooding as well as increased maintenance costs for port authorities, coastal industries and infrastructure;
- lower rainfall would increase reliance on water source alternatives to groundwater or surface water; and
- increased incidences of damage from more frequent and extreme events.

Projections for Karratha provided by JDA et al. (2012) indicate the following:

- The projected climate conditions for 2060 include a 0.3 m rise in sea level, 10% increase in intensity and frequency of cyclones and a 0–20% increase in rainfall intensity for events greater than a 20-year ARI (Average Recurrence Interval) storm event; &
- The projected climate conditions for 2110 included a 0.9 m rise in sea level, 10% increase in intensity and frequency of cyclones and a 10–30% increase in rainfall intensity for events greater than a 20-year ARI event.



Source: BoM 2013

Coastal Processes

Coastal, low lying areas of the City are extremely vulnerable to inundation during tropical cyclones, storms and tsunami events. These areas are subject to very large tidal ranges, which coupled with the adjacent wide and shallow continental shelf, leads to the coastline being highly susceptible to storm surge and impacts from tsunamis (GEMS 2009).

Modelling scenarios considered in this *Strategy* are the 100-year ARI Stormwater Flood Extent and the 500-year ARI Storm Surge Extent. Selection of this data was based on providing worst-case scenario modelling to determine impacts from coastal processes in accordance with *State Planning Policy 2.6 Coastal Planning (SPP 2.6)*.

The 100-year ARI Stormwater Flood Extent shows those areas that will be affected by stormwater from an oncoming 100-year storm, essentially displaying the path of stormwater runoff and flooding.

The 500-year ARI Storm Surge Extent shows those areas affected by an oncoming 500-year ARI storm due to the combined impacts from rises in sea level, rivers, tides and wave action associated with wind stress and low atmospheric pressure. In the City of Karratha, these scenarios would normally be associated with tropical cyclones.

The following sources of available data were drawn on to create a City of Karratha coastal processes map (Figure 32) to determine those areas of the City subject to the affects of flooding and storm surge for the 100-year and 500-year ARI events in accordance with *SPP 2.6*:

- JDA et al. (2012a, 2012b), which provides a series of flood maps highlighting areas of Dampier and Karratha subject to flooding and storm surge impacts following the 100-year and 500-year ARI events;
- GEMS (2009), which indicates areas of the greater City subject to inundation following the 100-year ARI event, as well as the depth of inundation; and
- Data provided by City of Karratha indicates areas around the Roebourne townsite subject to storm surge inundation following a 500-year ARI event.

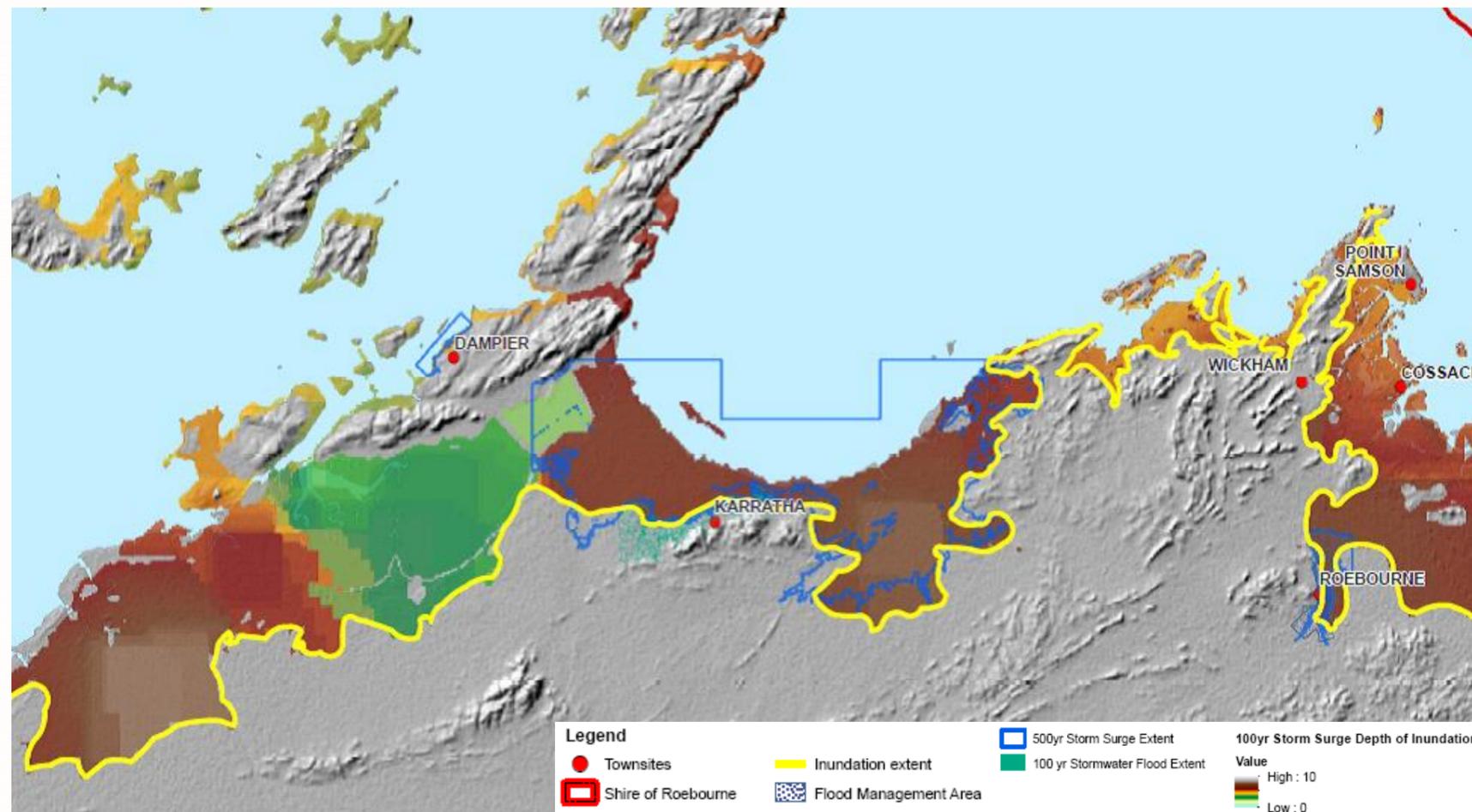


Figure 32: Stormwater flood extent and storm surge extent modelling (Strategen, 2013)

Coastal Flooding

Results indicate storm surge from a 500-year ARI event will affect the existing Karratha and Dampier townsites, particularly those areas situated at the northern and north-western outskirts respectively (see Figure 33). Similarly, stormwater flood extent following a 100-year ARI event will affect both townsites.

The eastern outskirts of the Roebourne townsite are marginally affected by storm surge from a 500-year ARI event, but the existing townsite lies outside the 100-year ARI event inundation line, which is generally associated with the Harding River to the east (Essential Environmental 2013).

The existing Wickham townsite is situated outside the 100-year ARI event inundation line, which will constrain future development to the east and northwest. Conversely, future development within the Point Samson and Cossack townsites will be significantly constrained due to the coastal location of each and associated inundation expected to occur from a 100-year ARI event.

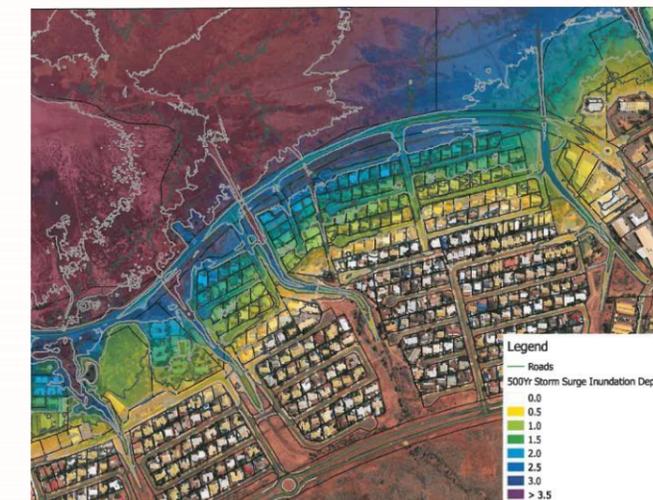


Figure 33: Example 500yr storm surge inundation depth for Pegs Creek (MP Rogers & Associates (2012); City of Karratha DP19 (2013))

Managing Coastal Vulnerability

The City has taken a precautionary approach to the management of the coastal environment. This includes investigating coastal hazards and vulnerabilities, incorporating modelling into policy work and constructing a risk management framework for assessing coastal development proposals. In addition, available flood modelling will be used to plan and implement upgrades to the drainage network to reduce the risk of flooding.

The City has prepared a Coastal Management Strategy (2017) which provides a framework for the long term management of the coastal environment, taking a quadruple bottom line approach that considers social, economic, environmental and governance factors.

The City will evaluate land use and development in the context of likely effects of 100-year and 500-year ARI events as appropriate. The extent of potential coastal hazards and shoreline stability will determine town site expansion areas across the municipality. The City will ensure the impacts from coastal hazard risks are avoided or reduced to acceptable levels through Foreshore

Management Plans and/or through Coastal Hazard Risk Management and Adaptation Plans. This approach allows for the incorporation of the most current scientific information as it becomes available.

The consideration of sea level rise for coastal development and infrastructure has also been undertaken through the use of recommended coastal setbacks. In addition to risks of inundation from storm surge and sea level rise, coastal erosion will be investigated for new development in the coastal environment. Consideration of erosion will include allowances within the 100-year planning horizon for:

- The current risk of storm erosion;
- Historic shoreline movement trends;
- Erosion caused by future sea level rise; and
- Allowance for uncertainty.

Furthermore, understanding how sediment cells function, provides guidance on the type of management solutions most suitable for specific coastal nodes. Marine and terrestrial landforms are connected. Development or construction in one sediment cell may have effects on other cells. There are four key sediment cell considerations in coastal planning:

1. Coastal stabilisation works can transfer stresses along the coast, which is manageable if there is a balance of erosion and accretion within a sediment cell.
2. Coastal stability issues that affect an entire cell will require an improvement of coastal resilience, for example through transferring sand from the nearshore to the beach and dune system.
3. Erosion and accretion occurring differently between cells will require long-term management for effective balancing.
4. Erosion or accretion occurring across multiple cells implies a significant dominant issue for management consideration, which can be addressed by identifying sacrificial coastal nodes.

To manage coastal vulnerability, the City completed a Coastal Hazard Risk Management Adaptation Plan (CHRMAP) in 2014. The CHRMAP provides guidance to applicants and decision makers looking to develop buildings and infrastructure on land identified as being affected by the 500-year ARI storm surge event. The CHRMAP enables the City to determine where a coastal hazard risk is acceptable and if so, under what management conditions. If development is not covered by existing mapping, or if the existing mapping is not adequate, the onus is on proponents to undertake the necessary coastal hazard identification process in accordance with the requirements of the CHRMAP.

Surface Water

The City covers numerous surface water catchments, including Fortescue River, George River, Harding River, Maitland River, Peawah River, Peter Creek, Robe River, Sherlock River, Turner River, Yule River and Coastal catchments. Coastal settlements of the City are situated within the Coastal catchment area.

All waterways in the City of Karratha are highly variable, flowing for only part of the year in response to larger, generally cyclonic, rainfall events. Major river systems of the City originate on higher ground to the south and traverse over the

coastal plain, with most watercourses terminating in sand and mud flats some distance inland from the sea.

The major drainage system in proximity to coastal settlements of the City is the Harding River, which traverses Roebourne and discharges near Cossack. The Harding Dam, located upstream from Roebourne along the Harding River, is the only surface water source used as a major water supply in the Pilbara.

Neither Ramsar nor nationally important wetlands are located within the City.

The Department of Water and Environmental Regulation (DWER), in carrying out its role in floodplain management, provides advice and recommends guidelines for development on floodplains with the objective of minimising flood risk and damage. DWER use the following guiding principles to ensure proposed development in flood prone areas is acceptable with regard to major flooding:

- Proposed development has adequate flood protection from a 100 year ARI flood;
- Proposed development does not detrimentally impact on the existing 100 year ARI flooding regime of the general area.

The DWER's recommended floodplain development strategy includes the following provisions:

1. Proposed development (i.e. filling, building etc.) that is located within the flood fringe is considered acceptable with respect to major flooding. However, a minimum habitable floor level of 0.5metres above the adjacent 100 year ARI flood level is recommended to ensure adequate flood protection.
2. Proposed development (i.e. filling, building etc) that is located within the floodplain and is considered obstructive to major flows is not acceptable as it would increase flood level upstream. No new dwellings are acceptable within the floodplain.
3. A failure to properly adhere to these recommendations will result in a greater exposure to risks of flood damage. This advice is related to major flooding only and other planning issues such as environmental and ecological considerations may also need to be addressed.

DWER assists local government in the establishment of floodplain management strategies based on these guiding principles and floodplain management principles. *Best Practice Principles and Guidelines* (CSIRO 2000) sets out principal objectives for floodplain management.

Where development occurs, surface water needs to be managed so as to not impact on the environment or cause flooding. The City is responsible for the management of flooding and drainage in the major townsites of Karratha, Dampier, Point Samson, Roebourne, Wickham and Cossack. This includes routine maintenance of systems and approval of new systems for new areas of development.

Key stormwater management issues associated with Development in the City include the management of erosion, silt, sediment, water quality and weeds, particularly in sensitive environments. It is recognised that the red soils of the Pilbara region have a high capacity for erosion. This, coupled with the high

volumes of stormwater which flow in the wet season, requires active and effective management to adequately control erosion and sediment transport. These require different approaches to those currently being implemented in the South-West of the State across the Swan Coastal Plain, largely due to the different soil conditions and nature and volumes of rainfall.

A number of studies have been investigated the capacity of the existing drainage systems of Karratha, Dampier, Point Samson, Wickham and Roebourne. These studies are utilised by the City to inform asset management planning and infrastructure upgrades where possible. In addition, these studies are used to guide the design and construction of new drainage systems in new areas. Key studies which provide guidance for the future planning and development of the key townsites within the City are:

- City of Karratha Water Management Strategy (2016)
- Karratha drainage management plan (2010)
- Dampier stormwater management study (2015)
- Roebourne local water management strategy (2013)
- Wickham townsite accommodation expansion project (2011)
- City of Karratha Stormwater Design Guidelines for Residential Developments (2011)

Groundwater

Because of the variability in rainfall and high evaporation rate in the Pilbara, groundwater is a very important water resource in the City. Groundwater occurs throughout the region but is most easily located and accessed near surface water drainage lines.

The key groundwater aquifers in the City are the Hamersley fractured rock aquifer, Pilbara fractured rock aquifer, Lower Fortescue Alluvial, Carnarvon – Birdrong, and Pilbara coastal saline aquifer. The aquifers on the coast are relatively small, typically receiving an annual recharge of less than 10 GL/yr. Allocation limits and water availability for these aquifers is presented in Table 23.

The fractured rock aquifers are harder to locate than the coastal aquifers and the amount of water available from them is difficult to predict. Water supplies in these inland areas can, therefore, be problematic both in quantity and quality (DoW, 2010). The water abstracted from these aquifers is mainly for mine use and mine dewatering purposes.

Table 23: Groundwater Allocation Limits (2015)

Aquifer	Allocation limit (kL/year) ^	Availability (July 2015)**
Lower Fortescue Alluvial	7,000,000	Water available
Pilbara - Coastal Saline	2,000,000	Fully allocated
Pilbara - Fractured Rock	Not set*	Unknown
Hammersley - Fractured Rock	Not set*	Unknown
Carnarvon - Birdrong.	300,000	Water available

Notes:
 ^Pilbara groundwater allocation plan draft for public comment (DoW, 2012a)
 *For fractured rock aquifers, where most mining occurs, water availability will be assessed on a case-by-case basis through licensing (DoW, 2012a)
 **Obtained from DoW's online Water Register: <http://www.water.wa.gov.au/ags/WaterRegister/>

Water Source Protection Areas

Surface and groundwater resources of the City are contained within the Pilbara Surface and Groundwater Areas, which are proclaimed and protected under the Rights in Water and Irrigation Act 1914 (RiWI Act). In addition, there are two Public Drinking Water Source Areas (PDWSAs) in the City protected under the Country Areas Water Supply Act 1947 (CAWS Act). These are the Harding Dam Catchment Area, which includes the Millstream aquifer (Protection Area P1); and the Roebourne Water Reserve (Protection Area not assigned). Any future development will need to consider potential impacts on these PDWSAs, as required under the CAWS Act.

Water Supply Management

Water for the West Pilbara water supply scheme comes from the combined sources of the Lower Bungaroo Valley borefield, Harding Dam and Millstream aquifer (Figure 34). The West Pilbara water supply scheme supplies most of the coastal towns and port facilities of the City including Karratha, Dampier, Roebourne, Wickham, Point Samson and Cape Lambert and proposed ports at Anketell and Cape Preston.

Prior to 2014, the West Pilbara water supply scheme was sourced from the Harding Dam and Millstream Aquifer. The demand on these sources was around 12 to 13 GL/yr, which was largely attributed to dust suppression requirements for iron ore production and other industries to meet health and safety requirements. This amount however, exceeded the long-term reliability of supply which was modelled at 10GL/yr (DoW, 2013).

The State Government and Water Corporation undertook negotiations with Rio Tinto to establish another drinking water source and in May 2014, Rio Tinto completed construction of a new 10GL/yr borefield in the Lower Bungaroo Valley in the Shire of Ashburton which now contributes to the West Pilbara water supply scheme.

Currently, irrigation water for public open space is largely provided from scheme water, although it is proposed that wastewater from the upgraded Karratha wastewater treatment plant may be used to supply non-potable water to the Mulataga development or for use by the City. West Pilbara has a non-potable seawater supply scheme and desalination plant capable of supplying water for industrial use. The port facilities at Cape Lambert, Dampier and the Burrup Peninsula are the main industry users of scheme water.

Demand is expected to increase to 27.5 GL/year by 2031 in accordance with population demand projections (DoW, 2012). In terms of expansion of water infrastructure to cater for future growth in the City of Karratha, the Water Corporation has longer-term plans in place to provide additional water storage infrastructure up to 2035. The expansion of Water Corporation's infrastructure will also be influenced by the amount of industrial growth requiring a water supply service and the capacity of the Harding Dam and Millstream groundwater sources.

The Water Corporation will continue to monitor growth and then make decisions accordingly.

Ongoing improvements in water efficiency and recycling are important as they can help delay large investment in new water sources. Significant gains have been made over the past decade, for example Rio Tinto has reduced water used at the Dampier port by almost 30 per cent.

The Water Corporation has also implemented a program expected to save 3.4 GL/yr across the Pilbara and will continue to identify and implement further improvements. The water demand-supply balance will be reviewed with stakeholders at least every two years to determine if there have been any significant changes.



Figure 34: City of Karratha water sources

Landform & Topography

The Pilbara region contains a diverse range of landform features, from low mud flats, rocky promontories and sandy beaches of coastal areas, to inland desert areas characterised by stony ridges, abrupt escarpments and steep scree slopes, separated by stony, sediment plains.

Coastal settlements of the City are contained within an extensive coastal plain traversed by numerous north flowing rivers that drain the northern side of the Chichester Plateau. The coastal plain is generally alluvial and has varying topography including areas of extensive flat plains from 0–50 m AHD, low stony hills and flat top residual rock outcrops from 50–100 m AHD.

Each of the coastal settlements has been developed on low-lying areas of the coastal plain and avoids hilly or rocky areas. This has created ongoing flood, storm surge and drainage risks, which are expected to increase with the projected increase in tropical cyclone and storm activity in the area.

Geology & Land Systems

Key geological features of the City include limestone islands, coastal plains, coastal flats, beaches, dunes and mud and silt flats, which are described in detail in the *Shire of Roebourne Coastal Management Strategy (2011)*. Land systems occurring throughout coastal areas of the City include Boolgeeda, Calcrete, Cheerawarra, Granitic, Horseflat, Littoral, Macroy, Mallina, River, Rocklea, Ruth, Sherlock and Uaroo.

Soils

Numerous soil types are found on the Karratha coastline. Saline loams with shelly sands occupy areas of coastal flats which fringe the mainland coast. Major soils comprising the broad coastal plain of the region include alkaline red soils between Port Weld and the Fortescue River; brown loams and earthy loam soils in the area south of Cape Preston; deep cracking clays around Balla Balla River; and red earths, soils and light clays between Balla Balla River and Peawah River. The stony hills in the vicinity of Karratha, Cleaverville, Roebourne, Wickham and Point Samson have shallow, stony earth loams, although there are extensive areas without soil cover.

Acid Sulfate Soils

Much of Western Australia's acid sulfate soil material lies just below current water-tables. Continuing declines in annual rainfall, changes in land uses and increasing ground-water abstraction will lead to lower water-tables, resulting in possible widespread acid sulfate soil oxidation (DEC, 2013b).

Acid sulfate soil (ASS) risk generally decreases with increasing distance from the sea and watercourses/drainage lines. Although ASS mapping (see Figure 35) suggests a significant presence of potential ASS along coastline and mudflat areas of the City, site investigations have yet to encounter any actual acid sulphate soils.

Contaminated Sites

Land owners, occupiers and polluters are required to report all known or suspected contaminated sites to the Department of Environment Regulation. Reported sites are then classified, in consultation with the Department of Health, based on the risks posed to the community and environment.

The Department of Water and Environmental Regulation's *Contaminated Sites Database* identifies 9 contaminated sites in the City, most of which are in relation to hydrocarbon contamination in soil and groundwater, metals and polychlorinated biphenyls in soil and asbestos in soil.

Other sites reported to the Department of Water and Environmental Regulation, including sites awaiting classification are recorded separately and have not been mapped in the *Environmental Strategy*.

There is a potential risk posed by the existence of sites that are contaminated, but are yet to be registered on the database. Contaminated material, due to inadequate operational practices in relation to past activities, could be present for unregistered sites within the City.

Point Samson is currently unsewered, which may have the potential to lead to contamination of land and groundwater.

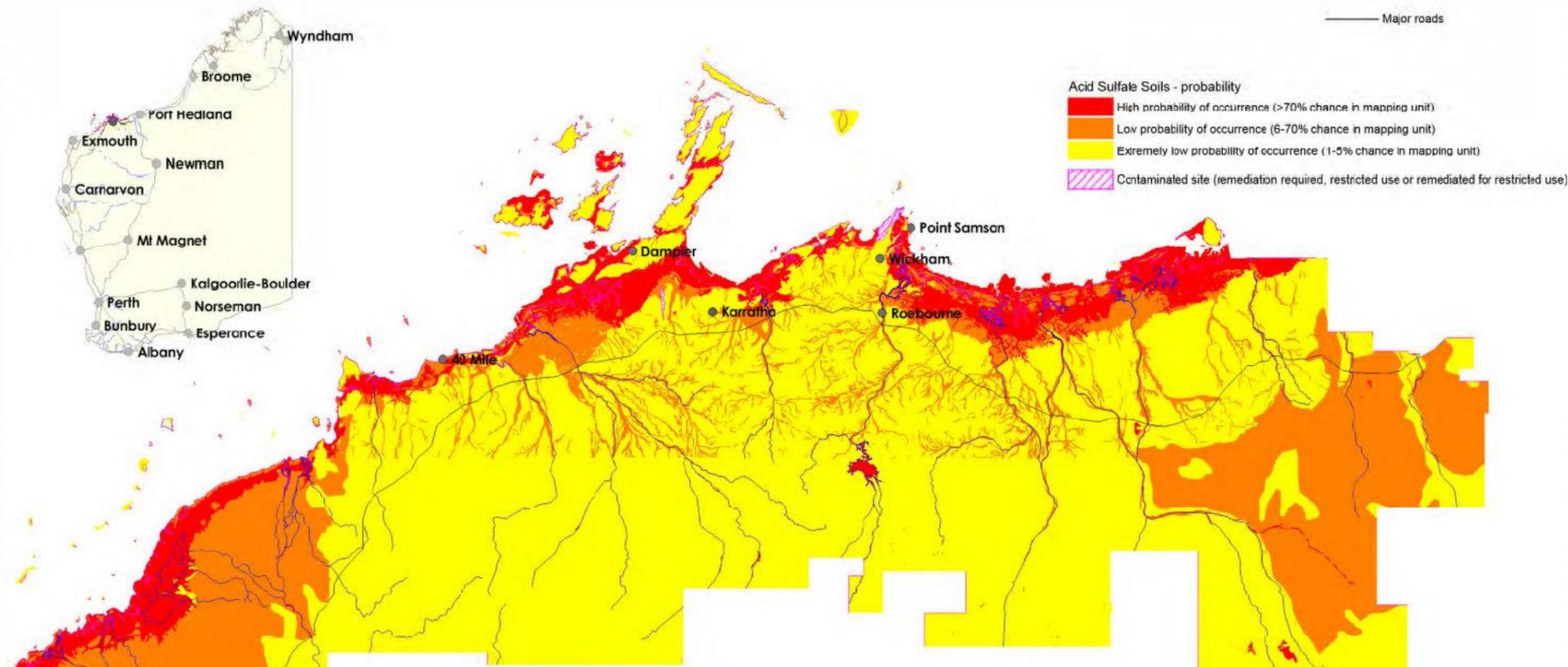


Figure 35: Acid Sulfate Soil Risk & Contaminated Sites (Essential Environmental, 2013)

Terrestrial Environmentally Sensitive Areas

The City contains parts of the *Roebourne* and *Chichester Interim Biogeographical Regions (IBRA)*. The City is characterised by a diverse range of terrestrial, aquatic and marine landscapes, flora and fauna. Native vegetation within the City remains largely uncleared with the exception of areas for mining and associated infrastructure, as well as for townsite development. Pastoral use of land is classified as 'uncleared' however does not give an indication of vegetation condition.

Coastal areas of the City and offshore islands comprise significant native flora values and key habitat areas (see Figure 36). The *Shire of Roebourne Environmental Strategy* (Essential Environmental 2013) has documented the biodiversity characteristics within the City of Karratha. Terrestrial areas of the Dampier Archipelago support a high proportion (approximately 32%) of the flowering plant species known from the Pilbara region. In addition, approximately 200 different vegetation associations have been described on the Burrup Peninsula, which is a reflection of the area's habitat diversity.

Coastal areas of the City, particularly the Burrup Peninsula and Dampier Archipelago, support a wide diversity of native terrestrial fauna, including over 100 species of sea and shore birds (many of which are migratory), as well as several mammal and reptile species. These relatively undisturbed terrestrial habitats of the Burrup Peninsula and Dampier Archipelago comprise numerous threatened fauna species; some of which are protected under the *State Wildlife Conservation Act 1950 (WC Act)* and/or the Australian Government *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

Environmentally sensitive areas comprise National Parks, conservation reserves, threatened/priority ecological communities and key habitat areas for native flora and fauna. Many different environmentally sensitive areas occur throughout the City, particularly along coastal areas, and are depicted in **Figure 46** and summarised as follows. These areas are all significant natural assets of the City, to be preserved, protect and celebrated into the future.

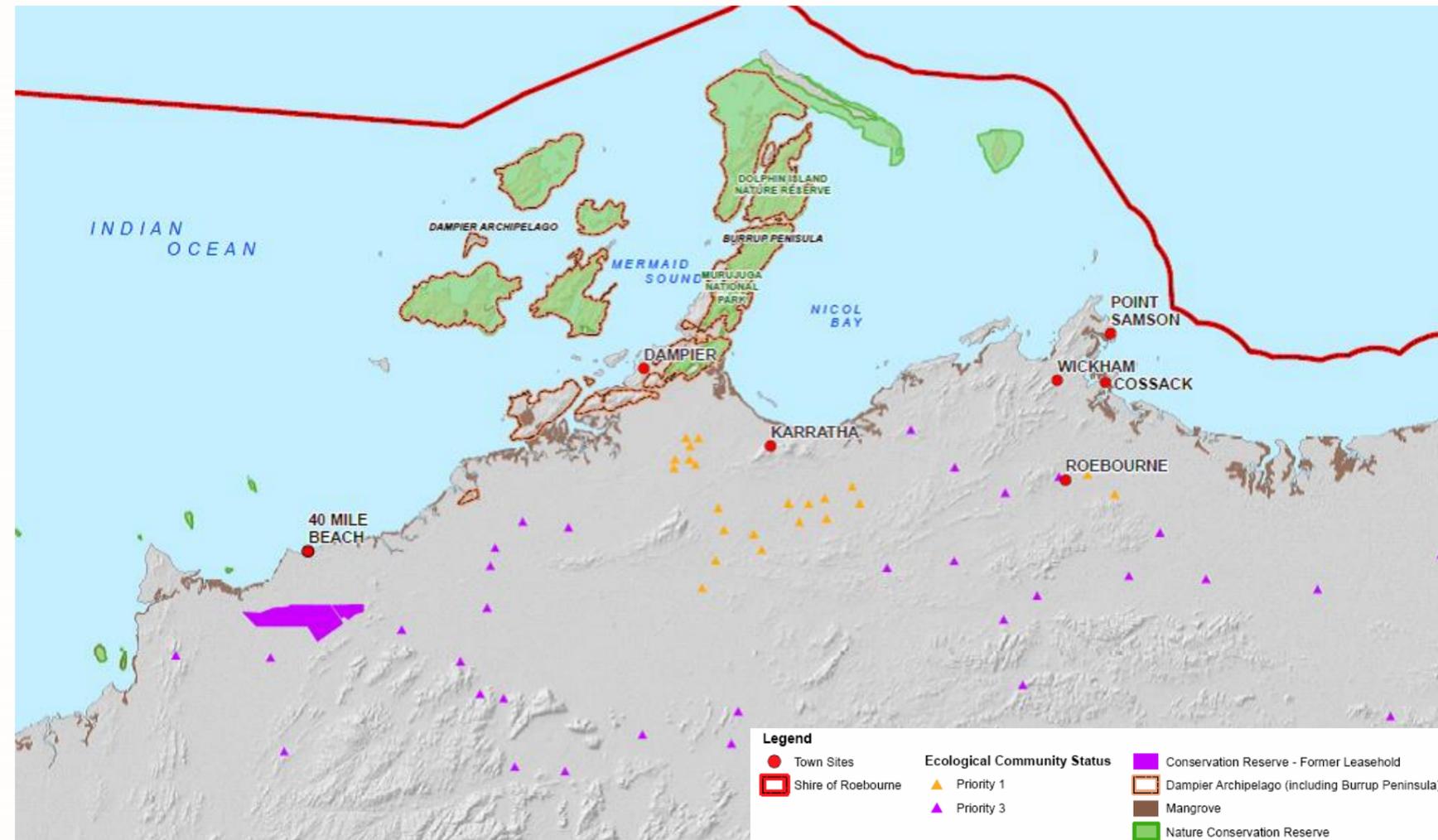


Figure 36: Environmentally Sensitive Areas (Strategen, 2013)

- Burrup Peninsula Conservation Reserve:** 60 km² in area with significant conservation and environmental values. The peninsula contains a diverse range of flora and fauna and provides an undisturbed habitat for many species endemic to the Pilbara. Much of the peninsula remains in a relatively untouched state. The area is also rich in aboriginal heritage sites and cultural values. The Burrup Peninsula contains the world's richest known concentration of rock art and as such, is a conservation resource of international significance. Its management is governed by the *Burrup Peninsula Conservation Reserve Draft Management Plan 2006–2016*.
- Murujuga National Park:** The Murujuga National Park has the distinct of being Western Australia's 100th national park and the first to be jointly managed. Covering 4913 ha within the Burrup Peninsula, the park is privately owned by the Murujuga Aboriginal Corporation and jointly managed with the Department of Biodiversity, Conservation and Attractions. The park is also ecologically and biologically diverse. Major landforms and habitats within the park include steep scree strewn granophyre and gabbro hills, narrow valleys, sandy and rocky shores, mangroves, mudflats and sea cliffs. *Triodia pungens* hummock grasslands predominate, and there are numerous other vegetation communities of limited distribution. Several threatened and migratory species are known to frequent the area and are protected under state and national environmental laws. The *Murujuga National Park Management Plan 78* provides guidance on management of the park. Further information on the cultural significance of the national park is provided in section 7.4.
- Dampier Archipelago Nature Reserves:** comprising of 42 islands, islets and rocks lying within 45 km of Dampier, twenty-five of the islands are incorporated into four nature reserves, including one *Class A* reserve, one *Class B* reserve and two *Class C* reserves. Management of the nature reserves is guided by the *Dampier Archipelago Nature Reserves Management Plan 1990-2000*.
- Mangroves:** located along various stretches of City coastline they are considered regionally significant arid zone mangroves. They act as nursery, feeding and breeding grounds for marine fauna and as buffer zones against wave action, reducing erosion and storm surge damage to coastal areas. They are considered an integral part of coastal and marine processes.
- Ecological Communities:** five *Priority Ecological Communities (PECs)* have been identified in the City, including Roebourne Plains gilgai grasslands; Roebourne chenopod association; Wona Land System; Burrup Peninsula rock pile communities and the Horseflat Land System. Each *PEC* has an associated buffer which need to be confirmed with DPaW prior to any potential disturbing activities, particularly in Roebourne, which is situated adjacent west of a *Priority 3 PEC*. There are no Threatened Ecological Communities in the City.
- Turtle Nesting Sites:** the most significant turtle rookery beaches are located around the Cape Lambert development near Wickham. Based on limited surveys, Bell's Beach (also known as Back Beach) near Wickham is considered the most significant turtle nesting beach in the Cape Lambert area, with 90–100 Flatback turtles nesting each year. Cooling Water Beach at Cape Lambert also has turtle nesting, with 10–15 Flatback turtles nesting each year. These beaches comprise about 10% of nesting female Flatback turtles within the region. Small numbers of Green and Hawksbill turtles also

nest on these beaches. There are also significant nesting beaches offshore from the City within the Dampier Archipelago, notably Rosemary Island, which potentially hosts the largest rookery of Hawksbill turtles globally.

Marine Environment

The mainland coastline of the City of Karratha stretches for approximately 350 km and contains a diverse range of ecosystems. These marine waters fall within the Northwest Shelf Province of the Northwest Marine region, an area that supports a complex range of habitats including rocky coastlines, sandy substrates with mangroves and seagrass, and a number of islands and associated reefs. These habitats support a high diversity of marine wildlife, including significant populations of state and nationally protected marine mammal, reptile and shark species.

Key protected areas include the Dampier Archipelago Marine Park and Cape Preston Marine Management Area. Management of these specially protected marine areas is guided by the *Indicative Management Plan for the Proposed Dampier Archipelago Marine Park and Cape Preston Marine Management Area*.

The *Shire of Roebourne Coastal Management Strategy Position Paper* (Landvision 2011) sets out the City's objectives for the management of its coastline. The *Position Paper* identifies a series of projects that are recommended to be commenced as interim measures prior to the preparation of Foreshore Management Plans for the designated recreational activity nodes of Dampier Foreshore, Hearson Cove, Karratha Back Beach, Wickham Back Beach, Point Samson / Sams Creek area and Cossack / Settlers Beach.

Foreshore Management Plans have now been prepared for 40 Mile Beach, Karratha, Point Samson and Cleaverville providing guidance for the management of human use impacts on the respective foreshores. The Management Plans have been advertised and are in need of final adoption and implementation. Future development of coastal townships of the City will need to be cognisant of the management recommendations outlined in these plans.

Invasive Species

Introduction of weeds, pests and feral animals can lead to loss of vegetation, habitat and biodiversity, including flora and fauna, as a result of increased competition for food, water, soil and land. Key animal species of concern in the City include the horse, house mouse, black rat, feral cat, red fox and rabbit. Environmental weeds also require a substantial management effort to control. Key weed species include buffel grass, prickly pear, Parkinsonia and mesquite.

Bushfire Risk

Pre-European burning of spinifex grasslands was once common practice for indigenous communities. This no longer occurs to the same historical extent however, and consequently, fuel loads throughout the City have accumulated and pose an increased bushfire risk to life, property and the environment.

These altered fire regimes have the ability to significantly impact on existing settlements and biodiversity values of the City. Fires, which may be ignited accidentally by visitors or from lightning strikes, have the ability to cause widespread damage, particularly when they occur in the hotter months of the year. Many native plants have evolved fire-related adaptations over time, such as fire-induced flowering or smoke-induced germination. Problems occur when

ecosystems are burnt too often and can lead to loss of biodiversity through inadequate recovery and reproduction times for many plants and animals.

Fires can also exacerbate or cause additional threatening processes to occur such as soil erosion, release of particulates to the atmosphere and weed invasion. Fires also result in the release of greenhouse gases (EPA 2007).

As such, wildfire risk to life, property and the environment must be a key consideration for any future development in the City, in particular for those areas in proximity to long unburnt spinifex grassland fuels.

A restricted fire season exists all year within the City. Lighting fires is not permitted without a permit from the City. Pastoral land managers are responsible for management of their pastoral lands in order to prevent bushfires, as notified by local government. The Department of Parks and Wildlife is responsible for the management of conservation areas in order to prevent bushfires. Wildfire risk to life, property and the environment must be a key consideration for any future development in the City.

Much of the City, except established townsite areas, falls within a mapped bushfire prone area as defined by the Map of Bushfire Prone Areas (DFES, 2020). The nature of vegetation in and around the main would most likely reflect bushfire hazard levels of low and moderate. There may be pockets of extreme bushfire hazard (tall shrubs) in some areas of the City.

In line with State Planning Policy 3.7 and the Guidelines for Planning in Bushfire Prone Areas, bushfire risk, hazard, and potential bushfire attack level should be considered in all planning proposals. Strategic planning and development proposals (such as rezoning of new developable land, structure plans, subdivisions, or development applications) are required to be supported by technical information that demonstrates that bushfire protection criteria set out in the guidelines can be met by the development proposed.

Air Quality

Port facilities, particularly those for iron ore shipment, are recognised as having the potential to impact on ambient air quality, as a result of particulates (dust) and emissions from ships. These impacts may result in declining air quality, pollution of adjacent land and waters and impacts on biodiversity.

While the air quality in the majority of the City is considered generally to be good, there are a variety of industrial activities in the coastal centres of Karratha, Dampier and Cape Lambert which may impact on air quality. The 2004 Pilbara Air Quality Study found that industry was the single largest contributor to emissions in the airshed in Karratha, contributing 95% of the volatile organic compounds, 82.3% of the oxides of nitrogen and 19.6% of the carbon monoxide (DEC 2004). Significant sources of emissions to air on the Burrup Peninsula include the North West Shelf Joint Venture; Rio Tinto's iron ore export facility; and Burrup Fertiliser's ammonia plant. The air quality of these locations is mapped in the *Environmental Strategy* (Essential Environmental 2013).

Noise

Noise pollution has been an issue in the Pilbara, particularly in areas where mining and industrial activity are adjacent to residential and tourist areas. Similar to air quality, noise created by industrial activities has increased with the expansion of port operations in locations in the Pilbara (DSD, 2010). The construction phase of expansions in particular, both in port precincts and associated transport corridors, can result in significant noise pollution issues.

Noise pollution results in a decrease in amenity, risk to community health associated with elevated noise levels, impacts on fauna and conflict between land owners and adjacent industry. Consistent with draft State Planning Policy 4.1 Industrial Interface (2017) and *EPA Guidance Statement 3 Separation Distances between industrial and Sensitive Land Uses* (EPA, 2005) the City will ensure that the impacts of noise are considered were relevant at each stage of the planning process.

7.2 Key Issues: Physical Environment, Climate & Natural Resource Management

- Low-lying coastal locations of major settlements present vulnerability to coastal processes. Several areas of existing development in Karratha, Dampier, Roebourne and Point Samson are confirmed to be inundated by 1:100 or 1:500 year ARI events. Impacts of climate change have the potential to further increase coastal vulnerability. Climate change projections suggest increased occurrence and severity of tropical cyclones for the City area into the future. Future planning is to have due regard, to the City's Coastal Management Strategy, CHRMAP and SPP 2.6 to minimise risk associated with coastal processes.
- There is sufficient long term availability of potable water supply in the City. The establishment of the Effluent Reuse System has reduced demand on the City's water supply scheme.
- Native vegetation of the Abydos Plain vegetation type occurs in the locality of the City's major settlements and may provide habitat for conservation significant fauna. Urban expansion will need to be cognisant to avoid disturbance of significant native vegetation and fauna habitat areas. Disturbance around identified *Priority Ecological Communities* and their buffers should also be avoided.
- Coastal environments of the City are highly valued for their (often competing) aesthetic, recreational, cultural, economic and ecological values. Coastal planning needs to identify appropriate areas for sustainable use of the coast for tourism, recreation and industry uses, while also protect, conserve and enhance areas of landscape, ecosystem and cultural significance. Mangroves and turtle nesting beaches are particularly significant coastal habitats, which need to be protected from disturbance and future development.
- There is a need to ensure conservation and environmental values of the Dampier Archipelago Nature Reserves, Burrup Peninsula Conservation Reserve and Murujuga National Park are preserved and balanced with the impacts of adjacent industry on the Burrup Peninsula. Residual impacts of industrial uses to protected marine waters, particularly Dampier Archipelago Marine Park and Cape Preston Marine Management Area, also need to be mitigated.
- Spinifex grassland fuels create potential for risk of wildfires. In line with SPP 3.7, planning and development proposals are to be supported by appropriate bushfire planning.
- The impacts of noise are to be considered at each planning stage, where relevant, consistent with the relevant State planning policies and EPA guidance.

7.3 Local Profile: Urban Design, Character & Heritage

Housing Typology & Character

The predominant housing typology within the City is separate house (85%, Karratha Land Supply Assessment, 2020).

Housing for the most part falls into two distinct age brackets and associated characters. The first major phase of dwelling construction occurred from 1970 to 1989. The construction style had generally a short term build mindset, consisting of lightweight metal, with minimal consideration of shading and insulation. More than 4,000 dwellings constructed during this period are still standing. The result is a widely aging stock.

The second major growth phase commenced recently, in 2008, and saw approximately 250 to 350 new dwellings built per year to 2014. The typology of this new housing stock ranges from large two-storey 4 x 2's, to smaller duplexes, to apartments in the Karratha City Centre. The character of dwellings is generally similar to that of current projects in the Perth metropolitan region, and does not readily demonstrate a regionally specific character.

A short-term build mindset and lack of unique character and climate appropriate design features characterise a wide proportion of the City's existing dwelling stock. Providing locally appropriate housing that contributes a distinct character of dwellings will be important to the development of attractive and sustainable settlements for the City.



Residential Neighbourhoods & Streetscapes

Throughout the City's settlements residential streetscapes are generally adequately presented and landscaped, but without exceptional character or amenity (depending on the age of building stock and suburb). Residential neighbourhoods have minimal street-facing fencing. Dwellings are generally setback considerably from the street. Boat and caravan parking is prevalent throughout residential neighbourhoods, and reflects the lifestyle of a large proportion of the community. Connectivity of residential neighbourhoods is often limited, with irregular street networks and frequent provision of drainage areas dividing residential cells. Footpaths through residential neighbourhoods are infrequently provided.

Town Centres

Most of the City's settlements have town centres with street-facing development contributing to a regional town feel. The City centre revitalisation focussed upon Sharpe Avenue (anchored by the Pelago Towers/Warrambie Estate, and the future Civic Precinct at either end) is steadily introducing a main street character that will vastly improve town centre atmosphere within Karratha. Town centres are generally more accessible to both pedestrians and vehicles than residential neighbourhoods.

Settlement Specific Character Attributes

Aside from the commonalities of urban design and character discussed above, each settlement contains its own specific character attributes, which are briefly summarised in Table 24.

Table 24: Character Attributes Specific to Individual Settlements

Settlement	Character Attributes
Karratha	<p>Abundant public open space – the Lazy Lands project run by the Pilbara Cities Office has identified 61 pieces of excess public open space to be redeveloped as residential infill.</p> <p>Distinct difference in the character of housing in old and new residential suburbs.</p> <p>Two storey dwellings slightly more predominant in the newer residential suburbs.</p> <p>Centro Karratha internalised shopping mall major retail precinct.</p> <p>New Sharpe Avenue main street and multiple dwelling development in town centre set to change orientation and focus of town centre.</p>
Dampier	<p>Town centre interaction with the coast: Hampton Harbour and the Dampier Archipelago.</p> <p>High proportion (nearly 10%) of high density units and apartments, reflecting the considerable number of older apartment style buildings located along Hampton Drive and Hill Road which are dated and detract from amenity of area.</p> <p>Residential areas are setback from the coast.</p> <p>High amenity location with potential to attract high end residential and tourist markets.</p>
Roebourne	<p>Strong indigenous heritage and artistic culture contributes to character.</p> <p>Several heritage buildings presenting to street contribute to historic regional town main street amenity.</p> <p>Substantial proportion of housing low quality and poorly presented.</p> <p>Some residential properties contain boundary fencing to the street frontage that detracts from the appearance of the streetscape.</p> <p>Town centre fronts and interacts with the Harding River.</p>
Wickham	<p>Town centre not well defined and demonstrates a character typical of mining towns developed in the 1960-1970s mining boom era.</p> <p>Development setback substantially from road, discouraging pedestrian activity.</p> <p>Relatively low proportion (39%) of single dwelling residential development overall.</p> <p>Road layout and design provides for poor vehicle connectivity.</p>
Point Samson	<p>Dwellings designed for tourist / recreation lifestyle, with large alfresco areas.</p> <p>Most of the settlement's residential development extends along the coast, maximising coastal lifestyle.</p> <p>Some houses built on stilts in response to coastal vulnerability.</p> <p>Well presented streetscapes and landscaping.</p> <p>Quaint coastal fishing village atmosphere.</p>
Cossack	<p>Largely abandoned with few remaining buildings.</p> <p>Buildings that remain of significant heritage value.</p> <p>Current land use limited to low-key tourist site seeing, local fishing, accommodation and functions.</p> <p>Low lying nature of the land poses a significant constraint.</p>

Aboriginal Heritage

It is recognised that Aboriginal people have been living in the Pilbara for over 30,000 years. The traditional cultural and ecological knowledge of Aboriginal people is now being collated and presented in an accessible manner for all people. The Department of Aboriginal Affairs currently documents more than 2000 Aboriginal heritage sites across the City of Karratha.

In the mid 1900's the Yindjibarndi (Tableland People) resettled around Ieramugado (Yindjibarndi name for Roebourne) which was Ngarluma Country (Coastal People).

The Traditional Custodians speak of the Wharlu Song which tells the story of how the Yindjibarndi and Ngarluma people come to be living on country together:

“A great storm rose towards Ieramugado. The sea snake had come inland, the Gurrin Gurrin bird leading him. At day break Ieramugado was under water. The Yindjibarndi people thought they would be killed by the coastal sea snake (Wharlu), so they called up the freshwater snake from the Fortescue River to save him. The snakes fought a long battle in the sky and the freshwater snake pushed the sea snake back to the sea and the Yindjibarndi people were allowed to stay in Ieramugado.”

‘Exile of the Kingdom’ abstract - Roger Solomon (deceased), Ngarluma and Yindjibarndi Elder

At present, the majority of Yindjibarndi and Ngarluma people living in the City of Karratha undertake traditional practise and remain well connected to their country.

The Burrup Peninsula and Dampier Archipelago also hold great Aboriginal significance and Murujunga Aboriginal Corporation (MAC) has produced the *Murujunga Cultural Management Plan (MCMP, 2015)* which provides more information about the cultural heritage of this area. The *MCMP* records and documents the Aboriginal connection to this country, outlines the correct protocols for activity, and explores management strategies for the long term protection of this important area. A World Heritage nomination is currently being prepared to have the unique cultural, spiritual and archaeological values of Murujunga recognised internationally at the highest level. In January 2020, the Murujunga Cultural Landscape was added to the World Heritage Tentative List, which is the first step in the World Heritage nomination process.

Aboriginal heritage is a critical consideration in respect to future planning. Aboriginal heritage sites, which are protected under the *Aboriginal Heritage Act 1972*, are scattered throughout the City, including settlement areas. They are particularly concentrated on the Burrup Peninsula, covering the entirety of this area. Figure 37 shows the location of all documented Aboriginal heritage sites in the vicinity of the City's major settlements.

Development should be avoided in areas containing Aboriginal heritage where possible, and any area identified to contain Aboriginal heritage requires further site specific investigation and satisfaction of the *Aboriginal Heritage Act 1972* requirements prior to development. Council and developers should continue to investigate ways of protecting and incorporating significant features of Aboriginal heritage into new developments.

European Heritage

Europeans first explored the City of Karratha area in 1861. It was initially settled by pastoralists, and also harboured a pearling industry. The first mining began in 1873, with the discovery of copper, followed by gold in 1887. Growth of the locality slowed until the discovery of iron ore in the 1950s. The 1960s and 1970s were a period of significant growth for the City, with Dampier, Karratha and Wickham all built to support the newfound mining industry.

The City of Karratha has unique European heritage, with considerable significance, which is documented in the City's *Local Government Heritage Inventory (LGHI)*. The *LGHI* documents heritage only since the beginning of European settlement, and includes sites of contemporary significance. Aboriginal heritage is dealt with separately, under the *Aboriginal Heritage Act 1972*.

The *LGHI* was created in 1996 under the auspices of the *Western Australian Heritage Act 1990*. Its preparation incorporated substantial research and community consultation. There are 73 listed heritage sites included on the *LGHI*. Most are located in and around Roebourne and Cossack, and include sites such as the Roebourne police station and gaol, churches, post offices, cemeteries, and station houses. Other notable sites include homesteads such as Karratha Station, and sections of the Dampier Archipelago and Burrup Peninsula. Some of those sites included on the *LGHI* are also listed on the *State Heritage Register*.

The Cossack Town Site Precinct is a particularly renowned heritage site in the City, which is listed on the *State Heritage Register*. It comprises all of the land within the area bounded by Wickham Street, Dampier Street, Pearl Street, Ward Street, Pilot Street, Perseverance Street, Settlers Beach Road to the Cemetery at Lots 422 & 433, and the foreshore to the high water mark (including the Land Backed Wharf). It consists of buildings and archaeological sites dating from the 1870s. Its historical significance is based upon its status as a frontier settlement and the first port in the North West of Australia. It documents the impact of European settlement on Aboriginal life and evidence of multicultural society. The town is currently recognised as a *Special Control Area* in LPS8.

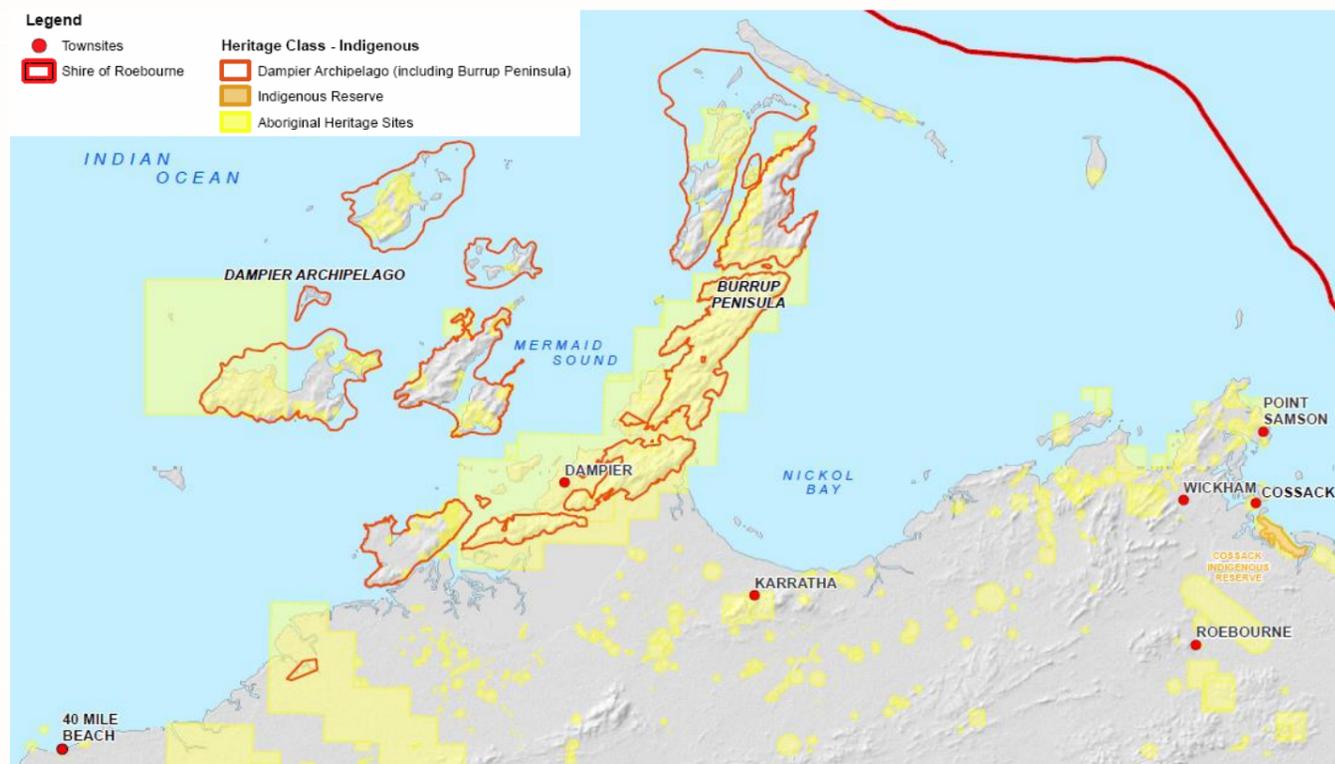


Figure 37: Cultural Heritage Sites



Retention & Enhancement of Character & Heritage

The City has a unique heritage, considered worthy of recognition and celebration. Its character is underpinned by its history, and many of the opportunities for further enhancement of the City's character come from its historical buildings and features. Accordingly, preservation and recognition of key heritage sites and buildings, consistent with *State Planning Policy 3.5 Historic Heritage Conservation*, is critical.

State Planning Policy 7.0 Design of the Built Environment sets out the objectives, measures, principles and processes which apply to the design and assessment of built environment proposals through the planning system. This policy provides the overarching framework for a range of supporting State Planning Policies that provide design quality guidance for specific types of planning and development proposals. One of the key design principles is 'context and character' whereby good design responds to and enhances the distinctive characteristics of the local area, contributing to a sense of place.

Where at all possible, sites listed on the City's *LGHI* should be preserved and restored in keeping with their original character. Redevelopment of heritage sites should be discouraged or restricted to preserve heritage significance.

Areas of particularly strong heritage significance, such as the concentration of heritage buildings in Roebourne town centre, should be recognised and protected. The suitable protection mechanism may be a *Special Control Area* designation under the Local Planning Scheme similar to that used for Cossack. Appropriate identification and protection of this heritage character area will ensure existing heritage sites are preserved and further enhanced through careful consideration of the existing built environment and complementary planning for surrounding development.

Aspects of the existing landscape, particularly hills and viewsapes are important character features, which planning should seek to preserve. These unique characteristics make essential contributions to visual amenity both within the City's major settlement's and across its vast landscapes.

There is scope to improve character of the City's settlement areas through urban design and built form design. Landscaping and appropriate ground covers have a significant role in impacting amenity of public spaces. The recently prepared *Pilbara* and *Karratha Vernaculars* provide principles for design which consider the unique environment, climate, culture and lifestyle of Karratha and the Pilbara region.

The *Pilbara Vernacular* aims to address the challenges of the existing built form across various Pilbara settlements. It identifies particular challenges in the relatively limited stock of heritage character buildings and in a large proportion of existing building stock reaching the end of its useable lifespan. The *Pilbara Vernacular* is based upon the following 'Pilbara values':

- Responding to climate;
- Incorporating the natural environment;
- Building on the Pilbara character and identity;
- Enhancing liveability; and
- Mobilising for change.

While the *Pilbara Vernacular* is not prescriptive, it aims to create a set of design strategies for housing and built form (predominantly single and grouped housing) and public space which are responsive to the local landscape, environment, climate and culture, and establish a sense of place in the region. It sets out parameters of design that will enhance future development across the Pilbara, whilst also acknowledging the unique characteristics of individual settlements.

The *Karratha Vernacular* provides a set of design principles to create a new paradigm for development in Karratha. The principles for design consider the unique environment, climate, culture and lifestyle of Karratha and the Pilbara region. While the *Karratha Vernacular* was developed specifically for the Karratha city core and Mulataga developments, it is a useful document to consider in respect to development across all of the City's settlements. All future development in Karratha, as well as across the City more generally, should consider the design principles recommended by the *Karratha Vernacular*.

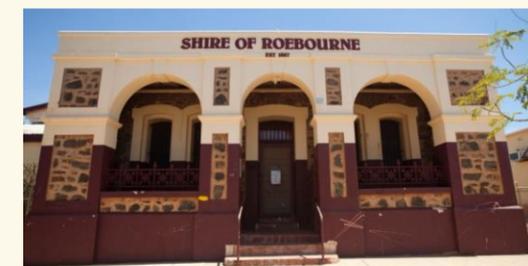
For the first time in the City's history, the *Karratha Vernacular* formally addresses public realm and built form design. In respect to public realm, it encourages activity in the public spaces and streetscapes and recommends climate appropriate responses, including water sensitive urban design, mitigation of hot westerly breezes and shade provision. In regard to built form, the *Karratha Vernacular* recommends stack effect, shading, orientation and other design features that respond to the region's climate. When taken holistically, the portfolio of design principles addressed by the *Karratha Vernacular* are intended to contribute to development practices that will deliver social benefit to the City of Karratha community. The realisation of the *Karratha Vernacular* in future development across the City will enhance the character of streetscapes, public places and built form in all settlements by providing for:

- Street level activation and vibrancy with a mix of uses;
- Climate appropriate building design with efficient cooling and passive ventilation;
- Incorporation of wind and solar power systems;
- Recognition and celebration of Aboriginal heritage;
- Iconic and recognisable places of human scale; and
- Climate appropriate landscaping and design features.

The principles put forward in both the *Pilbara* and *Karratha Vernaculars* are sound, valuable considerations for establishing a City specific climate appropriate built environment character for the City of Karratha. What is now required is a planning mechanism to ensure delivery of these principles. Detailed Area Plans and Design Guidelines for recent residential expansion areas have sought to achieve this to some level within individual residential estates. The City would benefit from a more coordinated approach to design guidelines that could be enforced through a Local Planning Policy or provisions under the Local Planning Scheme. Caution must, however, be exercised to ensure that the requirements of design guidelines are affordable to implement, and reflective of the desires of the community.

7.4 Key Issues: Urban Design, Character & Heritage

- Existing housing character and typology is widely characterised by aging single dwelling stock that suffers from a lack of unique character or climate appropriate design. There is a demonstrated desire from the community for more locally appropriate and environmentally sustainable housing. Affordable ways to deliver such product need to be considered and implemented.
- Each of the City's major settlements demonstrates its own unique aspects of character. These unique attributes are largely defined by the differing roles of each settlement, from the major regional service centre down to the coastal tourism and fishing village, as well as the unique history of each settlement. Existing character, including heritage, is an essential consideration for the future enhancement of character within each of the City's settlements.
- Place-making design and investment into the City Centre's streetscapes, public spaces, public art and street furniture will help to improve amenity, stimulate investment, and accommodate a wide range of uses.
- Aboriginal cultural heritage is an important component of the City's heritage and Aboriginal heritage sites are prominent across the City. These are often located within and around major settlement areas. Aboriginal Heritage is a critical consideration for future planning. Development should avoid disturbance of any Aboriginal heritage site where possible. Where unavoidable detailed investigation of the significance of Aboriginal heritage sites must be undertaken and consent of the Minister must be sought under Section 18 of the *Aboriginal Heritage Act 1972* prior to disturbance. The City will continue to support the World Heritage nomination of the Murujunga Cultural Landscape.
- Heritage sites listed on the *LGHI* should be conserved wherever possible, and planning provisions that encourage preservation of heritage significance should be applied to maintain and enhance heritage character. Heritage character, particularly concentrations of heritage buildings in Cossack and Roebourne present opportunities for tourism sector expansion, and a focus to ensure the amenity of these heritage character areas should be employed.
- Aspects of the existing landscape, particularly hills and viewsapes are important character features, which planning should seek to preserve. These unique characteristics make essential contributions to visual amenity both within the City's major settlement's and across its vast landscapes.
- Built form and urban design present opportunities to improve existing character and shape a distinctive and sustainable built environment responsive to the unique environment, climate, culture and lifestyle of the City. The design principles of the *Pilbara Vernacular* and *Karratha Vernacular* put forward the basis for this. Consistent statutory measures for implementation are now required to achieve the vision of those documents.



7.5 Local Profile: Rural Land

Crown Land & Rural Land Tenure

The vast majority of the City of Karratha local government area consists of rural land, used primarily for pastoral grazing and the harvesting of natural resources. The majority of rural land remains in Crown ownership with very limited freehold rural land within the City. Crown land may be unallocated or reserved for a specified purpose, generally being a public purpose.

Most of the City's rural coastline is contained with public reserves under the *Land Administration Act 1997* that are then reserved in LPS8 for *Conservation, Recreation and Natural Landscapes*. Other public reservations in rural areas include those for roads, infrastructure or public purposes such as water supply. Despite the various reserves, Unallocated Crown Land (UCL) remains prominent across the City.

The limited amount of freehold rural land in the City contributes to a relatively simple pattern of subdivision. The majority of rural lots are very large tracts of land, and only occasional smaller freehold lots exist. Avoiding fragmentation of rural land (as promoted by State Planning Policy 2.5) is critical to enabling a coordinated approach to future planning and urban expansion.

Several types of tenure exist over the City's rural Crown land, and in some cases settlement areas. Native Title, Pastoral Leases and Mining Tenements are widespread and in some instances constrain potential for urban expansion.



Native Title

The City of Karratha sits within the fully determined *Ngarluma/Yindjibarndi (WAD6017/96) Native Title* claim area. The *Ngarluma/Yindjibarndi Native Title Claim* was determined by the Federal Court on 2 May 2005. Accordingly, the majority of Crown land across the City is subject to Native Title.

The litigated determination of the *Ngarluma/Yindjibarndi Native Title* claim resulted in the establishment of the *Ngarluma Aboriginal Corporation (NAC)*, the Registered Native Title Body Corporate for the Ngarluma portion of the Determination Area. The *Yindjibarndi Aboriginal Corporation (YAC)* is the Registered Native Title Body Corporate for the Yindjibarndi portion of the Determination Area. Together NAC and YAC are the legal entity that holds the Native Title rights of the Native Title holders, including the right to protect and care for sites and objects.

The claim area is bordered by the Hamersley Ranges to the south, Maitland River to the west, Balla Balla and Peawah Rivers to the east and its northern boundary includes the Dampier Archipelago. The area excludes only limited portions of the Karratha, Dampier and Wickham settlements, and can therefore significantly impact land release and approval timeframes for urban expansion.

The *Ngarluma People Application (WAD165/2008)* was registered with the National Native Title Tribunal on 31 July 2008. The application covers settlement areas not currently included in the *Ngarluma/Yindjibarndi Determination*. The application has been progressing through mediation and has now been listed for a consent determination hearing on 25 June 2015.

In addition to the Federal Court determination and National Native Title Tribunal application, various *Indigenous Land Use Agreements (ILUAs)* exist within the City. *ILUAs* are voluntary agreements made under the *Native Title Act 1993* between people who hold, or claim to hold, Native Title in an area and other people who have, or wish to gain, an interest in that area. They are negotiated, flexible and without litigation.

Aboriginal Communities

There are three Aboriginal communities in the City, being Cheeditha (located just north of Roebourne), Weymul and Mingullatharndo (both of which are located in more remote rural areas). Weymul Community exists on a freehold lot within the Mount Welcome pastoral lease and is managed by the Weymul Aboriginal Corporation, established in 1999 to represent the Ngarluma people who are the traditional owners of the Ngarluma region of the Pilbara. Mingullatharndo Community is located approximately 10 km east of Roebourne and 1 km south of North West Coastal Highway.

While these communities form a relatively small proportion of the City's population, it is important that these settlements are also recognised through the *Local Planning Strategy* and Local Planning Scheme frameworks. Future planning and infrastructure provision will need to be undertaken by the State Government. Community Layout Plans have been adopted by the WAPC for two of the three communities. These plans require review prior to being endorsed by the City.

Mining Tenements

Access to mineral, petroleum and geothermal energy resources is of State economic importance. At present, the mineral and petroleum resources sector provides both direct and indirect employment for most of the City's communities, and the sector supports many commercial, industrial and social enterprises. Access to mining tenements is critical. Planning for urban expansion and growth must take into account the competing interests for access to these resources, related infrastructure corridors and port facilities. Mining and petroleum legislation and State Agreements provide statutory requirements regarding such access. The City of Karratha is widely covered by various pending and live mining tenements which impact land release and availability for urban development.

Plan 8 depicts pending and live tenements in the vicinity of the City's major settlements. Each tenement must be considered on an individual and site-specific basis with proposals for urban expansion. Figure 38 provides an indication of mineral prospectivity in the vicinity of the City's major settlements, which may be a consideration for any proposal over an area subject to mining tenements.

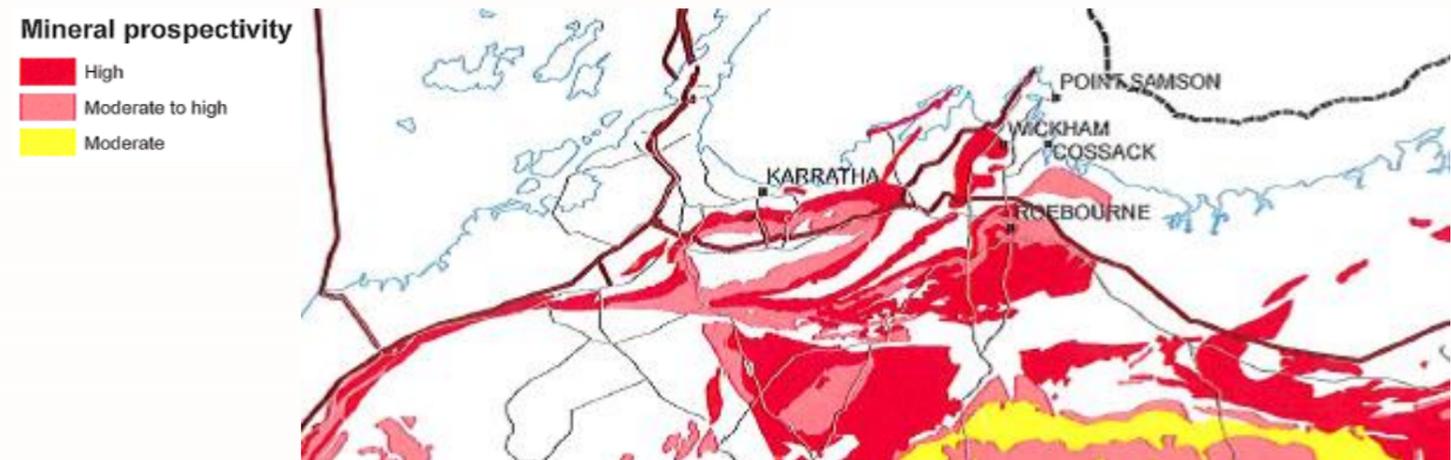


Figure 38: Mineral Prospectivity in the City of Karratha (DMP, 2012)

Basic Raw Materials

On Crown land, construction materials are defined as a 'mineral' and therefore require a mining lease under the *Mining Act 1978* for extraction of the mineral. Mining of material for new infrastructure will be required such as for fill facilitating urban and industrial development, roads, bridges, telecommunications etc. Local planning schemes cannot prohibit or affect the granting of mining tenements (mining leases and exploration licences) or the carrying out of any mining operation authorised by the *Mining Act 1978*.

The Department of Mines and Petroleum (DMP, now Department of Mines, Industry Regulation and Safety) has prepared mapping *Resource Potential for Land Use Planning Basic Raw Material Resources Karratha (2014)* that identifies tenements for basic raw materials, crown reserves for basic raw materials, active, inactive and proposed quarries and pits. The DMP previously prepared a data package *Karratha – Port Hedland, 2014: Basic Raw Material Resources* which provided information on the potential availability of basic raw materials (BRM), including sand, gravel, limestone, limes and, crushed rock and dimension stone, as well as mining tenements for BRM and locations of quarries and pits on Crown Land. There are no known extractive industry licences issued by the City on freehold land.

Sand is an important resource and there are existing mining tenements for sand around Karratha, south of Roebourne, at Point Samson and south of Wickham. It is essential that immediate protection is afforded to existing tenements and licensed extractive industries, as it is important to ensure basic raw materials are conveniently accessible and in proximity to the townsites and areas of industrial development for efficient extraction and logistics. In the absence of detailed modelling, the DMP recommends a conservative approach to considering generic buffer distances for sand quarries/pits. It is considered that 500m buffer distances to extraction areas be applied, pursuant to the EPA Guidance

Statement 3 *Separation Distances between Industrial and Sensitive Land Uses* (2005). WAPC policy in regards to basic raw materials should also be applied where appropriate relating to State Planning Policy 2.5 - Rural Planning. Figure 39 depicts the distribution of currently active BRM extraction sites in the vicinity of the City's major settlements.

Pastoral Leases

Pastoral leases, granted under the *Land Administration Act 1997*, allow Crown land to be used for the purpose of grazing livestock. Seven pastoral leases exist across the City, covering the majority of its land area. The Mount Welcome and Karratha pastoral leases are located in closest proximity to the City's settlement areas; however the current alignment of these leases do not limit future growth area requirements.

Economic diversification, particularly in the form of tourism that celebrates the unique environmental setting of the City, without compromising existing pastoral operations is an area of significant potential. To do so requires the granting of separate special leases, a framework for which is currently under review by the Department of Lands.

Agriculture & Primary Production

The *State Planning Strategy* recognises the increasing expansion of the agricultural sector in the Pilbara region and highlights the State wide future aspiration for local access to fresh food derived from well-managed environments. Two potential Agricultural Priority Management Areas (APMA) were identified in the late 1990's on the basis of suitable soils and potential for water resources, being:

- Roebourne Plains (in the vicinity of the Harding River); and
- Fortescue River Mouth (in the south west corner of the City).

Identification of these areas was not intended to 'restrict' agricultural development to these areas but instead provide a guide as to where development may occur in the future, subject to further investigations.

The concept of APMA has been replaced in the current State Planning Policy 2.5 – *Rural Planning (2016)* and associated rural planning guidelines by High Quality Agricultural Land (HQAL) and Priority Agricultural Land (PAL).

The Department of Primary Industries and Regional Development (DPIRD) does not currently have any HQAL information for Karratha. This is unlikely to be rectified in the near future, with DPIRD's current focus being on a number of other areas considered to be of greater strategic importance. Land resource information for the City is focused on the pastoral values of the land including the native vegetation on which pastoral activity depends. DPIRD do not have any land capability information relating to horticulture, cropping and grazing of modified pastures. Intensive agricultural opportunities are reliant on more detailed information relating to soil types and water resources. A prefeasibility assessment of the potential for irrigated agriculture development (2017), details the findings of the Pilbara Hinterland Agricultural Development Initiative (PHADI). The project noted that the Pilbara has land and water resources to support a number of irrigation developments.

Despite their lack of development DPIRD indicate that the two APMA areas retain potential for agricultural development. Generally land under pastoral lease, managed by DBCA or is UCL, to-date these areas have been considered suitable for irrigated pasture (Rhodes Grass). More work is needed however, to determine suitable pasture species for fodder which are not potential invasive species away from irrigated areas. Karratha may benefit in the long term from being a suitable location for a logistics centre for the export of PHADI future products.

Algae Industry

Potential also exists for economic development in the algae farming industry which converts algae into biofuel, omega-three and animal feed protein. Maitland Estate, south west of Karratha currently has the land capacity to produce at least 600 metric tons of biomass per month. The Maitland buffer area may be suitable for the development of algae ponds, however only where the ponds are associated with a processing facility within the core of the estate. Whilst Aurora Algae, who ran a pilot project from this site has divested its interest, potential remains for another company to utilise the location. The City offers ideal conditions for algae production, with abundant sunlight and carbon dioxide inputs.



Figure 39: Operating Mines, including Basic Raw Materials (2020)

Industry & Infrastructure Buffers

Salt, iron ore, magnetite and natural gas are important mineral and energy resources for the City of Karratha. The City comprises a considerable amount of heavy and special industrial land uses to accommodate the extraction, processing, transporting and servicing for these industries. Industrial land uses at the Burrup Peninsula, Cape Lambert, Cape Preston, and future Anketell Port take up extensive areas of otherwise rural land outside of existing settlements.

Industrial land uses need to be managed carefully, as they have the potential to create off-site emissions, which may adversely affect surrounding residential and sensitive uses. Impacts include gas, noise, dust, fumes, and odour, affecting air quality, health and safety standards, and amenity of those areas. *State Planning Policy 4.1 State Industrial Interface Policy* addresses the need and mechanisms to plan for both on-site and off-site buffers. Industry regulation is generally approached on a case-by-case basis, where the onus is on the proponent of the industrial land use. *EPA Guidance Statement No. 3 Separation Distances between Industrial and Sensitive Land Uses* provides guidelines as a basis to consider impacts resulting from various industrial land uses. The *Environmental Protection (Noise) Regulations 1997* provide standards for noise emissions.

The current extent of major infrastructure located throughout coastal areas of the City is presented in Figure 40.

The same policy and regulations are applicable to infrastructure uses, which may adversely affect surrounding residential and sensitive land uses, such as wastewater treatment plants and power stations. Buffers to such infrastructure are a critical consideration for future planning. While a buffer does not necessarily need to exclude all development, it should restrict sensitive land uses and ensure only mutually compatible (generally industrial or infrastructure based) land uses are located within buffer areas. *Eco-Industrial Precincts* are an emerging concept promoted by Water Corporation, encouraging collocation of mutually compatible eco-industrial uses within wastewater treatment plant buffer areas. This may include solid waste and wastewater recycling facilities, renewable energy facilities, other public utilities, industry, agriculture, research facilities, public open space and nature conservation reserves.

Infrastructure reserves are recognised under LPS8 to protect key infrastructure corridors such as gas pipelines, power lines and rail lines. Infrastructure reserves are designated for much of the infrastructure within the City, but not all. Various power lines exist without infrastructure reservations in remote rural areas, as well as around major settlement areas. There is a need to consolidate a record of existing power infrastructure and to review infrastructure reserves to ensure key infrastructure corridors are adequately identified and protected from encroachment. Consideration must be given to the appropriateness of reservation as a mechanism for protection from encroachment given the potential for compensation implications.

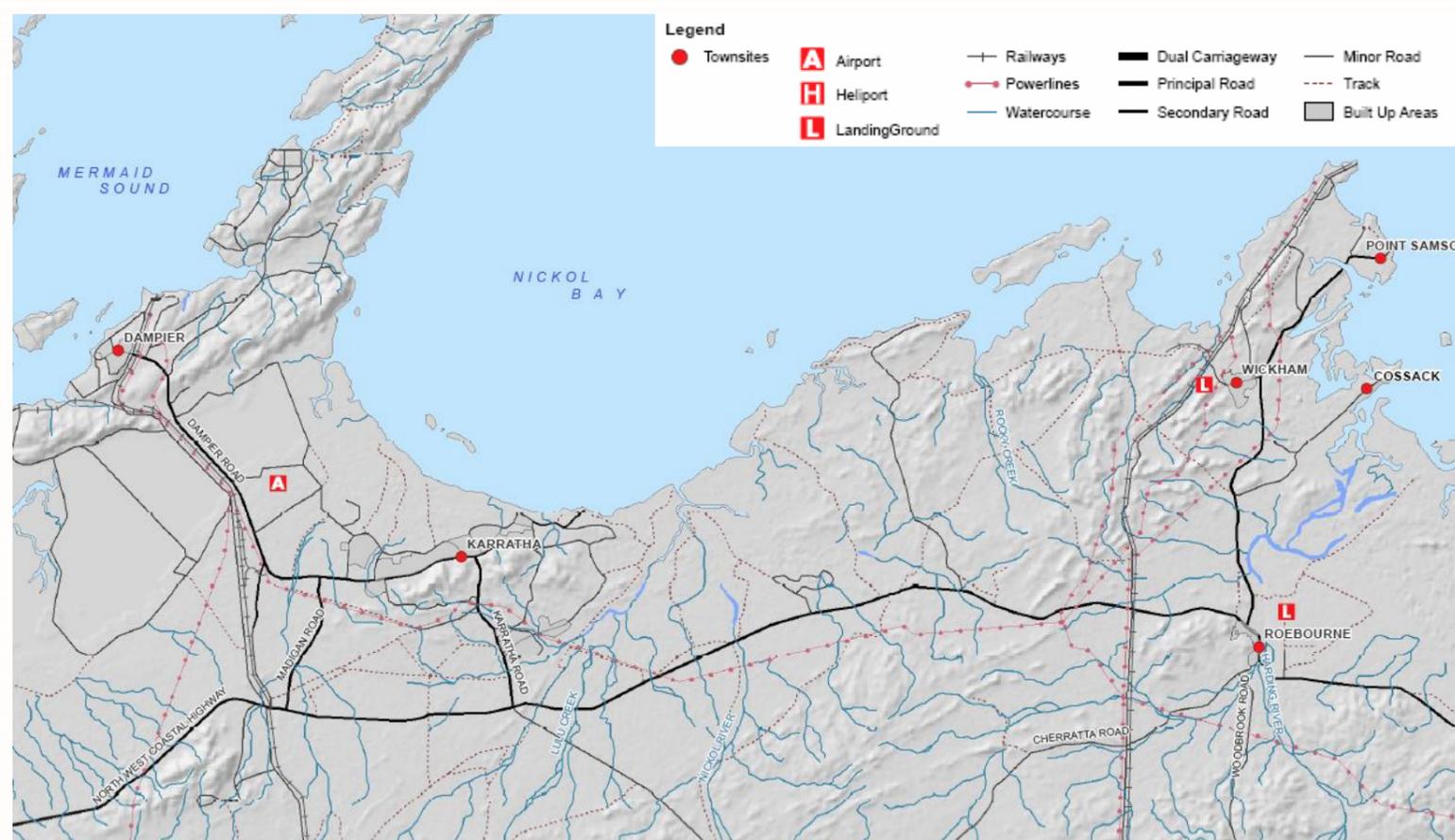


Figure 40: Infrastructure & Servicing

7.6 Key Issues: Rural land

- Extensive areas of the City comprise unallocated Crown land, which is affected by several types of land tenure; Native Title, Pastoral Leases and Mining Tenements. Land tenure, particularly Native Title and Mining Tenements, is a critical constraint to urban expansion that must be considered and resolved early in the planning process to progress expansion in a timely manner.
- Economic diversification, particularly in the form of tourism that celebrates the unique environmental setting of the City, without compromising existing pastoral operations is an area of significant potential.
- The City has three established Aboriginal communities outside of its major settlements. Coordination of planning for infrastructure and services to sustain these remote populations is an important aspect of planning for rural areas.
- There is potential for irrigated agriculture within the City, there is a need for further research to better define suitable areas, water resources and crops.
- The City of Karratha having prominence as a major regional centre is relevant to agribusiness expansion, being well positioned as a strategic link in the supply chain for future agribusiness products.
- The City provides an ideal environment for algae production, with abundant sunlight and carbon dioxide outputs. This presents a valuable opportunity for economic diversification and development of an extensive land area for this purpose should be encouraged.
- It is critical that the *Public Drinking Water Supply Areas* identified for the City, and particularly that relatively close to settlement south of Roebourne, are protected to reduce risk to the *West Pilbara Water Supply Scheme*.
- Appropriate planning needs to be applied to reduce pressures associated with high demand of BRM resources. Cost of fill currently critically constrains housing affordability. Access to BRM is currently limited and a comprehensive strategy to secure BRM supply is required. Additionally, current Western Australian development practices, largely reliant on retaining walls, flat building sites and compacted sand pads reinforce the need for BRM. Flexible planning provisions allowing alternative building techniques may be effective in reducing need for sand fill and retaining walls in dealing with flood and other site constraints.
- Major Heavy and Special Industrial land uses located at the Burrup Peninsula, Cape Lambert, Cape Preston and future Anketell Port must be managed appropriately so as to enable growth of the City's minerals and energy sector, while also protecting amenity for surrounding sensitive land uses. *SPP 4.1* and industry regulation must be applied consistently to mitigate gas, noise, dust, fumes, and odour emissions, which affect air quality, health and safety standards, and amenity.
- Infrastructure, such as wastewater treatment plants and power stations, also present adverse impacts for surrounding residential and sensitive land uses. Buffers, in accordance with *SPP 4.1* must be incorporated, but should not preclude all land uses. Strategic Resource Areas should be used to encourage collocation of compatible land uses. This may include solid waste and wastewater recycling facilities, renewable energy facilities, other public

utilities, industry, agriculture, research facilities, public open space and nature conservation reserves.

- There is a need to coordinate identification and reservation of all key infrastructure corridors throughout the City to ensure major gas pipelines, power lines and rail lines are provided with appropriate buffers and protected from incompatible encroachment.

8.0 Theme 4: Infrastructure

Timely provision of infrastructure provides a solid economic base for the City, justifies relevant City expenditure and underpins land use planning framework. A fundamental aspect of this Strategy ensure infrastructure provision and capacity is able to accommodate forecast population growth and related demands.

The Annual population growth review with its emphasis on increased and careful monitoring of the spatial aspects of population growth will underpin capital investment decisions. Short term decisions to preserve required road corridors and other infrastructure corridors are essential towards the delivery of infrastructure to facilitate an ultimate long-term population of greater than 50,000.

The integration of this careful monitoring of population growth into growth management strategies will assist the City in its long-term capital expenditure planning. This improved information base will strengthen the City's position when advocating for improved infrastructure and provide a sound basis to assess social and economic impacts of large resource projects as they arise.

Each of the different infrastructure classes have different characteristics in terms of supply, demands and the age of the existing infrastructure.

The Strategy acknowledges the need to protect existing and adequately plan for future, key infrastructure which serves the Pilbara Region and/or is part of the wider State network. The Strategy recognises that there is currently adequate capacity of infrastructure and public utilities to support growth thanks to significant infrastructure upgrades over the previous 10 years.

It is important that there is an alignment between planned growth and planning of service infrastructure to ensure efficient, economical and timely delivery of services. This requires ongoing consultation and coordination between the City, the development industry and service agencies.

Encouraging the private sector to invest in infrastructure or to provide more open access to existing infrastructure will help to spread the investment cost and reduce the potential for duplication and redundancy. This is particularly relevant to power infrastructure, where major resource companies frequently supply and reticulate their own power independent of the NWIS.

8.1 Local Profile: Infrastructure Services

Water

Water for the West Pilbara water supply scheme comes from the combined sources of the Lower Bungaroo Valley borefield, Harding Dam and Millstream aquifer. The West Pilbara water supply scheme supplies most of the coastal

towns and port facilities of the City including Karratha, Dampier, Roebourne, Wickham, Point Samson and Cape Lambert and proposed ports of Anketell and Cape Preston.

Industrial use accounts for approximately one third of total water consumption from the WPWSS.

Prior to 2014, the West Pilbara water supply scheme was sourced from the Harding Dam and Millstream aquifer. The demand on these sources was around 12 to 13 GL/yr, which was largely attributed to dust suppression requirements for iron ore production and other industries to meet health and safety requirements. This amount however, exceeded the long term reliability of supply which was modelled at 10GL/yr (2013).

The State Government and Water Corporation undertook negotiations with Rio Tinto to establish another drinking water source and in May 2014, Rio Tinto completed construction of a new 10GL/yr borefield in the Lower Bungaroo Valley in the Shire of Ashburton which now contributes to the West Pilbara water supply scheme. Water from these sources is treated and then transferred by large trunk mains to the storage tanks at the various townsites.

The Water Corporation upgraded the capacity of the pipeline from the Millstream borefield to the City's townsites. These upgrades provide a reliable scheme water supply of an anticipated 16-20 GL/year.

KRS notes that in 2011 and 2012, the Water Corporation reviewed its long-term water planning for the West Pilbara WSS and for the Karratha scheme, based on a planning horizon of 2040. The long term plan identifies the need and approximate timing of various upgrades and expansions to meet anticipated demands. The water scheme plan provides for staging of capital works and includes options to vary the planning based on the rate and spatial distribution of demand over time.

In 2013 the Department of Water advised that future water demand for the City, its coastal towns and ports are expected to be met through a combination of improved water efficiency and recycling, expansion of existing sources and new water sources, such as the West Canning Basin.

The Water Corporation believe the Harding Dam and Millstream groundwater sources have sufficient capacity to accommodate growth to the medium term. There are lots of factors to consider such as the;

- Amount of other industrial growth requiring a water supply service;
- Quantity of water used & number of people per service; &
- Ongoing growth rates.

The Water Corporation will continue to monitor growth and then make decisions accordingly. If the population rises under the high growth scenario to 38,000 people by 2031, then a new water source will most definitely be required.

Ongoing improvements in water efficiency and recycling are important as they can help delay large investment in new water sources. Significant gains have been made over the past decade, for example Rio Tinto has reduced water used at the Dampier port by almost 30 per cent.

The Water Corporation has also implemented a program expected to save 3.4 GL/yr across the Pilbara and will continue to identify and implement further

improvements. The water demand-supply balance will be reviewed with stakeholders at least every two years to determine if there have been any significant changes.

West Pilbara also has a non-potable seawater supply scheme and desalination plant capable of supplying water for industrial use.

Besides headworks infrastructure, the existing water distribution and reticulation network also require significant upgrade in order to achieve the planned housing densities.

Wastewater

Wastewater services in the key towns of the City are provided by either Rio Tinto or the Water Corporation. Point Samson, however, is unsewered and wastewater disposal is via septic tanks. There are three waste-water treatment plants (WTP) within the Karratha urban area.

Of the three treatment plants in the Karratha urban area, the treatment plant within the Karratha Industrial Estate (KIE) accepts and treats wastewater from the KIE area separately from other parts of the town. This is necessary to protect the operating integrity of the other treatment plants from any potential polluting waste stream from the KIA area. The KIA plant has a nominal 500m radius odour buffer around it, which is measured from the boundaries of the WWTP landholding.

The second WWTP is the Karratha WWTP No. 1 located immediately north of the KIA WWTP, which accepts and treats the bulk of the wastewater from the townsite. The wastewater treatment and treated wastewater management and disposal capacity of WWTP No. 1 was substantially upgraded in 2012 to a 10ML/day plant to account for significant housing and population growth. WWTP No. 1 has a nominal 500m radius odour buffer measured from the boundaries of the WWTP landholding.

The third plant is the Karratha WWTP No. 2 located to the west of the Karratha urban area and is currently still in operation, although it only treats wastewater from a small western portion of the Karratha urban area. The long-term plan is to eventually divert (pump) inflows from WWTP No. 2 to the expanded WWTP No. 1. This will allow WWTP No. 2 to be decommissioned or assigned to the sole treatment of light industrial wastewater. WWTP No. 2 has a nominal odour buffer of 500m radius measured from the boundary of the WTP landholding.

In 2015 the State Government completed work on a suite of projects worth \$113 million to upgrade Karratha's wastewater scheme and increase the amount of wastewater being recycled.

These upgrades have meant that up to 10 million litres of wastewater is able to be treated per day. Further the recycling facility has the capacity to produce up to 6 million litres of high-quality recycled water each day, which can supply nonpotable water for the Effluent Reuse Scheme, which will be used to irrigate areas of public open space across the Karratha townsite. It is noted that the quality of the effluent is of a very high standard. This increases the scope of opportunities for which it can be used such as to supply non-potable water for the future Mulataga development; for dust suppression; and some industrial and construction uses; however these options are limited significantly by the available volumes.

Rio Tinto also provides recycled water for use by the City for irrigation in Wickham and Dampier, which reduces the demand on the West Pilbara water supply scheme.

The Water Corporation's long-term conceptual wastewater system planning for the Karratha urban area includes the need for significant capital expenditure to upgrade as needed some of the existing pumping stations to cater for increasing demand into the future.

Apart from Point Samson, other settlements in the City have smaller scale facilities for treating wastewater to meet the needs of their local communities. Rio Tinto has advised that the current WWTP is fit for purpose to support the current town and has some limited capacity to support new dwellings. An initial assessment in 2014 suggested this was around 150 new dwellings and as such there are no plans to upgrade or relocate the WWTP. Relocation of the plant was studied by Rio Tinto in 2013. Any replacement would have a high capital cost. Furthermore, at the time it was noted that the town's existing sewer system would require upgrading at a further capital cost to allow for new dwellings. It is currently managed by Rio Tinto. The wastewater situation in Dampier does present a constraint to future growth of Dampier, to support expansion of the townsite, the WWTP need upgrading or relocation in the short term to medium term prior to any growth of Dampier.

Roebourne's WWTP has capacity to accommodate a population of about 1,200, and is planned for modest expansion. Wickham has recently received upgrades to its WWTP to allow for growth at Wickham South. Water Corporation also has plans for further modest expansion of Wickham WWTP, but will require further upgrading to accommodate growth in the medium to long term. Point Samson currently has no wastewater treatment, and such facilities would only become viable with at least 300 dwellings – a size Point Samson is not expected to reach over the planning horizon of this *Local Planning Strategy*.

Electricity

In most electricity systems, utilities rely on major industry to be the foundation of the load, justifying additional investment. In the Pilbara, major industry generally provides its own power generation infrastructure. For example Dampier and Wickham are serviced through the Pilbara Iron (Rio Tinto-owned) network.

The source of power for the City is from the North West Interconnected System (NWIS) which is a network of transmission lines, power stations and associated infrastructure. Karratha, Roebourne and Point Samson are supplied with electricity through the NWIS. Characteristics of the NWIS that make it atypical of electricity systems are:

- Unpredictable and uneven load growth associated with project-based development;
- Mixed public and private ownership of different parts of the transmission network without a unifying system management agreement;
- Prevalence of off-grid self-generators; and
- Lack of regulation.

Key facilities are the ATCO Karratha power station at Stove Hill commissioned in 2010 to supply residential and business consumers in the Karratha urban area under a long-term arrangement with Horizon Power and the new TransAlta power station in Port Hedland that is connected to Karratha via Horizon Power's 220kV transmission line.

Horizon power is expected to commence work early in 2020 to upgrade the transmission line, connecting the Karratha terminal sub-station to the Dampier sub-station, which is critical to the security of supply on the NWIS. This will also help support the growing demand for energy for the Burrup Strategic Industrial Area.

In addition, there is Rio Tinto's Gap Ridge and Cape Lambert Power Stations to cater for port and mine operations. To manage electrical supply, underground power has been provided throughout the Karratha urban area along with the upgrade of Karratha distribution to 22kV.

The City of Karratha advocates a reduction in the duplication of power supplies and seeks greater integration and cooperation from industry partners and suppliers.

Encouraging the private sector to invest in infrastructure or to provide more open access to existing infrastructure will help to spread the investment cost and reduce duplication and redundancy. An example of this is the investment in solar energy by the City for a 1MW solar project delivered for the Karratha Airport which will provide a reliable, long-term energy solution for the Airport's increasing electricity demands.

Considering the current power generation capacity and demand for electricity from the planned expansion of the Karratha urban area and demands from industrial uses, Horizon power does not anticipate any additional update to existing power infrastructure until 2029.

A report issued by the Australian Centre for Renewable Energy (ACRE) (now administered by the Australian Renewable Energy Agency) in October 2011 identified the significant potential for renewables, particularly wind and solar, in the Pilbara. The ACRE report also identified the need for exploration, mapping and monitoring of renewable energy resources in the Pilbara.

The City has a comparative strength in its potential for renewable energy resources and planning for coordinated power provision for the Pilbara should seek to ensure this potential is utilised.

Telecommunications

The City now has access to 4G coverage across most settlements. Karratha's telecommunications exchange and tower is located in the town centre on Balmoral Road, south of Morse Court. A communications reserve is also located on View Road, south of Millstream Road. This site accommodates the Telstra satellite station.

NBN fixed line services are now widely available throughout the City with internet connection speeds comparable to other regional centres. Widespread access to high speed internet is an important infrastructure consideration that allows the City to connect and remain competitive with other areas of the State. High speed broadband is critical to facilitate establishment of local businesses.

The City's Operational Economic Development Strategy has flagged the necessity for a City-wide Digital Strategy to provide a strategic vision for the City's future. The Strategy is expected to be enabled by enhanced broadband access and digital technologies.



Waste Disposal

The City's current waste facilities include:

- 7 Mile landfill - Class II and Class III
- 7 Mile waste transfer station
- Wickham waste transfer station.

In addition to the assets above the Pilbara Regional Waste Management Facility (within the Shire of Ashburton) is to be a Class IV facility that will accept Class III and IV waste, including waste from the mining, industrial and oil and gas sectors across the wider Pilbara region.

Waste generation within the City can be separated into three categories; 'construction and demolition', 'commercial and industrial' and 'municipal solid' waste. Over the previous 5 years the generation of construction and demolition waste, as well as commercial and industrial waste has remained relatively stable. The City since 2015 has reduced the amount of municipal solid waste by approximately 32% (see Figure 41).

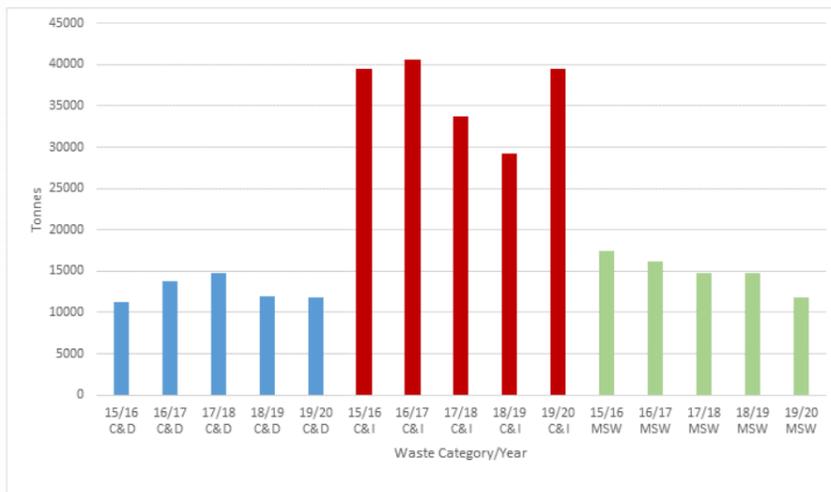


Figure 41: Waste Category 2015/16-2019/20

Previously there was minimal recycling of waste in the region, with only 1% being recovered for recycling and the rest sent to landfill. Since 2015 significant progress has been made in diverting waste from landfill, with approximately 14% diverted during the 19/20 financial year, an increase of 4% on the previous year (see Table 25).

Table 25: Waste diverted from landfill %

Year	Tonnes	%
15/16	3127	4.59%
16/17	4559	6.45%
17/18	5270	8.34%
18/19	5742	10.29%
19/20	9207	14.60%

Emerging innovations that could be utilised to improve the solid waste disposal practices include:

- **Incineration:** a “clean” technology which could be coupled with some other industry or process that also produces or needs heat energy;
- **Recycling:** new technologies to sort & separate out good materials from solid waste piles;
- **Re-use:** encouraging retail discounts for using your own materials; coffee cups, shopping bags, etc;
- **Design Life:** stop making products that have a “design life” and fail much sooner than they could; and
- **Traditional Landfills:** are very clean and safe today, but simply use up large areas of land.

In the past five years the City has constructed several upgrades to its waste management assets including:

- A residential transfer station at the 7 Mile Landfill site incorporating resource recovery areas for lead acid batteries, metals, green waste, e-waste and motor oil. The facility also includes a tip shop where re-usable items recovered from the waste stream are re-sold.
- Two class III landfill cells.
- Ongoing capital works investment in the region's solid waste infrastructure, in the medium to long-term, will be required. This includes the future construction of 10 additional class III landfill cells.

It is important that waste facilities operate within the scope of their environmental licenses to reduce potential impacts to sensitive receptors. The City will further ensure that sensitive receptors do not encroach towards waste management facilities.

Irrespective of the above, the capacity of the City's 7 Mile Tip is expected to meet demand well past 2031.

8.2 Key Issues: Infrastructure Services

- While previously there was a number of critical infrastructure constraints for the City that delayed development, in general these have been addressed through significant capital investment to upgrade services. Dampier, however, still remains critically constrained from growth by its aged infrastructure, which is at its maximum capacity.
- There has been significant investment to ensure capacity is matched to growth.
- Wastewater recycling and reuse projects, such as the Karratha Treated Waste Water System, will help to reduce the consumption of scheme water, while also providing for the 'greening' of the urban environment. Given the constraints on water supply, wastewater recycling and reuse should be made a priority.
- Encouraging the private sector to invest in infrastructure or to provide more open access to existing infrastructure will help to spread the investment cost and reduce the potential for duplication and redundancy. This is particularly relevant to power infrastructure, where major resource companies frequently supply and reticulate their own power independent of the NWIS.
- The City's natural environment affords significant potential for wind and solar renewable energy generation. There is a need to further investigate this potential with exploration, mapping and monitoring of renewable energy resources so that these alternative power resources can be implemented in future. Any coordination of the NWIS system through the Pilbara Power Project Board should incorporate planning for future renewable power resources.
- Waste production in the City has remained relatively stable over the past five years. The City aims to continually increase the amount of waste diverted from landfill, to enable this further a comprehensive waste recycling and disposal plan is needed. The City will ensure facilities are upgraded as needed, including the future construction of 10 additional class III landfill cells, and investigate emerging waste technologies to improve the City's waste management practices to be more sustainable. The City will ensure sensitive receptors do not encroach towards waste facilities.
- High speed telecommunications connectivity, including enhancement of mobile voice and data network coverage enhance the ability of the City to diversify its economy and remain competitive with other areas of the State.

8.3 Local Profile: Transport

Airports

There are currently four airports in the Pilbara Region located at Karratha, Port Hedland, Newman and Paraburdoo. Karratha is currently WA's busiest regional airport for passenger movements which peaked in 2012 at approximately 800,000 passengers per year, since then numbers have declined to approximately 470,000 people (2019), an increase of 6% compared to 2018.. There is also an airstrip at Roebourne, as well as a number of smaller airstrips throughout the City as shown in Figure 42. It should be noted that the expansion of Rio Tinto's Cape Lambert Port Operations has since resulted in the closure of Wickham Airport.

In 2013 the City of Karratha adopted the *Karratha Airport Master Plan & Land Use Plan 2013-2033 (KAMP 2013)*. Based on the adopted medium growth model current passenger numbers are forecasted to increase to 1.8 million passengers by 2031-32. Low and high growth forecasts ranging from 1.0 to 2.5 million passengers per year were also calculated and depended on various factors, including commencement of construction projects in the region, FIFO workforce changes and growth in non-resource related air travel.

KAMP 2013 provides the strategy for Karratha Airport to accommodate forecasted growth and corresponding capital development when required to meet demand.

The Passenger Terminal Upgrade project was completed in 2015. The \$35 million upgrade provided new cafes, a bar, other lettable concessional areas, additional toilets, combined arrivals and departures lounge, security enhancements and baggage claim to enhance amenity for passengers. The upgrade also provided the capability for international flights and for airline lounges should airlines deem them viable.

As passenger numbers grow additional capacity increases will be required at the existing passenger terminal and Regular Public Transport (RPT) apron in future. There is a limit to the capacity for expansion of existing facilities however, so *KAMP 2013* reserves space on the south side of the airport for possible relocation of passenger operations, including a new passenger terminal.

KAMP 2013 also identifies the potential for commercial development of available airport land that is not required for future airport operations. Land on the north side of the airport would be developed first with the larger areas south of the airport in the longer term depending on demand.

Ports

The Pilbara Port Authority operates as a corporatised entity under the *Port Authorities Act 1999*. The non-port authority port, Port Walcott (Cape Lambert) was established under the *Shipping and Pilotage Act 1967*. In general, non-port authority ports comprise one or more single-user export facilities operated by private resource companies. These ports and related facilities are operated with limited guidance from the State Government.

It is important to note the tonnages for some of these ports are substantial and further add to the State's existing and future port throughput. Port Walcott located at Cape Lambert is of particular significance exporting 20% of the State's iron ore. The port exported more than 168 million tonnes in 2019 a fall of 6% on the previous year. The expansion at Cape Lambert was completed in 2015 enabling Rio Tinto's annual production in the Pilbara to be more than 350 million tonnes per annum.

The important role of these ports to the economy of the City and the Pilbara Region needs to be recognised, as does the need to protect transport corridors into the Ports to ensure continued operation. Furthermore limited capacity exists for the expansion of existing industrial areas adjacent these ports, thus it is of critical importance that they be limited to use directly associated with the port and not for uses that can be accommodated in other industrial areas.

Future construction of the Anketell, Balla Balla and Cape Preston East Ports, and their associated Strategic Industrial Areas will further enhance the resource export potential of the City.

Rail

Within the City of Karratha there are a number of private heavy haulage rail lines that transport iron ore to the existing ports of Dampier and Port Walcott (Cape Lambert). These rail lines carry the vast majority of the iron ore volumes exported from these three ports. While the tonnages carried are substantial, these rail lines are privately owned and operated.

Two new railway lines are proposed to link the planned new Anketell Port and Strategic Industrial Area. As per existing rail lines, these routes require protection inclusive of sufficient buffers from encroaching development in accordance with State Planning Policy 5.4 – *Road and Rail Transport Noise and Freight Considerations in Land Use Planning*.

Of significance to the City of Karratha is the level of delay that can be experienced at major rail crossings, where freight trains can be in excess of 1.4km and require several minutes to pass over the road. Importantly however, there are no locations of freight rail lines crossing non-primary roads.

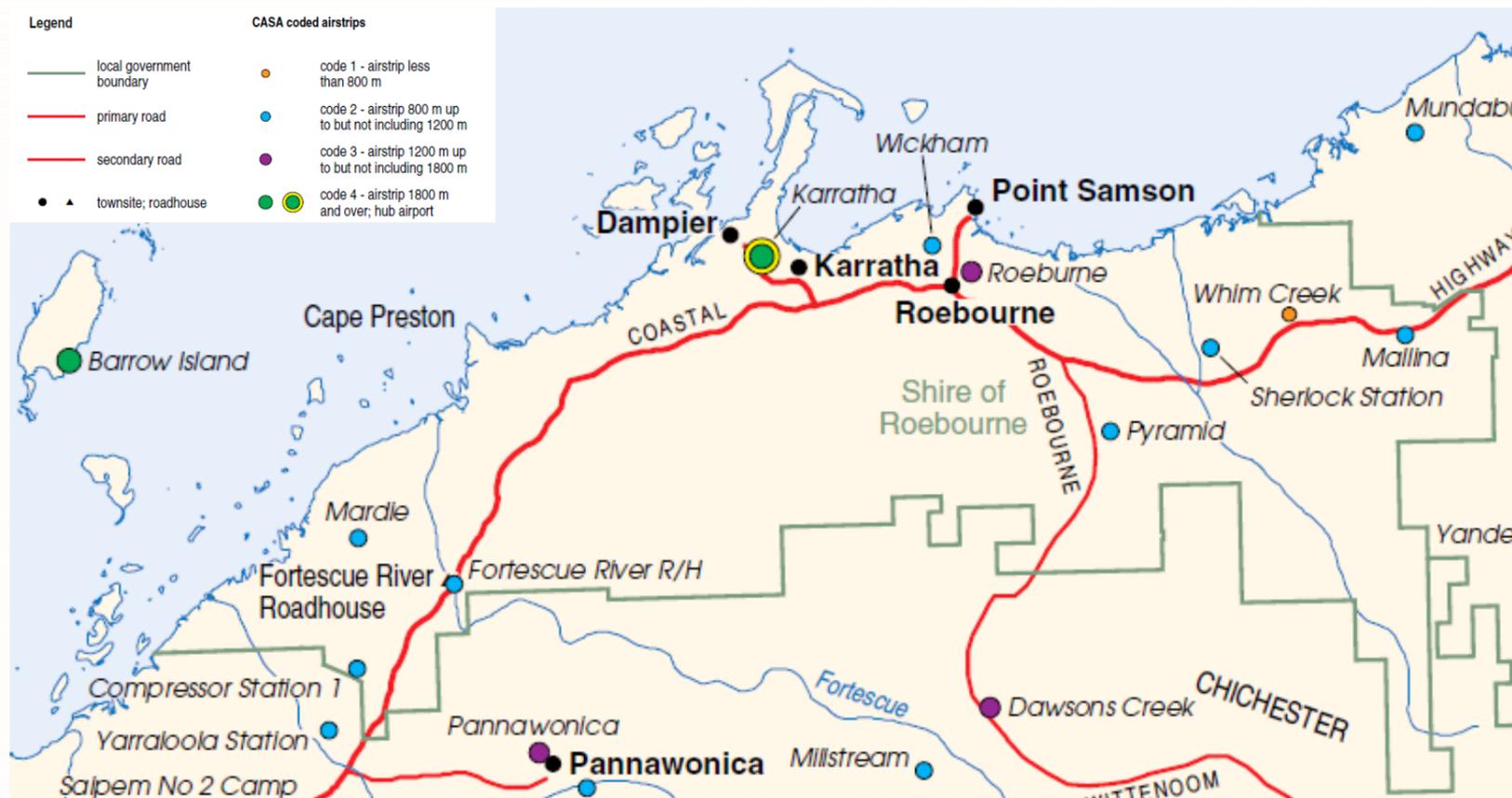


Figure 42: Existing Airports & Airstrips in the City of Karratha (Note: Wickham Airport now closed)

Primary Roads

The primary road system within the City of Karratha falls under the control of Main Roads Western Australia. Whilst Main Roads are responsible for maintenance and upgrading of these roads, any delays and capacity constraints may have significant impacts to local roads providing alternative routes.

State Planning Policy 5.4 Road and Rail Noise (SPP5.4) seeks to ensure that the community is protected from unreasonable levels of transport noise, whilst also ensuring the future operations of these transport corridors. The SPP 5.4 notes that the City contains Strategic freight and or major traffic routes, future development within the City will have to ensure that the requirements of SPP 5.4 are adequately addressed.

From a regional perspective the key challenges are the growing pressure caused by the overall increase in traffic movements caused by population expansion and the demand to move freight. The movement of freight is further complicated by the growth of pre-assembled, large module transport across the road network to service the needs of the resource sector.

Other issues include the reliability of the network due to flooding and significant delays at existing and future railway level crossings.

Freight Network

Freight movement in the City is dominated by the movement of iron ore from mines to ports, primarily by rail, and movement of other goods to mines, towns and industrial areas mainly by road.

Two existing Rio Tinto railway lines transport iron ore to two of the state's highest export tonnage ports at Dampier and Cape Lambert. Two more mining company railway lines are planned from mine sites to the planned new Anketell Port and Strategic Industrial Area located between Karratha and Cape Lambert.

Dampier Port had a throughput of 173 million tonnes in 2018/19 and is projected to increase to 230 million tonnes per annum by 2030. Port Walcott at Cape Lambert handled 168 million tonnes in 2019. The new Anketell Port will be capable of expanding to 350 million tonnes per annum if required. Port Preston (approximately 60km southwest of Dampier) could potentially be expanded in future as well. For the proposed Forge Resources Magnetite project near Whim Creek one of the options under consideration would involve potential new port facilities at Balla Balla (approximately 100km east of the planned Anketell Port).

Figure 43 provides an indication of road freight growth from 2012 to 2030 within the City, although it should be noted that this is based on the existing road network and does not include the planned Karratha Western Bypass (west of Madigan Road) and the new access road planned from North West Coastal Highway to Anketell Port and SIA (beside the proposed railway shown).

Several regional freight priorities were previously identified within the Western Australian Regional Freight Plan (2013), including upgrades to around King Bay for and regional port access roads such as the Anketell port access road (DoT, 2013).



Figure 43: Current & Future Road Freight Demand (DoT, 2013)

Road Network

The existing regional road network linking settlements within the City of Karratha and beyond is illustrated in Figure 44.

The primary road system within the City of Karratha falls under the control of Main Roads Western Australia. Whilst Main Roads are responsible for maintenance and upgrading of these roads, any delays and capacity constraints may have significant impacts to local roads providing alternative routes.

From a regional perspective the key challenges are the growing pressure caused by the overall increase in traffic movements caused by population expansion and the demand to move freight. The movement of freight is further complicated by the growth of pre-assembled, large module transport across the road network to service the needs of the resource sector.

Other issues include the reliability of the network due to flooding and significant delays at existing and future railway level crossings.

Existing traffic volumes on the road network are illustrated in Figure 45. The figure highlights the much higher traffic flows, of 10,000 to 12,000 vehicles per day (vpd), on Dampier Highway compared to most other roads in the City. The high proportion of heavy vehicles is also noted.

A variety of movement network improvements are necessary to accommodate future growth within the City. This improvement is required at many levels, with priorities identified in the following section.

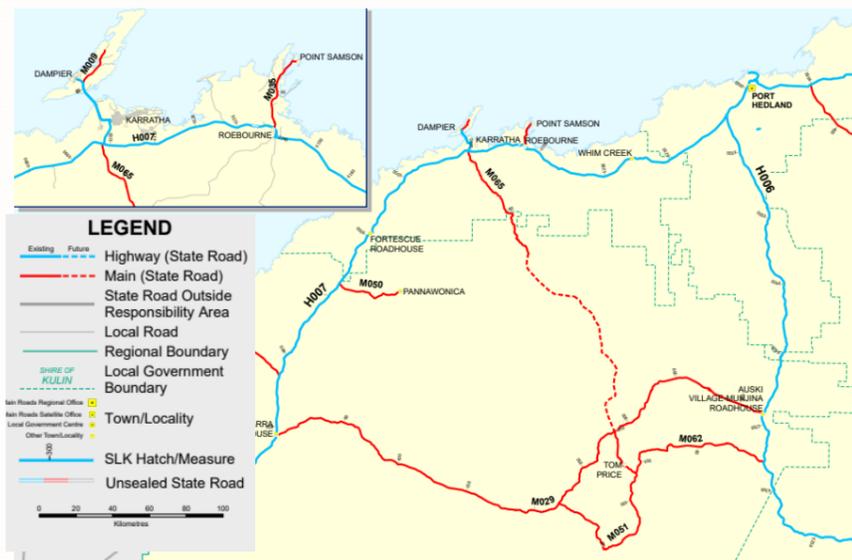


Figure 44: Existing road network (MRWA, 2020)

Network Upgrades

The existing road network system within Karratha entails connectivity issues due to Radburn layout and flood ways. The proposed road network strategy recommended in KCN aims to improve connectivity and permeability for all modes of transport.

In July 2014 Riley Consulting reviewed the operational capacity of the Regional Road network based on a predicted annual increase in traffic volumes of 3% to the year 2031, and a doubling in truck movements in line with freight forecasts (see Table 26). An assessment of the future traffic movements to the local road network (non regional roads) was also undertaken based upon the population projections discussed earlier in this report.

Based on a population of 35,268 by 2031 (exclusive of FIFO), current ABS data indicating 2.9 persons per household, the standard residential trip rate of 8 trips per dwelling (equating to 2.7 trips per person), forecasted traffic increases for each settlement are expected to be in the order of the following:

- Karratha +9,839 persons
 - Mulataga (65% increase) +17,267 vehicle movements per day
 - Gap Ridge/Madigan (35% increase) +9,298 vehicle movements per day
- Dampier +850 persons +2,295 vehicle movements per day
- Wickham / Point Samson +820 persons +2,216 vehicle movements per day
- Roebourne +125 persons +338 vehicle movements per day

Whilst this work contains differences in the population growth of different centres (in particular Dampier whose infrastructure constraints weren't fully understood at the time) it doesn't alter the conclusion that forecast traffic increases as a result of the population expansion are significant within the Karratha townsite, but increases to other towns are not high and can generally be accommodated by the current road network.

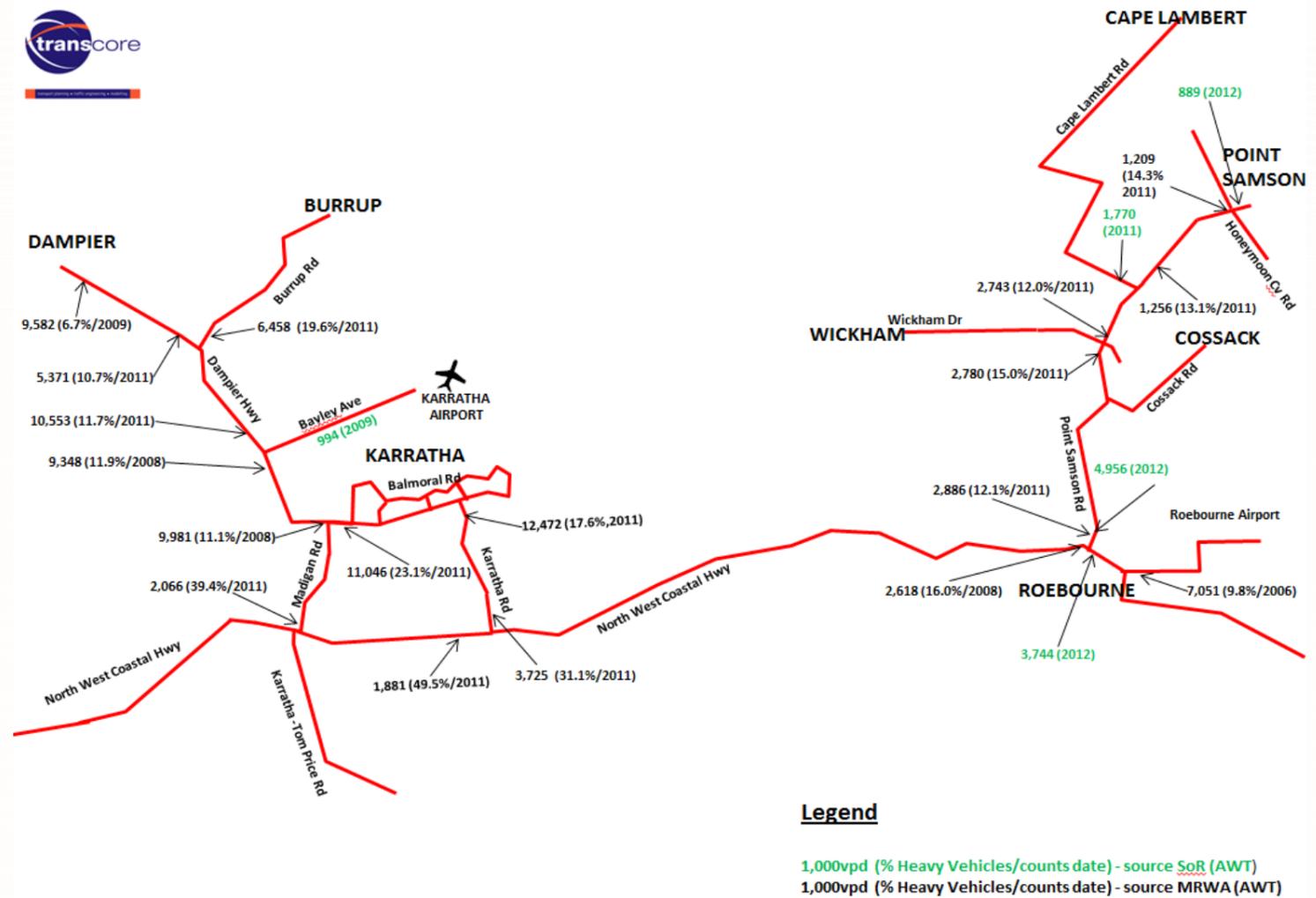


Figure 45: Existing Traffic Volumes between Major Settlements (Transcore)

Based on the traffic modelling undertaken, the Strategy anticipates that the first two upgrade noted below may need to be constructed or upgraded by 2031, with the upgrades following upgraded as future demand requires:

- Dampier Hwy/Millstream Rd (Searipple Rd to Maitland Rd) – dual carriageway (4 lanes).
- Balmoral Rd (Millars Rd to Warambie Rd) – dual carriageway (4 lanes).
- Point Samson-Roebourne Rd (Roebourne to Wickham) – dual carriageway (4 lanes).
- Roebourne northern highway realignment (Point Samson-Roebourne Rd to North West Coastal Hwy) – construct as 2-lane road (to reduce traffic volumes including heavy vehicles on the corresponding section of Point Samson-Roebourne Rd in Roebourne townsite).
- Roebourne southern bypass (North West Coastal Hwy to North West Coastal Hwy) – construct as 2-lane road (to reduce traffic volumes including heavy vehicles on the corresponding section of North West Coastal Hwy in Roebourne townsite).
- Karratha Western Bypass (Dampier Hwy to Madigan Rd) – construct as 2-lane road (to reduce heavy vehicle traffic on the corresponding section of Madigan Rd in Karratha townsite).
- New road link from Millstream Rd southward through the Mulataga area to the Karratha Industrial Area and Karratha Rd – construct as 2-lane road (to keep traffic volumes on the northern section of Karratha Rd below 10,000vpd as the Mulataga area continues to develop).
- Millars Rd (Balmoral Rd to Karratha Airport) – upgrade to sealed road standard (2 lanes).

Level of Service Definition

The Level of Service concept was developed in North America to assess the operation of major road links. In Australia the concept has been adopted as a simplistic measure of road and intersection performance. Based on the USA Highway Capacity Manual (HCM) the letters A through F, with A being the best and F being the worst, designate the performance level as follows;

- A: free flow. Traffic flows at the posted speed limit and motorists have complete mobility between lanes.
- B: reasonably free flow. Posted speeds are maintained, maneuverability within the traffic stream is slightly restricted.
- C: stable flow, at or near free flow. Ability to maneuver through lanes is noticeably restricted and lane changes require more driver awareness.
- D: less stable flow. Speeds slightly decrease as traffic volumes slightly increase. Freedom to move within the traffic stream is more limited. Minor incidents are expected to create delays. The lowest preferable Level of Service for arterial roads.
- E: unstable flow, operating close to capacity. Flow becomes irregular due to limited usable gaps in the traffic stream and speeds rarely reach the posted limit. Any disruption to traffic flow, such as merging traffic or lane changes, can create a shock wave affecting traffic upstream. Any incident will create serious delays.
- F: forced flow. This Level of Service typically indicates more demand than capacity. The road would be considered as congested.

It is also known that at some future time MRWA will provide a diversion to Madigan Road and provide grade separation at Dampier Road. This proposal would not be expected to impact traffic patterns, nor is it likely to significantly improve journey times.

A potential new road linking Dampier Road through to Balmoral Road using Millars Road has also been muted. No alignment has been developed and it is known that major flooding would occur on this link. The road would provide a convenient connection between the town centre and the airport, but may result in higher than desirable traffic movements through residential precincts.

These upgrades are all in addition to those necessary to service the future Anketell Port project. Indicatively, the industrial uses could generate between 15,000 to 25,000 additional vehicle movements per day, necessitating the provision of up to three single two lane roads or one four lane divided road.

In addition North West Coastal Highway will require upgrading to a four-lane divided road between the future port and Karratha, as will De Witt Road between the Highway and Karratha. Due to expected impact, it is the City's position that these upgrades need to precede commencement of the port.

Other key movement network improvement initiatives embraced by the Strategy include:

- Improved connectivity across culs-de-sac and the Radburn layouts found in Karratha and Wickham – this includes roads, footpaths and bikeways;
- Increased shade provision for footpaths and bikeways;
- Public transport must be considered as a priority within settlements as well as across the City; &
- The provision of adequate truck breakdown areas;
- Sealing of the Manuwarra Red Dog Highway beyond the City's boundary to improve road safety and reduce journey times, in recognition of the Regional Centre role of Karratha to the West Pilbara.

Table 26: MRWA Roads current operation characteristics (Riley Consulting, 2014)

Road	Volume ¹	HGV	PCU value	Pavement	Type ²	LoS	2031 volume ³	LoS	Comments
Burrup Road	8,483	20%	8,990	7.9m	S1	D	16,434	E	Duplication required
Dampier Highway E Broadhurst	13,548	11%	14,054	2 X 7.2m	DCC	A	25,058	A	Very good operation
Dampier Highway west Karratha Rd	16,792	13%	17,519	2 X 7.2m	DCC	A	31,448	B	Good operation
Dampier Highway west Madigan Rd	11,754	11%	12,197	2 X 7.2m	DCC	A	21,753	A	Very good operation
Dampier Road north of Burrup Rd	5,431	7%	5,562	7m	S2	C	9,763 ^A	D	Acceptable operation
Dampier Road south of Bayly Ave	10,765	19%	11,392	2 X 7.2m	DCC	A	20,794	A	Very good operation
Karratha - Tom Price Road	1,351	34%	1,470	7.1m	S1	A	2,768	A	Very good operation
Karratha Road - north Highway	6,571	21%	6,990	7.2m	S1	C	5,655 ^B	C	Good operation
Karratha Road south Millstream	14,291	9%	14,745	7m	S1	E	20,082 ^B	E	Duplication required
Madigan Road	4,035	37%	4,411	7.2	S1	B	8,348	C	Good operation
NWCH at Karratha	4,098	45%	4,528	7m	S2	B	8,668	C	Good operation
NWCH east Roebourne	1,213	35%	1,321	7m	S2	A	2,491	A	Very good operation
NWCH west of Karratha	1,360	37%	1,488	7m	S2	A	2,816	A	Very good operation
NWCH west Roebourne	5,495	21%	5,839	7m	S2	C	10,709	D	Acceptable operation – Affected by Anketell Port
Point Samson Rd South Wickham	5,345	28%	5,760	6.5m	S3	C	10,734	D	Acceptable operation
Point Samson Rd	1,628	11%	1,691	6.5m	S3	A	2,243 ^C	A	Very good operation
Roebourne-Wittenoom Road	29	11%	31	-	S5	A	54	A	Seal will be required

¹Volume is the PCU flow. PCU's adjust all vehicles to reflect the equivalent volume of cars (HGV = 3).

²Refer Appendix A for road types and LoS definition

³2031 volume at 3% growth per annum or base volume + known development

(A) Riley Consulting Dampier Townsite Expansion report July 2013

(B) Riley Consulting Karratha Light Industrial area expansion report

(C) Riley Consulting Point Samson structure plan traffic report

Public Transport

Both *KCN* and the *KSR* noted that the lack of effective and viable public transport and bus services in Karratha contributed to the total dominance of motor vehicles. Since that time improved bus services between towns in the City have been established and have helped in facilitating non-car-based access from the other towns to the regional facilities available in Karratha.

The Public Transport Authority has operated bus services (under the TransRegional banner) in the City since 2017, routes currently offered are shown below in Figure 46.

Parking

Currently demand for parking supply is not expected to be an issue in Karratha due to the significant number of parking bays available at different locations including the town centre. Parking surveys undertaken by Transcore for *KCN* showed that the highest overall parking occupancy across the whole town centre was 55% on Friday (12AM-1PM) and 53% on Saturday (1PM-2PM). The main shopping centre car parks (966 spaces including disabled and loading zones) are up to 73% full on Friday and up to 85% full on Saturday.

Parking supply in the heart of the city centre should be rationalised to match observed demand. It should be recognised that drivers will first try to find parking in the most conveniently located parking areas close to major destinations, such as the shopping centre and the main street. Logical routes from these inner parking areas to outer parking areas are therefore necessary to efficiently act as additional parking at peak times. Decker and underground parking and concealed parking areas (behind buildings) are initiatives promoted to further improve the space utilisation and appearance of the city centre areas. The same principle is applicable for other towns in the City.

Local Planning Policy DP18 – Karratha City Centre Parking Policy prescribes mechanisms for the supply and management of parking within the city centre in accordance with the objectives outlined in *KCN*.

Bicycle & Pedestrian Networks

KCN also recommended provision of pedestrian and bicycle facilities in accordance with Liveable Neighbourhoods principles, including the network of shared paths shown in Figure 47.

Final alignments and staging arrangements form the subject of the *City's Future Works Report (Footpaths 2013-2023)*. The recommendations of this report are acknowledged and regarded in the *KSR* as essential to underpinning the core *KCN* principles of a walkable, connected, sustainable and healthy City.

Other towns in the City will remain much smaller than Karratha, so non-motorised transport modes such as walking and cycling remain a viable option for movement around the town. Public transport would not be warranted in those smaller centres, but good pedestrian and cyclist facilities should be considered essential in smaller towns.

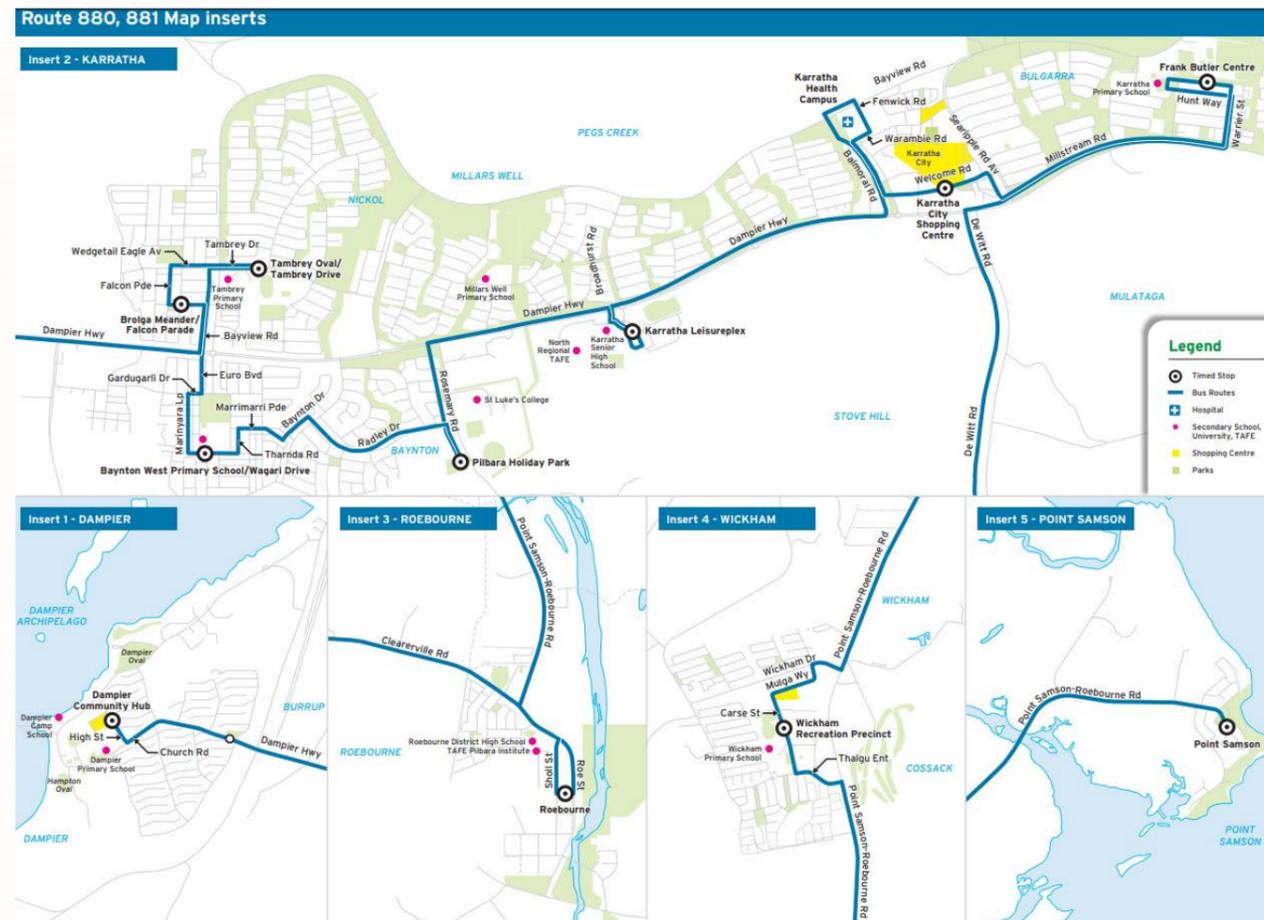


Figure 46: Public Transport Routes for the City of Karratha (Transperth, 2020)

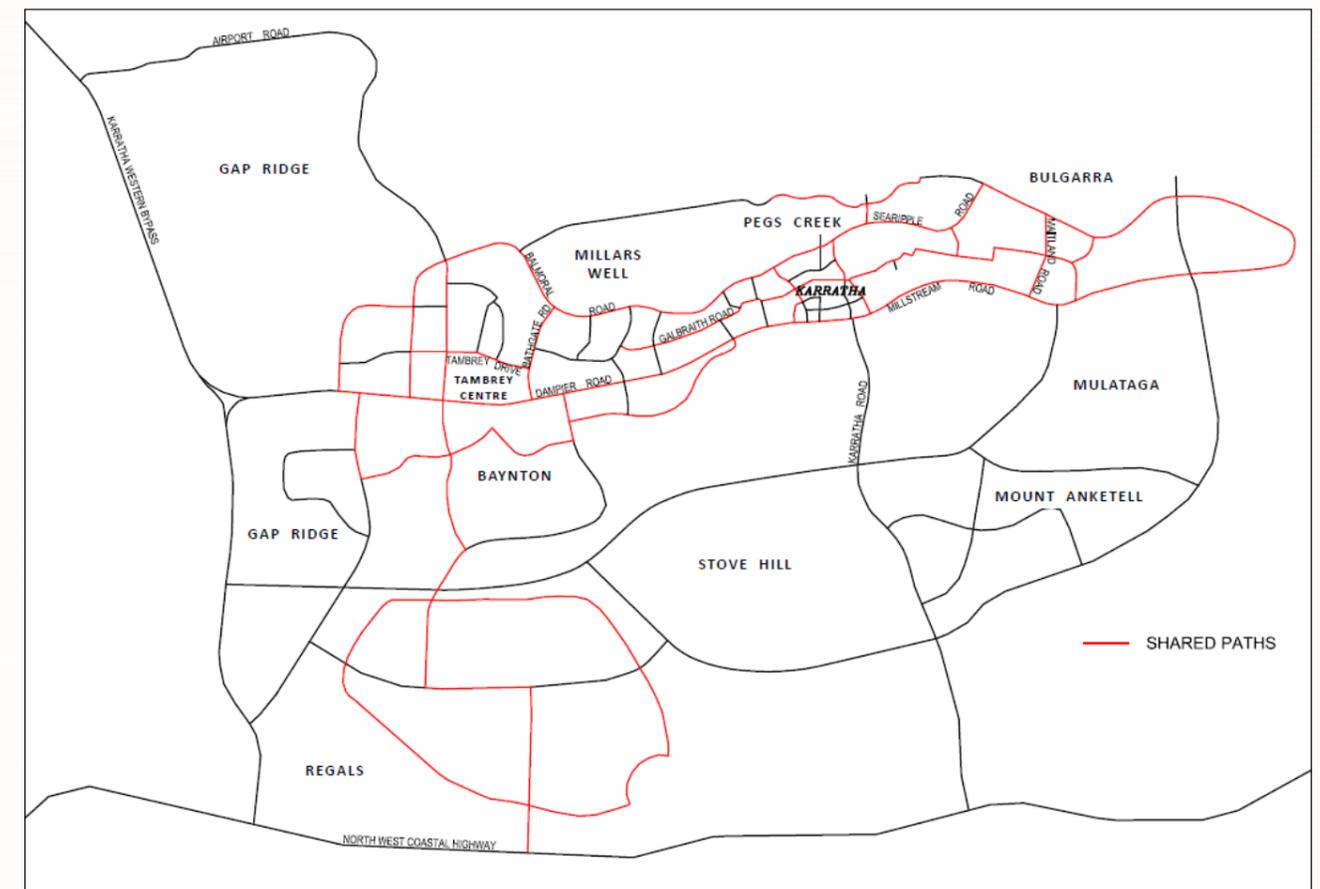


Figure 47: Proposed Shared Path Network for Karratha

Land Use / Transport Integration

Urban centres around the world are sustained because they provide sufficient access to different land uses, activities and opportunities distributed in the urban area. As these land uses grow however, integration becomes more difficult to maintain. Transport routes to outer areas become more congested, dispersed and costly. Increasing the proximity of land uses to each other, including more mixed use centres, as well as technology can improve accessibility without increasing car usage.

The City of Karratha has experienced rapid growth on the back of minerals and energy sector economic growth over recent years. Growth of the City is projected to continue, and providing sustainable transport infrastructure in line with land use growth is essential.

Movement between different land uses depends on their location and available transport. In the past, improving transport links such as duplication of Dampier Highway has improved access. This option is becoming more expensive to maintain, not only in financial terms but also in environmental and social terms, as different centres in the City grow.

Integrating land uses and transport can deliver a more sustainable City with a high quality of life for current and future residents. Over the next 15+ years, the City of Karratha population has the potential to increase to 26,000 people, with an aspirational target of up to 50,000. The locations chosen for development to accommodate these people, and the transport available to them, will determine whether the current high rate of car use can be regulated. As Karratha and the other major settlements of the City grow, more land is cleared for urban use and more motor vehicles impact on the air quality. Generally, people want home, work and essential services including schools, medical facilities, shops, public transport and parks to be within a 10-20 minute trip.



Truck Breakdown Areas

Main Roads has classified the road network in regard to truck movements. The Restricted Access Vehicle (RAV) networks cover the State and specify what size vehicle may use each road. At locations where long vehicles (road trains) are not permitted, there is a need to provide breakdown areas where trucks can disassemble the road train into acceptable lengths to reach the load destination.

The provision of breakdown areas is a function of the Main Roads RAV system and as such breakdown areas should be provided (by MRWA) at locations where the RAV network changes. Within the City of Karratha breakdown areas could be required (in order of priority) at:

- North West Coastal Highway at De Witt Road and/or Madigan Road ;
- Point Samson-Roebourne Road south of Wickham;
- Karratha Light Industrial Area;
- Dampier Highway by Kangaroo Hill Access; &
- Gap Ridge.

A new facility may also be required for the Anketell Port project in the vicinity of Cleaverville Road. The facility would service the port and deliveries to Wickham.

Main Roads policy for the provision of truck breakdown areas is where the MRWA road network requires the provision of a breakdown area, it would be provided by Main Roads. Where the local road network requires the provision of a breakdown area, it should be provided by the City. Thus where a RAV route terminates, but a road under the control of Main Roads continues, Main Roads would provide a breakdown area. Where, for example, a district road connects with a Main Road, the requirement for a truck breakdown area is a need of the district road and thus would be provided by the City. Main Roads acknowledge there is a need to assess truck breakdown areas on a realistic basis and each location should be assessed on its merits and reasons for requirement.

8.4 Key Issues: Transport

- A number of strategic transport issues for the Pilbara region have been identified in State Government planning studies, but most of those items are outside of the direct control of the City of Karratha and beyond the scope of this *Local Planning Strategy*. The City can only manage or control development on privately owned (or non-State Government owned) land. The City needs to be an informed partner in the wider mining and industrial development of the City and in State Government policy development that has implications for the City.
- Most of the transport-related challenges and opportunities for the City relate to roads rather than the other types of transport infrastructure. Previous reports for Karratha, in particular, have identified a range of transport-related challenges and opportunities relevant to the City, which also relate to the principles of land use / transport integration.
- The previous upgrading of Dampier Highway to dual carriageway standard from Karratha to Burrup Road was required for the current traffic volumes of 10,000 to 12,000 vpd on this road. Planning of the future Karratha Western Bypass is in progress although construction is currently indicated as a long term project. It is recommended that the threshold of 10,000 vpd be used as a realistic threshold for determining when road upgrading to dual carriageway is required in this regional context.
- At Roebourne a bypass (around the southwest side of town) may be further considered upon the generation of sufficient traffic demand.
- Based on the traffic modelling undertaken for this *Local Planning Strategy* it is anticipated that a number of road links may be constructed or upgraded by 2031, depending on depending on future demand.
- Continued provision of public transport in Karratha and between centres is seen as an essential service. Continuation of the service is required in order to provide non-car-based access from the other towns to Karratha's regional facilities.
- At Dampier the proposed Dampier Marine Services Facility involves a new jetty and land-backed wharves to accommodate increased cargo movements. The proposed Dampier Marina project will be a significant recreational boating facility with residential and tourist accommodation. Both would place additional demand on transport links and access in this area.
- In all towns provision and upgrading of pedestrian and bicycle facilities is strongly recommended. The WAPC's Liveable Neighbourhoods policy provides appropriate guidance, including a network of shared paths alongside the busier roads and footpaths alongside most other local roads.
- Proposal to transport 90% of waste to Port Hedland for processing and return of ash to City will result in a significant increase in truck movements between Karratha and Port Hedland which have not currently been factored into road network strategy, which may necessitate a review in future.

9.0 Opportunities & Constraints Mapping

Analysis of the physical and administrative constraints upon development forms an important component of the *Local Planning Strategy* preparation process. This process also importantly involves identification of opportunities for growth. Opportunities may be specific, or may arise in the form of areas unaffected by constraints to development. Opportunities and constraints mapping, therefore, plays a critical role in informing the debate on spatial form aspects of development of the City. Section 5 of Part A contains mapping showing opportunities and constraints to development, focusing primarily on the main settlement areas of the City.

9.1 References

Author	Title	Date
Technical Reports		
Syme Marmion and Co.	Technical Report 1: Local Economic Development Strategy	Sept 2013
MacroPlan Dimasi	Technical Report 2: Property Market Analysis	July 2013
Syme Marmion and Co.	Technical Report 3: Population and Demographic Analysis	July 2013
Syme Marmion and Co.	Technical Report 4: Community Facilities Matrix (2013 update)	Aug 2013
MacroPlan Dimasi	Technical Report 5: Civil Engineering Services Capacity	July 2013
Evidential Analysis Papers		
Syme Marmion and Co.	Evidential Analysis Paper 1: Main Economic Drivers	Sept 2013
Strategen	Evidential Analysis Paper 2: Physical and Environmental Limiters	Oct 2013
MacroPlan Dimasi	Evidential Analysis Paper 3: Urban Residential Densities	Sept 2013
Syme Marmion and Co.	Evidential Analysis Paper 4: FIFO Labour	Sept 2013
Transcore	Evidential Analysis Paper 5: Transport Infrastructure Integration	Sept 2013
Syme Marmion and Co.	Evidential Analysis Paper 6: Major Industry Projects	Sept 2013
Planning Solutions	Evidential Analysis Paper 7: Character, Strategic and Functional Role	Aug 2013
Planning Solutions	Evidential Analysis Paper 8: Alternative District Growth Patterns	Aug 2013
Planning Solutions	Evidential Analysis Paper 9: Future Growth Areas	Aug 2013
Background Sources		
Australian Bureau of Statistics	(various) Census Statistics	2020
Acil Tasman	FIFO and Regional Impact Assessments	Jan 2009

Author	Title	Date
AEC Group	Pilbara Tourism Product Development Plan	2014
Astron Engineering	Cleaverille Beach – Existing Environment And Management Issues (Draft)	Dec 1998
Astron Engineering	Karratha Accommodation Study	May 1999
Bob O'Sullivan	Coastal Strategy Plan (Draft)	Nov 2008
BoM	Cape Lambert Storm Surge Study	April 1998
BoM	Climate Statistics for Australian Locations: Karratha Aero, Dampier Salt, Roebourne, Cossack and Roebourne Aero	March 2013
CARDNO	DRAFT Point Samson Structure Plan	2015
CBRE	Industrial Land Supply Analysis – Pilbara Region	2013
Chamber of Minerals & Energy and PWC	State Growth Outlook	2011
Chamber of Minerals and Energy of WA & PWC	WA State Growth Outlook 2015-2025	April 2014
City of Karratha	Local Government Heritage Inventory	2014
City of Karratha	DRAFT Dampier Community Hub Management Plans	2014
City of Karratha	Operational Economic Development Strategy 2014-16	2014
City of Karratha	Destination Management Plan	2018
CODA	Pilbara Vernacular Handbook	Dec 2011
CSIRO	Pilbara Regional Mining Climate Change Workshop Outcomes	Dec 2011
CSIRO	Priority Threat Management for Pilbara Species of Conservation Significance	2014
Dampier Port Authority	Dampier Port Authority – Development Guidelines	Dec 2006
Dampier Port Authority	Port of Dampier – Land Use and Infrastructure Plan 2014	2014
Dept of Agriculture	Salinity Investigations at Karratha	Sep 1975
Dept of Conservation and Land Management	Burrup Peninsula Recreation and Tourism Masterplan	Feb 1999
Dept of Conservation and Land Management	Indicative Management Plan for the Proposed Dampier Archipelago Marine Park and Cape Preston Marine Management Area	2005
Dept of Conservation and Land Management	Dampier Archipelago Nature Reserves Management Plan	May 1990
Dept of Conversation and Land Management	Murujuga National Park Management Plan	2013
Dept of Environment & Conversation	Biodiversity Conservation Strategy for WA (Draft)	2006
Dept of Environment and Conservation	Proposed Burrup Peninsula Conservation Reserve Management Plan (Draft)	2006
Dept of Housing and Pilbara Development Commission	Pilbara Towns Housing Study	
Dept of Jobs, Tourism, Science & Innovation	WA Iron Ore Profile May 2020	May 2020

Author	Title	Date
Dept of Mineral & Petroleum Resources	King Bay – Hearson Cove Precinct Plan	Aug 2002
Dept of Mines, Industry Regulation and Safety	Western Australian Mineral and Petroleum Statistics Digest 2018-19	Jan 2020
Dept of Planning, Lands & Heritage	Karratha Land Supply Assessment	2020
Dept of Planning, Lands & Heritage	Karratha Land Use and Employment Survey	2019
Dept of Planning, Lands & Heritage	Land Capacity Analysis	2020
Dept of Transport	Western Australian Regional Freight Transport Network Plan	2013
Dept of Water	Pilbara Coast Water Study	Feb 2009
Dept of Water	Pilbara Groundwater Allocation Plan (Draft)	2012
Dept of Water	Pilbara Regional Water Plan	Nov 2008
Dept of Water	Pilbara Regional Water Plan	June 2010
Dept of Water	Pilbara Regional Water Plan (Draft)	Nov 2008
Dept of Water	State Water Plan	2007
Dept Regional Development and Lands	Pilbara Cities Vision	2012
EPA	Guidance for the Assessment of Environmental Factors No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia	2004
EPA	Guidance for the Assessment of Environmental Factors No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia	2004
EPA	Guidance for the Assessment of Environmental Factors No. 3: Separation Distances Between Industrial and Sensitive Land Uses	2005
EPCAD Pty Ltd	Dampier Enhancement Initiative	2014
Essential Environmental	Pilbara Strategic Regional Land Use Plans (Draft)	Sep 2010
Essential Environmental/ RDA Pilbara	Pilbara State of the Environment Report	June 2013
Essential Environmental	Gnoorea (40 Mile) Foreshore Management Plan	2014
Essential Environmental	Karratha Foreshore Management Plan	2014
Essential Environmental	Point Samson Foreshore Management Plan	2014
Essential Environmental	Hearson cove foreshore management plan	2016
Essential Environmental	Wickham boat beach area foreshore management plan	2016
Essential Environmental	Karratha District Water Management Strategy	2016

Author	Title	Date
Geographia & CCS Strategic Management	Karratha 2020 Vision and Accommodation Plan	Jan 2009
GHD	Burrup Industrial Estate – Optimal Use of Sites	Jan 2010
GHD	Burrup Support Industry Land Investigation	Aug 2007
GHD	Karratha Drainage Management Plan	Oct 2010
GHD	Pilbara Towns Water Supply Infrastructure Modelling and Planning Study	Oct 2008
Global Environment Monitoring Systems	West Pilbara Cyclone Surge Inundation Study	June 2009
Gresley Abas	DRAFT Dampier Hub Design Development Report	2014
Haig, T./ Dept of Water	The Pilbara Coast Water Study	2009
Hassell	Karratha Vernacular	2011
Heritage Council	Cossack – Conservation Policy	1996
Heuris Partners Ltd	Planning for Resources Growth in the Pilbara – Employment and Population Projections	Aug 2008
Heuris Partners Ltd	Planning for Resources Growth: Revised Employment and Population Projections	April 2010
JDA Consultant Hydrologists	Dampier Coastal Vulnerability Study	Mar 2012
JDA Consultant Hydrologists	Karratha Coastal Vulnerability Study	Aug 2012
JCY Architects	Karratha Cultural Precinct – Concept Design Report Vol. 1	Jan 2014
Landcorp	Karratha City Masterplan	2010
Landcorp	Karratha City of the North Town Revitalisation	May 2010
Landcorp	Karratha City Revitalisation Brochure	June 2010
Landcorp	Karratha Community Revitalisation Plan	May 2010
Landcorp	Karratha Implementation Plan	2010
Landcorp	Karratha Town Centre Revitalisation Project	Dec 2009
Loechel, B., Hodgkinson, J.H. and Moffat, K.	Pilbara Regional Mining Climate Change Adaptation Workshop: Report on Workshop Outcomes	2011
MacroPlan Dimassi	Karratha Homemaker Centre WA – Assessment of Market Potential	2014
Main Roads WA	Regional Road Network Pilbara	2020
Main Roads/ GHD	Karratha-Wickham Coastal Route Feasibility Study	2012
MetOcean Engineers Pty Ltd	Cyclic and Non-Cyclic Ocean Waves Study	April 2004
Murdoch University	Pilbara Regional Sustainability Strategy	June 2005
O'Brien Planning Consultants	Municipal Heritage Inventory Part 1 & 2	April 1996
Pilbara Area Consultative Committee Inc	The Pilbara Plan	

Author	Title	Date
Pilbara Development Commission	Pilbara Commercial Property and Land Snapshot	Dec. 2013
Pilbara Development Commission	Pilbara Housing And Land Snapshot	Oct. 2014
Pilbara Development Commission	Pilbara Infrastructure Needs Current & Future (Draft)	1998
Pilbara Development Commission	Pilbara Regional Priority Plan	Oct 2005
Pilbara Development Commission	Pilbara/Gascoyne Islands Ecotourism Management Strategy	1995
Pilbara Development Commission	Summary of Housing and Accommodation Initiatives in the Pilbara	July 2009
Pilbara Iron – Rio Tinto	Understanding the Pilbara Region and its Economy	
Regional Development Australia Pilbara	Pilbara Report Investment Prospectus 2012	2012
Regional Development Australia Pilbara	Regional Development Australia Strategic Plan 2011-2014	2010
Regional Development Australia Pilbara	Regional Development Policy Framework 2012-2017	2011
Rehbein Airport Consulting	Karratha Airport Masterplan (Draft)	Jan 2013
Remplan	(Various) Economic and Tourism summaries	Feb 2020
Riley Consulting	Supplementary Transport Paper for LPS	2014
Rio Tinto	Cape Lambert Port B Development	Mar 2009
Rio Tinto	Wickham Town Structure Plan	2011
Roberts Day Group	DRAFT Karratha Revitalisation Strategy	2015
RPS Group	Transient Worker Accommodation	April 2011
SGS Economics and planning for DPI	Karratha Primary Trade Area Retail and Commercial Strategy	Feb 2008
SGS Economics and planning for DPI	Karratha Primary Trade Area Retail and Commercial Strategy - Part B	July 2009
Shire of Roebourne	Cleaverville Area Foreshore Management Plan	2005
Shire of Roebourne	Coastal Management Strategy (Draft)	June 2005
Shire of Roebourne	Foreshore Management Plan (Draft)	July 2005
Shire of Roebourne	Karratha Open Space Strategy (Draft)	June 2008
Shire of Roebourne	Local Structure Plan (Draft)	
Shire of Roebourne	Shire of Roebourne Major Land Transaction Business Plan (Draft)	2013
Shire of Roebourne	Strategic Community Plan 2011 - 2021	2011
Shire of Roebourne	Strategic Community Plan 2012 - 2022	2012
Shire of Roebourne	Strategic Plan 2009 – 2013	2009
Syme Marmion and Co	Extractive Industry and Sustainable Regional Development	June 2010
Syme Marmion and Co	Industrial Land in the Eastern Corridor of the Shire of Roebourne	Aug 2013
Syme Marmion and Co	Shire of Roebourne Workforce Plan (Draft)	2012

Author	Title	Date
Taylor Burrell Barnett	Wickham South Development Plan	Nov 2010
Taylor Burrell Barnett	Wickham Townsite Structure Plan	Jan 2011
UDLA	Roebourne Structure Plan	2014
UDLA	Cossack Visioning Document	2014
Urbis	Dampier Townsite Redevelopment and Revitalisation Strategy (Draft)	July 2013
WA Tropical Cyclone Industrial Liaison Committee	Karratha Storm Surge Inundation Study	Nov 2996
WAPC	Karratha Area Development Strategy	April 1998
WAPC	Karratha Land Development Program – Land Release Plan	April 1997
WAPC	Karratha Land Use Survey 1997	April 1997
WAPC	Karratha Regional Hotspots Land Supply Update	Dec 2010
WAPC	Local Planning Manual	Mar 2010
WAPC	Pilbara Framework Regional Profile + Appendices	Aug 2009
WAPC	Pilbara Infrastructure Priorities	June 2010
WAPC	Pilbara Planning and Infrastructure Framework	Jan 2012
WAPC	Planning Provisions for Affordable Housing Discussion Paper	Oct 2013
WAPC	State Coastal Planning Policy Guidelines	July 2013
WAPC	State Planning Strategy (Draft)	2012
WAPC	Status of Coastal Planning in WA	Jan 2010
WAPC	WA Tomorrow Forecast Summary – LGAs of WA	Feb 2012
WAPC	WA Tomorrow Forecast Summary – Roebourne	Feb 2012
Water Reform Implementation Committee	A blueprint for Water Reform in WA	Dec 2006
Worley Parsons	Pilbara Algae Industry Study	June 2012

City of Karratha

Lot 1083 Welcome Road
PO Box 219
Karratha WA 6714
(08) 9186 8555
enquiries@karratha.wa.gov.au

