

# Roebourne Structure Plan

PART B  
SUPPORTING INFORMATION  
Vol 1 & Vol 2  
July 2014



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# 1.0 Introduction

This Part B of the Roebourne Structure Plan presents and summarises;

- extensive technical studies, including heritage studies, and these are fully cited in the reference list
- thorough field trips
- various analyses of the natural and built environments
- major findings from the extended consultation program.

As the oldest town in the North West of Western Australia, Roebourne is a town with a long history. The Structure Plan and this supporting information is to provide a land use framework for the initiatives to revitalise the town which are being carried out or planned by:

- City of Karratha
- Ngarluma Aboriginal Corporation
- Ngarluma Yindjibarndi Foundation Limited
- Other Aboriginal Corporations and Non-Government Organisations
- Other government agencies,
- Members of the Roebourne community.

This Structure Plan has been prepared by the City of Karratha to provide an overarching framework for the revitalisation and future development of the town of Roebourne. This plan supports the ongoing and planned development initiatives as well as the protection of significant heritage sites.

The town of Roebourne is located on the North West Coastal Highway, on the banks of the Harding River, approximately 40 km east of Karratha in the City of Karratha (Figure 1). It has a population of approximately 815 people and is located within the Eastern Corridor of the City of Karratha boundaries.

The townsite of Roebourne sits within the Ngarluma Determination Area which was granted in 2005 and made in favour of the Ngarluma and Yindjibarndi. The Aboriginal names for this site are respectively:

Yirramagardu – Ngarluma

Ieramugado – Yindjibarndi.

Due to wide and current usage, the European term Roebourne will be used throughout this Structure Plan, however, the cultural significance of both names is acknowledged.

This Plan will guide development and provide advice on subdivision within the Roebourne townsite.

A staged approach has been adopted for this Structure Plan which allows development to respond to residential and commercial demand pressures over time.

## 1.1 Vision

The Vision for this Structure Plan was developed after extensive consultation during 2013 with the Aboriginal community as well as many other stakeholders with strong interests in the town of Roebourne. In recognition of the important role consultation has played in the development of this Plan, consultation outcomes are documented in Section 6 of Part A.

### **Roebourne Townsite Vision**

***Create a future for Roebourne that facilitates the creation of a diverse and well-functioning permanent residential community, based on a celebration of the cultural strength of the residents, while building a diversified economic base that responds to the natural environment and contributes to the Pilbara region.***

## 1.2 Objectives and Principles

In support of the Vision, the following key objectives have guided the formulation of this Structure Plan, as described in the following sections. These objectives will continue to guide the implementation of the Vision.

### Structure Plan objectives

- Celebrate the town's heritage and cultural identity by preserving and restoring historic buildings and fostering the development of artistic and cultural activities and businesses that facilitate economic and social diversification.
- Plan for a diversity of land uses and infrastructure that support the economic and cultural base of the town and provide for the needs of the local and regional community.
- Protect and improve the amenity of the residential precincts.
- Improve the accessibility and legibility of the movement network and provide suitable movement systems for the diversity of vehicle and pedestrian needs, recognising the importance of cultural and environmental linkages and pathways.
- Facilitate upgrading and improvement of the quality of public realm, civic spaces, cultural and community facilities across the townsite to ensure the creation of safe, attractive, friendly and climatically appropriate public spaces.

The following principles which underpin this Structure Plan and facilitate implementation are listed next.

### Urban Design principles

- Infill around existing development will be the preferred approach and is to provide a means of consolidating and building upon the existing development initiatives and economic activities.
- Economic opportunities will be led by investment in catalyst sites within the Roebourne Centre Precinct, with Padbury Street to form an intimate scale main street featuring the retail and commercial hub for the town.
- The nature of this community requires transition from North West Coastal Highway to community uses through to residential areas. This is to address the constraints of the highway, the intrusive nature of tourist traffic and to meet the needs of a disadvantaged community.
- The climatic extremes recorded in Roebourne require that climate responsiveness must be demonstrated in all new developments and in the design of linkages throughout the town, including paths joining precincts and provision of access to Harding River.

### Implementation principles

- Development within this masterplan and land use pattern will be encouraged by flexible and minimal prescriptions.
- The City will play a strong leadership role in the development of the Recreation Precinct as well as other precincts.
- Improvements in safety are to be incorporated by the application of CPTD principles and the short term management of truck behaviour within the townsite boundaries including the location of a load assembly area.
- To preserve the amenity of residential areas there will be a separation from the policing, health and rehabilitative functions.
- The staging plan illustrates the preferred order of development with the townsite.



# Roebourne Context and Community



## 2.0 Physical Context

### 2.1 Location

The Roebourne townsite is located in the City of Karratha in Western Australia's north west region. It is situated inland on the North West Coastal Highway, on the banks of the Harding River, approximately 10 km south of the nearest coastline. It is approximately 40 km east of Karratha, 160 km west of Port Hedland and 1,600 km north of Perth.

Roebourne is situated in the "Eastern Corridor" of the City of Karratha. The concept of an Eastern Corridor has been proposed in recent strategic documents, and relates to the area from Cape Lambert and Point Samson through Wickham to Roebourne (Imani, 2013). It is recommended that the Eastern Corridor develops integrated but differentiated communities and services that provide different opportunities to those in Karratha. This Structure Plan aims to support this concept by developing a local identity for Roebourne that provides alternative opportunities to those in Karratha in terms of employment, housing, recreation and cultural activities.

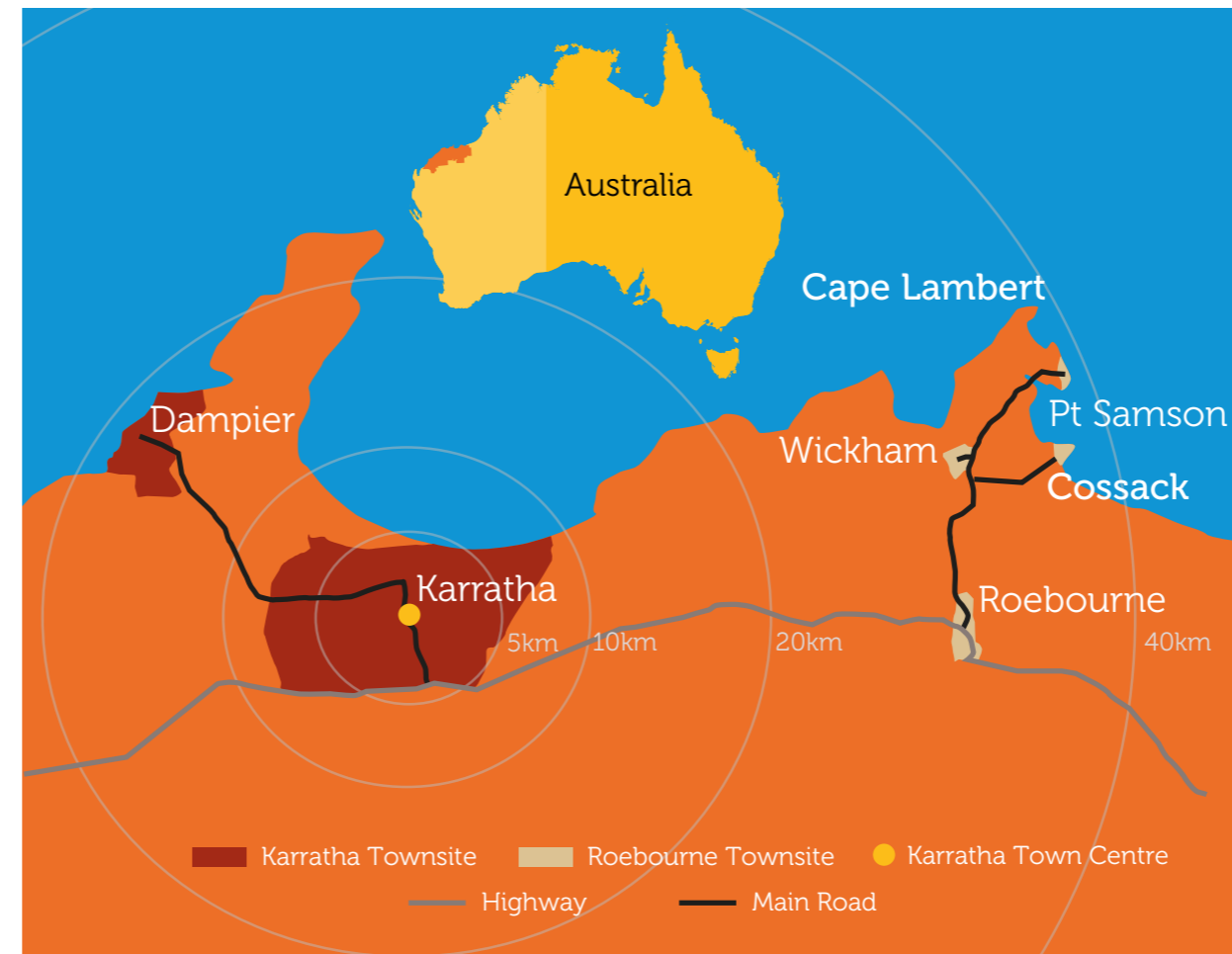
The townsite area is bounded to the south by the North West Coastal Highway, and rural areas extend beyond its northern boundary. The majority of development within the Roebourne townsite is located on the western side of the Harding River. However, a smaller separate area is located south-east of the town centre and east of the Harding River.

Roebourne is located in the Pilbara region, in the north west of Western Australia which includes some of Australia's consistently hottest places with highly irregular rainfall and where the average yearly evaporation exceeds average yearly rainfall. It also experiences severe droughts and major floods as a result of tropical cyclones, which can occur simultaneously across the region.

The Pilbara region maintains a unique and rich landscape of biodiversity and water resources, which include many waterways, wetlands and groundwater resources. It is also a resource rich area with large and numerous mineral and petroleum deposits which include iron ore, oil and gas, gold and copper.

Roebourne has a rich indigenous history and a significant indigenous community living in town and at nearby Cheeditha Community.

Figure 1 Location Map



## 2.2 Land Use

The Roebourne Structure Plan includes a limited range of land uses which include;

- residential areas
- several heritage listed buildings mostly in current usage for civic, policing and tourism activities
- some small businesses in the north along the Point Samson-Roebourne Road, generally associated with motor trades and construction
- a small commercial strip along Roe Street/North West Coast Highway encompassing
  - a post office
  - Centrelink office (or sub-office)
  - General store
  - NYFL offices and other functions associated with construction and landscaping
  - Some community welfare functions
- two art groups housed in residential buildings – one at either end of Roe Street
- a BP service station
- a significant education precinct containing primary and high schools
- a swimming pool and recreation hall adjacent to the education precinct
- hospital and a number of community services along Sholl Street
- the predominant City presence is the Library at the corner of Padbury and Sholl Streets
- a residential zone which provides for worker's accommodation.

The following are located across the Harding River;

- the Harding River Caravan Park
- light aeroplane field including skydiving facilities.

There are significant areas set aside for conservation and recreation, particularly around Harding River, as well as Rural land to the east of Mt Welcome.

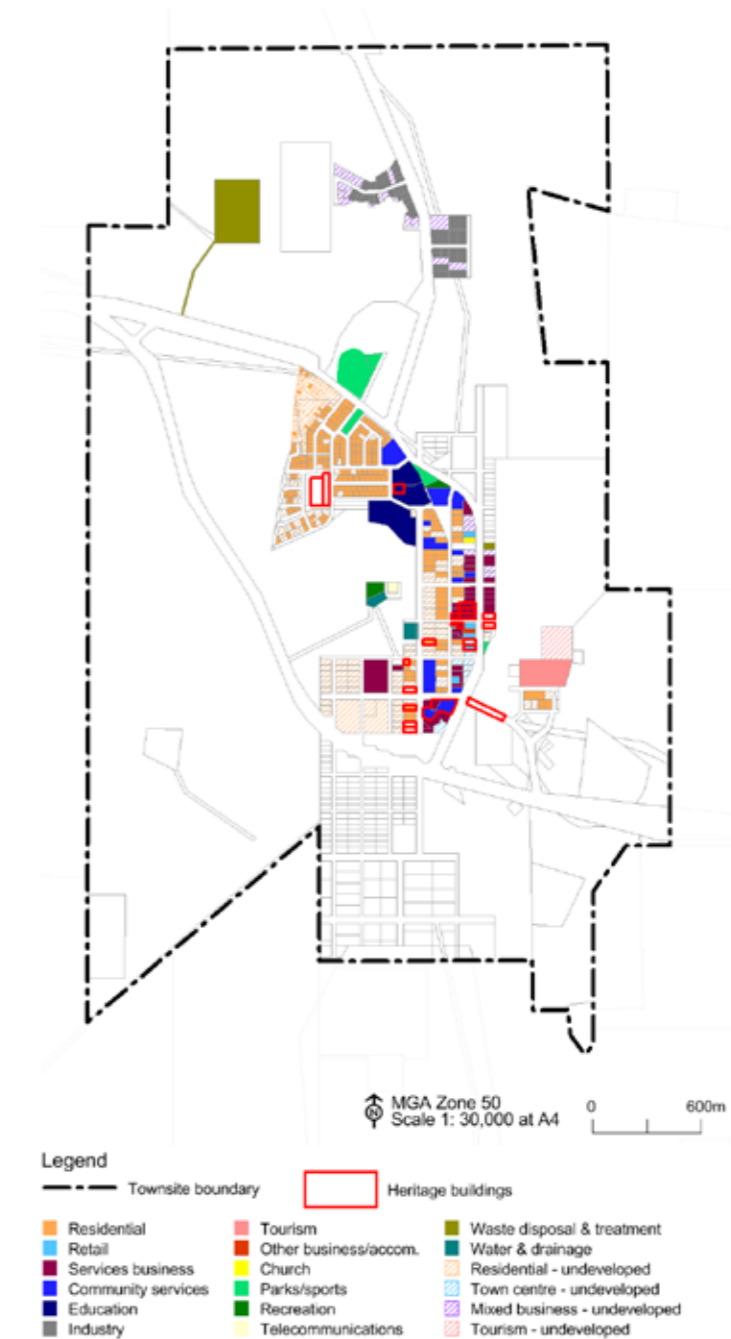
A wastewater treatment facility is located to the north west and is adjacent to a significant parcel of developable land which is held in freehold by private individuals.

Roebourne is a hub for Aboriginal enterprise and culture and is home to the Ngarluma people, as well as many Yindjibarndi and Banyjima people from outlying stations.

The townsite currently serves passing highway traffic and tourism, particularly as a gateway to a number of national parks, including the Millstream-Chichester National Park. It contains many historic buildings including the Roebourne Gaol. Whilst the Roebourne Visitor Centre statistics report an average of 15,500 visitors per year, there is limited opportunity for economic input from these visitors with the exception of fuel, indigenous art, basic supplies, and a small range of gifts in the Visitor Centre.

The townsite itself is mostly residential with some mixed business in the north along the Point Samson-Roebourne Road, with a significant education precinct containing primary and high schools. The town also has a hospital and a number of community services. The area includes the Harding River Caravan Park and a residential zone which provides for worker's accommodation.

Figure 2 Map showing land uses



## 3.0 Community Characteristics

### 3.1 Demographics

The population in Roebourne UCL (Urban Centre Locality) has been gradually declining over recent years and is currently estimated to be 813 people (2011 Census QuickStats, see Figure 3 below). Dramatic changes are unlikely without the start-up of another major project in close proximity or some other innovative approach to building the capacity of the town. The status of the next likely major project - Cape Anketell is unknown, so it is assumed that the population will remain somewhere near static in the short to medium term.

Figure 3 ABS Population figures for Roebourne 2001, 2006, 2011

	2001	2006	2011
Total persons of which there were:	946	857	813
Males	n/a	437	433 (52 %)
Females	n/a	420	380 (48 %)
Aboriginal	585	523	495
Torres Strait Islander	0	3	4
Overseas Visitors	3	n/a	n/a

The demographic characteristics which differentiate Roebourne UCL from the Western Australian and National figures include;

- A much higher Aboriginal representation (61.4%) than either WA at 3.1% and 2.5% for the nation.
- Roebourne has a relatively young population particularly up to and including school age (0 -14 years) at 20.5%, when compared to WA 19.7% and nationally 19.3%.
- The median age in Roebourne is 33 ,which is lower than for WA (36 years) and Nationally (37).
- A stronger picture is seen with those over 60 years of age with Roebourne 10.1%, WA 17.7% and Nationally 19.6%.

As well as very strong Aboriginal representation, Roebourne UCL clearly has a young population and a very low proportion of older people, with nearly half the national figure for those over 60.

There have been some informal observations that the census does not necessarily capture all of the Indigenous data due to various factors including the mobility of the population (Imani, 2013). This may impact on the ABS figures that are reported; however in comparison to the other townsites in the Eastern Corridor the population trend for Roebourne does not appear to be consistent with their level of growth. Nor does it align with the very strong Aboriginal and Torres Strait Island growth identified in NSW and Queensland.

Across the City of Karratha there has been significant growth in recent years due to an expansionary phase in the mining industry. The figure below indicates that this growth is not evenly spread throughout the Eastern Corridor or City.

Figure 4 ABS Population in the Eastern Corridor (ABS description Roebourne locality includes Roebourne, Point Samson, Cape Lambert and Cossack towns)

	2006	2011	% GROWTH
People	920	1,410	53%
Male	466	916	196%
Female	454	494	9%
Of which Aboriginal and Torres Strait Islander	584	784	34%

Weekly household income at \$1,512 is well below the City average that was \$2,839, as is personal income, which was \$1,555 for the City as a whole. Given the high cost structure of the Pilbara in general and the City in particular, this points to significant relative income disadvantage for the residents of Roebourne. The median individual income per week of Roebourne residents is well below the WA median, but the household income is comparable to the WA median, suggesting that more income earners live in the one household than is typical of WA.

Figure 5 Overview of the population characteristics of Roebourne town

Median age of persons	33
Households	212
Families	204
Average people per household	3.4
Median total personal income (\$/weekly)	574
Median total family income (\$/weekly)	1,275
Median total household income (\$/weekly)	1,512
Median mortgage repayment (\$/monthly)	1,083
Median rent (\$/weekly)	170
Average number of persons per bedroom	1.5
Average household size	3.4

The number of cars per household however is significantly lower than experienced throughout the rest of the State. These patterns suggest a higher reliance on walking, a greater need for children and youth facilities, and a greater number of people living in the one home with a lower socio-economic base.

### 3.2 Population Targets and Capacity for Growth

In accordance with the Local Planning Strategy the anticipated population out to 2031 for Roebourne is forecast to be between 1,500 (low growth assumptions) and 3,000 (high growth assumptions). With current and likely low growth scenarios the total population with Roebourne is planned for 1,500, or an additional population of 685.

The Valuer General's Office data identifies only 251 dwellings in Roebourne, 216 of which are zoned R20 and 35 of which are on land that has no R-Code. Like other areas zoned R20 in the City of Karratha, average net site densities are significantly below the permitted average and as such significant capacity remains on already developed lots. However, in Roebourne there are also a large number of vacant lots which could also accommodate significant capacity. Overall 144 new homes could be accommodated on under developed lots and a further 161 dwellings on currently vacant lots.

This indicates that:

- within the existing townsite and access to services there is the potential for an additional 305 dwellings on both existing vacant (161) and under developed sites (144)
- using an average household occupancy of 3.5 people per dwelling would indicate capacity for an additional 1067 people (or with the current Roebourne pattern of 3.2 people/dwelling an additional 990 people)
- the forecast population growth is for another 685 people, therefore it is unlikely that there will be a demand for additional residential land in the next 20 years
- assuming all new dwellings were built on vacant land and densities remained low, 161 lots are available and could accommodate between 515 and 563 additional people. This suggests it would still be many years before any significant demand for residential land was evident in Roebourne.

This statistical data is further supported by the slow take-up rates identified in Yaburijji Estate which released 99 lots in 2012 and still has 60 lots available for sale (sourced from Realestate.com and personal communication with the project agents, Ray White, Karratha, January 2014).

The NASH development proposal has planned for up to 400 housing lots. Innovative approaches such as that being investigated for this project may have some impact on residential demand and building capacity within this community, which is intended to provide new opportunities for Ngarluma people to own their own home if they wish and to provide an improved social housing stock for those who wish to remain as renters.

Fremantle Consulting Group (FCG) has negotiated an agreement with the new State Government on behalf of NAC for this land to be made over to NAC and the project is now able to be progressed. Foundation Housing is currently negotiating with FCG the development of a joint venture between it and NAC for the development of social housing for indigenous people.

(<http://www.ngarluma.com.au/community-initiatives/> accessed 3 February, 2014).

In the short to medium term a staged approach is planned for the release of any additional residential land in Roebourne and only on the basis of expressed demand for this development. Innovative approaches such as that under consideration in the NASH development may change these existing conditions of low demand and considerable capacity.

### 3.3 Indigenous Communities

Over 60% of the population of Roebourne is of Aboriginal descent (ABS, 2013). Roebourne is a hub for Aboriginal enterprise and culture and is home to the Ngarluma people, as well as many Yindjibarndi and Banyjima people from outlying stations.

The townsite of Roebourne sits within the Ngarluma Determination Area which was granted in 2005 and made in favour of the Ngarluma and Yindjibarndi. The Aboriginal names for this site are respectively

- Yirramagardu – Ngarluma; and
- Ieramugado – Yindjibarndi.

Due to wide and current usage the European term Roebourne will be used through out this Structure Plan, however the cultural significance of both names are acknowledged.

The Cheeditha Community is the closest significant Aboriginal community located near Roebourne, approximately 3 km north west of the town centre. Mingullatharndo/5-Mile is a small community located approximately 8 km south east of Roebourne townsite. Ngurrawaana is a community located 70 km south west of Roebourne, near Millstream-Chichester National Park in Yindjibarndi country (Shanks, 2009). Plans currently exist, however, to close Cheeditha and transform it into temporary workers accommodation.



A number of community services are provided for indigenous people in Roebourne, including:

- Mawarnkarra Aboriginal Health Service
- Ngarluma Aboriginal Corporation (NAC)
- Yindjibarndi Aboriginal Corporation (YAC)
- Juluwarlu Aboriginal Corporation (JAC)
- Ngarluma Yindjibarndi Foundation Limited (NYFL)
- Marnda Mia Limited
- Ngarliyarndu Bindirri Aboriginal Corporation
- Roebourne Arts Group
- Yaandina Family Services

Indigenous educational facilities are also present in Roebourne, including:

- Roebourne primary school
- Minurmarghali Mia (Roebourne TAFE)

Volunteer fire and emergency services, St John Ambulance and the Aboriginal church also provide community services. The Mingga Patrol also provides support by helping to ensure the safety and security of intoxicated people who may be at risk of harm, by transporting them to a safe place. Vulnerable children and young people, who may also be at risk, are also offered transport.

A lack of adequate housing for Aboriginal people living in Roebourne has been previously identified as a major social issue (Shanks, 2009). This includes considerable overcrowding as well as social and environmental factors including alcohol which require isolatable areas to provide safety at night.



### 3.4 Community Facilities

There are a number of community facilities available in Roebourne. These include:

- Roebourne Primary School;
- Roebourne District High School;
- Minurmarghali Mia (Roebourne TAFE)
- Roebourne Recreation Centre (pool, basketball courts)
- Roebourne Community Resource Centre
- Yaandina Roebourne Youth Centre
- Hospital
- Roebourne Child Health Service
- Childcare
- Library
- Post Office
- Roebourne Visitor's Centre
- Roebourne old gaol art and craft centre;
- Roebourne volunteer fire and rescue service
- Police Station
- Technical College
- Yaandina Family Services
- Aboriginal Medical =Centre
- Hospital and associated services

It has been noted that there are more community services in Roebourne per capita of population than any other town in the State. This is summarised in Figure 6.

Points to note from this table are;

- The population for Roebourne quoted above includes the prison and the residents in the various workers camps plus the population in addition to the residents within the townsite
- This Roebourne population figure is approximately 10% of that of Karratha
- Even with this expanded population the services and facilities far exceed those provided in Karratha on a pro rata basis.

Figure 6 Community Services in Roebourne compared to City

Community Facilities	Karratha District	Dampier	Wickham & Point Samson	Roebourne Town	Others	Total
Population 2011	14,739	1,433	2,277	1,280		19,729
Early Learning Centre	2		1			3
Amenities	5	1		3		9
Pavilion	5	1		2		8
Community Centre	1			1	1	2
Office	1			1		2
Clinic	2		1	1		4
Library			1	1		2
Shed			1			1

Source: Syme Marmion & Co 2013c

These services and facilities are provided by the City of Karratha (the Library) and the wide variety of not for profit/NGO operations in Roebourne. There are also the numerous community focused agencies that are directly linked to the Aboriginal Corporations based in Roebourne. Many operate out of office buildings which are of questionable quality and appropriateness. Some are quite presentable such as the City building that is leased to an Aboriginal Community Service (Bindirri), while others are known to be condemned due to various faults including asbestos. Some operate out of demountables (Imani, 2013).

Work commenced on the Roebourne Cultural Complex during 2013. This cultural complex will be owned and operated by the Ngarluma Yindjibarndi Foundation and will provide cultural, linguistic, artistic, social and environmental facilities. As well as providing a positive focus for the local people, the complex will also operate revenue generating space to ensure its long term sustainability. Once construction of the complex is complete it will comprise the following:

- Museum, to store cultural artefacts
- Cafe/Restaurant, for locals and visitors
- Retail outlet, selling locally produced Aboriginal product and gifts
- Separate Men's and Women's spaces, which are traditional meeting spaces
- Elders Teaching and Workshop space
- Public display and cultural entrance
- Conference facilities for up to 150 people

Roebourne has a substantial education precinct which contains the high school and TAFE. Plans for the future of this precinct have considered expansion of facilities over the North West Coastal Highway; however this would present significant challenges relating to access as a result of the high number of daily truck movements along this road. Consideration should be given to the realignment of the North West Coastal Highway slightly to the north east, to provide additional land for the expansion of the education precinct.

There is limited public open space within the town and most of the open space is provided for the management of stormwater drainage and flooding. Of the over 130ha of space within the townsite allocated to Water and Drainage (both the Parks, Recreation and Drainage Reserves and Public Purposes Reserves), less than 10ha is not impacted by flooding in a major event (100 yr ARI).

Outdoor recreational opportunities are provided largely by the two ovals - one to the north of the highway, now surrounded by the new NASH development and the other next to the Primary School. There is also a children's play park on Andover Street in the northern part of town and a small park across the street from the old Shire Offices on Roe Street.

There is a large Parks, Recreation and Drainage reserve along Harding River, which is undeveloped but can provide formal recreational opportunities.

### 3.5 Key Challenges

The provision of local community services has significantly increased in recent times. The location of these services has occurred in the absence of any strategic direction or thought regarding appropriate levels of service provision, ongoing management, access and location. Clients are unable to travel to a convenient central location for their needs, rather they are forced to travel all over town to access individual services where they are scattered. This has also detracted from the ability to deliver a substantial retail outlet. Services have also been largely provided on an opportunistic basis in response to the role of particular organisations, rather than in response to a strategic understanding of the services and facilities that are actually required in Roebourne.

## 4.0 Environmental Characteristics

### 4.1 Climate

The arid and semi-arid climate is typical of the Pilbara region of Western Australia, with hot summers with irregular rainfall and milder, dry winters. Average annual rainfall is 312 mm. The north coast of the Pilbara region experiences tropical cyclones which result in highly variable rainfall patterns in the region.

The Bureau of Meteorology maintains a weather station in Roebourne that has been operating continuously since 1887. Both temperature and rainfall reach their maximum in summer, with temperature peaking in December at 39°C, and rainfall peaking at 67.5 mm in February. During the winter, the situation is reversed with maximum temperatures reaching their lowest point in July (approximately 27°C) whilst rainfall reaches its lowest amount, of approximately 0.7 mm, later in the year in October.

### 4.2 Landform and Soils

Steep ridge lines west of the Roebourne townsite, including the highest point at Mount Welcome, are the defining landform of the townsite area (Figure 9). Just outside of the townsite to the east the riparian landscape of Harding River is a contrasting but similarly distinctive landform. A smaller area of the Roebourne townsite lies separate from the main site, disconnected by Harding River to the south east.

The townsite area is generally flat to undulating, most of which lies at an elevation between approximately 10 – 20 m AHD. However, Mount Welcome, which cuts through the central southern area of the townsite, peaks at approximately 70 m AHD. A second, smaller hill peaking at approximately 38 m AHD cuts through the north of the townsite.

The geology of the Roebourne townsite area may be broadly described as granite and greenstone (Van Vreeswyk *et al.*, 2004). Soils in Roebourne are generally a combination of floodplain alluvial sediments (Qa) consisting of sands and clay (GHD, 2012 and Stewart *et al.*, 2008) and igneous rock (Adav) (Figure 8).

There is also potential for Gilgai soils to be found in the Roebourne townsite area and surroundings. These are soils consisting of clay that rapidly expand as they absorb moisture and then contract as they dry. These soils create instable surfaces which can result in cracking of any infrastructure built over them.

### 4.2.1 Acid Sulphate Soils

Roebourne townsite area has no known risk of acid sulfate soils (ASS) occurring within 3 m of the natural surface (Landgate search 2013). However, a moderate to low risk of ASS occurs along the banks of Harding River and its tributaries, including a surface water flow path from the back of Mt Welcome to the river. Any development in this area will require further investigation to determine whether ASS is present. A high to moderate risk of ASS has been identified in Harding River itself (Figure 7).

### 4.2.2 Asbestos

Roebourne was historically part of a transportation route for crocidolite (blue asbestos) mined in Wittenoom and transferred to Point Samson. Asbestos was once considered a safe material and used for many different applications including construction, roofing, fencing, insulation and water pipes (Shire of Roebourne, 2012). Widespread use of asbestos is thought to have resulted in the continued presence of low levels of asbestos throughout many areas of the town.

### 4.2.3 Contamination

While no contaminated sites are recorded in Roebourne on the Department of Environment and Conservation's Contaminated Sites Database, asbestos contamination has been previously recorded in a number of areas within the Roebourne township by the City.

In 2003, work was undertaken to remove asbestos discovered on selected sites within Roebourne township and on vacant crown land on the southern flanks of Mount Welcome (ABC, 2012). A number of other properties were identified as being contaminated with asbestos, however, they were not considered to have recorded levels of asbestos high enough to be regarded as an environmental hazard or require clean-up by the City of Karratha (GHD, 2012). Asbestos is not regarded as a major constraint to development.

### 4.2.4 Arsenic

It has been established that Arsenic occurs naturally in certain areas of the region and contamination of groundwater is suspected in and around Roebourne township (ABC, 2010, GHD, 2012a and Plexus Town Planning P/L, 2007).

Figure 7 Acid Sulphate Soil

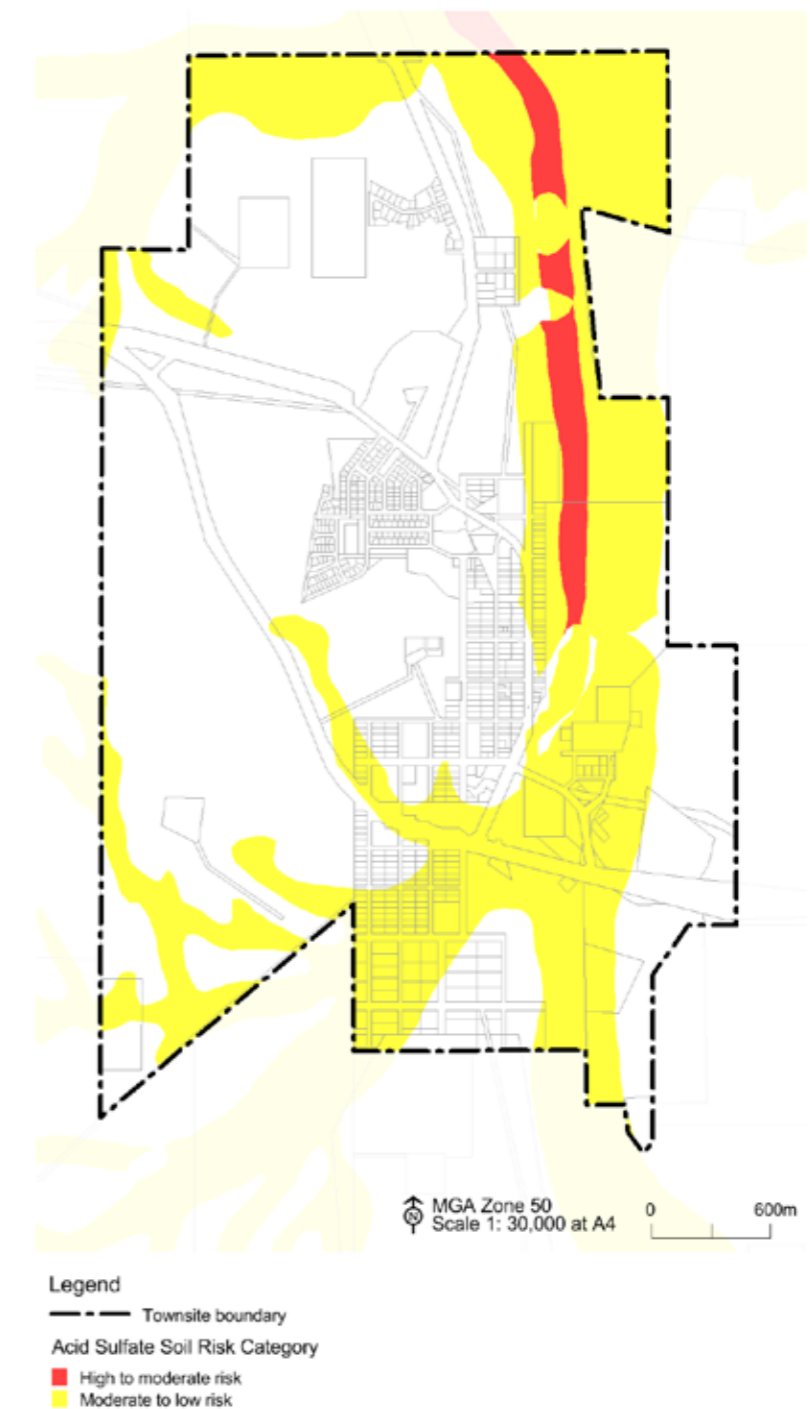


Figure 8 Soils

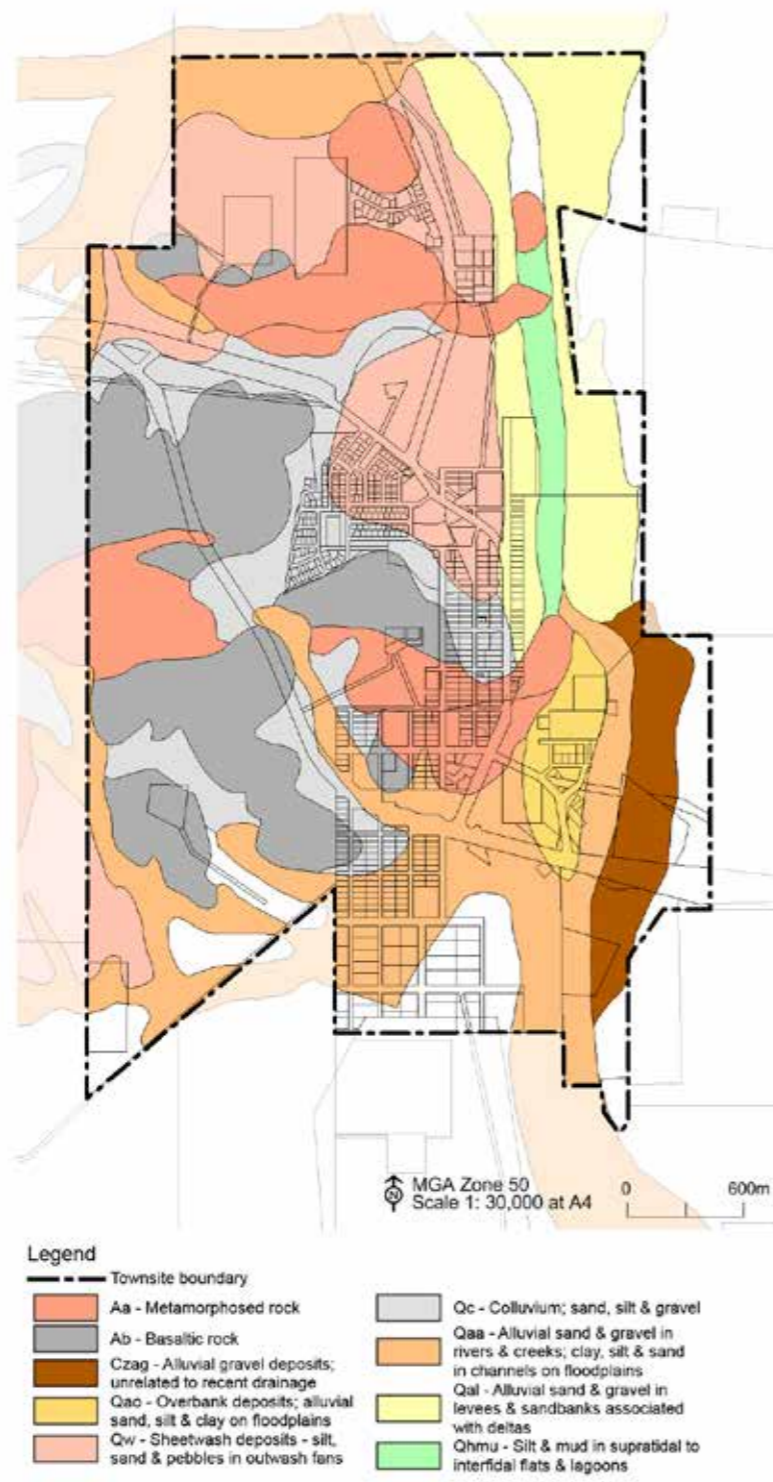


Figure 9 Topography



## 4.3 Groundwater and Surface Water

### 4.3.1. Surface Water and Drainage

The northwest of Western Australia experiences unreliable and highly variable rainfall. Rainfall occurs predominantly in summer as a result of the northern Australian wet season and often as a result of tropical cyclones. Consequently, much of the north west region is subject to inundation during cyclonic events due to riverine flooding and local runoff from smaller catchments.

The Harding River is the major water body in Roebourne and is the low point to which all stormwater from the townsite ultimately drains. Areas of the townsite are also affected by flooding from Harding River in major rainfall events.

Areas within the townsite, predominantly comprising drains, have been set aside for the management of local stormwater generated on the site or from adjacent areas, as well as for the management of flood risk from the Harding River.

Surface water and drainage are discussed in more detail in this section, as well as in the *Roebourne Townsite Local Water Management Strategy* (Essential Environmental, 2013b), and the *Roebourne Townsite Stormwater and Flood Management Plan* (Essential Environmental 2013a).

### 4.3.2. Groundwater

The Roebourne townsite is situated over the Pilbara fractured rock aquifer, which consists of Precambrian granite-greenstone terrain overlain by surficial sediments in the river valleys. The water table is generally within 5 to 10 m of the surface in the granitic areas, but may be quite deep below the greenstone hills. Groundwater is mainly fresh, ranging up to brackish towards the coast. Bore yields vary depending on intersection of fractures (DoW, 2012).

### 4.3.3 Considerations for Future Development

Predicted changes in climate patterns in the future mean that more frequent and severe storms are likely to occur, leading to flash flooding and pressure on drainage systems. An increase in cyclone occurrence may also lead to more cyclone damage, strain on sewerage systems, greater insurance losses, possible black-outs, and challenges for emergency services (CSIRO, 2007). Other potential impacts are likely to include declining groundwater recharge and increased erosion.

Figure 10 Hard Spinifex, *Triodia Wiseana*



## 4.4 Flora, Fauna and Natural Areas

The Roebourne townsite lies within the Pilbara (IBRA) bioregion and contains parts of two IBRA subregions: the majority lies within the Chichester subregion with only a small portion on the eastern side of the study area within the Roebourne Plains subregion. Most of the townsite has been mapped as Abydos Plain Chichester hummock grasslands, grass steppe and hard spinifex (*Triodia wiseana*). This vegetation has a medium rating for reservation priority, with 99.06% of its pre-European extent remaining and is considered of least concern by the Department of Natural Resources and Environment (2002) for protection.

A preliminary search of the Department of Environment and Conservation (DEC)'s *Naturemap* database returned no record of Declared Rare Flora within 5 km of Roebourne. There are no Environmentally Sensitive Areas within the townsite boundary. A search of the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* protected matter search tool returned no record of threatened ecological communities or threatened species within 2 km of the site.

The Naturemap database search also returned no record of Declared Rare Fauna, *Dasyurus hallucatus* (Northern Quoll) within 15 km of the site.

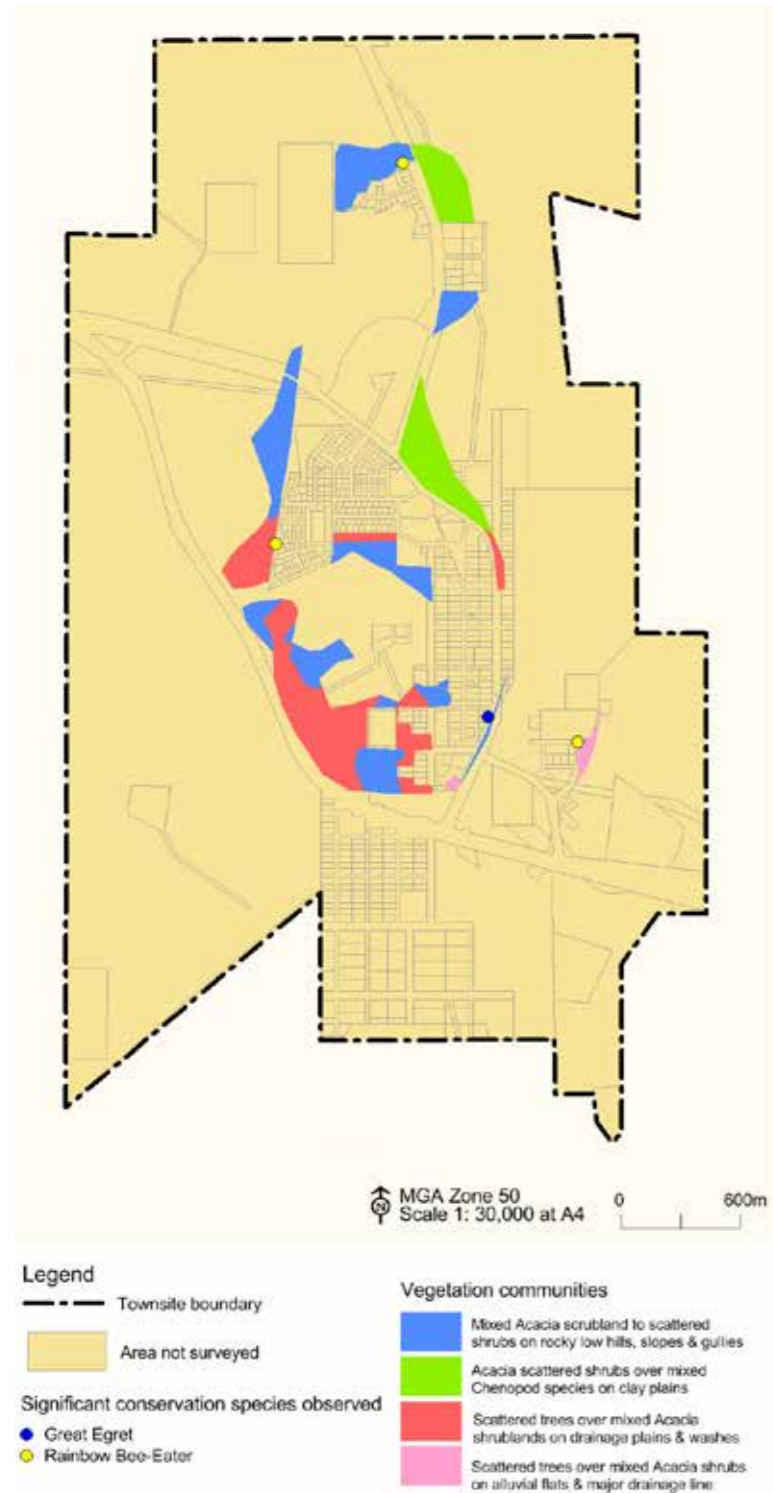
Five species of birds protected under international agreement, including four threatened species of mammals of both vulnerable and endangered status and ten migratory species (including terrestrial, wetlands and marine birds) under the EPBC Act, have been recorded within 5 km of the townsite.

A Level 1 flora, vegetation and fauna survey was undertaken by Eco Logical Australia at the townsite on the 25th October 2012. The major findings included the following (Figure 11):

- No Threatened flora species listed under the EPBC Act or the *State Wildlife Conservation Act 1950* were recorded within the study area;
- No Priority flora species or species at the extent of their range, represent a range extension, or are considered regionally significant were recorded;
- All vegetation communities in the study area have been subject to historic disturbances such as vegetation clearing, proliferation of tracks, historical grazing and rubbish dumping. Vegetation condition ranged from Completely Degraded to Good with the majority of the study area described as being in Degraded condition
- One vegetation community identified within the study area during the survey shares similarities with a Priority 3 - Priority Ecological Community (PEC) known as the 'Horseflat land system of the Roebourne Plains'. However this portion of the study area is degraded with significantly reduced species diversity typically found in this PEC
- Two conservation significant fauna species were recorded within the study area during the survey, and a further two conservation significant species were recorded just beyond the eastern edge of the study area within the Harding River. All four species are federally listed migratory birds:
  - Rainbow Bee-eater (*Merops australis*) - observed in several locations within study area
  - Great Egret (*Ardea alba*) - observed flying over the study area
  - Cattle Egret (*Ardea ibis*) - observed in Harding River just beyond the study area
  - Common Greenshank (*Tringa nebularia*) - observed in Harding River.

Based on the available habitat types and lack of core habitat, it was concluded that the site has few constraints to development. In addition, the relatively poor condition and high level of disturbance evident contributes to the low ecological value of the site in the context of the surrounding land and wider northern Pilbara in which there are extensive similar habitat types (Eco Logical, 2012).

Figure 11 Vegetation Communities and Significant Species



#### 4.4.1. Considerations for Future Development

No significant ecological values have been identified that are considered to pose a constraint to development; however consideration should be given to retaining the ecological corridor from Mt Welcome to the west and retaining and/or restoring the Priority 3 - Priority Ecological Community 'Horseflat land system of the Roebourne Plains' in consultation with the Department of Parks and Wildlife.

In order to reduce rubbish dumping and weeds in natural areas, it is recommended that active management of the conservation areas is increased, together with the installation of dedicated pathways and interpretive signage. It is also recommended that any future development retains any healthy trees, utilising locally native species in landscaping. The proposed environmental strategy is outlined in Figure 13.

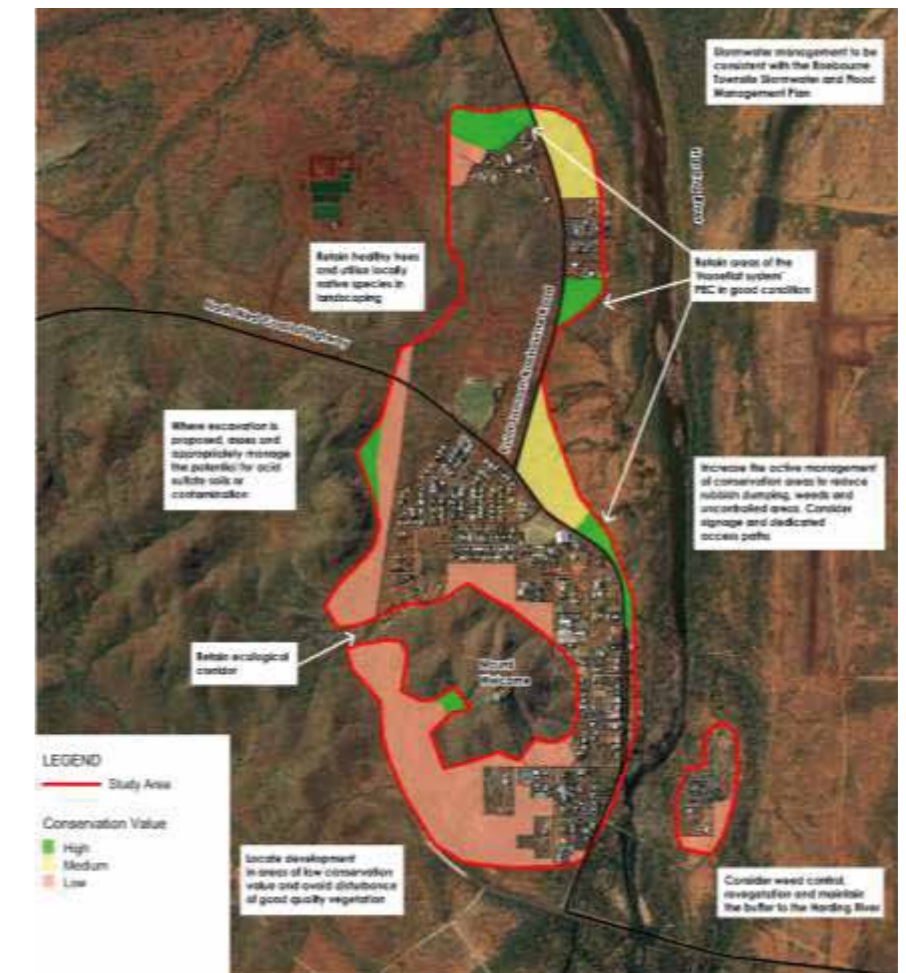
Any development proposed in areas that have not been surveyed (and have not previously been developed) will require a survey for the presence of protected species and communities.

The proposed environmental strategy for the Roebourne townsite is shown below.

Figure 12 Common Greenshank (Tringa Nebularia)



Figure 13 Proposed Environmental Strategy



## 4.5 Flooding

The strategy identifies development and redevelopment of key areas to improve the sustainability of the town. Key constraints to development of these areas due to flooding are identified in the Roebourne Townsite Stormwater and Flood Management Plan (Essential Environmental, 2013) and shown in Figure 14. Constraints due to flood risk are identified for:

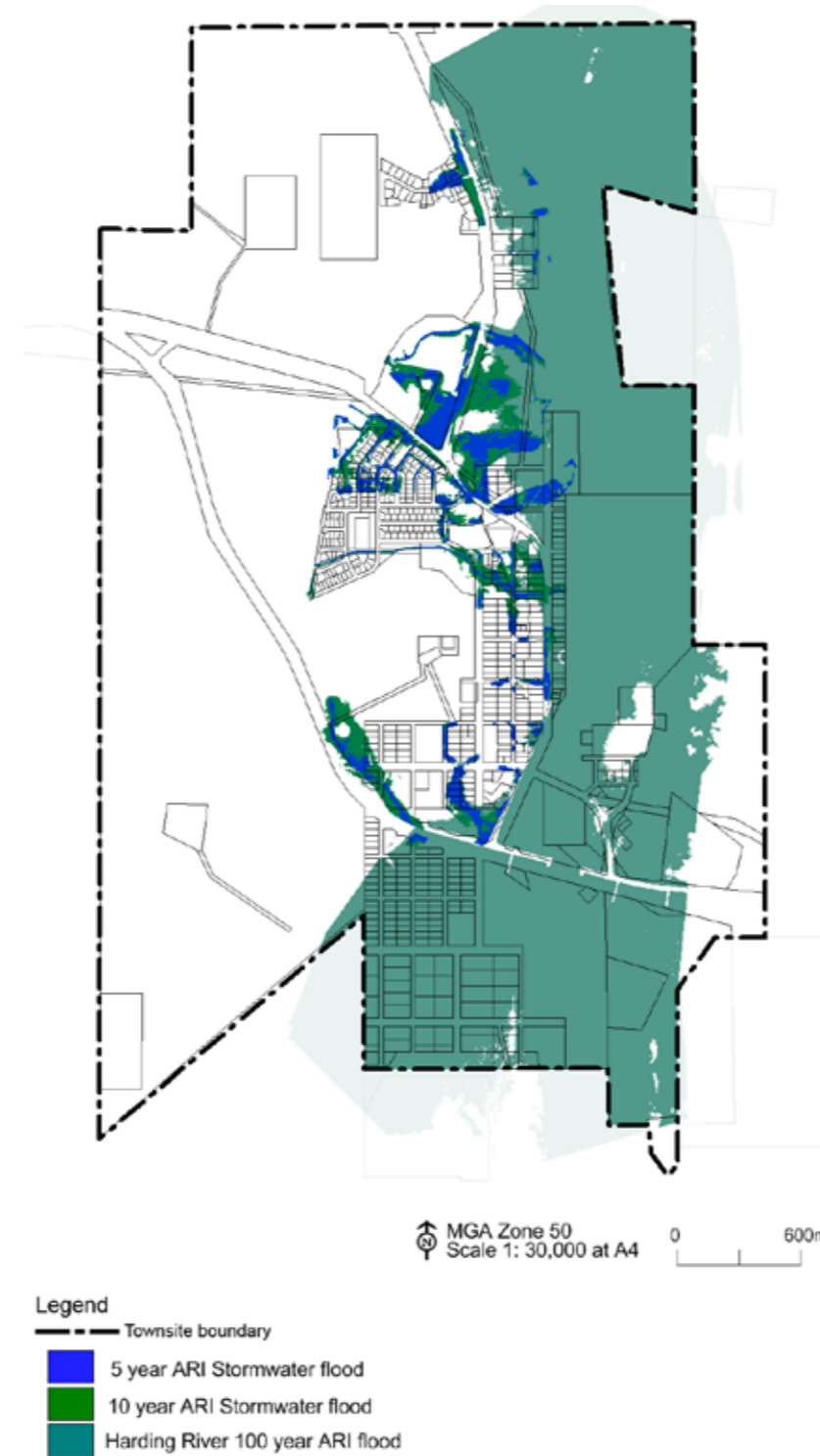
- NASH development
- Northern community hub
- Business hub redevelopment
- Southern development zone
- Industrial expansion
- Eastern development precinct

Land use planning and development controls are the primary mechanism for flood and stormwater management. Any new development should be consistent with the requirements of the Roebourne Townsite Local Water Management Strategy. This includes ensuring adequate protection for development from flood risk and upgrades to infrastructure where required. Additional information regarding the planning controls, standards and criteria which are to be applied is provided in Part 2 of this report.

### 4.5.1 Key Challenges

Key capacity constraints and existing flood management issues have been identified in the Roebourne Stormwater and Flood Management Plan (Essential Environmental, 2013a). The City will consider drainage infrastructure improvements to provide more efficient conveyance of flood waters away from residential areas to more suitable downstream locations for management. In addition, the City will need to assess any application for development against the recommendations of the Roebourne Townsite Stormwater and Flood Management Plan to ensure that adequate flood protection and stormwater management strategies are provided.

Figure 14 Flood Risk



## 5.0 History and Heritage

### 5.1 Pre Settlement

Pre-settlement in the Roebourne area was Ngarluma tribal country bounded by the Maitland River in the west to Peewah River in the east. Food was abundant and this was an area of several language groups – Ngarluma, Yindjibarndi, Banjima and Gurrama. This inhabitation is depicted in the Ethnographical Notes of E. Clement and cited by NAC 2013.

The Aboriginal names for this site are respectively

- Yirramagardu – Ngarluma (alternate spelling is Yeeramukadoo).
- Ieramugado – Yindjibarndi.

Source: UDLA Roebourne Structure Plan Engagement Report, 2013.

Due to wide and current usage the European term Roebourne will be used through out this Structure Plan, however the cultural significance of both names are acknowledged.

A preliminary search of the Aboriginal heritage register returned 27 records within 5 km of the townsite, including 17 registered Aboriginal Sites (two are located within the townsite itself) and 5 other heritage places (Figure 16). These include an engraving, artefact scatter, grinding patches and a burial site.

A further study into Aboriginal and European heritage in 2013 found references to five other Aboriginal sites not registered with the Department of Aboriginal affairs located in DA 25 area and just south of the Caravan Park (Anthropos Australis, 2013).

### 5.2 Post Settlement

The township of Roebourne was first established in 1866 and named after John Septimus Roe, WA's First Surveyor General (Karratha Visitor's Centre, 2012). Originally the administrative capital of the North West, the growing town was serviced by the nearby port at Cossack.

Roebourne experienced a period of growth during the gold rush of the 1880s and 1890s. This resulted in a short-lived population boom and period of rapid growth, with Point Samson acting as a port for Roebourne. Some early European contact with traditional Aboriginal landowners occurred on good terms, such as in the case of the Withnells who settled in Roebourne 1864, and the friendship they developed with the local Ngarluma people was demonstrated by the Withnells' admission into the tribe (Weightman, 2006).

Further development in Roebourne did not significantly occur until the discovery of the now infamous blue asbestos in 1937 in Wittenoorn Gorge (Rom and Markowitz, 2007), and of iron ore in the Hamersley Ranges in the 1960s. Nearby Wickham was established by Cliffs Robe River Iron Ore in 1970 to provide accommodation for the Cape Lambert iron ore processing and shipment facility.

Figure 15 Fisher's House



Roebourne served as the primary service centre for the Shire of Roebourne until 1975 when it shifted to Karratha. The town has largely remained isolated from the benefits of the mineral rich area, however, as Roebourne saw a gradual decline in population, services and opportunities.

Residents of Roebourne recognise the town's rich heritage as an asset for the community and visitors. Accordingly, both the well-maintained and more neglected buildings and structures have the potential to contribute to the future character and identity of Roebourne, and support a significant heritage precinct.

Post settlement heritage is recorded on the Local Government Heritage Inventory (2014) and this list has 73 heritage records. The heritage records for sites in Roebourne are shown below.

Figure 16 City of Karratha Local Government Heritage Inventory (2014) Roebourne Township Entries

Lghi Id	Place Name	Locality	Management Category
1	Aboriginal Cemetery (2 Mile)	Roebourne	A
2	Aboriginal Reserve (2 Mile)	Roebourne	A/B
7	Convent School (fmr)	Roebourne	C
12	Dalgety House (fmr)	Roebourne	A
17	Fisher's House (fmr)	Roebourne	B
18	Freddie Yee Palk's Bakery and Store (fmr)	Roebourne	B
19	Garage Workshop (fmr)	Roebourne	B
22	Holy Trinity Anglican Church	Roebourne	A
23	Hospital, Kitchen Block & Quarters and Matron's Quarters	Roebourne	A
33	Meares' House (fmr)	Roebourne	C
39	Old Cemetery	Roebourne	B
46	Roe's House (ruin)	Roebourne	C
47	Roebourne Airport	Roebourne	C
48	Roebourne Police Station, Gaol & Court Precinct (fmr)	Roebourne	A
49	Roebourne Post Office	Roebourne	A
50	Roebourne Primary School & Quarters (fmr)	Roebourne	A
51	Roebourne Race Track (North West Jockey Club)	Roebourne	B
63	Union Bank (fmr)	Roebourne	A
64	Victoria Hotel	Roebourne	A
65	War Memorial	Roebourne	B
67	Watson & Tee Store (fmr)	Roebourne	A
68	We Care Life Centre (fmr)	Roebourne	C

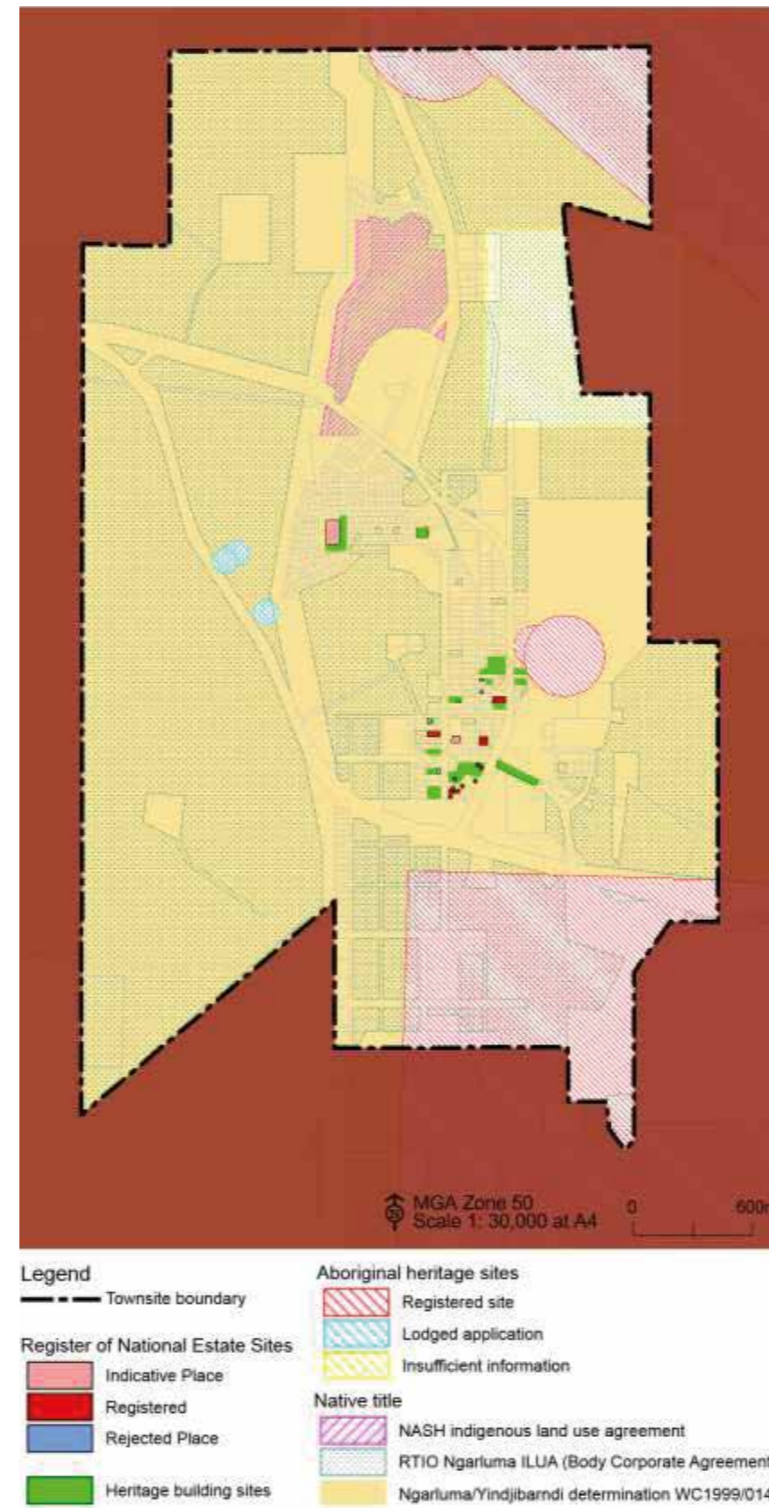
### 5.3 Native Title

In June 2007 a native title determination was made in favour of the Ngarluma and Yindjibarndi peoples (WC1999/014). Since this claim, both Ngarluma and Yindjibarndi peoples have established corporate bodies to hold and manage native title rights and interest. There are separate Ngarluma and Yindjibarndi boundaries within the Roebourne claim area with Ngarluma covering the town of Roebourne. Seven reserves in and around Roebourne and Point Samson are held by Aboriginal Lands Trust (GHD, 2012a).

An Indigenous Land Use Agreement (ILUA) exists over large parts of the Roebourne townsite (Figure 17) between the Ngarluma Aboriginal Corporation and Rio Tinto Iron Ore for development, industry, mining and infrastructure (Body Corporate Agreement WI2011/005). A further ILUA, the Ngarluma Aboriginal Sustainable Housing (NASH) ILUA, exists between the Ngarluma body corporate and the State of Western Australia (WI2012/002) over the land encompassed in DA 25. This agreement facilitated the development of the NASH estate.

All development proposals in Ngarluma Country must be negotiated Heritage Protection Agreements or Indigenous Land Use Agreements with the Ngarluma Aboriginal Corporation directly prior to commencing works on any areas of Crown Land.

Figure 17 Heritage Sites and ILUA





## 6.0 The Economic Context

### 6.1 Local Economy

The current stagnant local economy of Roebourne is related to the massive restructuring of the economy, particularly as when the fortunes of the pastoral industry waned so did those of Roebourne. During the 1980's the demands of the resources industries were increasingly being met by Karratha and as a consequence Roebourne's importance as regional service centre fell away.

Very high traffic volumes are recorded in Roebourne. This traffic is characterised as predominantly resource industry or haulage related movements with seasonal tourist traffic being a relatively minor component. The resource industry and haulage vehicles do not stop, and the tourism traffic which does stop, is highly seasonal.

With the exception of the historic area there is little to attract visitors to stop.

The Aboriginal Corporations are increasing their capacity to be economic drivers for Roebourne and its surrounding communities. As an example, the Ngarluma Aboriginal Corporation (NAC) has made significant strides forward since the landmark 2005 native title determination. NAC has a corporate structure with a CEO and staff that are focused on the management and investment of the NAC trust funds in order to deliver a future fund and benefits to members.

The Wirilu-Murra Yindjibarndi Aboriginal Corporation, is similar to NAC in aims, objectives and size of membership. It also has significant financial resources. These corporations are likely to be major contributors to the town's economic health and viability.

### 6.2 Retail

The town has limited retail businesses with essentially only the General Dealer store on Roe Street, the BP service station and the Post Office shop on Sholl Street of any significance. There are some specialist stores including the art gallery and an Opshop by the Aboriginal Church on Roe Street, a Resource Centre on Padbury Street and a Tyre shop near the General Store.

A new coffee shop opened in September 2013 located on the premises of the General Store. It offers range of café drinks and food and is owned by NYFL. It is anticipated that the coffee shop will offset some of the loss currently experienced by the General Store.

Roebourne Visitor Centre statistic's report an average of 15,500 visitors per year, with the majority of visits concentrated in the high season from May to October. This Visitor Centre is located in a heritage building and has won several local business excellence awards. However apart from fuel, indigenous art, basic supplies, and a small range of gifts in the Visitor Centre, there is little else on which to spend money in the town itself. The Centre has sales revenue of about \$100,000 a year with an average spend \$9.50 per person (Roebourne Visitor Centre Annual report 2013).

Original Indigenous art can be purchased from either the Roebourne Art Group or Yinjaa-Barni Art, both located on Roe Street.

The most significant observation is what is not in Roebourne – for instance there is no bank, real estate agent, pharmacy, take-away, restaurant, hardware, furniture, bakery, butchery, gifts or sports goods store in the town. It is noted that in the past ten to twenty years some of these services, such as a butchery, restaurant and cottage industry stores, were available but have since closed down.

### 6.3 Commercial and Service Industry

Service industries are the most prevalent non-residential land use, with many office buildings providing accommodation for a wide variety of community service agencies. These agencies are generally linked to the Aboriginal Community and provide social enterprises that are supporting employment, youth engagement and aspirational opportunities in Roebourne. These include:

- Brida: Delivering land management and gardening services
- Ways2Work: NBAC's employment pathway for potential job seekers based in Roebourne
- Red Dirt Driving Academy: Supports the Roebourne community to complete the driver's license process both for safety and future employment opportunities
- Yindjibarndi and Roebourne Art Groups: To provide an environment to foster Aboriginal art
- NYFL/NRW Joint Venture: To provide training, education and employment of local community members through a 'work ready' program to specifically equip Aboriginal people with the requirements to enter the civil and mining industry
- Big hArt: Theatre, dance, recording, filmmaking and art project to develop youth and community in Roebourne.

There is considerable potential for further social enterprise development in Roebourne that could also encompass commercial offerings such as catering, cottage industries and conferences.

## 6.4 Industrial Activity

Roebourne has two areas where light industrial land uses have settled. These are on the outskirts of the town with a total land area of 18ha. They are located either side of the Point Samson-Roebourne Rd around Hall St and Jager St. Lot sizes generally range from about 1,000m<sup>2</sup> to 2,500m<sup>2</sup>.

Although there is an industrial area on Hall St, this comprises a large workers' camp. The workers' camp provides limited amenity for its residents. This industrial area also contains garden landscaping, a boilermaker, construction/road equipment hire, earthmoving services, a large lot for sale and some undeveloped space.

The industrial area around Jager St contains building supplies, plumbing services, landscaping, earthmoving and mechanical/workshops. It also has two developed lots for sale, one developed lot for lease and approximately six vacant lots. A recent report by Syme Marmion and Co (2013) to support the development of the Local Planning Strategy considers the Industrial Land in the Eastern Corridor of the City of Karratha. The analysis indicates that by 2021 under medium population scenarios (expected population of 2,187) and based on a medium estimate of 101 m<sup>2</sup> of industrial land per person, up to 22 ha of net developed industrial land would be expected (Figure 18).

Figure 18 Industrial Land (Net developed ha required)

Industrial Land (Net Developed Ha required)						
Scenario	by 2021			by 2031		
	Low	Medium	High	Low	Medium	High
Roebourne	16	22	26	22	30	35

Source: Syme Marmion 2013

Although there is currently only 18ha of industrial land in Roebourne, the vacant lots and lots currently for sale still provide an opportunity to increase industrial activity and mixed-use business in the town.

The City has initiated Scheme Amendment 33 which will have the effect of rezoning currently rural land to the west of Jager Street to industry zone. This should add up to 21 lots of various sizes to the current supply of industrial land in Roebourne.

## 6.5 Considerations and Future Development

There is a shortage of suitable office space in Roebourne town for the current level of service and commercial providers. It is noted that this is not considered to be a zoning issue, as some Mixed Business lots remain vacant. In many cases it is a lack of investment in current built infrastructure. There are also possible tenure issues that need to be resolved that could create a more vibrant commercial ownership/rental market. Consideration should be given to facilitating additional commercial lots in the Town Centre.



## 7.0 Movement Networks

### 7.1 Access and Visibility

Good walkability is a key characteristic of an attractive town or neighbourhood environment. The Roebourne townsite has a variety of activities/destinations which include the school, pool and sports centre, community centre, youth centre, BP Station, Technical college, Aboriginal medical centre, library, General Dealer, Post Office, hospital and associated services.

Due to the layout and structure of the townsite, which comprises two main activity nodes, the key activities that are regularly visited are generally a long walk apart (Figure 19). This layout reduces pedestrian access, in an environment in which a large proportion of people have limited or no access to transport.

Most of the northern residential areas are more than a 5 minute walk from any business. The southern activity cluster is also remote from the majority of the residents but is easily reached by people inside the 5 minute walk circle from just beyond Wellard Street down to the Hospital and Police Station.

There is a lack of shade along the streets, which makes walking very uncomfortable in the mid-day heat. Pedestrian movement is further hampered by the level of traffic along Roe St, with the substantial number of road-train movements posing a high risk to those walking along the street.

In addition to the formal street layout, the town is surrounded by a network of informal tracks which form part of the current circulation system. The tracks are generally used for off road driving, but are also used for walking.

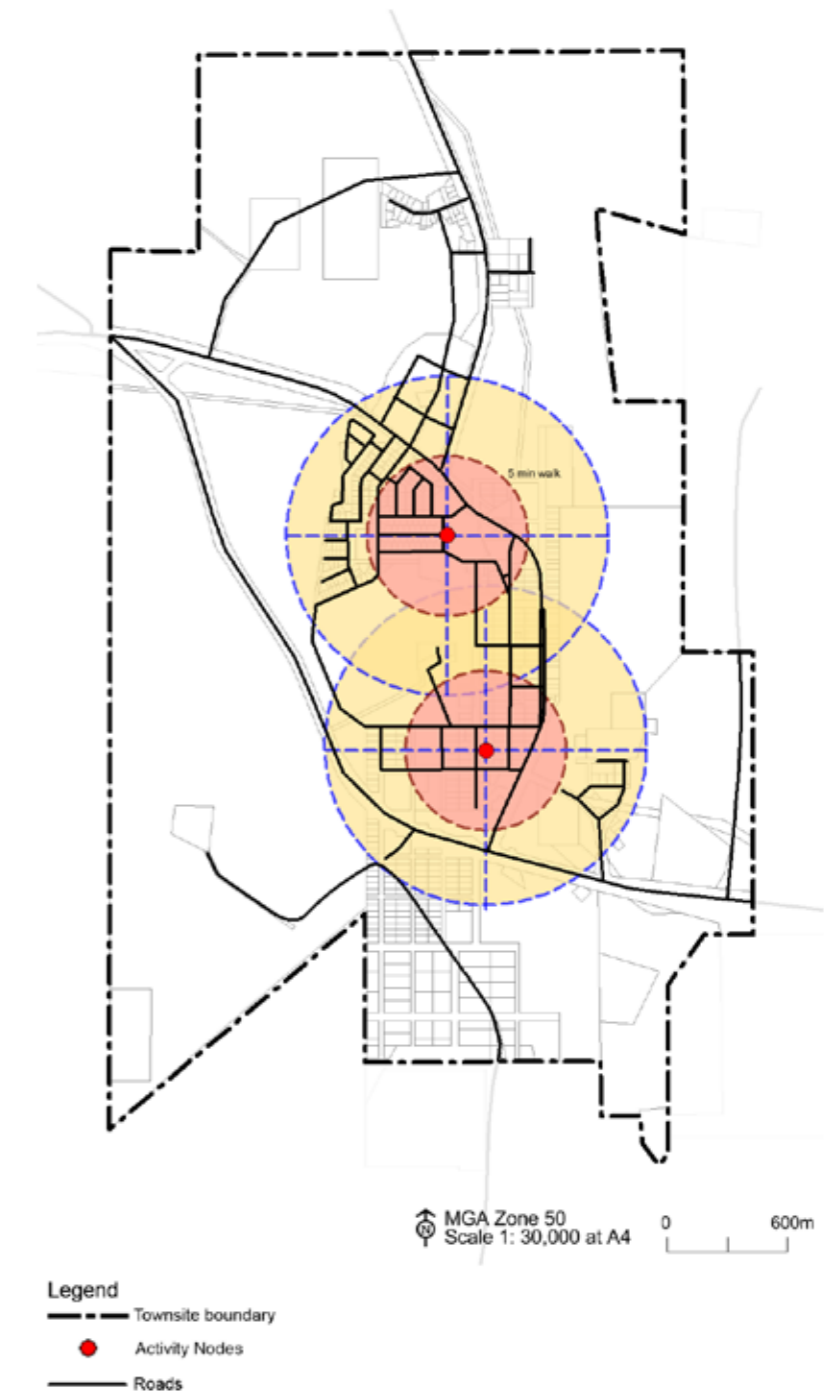
Safety and surveillance are also key issues requiring consideration. Roebourne accounts for 28 per cent of the City of Karratha's reported crime statistics. Police priorities are burglary, domestic violence, assault and hooning (Amlec House, 2011).

A report by Amlec House in their investigation for the City in 2011 reported that the majority of the town is insufficiently illuminated and generally poorly maintained. It noted that the Aquatic Centre is a major issue, experiencing a range of offences including disturbances, alarm, burglary, stealing, damage, trespass and graffiti. Other problem areas included Andover Park, Harding Street, the Entertainment Sports Precinct and the Primary School.

Since 2011, the City has implemented a number of the recommendations to improve the safety and surveillance of the town. A Lighting Master Plan Report was prepared by Sage Consulting Engineers Pty Ltd in June 2012. The report recommended appropriate lighting in terms of Australian Standards for the Roebourne townsite on the basis of discussions with the City and police officers and considering the three criteria in the standard: level of activity; risk of crime; and need to enhance prestige. The report provided cost estimates to achieve the proposed lighting based on Horizon Power methods and materials which equate to just over \$1.4 million (Sage Consulting Engineers, 2012).

Further work is still required to address all the CPTED strategies within Roebourne's public spaces.

Figure 19 Walkability of the Townsite



## 7.2 Road Network

The local road network in Roebourne is designed around a standard grid pattern although many roads are not fully connective. This pattern is considered important to optimise connectivity, climate responsive design and legibility of the road network.

There are a number of important road networks in the Roebourne townsite. The North West Coastal Highway is a primary regional road providing connectivity between Karratha and Port Hedland. Unlike any other towns in the Pilbara (or other parts of the State), there is no heavy haulage bypass around the town and all traffic from the North West Coastal Highway traverses the town, passing along Roe Street. This road is well utilised by freight movements and regional tourist traffic.

The road to the Roebourne Prison, Wickham, Cossack, Cape Lambert and Point Samson also comes off the North West Coastal Highway in the heart of town, near the school. This road, the Roebourne-Point Samson Rd, has seen a significant increase in traffic movements and is now carrying traffic at a similar level to the North West Coastal Hwy (Riley Consulting, 2013).

There are also a number of important local roads, including Jager St, Hall St, Cleaver Ct, Andover Way, Scholl St and Withnell St (Figure 20).

A traffic assessment by Riley Consulting shows that current traffic demands on the North West Coastal Highway are in the order of 4,000vpd to the west of Point Samson-Roebourne Road. Taking into consideration the level of trucks on the highway, an equivalent volume of 5,600vpd would be derived using passenger car units (PCU's). At 6,000vpd pedestrians will experience delays in crossing a road and median protection is recommended on roads carrying more than 6,000vpd.

It is considered therefore that the North West Coastal Highway west of Point Samson-Roebourne Road would benefit from the provision of a median within the next few years, based on general traffic growth (Riley Consulting, 2013). However in general, the regional road network is currently operating with daily volumes well within appropriate levels.

Although the network is currently coping with the number of daily movements, there are a number of issues with the local road network that require further assessment. These include:

- the level of heavy haulage vehicles that move through the town, creating issues with safety of road crossings for both cars and pedestrians
- major traffic movements at the intersection of the Point Samson-Roebourne Road and the North West Coastal Highway
- the use of a number of locations within the town for break-down and reassembly. This type of activity is inconsistent with town centre activities.

Historical planning for Roebourne identified a possible bypass alignment to the south of the town and this has been included in the Scheme. The provision of a southern bypass is expected to lower daily volumes to within desirable limits but it will also remove tourist traffic from the town. This could have a major impact upon the community and local business opportunities. As Roebourne is located just 40km from Karratha, it is anticipated that Karratha will provide for any non-essential fuel and refreshment stops currently undertaken in Roebourne. Furthermore, the southern bypass will have no impact to the high level of traffic using Point Samson-Roebourne Road (Riley Consulting, 2013).

In order to address the significant amount of traffic on the Point Samson-Roebourne Road, consideration should be given to the construction of a northern bypass (Figure 20). A bypass to the north of the town would effectively remove the current traffic movement between Karratha and Wickham from the town and is expected to attract a similar level of traffic to the southern bypass (Riley Consulting, 2013).

Although the intersection of North West Coastal Highway and Point Samson-Roebourne Road has relatively good lines of sight, it is a busy intersection and so would benefit from an upgrade in the immediate future. Full channelisation of this intersection is considered appropriate to maintain a safe intersection environment (Riley Consulting, 2013).


There are also several minor intersections with turning vehicles and pedestrians already posing problems. These include Andover Street where it currently crosses over Cleaverville Road next to the Oval. This is a severe traffic hazard, but with the development of the NASH project the northern leg will be closed making it into a T-junction with improved safety.

Figure 20 Roebourne Road Hierarchy



### ROEBOURNE MOVEMENT NETWORKS

#### LEGEND

-  INFORMAL PATHWAYS (CURRENT)
-  COMMUNITY & EDUCATION PRECINCT MOVEMENT
-  PEDESTRIAN MOVEMENT
-  TOURIST MOVEMENT
-  ROAD TRAIN MOVEMENT

NOTE. PROPOSED BYPASS IS ANTICIPATED IN MEDIUM TO LONG TERM, TO BE DESIGNED TO CARRY HEAVY VEHICLES AND STILL ENCOURAGE TOURISTS, VISITORS AND BUSINESS INTO ROE ST

### 7.3 Future Traffic Impacts

In order to assess potential impacts on the regional and local road network, a traffic model was developed using the Saturn suite of programs to consider the existing and proposed land uses. The results of the modelling show that the development of 1,500 new dwellings and associated industrial, commercial and retail activity may have a significant impact on the regional road network. However, local roads appear to operate with daily volumes cognisant to their function (Riley Consulting, 2013).

As noted above, historical planning for Roebourne has identified a possible bypass alignment to the south of the town. Whilst the southern bypass is shown to alleviate traffic flows to remove the need to duplicate North West Coastal Highway through Roebourne, the provision of a southern bypass may adversely impact the town. Accordingly should the southern bypass be constructed, it should be designated as a heavy haulage road only, so that visitor and tourist traffic still passes through the town. Consideration should also be given to the configuration of the intersection at Roe St so that traffic has to make a decision to actually turn on to the bypass road.

With regards to the northern bypass, this would effectively remove the current traffic movement between Karratha and Wickham from the town; however, no alignment study has been undertaken and this option should be further investigated.

In addition, as a result of the possible full development of Roebourne, key intersections may require some form of upgrading as indicated in the *Roebourne Structure Plan Traffic Report* (Riley Consulting, 2013).

### 7.4 Pedestrian Movement

Due to the low proportion of car ownership in town, pedestrian movement is the predominant form of travel and so footpaths and pathways are critically important to residents.

Although there have been some footpaths formed in recent years, the majority of the town has no formal footpaths. This is not considered an issue in short, low volume streets where traffic moves slowly, but it is an issue where there is through traffic, higher speeds and larger volumes. This includes the main highway apart from the Roe Street section, the Point Samson-Roebourne Road and the pathway to the Information Centre.

Where footpaths have been provided their quality is high, with a good width and light colour (better at night and better in the heat of the day), for example in Roe Street, Padbury Street, Sholl Street and around the school. Their comfort would be improved, however, through the addition of shelter or shade and improved lighting. It is noted though that where trees have been planted or lights installed these are often vandalised.

### 7.5 Cycling

The results of the traffic study suggest that cycling would be safe on the majority of local streets where traffic flows are less than 1,000 vehicles per day. On the neighbourhood connectors shared paths should be provided as a safe alternative to on-road cycling. Off-street cycle routes are desirable to provide recreational cycling opportunities in the region. However it is recognised that the variable climatic conditions may not be conducive to cycling (Riley Consulting, 2013).

### 7.6 Truck Breakdown

Trucks and road trains tend to stop across from the swimming pool and basketball courts south of the Point Samson-Roebourne Road turn off. Many use this space to leave part of their load temporarily, while transporting other goods to Wickham and Cape Lambert, before picking it up again to continue on their journey north or south. The community considers this a nuisance as they create a lot of noise and dust. This situation is also quite dangerous to passing traffic and reduces the amenity of the area.

### 7.7 Parking

Street parking is generally by mountable curbs apart from Roe Street and Padbury Street where dedicated parking is marked out, as well as a stretch along Sholl Street by the Post Office.

### 7.8 Key Challenges

Although the existing road network modelling suggests that the movement network is coping with the current number of vehicle movements, the utilisation of the main thoroughfare through the town by heavy haulage vehicles requires further consideration to improve accessibility across the North West Coastal Highway and Point Samson-Roebourne Road. This may include the installation of an appropriate median and designated crossing points, as well as turning lanes to provide a safe environment for turning traffic. It is also necessary to formalise the truck break down area, preferentially out of the developed areas of town, potentially at the junction of the heavy vehicle diversion route.

Other movement related issues include the improvement of certain intersections, provision of adequate footpaths, shade, seating and lighting, and the opportunity to provide stronger linkages through the town to the river.

In the future and as the town grows, consideration should be given to the provision of a northern and/or southern bypass, providing that they do not impact on the ability to attract visitors into the town.

# 8.0 Water Cycle Management

## 8.1 Water Supply

The Roebourne town water supply network is serviced by a storage tank situated on Mt Welcome in the centre of the townsite. One main pipe (running north along the western edge of the town) feeds this tank, with water supplied as part of the West Pilbara Water Supply Scheme operated by the Water Corporation. Water for the scheme comes from various groundwater and surface water sources including the Millstream and Bungaroo Borefields and Harding Dam. The infrastructure characteristics of Roebourne’s water supply are summarised in Figure 21.

Figure 21 Existing water supply infrastructure information

Water infrastructure item	Details
Roebourne water storage tank	Top water level 64.6 m AHD Capacity 2,250 m3
Water supply pipe to tank (inlet)	Diameter 250 mm
Water supply main pipe from tank (outlet)	Diameter 250 mm

A high level hydraulic assessment of the tank outlet pipe showed that the current configuration has some spare capacity that would enable supply for an additional 1500 people.

No reticulation exists in the areas west and south of Mt Welcome. Any development in these areas would require the expansion of the reticulation network. Connection to the network in some areas may necessitate the upgrade of upstream pipework, and hydraulic modelling would be carried out by the Water Corporation to determine infrastructure requirements for new developments.

## 8.2 Wastewater Servicing

Sewerage services are supplied by one service provider. The Water Corporation is the service provider for wastewater in this area, and subject to conditions for connection, provides sewer connections within the Operating Area. Wastewater services in the town of Roebourne consist of a sewerage network including gravity and pressure pipework, pumping stations and a pond-type wastewater treatment plant (WWTP) that treats wastewater to a secondary standard and disposes of treated wastewater in evaporation/infiltration ponds.

The sewerage network consists of gravity sewers in the town to the north and east of Mt Welcome. Sewage flows via gravity to a pumping station on the eastern edge of the town and is pumped to the WWTP located north-west of Roebourne.

An area (sewage catchment) south of Mt Welcome is serviced by pressure main sewers. There are 4 additional pumping stations in this area that pump sewage to the southern end of the gravity sewer system (beginning on North West Coastal Highway north of Withnell Street).

An odour buffer of 500 m around the WWTP restricts development within this area.

Future gravity and pressure sewers and two new pump stations are planned for the development north of North West Coastal Highway, known to be the site for the Ngarluma Aboriginal Sustainable Housing (NASH) project.

### 8.2.1 Gravity Sewer Network

For development in areas adjacent to and at a higher land level than existing gravity sewer lots, extension of existing wastewater catchments may be possible, depending on the capacity of the existing sewers. The gravity sewer network would need to be extended and downstream pump stations may need to be upgraded.

### 8.2.2 Pressure Conveyance Network

Increased wastewater flows would necessitate increased pump station capacity and changes may be required. Potential development areas that are not adjacent to and higher (land level) than existing sewers will necessitate the construction of new pump stations and pressure mains.

### 8.2.3 Wastewater Treatment Plant

Discussions with Water Corporation confirmed that although the WWTP was recently upgraded, the increase in flows as a result of new connections associated with NASH will bring the WWTP to capacity. Information on the capacity of the WWTP was not made available and represents a gap in the background information review. Planning for any additional development in Roebourne will require negotiation and agreement with Water Corporation on upgrading the WWTP.

A buffer of 500 m is required between the wastewater treatment plant located north west of the townsite and any sensitive land use.

### 8.2.4 Key Challenges

The Water Corporation has advised that the development of the Yaburriji Estate (NASH land) will bring the existing WWTP to capacity. It is not known whether their capacity calculations include the existing vacant residential areas, although this is likely. Any further development of areas that are not yet zoned for development will need to consider the capacity of the WWTP in consultation with the Water Corporation.

Consideration should also be given to the opportunity to use the recycled water from the wastewater treatment plant to irrigate the oval, reducing the demand for drinking water within the townsite.

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# 1.0 Built Form and Urban Analysis

One of the key technical reports was prepared by Urban Initiatives, a respected firm of urban designers. These observations and analyses were made after several field trips to Roebourne which were conducted during 2011.

Since this work, several other studies have been conducted and other factors, including community consultation have shaped the final Structure Plan. This information is included because it provides important urban design analysis and conclusions which were not discussed in other reports.

The brief provided to Urban Initiatives included the following objective:

*To assist Roebourne in moving from being "a remote Aboriginal Community in a Town Shell" and become a socially diverse, functioning and economically vibrant settlement again.*

This chapter provides an analysis of many of the technical issues discussed earlier in Part B from an urban design approach. This section moves through the urban design implications of many of the physical characteristics of Roebourne and concludes with development framework options and the components required to formulate a Roebourne Vernacular. Many of the concepts discussed below were identified as key components towards a revitalisation of the town of Roebourne.

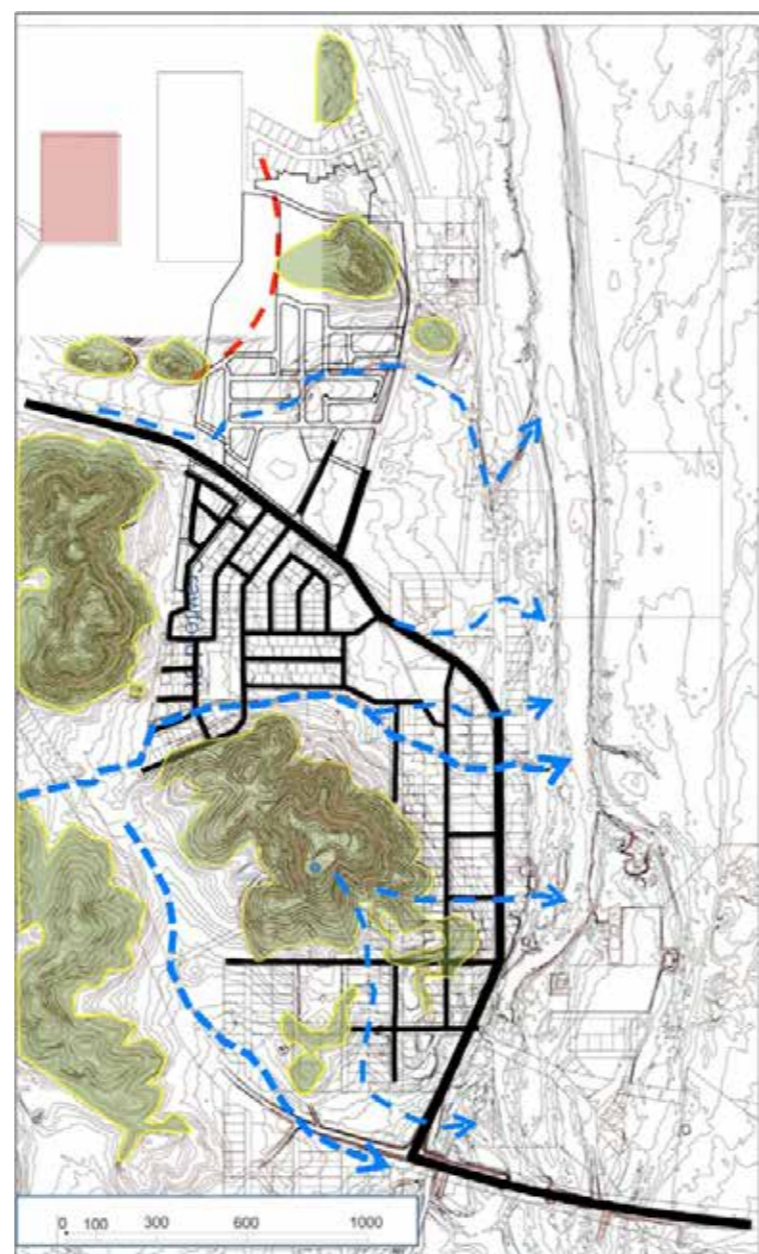
## 1.1 Physical Constraints to Development

The physical characteristics of any site shape urban patterns and dictate the constraints on development. Roebourne has been shaped by steep slopes and occasional but significant flooding and overland flows.

### 1.1.1 Steep Slopes and Development

- The analysis shows that the larger areas of steep slopes are all confined to Mount Welcome and the hills to the west of it.
- However some smaller areas of steep slopes extend into the town in the south west, but do not preclude development around them.
- Care should be taken to make sure overland storm water flow paths are taken into account as these can be a significant hazard to development"

Figure 1 Physical Constraints to Development



- Slopes approximate 1: 5 and steeper
- Over land flow path
- Waste Water Treatment plant buffer

### 1.1.2 Flooding

Apart from the flood areas arising from the Harding River, care should be taken to make sure local overland storm water flow paths are taken into account. The study by Essential Environmental identified the hazards of localised flash flooding from the creeks around the local ranges. The study highlighted several vulnerable areas:

- Some drainage elements in the existing town would not cope with typical rainfall for Roebourne and are seen as a high risk. Drainage will be hindered when the river is in flood. For example:
  - The overland flow path between the Primary School and the TAFE
  - The creek coming down past the Depot which was redirected past the electric sub-station
  - The corner where the Police Station is located is of particular concern
  - The industry along Jager and Hall Streets are exposed to localised flooding as well as the Point Samson Road
  - Areas along the Highway currently serving as a drain pose an extreme and high risk
  - Floodable areas in the new developments currently being constructed (NASH) which will need attention especially the site on the corner of the North West Coastal Highway and the Point Samson-Roebourne Road
  - Padbury Street flooding can be hazardous due to the water stream speed.
- Areas around the outskirts of the current town are also at risk:
  - The whole area east of Cleaverville Road and east of Point Samson-Roebourne Road, across from the local oval and the basketball courts, are also highly vulnerable to flooding and drainage overflow
  - Part of the proposed future growth area south and west of Mount Welcome is also exposed to extreme flooding.
- Flooding by the Harding River is focused in three parts of the town:
  - The lower part of Hall Street
  - The northern end of Roe Street north of Wellard Street
  - The southern end of town by Carnarvon Street, south of Withnell Street and at Queen Street.



## 1.2 Existing and Evolving Development Characteristics

Any strategies to address or promote revitalisation must initially recognise land ownership, current land uses and the key role played by community services.

### 1.2.1 Land Ownership and Tenure

The pie charts and the table below show the ownership and occupancy patterns in Roebourne.

Property ownership is quite diverse with the private sector having the largest share (39%).

Approximately 25% of all lots are vacant, and of those, the largest proportion (33%) are privately owned.

Figure 2 Ownership and Occupancy by Table and Graph

Ownership	Built-up		Vacant	
Education	4.0	1.5	0.0	0.0
WA Government	36.0	13.7	21.0	24.7
City	11.0	4.2	10.0	11.8
Private	102.0	38.9	28.0	32.9
Department of Housing	83.0	31.7	16.0	18.8
Aboriginal	26.0	9.9	10.0	11.8
<b>TOTAL</b>	<b>262.0</b>	<b>100.0</b>	<b>85.0</b>	<b>100.0</b>

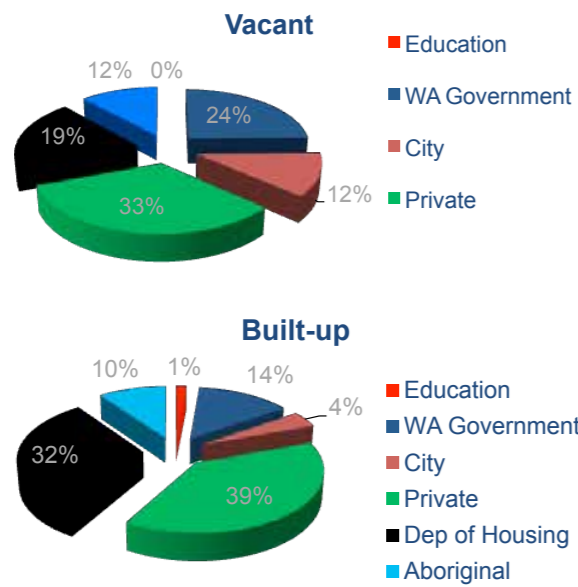


Figure 3 Ownership and Occupancy Pattern



Legend

Housing tenure identified in the 2011 Census is shown in the figure below.

Figure 4 Housing Tenure (2011)

HOUSING TENURE	Separate house	Semi-detached, row or terrace house, town house etc.	Flat, unit or apartment	Other dwelling	Not stated	TOTAL
Owned outright	20	0	0	22	0	42
Owned with a mortgage(b)	30	0	0	3	0	33
Rented	103	11	0	5	3	122
Other tenure type(e)	0	0	0	0	0	0
Tenure type not stated	10	0	0	3	0	13
<b>TOTAL</b>	<b>163</b>	<b>11</b>	<b>0</b>	<b>33</b>	<b>3</b>	<b>210</b>

This paints a picture of a small town with lots of vacant land and a very low level of private ownership when compared to towns in other locations. Government agencies play a very large role in Roebourne, as both housing and service providers.

### 1.2.2 Current Land Uses

There are some scattered and some focused land uses in Roebourne Townsite.

The residential component was traditionally concentrated along Sholl and Roe Streets in the older part of town, however, a range of other uses infiltrated this area. It consists mainly of community services-type uses, with clusters in the north and south. The northern cluster accommodates the education facilities, whilst the southern area has a health-focus as well as tourism and limited retail.

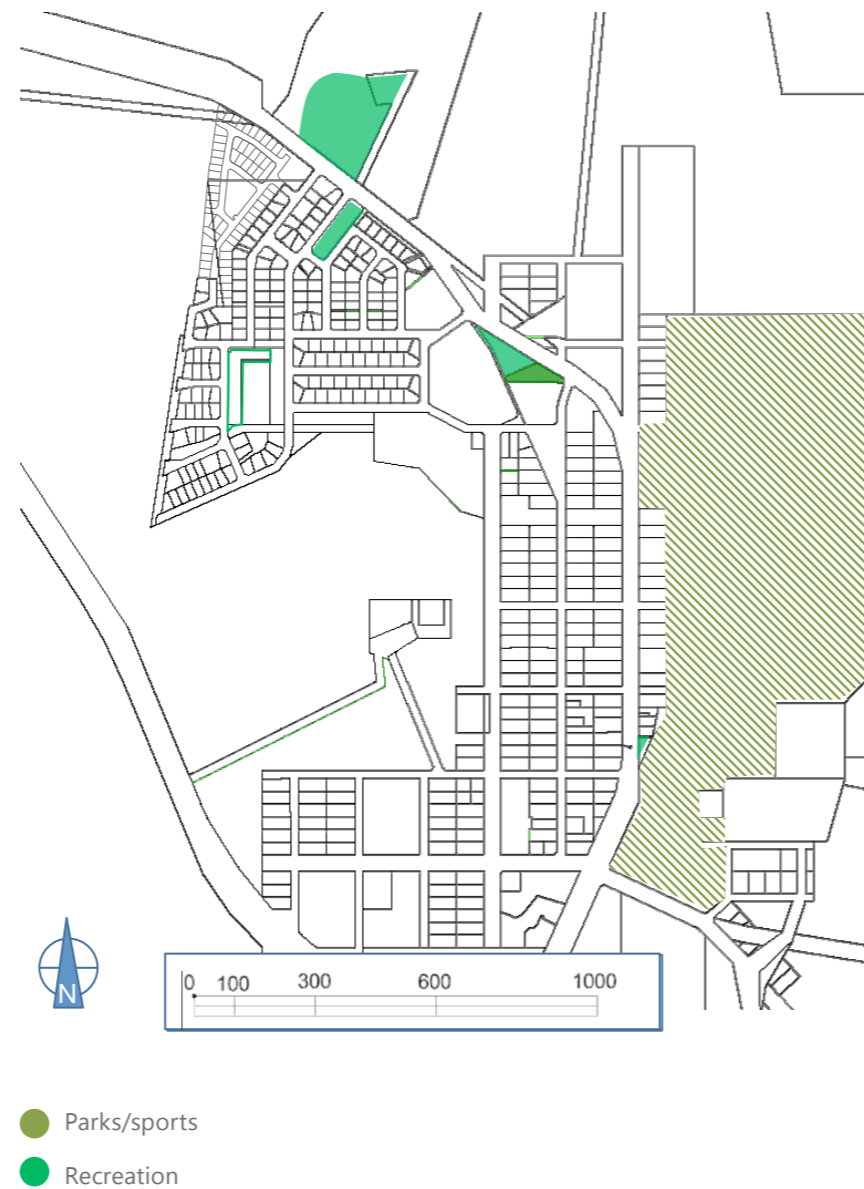
#### Current Land Use

- In a field survey 205 housing lots were counted, with a few having multiple houses on them and a number under construction. This is likely to explain the difference between this number and the Census figures below.
- There are also 3 houses across the river by the caravan park, as well as accommodation in the caravan park.
- The survey also identified 5 sites with retail component.
- The retail component is poorly represented with essentially only the general store on Roe Street of any significance and the post office on Sholl Street.
- There are some specialist stores including the art gallery and an Opshop by the Aboriginal Church on Roe Street, and a Resource Centre on Padbury Street.
- Most of the shops have uninviting facades which do not contribute to the street scene and lack attractiveness.
- 6 sites with service businesses are spread through the town.
- A key business is the BP Service station.
- The largest site is the City Depot which is currently being closed down.
- There is also an electricity transformer site of the Horizon Power Corporation and a telecommunication site of the Australian Telecommunication Commission.
- The remainder of the sites seem to be transport related businesses, some of which are run from home.

#### Parks, Sport and Recreation

- The parks consist of two ovals; one to the north of the highway, now surrounded by the new NASH development, and the other next to the Primary School on the same site.
- There is also a children's play park on Andover Street in the northern part of town.
- In addition there is a small park across the street from the old Shire Offices on Roe Street.
- These are all the developed parks in the town.
- The reserves leading down to and across the river are undeveloped parks.

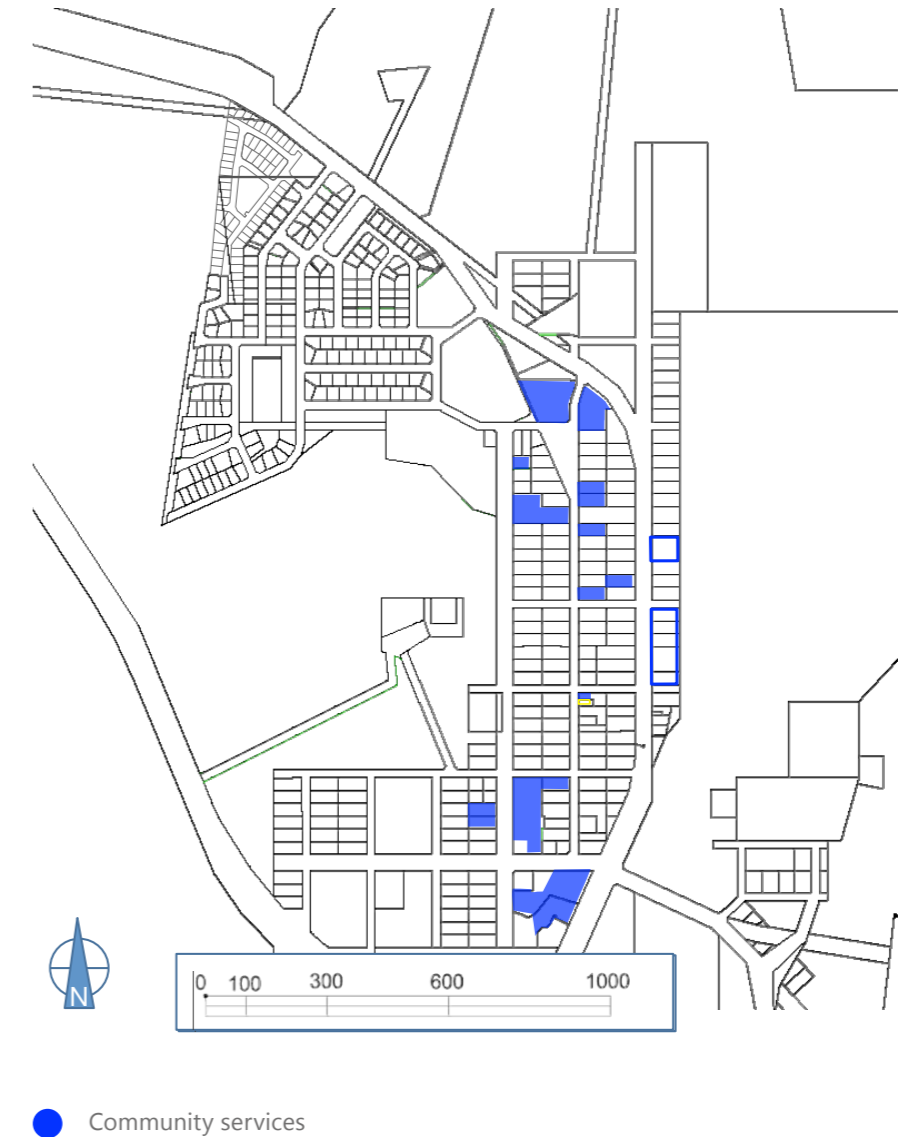
Figure 5 Parks, Sport and Recreation



#### Community Services

- Apart from residential uses, this is the highest single land use type and covers mostly office-type accommodation for community services.
- There are a wide variety of agencies including the local hospital with associated activities around it.
- The Tourist Information Centre, located in the old Goal next to the law courts, forms an important heritage hub.
- There is also the old Youth Centre on Roe Street, recently replaced by a new centre next to the "Fifty Cents building".

Figure 6 Community Services



### Evolving Development – New Housing and Amenities

Some of the more recent housing development lack sensitivity to climate and liveability. There is a need to develop a generic design vernacular for Roebourne that would assist to enhance both the appreciation of the existing historic component of the town as well as guide new development. The aim is to ultimately build a strong local design character, contributing to liveability and giving heed to the community workshop on housing outcomes held in 2010.

The primary school (and old school house), the children's play park and new youth centre are positive elements in an otherwise lacklustre neighbourhood. However, the critical lack of natural surveillance and poor lighting leads to the limited use of these facilities by the community, especially at night. Better natural surveillance could actually bring the school back into the neighbourhood.

#### Hall Street Industrial

Work camps in industrial areas are never an ideal solution to the need for housing. There is normally poor community integration, support and personal outcomes for the often temporary resident workers.

The development in Hall Street is totally bereft of any community support services, with no shops or leisure elements close by or liveable design suited for the climate.



### 1.3 Infrastructure Constraints

A comprehensive traffic analysis with modelling was undertaken in support of the broader land use and activity analysis. The key points taken from this work include:

- Roebourne has good quality local streets apart from minor road elements which have not been constructed, e.g. Hampton Street which only exists for a limited way south from the school and then further for two blocks south of Withnell Street. The section in between does not exist as Mount Welcome comes down all the way across it and is too steep and or expensive to construct over.
- Roe Street has a double carriage way from just south of the BP Service Station to Withnell St. However, the northern part (Cleaverville Road) is actually carrying more traffic in general, as well as more heavy vehicles, and has no special design features to ensure appropriate safety and amenity.
- The Andover Street crossing on Cleaverville Road next to the Oval is a traffic hazard, but with the development of the NASH project the northern leg will require this junction to be re-modelled and may improve safety.

#### Parking

- Street parking is generally by mountable curbs apart from Roe Street and Padbury Street, where dedicated parking is marked out, and a stretch along Sholl Street by the Post Office.
- Trucks and road trains tend to stop across from the Swimming Pool south of the Point Samson-Roebourne Road turn off. The community consider them a nuisance as they create a lot of dust. This situation is also quite dangerous to passing traffic and unsightly. A solution will need to be found.

## Footpaths

Although there have been some footpaths formed in recent years, the majority of the town has no formal footpaths. This is not an issue in short, low volume streets where traffic moves slowly, but it is an issue where there is through traffic, higher speeds and larger volumes. In particular:

- There is no footpath along the main highway apart from the Roe Street section
- The Point Samson-Roebourne Road has no footpaths
- The Visitor Information Centre has no footpath connection.

Where footpaths have been provided their quality is good with reasonable width and light colour (better at night and better in the heat of the day) for example in;

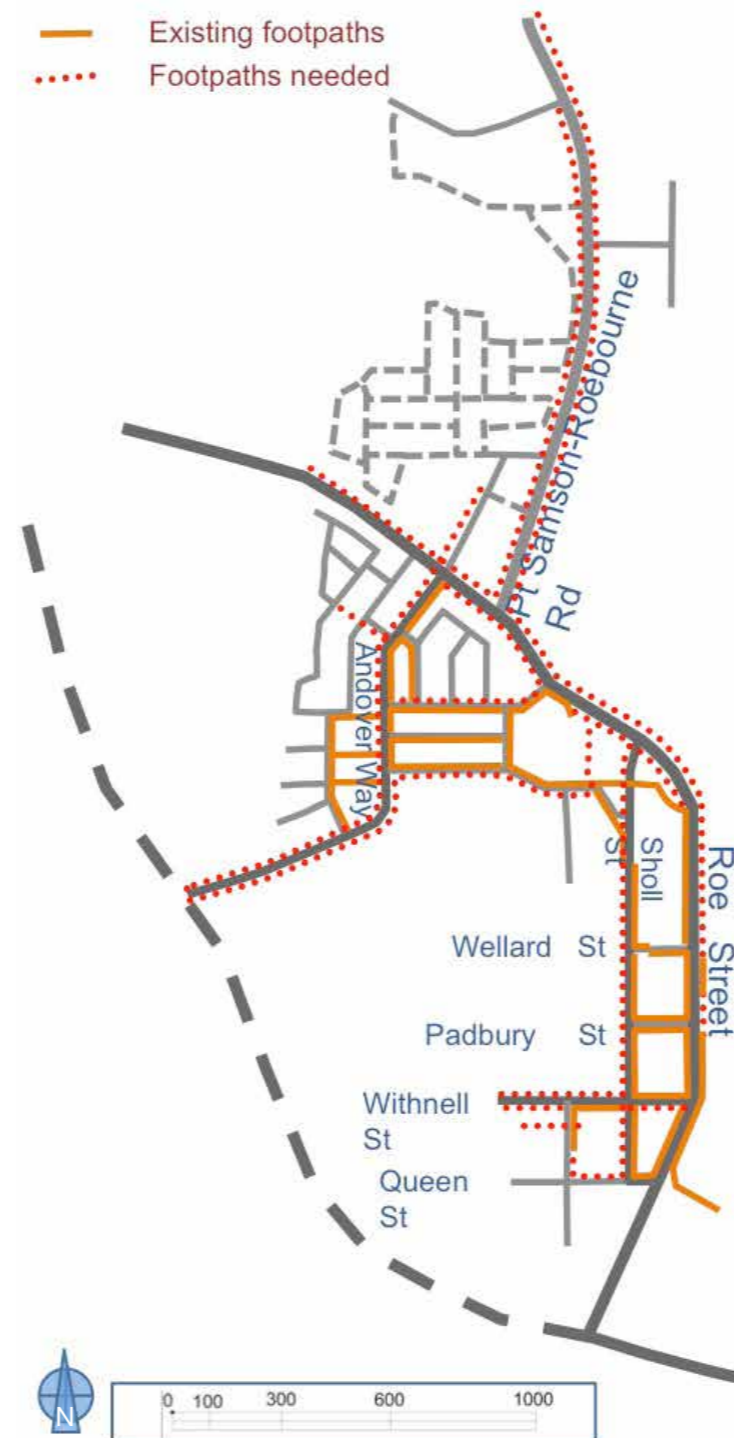
- Roe Street
- Padbury Street
- Sholl Street
- Around the school.

Other issues around the usability of the footpaths include;

- Views and sightlines are somewhat obscured by bushes and trees with low branches along Roe Street
- The footpaths are generally bereft of any form of shelter. Where trees have been planted many are vandalised and broken off. The ones still growing are mostly mangled
- Footpaths are mostly limited to one side of the street.

Apart from the normal footpaths along streets there is a need to integrate the town with the surrounding open space. Footpaths can be provided, but need not be of concrete finish.

Figure 7 Existing and Required Footpaths



## 1.4 Growth Potential

Figure 8 Capacity for Growth

LOCATION	Ha	Housing units	People @ 3.5/unit
Vacant sites in town	22.5	362	1270
Vacant development land adjoining the town	±47ha	710	2500
<b>TOTAL</b>	<b>262.0</b>	<b>1082</b>	<b>3770</b>

As shown above, the preliminary estimate for growth potential (contingent on many factors) shows that;

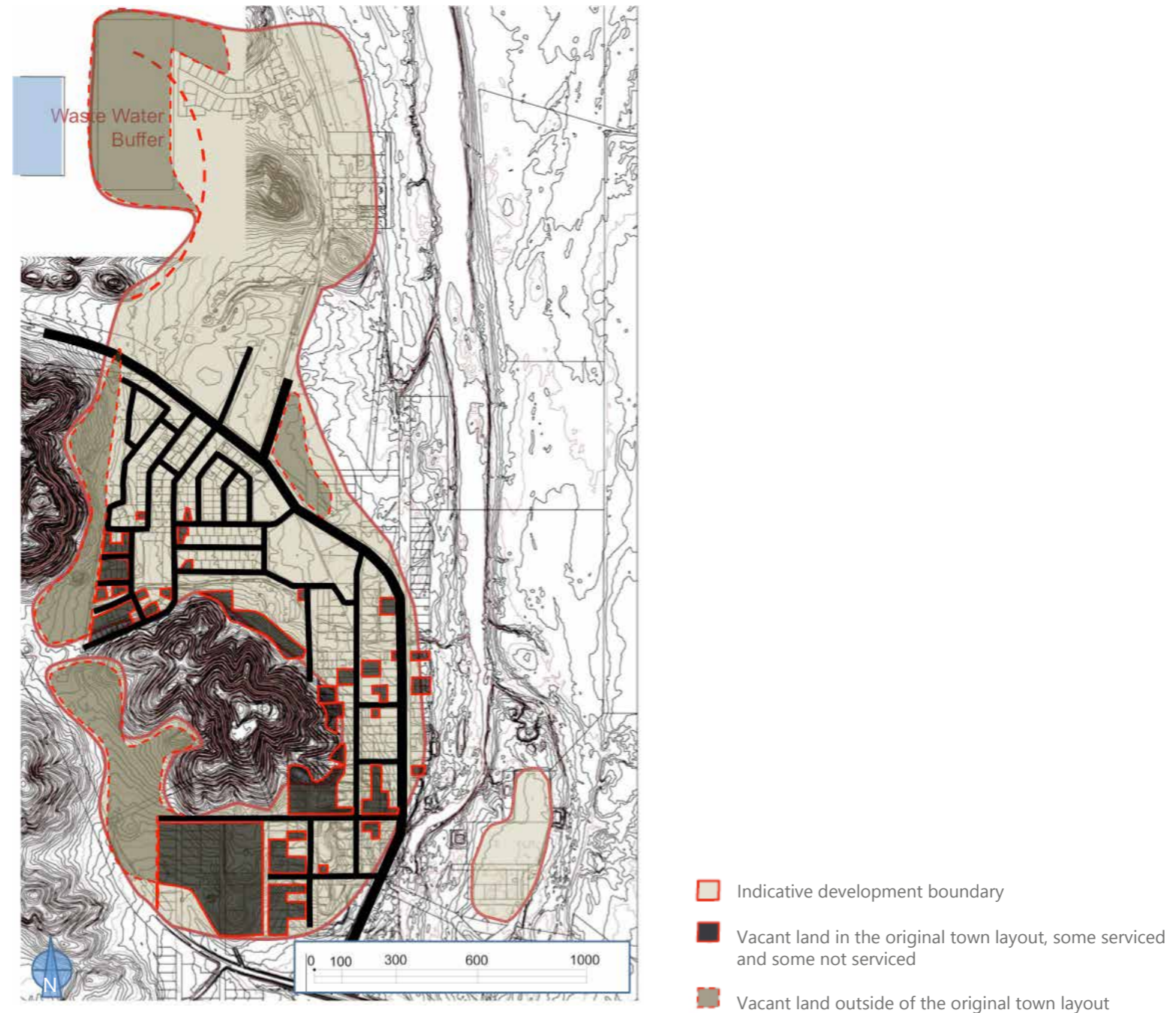
- The potential increase in population by utilising all current vacant land in the town could be some 1270 people in 362 homes.
- In addition, an estimated 2500 people (at 3.5 persons per housing unit and 15-20 units/ha), can be accommodated on some 47ha of land around town. The bulk of it is to the south and west (including the Depot site).

This excludes:

- The NASH project, which could accommodate up to 1350 people
- Development of the workers' camp in the caravan park
- The workers' camps in the industrial area of Hall Street
- Redevelopment of current houses on large sites in the old town.

Basically there is room to accommodate a total of at least double the current population, with a total population capacity of around 2500 - 3000.

Figure 9 Summary of Vacant and Potentially Usable Land



## 1.5 Liveability Assessment

The key components of liveability which have been addressed in the urban design analysis include;

- Connectivity and Walkability
  - Core Walkability
  - Informal Connectivity
- Safety and Surveillance
  - Key Observations
  - Issues and Recommendations

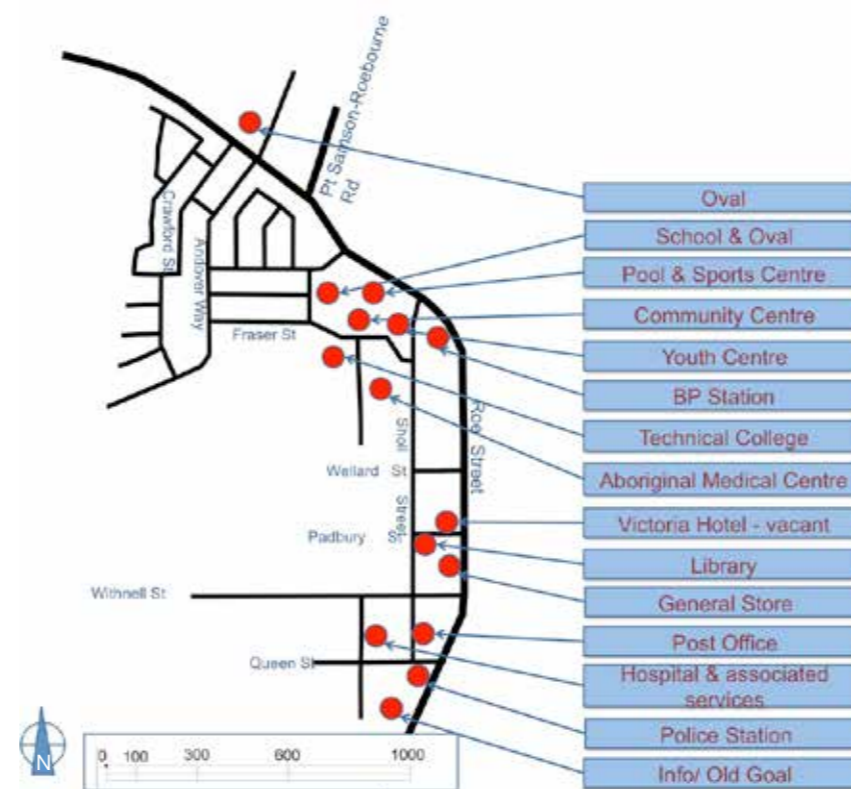
### 1.5.1 Connectivity and Walkability

Connectivity plus walkability contribute to liveability. Connectivity describes the linkages and ease of navigating around a town.

Walkability is about the distance between places people want to be. It also acknowledges climatic factors, e.g. how far people will or can walk in the temperatures of a particular area, and the surfaces available to walk on, e.g. formed footpaths or on paths with exposure to high levels of traffic.

- Good walkability is a key characteristic of an attractive town or neighbourhood.
- Connectivity mapping is relative to selected activities and destinations, and highlights the spread or clustering of destinations, which either deter or promote ease of access and walkability.

Figure 10 Major Attractors

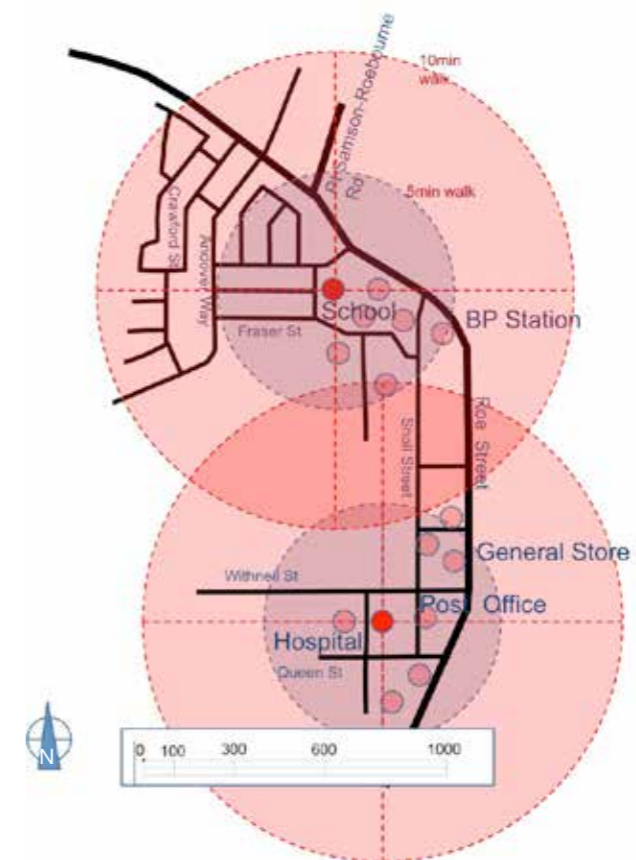


The diagram below depicts the relative walkability of seven selected activities and destination groups covered in a 5 minute walk (400m).

It is desirable that the 5 minute walk will cover most day-to-day destinations. From a shopping and business perspective, 5 minute walkable catchments are very important. Catchments can really come to life where there are multiple destinations.

From this analysis it is clear that key activities which would form part of regular visits in Roebourne are quite a long walk apart.

Figure 11 Analysis of Walkability



- The circles indicate the overall potential areas within walkable reach to/from selected activities and destinations
- The diagram depicts the possible extent of a 400m or 5min walk and a 800m or 10min walk
- Some key activities which are regularly visited are quite a long walk apart
- Activities appear to be in two clusters

### 1.5.2 Safety and Surveillance

This section describes the positive and negative aspects of the major parks in Roebourne. Crime can be prevented by the application of good design principles; these are known collectively as Crime Prevention Through Environmental Design or CPTED. CPTED recommendations are provided for each park.

**Andover Park** – bordered by Lockyer Way, Hicks Street and Andover Way

This park, which has a considerable range of equipment, is surrounded by a fence.

#### Positive

- The trees throughout the park provide shade and encourage use.
- Shaded seating is available and encourages use of the area. Generating activity can increase community pride and enhance a sense of ownership.
- The play equipment appears to be in good working condition, encouraging activity in the area.

#### Negative

- Some trees in the park limit natural surveillance to connecting areas around the park.
- The fence around the park can create a feeling of being trapped.
- Cans and other litter were observed inside the fencing surrounding the play equipment.
- Graffiti was observed throughout the park.
- Poor lighting in and around the park leads to poor perceptions of safety and natural surveillance.
- The areas surrounding the park appeared overgrown and unmaintained. Well maintained areas can increase a sense of ownership for the community and encourage use of an area.
- Signage listing prohibited activities does not contribute to a welcoming or attractive entrance.

#### CPTED Recommendations

- Pruning trees in the park will improve both aesthetics and natural surveillance and safety.
- Maintenance of benches, play equipment, vegetation and litter is required.
- Graffiti should be well policed and a quick response for removal should be maintained.
- Rectify lamps not operating and improve poor illumination.

### Harding Street

#### Negative

- Graffiti was observed on light poles throughout Harding Street.
- Poor illumination throughout the street during the hours of darkness exacerbates poor perceptions of safety and natural surveillance.
- A rusted shell of a mini bus is located at the front of a residential property.

#### CPTED Recommendations

- Maintenance of vegetation will improve aesthetics and enhance a sense of ownership for the community.
- Ensure reporting of graffiti for police attention and as well as prompt maintenance. Monitor trends and consider possible covert/interim surveillance, if required.
- Rectify lamps not operating.

### Entertainment Sports Precinct

#### Positive

- The community bus stops at “Fifty Cents building” and the Aquatic Centre, although it only operates 3 times a week. This generates activity in the area which increases natural surveillance and perceptions of safety.
- The Aquatic Centre has a well maintained entrance gate, with clear signage and information.
- During the audit the basketball courts were well utilised at night and appeared well lit.
- There is good natural surveillance in selected areas.

#### Negative

- Graffiti was observed in the Aquatic Centre car park and at the basketball courts.
- A number of youths were roaming the streets after dark. With current poor lighting and numerous dark and hiding spots, this does not contribute to a feeling of safety and security.
- Although the basketball court was well attended in the evening there is no supporting street lighting.

#### CPTED Recommendations

- Attend to the ongoing graffiti and vandalism of 50 Cent Hall, the basketball courts, around the aquatic centre and the car park.
- Ensure reporting and maintenance, and monitor trends for police attention and covert/interim surveillance.
- Introduce a mural on the exterior wall of the 50 Cent Hall to limit opportunities for graffiti.
- Significantly improve lighting around the basketball courts, youth centre and aquatic centre and the surrounding residential areas to increase perceptions of safety and natural surveillance for youths returning home during the hours of darkness.
- Ensure all car parks are sufficiently and consistently illuminated, in particular to reduce crime displacement and support CCTV image quality during the hours of darkness.

## Primary School

### Positive

- The City of Karratha applied a policy to extend the hours that the lights are turned on at the primary school oval to 10:00pm. They have organised planned activities on the majority of nights to encourage community participation and natural surveillance.
- The oval appears well maintained and suitable for a variety of sporting activities. Generating activity can increase a sense of ownership and natural surveillance in specified areas.

### Negative

- The primary school contains no exterior lighting, providing poor perceptions of safety and natural surveillance.
- Signage is located at the oval showing redevelopment plans from 2007. This signage has been subjected to graffiti.
- Excessive foliage limits natural surveillance throughout the car park at the primary school. Limited natural surveillance decreases perceptions of safety.

### CPTED Recommendations

- Improve exterior lighting of the primary school to enhance perceptions of safety and natural surveillance.
- Remove outdated signage to reduce opportunities for vandalism and graffiti. This will also improve aesthetics in the area.
- Consistent pruning of foliage and trimming of trees to about 5m can increase natural surveillance by removing obstructions and increase perceptions of safety.
- Ensure all car parks are sufficiently and consistently illuminated, in particular to support CCTV image quality during the hours of darkness.

(Note the Entertainment and Primary School precincts have since been amalgamated).

## Primary School



## Roe Street

### Positive

- The footpaths on Roe Street were recently upgraded and although they are simple in design they are pleasant to use. The light colour lessens heat absorption making it good for foot traffic.
- The new Cultural Centre opposite the old Victoria Hotel will bring more activity into the area. Generating activity can increase a sense of ownership and natural surveillance along the street and the open space areas.
- The small pocket park developed across the street from the old Shire office is well laid out and is well used by passing travellers

### Negative

- Very few activities along the street actually face the street or have a view over the street. This results in a poor perceptions of safety and surveillance.
- The good footpaths lack shady areas along the way, however shrubs tend to limit surveillance.
- The unkempt, poorly maintained and vacant premises create negative impressions.

### CPTED Recommendations

- Improve the use of the street by tidying up properties.
- Pruning of foliage and trimming trees to about 5m can increase natural surveillance.
- Encourage building owners to provide some oversight to the street – creating a presence on the street.
- Improve lighting to footpaths to make it safer at night when this area is quite desolate.

### View along Roe Street





## 1.6 Development Options

### 1.6.1 Visioning: A Future Roebourne

The brief provided to Urban Initiatives included the following objective:

*To assist Roebourne in moving from being “a remote Aboriginal Community in a Town Shell” and become a socially diverse, functioning and economically vibrant settlement again.*

At the conclusion of the background study and analysis the following vision was recommended:

A Vision for Roebourne

*An inspiring evolving urban environment with increasing liveability qualities and an urban structure supporting attractive places which are in harmony with and celebrate the unique surrounding natural environment of the hills and the river.*

*It has an urban vernacular that recognises its heritage and allows for sympathetic design and development – together creating a symphony of colour, vibrancy, culture and character.*

*Its activities and development responds positively to the regional context and role – whilst sharing and optimising infrastructure use.*

*The quality of the urban environment is also reflected in the key activities of the town – a vibrant business node, a colourful and enticing community and leisure focus, and a standard-setting education hub – all celebrating Roebourne’s rich history and heritage.*

*The urban environment has a family focus, underpinned by quality housing and amenity appropriate to the challenging climatic conditions, catering for a wide range of lifestyles, tastes and cultures.*

**All these factors combine to making it a sought-after place in the West Pilbara supporting a growing vibrant community.**

To achieve this Vision it is necessary to focus on what makes a successful place and how to create a liveable environment.

Roebourne has a valuable historic built fabric as well as many building blocks within the community. These are also known as the social capital and include;

- a range of community support organisations
- the youth centre
- churches
- sports venues
- businesses
- clubs, associations and many others.

To bring about a successful network of places, these all need to be anchored in the community and supported by the right infrastructure.

To make it work it will need a “chain” or combination of:

- 1) Liveability
- 2) Good access and linkages
- 3) Comfort and image
- 4) Community uses and activities
- 5) Sociability

### 1.6.2 Liveability

In addition to a network of good places the focus also needs to fall on liveability. This is the way people experience their living environment – where they live, where they work, where they love to relax, where they meet their friends, where they participate in their sport, where they train and learn, and how they travel. These aspects and many more all combine to bring together elements which contribute to a healthy society and a liveable urban environment. A place people love to be.

Elements of Liveability to consider include:

- Do we create transport choices like walking, cycling and public transport?
- Do the community have access to climate suitable affordable housing?
- Does the living environment provide for and promote economic competitiveness?
- Are local existing communities supported?
- Is attention given to integrated and coordinated investment and development?
- Do we foster and value communities and their neighbourhoods?

Some of these questions are more directly involved with the physical planning environment and others focus on other aspects of wellbeing, also known as the triple or quadruple bottomline. Regardless of the term, there is a need to integrate positive effects for all stakeholders.

Figure 12 Roebourne Built Fabric



### 1.6.3 Access and Linkages

The importance of access in delivering a good workable town is highlighted in the following statement:

*“You can judge the accessibility of a place by its connections to its surroundings, both visual and physical: A successful public space is easy to get to and get through; it is visible both from a distance and up close. The edges of a space are important as well: For instance, a row of shops along a street is more interesting and generally safer to walk by than a blank wall or empty lot. Accessible spaces have a high parking turnover and, ideally, are convenient to public transit.”*

Downloaded from [www.pps.org/reference/grplacefeat/](http://www.pps.org/reference/grplacefeat/)

Elements to consider:

- Can you see the outdoor space from a distance? Is its interior visible from the outside?
- Is there a good connection between the space and the adjacent buildings, or is it surrounded by blank walls? Do occupants of adjacent buildings use the space?
- Can people easily walk to the place or outdoor space?
- Do sidewalks lead to and from the adjacent areas?
- Does the space function for people with special needs?
- Do the roads and paths through the space take people where they actually want to go?
- Can people use a variety of transportation options – bus, train, car, bicycle, etc., to reach the place?
- Are bus stops conveniently located next to destinations such as libraries, post offices, park entrances, etc.?

In the context of Roebourne it would for instance mean that the current community and leisure facilities at the top of Sholl Street and the business and arts precinct on lower Roe Street, are all both;

- Highly accessible – good walking, cycling, car and public transport access,
- Easily found, convenient to go to; and,
- Safe and interesting – not blank walls, rubbishy, or isolated.

#### 1.6.4 Comfort and Image

Whether a space is comfortable and presents itself well – has a good image – is key to its success. Comfort includes perceptions about safety, cleanliness, and the availability of places to sit – the importance of giving people the choice to sit where they want is generally underestimated. Women in particular are good judges on comfort and image, because they tend to be more discriminating about the public spaces they use.

Aspects to consider on Comfort and Image:

- Does the place make a good first impression?
- Are there more women than men?
- Are there enough places to sit? Are seats conveniently located? Do people have a choice of places to sit, either in the sun or shade?
- Are spaces are clean and free of litter? Who is responsible for maintenance? What do they do? When?
- Does the area feel safe? Is there a security presence? If so, what do these people do? When are they on duty?
- Are people taking pictures? Are there many photo opportunities available?
- Do vehicles dominate pedestrian use of the space, or prevent them from easily getting to the space?

In Roebourne many of the normally expected comforts are hard to find, and if they are there, the first impressions may not be inviting.

Seating both at the centre around the pool and at the business node is limited and sometimes isolated, even if they are on the street – there are no overlooking activities, no shop windows and little shade.

Litter is a problem. At night it is worse – lights have been vandalized and where they do work the lack of natural surveillance makes these areas feel unsafe, isolated and uninviting. Intimidating youth groups are feared.



#### 1.6.5 Community Uses and Activities

The keys to good public spaces and the community they serve are things to do and people to be seen. This is captured in the following:

*“Activities are the basic building blocks of a place. Having something to do gives people a reason to come to a place – and return. When there is nothing to do, a space will be empty and that generally means that something is wrong.”*

Downloaded from [www.pps.org/reference/grplacefeat/](http://www.pps.org/reference/grplacefeat/)

Principles to keep in mind in evaluating the uses and activities of a place are:

- The more activities that are going on, and that people have an opportunity to participate in, the better.
- There is a good balance between men and women (women are more particular about the spaces that they use).
- People of different ages are using the space (retired people and people with young children can use a space during the day when others are working).
- The space is used throughout the day.
- A space that is used by both singles and people in groups is better than one that is just used by people alone because it means that there are places for people to sit with friends, there is more socializing, and it is more fun.
- The ultimate success of a space is how well it is managed.

Elements to consider:

- Are people using the space or is it empty?
- Is it used by people of different ages?
- Are people in groups?
- How many different types of activities are occurring – people walking, eating, playing baseball, chess, relaxing, reading?
- Which parts of the space are used and which are not?
- Are there choices of things to do?
- Is there a management presence, or can you identify anyone is in charge of the space?

In Roebourne many of the normal activities are not visible and where they are present many of the elements listed above are absent.

### 1.6.6 Sociability

This is a difficult quality for a place to achieve, but once attained it becomes an unmistakable feature. When people see friends, meet and greet their neighbours, and feel comfortable interacting with strangers, they tend to feel a stronger sense of place or attachment to their community – and to the place that fosters these types of social activities.

Elements to consider on Sociability are:

- Is this a place where you would choose to meet your friends? Are others meeting friends here or running into them?
- Are people in groups? Are they talking with one another?
- Do people seem to know each other by face or by name?
- Do people bring their friends and relatives to see the place or do they point to one of its features with pride?
- Are people smiling? Do people make eye contact with each other?
- Do people use the place regularly and by choice?
- Does a mix of ages and ethnic groups that use the place generally reflect the community at large?
- Do people tend to pick up litter when they see it?

In Roebourne the question here is: Where are the people? At times there are lots of cars parked on Roe Street, some in front of the defunct Hotel and Bar, but not a soul in sight. The same applies to the Community Centre environment. From time to time meetings and social occasions take place indoors, but very seldom is anybody to be found outside.

It is clear that it will take a lot of energy, collaboration and joint effort to achieve the Vision for Roebourne.



## 1.7 Development Framework Options

The distribution of key activities in town are currently mostly focused into three broad locations:

- A northern cluster of industrial activity as well as a work camp. These are just beyond the set of hills surrounding the town.
- A broadly defined node in the northern part of the core area which contains a number of;
  - community service organisations
  - recreational facilities including basketball courts and the aquatic centre
  - an education hub with the primary school and TAFE
  - the service station with convenience shopping.
- A southern node includes;
  - the general store
  - a variety of small community service type businesses
  - the library, post office and police station.
  - hospital and associated medical services
  - the Visitor Information Centre, all set in the midst of a significant heritage cluster with associated tourism.

### 1.7.1 Land Use Potential

From earlier analysis it is clear that there is limited scope for extending the town in any direction. This is because of the following considerations;

- Development opportunities are contained by both the steep hill sides as well as the river and its associated flood regime.
- This leaves essentially two broad residential 'enclaves'; one north and one south.
- The northern enclave is laid out into lots with the current NASH development, which, according to its owners could take more than 10 years to complete.
- The southern enclave comprises the old town, in parts developed and in parts vacant, as well as areas set out but never developed. This enclave also brings in new areas to the east along the potential bypass route which has magnificent views to the east and south.
- These remaining two areas therefore have very different characteristics and present different opportunities for housing elements.



### 1.7.2 Traffic, Access and Visibility

#### General Traffic Observations

- The North West Coastal Highway traverses the town, with all traffic through to the north and down to the south passing through the town along Roe Street.
- The road to the Roebourne Prison, Wickham, Cossack, Cape Lambert and Point Samson turns off the North West Coastal Highway in town.
- This main intersection has relatively good lines of sight in all directions. However, there are several minor intersections onto Roe Street close by, all with turning vehicles and pedestrian usage which poses a problem.
- A large proportion of the traffic, especially from the north, has come a long way since the last opportunity to stop. There is potential for this traffic to stop in Roebourne and enjoy any retail or associated facilities.
- Some road trains park off Roe Street across from Sholl Street and leave their trailers/load (or part of it) there to be collected later.
- The main focal points along the route through Roebourne township have reasonably good sightlines. This provides some opportunity for improvement as well as posing some constraints which will require more detailed traffic design.
- At some stage in the future it may be necessary to implement the bypass, at which time traffic constraints could be put in place in town. However, the traffic through to Cape Lambert will remain an issue.
- It is critically important that any bypass proposal be designed to capture heavy traffic and discourage tourist and light vehicles.

#### Truckstops: breakdown or load assembly areas

- Trucks are currently stopping on the dirt across from the basketball courts, which is both close to the BP filling station and the Point Samson-Roebourne Road.
- Many use this space to park part of their truck load here, before dropping off loads in Wickham and Cape Lambert, and then returning to continue on the journey north or south.

The presence here of trucks causes some nuisance with dust and rubbish. As a result the local community is not comfortable to have them here.

Roebourne viewed from the air highlighting the key concepts and components of the structure plan proposals



- Sites for industry & commercial/residential
- Key community services node
- Curtail spread of community services groups, co-locate with retail
- Business zone with residential on Sholl St
- Consolidate caravan park/twc
- Promote Character Primary Business Node
- Create park along the Harding River and other parks
- Key significant heritage focus points
- Linking main access routes
- Potential new residential development areas
- Key ring route connecting all parts of town

## 1.8 Formulating a Vernacular

Here the term 'vernacular' refers to a distinct architectural language used to underpin a set of design responses which reflect the **local environment, circumstances and culture**.

- The **environment** in Roebourne is harsh and hot, and when it rains it is torrential often causing short term flooding.
- The **circumstances** are that this once busy town is no longer a commercial centre but a rather remote town with a declining population and growing social problems.
- The culture of Roebourne's past is expressed through its **many fine and very old buildings**. Current cultural activity is provided by a vibrant **Aboriginal expression** of country, family affiliations and artistic talent.

### 1.8.1 The Public Realm

#### Issues

In the Structure Plan studies it is clear that the town has suffered a major setback in the course of its existence. It has dwindled down from a flourishing business and transport hub in the early years to a skeleton of what it used to be. However, there are signs of a revival. Housing has increased in the last decades; community support services and business is growing; and more recently a range of enquiries about proposed new businesses would seem to draw a more positive picture for the future.

It would, however, be simplistic to expect that the current issues of neglect and an exceedingly high crime rate will just disappear. The Structure Plan can address some of the issues related to the qualities of the living, business and community environment, but these are not all of the issues hampering a balanced, vibrant and forward-looking society. Fostering this type of society will largely depend on the cooperation of the community. Hopefully the proposals collated in this Plan will build enthusiasm that will make a difference.

Without that enthusiasm it will be difficult to bring about change. To help foster positive change this Plan will endeavour to create an improved appreciation of the unique locality, history, culture and character of Roebourne.

This Plan aims to address the aspects which can bring out the best of the community. These can be achieved by providing for:

- An improved street environment with sheltered small local plazas where people would like to linger. Lovely streetscapes with abundant low maintenance local wild flower focus points to provide colour and life.
- Exciting new compact living environments providing pride of ownership and a special lifestyle where residents can make it their own.
- Places where local arts can flourish and contribute to the character of the town.
- Above all a sustainable environment minimising environmental risks and contributing to a solid future for coming generations and their supporting activities and businesses.

#### Town Centre Objectives

The **Town Centre** needs to act as a catalyst for the development of the whole town and to once again become a flourishing hub. How this can be achieved needs to be reflected in the design objectives. The following Town Centre precinct focused objectives are important:

**Develop Focus** – the plan will need to work against the dispersal and fragmentation that is currently ongoing, and create and support a focal point to reinvigorate business and retail to return to the town centre.



**Concentrate on the Public Realm** – The town centre needs to be “a nice place to be”. With the current core – the art gallery, the general store, a number of low key office uses, a local vet surgery, the library and the well-used pocket park, the aim should be to turn it into a place which is easy to use with lots of local facilities and an urban form which is legible and easy to understand.

The design should provide additional reasons to come to the town centre in collaboration with potential users and developers. Design can achieve this by incorporating surrounding natural features and presence to define the town centre and to make it amenable and attractive to be in. Develop:

- Its location on the river – park, walking, shelters, picnics and BBQ's
- Mountain views – preserve and emphasise sightlines and views
- Utilisation of the slope and heritage qualities to emphasise stability and character –building the character.

Make it easy to get to and to be there by:

- Making it highly accessible for residents, businesses and tourists with streets and footpaths with shade, resting places and easy parking
- Providing good signage, visibility and direction
- Interesting public spaces – a place to meet people
- Making it easy to move around in and compact, allowing several visiting points with parking required only once.
- Making it safe at all hours by applying good design principles:
  - no hidden places
  - good lighting
  - active edges overlooking public places
  - activities spilling over into the public realm.

Focus on reinvigorating heritage features and buildings, install activities in historic features and combine the town with modern amenities:

- Ensure liveability day and night
- Town centre apartment living (including worker accommodation)
- Motels and hotels for passing tourists and business
- Easy and safe walk-in for surrounding residents after dark
- Provide good lighting with both effective light for security and ambience.

The above focussed objectives should be part of a wider drive to reinvigorate the whole town.

### A Range of Essential Activities

To be successful as a town there is a need for a wide range of interrelated activities. Normally these form a cluster or clusters where you can obtain your daily needs in terms of retail, services and socialising. These activities also provide local employment opportunities. However, it is normal for small towns to lose a large component of their market to larger towns nearby, but as the town grows it should not only retain services, but also attract more.

In Roebourne that has typically been the case. On the one hand, larger towns (Wickham and Karratha) undermine them for retail services, whereas on the other hand, local community services (and therefore local employment) have been proliferating in recent times.

However, the impact of the above trend, seen from an urban design and liveability perspective, was mostly negative. This is so mainly because the businesses/services had a scattergun approach – settling all over town with no identifiable cluster other than the focal point around the community centre/youth centre. In short the overall increase in activity has not created a ‘place’. Neither has it provided a convenient central location for their customers to come to, rather clients have to cover all of the town to access individual services where they are scattered.

This state of affairs is actually responsible for the lack of any substantial retail outlet in town apart from the general store on Roe Street. As a consequence Roebourne lacks a town centre.

As a further consequence there is also not a particular place in town where retail or other supporting services would prefer to settle (and invest and provide jobs), and singularly and in isolation it is difficult for any one business to survive.

The logical conclusion is to advocate a town centre or at least a couple of nodal locations where activities can congregate while deriving some synergies. This will not be an immediate panacea, but over time as businesses grow, upgrade premises and change, a nodal concept can take hold providing benefits to all, for businesses as well as the community. The current investment in office space is insecure and a nodal location will bring about security. The current wide spread of activities do not allow for efficiencies of conglomeration or good access to supporting services.

From all the analysis there would seem to be a possible enduring solution by providing for two nodes;

- One, a business and retail cluster coinciding with the southern heritage precinct; and,
- Two, a community facilities, recreation and services node focused in the vicinity of the current community centre and the BP station.

### Residential Areas

It is important to develop a simple, easy to maintain streetscape vernacular which clearly identifies the living neighbourhood and slows traffic, making it pleasant to walk and visit on the street. The living neighbourhood will be a relatively calm environment with good surveillance, especially around the education hub.

### 1.8.2 Framing a Workable Vernacular

Currently the town has a confused existing scenario, where a broad mix of uses are spread throughout the town with little rhyme or reason, and where the current situation will be difficult to unravel. To improve this it will be necessary to demonstrate through a very strong and somewhat simple vernacular design the focal points in the town that will be supported in the future. In terms of the streetscape the following elements are suggested:

#### Heritage – Taking it into the Future

- Character, attractiveness, liveability and sustainability of a town are not easily defined elements. An intricate mosaic of culture, heritage, lifestyles and many other aspects thrown together over lifetimes all contribute to the townscape. With age it reflects a rich patina which you cannot easily replicate.
- Roebourne has many of the above characteristics with historic relics operating as living structures from their founding day, as well as a large number of tired structures in various states of disrepair. Contrasting these there are numerous relatively new buildings, including housing, sports facilities and community support structures functioning well.
- However, the built environment is also part of the rather inferior living environment which comes across as unkempt and in a state of neglect. Even the more recent buildings are not immune to this condition and they do not reflect their qualities because of the environment they are operating under.
- This poor state of affairs is impacting on everything around it. Even during a meeting with representatives on local heritage the roof of the “50 Cents Building” was continuously pelted with rocks in broad daylight.
- Fortunately this negative image is offset by great examples of care, tidiness and good design and maintenance of selected current facilities.
- Going forward, building up the town without celebrating the past and the current will not deliver the positive results we envisage. This will only happen if it is brought about by the local community with support of the City. Short term positive outcomes which can bolster participation, stewardship and pride are the key to success.

### The Public Realm

The recommendations for the public realm are spread across several concepts:

#### Active Environments

- Ensure overlooking windows of living rooms/kitchens onto street
- Ensure active street fronts in activity areas
- Ensure good lighting – providing true colour, not too harsh for ambience, brilliant enough for person recognition and limiting light spill.

#### Walkability in the Local Climate

- Connectivity – provide clear route options, good sightlines, no hidden areas
- Footpath design – width, colours/heat absorption/radiation
- Safety CPTED – surveillance – day/night.



### Streetscape

- Ensure buildings offer a diverse but coherent façade to the street
- In business activity areas allow no setbacks unless to accommodate outdoor activities integrated with the street environment
- Allow footpath seating for restaurants/cafes only if it does not pose an obstacle to good pedestrian movement – e.g. at least 2.4m footpath width in activity nodes with the footpath against the building side
- Shaded nodes – sails or trees – minor stops and major congregating point. Street trees to be up-limbed to at least 4.5m. Ensure young growing trees are well-protected against vandalism; have community planting days and after that community care days to ensure their success. The recommended plants are:
  - Poinciana trees (Delonix regia) orange-red flowers – Short (east-west) streets
  - Corymbia Flavescens (Snappy Gum) – along (north-south) streets
  - Palms – marking special places, plazas and squares
  - Bougainvillea – pergola planting for colour and shade
  - Low growing shrubs and flowing natives – local natives.

### Public Spaces

- Ensure these special places have good natural surveillance.
- Keep open vistas with shrubs trimmed down to less than 1m height and trees up-limbed to at least 4.5m height
- Integrate the river views with the Roe Street – emphasise views, create informal footpaths where there are current traditional footpaths wherever possible.

### Colour and Texture

- Aboriginal art – frescos against prominent walls and feature elements
- Stacked stone retaining and stone walls – rustic browns, reds and blacks
- Colour-coded concrete – light colours in pastel shades.





### 1.8.3 Business Environment – Roe Street

#### The Main Street - Gateways

The town's visual attractiveness is essentially limited to a few outstanding heritage items. However, there are many opportunities to remedy this apparent lack of identity through systematic improvements in the streetscape. Roe Street (south) already has the basic combination of elements making it interesting and attractive. This is a good skeleton to flesh out into a unique landmark activity hub.

This section a mosaic of significant heritage architecture, a convenient and attractive small park with memorials and backed by potentially excellent river views. However, this gateway is marred by broken balustrades and fences as well as neglected gardens of the heritage buildings and a lack of continuity of key facades.

The entrance from the north is different and lacking in amenity and attraction, but offers some opportunities:

- It is dominated by the BP filling station and shop with vacant land in the flood plain of the Harding River opposite as well as on both sides. It would seem the BP shop has limited support for its retail.
- This end of town mainly accommodates a range of community-type services. It will be good if they have a street presence with inviting facades and designs offering surveillance.
- Turning traffic from both the north and the south have limited visibility and space to get out of traffic lanes.
- The NASH mixed use lot on the corner of the Roebourne-Point Samson Road could in future generate competition but it also has major pedestrian safety problems and vehicle access.
- The images adjacent are of Roe Street (north) with few positive elements. The images to the right depicts some of the better elements of Roe Street South – a combination of heritage, park and business – with opportunities to grow.

#### General Conditions

- The town's streets are quite bleak with few viable attractors which could serve as anchors or focal points for new development.



### 1.8.4 Roe Street North

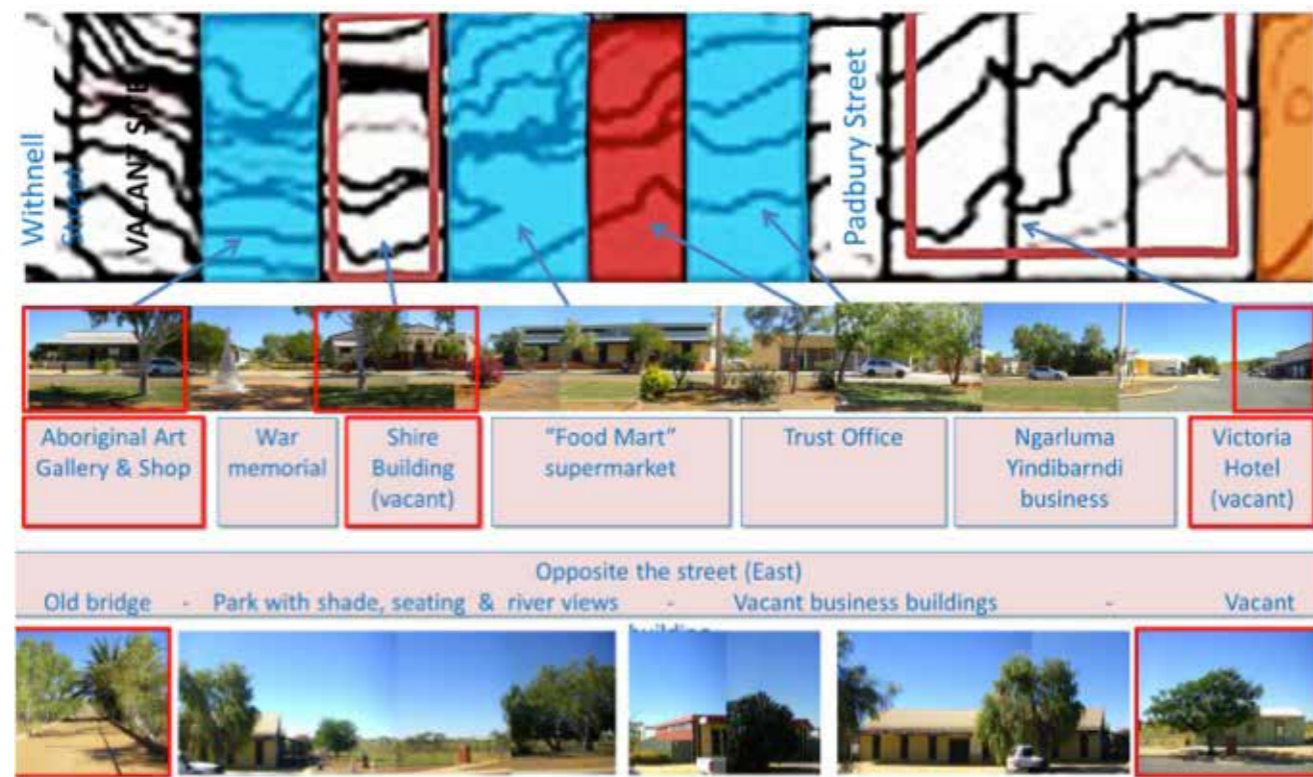
The northern part of town is of more recent vintage with a single heritage building (the Old School House) on the current primary school premises. The BP station in the north is the only filling station in town serving an extensive area. As the diagram shows it is quite isolated with no neighbours either side or across the road.



### 1.8.5 Roe Street South

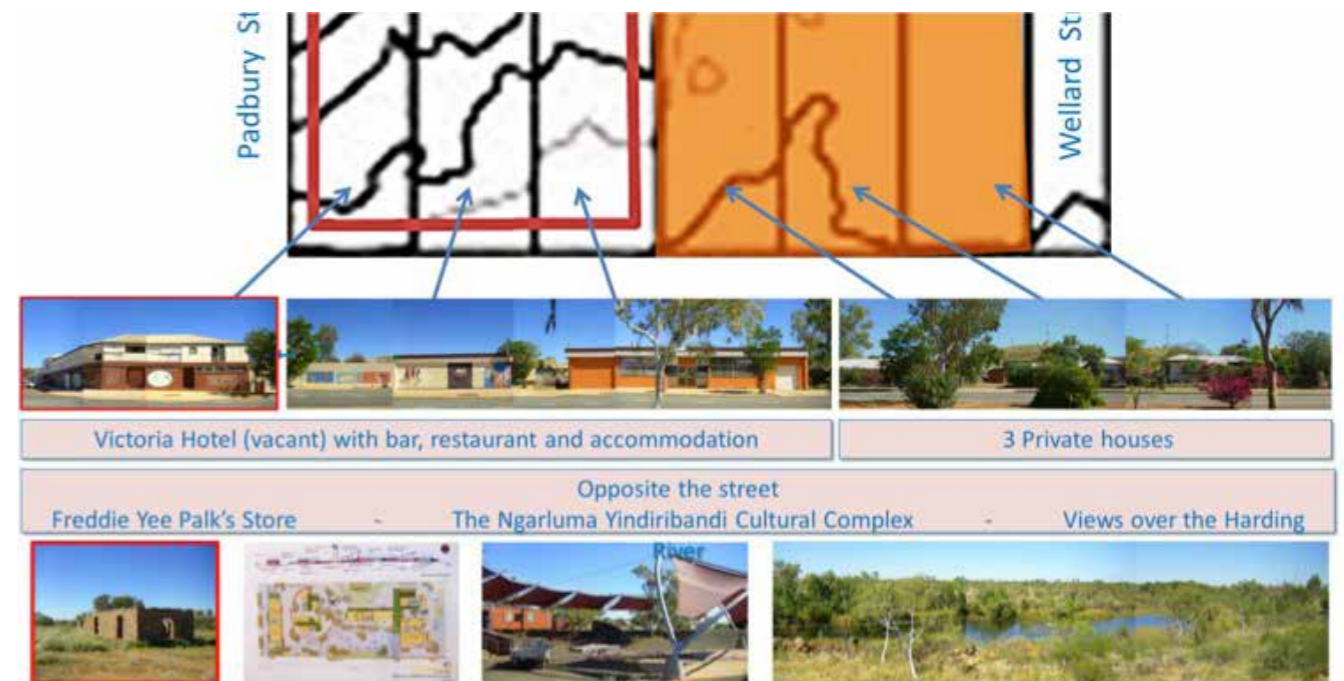
Items of interest are scattered through the southern part of the town, but with a recognisable heritage precinct at the southern point of Roe Street.

- The illustration below highlights the current land use with heritage items outlined in red, and of the buildings both sides of the street.
- As pointed out earlier, Roe Street (south) already has the basic combination of a few historic treasures making it quite interesting and pleasant. It has the makings of a special precinct and could provide an anchor or “bookend” for the southern part of the “Mainstreet” environment.
- However, it is quite vulnerable and needs supporting activities as soon as possible to stop further deterioration of the remaining mainstreet activities.



### 1.8.6 Central Roe Street

- The central part of the street boasts the new outdoor amphitheatre facility (and in future a cultural hub) which can bring some identity to the otherwise bleak environment.
- The Victoria Hotel used to be an important landmark overlooking this new development and the River. It occupies a prime position, but seems to have a limited chance of remaining unscathed. With few prospective users wanting to establish in town, it would seem that the cost of restoration outstrips potential income. However it is of such significance that its restoration is key to the success of the revival of the “Mainstreet”.
- The Hotel’s location lends itself for a range of diverse uses, including offices, shops, restaurants and other businesses. In combination with apartments and accommodation, this could result in a much improved level of activity on both Padbury and Roe Streets, and as such it is a really attractive mixed-use opportunity.
- Structures which have asbestos in them will need it to be removed to render the site suitable for use, adding to the cost of renewal and redevelopment.



### 1.8.7 Sholl Street – General Observations

Apart from Roe Street this is the only other street of the old town that runs the full length of town.

Sholl Street has many activities located along its length, particularly close to its northern and southern ends.

Most of the other activities in town, like the school, the technical institute and community support services ultimately are reached via Sholl Street. This makes it the busiest street with mostly local traffic, compared to through traffic on Roe Street. Having a wide road reserve with wide verges, it is operating more like a rural highway than a local suburban street with high speeds putting pedestrians at risk.

From an urban design perspective, the street lacks character and identity with many buildings tucked away behind fences and overgrown by shrubs. There is a footpath on the eastern side but the verges are totally bereft of trees and shade, making it unpleasant to walk along in the summer heat. With very few people walking in town, there is a feeling of isolation which turns to concerns for safety at night. The wide expanse is conducive to vehicles speeding.

### 1.8.8 The Community Centre Design Issues

Vandalism here is an issue. In the main the problem stems from the fact that this set of buildings do not have good natural surveillance. Although there are activities throughout most of the day and the evening, they are hidden from view behind walls and screens. Ideally the Aquatic Centre, the Fifty Cents Building and the new Youth Centre should provide the necessary surveillance over the area with activities spilling over to the outside of the premises. The trees and shrubs along the street side are not helpful either.

The set of conditions are poor and installing CCTV cameras alone will not rectify it.

Behind the Youth Centre (south) on Weerianna Street the surveillance is equally poor. However, this area actually lends itself to become a small local park and would provide for a definite need as there is a dearth of parks in the town. It will also serve to redefine this end of Sholl and Fraser Streets by emphasising a change of environment, progressing from a predominantly community focus to a residential neighbourhood.



## 2.0 Planning Framework

### 2.1 Local Planning

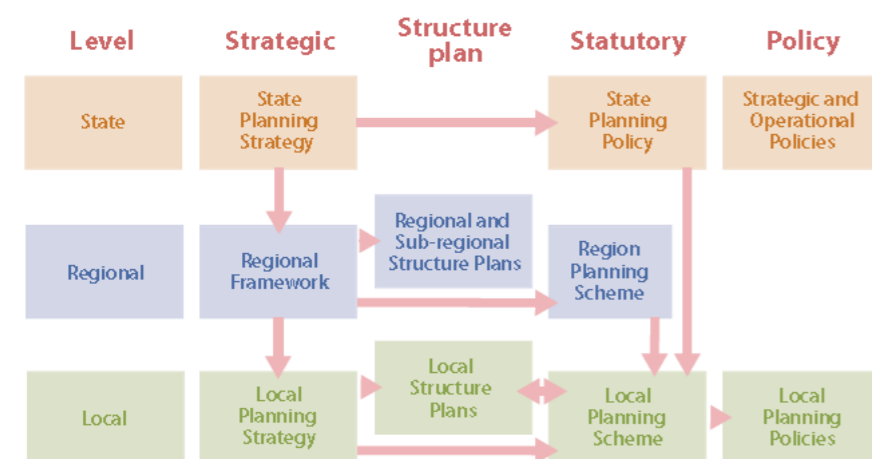
#### 2.1.1 Planning Framework Relationships

The Roebourne townsite boundary is depicted on the City of Karratha Town Planning Scheme Map. The boundary is defined under section 26 (2) of the Land Administration Act 1997.

The area within the boundaries of the townsite is approximately 1,395 ha. The town is defined by two prominent landscape features; Mount Welcome in the centre and the Harding River bordering the eastern side of the town.

The planning framework including relationships is summarised in the figure below from the Pilbara Planning and Infrastructure Framework (WAPC 2012:2).

Figure 13 Pilbara Planning and Infrastructure Framework - Planning Context



The key components of this framework are described in the following sections.

#### 2.1.2 City of Karratha TPS No 8

The City of Karratha TPS No. 8 (2011) (the Scheme) outlines the City of Karratha's planning aims and intentions for the City of Karratha municipal district. It also aims to control and guide land use and development within the district, as well as facilitating community input into planning. The Scheme sets out procedures for the assessment and determination of planning applications, defines the uses and types of development to be permitted on land within the Scheme Area, including land reserved for public purposes, and controls and regulates the development of land, erection and demolition of buildings, and the carrying out of works.

The development objectives for Roebourne, as defined in Part V of the Scheme, are:

- Preserve the heritage values of the Roebourne town, whilst facilitating an increased range of services.
- Improve the links between the Town Centre and the Harding River parklands.
- Limit further development within the Harding River Flood Plain.
- Encourage the development of intensive agriculture where sustainable.
- Develop the Roebourne Mixed Business zone as a precinct in which:
  - businesses may be developed in conjunction with single residences
  - uses are not permitted which are incompatible with the residential component
  - no site may be developed purely for a residential function.
- Facilitate the development of the Cheeditha Community in line with any adopted Community Layout Plan.

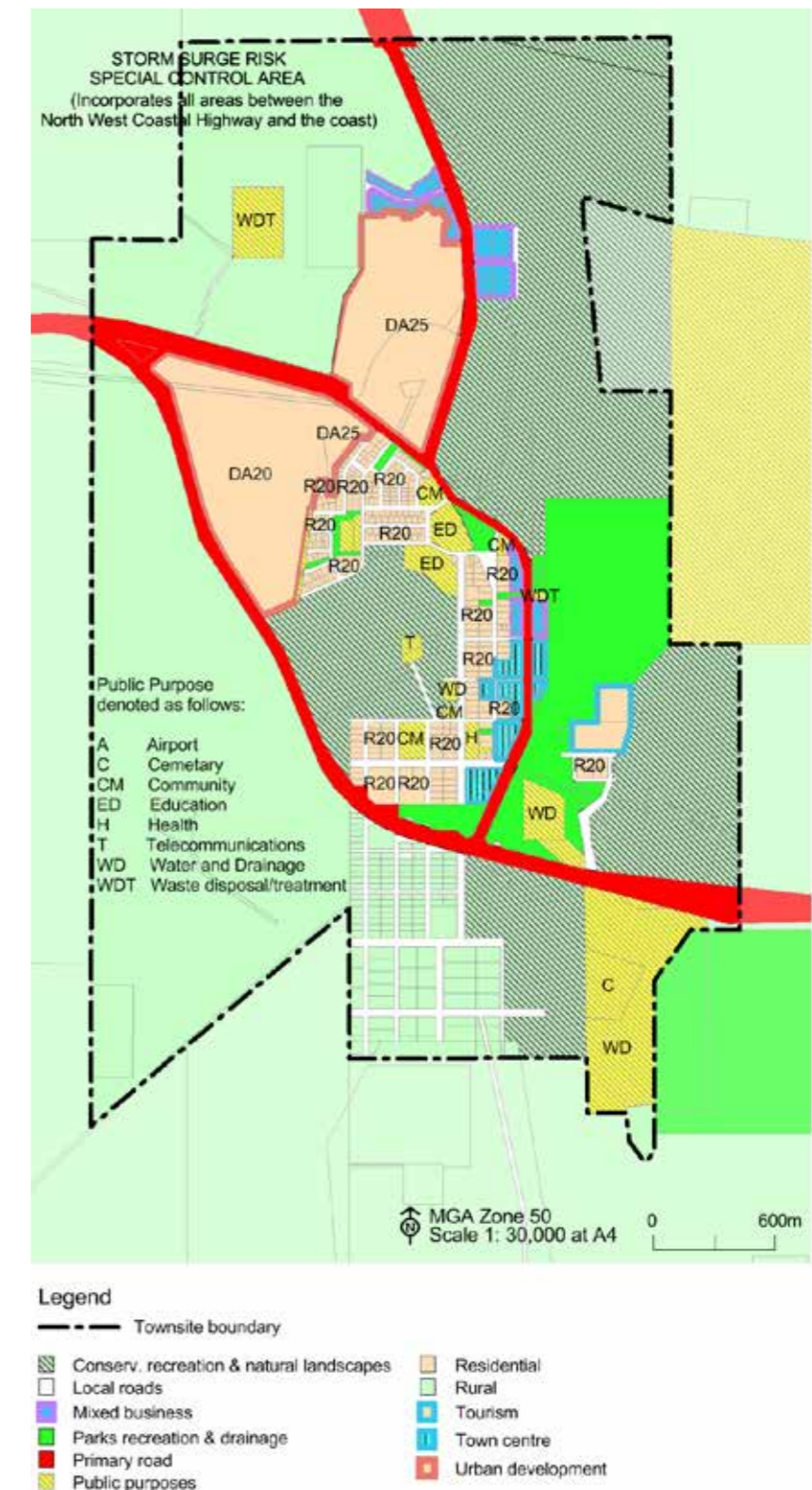
#### 2.1.3 Zoning and Reservations

The City of Karratha Town Planning Scheme No 8 identifies the following reserves and zones within the Roebourne townsite Structure Plan area.

- Conservation Recreation and Natural Landscape
- Parks, Recreation and Drainage
- Rural
- Public Purposes
- Mixed Business
- Urban Development
- Town Centre
- Residential
- Tourism

All development is to be consistent with the objectives of the Scheme for the Roebourne townsite as well as the provisions and requirements of each zone. Additional planning requirements are provided by a number of special control areas.

Figure 14 TPS No.8 Roebourne Townsite



### 2.1.4 Development Plans

The Scheme provides for the preparation of Development Plans where comprehensive planning is required prior to subdivision and development. Section 7.2 of the Scheme sets out the prescriptive requirements for the preparation of a Development Plan. Any future development or subdivision application within the Development Plan area should be in accordance with the endorsed Development Plan. Any departure or alterations to the Development Plan may be approved by Council if the changes do not compromise the progressive subdivision and development of the area.

The Roebourne townsite contains two identified development plan areas. DA 20, Roebourne North West Coastal Highway and DA 25, Roebourne North West Coastal Highway and Roebourne-Point Samson Road. The development plan for DA 25 has been adopted and will guide subdivision, land use and development to provide for residential development, commercial and mixed business development and recreation. No development plan has been lodged for DA 20.

### 2.1.5 Roebourne Flood Management Plans

Parts of the Roebourne townsite are subject to the Roebourne Flood Management Area Special Control Area. This Special Control Area is to ensure development addresses the risk of flooding from Harding River. The requirements of the Special Control Area (Clause 7.4) are that Council will ensure:

- Development has a minimum finished floor level of 10.2 metres AHD;
- No development is within or obstructs the floodway; and,
- Any foundation or fill is designed and/or reinforced to allow the flow of floodwater through or around development without damage to the foundation, fill or development.

Council may require applications for planning approval to include an assessment, prepared to its satisfaction, of the impact of potential flood events on the proposed development.

The City initiated Amendment 35 in February 2014 which will have the effect of modifying this special control area to reflect findings from the most recent modelling (Essential Environmental, 2013).

### 2.1.6 Storm Surge Risk Area

All areas between the coast and the North West Coastal Highway are also subject to the Storm Surge Risk Area Special Control Area. The provisions of this Special Control Area (Clause 7.5) are as follows.

When considering applications for planning approval, Council shall have regard to information about the land prone to 1 in 100 year storm surge events and may permit, with or without conditions, or refuse proposals at its discretion.

When considering applications for planning approval, Council shall consult the relevant agencies regarding the most up to date information available about potential storm surge events and sea level rise which may affect the proposals subject to application.

Development within the Residential, Commerce or Health, Welfare and Community categories within the zoning table is not permitted within an area known to be subject to 1 in 100 year storm surge events. Council may approve other development categories subject to considering:

- The sensitivity of the proposal to risk;
- Protection measures to be constructed; and
- Social and cultural values.

### 2.1.7 City of Karratha Local Planning Strategy (in preparation)

The City of Karratha is in the process of preparing a local planning strategy for the City. The Local Planning Strategy will set out the long-term planning direction for the City of Karratha. It will guide Council, investors, developers, infrastructure providers and the community on where growth can occur and how it will be managed. It will provide a strategic framework for future development and the rationale for land use zoning defined within the Local Planning Scheme to 2031.

## 2.2 Regional Planning

### 2.2.1 Pilbara Planning and Infrastructure Framework

The Pilbara Planning and Infrastructure Framework (2012) sets out the strategic direction for the future development of the region over the next 25 years. It addresses the scale and distribution of future population growth and housing development, as well as identifying strategies for dealing with economic growth, environmental issues, transport, infrastructure, water resources, tourism and emerging impacts of climate change.

The Pilbara settlement hierarchy to 2035 defines Roebourne as a town (WAPC 2012:13). No target population is provided, however the figure below sets out the likely demand for dwellings.

Figure 15 Roebourne Dwelling Demand

Roebourne	Current Unmet Demand (Dwellings)			Future demand 2009-2015 (dwellings)			
	54	93	147	Additional future demand 2009-2015		Total future demand 2009-2015	
				Low Growth	High Growth	Low Growth	High Growth
				41	212	188	359

Points to note from this analysis are;

- Dwellings referred to here only include permanent dwellings not transient workforce accommodation or workers' camps
- Apparent demand includes housing waiting lists, including social and GROH housing, homeless persons and overcrowding of current housing stock
- Latent demand is the undersupply of affordable and appropriate housing which has constrained the region's service and construction sections, causing them to operate below capacity
- There is a total unmet demand of 147 dwellings in Roebourne township
- The forecast total future demand out to 2015 is 359 dwellings.

It should be noted that this pattern of considerable unmet apparent and latent demand is consistent across the Pilbara region, with Karratha having the highest level of current unmet demand in 2012.

### 2.2.2 Pilbara Framework Regional Profile

The Pilbara Framework Region Profile (2009) supports the Pilbara Planning and Infrastructure Framework with background, technical information and mapping. It provides information to support the rationale and direction in the Framework;

- No development is within or obstructs the floodway; and
- Any foundation or fill is designed and/or reinforced to allow the flow of floodwater through or around development without damage to the foundation, fill or development.

Council may require applications for planning approval to include an assessment, prepared to its satisfaction, of the impact of potential flood events on the proposed development.

## 2.3 State Policies and Initiatives

This Structure Plan has been prepared cognisant of all relevant government policies and reflects the requirements, objectives and intent of such policies including State Planning Policies, Development Policies and Guidelines including the Residential Design Codes and Liveable Neighbourhoods.

A number of state and local policies, plans and initiatives are directly applicable to Roebourne and have been considered as part of the development of the townsite Structure Plan. A number of State Planning Policies (SPP) have been adopted by the Western Australian Planning Commission and are applicable to future land use planning for the Roebourne townsite. The relevant policies are detailed in the following sections.

### 2.3.1 Environmental and National Resources (SPP 2)

SPP 2 seeks to ensure environmental and natural resource considerations are integrated with planning decisions and actions and the conservation of important areas. The policy identifies a series of general measures to achieve this goal including avoiding development that may result in unacceptable environmental damage; actively seeking opportunities for improved environmental outcomes; protecting significant natural, indigenous and cultural features; ensuring coastal development is sustainable; and, taking into account the impact of environmental change.

### 2.3.2 Water Resources (SPP 2.9)

SPP 2.9 presents a number of objectives relating to protecting, preserving, managing and improving the state's water resources through land use planning. An integrated management approach, focused on achieving sustainable outcomes will ensure that economic, social, cultural and/or environmental values are considered and enhanced. The Western Australian Planning Commission's Better Urban Water Management 2008 document emphasises the use of integrated water cycle management to achieve more efficient use of water resources and sustainable outcomes for the environment and urban form. Principles of integrated water cycle management can be achieved through the evaluation of development, whereby land use planning and water planning are undertaken concurrently in order to achieve water sensitive urban design.

### 2.3.3 Urban Growth and Settlement (SPP 3)

SPP 3 sets out requirements for well-planned and coherent settlements. Planning should ensure that settlements have a strong, diversified and sustainable economic base to provide employment; sufficient and capable land in suitable locations for housing, employment, commercial, recreational and other purposes; coordination of various land uses; a choice of housing and lifestyle opportunities; and proper consideration of the environment. Importantly for Roebourne, the policy requires that in regional areas growth should be accommodated through consolidation and expansion of existing settlements rather than creation of dispersed new settlements.

### 2.3.4 Residential Design Codes (SPP 3.1)

The purpose of SPP 3.1 is to provide a comprehensive basis for the control of residential development throughout Western Australia by local government. The R-Codes outline the 'rules' which apply to residential development and are intended to minimise the need for local government to introduce additional planning policies to control residential development. The R-Codes do not address the physical construction requirements or internal arrangements of buildings – these matters are dealt with by the Building Code of Australia (BCA).

SPP 3.1 was amended on 22 November 2010 to include additional multiple dwelling provisions.

### 2.3.5 State Industrial Buffer Policy (SPP 4.1)

SPP 4.1 is directly applicable to the determination of an appropriate buffer to the Roebourne Power Station and waste water infrastructure. It is noted that SPP 4.1 State Industrial Buffer (Amended) is currently under review and the assessment of land use buffer for infrastructure must also have due regard for this Draft version of the Policy.

### 2.3.6 Liveable Neighbourhoods

Liveable Neighbourhoods (2007) is an operational policy adopted by the WAPC for the design and approval of urban development. It intends to implement the objectives of the State Planning Strategy which aims to guide the sustainable development of Western Australia to 2029. It applies to structure planning and subdivision for greenfield sites and for the redevelopment of large brownfield and urban infill sites.

## 3.0 Site Context

### 3.1 Planning Issues and Context Analysis

Roebourne has a rich history as one of the earliest settlements on the west coast of Australia. However, a range of diverse events have led to the deterioration of the town over many years.

Activities within the town are focused in three locations:

- a northern cluster of industrial activity;
- a broadly defined node in the northern part of town that is supported by community service organisations, recreation including basketball courts and the aquatic centre and an education hub with the primary school and technical institute; and,
- southern node that includes the library, post office, police station, hospital and associated medical services and the information centre, all set in the midst of a significant heritage cluster.

There are a number of planning issues that need to be considered to revitalise the town.

### 3.2 Residential Zoning

The residential areas of the town were traditionally located along Sholl and Roe Streets in the older part of town, however, a range of other uses has infiltrated this area, consistent with the Town Centre and Mixed Business zones. This includes community services-type uses, such as education facilities in the northern parts, with health services, tourism and some retail in the southern sector of town.

The Valuer General's Office data identifies only 251 dwellings in Roebourne, 216 of which are zoned R20 and 35 of which are on land that has no R-Code. Like other areas zoned R20 in the City of Karratha, average net site densities are significantly below the permitted average and as such significant capacity remains on already developed lots. However, in Roebourne there is also a large number of vacant lots that could also accommodate significant capacity. Overall 144 new homes could be accommodated on under developed lots and a further 161 dwellings on currently vacant lots.

Roebourne's dwelling stock is significantly older than the other town sites in the City. More than half of Roebourne's extant dwellings were built prior to 1975. Dwelling construction activity has been very moderate since 1986 with fewer than four dwellings being built each year through until 2011. In 2012, 10 dwellings were built in the town primarily by the Department of Housing as public housing.

Roebourne's capacity for additional dwellings on zoned land is considerably different to that of the other town sites in the City in that most of the dwelling capacity is on land that is currently vacant. Another 305 dwellings could be built on land that has been designated for R20 densities (Figure 16). Should all the vacant land in the townsite be developed, this could easily accommodate twice the current population.

Figure 16 Additional Development Potential by R-Code – Roebourne

R-Code	Capacity on built lots	Capacity on vacant lots	Total
R20	144	161	305
Total	144	161	305

Source: Department of Planning, Integrated Land Information Database; MacroPlan Dimasi LPS Evidential Analysis Paper – Urban Residential Densities, September 2013

### 3.3 Housing Stock Characteristics

#### 3.3.1 Ownership and Built Form

A large proportion of the Roebourne townsite is owned and/or vested in a public entity. The largest number of lots is held by the Department of Housing and Works, Commonwealth of Australia and Department of Planning and Infrastructure. Of the 466 publically owned/vested lots in the townsite, 300 (64%) are listed as undeveloped. Of these, 11 are zoned for urban development, 25 are zoned for the Town Centre, 2 are zoned for Tourism with the remainder zoned Residential. All the mixed business lots are listed as developed.

According to the 2011 Census, the majority of homes are rented, detached dwellings (Figure 17). Much of the housing stock is old and in need of repair. Although some of the later housing developments have not delivered optimal outcomes, the latest developments (NASH stage 1) propose a vernacular that responds to the climatic conditions in the Pilbara and the needs of the community.

Figure 17 Dwelling Structure

Dwelling structure	Separate house	Semi-detached, row or terrace house, town house etc.	Flat, unit or apartment	Other dwelling	Not stated	Total
Owned outright	20	0	0	22	0	42
Owned with a mortgage(b)	30	0	0	3	0	33
Rented	103	11	0	5	3	122
Other tenure type(e)	0	0	0	0	0	0
Tenure type not stated	10	0	0	3	0	13
Total	163	11	0	33	3	210

Source: ABS:2011

The Ngarluma Aboriginal Sustainable Housing (NASH) project to the north of the North West Coastal Highway, west of the Roebourne-Point Samson Road, intends to address the lack of adequate housing for aboriginal people living in Roebourne. This development will result in nearly 300 new lots, including a grouped housing site, 18 mixed business lots and a commercial site. This development is currently being constructed and lots are now available for sale; however none have yet to be purchased. Unless there are "foundation" investors it is conceivable that it will take up to 20 years before this development is built out (Imani, 2013).

### 3.3.2 Short Term Accommodation

Shortterm accommodation is limited in Roebourne. There is no accommodation in the town centre itself as the hotel is closed and is in a serious state of disrepair. As this is one of the most visible buildings on Roe Street it gives a poor impression to passing traffic.

There is only one caravan park located outside the town centre. Availability within the caravan park is limited also, due to the majority being utilised for workers' accommodation and therefore offering few places to the tourist market.

### 3.3.3 Key Challenges

The priority for residential redevelopment will be focused on infill within residentially zoned sites with some type of development prior to considering greenfield or completely undeveloped sites.

Delivering additional dwellings in the townsite of Roebourne is a challenge which is related to factors other than land availability and includes;

- the cost of building in the Pilbara
- a lack of commitment from Government agencies to accommodate their staff in Roebourne
- similar to the point above, the resource companies also have a reluctance to build accommodation for their staff in the town
- in spite of an attractive location, the Yaburriji Estate has a poor take-up history.



## 4.0 Opportunities and Constraints

Although the Roebourne townsite has seen a slow but steady decline in population and economic activity over a number of years, there are a number of elements that provide key opportunities for the future revitalisation of the town.

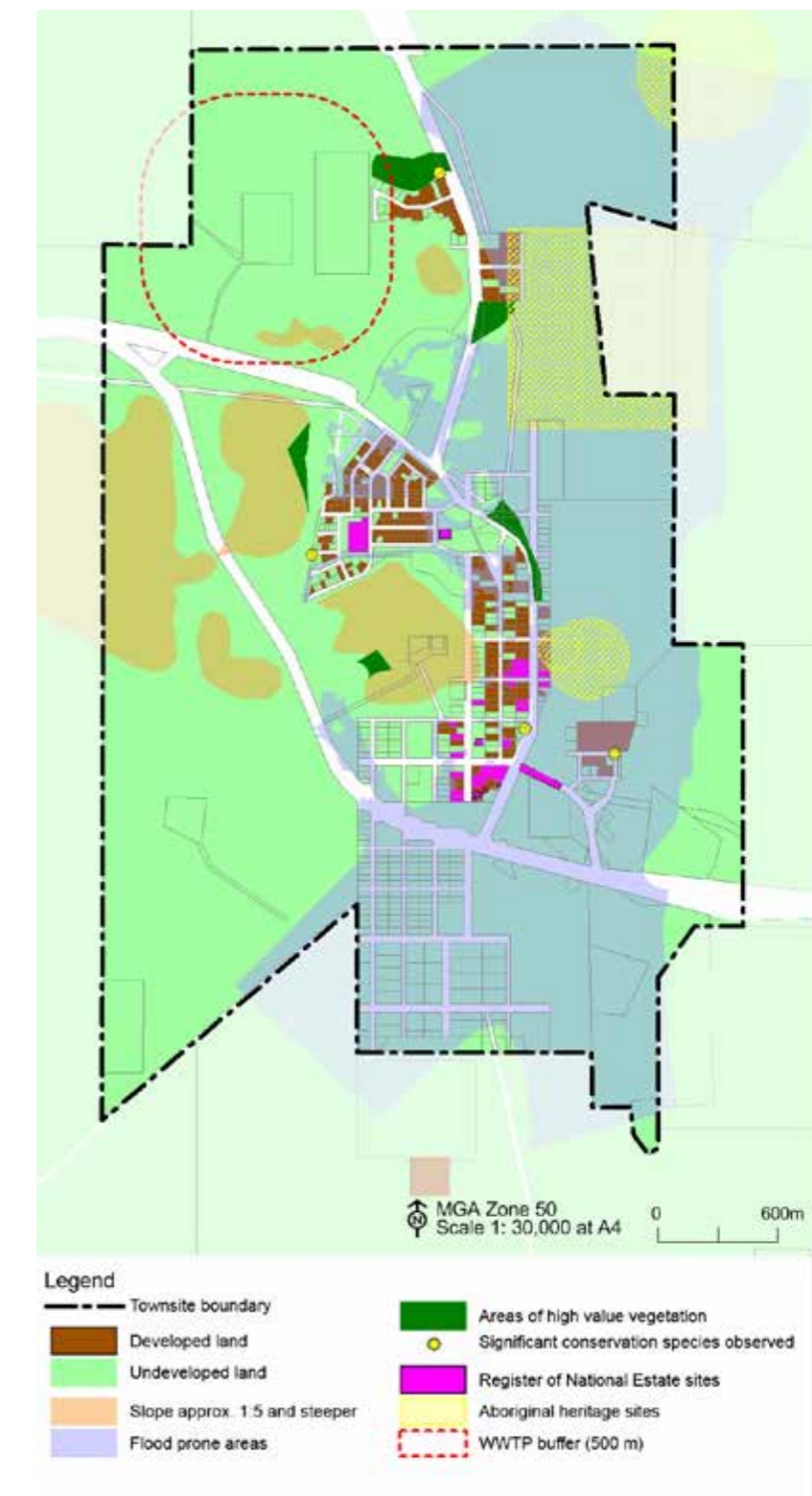
Roebourne has a colourful history and contains many places that are valued by the community – both of Aboriginal and European origin. This rich history is able to form the foundation for cultural enhancement and diversification, and it is recommended that effort is made to develop the economy around the arts in order to generate a wider range of people and businesses in town.

Due to large areas of vacant land, there is sufficient land available to cope with a moderate level of growth. The form of the town provides a variety of residential and commercial opportunities, with infill and redevelopment opportunities in the southern portion of the town and significant land available in the NASH development in the north. Should additional land be required, the townsite is able to be extended around the western side of Mount Welcome, provided that appropriate Native Title agreements are reached. Key directions from this analysis include;

- Preservation of historic buildings and heritage
- Provision of diverse residential lot sizes and maintaining a high percentage of larger lots to cater for cultural/family uses
- Facilitation of enhanced opportunities for commercial and retail development within the town centre in the Heritage-Commercial-Tourist precincts as well as the NASH commercial precinct
- Improvement of pedestrian linkages including footpaths, lighting and shade and a reconnection of the town to the river
- Upgrades to the intersection of North West Coastal Highway and Point Samson-Roebourne Road and consideration of southern and northern bypasses
- Formalisation of a safe, heavy truck breakdown area outside of the main built-up area
- Realignment of the North West Coastal Highway to provide additional land for the education precinct
- Appropriate management of flood-risk including upgrades to existing infrastructure
- Improvement of streetscape including visibility and passive surveillance
- Provision of more diverse recreational opportunities and associated meeting areas within the main precincts
- Work with the Water Corporation to ensure adequate water and wastewater services are available. Consider opportunities to reuse treated wastewater for irrigation of ovals
- Provision of adequate land for industrial activities while maintaining appropriate buffers between sensitive land uses
- Revegetation and enhancement of degraded natural areas
- The public perception of the town, in that it is not a safe place to be, is also a significant constraint.

It is recognized that there are a number of issues that cannot be solved by a plan, which will require action in order to achieve the vision for the Roebourne townsite.

Figure 18 Roebourne townsite constraints



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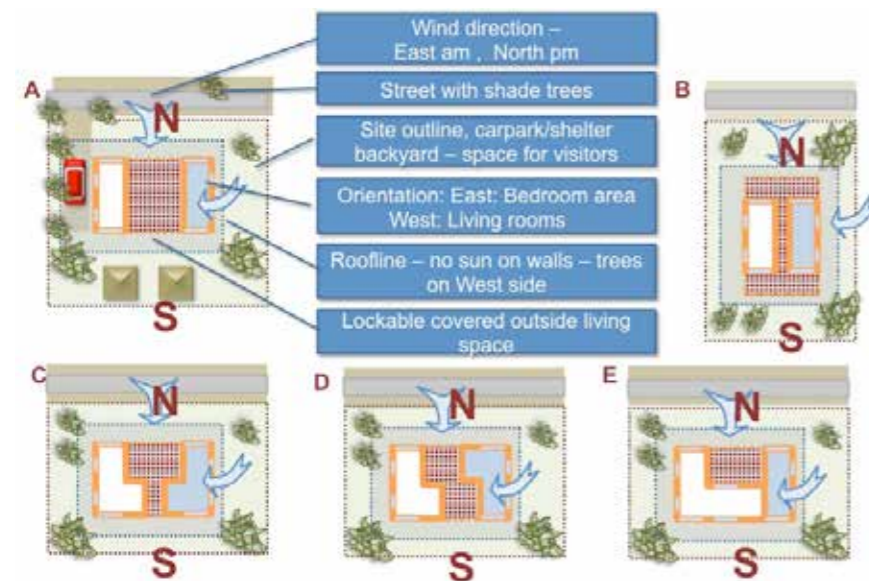
## Attachment 1: Catering for housing needs by Urban Initiatives

### Catering for Housing Needs: Key Typologies

The main aim of outlining a number of potential housing typologies is to arrive at the influence on the liveability, the streetscape, walkability and safety of the urban environment, whilst allowing for climate and lifestyle. Including the outcomes of the 2010 Community Workshop, the demands of the weather conditions (heat, sun and cyclonic aspects), the street environment and the family structures/culture, can assist in defining the future townscape.

#### Typologies

The following five diagrams depict houses facing north to the street (or south with similar outcomes) allowing for afternoon breezes and flexibility for visitors' tents/swags, pets, gardens, cars and storage.



### Designing for the Climate

#### Wind

The Windrose information (courtesy of BoM) shows that in the morning the breeze is normally from the east and in the afternoon it is more variable coming mainly from the north west to the north east.

#### Sun

The sun at this tropical latitude is mostly high with limited penetration north or south, but could be quite severe particularly in the late afternoon from the west. To assist in reducing severity and providing shade a car shelter on the west side would be the appropriate location.

### Typical Clusters and Street Layouts

#### Low Density Residential (15 – 20 units per ha)

Housing lots varying between some 500m<sup>2</sup> and 750m<sup>2</sup> can produce intimate living environments around local places geared to extended family living or just to provide quiet locations away from through traffic.

This option delivers lots for large houses on a single level with multiple car parking and large backyards. It therefore caters for the extended families rather than small unitary families. This delivers outcomes with quiet shared street environments which offer much more than infill housing hidden away behind other houses.

The street environment can be softened with local secluded places where paving changes to create a 'place' and trees/planting create a separate identity.

**Low density example;** The image on the right shows a diagram of the houses with breezeways (orange) between living areas and bedroom areas (red) with no sun on walls, and an informal access layout in concrete with brick liners.

#### Low-Medium Density Residential (20-30 units per ha)

This selection will still deliver medium to large single storey houses on smaller sections, with the potential to have two units on the outside corners if needed. Houses also can have lockable breezeways with no sun on walls and an informal access layout where families can meet and children play.

#### Medium Density Residential (30+ units per ha)

This category of housing development should be limited to selected core areas in and around nodes. This density mostly provides for semi-detached units and apartments which could be located on larger sites with internal circulation of vehicles and pedestrians. The accommodation can come with or without shared facilities like pools and open space elements.



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