

October 2014

BABBAGE AND WHITLOCK ISLANDS

Structure Plan



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PLANNING DESIGN ENVIRONMENT

DEPARTMENT OF PLANNING

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ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the Shire of Carnarvon Local Planning Scheme No. 13

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

15 December 2014

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

Date of Expiry:

19 October 2035

modifications

MODIFICATION NO.	DESCRIPTION OF MODIFICATION	DATE ENDORSED BY COUNCIL	DATE ENDORSED BY WAPC

pre-lodgement consultation

The following were consulted as the Structure Plan was being prepared. Outcomes of consultation are provided in Chapter 12.

AGENCY OR ORGANISATION	DATE OF CONSULTATION	METHOD OF CONSULTATION
Department of Planning	23rd May 2013	Letter
Department of Environment Regulation	23rd May 2013	Letter
Department of Parks and Wildlife	23rd May 2013	Letter
Department of Water	23rd May 2013	Letter
	2nd May 2013	Working Group
Department of Transport	23rd May 2013	Letter
Department of Fisheries	23rd May 2013	Letter
Department of Lands	23rd May 2013	Letter
	2nd May 2013	Working Group
Department of Aboriginal Affairs	23rd May 2013	Letter
Carnarvon Heritage Group Inc.	23rd May 2013	Letter
	2nd May 2013	Working Group
Gascoyne Development Commission	23rd May 2013	Letter
	6th June	Meeting
Carnarvon Chamber of Commerce and Industry	23rd May 2013	Letter
Landcorp	23rd May 2013	Letter
Member for the North-west	23rd May 2013	Letter
Tourism WA	23rd May 2013	Letter
Carnarvon Tourism Alliance	23rd May 2013	Letter
	6th June 2013	Meeting
Yamatji Marlpa Aboriginal Corporation	23rd May 2013	Letter

executive summary

Babbage and Whitlock Islands ("the islands") have been identified by the Shire of Carnarvon as a significant and unique site within the context of the broader town. There have, over 10-15 years, been several attempts to prepare a plan for the islands; however none have come to fruition. Some preliminary structure planning has occurred, but without a comprehensive analysis of the opportunities and constraints to underpin the concepts being explored.

The Structure Plan applies to the full extent of Babbage and Whitlock islands and comprises:

1. Part One – Statutory Section

This section contains the structure plan map and statutory provisions and requirements.

2. Part Two – Non-statutory (explanatory) section

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

PURPOSE AND INTENT OF THE STRUCTURE PLAN

Development of Babbage and Whitlock islands will reflect community sentiment and take into account the unique location of the islands, coupled with their environmental. To achieve this, development will occur in a sustainable and eco-friendly manner – concepts which form the basis of the Structure Plan.

The Structure Plan proposes a range of precincts that will guide land use and development across the islands over time. To achieve the **purpose** and **intended character** the following precincts are proposed:

LAND USE PRECINCT	SUMMARY OF INTENT
Low Density Residential	<ul style="list-style-type: none"> Recognise the existing residential uses on the island as legitimate uses, and restricting further development of this type.
Tourism and Independent Living	<ul style="list-style-type: none"> Encourage the development of a unique, largely self-contained high-end tourist facility with close proximity to the Carnarvon town site that provides a unique tourist experience. Provide for a land use that is not currently provided for in the broader Carnarvon region, comprising a self-contained 'lock and leave', centrally managed long term accommodation option aimed primarily at retirees. Development based on R40 residential density and adaptable housing standards.
Camping	<ul style="list-style-type: none"> Low end tourist accommodation (RV Caravan Park) with access to coastal foreshore areas and water views.
Conservation	<ul style="list-style-type: none"> Areas of high conservation value, including wetlands, mangroves and areas of good quality remnant vegetation.

Foreshore and Low-Key Recreation Nodes

- Foreshores to remain largely undeveloped and managed for limited public access for recreation purposes.
- Low-key recreation nodes located at strategic coastal locations.
- Extended 'loop' shared path/trail around both islands with identified beach access and coastal infrastructure.
- Public Golf Course (nine holes with club house facilities).

Heritage

- Recognise the Aboriginal and European heritage of the islands and their connection to the Carnarvon town-site.
- Promote land uses that will complement these heritage values.

Golf Course

- Golf Course with access available to the public.

IMPLEMENTATION

The Babbage and Whitlock islands Structure Plan shall be adopted by the Shire of Carnarvon Council and the WAPC as a strategic document that will form the basis of decision-making by the Shire and WAPC until such time as the Shire's Local Planning Scheme is amended to specifically include provisions for the statutory adoption of Structure Plans.

Once the Local Planning Scheme is amended the Babbage and Whitlock islands Structure Plan shall be adopted as a Statutory Structure Plan under the scheme.

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Prepared by

Land Insights

1/1 Alvan Street, Mt Lawley WA 6052
PO Box 289, Mt Lawley WA 6929

Phone (08) 9271 8506

Fax (08) 9370 5786

Document details

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PART ONE STATUTORY SECTION

statutory section

1.1 STRUCTURE PLAN AREA

This Structure Plan applies to Babbage and Whitlock islands, being the land contained within the inner edge of the line denoting the structure plan boundary on the structure plan map (Figure 1.1).

1.2 STRUCTURE PLAN CONTENT

This structure plan comprises:

1. Part One – Statutory Section

This section contains the structure plan map and statutory provisions and requirements.

2. Part Two – Non-statutory (explanatory) section

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

Part One follows the outline as set out in the WAPC's Structure Plan Preparation Guidelines (2012) as far as practicable within the context of proposed land uses and existing scheme provisions.

The information in Part Two is based on the adopted Outcomes Report and includes a description of the planning background, physical and biological features, services and infrastructure and an assessment of the opportunities and constraints.

1.3 INTERPRETATION AND SCHEME RELATIONSHIP

Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the Shire of Carnarvon Town Planning Scheme No. 10 (the Scheme) including any amendments gazetted thereto.

The structure plan map (Figure 1.1) outlines proposed land use precincts applicable within the structure plan area.

1.4 OPERATION

This Structure Plan shall not come into effect until such time as the Structure Plan has been adopted by the Shire of Carnarvon Council and subsequently endorsed by the Western Australian Planning Commission. It is likely that a future Local Planning Scheme may include the entire Structure Plan Area as a Special Use within the scheme, with specific reference made to this Structure Plan in the accompanying schedule. Until that time the Structure Plan shall provide guidance to Council on future land use and development within the Structure Plan area.

1.5 LAND USE PERMISSIBILITY

Permissible land uses within the Structure Plan area shall be in accordance with the Shire of Carnarvon Town Planning Scheme, unless as modified in the table below.

Table 1.1 – Permissible Land Uses and Provisions

1. Low Density Residential	<ul style="list-style-type: none"> • Single House (P) • Home Occupation (P) • Ancillary Accommodation (P)
2. Tourist and Independent Living	<ul style="list-style-type: none"> • Subject to Local Development Plan endorsed by Council • Short Stay Accommodation (SA) • Serviced Apartment (SA) • Caretakers Dwelling (IP) • Grouped Dwelling – as detailed in Section 1.6
3. Foreshore Reserve/Low Key Recreation Node	<ul style="list-style-type: none"> • Recreation • As detailed in Section 1.6
4. Heritage	<ul style="list-style-type: none"> • Subject to Local Development Plan endorsed by Council
5. Camping Area	<ul style="list-style-type: none"> • Camping Area • Caravan Park (Restricted – as detailed in Section 1.6)
6. Storm Surge Inundation Risk SCA	<ul style="list-style-type: none"> • As detailed in Section 1.6.
7. Conservation	<ul style="list-style-type: none"> • Subject to the provisions of the 'Parks and Recreation' requirements of TPS10
8. Golf Course	<ul style="list-style-type: none"> • Recreation (P) • Private Club (IP) • As detailed in Section 1.6
9. Tramway	<ul style="list-style-type: none"> • As detailed in Section 1.6

1.6 DEVELOPMENT REQUIREMENTS

The following development requirements relate to the future use and development of the land subject to this Structure Plan:

1. Land Use and Development within the **Tourism and Independent Living** and **Heritage** precincts shall be guided by a future **Local Development Plan**. The **Local Development Plan** shall generally accord with the R40 Grouped Dwelling provisions of the Residential Design Codes. Any **Local Development Plan** is to be endorsed by Council.
2. Any **Local Development Plan** prepared for the **Tourism and Independent Living** precinct shall have regard to best practice sustainability outcomes, incorporating renewable energies and recycling, environmentally-sensitive design, construction and ongoing management, and self-containment.
3. Development within the **Camping** precinct shall be low key and avoid the development of permanent structures. *Parking of caravans within this area shall not be permitted however temporary/short term parking of RV's shall be permitted.*

4. Development within the **Storm Surge Inundation** Special Control Area shall have regard to the protection of life and property to the satisfaction of the Shire of Carnarvon.
5. Any **Local Development Plan** shall be supported by the following management plans, as applicable. These are to be prepared to the satisfaction of the relevant authority and provided as supporting documentation:
 - a. Local Water Management Strategy
 - b. Transport Assessment
 - c. Infrastructure and Servicing Report
 - d. Environmental Impact Assessment
 - e. Bushfire Management Plan
 - f. Coastal Hazard Risk Management and Adaptation Plan
6. No development shall be permitted within the **Tramway** precinct. Public access shall be continuously provided for.
7. Low Key Recreation Nodes shall comprise primarily of Shire-managed infrastructure to facilitate enjoyment of the nodes by the public. Consideration should be given to picnic facilities and controlled beach access.
8. Any Local Development Plan prepared for the golf course shall ensure that public access is maintained, and consider the inclusion of any associated sports and leisure uses and related infrastructure.

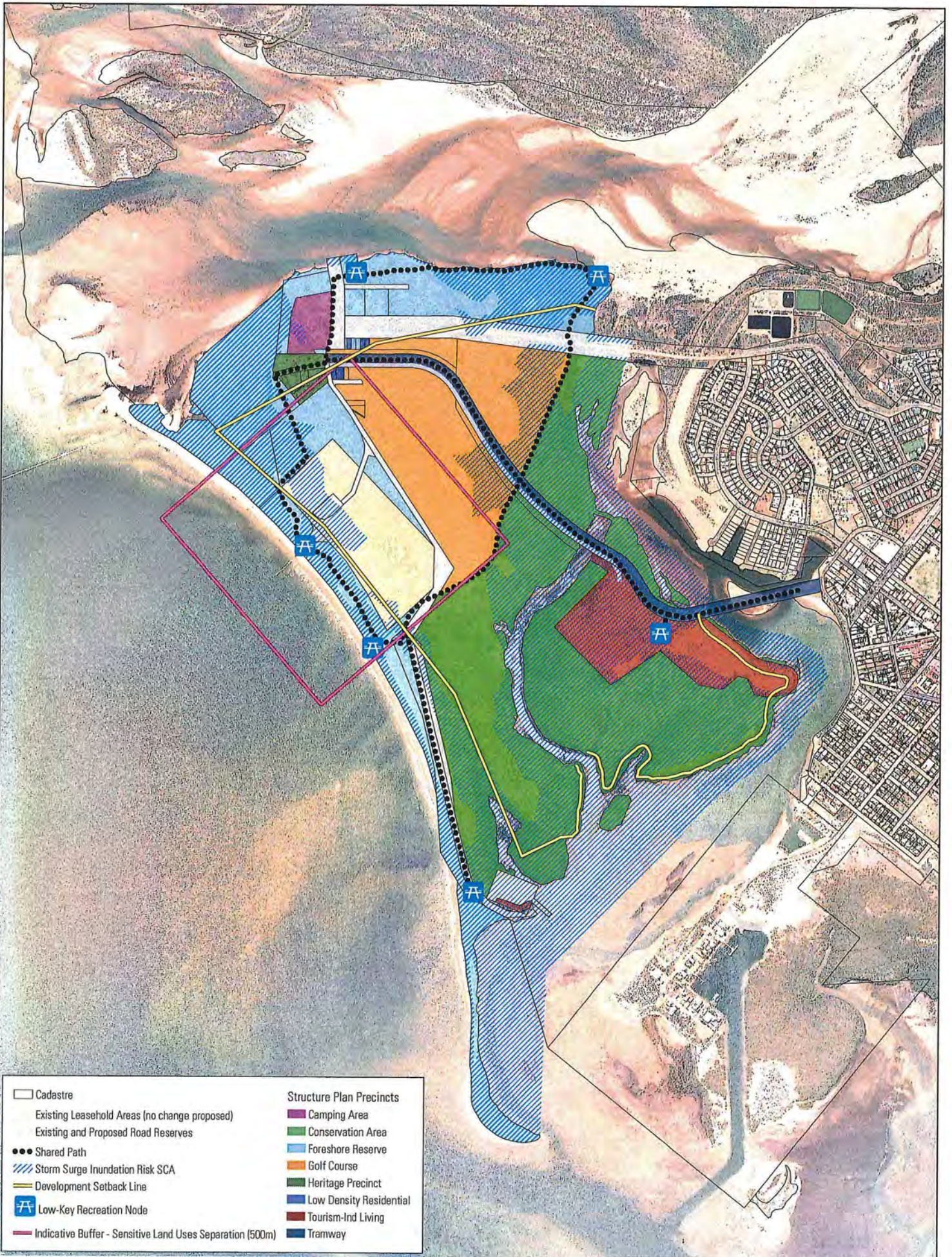
1.7 LOCAL DEVELOPMENT PLANS

Local Development Plans are required, as a minimum, to address the following of any particular site:

- The topography
- The vegetation
- The existing major road systems
- The location and width of proposed major roads and cycleway systems
- The approximate location of the recreation and open space proposed
- The population, residential densities and detailed subdivision standards proposed, including the location of appropriate 'Residential Planning Code' densities
- The basic layout of a sewerage system
- The layout of comprehensive drainage both land and stormwater
- Land holdings adjacent to and including the area subject of the application
- The development proposed, the method of carrying out the development and the projected times of completion of each stage of development
- Such other information as may be required by Council.

1.8 INCONSISTENCIES OR CONFLICT

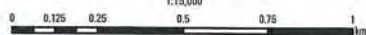
In the event of there being any inconsistencies or conflict between the Structure Plan and any other document once the Structure Plan has been adopted, the provisions of the Structure Plan shall prevail.



- | | |
|--|---|
| <ul style="list-style-type: none"> □ Cadastre Existing Leasehold Areas (no change proposed) Existing and Proposed Road Reserves ●●● Shared Path Storm Surge Inundation Risk SCA — Development Setback Line Low-Key Recreation Node Indicative Buffer - Sensitive Land Uses Separation (500m) | <p>Structure Plan Precincts</p> <ul style="list-style-type: none"> Camping Area Conservation Area Foreshore Reserve Golf Course Heritage Precinct Low Density Residential Tourism-Ind Living Tramway |
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PART TWO EXPLANATORY SECTION

context

Babbage and Whitlock Islands ("the islands") have been identified by the Shire of Carnarvon as a significant and unique site within the context of the broader town. There have, over 10-15 years, been several attempts to prepare a plan for the islands; however none have come to fruition. Some preliminary structure planning has occurred, but without a comprehensive analysis of the opportunities and constraints to underpin the concepts being explored.

Within this context, the Shire of Carnarvon has commissioned the preparation of a Structure Plan for the islands to guide planning, development and environmental management for the next 15 years. The aim of the Structure Plan is to provide firm direction in the areas of planning, development and infrastructure and provide guidelines to assist decision-makers and developers. The preparation of the Structure Plan will, by completion, have resulted in a comprehensive analysis of the following:

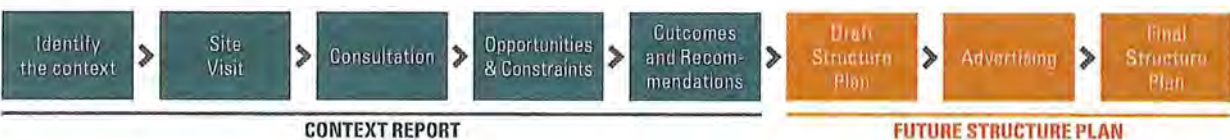
- Existing land uses
- Capacity of existing services and infrastructure
- Environmental constraints
- Heritage values
- Ownership
- Tourism and recreation potential.

2.1 THE ISLANDS

Babbage and Whitlock Islands are located off the west coast of Australia, to the west of the Carnarvon town site. They are separated from the mainland by a waterway known as the Fascine. The waterway used to provide complete separation of the islands from the mainland, however they are now connected at the northern end of Babbage Island by the Causeway Bridge/Babbage Island Road. The two islands are separated by Whitlock Creek.

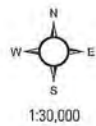
2.2 KEY STEPS UNDERTAKEN

Preparation of this report required a comprehensive review of all available literature and data on the Islands, consultation with stakeholders and the community for additional information on the history, land use and issues, and a site visit to observe opportunities and constraints first hand.





Structure Plan Boundary
 Cadastre



3. THE STRUCTURE PLAN EXPLAINED



structure plan purpose

3.1 STRUCTURE PLAN PURPOSE

Development of Babbage and Whitlock islands will reflect community sentiment and take into account the unique location of the islands, coupled with their environmental. To achieve this, development will occur in a sustainable and eco-friendly manner – concepts which form the basis of the Structure Plan.

3.2 INTENDED CHARACTER

Future development and land use on Babbage and Whitlock Islands should focus on tourism, heritage (Aboriginal and European), public recreation and independent living in consideration of the natural landscape, environmental constraints, and renewable energy and re-use opportunities and sustainable design principals.

The draft Structure Plan reflects these land uses and parameters in consideration of the stated purpose with an approach to clustering development to minimise environmental and visual impact, building design guidelines.

3.3 RELEVANT GOVERNMENT POLICY

Several existing policy statements apply to the Structure Plan.

These are considered in Table 3.1 below.

POLICY	COMMENT
State Planning Policy 2 – Environment and Natural Resources Policy	Complies Section 6 of the Structure Plan outlines the various natural features of the islands in recognition of State Planning Policy 2 – Environment and Natural Resources. The intent of each precinct in the Structure Plan is focussed on preserving the unique natural features of the islands.
State Planning Policy (SPP) 2.6 – State Coastal Planning Policy	Complies The Structure Plan adopts a conservative approach to coastal management by proposing a Special Control Area for Storm Surge Inundation and a 100 year Coastal Setback line. The data used has been sourced primarily from the Gascoyne Coast Vulnerability Report, prepared for the Department of Planning. One of the key outcomes of the Gascoyne Coast Vulnerability Report was that the strategy preferred by SPP 2.6 to “Avoid” inundation and erosion hazards over the next 100 years is likely to be impractical. Therefore the town (including Babbage and Whitlock Islands) requires risk management of coastal hazards, using the CHRMAP framework suggested by SPP 2.6. Due to the more site-specific nature of the shoreline change analysis previously undertaken, it might be considered suitable for a CHRMAP, with an “upper limit” for planning considerations in accordance with SPP2.6 default setback allowances.

State Planning Policy 3.5 – Historic Heritage Conservation	Complies Section 6.7 of the policy refers to the need to consider heritage places and areas when formulating schemes and strategies. By extension, this policy requirement also applies to Structure Plans that will be adopted under a scheme or inform the preparation of a strategy. The Structure Plan incorporates a Heritage Precinct that identifies and reflects the key heritage elements of the islands.
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State Planning Policy 2.9 – Water Resources	Complies Available information on water resources has been included in Section 6.6 of the Structure Plan – addressing groundwater and surface water characteristics as well as flood management. Given the coastal location of the islands there is somewhat of an overlap between the requirements of this policy and those of State Planning Policy 2.6. The Development Requirements (Section 1.6) and Local Development Plan requirements (Section 1.7) of the Structure Plan require consideration of water management strategies and drainage requirements.
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State Planning Policy 3.4 – Natural Hazards and Disasters	Complies The Structure Plan addresses the hazards identified by the policy that have a chance of occurring within the Structure Plan area, including flood risk, bush fire hazard, storms and storm surge, and coastal erosion.
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State Planning Policy 6.3 – Ningaloo Coast	Complies The Structure Plan recognises and promotes the objectives and Guiding Principles of the policy by promoting the islands as a community resource focusing on tourism and recreation, while being cognisant of the natural features of the site. This Structure Plan updates the proposals within the existing Carnarvon Structure Plan as they apply to the site – and by doing so further promote the tourism and recreation focus of the islands.
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Draft Country Sewerage Policy.	Complies The policy requirements for ‘remote or isolated subdivision or development’ are met via the Structure Plan provisions limiting low density residential development to those lots already developed on the islands. Any other development proposed on the islands would likely constitute ‘density development’ for the purposes of the policy. These areas are subject to the Development Requirements (Section 1.6) and Local Development Plan requirements (Section 1.7) of the Structure Plan, which require consideration of infrastructure and servicing, including the basic layout of a sewerage system. Furthermore, there is a requirement under each of the relevant Land Use Precinct ‘Future Actions’ to liaise with the Department of Health and Department of Environment Regulation regarding the provision of wastewater infrastructure systems.
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3.4 LAND USE PRECINCTS

The Structure Plan proposes a range of precincts that will guide land use and development across the islands over time. To achieve the purpose and intended character the following precincts are proposed:

Table 3.2 – Precinct intent

LAND USE PRECINCT	SUMMARY OF INTENT
Low Density Residential	<ul style="list-style-type: none"> Recognise the existing residential uses on the island as legitimate uses, and restricting further development of this type.
Tourism & Independent Living	<ul style="list-style-type: none"> Encourage the development of a unique, largely self-contained high-end tourist facility with close proximity to the Carnarvon town site that provides a unique tourist experience. Provide for a land use that is not currently provided for in the broader Carnarvon region, comprising a self-contained 'lock and leave', centrally managed long term accommodation option aimed primarily at retirees. Development based on R40 residential density and adaptable housing standards.
Camping	<ul style="list-style-type: none"> Low end tourist accommodation (RV Caravan Park) with access to coastal foreshore areas and water views.
Conservation	<ul style="list-style-type: none"> Areas of high conservation value, including wetlands, mangroves and areas of good quality remnant vegetation.
Foreshore and Low-Key Recreation Nodes	<ul style="list-style-type: none"> Foreshores to remain largely undeveloped and managed for limited public access for recreation purposes. Low-key recreation nodes located at strategic coastal locations. Extended 'loop' shared path/trail around both islands with identified beach access and coastal infrastructure. Public Golf Course (nine holes with club house facilities).
Heritage	<ul style="list-style-type: none"> Recognise the Aboriginal and European heritage of the islands and their connection to the Carnarvon town-site. Promote land uses that will complement these heritage values.
Golf Course	<ul style="list-style-type: none"> Golf Course with access available to the public.

LOW DENSITY RESIDENTIAL

INTENT

Recognise the existing residential uses on the island as legitimate uses, and restricting further development of this type.

KEY POINTS

- Provision of long-term security for existing low-density residential uses that have existed on Babbage Island for many years.
- Clearly articulating that a similar form of low-density residential development will not be permitted elsewhere on the islands.

RATIONALE

A small pocket of low density residential development has existed on Babbage Island for many years, comprising four freehold lots. These lots form the basis of the precinct. The inclusion of this precinct recognises the long-term low density use of this small area of the island and provides for the use to continue indefinitely. Development within the precinct has been limited to R10, which taken into account with the existing lot sizes, will limit any further subdivision.

It should be noted that other areas of the town are also being considered in separate Structure Plans currently, with a particular consideration of residential growth and infill areas. On a review of information currently available it is apparent that further residential development in addition to that described above will not be a viable or desirable outcome due to:

- current growth rates of the Shire and the town
- possible future land releases in Carnarvon
- the likely high cost of development on the islands
- the desire to protect the character and environmental features of the islands.

FUTURE ACTION

No future action is required.

TOURIST DEVELOPMENT AND/OR INDEPENDENT LIVING ACCOMMODATION

INTENT

Encourage the development of a unique, largely self-contained high-end tourist facility with close proximity to the Carnarvon town site that provides a unique tourist experience.

Provide for a land use that is not currently provided for in the broader Carnarvon region, comprising a self-contained 'lock and leave', centrally managed long term accommodation option aimed primarily at retirees.

Development based on R40 residential density and adaptable housing standards (mindful of Storm Surge SCA).

A boutique tourist facility (ie. public hot springs coupled with water playground).

Recognise the existing tourist use at Pelican Point.

KEY POINTS

- Promote the development of a 4-5 star tourist accommodation centred on Whitlock Island, with an excellent pedestrian linkage to town-site via Tramway Bridge.
- Support access to Fascine for commercial tourism operator to provide boat/marine activities.
- Development to be subject to future Local Development Plan to incorporate a public tourism component.

- A 10 hectare site has been identified. There will be a need to liaise with Department of Lands to determine appropriate size in accordance with future operator and release land for freehold purchase. Remainder to be incorporated into a reserve.
- Meet the needs of permanent/semi-permanent residents in the Shire, including retirees who base themselves in the town for winter months to explore the broader region.
- Provision of a self-contained and centrally-managed facility.

RATIONALE

Tourism

The Structure Plan proposes that the precinct provides the opportunity for the development of a 4 (or possibly) 5 star beachside resort on Whitlock Island which could be coupled with a range of recreational activities, as well as independent living/retirement housing. The Structure Plan also recognises the existing tourist site at Pelican Point.

The scale, mix and timing of development are difficult to predict – considering that all previous attempts have failed based on the cost of extending services to support development. Nevertheless, the Structure Plan provides the framework for this style of development that will enhance Carnarvon as a destination in its own right, as well as providing the local community with a form of accommodation that is not currently available within the broader town.

It is expected a resort will provide high quality facilities and activities which will mean that people can travel specifically to Carnarvon for a holiday. The recreational facilities could also be open to the public to ensure sustained use and offset construction and operational costs. The Structure Plan proposes that this be achieved with a public golf course managed by the local golf club with participation and contribution from the resort operator.

Management of Whitlock Island should recognise that there is different capacity for management of inundation and erosion hazards.

Inundation can be suitably managed through the identification of suitable levels for development and access pathways.

An emergency management plan, considering flood risk identification, warning systems and evacuation paths should be developed.

Erosion setbacks along the Whitlock Island shore are less readily managed, as any form of intervention is likely affect another section of shore.

Coastal erosion on the western side of Babbage Island, including Pelican Point, was extrapolated from patterns of coastal change following the last major river deposition phase (i.e. the subsequent erosive phase). Due to the potential for large volumes of sediment to be deposited by the Gascoyne River, the coastal setback therefore represents a conservative position, as it effectively assumes a permanently reduced sediment supply to this section of coast. This suggests that it may be feasible for the Pelican Point area to be managed under a CHRMAP framework for a number of decades, although not indefinitely.

Steps that may be required if the erosion progresses:

- 1) Eastward relocation (or protection) of the road leading to Pelican Point;
- 2) Construction of an alternative access, located further to the east, with a bridge structure to ensure tidal flow into the mangroves
- 3) Possible future removal of existing structures and potential abandonment of the site.

Independent Living

Based on the recent Verso report on aged care and independent living needs commissioned by the Shire there appears to be an emerging industry demand for this form of housing in the broader Gascoyne and Pilbara regions given the changing demographics towards an aging population. At present there is little capacity to accommodate current demand, and while there are plans to further develop the Gascoyne Memorial Foundation (GMF) site and part of the adjoining Brockman Park for this purpose, it is suggested a longer term opportunity exists to foster additional development on Babbage and Whitlock islands to meet future demand. It is noted that some retirees at present stay in caravan parks across the Gascoyne Region for extended periods during the winter months or while travelling and might prefer a permanent base in Carnarvon which offers an ideal climate and lifestyle.

Services

The islands are not currently well serviced with power, water, gas or wastewater. Previous feasibility studies for the proposed development on northern Whitlock Island found that costs could exceed millions of dollars to provide power, water and gas from the mainland. It was decided that this made any future development on the islands unfeasible. As a result, if development is to proceed within this precinct, the provision of services and infrastructure should be considered in the light of using renewable technologies and low maintenance materials.

FUTURE ACTION

1. Liaise with the Department of Lands to secure the conversion of UCL in the identified precinct to an appropriate tenure.
2. Liaise with the Department of Lands to alter the purpose of a portion of Reserve 18445 (as depicted on the plan) to allow the development of a golf course; and subsequently issue the Shire of Carnarvon with the Management Order for the reserve, incorporating a power to lease.
3. Prepare a Local Development Plan to control and guide future development of the area allocated for tourist use, which may include meeting and/or function space to accommodate meetings, incentives, conferences and exhibition.
4. Prepare an Environmental Management Plan in accordance with the requirements of EPA Bulletin 703 (Recommendation 2).
5. Support the owner of the Pelican Point tourist site in progressing a Local Development Plan that considers future use and development of the site, taking into account shoreline movement and storm surge.
6. Liaise with the Department of Health and Department of Environment Regulation regarding wastewater infrastructure systems to service the precinct.

CAMPING

INTENT

Low end tourist accommodation (RV Caravan Park) with access to coastal foreshore areas and possible water views;

KEY POINTS

- Provides a low-key tourist park at a unique coastal location in the Shire with good proximity to the Carnarvon town-site.

- Facilitates low-key camping.
- Caters for a limited number of larger recreational vehicles that cannot be easily catered for elsewhere.
- Regular caravans encouraged to use existing sites east of town-site.

RATIONALE

Currently, there is nowhere for visitors to stay as camping is prohibited on the islands and the only formal accommodation is provided at Pelican Point. In this context the Structure Plan is promoting the development of a specialised Camping Ground to cater for low-key camping and that can also accommodate larger recreational vehicles. The development of the area for a Camping Ground differs from a typical Caravan Park as found elsewhere in the Shire and will therefore not necessarily compete for patronage.

FUTURE ACTIONS

1. Liaise with Department of Lands to have the precinct (currently UCL) created as a reserve and allocated to the Shire of Carnarvon, ensuring that the Management Order allows for the Shire to lease the land.
2. Liaise with the Department of Health and Department of Environment Regulation regarding wastewater infrastructure systems to service the precinct.

FORESHORE RESERVE, RECREATION NODES AND GOLF COURSE

INTENT

Foreshores to remain largely undeveloped and managed for limited public access for recreation purposes.

Low-key recreation nodes located at strategic coastal locations.

Extended 'loop' shared path/trail around both islands with identified beach access and coastal infrastructure.

Public Golf Course (nine holes with club house facilities).

KEY POINTS

- Foreshore Reserves are established around the island that facilitate public access and appropriate management
- Public Golf Course (nine holes with club house facilities) to be associated with tourist/independent living precinct.
- Identified nodes of low-key recreation development are developed at appropriate locations around the islands
- A Shared Path network is established providing a pedestrian and cycle network
- Whitlock Island Road closed and incorporated into adjoining reserve.

RATIONALE

As outlined earlier, the Structure Plan proposes the development of a nine-hole shared golf course that can be managed by the local golf club with participation and contribution from a future resort operator. It is anticipated that the golf club will comprise associated ancillary structures such as club rooms. The extent of the proposed golf course is depicted on the Structure Plan.

A network of Shared Paths linking the tourist node with other key locations around the island and the Tramway Bridge is also proposed. This provides for controlled access to key locations and allows visitors and users of the islands the ability to interact and experience the locality in a manner that may not otherwise be possible.

Several foreshore sites have been identified for low-key recreation nodes. These would typically provide basic levels of public infrastructure, such as toilet facilities, bike parking, bird hides and managed access to the adjoining beaches in relevant locations.

It is proposed that the tenure of the Foreshore Reserves adjacent to the Gascoyne River are modified so that Management Order lies with the Department of Water. The Shire will seek the Management Order for the remaining Foreshore Reserves, namely those abutting the coast.

FUTURE ACTIONS

1. Liaise with the Department of Water or any other suitable agency to seek their support to accept a Management Order for the portion of Reserve 18445 abutting the Gascoyne River (this may result in the creation of a new reserve across this area).
2. Liaise with Department of Lands to change the purpose of the reserve from Government Requirements to Foreshore.
3. Liaise with Department of Lands to change the purpose of the western portion of the reserve from Government Requirements to Foreshore.
4. The Shire of Carnarvon to accept the Management Order for this portion of the reserve (this may result in the creation of a new reserve across this area).
5. Liaise with the Department of Health and Department of Environment Regulation regarding wastewater infrastructure systems to service the precinct.
6. Prepare a Local Development Plan to control and guide future development of the area allocated for golf course, which may include associated sports and leisure uses and its related infrastructure.

CONSERVATION

INTENT

Areas of high conservation value, including wetlands, mangroves and areas of good quality remnant vegetation.

KEY POINTS

- Important mangrove areas and good quality vegetation protected from development
- Mechanism for appropriate management to be developed and implemented.
- Access to be controlled.
- Golf Course to be established in an environmentally-sensitive manner.

RATIONALE

A majority of the islands have been relatively undisturbed, and, as such, consist of vegetation in Very Good condition. The vegetation not only has intrinsic environmental value, it also provides important habitat

for native fauna, including nursery areas within the mangroves for fish and feeding areas on the tidal flats for waterbirds. Pristine areas also attract tourists who are seeking an escape from the urban environment and new residents who want to live closer to nature. Therefore, it is important to retain and preserve the natural environment when entertaining future development and new land uses.

The Shire does not have the resources or expertise to adequately plan for and manage areas of environmental significance. As a result the Structure Plan proposes that the areas identified for Conservation, broadly aligning with a large extent of Reserve 18445, be managed by the Department of Parks and Wildlife (subject to their willingness to accept the Management Order).

It is acknowledged that the proposed nine-hole golf course will be located over a low-lying and partly vegetated area. In developing the plans for the golf course it will be important to ensure that the facility has a small footprint and is developed as far as practicable, to minimise environmental impact. In this regard it is suggested that the design seek to maintain natural contours of the land and avoid removal of vegetation outside each of the nine holes. It is also suggested the proposed club rooms be co-located within the broader recreation and tourism node previously discussed.

FUTURE ACTIONS

1. Liaise with the Department of Parks and Wildlife or any other suitable agency to seek their support to accept a Management Order for the central portion of Reserve 18445 as depicted on the plan (which may need to be allocated to a new reserve).
2. Liaise with Department of Lands to change the purpose of the reserve from Government Requirements to Conservation.
3. Ensure that the proposed nine-hole golf course is appropriately designed for the unique conditions of Babbage Island, including minimising modification of the landscape and vegetation.

HERITAGE

INTENT

Recognise the Aboriginal and European heritage of the islands and their connection to the Carnarvon town site

Promote land uses that will complement these heritage values

KEY POINTS

- The heritage values of the islands, particularly focussing on the identified precinct, are protected.
- Carnarvon Heritage (with appropriate support from the Shire) remains responsible for the day-to-day management of the Heritage Precinct.
- The Yamatji Marlpa Aboriginal Corporation is consulted as part of detailed planning in other areas of the islands where appropriate.

RATIONALE

The heritage of the islands remains an important element of their character. The tramway leading from the Carnarvon town-site to the heritage precinct will be protected by the Structure Plan. Furthermore, the heritage precinct itself will come under the day-to-day management of Carnarvon Heritage.

It is proposed that two existing reserves, namely Reserve 24107

(Historic Museum Site; Management Order with Shire of Carnarvon) and Reserve 8952 (Navigation Beacon Site; Management Order with the Minister for Transport) be allocated to Carnarvon Heritage to consolidate the ongoing management of the site.

The Yamatji Marlpa Aboriginal Corporation has confirmed the Aboriginal significance of the islands and recommended against significant development, with instead a focus on the ongoing preservation of heritage and environmental values, supported by recreational use for the broader community. These suggestions have assisted in providing a broad direction to future land use and development across the islands, with more intensive development being restricted to smaller areas. In this regard, it is highly recommended that the Yamatji Marlpa Aboriginal Corporation be further consulted over time as Local Development Plans for particular nodes are developed to ensure that local Aboriginal heritage issues are considered and incorporated into detailed design.

FUTURE ACTIONS

1. Liaise with Carnarvon Heritage or any other suitable agency to seek their support to accept a Management Order for the portion of Reserve 24107, Reserve 8952 and Lot 627.
2. Liaise with the Yamatji Marlpa Aboriginal Corporation during the preparation of Local Development Plans as required by the Structure Plan.
3. Finalise and endorse a Local Development Plan for the identified Heritage Precinct.

3.5 MOVEMENT NETWORK

Investigations into road access to the islands reveals that Babbage Island Road and all intersection are appropriate. Additional access points from the mainland are problematic and not recommended, particularly given the scale of development proposed on the islands. As a result there are no changes proposed to Babbage Island Road.

The existing Whitlock Creek Road is not contained within a road reserve and is largely unconstructed. It traverses an area to be used for the nine-hole golf course and adjacent Conservation reserve and as such is recommended for closure.

Access to the tourism node, incorporating the tourist accommodation, independent living precinct and public recreation area, is proposed via a new road from the intersection of Babbage Island Road and Anear Place, running east within the Tramway Reserve. A four-way intersection treatment will be required at the intersection.

Pedestrian access is presently obtained via Tramway Bridge and along the old tramway line which runs through the centre of the islands and leads towards One Mile Jetty. The Structure Plan proposes the development of an island-wide trail, linking the tourism node and Tramway Bridge with other key sites around the island.

3.6 PUBLIC INFRASTRUCTURE

The islands are not currently well serviced with power, water, gas or wastewater. Feasibility studies for the proposed development on northern Whitlock Island previously found that costs could exceed millions of dollars to provide power, water and gas from the mainland.

As discussed earlier, development within the tourism node in particular

should be considered in the light of using renewable technologies and low maintenance materials. Alternatively, a development that does not require extension of services from the mainland could be considered, depending on economics.

3.7 STORM SURGE SETBACK SPECIAL CONTROL AREA AND DEVELOPMENT SETBACK

The Structure Plan designates a storm surge Special Control Area (sourced from the Gascoyne Coastal Vulnerability Report), which ideally should be included as a Special Control Area in the future Town Planning Scheme. The setback area corresponds to the modelled flood extent of an extreme Tropical Cyclone after a sea level rise of 0.88 metres. A Development Setback line is also proposed, which corresponds to the 'Shoreline Movement – 100 year' line as determined by the Gascoyne Coastal Vulnerability Report.

The Special Control Area identified in Figure 3.7 identifies areas that are potentially at risk of inundation during a severe tropical cyclone impact, coincident with high tide, and includes an allowance for projected sea level rise over the next 100 years. Following from the State Coastal Planning Policy (WAPC 2013), this hazard may not preclude development from occurring in these areas, but requires appropriate means of flood risk mitigation to be incorporated into development design.

The required level of mitigation varies throughout the flood hazard area due to potential depth and speed of flooding, the potential for isolation due to flooding, and the possible effects of coastal erosion. A preliminary indication of requirements is suggested by the Table below. However, definition of the areas associated with these hazard domains requires full development of a flood hazard management strategy, which incorporates an evacuation plan, flood defence infrastructure and building design guidelines.

Table 3.3 – Mitigation of Flooding Hazards

HAZARD DOMAIN	POTENTIALLY APPROPRIATE LEVEL OF MITIGATION	INAPPROPRIATE MITIGATION
Flood Hazard Area (possible isolation, but above flood level)	Warning System & Evacuation Plan; Building Design Guidelines (flood-proofing)	
Flood Hazard Area Fringe (<0.3m deep)	Evacuation Plan; Minimum Building Floor Levels; Minor Lot Filling; Building Design Guidelines (flood-proofing); Wave defence structures;	
Flood Hazard Area (slow flooding, >0.3m deep)	Evacuation Plan; Lot retaining*; Building Design Guidelines (flood-proofing); Flood defence structures; Piled buildings*	Minor Lot Filling;
Flood Hazard Area (rapid flooding, >0.3m deep)	Warning System & Evacuation Plan; Building Design Guidelines (armouring & flood-proofing); Flood defence structures**; Piled buildings*	Minor Lot Filling; Lot retaining;

Flood Hazard Area (erosion prone)	Do not develop. Any infrastructure requires armouring.	Mitigation is not considered appropriate.
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* Lot retaining and piled buildings must consider potential implications of design event exceedance. ** Flood defence structures must consider potential implications of design event exceedance, using overflow pathways.

The Development Setback line on Figure 3.7 shows the extent of coastal erosion over a 100 year period assuming a sea level rise of 0.88m.

Development within this area will need to be subject to adaptation or protection measures to reduce any potential risk to an acceptable or tolerable risk in accordance with the requirements of State Planning Policy 2.6. Any new development within these areas should be avoided if possible.

FUTURE ACTIONS

1. Incorporate the Special Control Area into the Local Planning Scheme.

3.8 TENURE MODIFICATION

The Structure Plan proposes significant changes to tenure across the island. The proposed changes have been addressed earlier in this Section, however to gain an appreciation of how the tenure across the island may appear once the Structure Plan is implemented a summary is provided on Figure 3.9. A summary of changes is provided in Table 3.4 below.

Table 3.4 – Tenure modifications

TENURE	AREA	LOCATION	CURRENT OWNERSHIP	PROPOSED OWNERSHIP
Unallocated Crown Land	27ha	Northern side of Whitlock Island.	N/A	Shire of Carnarvon
Reserve 18445 (Lot 301)	228ha	Remainder of Whitlock Island and central area of Babbage Island.	Not vested. Purpose – Government requirements	Shire of Carnarvon Department of Parks and Wildlife Department of Water
Reserve 28553 (Lot 1048)	6.6ha	Along either side of the road through Babbage Island.	Shire of Carnarvon. Purpose – recreation.	Shire of Carnarvon
Reserve 35555 (Lot 1199)	0.056ha	Southern end of Babbage Island.	Shire of Carnarvon. Purpose – parking	Shire of Carnarvon
Lot 1310 (P191833)	2.54ha	Southern end of Babbage Island.	Private	Private
Lot 1312 (P191833)	0.45ha	Southern end of Babbage Island.	State of WA	Shire of Carnarvon
Lot 626 (P206109)	26ha	Babbage Island.	State of WA	State of WA
Lot 1044 (P170870)	0.8ha	Babbage island.	State of WA	State of WA
Lot 1198 (P193764)	0.36ha	Babbage Island.	State of WA.	State of WA
Reserve 48229 (Lot 300 and 1366)	33.5ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – recreation and foreshore protection.	Shire of Carnarvon
Reserve 39476 (Lot 1233)	3.2ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – recreation and foreshore protection.	Shire of Carnarvon
Reserve 24107 (Lot 1231)	0.66ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – Historic museum site.	Carnarvon Heritage
Reserve 8952 (Lot 1232)	0.24ha	Northern end of Babbage Island.	Minister of Transport. Purpose – Navigation Beacon Site.	Carnarvon Heritage
Reserve 39483 (Lot 501)	1.37ha	Northern end of Babbage Island.	Carnarvon Heritage Group. Purpose – heritage purposes.	Carnarvon Heritage
Lot 628 (P162444)	0.133ha	Northern end of Babbage Island.	Private	Private
Lot 634 (P162444)	0.1ha	Northern end of Babbage Island.	Private	Private
Lot 637 (P162444)	0.1ha	Northern end of Babbage Island.	Private	Private
Lot 638 (P162444)	0.1ha	Northern end of Babbage Island.	Private	Private
Lot 627	1.21ha	Northern end of Babbage Island	UCL	Carnarvon Heritage
UCL (Lots 627, 630, 633, 635, 636, 643, 644, 698, 834, 1234, 3000)		Various lots throughout the northern end of Babbage Island.	N/A	Shire of Carnarvon
Lot 914 (P168739)	1.3ha	Northern end of Babbage Island.	State of WA and Shell Co of Australia.	Shire of Carnarvon
Reserve 29331 (Lot 1049)	0.7ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – Public Recreation.	Shire of Carnarvon
UCL	66ha	North-eastern side of Babbage Island.	N/A	Shire of Carnarvon
Reserve 6049 (Lot 1203)	15.7326ha	Babbage Island Tramway Reserve	Shire of Carnarvon – Historical Purposes	Shire of Carnarvon

1 Proposed ownership is a suggestion only. Liaison for future management can be with any other suitable agency as required.





Legend

- Structure Plan Boundary
- Cadastral

Structure Plan Precincts

- Tourism & Independent Living Precinct



Figure 3.2



Legend

- Structure Plan Boundary
- Cadastre
- Structure Plan Precincts
- Camping Area Precinct



1:10,000



Legend

- Structure Plan Boundary
- Cadastre

Structure Plan Precincts

- Foreshore Reserve
- Golf Course

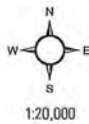
A Low Key Recreation Node





Legend

- Structure Plan Boundary
- Cadastre
- Structure Plan Precincts
- Conservation Area



1:20,000



Legend

- Structure Plan Boundary
- Cadastre

Structure Plan Precincts (V7)

- Heritage Precinct



1:10,000



Legend

- Structure Plan Boundary
- Cadastral
- Storm Surge Inundation Risk Area
- Development Setback Line



Figure 3.7
**Structure Plan - Storm Surge &
 Development Setback SCA**



Legend

- Structure Plan Boundary
- Cadastre
- A Low-Key Recreation Node
- Shared Path
- Existing and Proposed Road Reserves





	Cadastral
	Structure Plan Boundary
	Existing and Proposed Road Reserves
Structure Plan Proposed Tenure	
	Freehold
	Shire Reserve
	DPaW Reserve
	DoW Reserve
	Carnarvon Heritage Reserve
	Existing Leasehold



A long, narrow wooden pier extends from the foreground into the ocean. The pier is made of dark brown wooden planks and has a white railing on the right side. The water is a deep blue, and the sky is a clear, bright blue. In the distance, a small structure or lighthouse is visible on the horizon. The overall scene is peaceful and scenic.

4. LITERATURE REVIEW

literature review

A review of current government reports has been undertaken and relevant information identified in the table below, with an explanation on the implications on the Structure Plan. The focus of the literature review was to look at information relating to future expansion of the economy (such as mining, horticulture and tourism), the vision for future growth, the constraints to development and any other information specifically relevant to Carnarvon or the study area. It should be noted that there are a range of regional and State policies and plans that also identify a direction for development within and around Carnarvon within a broader regional context.

Figure 4.1 – Literature Review

NAME	AUTHOR	DATE	OUTCOMES	IMPLICATIONS
Future Directions: Sustainable Tourism and Land Use Scenarios for the Carnarvon-Ningaloo Coast	Department for Planning and Infrastructure	2003	Ningaloo, Coral Bay and Exmouth are the focus in this report, and Carnarvon is referred to as the regional centre, providing services such as health, education, sport and accommodation.	As the regional centre, there is potential for Carnarvon to be a tourist destination for tourists travelling along the coast.
Carnarvon Tourism Project	Carnarvon Tourism Project	2004	This report provides a clear vision of the Carnarvon Tourism Project for Babbage and Whitlock Islands. The main components of the vision include a water-front resort hotel, a golf course, tourist accommodation units and residential housing sites and transformation of the Fascine into a water playground. The project hoped to build on the existing assets within Carnarvon to create a holiday destination based around the water, heritage and environmental values.	The vision of the Carnarvon Tourism Project was identified in previous Structure Plans prepared for the islands. The ideas are still valid and will be considered in the design options.
Gascoyne Regional Development Plan	Gascoyne Development Commission Shire of Carnarvon Shire of Exmouth Shire of Shark Bay Shire of Upper Gascoyne	2010	Identifies the provision of residential land in Carnarvon to provide for future needs. It encourages any development proposals to take advantage of the coastal and waterfront areas and beaches as an attraction for residents. It identifies that key areas for development could include parts of Babbage and Whitlock Islands. Identifies Carnarvon as having an important horticultural industry, with less susceptibility to drought with better provision of water. This is expected to result in larger areas under crop and release of more land for farming which will result in more employment. Recent development at the Carnarvon Boat Harbour will result in expansion opportunities for businesses in fishing and aquaculture, also providing more employment opportunities. The report also mentions the possibility of Carnarvon being used as a base in the future for FIFO (instead of Perth as a base). It also identifies that there is potential to develop tourism products for those visitors looking for local produce and fine dining experience, more culturally oriented attractions, regional events/festivals, or a safe holiday environment for families with children.	An increase in horticulture and fishing industries will provide more job opportunities and employment, potentially resulting in a demand for employees which will bring people to the town.
Carnarvon Tourism Strategy & Carnarvon Tourism Action Plan 2012-2015	Carnarvon Tourism Alliance	2010	Identifies low-key tourism accommodation potential on Babbage Island and at the One Mile Jetty precinct. It suggests a 360 bed caravan park. Identifies Whitlock Island with potential for a resort, hotel, and serviced apartments and preferably eco-orientated due to costs of infrastructure.	The Strategy leads into proposals in the Action Plan. The main proposal relates to the importance of the Tramway bridge as a linkage to Babbage Island and this has been reflected in the Structure Plan.

NAME	AUTHOR	DATE	OUTCOMES	IMPLICATIONS
Carnarvon Strategic Community Plan	Shire of Carnarvon	2011	<p>Community consultation shows that the community highly value the heritage aspects of the town and the islands and hope to build on this to enhance the uniqueness and attractiveness of the town.</p> <p>Key issues identified include housing affordability and range, tourism infrastructure and limited employment opportunities.</p>	The lack of housing availability and tourism infrastructure could be addressed in this Structure Plan. Some employment can be provided through any recreational or tourism operations requiring staff to operate them.
Economic Development Opportunities for the Gascoyne Region associated with Resource Sector Investment and Expansion	Gascoyne Development Commission	2012	<p>This report states that Carnarvon seeks to grow its permanent population from 6,500 people to 15,000 in the medium to long term. It also states that the shire is looking towards strengthening and expanding on the main economic drivers (of horticulture, tourism, fishing, pastoral and mining) to attract more people to the town.</p> <p>It identifies that upgrades to the airport are necessary in order to allow for more FIFO which could lead to employees from the resource sector using the town as their base and permanent home.</p>	The population growth expectations will influence the demand for housing and commercial land for employment, therefore there <u>might be</u> a need to develop some housing on the islands. The Shire has other planning programs underway within existing areas to increase the available land for development. As a result it is considered that demand for housing within the Study Area is probably not warranted at this point in time.
Ningaloo Coast Regional Strategy	Department of Planning	2004	<p>The strategy specifically mentions the islands and states that they are partially protected by a conservation reserve over the mangroves, wet samphire and mobile dunes and the sandy inter-tidal shorelines on Whitlock Island.</p> <p>It states that the objective of a management for the islands is to provide public access to public open spaces and conservation areas and to detail the actions necessary to ensure maintenance of these ecosystems.</p> <p>Carnarvon isn't listed as a tourist node.</p> <p>The Carnarvon Structure Plan encourages development of residential, recreation, cultural and tourist land uses. It identifies 'tourism development' across Whitlock Island 'public open space', 'residential' and 'tourism development' across Babbage Island (subject to detailed assessment).</p>	<p>The area relevant to the Strategy covers a large area, the information relating specifically to the islands implies that the objective of the management plan is to ensure public access is provided and to conserve areas of environmental value.</p> <p>It identifies future development for residential, public use and tourism on the islands subject to detailed investigation which should be considered further in the Structure Plan.</p>
Draft Gascoyne Regional Planning and Infrastructure Framework	Department of Planning	2012	<p>One of the strategies in the draft framework is to identify sufficient and appropriately located land to accommodate growth.</p> <p>It identifies that expansion of the horticultural industry through the State Government's Gascoyne Food Bowl initiative will likely require expansion of industrial and commercial land. The provision of new water resources could expand the horticultural area by 400ha.</p> <p>It identifies the lack of services such as reticulated sewerage as a constraint to development as well as flood prone areas.</p> <p>The existing salt mine at Lake MacLeod at Cape Cuvier, north of Carnarvon, is identified as another economic contributor and identifies future plans to possibly expand the operation.</p>	The expected expansion of the horticulture area and the existing salt mine <u>could result</u> in increased employment opportunities and demand for land for development, however at this stage it is too premature to accurately determine.

NAME	AUTHOR	DATE	OUTCOMES	IMPLICATIONS
TPS No. 10	Shire of Carnarvon	1988	Zones and reserves land across the entire Shire of Carnarvon. Includes several special provisions relating to the islands, including the requirement of a Subdivision Guide Plan.	Any development on the islands needs to be undertaken in accordance with the provisions of the Scheme. It is likely, however, that the Structure Plan will identify changes to the zones and other provisions on the islands. Implications are further discussed in section 3.2.
Lower Gascoyne Carnarvon Floodplain Management Study	SKM	2002	Describes the flood hazard for the Lower Gascoyne region, providing an investigation of flood behaviour. It defines the nature of flood hazard across the floodplain by providing information on the extent, level and velocity of floodwaters, and on the distribution of flood flows.	Any development on Babbage Island needs to take into account flood management and inundation risk. This is addressed further in Section 5.
Cyclonic Inundation and Coastal Process Modelling	Department of Planning (GEMS)	2009	Report examine the impact of storm surge inundation and coastal processes at Carnarvon. The aims of the study were to determine: <ul style="list-style-type: none"> • Areas affected by cyclonic inundation; • Stability of Babbage Island spit during significant cyclonic events; • Appropriate coastal development setbacks; • Finished floor levels for development; and • Any required protection works and management strategies in order to minimise the risk of damage to future development. 	Any development on Babbage Island needs to take into account flood management and inundation risk. This is addressed further in Section 5.
State Planning Policy 2.6	Western Australian Planning Commission	2013	The policy provides guidance in relation a range of matters pertaining to coastal management, including land use change, foreshore reserves and managing coastal values.	Of particular relevance to the Structure Plan are the policy provisions relating to Building Height and Coastal Hazard Risk management and adaptation planning. These will be addressed in the Structure Plan as required. Coastal Hazard Risk and adaptation are considered in more detail in Section 5 of this report.
Babbage Island Coastal Management Progress Report	Cardno	2012	Coastal engineering review to consider options to protect a section of the coast adjacent to Pelican Point Road. Erosion has been occurring in this locality for 10-15 years and is now undermining the road and affecting access to the beach.	The report recommends several engineering solutions to improve protection of the coast and coastal infrastructure in this location. These measures are being addressed by the Shire separately to the Structure Plan, however will guide future development (if any) within this area.
Fascine Deed of Agreement	Shire of Carnarvon/ Department of Transport	1995	Agreement reached between the Shire of Carnarvon and the Department of Transport highlighting roles and responsibilities pertaining to the maintenance of the Fascine.	Ongoing agreement pertaining to the maintenance of the fascine and waterways.

NAME	AUTHOR	DATE	OUTCOMES	IMPLICATIONS
Fascine Structure Plan – Revised	Landcorp (TBB)	2004	Proposes development of Northwater and a Tourist Node on Whitlock Island, incorporating a Marina Village and Tourist Development, in addition to Marina Residential development.	Only a limited stage of Northwater has been developed to date, with the remainder to be reconsidered in terms of the suitability of canal-based residential development. No development has occurred on Whitlock Island to date, however the concepts included in the plan have and will continue to be reviewed as the current Structure Plan progresses, with a particular consideration of the suitability of canal development and the underlying geotechnical conditions of the site.
Fascine Waterways and Environs Master Plan	Hassell	2010	The Master Plan largely focuses on the townsite-side of the fascine, with a range of landscape and recreational features being proposed. A specific section of the Master Plan considers Whitlock Island, suggesting that, given the environmental sensitivity of the island, future development proposals should be limited to low impact interventions with potential to improve the vase ecological value of the island.	This concept is supported by the preliminary work completed during the preparation of this report, as well as the consultation undertaken to date. Any development on the island will need to reflect the sensitive and unique environment in which it is located.
Carnarvon Fascine Coastal Processes Review and Design Issues Report	Cardno	2011	The report provides an assessment of the coastal processes that are likely to affect the movement of sediment along the Fascine shoreline and thus provide input to the engineering design of upgrades of the assessment of the need to replace existing structures.	Findings predominantly relate to the townsite-side of the Fascine, and indicate that the Town Beach is relatively stable, however recommends maintenance dredging is required north of the Tramway Bridge. Erosion was also noted along sections of the eastern side of Babbage Island.
Carnarvon Heritage Precinct Structure Plan and Master Plan	Shire of Carnarvon/ Carnarvon Heritage Group	2004 (Structure Plan) 1998 (Master Plan)	These plans provide guidance for the future development of the heritage precinct on Babbage Island. The Carnarvon Heritage Group has been working on the development of an interpretative centre at the Heritage Precinct. At the time of writing the new \$3 million interpretive centre and licenced café was nearing completion.	The Heritage Precinct Structure Plan and Master Plan will likely form a component of this Structure Plan. Further discussions with the Carnarvon Heritage Group will likely be required to ensure that all relevant requirements are included in the plan.

5. TENURE AND LAND USE



tenure and land use

5.1 TENURE

The land uses across the islands vary from recreation to conservation to historic uses. A majority of the islands are located within reserves with purposes including recreation and foreshore protection and for government requirements. Some freehold residential lots are located at the northern end of Babbage Island. Lots 626, 1044 and 1198 are associated with Nor-West Seafoods. These lots consist of a seafood processing plant and a camping/accommodation area for employees and are subject to existing leases.

Tenure across the islands is detailed in the table below:

Figure 5.1 – Existing Tenure

TENURE	AREA	LOCATION	OWNERSHIP
Unallocated Crown Land	27ha	Northern side of Whitlock Island	N/A
Reserve 18445 (Lot 301)	228ha	Remainder of Whitlock Island and central area of Babbage Island	Not vested. Purpose – Government requirements
Reserve 28553 (Lot 1048)	6.6ha	Along either side of the road through Babbage Island	Shire of Carnarvon. Purpose – Recreation
Reserve 35555 (Lot 1199)	0.056ha	Southern end of Babbage Island	Shire of Carnarvon. Purpose – Parking
Lot 1310 (P191833)	2.54ha	Southern end of Babbage Island	Private
Lot 1312 (P191833)	0.45ha	Southern end of Babbage Island	State of WA
Lot 626 (P206109)	26ha	Babbage Island	State of WA
Lot 1044 (P170870)	0.8ha	Babbage island	State of WA
Lot 1198 (P193764)	0.36ha	Babbage Island	State of WA
Reserve 48229 (Lot 300 and 1366)	33.5ha	Northern end of Babbage Island	Shire of Carnarvon. Purpose – Recreation and foreshore protection
Reserve 39476 (Lot 1233)	3.2ha	Northern end of Babbage Island	Shire of Carnarvon. Purpose – Recreation and foreshore protection
Reserve 24107 (Lot 1231)	0.66ha	Northern end of Babbage Island	Shire of Carnarvon. Purpose – Historic museum site
Reserve 8952 (Lot 1232)	0.24ha	Northern end of Babbage Island	Minister of Transport. Purpose – Navigation Beacon Site
Reserve 39483 (Lot 501)	1.37ha	Northern end of Babbage Island	Carnarvon Heritage Group Purpose – Heritage purposes
Lot 628 (P162444)	0.133ha	Northern end of Babbage Island	Private
Lot 634 (P162444)	0.1ha	Northern end of Babbage Island	Private
Lot 637 (P162444)	0.1ha	Northern end of Babbage Island	Private
Lot 638 (P162444)	0.1ha	Northern end of Babbage Island	Private
UCL (Lots 627, 630, 633, 635, 636, 643, 644, 698, 834, 1234, 3000)		Various lots throughout the northern end of Babbage Island	N/A
Lot 914 (P168739)	1.3ha	Northern end of Babbage Island	State of WA and Shell Co of Australia
Reserve 29331 (Lot 1049)	0.7ha	Northern end of Babbage Island	Shire of Carnarvon. Purpose – Public Recreation
UCL	66ha	North-eastern side of Babbage Island	N/A
Reserve 6049 (Lot 1203)	15.7326ha	Babbage Island Tramway Reserve	Shire of Carnarvon – Historical Purposes

A large portion of UCL on the northern end of Whitlock Island was filled with sand several years ago to prepare the site for residential development. This development did not proceed (and subsequent geotechnical investigations have found that the site will need to be modified to make it suitable for residential development) and it remains UCL.

5.2 ZONING AND RESERVATIONS

The Shire of Carnarvon Town Planning Scheme No. 10 identifies a number of zones across Babbage and Whitlock Islands including:

- Residential R20 (northern end of Whitlock Island and Babbage Island)
- Residential Development (central area of Babbage Island)
- Special Use – Residential/Tourist and Reserve Uses – Babbage Island Area 1 (northern end of Babbage Island)
- Private Club and Institution – Babbage Island Area 1 (Southern end of Babbage Island and majority of Whitlock Island)
- Fascine Waterway Development (north-eastern side of Whitlock Island)
- Important Local Road Reserve (Pelican Point Road and Babbage Island Road).

There is no zone along the western side of Babbage Island. The entire Study Area is identified in the Scheme as being within a Subdivision Guide Plan Development Area Boundary. This means that any subdivision and development proposed needs to be completed in accordance with a Subdivision Guide Plan prepared in accordance with the Local Planning Scheme.

Under the current planning scheme provisions 'Appendix No.IX – Schedule. Special Use Sites' states:

SCHEDULE

LAND & PROPERTY DESCRIPTION	PRIMARY USES	DEVELOPMENTS REQUIREMENTS
2 Babbage-Whitlock areas	3.3 Residential/Tourist Reserve Uses	3.4 (See below)
3.5	(i) No development will be permitted until such time as overall Structure Planning has been carried out to the satisfaction of Council and the State Planning commission. (ii) Such Structure Planning shall incorporate the following: <ul style="list-style-type: none"> • an environmental assessment investigating coastal land forms and constraints, effluent disposal methods and foreshore management requirements. • proposed residential and tourist development types and locations. • road and servicing networks. • development staging. (iii) Upon completion, the Structure Plan shall be forwarded to the State Planning Commission for comment and ultimate endorsement. (iv) The staging of development shall be preceded by staging of zoning as and when development is ready to proceed.	

It is intended the Structure Plan will also provide a framework for possible rationalisation and updating of scheme reserves and zones across the site, and will also address the scheme requirements of 'Babbage Island Area 1' to be incorporated into the Shire draft Local Planning Scheme No.13.

5.3 RECREATION AND TOURISM

A number of historic structures are located on Babbage Island including the tramway, One Mile Jetty and the Lighthouse Keepers Cottage museum. The area is known collectively as the Carnarvon Heritage Precinct and the historic values of the area are an important attraction for tourists. A walk trail is provided alongside the old tramway all the way from the mainland through to the heritage precinct. Community consultation undertaken for the Carnarvon Strategic Community Plan in 2011 shows that the community highly values the heritage features of the islands and consider that these values give the town a unique point of interest which sets them apart from other towns on the coast. For example the Heritage Precinct Museum and One Mile Jetty is a popular tourist attraction with a new Interpretive Centre that incorporates a licenced café that is projected to increase the level of tourist interest for Carnarvon.

The islands are also used for a range of low-key recreational uses such as fishing, swimming and walking. Tourist accommodation is located at the southern end of Babbage Island (Pelican Point). A boat launching ramp is also provided at this location.

A toilet amenities block has recently been constructed on the western side of Babbage Island close to the Pelican Point area. The intention was to provide further facilities and car parking for recreational use of the beach area to the north and south. However, the beach area has suffered severe erosion recently and the shoreline is moving eastwards. The unstable nature of this area means that it is not the ideal location for a permanent recreation area. Beach access is also provided along Binning Road behind the seafood factory. The historic Prawning Jetty is located here which adds a point of interest. Access to this location, while functional, will probably require upgrading.

Other popular recreation includes walking and cycling, mainly using the tramway bridge and trail, and aquatic activities such as swimming, wind and kite surfing, jet skis and fishing – refer to section 3.4 below, that predominantly occurs to the south of Pelican Point.

5.4 FISHING

Fishing is a popular past time that takes place from beaches, boats and jetties in the waters of the Fascine, from One Mile Jetty, Prawning jetty, Pelican Point, Mangrove Point, Pickles Point and Dwyer's Leap. Estuarine and marine species found in the area include mulwally, flathead, flounder, whiting, tailor, snapper, mackerel, tuna, herring, shark, trevally and bream. Other marine creatures caught include mud crabs, prawns, scallops and crayfish.

Boat launching facilities are provided at Pelican Point at the southern end of Babbage Island. This ramp services smaller trailer boats and dinghies used for recreational fishing.

6. ENVIRONMENT



environment

6.1 BACKGROUND

The Babbage Island Road causeway was constructed in 1987 to provide access from the main land to Babbage and Whitlock islands, which effectively severed the southern arm of the Gascoyne River which created the Fascine Waterway.

A majority of the islands has remained relatively undisturbed from human activity with large areas of remnant vegetation is still present together with other significant environmental features such as wetlands, coastal dunes and a creek.

The Islands natural features and proximity to the Carnarvon town centre are important to the local community and are one of the key attractions of the locality. Further, the natural features will partially dictate the type and extent of development that could be supported accounting for the various considerations and characteristics of Babbage and Whitlock Island.

6.2 CLIMATE

Carnarvon and therefore the study area is situated mid-way along the Western Australian coast and experiences a 'Semi-desert Mediterranean' climate which is characterised by temperate winters (May-July) and warm to hot dry summers (October – March). The range in average temperature throughout the year is not high with the lowest average temperature being 25.8°C and the highest average temperature being 29°C (<http://www.bom.gov.au/jsp/ncc/cdio/weatherData/>). The mean annual rainfall for Carnarvon is 230.5mm (<http://www.bom.gov.au/jsp/ncc/cdio/weatherData/>).

Winds are dominantly moderate to strong southerlies but some seasonal and temporal differences exist. For example, in summer the winds are predominantly moderate to strong southerlies with occasional easterlies in the morning which switch to moderate to strong south-westerlies in the afternoon. In winter the winds are predominantly moderate to light easterlies and south-easterlies in the morning which shift to moderate south-westerly to southerlies in the afternoon. Carnarvon can also experience strong wind events such as gale force winds and heavy rains associated with cyclones. The most damaging winds occur from the south to south-west in summer which can cause wind erosion damage.

Overall the climate is viewed as comfortable that offers an ideal outdoor lifestyle.

6.3 SOILS AND LAND CAPABILITY

The soils and land capability across Babbage Island have previously been assessed by DAFWA and detailed in their report *An Assessment of Land Capability for Residential Land Uses – Babbage Island, Carnarvon* (DAFWA, 1987). Much of the information below is based on information from that report.

SOIL LAND SYSTEMS

The land systems across the study area include;

- Coastal land system (predominantly the dunes and dune flats of unconsolidated to poorly consolidated sand)
- Littoral land system (tidal and supratidal flats composed of river alluvium).

SUMMER PATTERNS



WINTER PATTERNS



LAND CAPABILITY

Land Capability across the islands was considered for both residential and tourist development with and without the provision of deep sewer. A summary of requirements for each use are identified in the following table.

Figure 6.1 – Land use requirements

LAND USE	REQUIREMENTS
Residential/ tourist development with deep sewerage	<p>Essential</p> <ul style="list-style-type: none"> land should be free from effects of storm surge, flooding, wave erosion or slope instability. land should not be susceptible to a degree of erosion hazard which would prohibit its sustained use or cause off-site effects detrimental to adjacent land users or the community. <p>Desirable</p> <ul style="list-style-type: none"> soil depth and drainage conditions permit trench excavation for provision of services or deep sewerage without excessive cost. land is sufficiently free from waterlogging or inundation to provide easy access and on-site trafficability. land is not excessively saline so that tree, garden or lawn establishment becomes prohibitive.
Residential/ tourist development with on-site effluent disposal	As above, but including the need for soils in effluent disposal areas to be sufficiently permeable and absorptive to accept and purify effluent. Ground water or surface water pollution should be prevented if these resources might be extracted for domestic use or garden water supply.

Source: DAFWA 1987



The majority of the islands has 'Low' to 'Very Low' capability for both land uses, with the main limiting factor being risk of wave erosion, storm surge hazard, wind erosion and salinity. When development is considered without deep sewer, further limitations are identified with the soil absorption and purification ability, again resulting in the majority of the site being classified as 'Low' or 'Very Low'.

FURTHER INVESTIGATIONS – WHITLOCK ISLAND

The Geotechnical Investigation Report by SKM (2005) for Whitlock Island found that a typical subsurface profile consisted of:

Figure 6.2 – Subsurface profile – Whitlock Island

UNIT	DEPTH TO TOP OF UNIT	UNIT THICKNESS	UNIT DESCRIPTION
1		0.0m to 2.5m	Fill, sand
2	0.0m to 2.5m	0.4m to 1.0m	Organic silt/organic clay
3	2.0m to 7.0m	3.0m to 5.5m	Sand
4	6.0m to 11.0m	1.5m to 4.0m	Silty Clay
5	12.0m to 15.0m	>3.0m	Silty sand/clayey sand
6	12m		Cap rock

Importantly, the report found that fill was placed across the site in an uncontrolled manner over a layer of organic material and was classified as Class 'P' from the guidelines in AS2870 (Class P is defined as *sites which include soft soils, such as clay or silt or loose sands*). The report had the following conclusions:

- A majority of the mangrove topsoil was not excavated and removed prior to placement of fill
- Fill was placed without any form of compaction which has resulted in varying density of fill
- The thickness of organic material ranged from 0.4m to 1.0m. Serious structural damage is likely to occur to foundations and services if construction occurs on existing fill.
- Liquification of submerged sand layers is not expected to occur in the event of a 50 year seismic event.
- The soil profile is likely to result in issues with the development of standard residential structures. To mitigate risk of instability, soil improvement will need to be undertaken.
- It was recommended that Unit 2 organic material is removed prior to construction (i.e. full excavation and stockpiling of Unit 1 and organic soil, tree roots and other deleterious material).

From this information it appears that there will be a significant requirement for site geotechnical remediation to support any form of significant development on this portion of Whitlock Island.

GEOMORPHOLOGY

The sand spit off the southern end of Babbage Island is at the entrance to the Carnarvon Fascine, and acts as a physical barrier to storm surge and waves, but is vulnerable to erosion, especially during cyclonic events. Since closure of the Fascine the spit has generally migrated southwards and eastwards, although further migration is limited by the tidal flushing of the entrance channel (TWA 2009).

The sandy beach area at the south-western side of Babbage Island is subject to severe erosion and the sandy areas have recently receded eastwards, significantly reducing the beach area. As a result, the dunes are moving eastwards and are slowly covering and eroding Pelican Point Road toward the southern end.

6.4 VEGETATION

BACKGROUND

Carnarvon is located within the Wooramel Subregion of the Carnarvon Region as classified by IBRA (2001). Vegetation in the area is dominated by arid perennial shrubs. The vegetation communities within and surrounding Carnarvon includes mangroves and samphires surrounded by acacia woodland. Shrublands and low woodlands of Acacia species are located on the dune systems. The floodplains are characterised by Gascoyne bluebush and other low halophytic salt tolerant shrublands. The mangrove areas are generally dominated by *Avicennia marina* and *Rhizophora stylosa*. The mangrove vegetation and seagrass communities support diverse ecosystems and fish nurseries and also help to mitigate storm surge damage and provide shoreline stability.

Babbage and Whitlock Islands comprise mangroves, wetlands, inland salt marshes and sand dunes. The different vegetation communities found across the islands are described below.

VEGETATION COMMUNITIES

Mangroves

Mangroves are found throughout low-lying areas and cover most of Whitlock Island. They are highly productive ecosystems and have significant conservation value. In addition to their environmental and habitat value, mangroves also provide a source of nutrients to the water and act as a buffer against wave action by binding the soil with their complex root system. This helps to minimise erosion, reduce storm surge damage and maintain coastline stability.

The mangroves provide a breeding area, nursery and feeding area for various fish species and prawns, thereby playing a significant role in replenishing fish stocks and maintaining the commercial and recreational fishing industries. These areas also provide important habitat for many species of waterbirds.

Mudflats and Sandy Shores

The tidal mudflats on the Fascine provide rich feeding areas for waterbirds, including migratory birds. Bird species which are known to feed on tidal mudflats in Carnarvon include the Bartailed Godwit, Grey-Tailed Tattler, Ruddy Turnstone, Great Knot, Red Knot and various species of Terns.

Terrestrial Communities

A majority of Babbage Island is covered with saline alluvial plains covered with samphire, saltbush and low shrubs. These vegetation communities are found in the low-lying areas throughout the central and eastern parts of the island.

The elevated sand dunes along the western and northern parts of Babbage Island comprise shrubs and low trees which are typical of dunal vegetation communities. The vegetation on the dunes helps to bind the sand to reduce the effect of wind and erosion.

Threatened Flora

A search of the DPaW databases identified several species of threatened flora that have been recorded within and around the islands. It is recommended that a Level 2 flora survey be conducted in future prior to further development occurring on the site to further identify and protect any threatened species.

Threatened Ecological Communities

No Threatened Ecological Communities are listed on the DPaW database. Further detailed studies are required in order to confirm this.

6.5 HABITAT AND FAUNA

The mangroves and tidal flats support a wide variety of bird species. There are known to be approximately 200 bird species within a 60km radius of Carnarvon. Approximately 30% of these birds are migratory species which are protected under international agreements. Some species nest amongst the mangroves and others nest on the ground. Bird species which are known to feed on tidal mudflats in Carnarvon include the Bartailed Godwit, Grey-Tailed Tattler, Ruddy Turnstone, Great Knot, Red Knot and various species of Terns. Birds and ground dwelling mammals also use the vegetation over the dunes as habitat.

The intertidal habitat areas along the Fascine and Whitlock Creek and the swampy low lying areas on Babbage Island provide important foraging habitat. Crustaceans and other invertebrates are the main source of food in these areas.

A search of DPaW databases indicates that there have been recorded sightings of species on and around the islands that fall into the category of 'Rare or likely to become extinct', 'Birds which are protected under an international agreement' and 'other specially protected fauna'. It is recommended that a Level 2 fauna survey for targeted species be conducted in future prior to further development occurring on the site.

6.6 HYDROGEOLOGY

Groundwater

The Carnarvon basin is a sedimentary basin which extends from Geraldton to Port Hedland. The Birdrong Sandstone aquifer is the main aquifer in this basin and can be as much as 600m below the surface. Superficial and alluvial sediments occur on the coastal plain overlying the sedimentary rocks of the Carnarvon Basin.

The Gascoyne River alluvium is the most important aquifer for the town of Carnarvon. It is heavily reliant on direct recharge from rainwater. Groundwater levels are generally within 5 to 10 metres of the surface, and become more saline towards the coast.

Surface Water

The islands are surrounded by water. The Gascoyne River mouth adjoins the northern end of Babbage Island and along the causeway and the Fascine runs along the eastern side of Babbage and Whitlock Islands. Before the causeway was built, the Gascoyne River flowed straight into the Fascine. Whitlock Creek separates the two islands, although it does not always contain water. The creek is largely silted and doesn't flow most of the time. This is a result of changes to the natural water flow surrounding the islands.

particularly reduced tidal and flood flows due to construction of Babbage Island causeway. Low-lying areas across Babbage and Whitlock Islands become swampy during the winter months.

Flood management

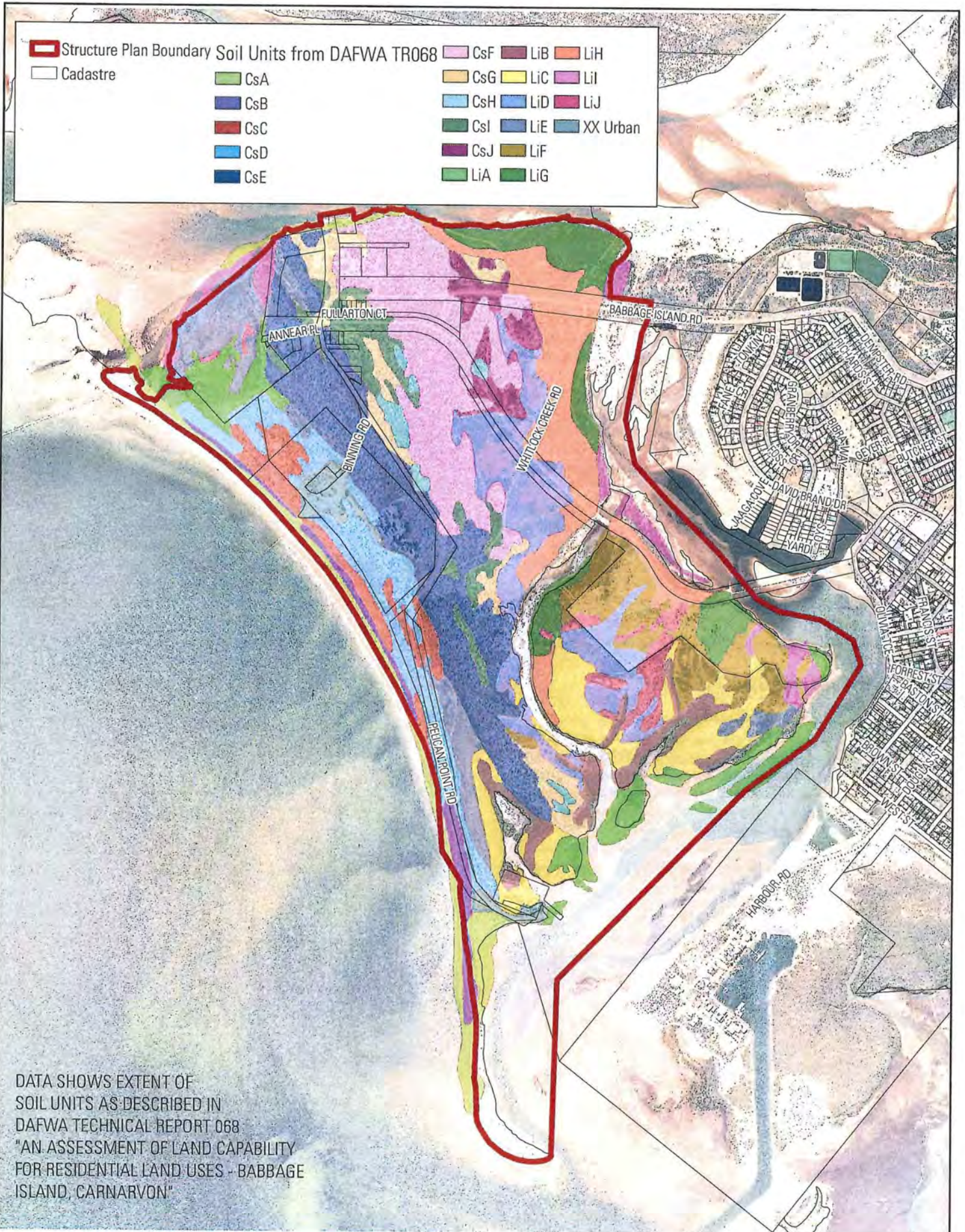
Carnarvon has historically experienced both runoff and coastal flood hazard, which has required development of separate strategies and mitigation works. Runoff flooding, which has historically caused the greatest damage to Carnarvon, including recent severe flooding in 2010, has reduced effect on Babbage and Whitlock Islands following closure of the Fascine and due to the widening of the Gascoyne River channel near to the ocean entrance. The majority of historic flood impact on the islands since 1981 has been due to coastal flooding associated with tropical cyclones, including the effects on Tropical Cyclone Steve in 2000.

Previous assessments of flood risk in Carnarvon has identified that a majority of Whitlock Island and large sections of Babbage Islands are at risk on inundation during severe storm surge. This limits expansion of facilities on the islands unless engineering works are undertaken. Gascoyne Coast regional Strategy recommended a minimum elevation of 4.2m AHD to be allowed for development near the coast to accommodate future flood events and storm surge.

Further detailed information is provided in the following chapter.

6.7 BUSHFIRE MANAGEMENT

As discussed earlier, the vegetation on the islands (for the most part) are relatively intact. The vegetation predominantly comprises low woodland, shrubland and mangrove, however the fire hazard is still likely to be significant. While wildfires are a natural occurrence in the Australian climate, any future development on the islands will need to be designed to ensure compliance with relevant policy and Australian Standard in force at the time. The need for fire management in this regard has thus been identified as a key requirement of any future Local Development Plan within any precinct.



DATA SHOWS EXTENT OF
SOIL UNITS AS DESCRIBED IN
DAFWA TECHNICAL REPORT 068
"AN ASSESSMENT OF LAND CAPABILITY
FOR RESIDENTIAL LAND USES - BABBAGE
ISLAND, CARNARVON"



- Structure Plan Boundary Land Capability - Sewered Development (Residential and Tourism Land Uses)
- Cadastre
- N/A
- Class II - Slight Limitation
- Class III - Moderate Limitation
- Class IV - High Limitation
- Class V - Severe Limitation



DATA SHOWS EXTENT OF SOIL UNITS AS DESCRIBED IN DAFWA TECHNICAL REPORT 068 "AN ASSESSMENT OF LAND CAPABILITY FOR RESIDENTIAL LAND USES - BABBAGE ISLAND, CARNARVON"





Structure Plan Boundary Land Capability - Unsewered Development (Residential and Tourism Land Uses)
 Cadastre
 N/A
 Class III - Moderate Limitation
 Class IV - High Limitation
 Class V - Severe Limitations
 No Data Attributes (likely Class IV)

DATA SHOWS EXTENT OF
 SOIL UNITS AS DESCRIBED IN
 DAFWA TECHNICAL REPORT 068
 "AN ASSESSMENT OF LAND CAPABILITY
 FOR RESIDENTIAL LAND USES - BABBAGE
 ISLAND, CARNARVON"





An aerial photograph of a coastline featuring a wide, vibrant red sand beach. The beach curves along the edge of a dark blue ocean. The sky is a clear, pale blue. The right edge of the image has a decorative, scalloped border.

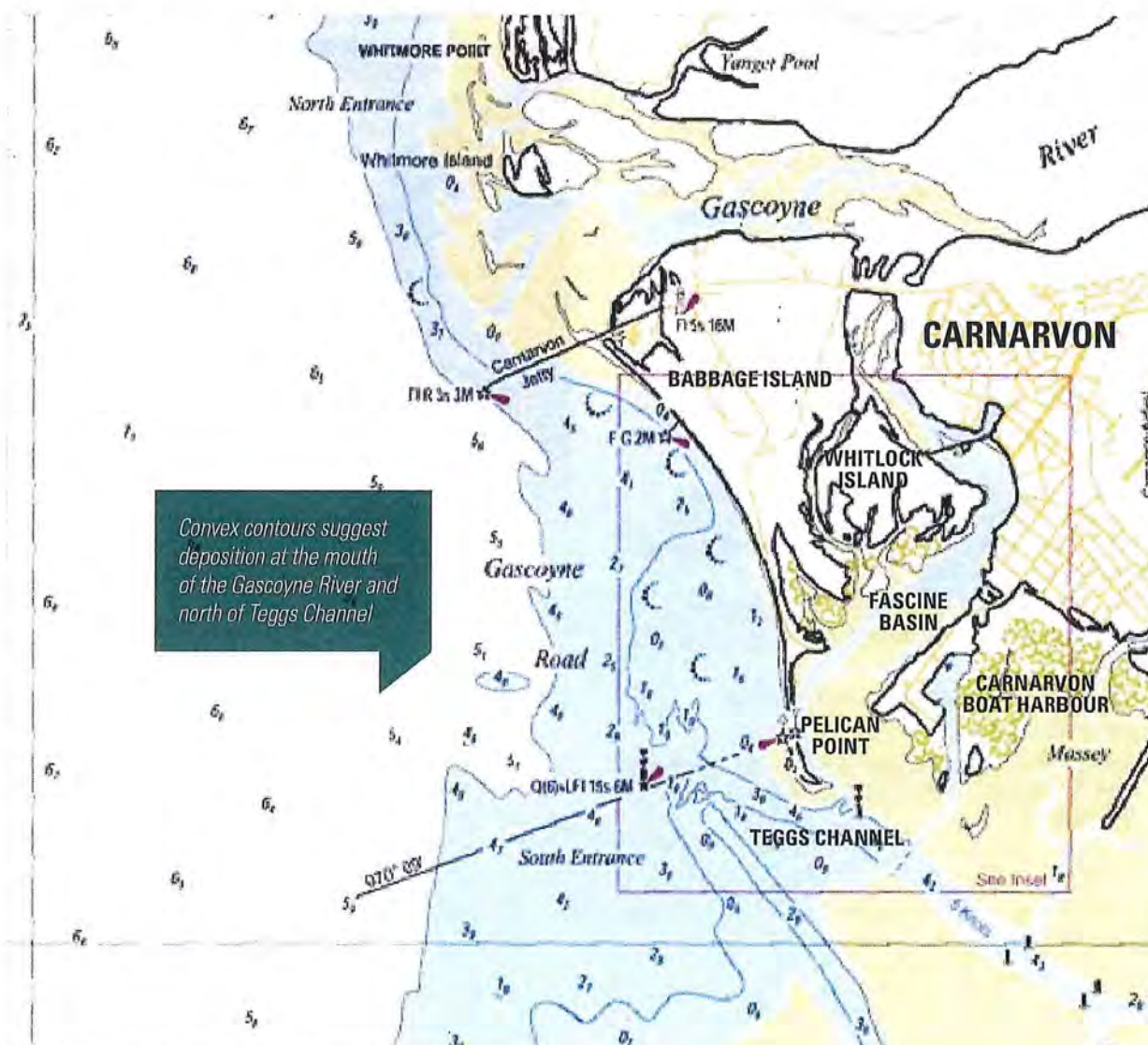
7. COASTAL PROCESSES

coastal processes

7.1 BACKGROUND

Babbage and Whitlock Islands make up the southwest lip of the Gascoyne River mouth, towards the northern end of Shark Bay. The islands were formed from the on-going release of sediment by the river, which may deposit vast volumes of sand and silt into the coastal waters during strong flooding events. The sheltered nature of the site, particularly from ocean swell waves (Diagram 5.1) has caused formation of the low, flat Gascoyne floodplain over millennia. The low topography and high sediment load have also enabled the river to have a highly mobile mouth, in geomorphic terms, creating a very broad deltaic structure, with multiple active and inactive channels. The modern river delta is to the north of two relict deltas, now draining much smaller catchment areas through Boodalia and Brown channels.

At the time of European settlement, the Gascoyne River mouth had three distinct channels ("arms") with the southern and central channels separating the islands from the mainland. The active depositional nature of the channels is suggested by the offshore contours, which show characteristic bulges at the main entrance (the north and central channels) and west of Babbage Island sand spit. Carnarvon town site was built to the east of the river mouth, with the adjacent part of the southern channel named the Fascine following construction of timber walling from 1910-1925. The structure of the Fascine remained dynamic, particularly during the impact of tropical cyclones, which alternated between channel cutting, overbank flooding and sediment deposition.



Extract from Hydrographic Chart WA982 (Department of Transport).

Following massive deposition and flooding in 1974 and 1980, a river flood strategy developed for Carnarvon recommended closure of the southern Gascoyne channel. A levee was constructed at its northern end in 1986, connecting Babbage Island to the mainland. It was identified that subsequent to closure the Fascine would evolve progressively, particularly with movement of Babbage Island sand spit, which had previously been limited by flood events. The enclosed water body was recognised to have considerable development potential, for both land and water based activities, leading to a State Development Deed, with a series of works throughout the Fascine, including dredging, reclamation, walling and construction of canal estates. Some dredged material was placed on a portion of Whitlock Island, to raise low lying areas.

7.2 COASTAL AND CHANNEL CHANGE

Changes to the Carnarvon coast are illustrated by comparison of historical aerial imagery (Diagram 5.2). Natural processes have continued to cause change at the Gascoyne river mouth and adjacent coast (Diagram 5.3), with observed changes within the Fascine being largely related to closure of the southern Gascoyne channel (Diagram 5.4). Changes along Babbage Island coast are caused by a mixture of natural and imposed processes, with the dramatic spit formation and extension caused by the closure, whilst wider erosion and accretion patterns apparently relate to flood-driven sediment supply.

The dynamic nature of Gascoyne River mouth in response to runoff flooding events determines that changes evident between snapshots (Diagram 5.3) are not necessarily reflective of a behavioural trend. Individual floods may cut a wider and deeper channel, cause the channel to move laterally, or result in sand deposition, depending upon the event. However, the historic behaviour (1885 onwards) generally matches deltaic geomorphology, with the river mouth, shoals and spits gradually advancing westward.

The imposed change of closing the southern Gascoyne channel has provided a series of coastal responses (Figure 5) that are still progressing today, and which have implications for adjacent land use and management. These include:

- Increased enclosure of the Fascine by Babbage Island spit
- Sedimentation inside the enclosed water body, particularly at the northern end
- Colonisation of low-lying fringing areas by mangroves
- Gradual choking of Whitlock Creek
- Change to the patterns of shoreline change (erosion and accretion) along the ocean coast, with focal erosion north of the Pelican Point boat ramp.



Diagram 2 – Aerial Photography Carnarvon Zoomed South.

7.3 IMPLICATIONS

Observed foreshore dynamics, including both erosion and accretion, may provide constraints to the active use of Babbage and Whitlock Islands.

Table 7.1 – Foreshore Components and Associated Constraints

FORESHORE COMPONENT	CONSTRAINT	POTENTIAL MANAGEMENT
Babbage Island River Bank	This foreshore has eroded historically due to southward movement of the channel. Low lying land to the west has infilled with mangroves and sediment.	Setback or River training works. River training baffles have previously been installed. Their effectiveness against a severe flood is uncertain.
Babbage Island Ocean Coast	Whilst generally accreting, this coast is subject to cycles of erosion and accretion depending upon Gascoyne River flood events. Potential long-term effects of sea level rise.	Setback. The generally accreting nature of this coast suggests that limited intervention is likely to be a practical approach.
Babbage Island Spit	This is an ephemeral feature, occurring in response to closure of the southern Gascoyne channel. Supply from the shoal feeding the spit will gradually reduce, such that it is supplied only by alongshore transport, and hence unlikely to be stable long-term.	No practical management. The unstable nature of this feature suggests short-term use only (i.e. no fixed infrastructure).
Babbage Island Southern Foreshore	Mangrove colonisation has caused advance of the shoreline, but results in very low-lying land, subject to inundation, particularly due to potential sea level rise.	Setback. Avoid mangrove areas due to environmental sensitivity.
Whitlock Creek	The absence of river floods to scour the creek channel has resulted in on-going sedimentation. This has been further exacerbated by reduced tidal flows from the northern Fascine area.	Maintain channel or avoid use. Gradual infill will occur. Therefore either the creek should not be considered a reliable feature, or it should be maintained through excavation.

Whitlock Island Foreshore	Mangrove colonisation has caused advance of the shoreline, but results in very low-lying land, subject to inundation, particularly due to potential sea level rise.	Setback / Infill. Avoid mangrove areas due to environmental sensitivity. Previously raised areas require a higher elevation to mitigate flood risk.
Babbage Island Northern Foreshore	The absence of river floods to scour the creek channel has resulted in on-going sedimentation.	Maintain basin or avoid use. Infill will continue to occur, with potentially poor water quality. The basin should not be considered a reliable feature, or it should be maintained through excavation.

FLOODING HAZARDS

The plan at the end of this section (Figure 5.1) depicts anticipated shoreline movement over a 100 year timeframe, taking into account on-going maintenance and upgrading of existing walling around the Fascine.

Furthermore, the shaded area on the plan depicts a modelled flood extent of an extreme Tropical Cyclone impact after a sea level rise of 0.88m (identified in Global Environmental Modelling System (2009) based upon the Intergovernmental Panel on Climate Change (2007) projections and discussions with the Department of Transport). This approximately corresponds to the setback position of updated State Planning Policy 2.6.

Development can occur within the flood extent area, however will require some form of risk mitigation, including for instance raising ground levels, and developing a warning system and evacuation plan. It should be noted however that such mitigation measures are likely to be extremely expensive to implement, and may also raise significant environmental concerns in relation to filling of mangrove areas. The default position suggested in this report is to avoid development within affected areas.

COASTAL SETBACKS

The Carnarvon Coastal Process Assessment (GEMS 2009) considered coastal movement over a 100-year time period. As part of this study, historical coastline movement was investigated, identifying that:

1. On the west coast accretion of ~500m since 1880 was observed, although this coast has largely eroded since 1980.
2. On the north coast erosion of ~300m since 1880 was observed, which mainly occurred during severe flood events prior to closure of the Fascine in 1981.
3. On the south coast (Pelican Point and south Whitlock Island) accretion has occurred, mainly through infilling of mangrove basins following closure of the Fascine.

4. On the east coast (Whitlock Island) accretion has occurred, mainly following closure of the Fascine.

Using this information coastal setbacks were determined – firstly following schedule one within SPP2.6, and secondly based on locally relevant modelling. These outcomes for total setbacks are identified in Tables 7.2 and 7.3 below.

Table 7.2 - Allowances directly following SPP 2.6 (variation within sections not considered)

SECTION	S1	S2	S3	TOTAL
West	25m	20m (accreting)	90m	135m
North	40m	300m	90m	430m
South	5m	20m (accreting)	90m	115m
East	5m	20m (accreting)	90m	115m

Table 7.3 - Allowances based on locally relevant modelling

SECTION	S1	S2	S3	TOTAL
West (1) N	25m	50m	40m	115m
(2)	25m	80m	40m	145m
(3) S	25m	160m	40m	225m
North (1) W	40m	20m	80m	140m
(2)	Interpolated			
(3) E	90m	280m	0m	370m
South (1) SW	15m	0m	130m	145m
(2)	5m	0m	15m	20m
(3) NE	15m	0m	30m	45m
East	5m	0m	90m	95m

On finalisation of the Gascoyne Coast Vulnerability Study it was determined that the requirements of SPP2.6 to wholly “Avoid” inundation and erosion hazard over a 100-year time frame could not be effectively met. This implies that the town (including Babbage and Whitlock Islands) should be managed through a CHRMAP framework. Due to the more site-specific nature of the shoreline change analysis, the setback allowances identified in Table 7.3 might be considered suitable for a CHRMAP, with allowances based on SPP 2.6 (Table 7.2) used as an “upper limit” for consideration where they are greater.

The requirement for a CHRMAP has been identified within the Development Requirements section of this Structure Plan. The setback line shown on the Structure Plan reflects that adopted by the Gascoyne Coast Vulnerability Study and as outlined in Table 7.3 above.

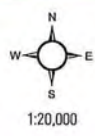
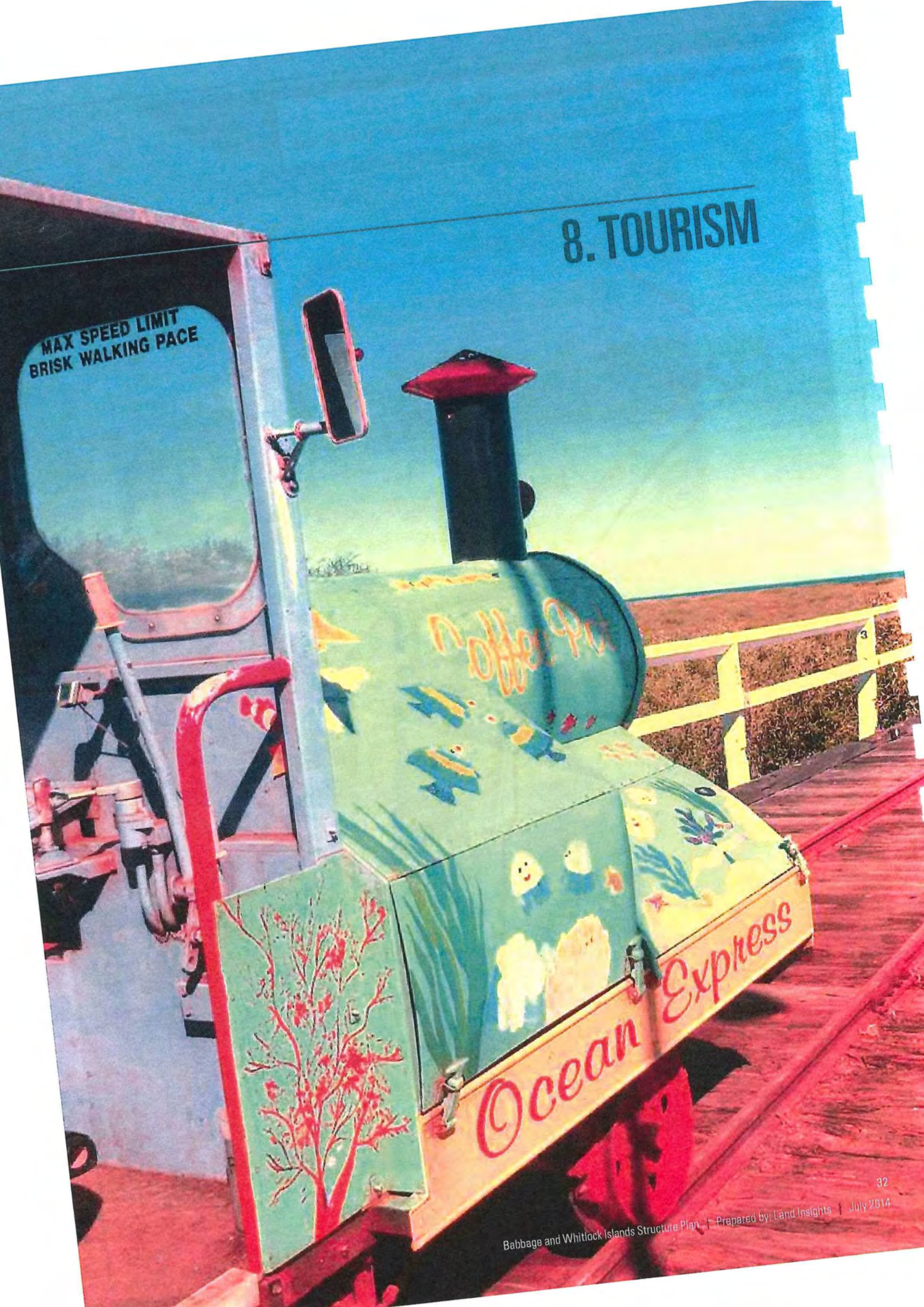


Figure 7.1
INUNDATION RISK

8. TOURISM

MAX SPEED LIMIT
BRISK WALKING PACE



tourism

8.1 GOVERNMENT DIRECTION

Tourism in Carnarvon has been a topic for a number of years, particularly the last 10 years. The tourism potential of the town, particularly the islands, has been discussed in a number of publications. They identify the potential of Carnarvon due to its waterfront/beach location and natural environment and its proximity to many regional attractions including Ningaloo Marine Park, Coral Bay, Kennedy Range National Park, Blowholes Reserve, Mt Augustus National Park, Monkey Mia and Shark Bay.

8.2 CURRENT AND FUTURE MARKETS

The background information provided in this section has kindly been provided by Tourism WA and is based on ABS analysis and discussion with local operators/tourism centre.

Table 8.1 – Tourism Market

CURRENT MARKET	
Total Rooms in June Quarter 2012 (AECgroup supply audit)	400
Current Occupancy Rate (YE June 2012)	77.9%
Current ADR (YE June 2012)	\$160
Average Annual Growth in ADR (YE June 2006-2012)	7.6%
FUTURE MARKET	
Room Nights Available - Low Growth Scenario (YE December 2022) (AECgroup supply audit)	136,391
Room Nights Available - Trend Growth Scenario (YE December 2022) (AECgroup supply audit)	159,088
Average Rooms in YE December 2022 - Low Growth Scenario (AECgroup supply audit)	375
Average Rooms in YE December 2022 - Trend Growth Scenario (AECgroup supply audit)	436
Occupancy in YE December 2022 - Low Growth Scenario	86.7%
Occupancy in YE December 2022 - Trend Growth Scenario	74.6%
Average Daily Rate (ADR) in YE December 2022 - Low Growth Scenario	\$255
ADR in YE December 2022 - Trend Growth Scenario	\$208
ADR Average Annual Growth (YE December 2012-2022) – Low Growth Scenario	5.2%
ADR Average Annual Growth (YE December 2012-2022) – Trend Growth Scenario	3.1%

8.3 VISITATION STATISTICS

As illustrated in the figure below, total visitor numbers to the Carnarvon Shire have exhibited significant volatility – typical of

a destination dominated by leisure tourism. There was a slight upward trend from the year ending (YE) June 2000 to YE June 2007, averaging 135,079 per year and growing at an average annual rate of 1.7%. Subsequently however, to YE June 2010, this trend reversed, trending downwards at an average annual rate of 16.2%. This in part is attributed to the Global Financial Crisis that has had an adverse effect on tourism generally. The last two years however, have witnessed a modest recovery in visitor numbers at an average annual rate of 7.3%, with 102,676 visitors in YE June 2012. But over the whole period from YE June 2000 to YE June 2012, this still represents an average annual rate of decline in visitation of -2.2%.

Domestic overnight visitors were the dominant visitor type in Carnarvon LGA, averaging 76.7% of total visitation from the YE June 2000 to the YE June 2006, followed by 15.4% international visitors and 7.9% day trip visitors. However, from the YE June 2006 to the YE June 2012, domestic overnight visitation lost some of this share, down to an average of 67.6%. Day trip visitation had gained share to 16.3%, approximately matching international visitation at 16.2%. However, domestic overnight visitation still remains the largest share of total visitation.

8.4 REASONS FOR VISITING CARNARVON

The figure below illustrates that the dominant reason for visitation to the Carnarvon LGA was holiday/leisure. This share fluctuated quite significantly between a low of 53.5% and a high of 76.3%, but trended quite flatly over the whole period from the YE June 2000 to the YE June 2012, averaging 63.6%. This was followed by other visitation (15.6%), business visitation (12.7%) and visiting friends and relatives visitation (8.1%).

8.5 TRENDS

According to the Carnarvon Visitor Centre, visitor numbers have been decreasing recently, though performance has been quite good this year. This is consistent with the falls in visitation surrounding the GFC in Diagram 6.1, and subsequent slow recovery. The Shire also highlighted strong visitation in areas north of Carnarvon to Coral Bay, especially during school holidays (about 5,000 per year). There is a mix of holiday/leisure, grey nomads, backpackers that visit the LGA too (note that the ABS has stopped accounting for backpackers, which account for 800-1,000 visitors per year). Business visitation is also supposedly increasing – an opinion which may be biased by the sharp spike in business visitation in the YE June 2011 in Diagram 6.2. The visitor centre also revealed that during the summer months, many overseas backpackers from Ireland, France, Germany and England visit the area. Visitors have also supposedly increased their lengths of stay in the LGA over the last 1-2 years. However, visitation numbers may have been skewed by the clean-up crews in the area following recent floods and fires, and recent construction projects in Carnarvon as a result of the Royalties for Regions funding.

8.6 TOURIST ACCOMMODATION

EXISTING ACCOMMODATION

Existing tourist accommodation (Carnarvon Beach Canal Retreat) on the islands is located at the southern point of Babbage Island (Reserve 28553).

A boat ramp is also located at this site.

Camping is prohibited on the islands and no formal camping facility is provided, notwithstanding unlawful camping by backpackers is a common occurrence within the Pelican Point car park adjacent to the public toilets.

ACCOMMODATION DEMAND

Research undertaken for Tourism WA in February 2012, culminating in the report entitled A Strategic Approach to Caravan and Camping Tourism in Western Australia, summed up the state of tourism accommodation in the town. This research indicated that

there is a feeling amongst stakeholders that although the town has a range of lower end accommodation, such as caravan parks, backpackers and three star motels, most of this accommodation is relatively dated and in need of refurbishment. There is also strong consensus that the limited accommodation available in Coral Bay at present (there are only three land owners who operate a three star resort, two caravan parks and a backpacker hostel) is in need of upgrading

While the report goes on to identify Coral Bay as a key location in the broader Shire, there are opportunities for Carnarvon, including the islands, to capitalise on demand.

8.7 LOCAL TOURISM ATTRACTIONS

HERITAGE

The Carnarvon Heritage Precinct is located at the north-west corner of Babbage Island (on Reserves 24107 and 8552 and UCL) on Annear Place. The Precinct includes the Old Tramway, a tram ride on the 'Coffee Pot Train' along One Mile Jetty, Lighthouse Keepers Cottage Museum, Railway Station Museum and facilities such as toilets, shelters and a small shop. The area is decorated with old tractors, farm equipment, wagons and train pieces. Visitors can walk along the jetty and tramway, explore the museums and heritage sites and fish off the jetty.

The Carnarvon Heritage Group has been working on the development of an interpretative centre at the Heritage Precinct. At the time of writing the new \$3 million interpretive centre and licenced café was nearing completion which will significantly add to the heritage/tourism experience. This was a recommendation from the 1998 Masterplan for the precinct. It is envisaged that the centre will be a building to facilitate interpretation of the One Mile Jetty, a kitchen, cafe, offices, ablution facilities and merchandise. The building is currently being built at the base of the One Mile Jetty.

The Precinct is a popular tourist attraction and has significant potential for further development as a tourist node. There is also potential for other tourist facilities to be developed in the area to take advantage of the heritage and interesting features of the site. An increase in visitation could also mean that more funds can be obtained through visitor fees which will help with maintenance of the precinct.

The community consultation undertaken for the Carnarvon Strategic Community Plan in 2011 shows that the community highly value the heritage aspects of the town and the islands and hope to build on this to enhance the uniqueness and attractiveness of the town.

NATURAL FEATURES

The natural environment is an attraction to tourists who are seeking escape from cities and relaxation in nature. The islands are largely undisturbed and contain large areas of vegetation and other natural features such as native fauna, wetlands, creeks, beaches and sand dunes. It is important that, while development takes place on the islands, proper consideration is given to environmental impact and areas of conservation, recreational use and as public open space. This will ensure enjoyment of the natural environment for future generations.

ACTIVITIES

A number of recreational activities are possible on the islands such as fishing, boating, swimming, walking, bird-watching and sunbathing. Other possible future recreational activities could include camping, golf and a variety of water sports. These holiday-making past-times attract tourists to a location and enhance the economic fabric of Carnarvon.

OTHER ATTRACTIONS

The facilities currently located on the mainland also help to attract visitors and tourists to the local area who may also choose to explore the islands.

The Tramway Bridge provides a pedestrian link between the mainland and the island. Some ideas have been discussed in the past about operating the tram along the bridge and through the islands to provide an alternative mode of transport other than walking. However, this would depend on the ability of the bridge to hold an operating tram.

A children's playground has recently been developed on the mainland where the Tramway Bridge begins at Town Beach. New toilet facilities and BBQ's have also been developed at this location.

A short walk north of Tramway Bridge is the main street through town. The close proximity of the islands to the town, playground, open space areas of Town Beach and the Fascine provides an opportune extension to the study area for increased facilities and attractions that could be made available to tourists and the general public.

8.8 REGIONAL TOURIST ATTRACTIONS

Tourist attractions surrounding Carnarvon include Ningaloo Marine Park, Coral Bay, Kennedy Range National Park, Blowholes reserve, Mt Augustus National Park, Monkey Mia and Shark Bay. The relative close proximity of these attractions to Carnarvon makes it an ideal base for people needing a convenient place to stay and visit these attractions or as a stop-over on their way to other sites.

9. TRAFFIC AND INFRASTRUCTURE



traffic and infrastructure

9.1 ROADS

The only vehicle access to the islands is along Babbage Island Road located at the northern end of the Babbage Island. This road leads to the Carnarvon Heritage Precinct where it intersects with Pelican Point Road that extends south along the western side of the island. Sections of Pelican Point Road are being threatened by coastal erosion and movement of sand dunes in an easterly direction across the road. The management of this road is being considered separately from this study. Whitlock Creek Road is a 4WD track which leads from Babbage Island Road across the centre of the island and connects mid-way along Pelican Point Road.

Babbage Island Road is classified as a Local Distributor Road under Main Roads WA Functional Road Hierarchy. Under this classification and in its current configuration (as a 2 lane sealed road) this road is capable of carrying up to 13,000 vehicles per day at a Level of Service of "C". Current traffic volumes are in the order of 1,150 vehicles per day.

Currently the intersections along Babbage Island Road consist of unchannelised standard "T" junctions with the exception of Babbage Island Road and Robinson Road intersection which is channelised. It is anticipated that the current intersections will continue to operate at a satisfactory level of service following development on Babbage and Whitlock Islands.

9.2 JETTIES

Two jetties are located on the western side of Babbage Island.

The first is the One Mile Jetty being a heritage structure of local significance and no longer used for transport and commercial loading operations. Its main purpose is now a tourist attraction and for recreational fishing, although the structure is in need of significant maintenance and remedial works due to years of weathering and periodic vandalism, including a recent fire resulting in considerable damage at the end of the jetty that has raised safety concerns and erection of a barricade. In light of this it is acknowledged the One Mile Jetty will require substantial capital funding in the future to address its structural integrity and retain its status as a major tourist attraction.

However, as demonstrated through reconstruction and upgrade of the Busselton Jetty, there is opportunity to value add to tourism by incorporating the One Mile Jetty as a broader project. In this regard advice and guidance could be sought from the City of Busselton.

The second structure is the Carnarvon Prawning Jetty located just south of One Mile Jetty and adjacent to the North West Seafoods processing factory. This jetty has been used for many decades for the whaling and more recently prawning industry. The structure is no longer used with its top side having been removed and only remnant pylons and some bearers remaining as a reminder of its past significance to the local fishing industries and now habitat for local fish species.

There is also a boat ramp at Pelican point at the southern end of Babbage Island. The ramp caters for tourists staying at the resort. It has relatively high importance because it's the easiest landing point on the islands.

9.3 WATER

There is currently a 375 diameter water main providing water reticulation to Babbage Island. It is understood that earlier enquiries to the Water Corporation indicated that further aquifers in the Carnarvon area have been identified which are capable of being developed to supply proposed development on Babbage and Whitlock Islands. As the Structure Plan is further developed it will be necessary to liaise with the Water Corporation in determining future water sources to service the increase in population associated with any proposed development.

As for non-potable/artesian water there is currently none supplied to Babbage or Whitlock Islands. However, extension of the Shire's artesian water from its bore at the Carnarvon Airport is a possibility. Presently, the Shire's integrated water supply terminates at Town Beach, but could be extended across the Tramway Bridge to supply non-potable water. Additionally, the extension of this service from the Carnarvon Sewerage Ponds located on Babbage Island Road is also a possibility.

9.4 POWER

Overhead power lines currently supply power to Babbage Island. This is needed to service the homes, Nor-West Seafood factory and campsite and the Carnarvon Beach Canal Retreat accommodation facilities. Current supply can be extended to service the Babbage and Whitlock Island areas. Capacity would need to be determined in association with further development of land use types and quantum.



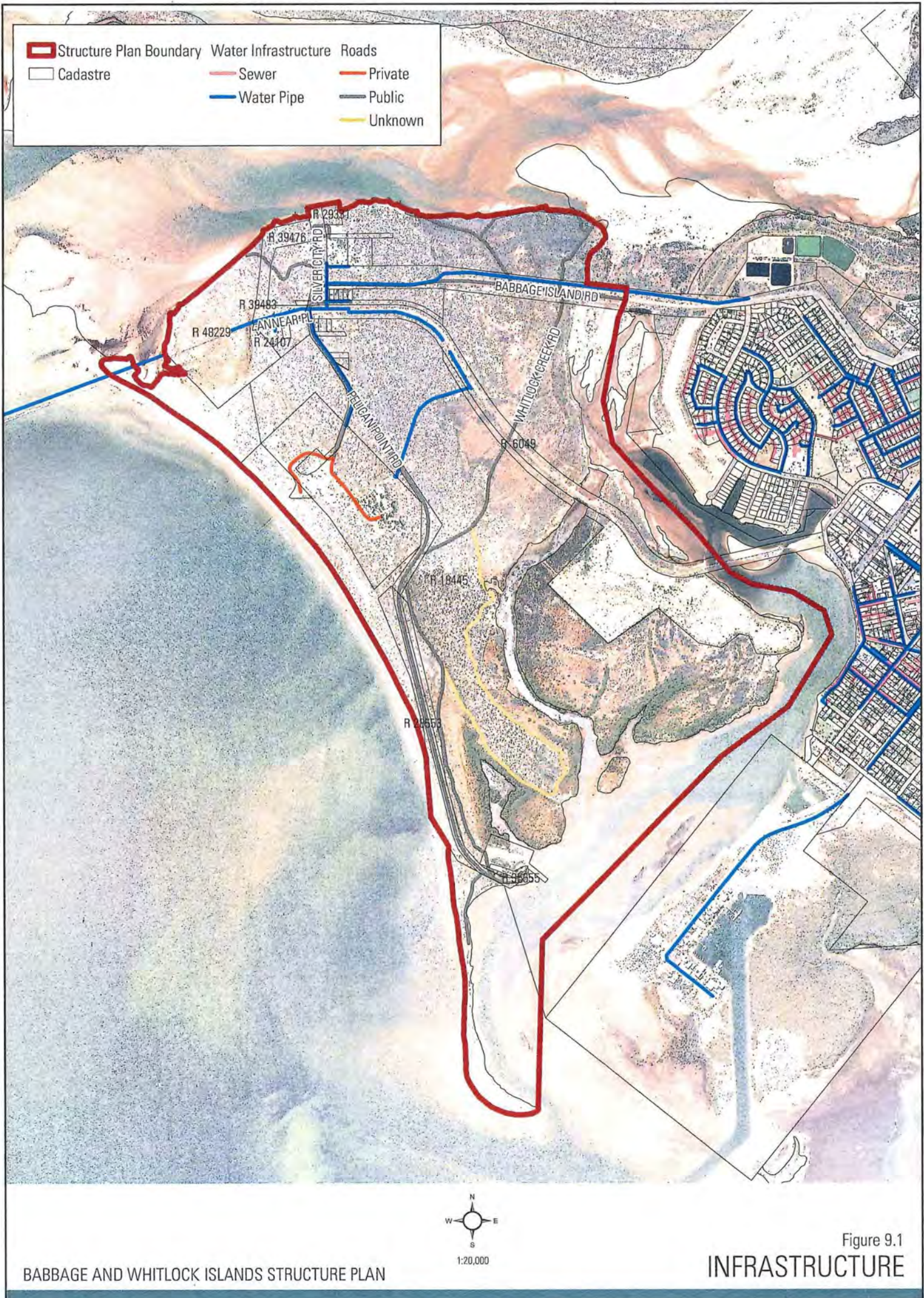
9.5 WASTEWATER

The capacity of the existing wastewater system to accommodate additional flows from Babbage and Whitlock Islands has not been determined; however should development include single residential components, it may be necessary to provide a pressure system and dependent on development density, a possible upgrading of the treatment plant.

A previous land capability assessment reported that onsite septic effluent disposal systems would generally not be recommended for Babbage Island as the soils of the Littoral System do not readily absorb or purify septic effluent because of their poor drainage status and the generally low permeability of surface clay layers. In addition some areas of the Littoral System are susceptible to storm surge which would cause septic systems to fail. Soils of the Coastal System would not readily purify septic effluent because of their very low clay content and very rapid drainage status. However the report did indicate that if superficial aquifers are not to be used for domestic water supply, and given the general aridity of the climate, it may be desirable to allow septic effluent to be added to the soil to increase the chances of survival for introduced vegetation. Alternative options include the use of wastewater recycling systems which currently have the capacity to cater for up to 13,300 persons per day.

9.6 STORMWATER

Water from site facilities and development can be discharged into soakwells onsite. Larger event flows would need to be directed to silt traps and then to infiltration and nutrient stripping basins, or to amenity areas, such as Public Open Space areas, for re-use. Design will aim at managing potentially nutrient rich stormwater runoff so that it is directed away from native vegetation areas and does not discharge directly onto or adjacent to existing native vegetation areas, such as samphire and mangrove communities.



10. VISUAL CONSIDERATIONS



visual considerations

10.1 INTRODUCTION

The landscape character and visual aspects of a location are valuable for intrinsic purposes, for quality of life and enjoyment and for economic benefit. Visual landscape planning looks at the character of the landscape and helps to better understand the scenic quality and sense of place to identify areas of high value. This in turn helps to inform which land uses are more compatible or desirable.

The study area has been visited twice to view the features of the islands, including the visual aspect. A detailed visual impact assessment has not been conducted across the site to date. The methods for visual planning assessment and guidelines for planning are outlined in Visual Landscape Planning in Western Australia (WAPC, 2007).

10.2 TYPES OF LANDSCAPES

The study area consists of a number of different landscapes which vary due to the landform, topography, vegetation, existence of water, existing buildings and other features.

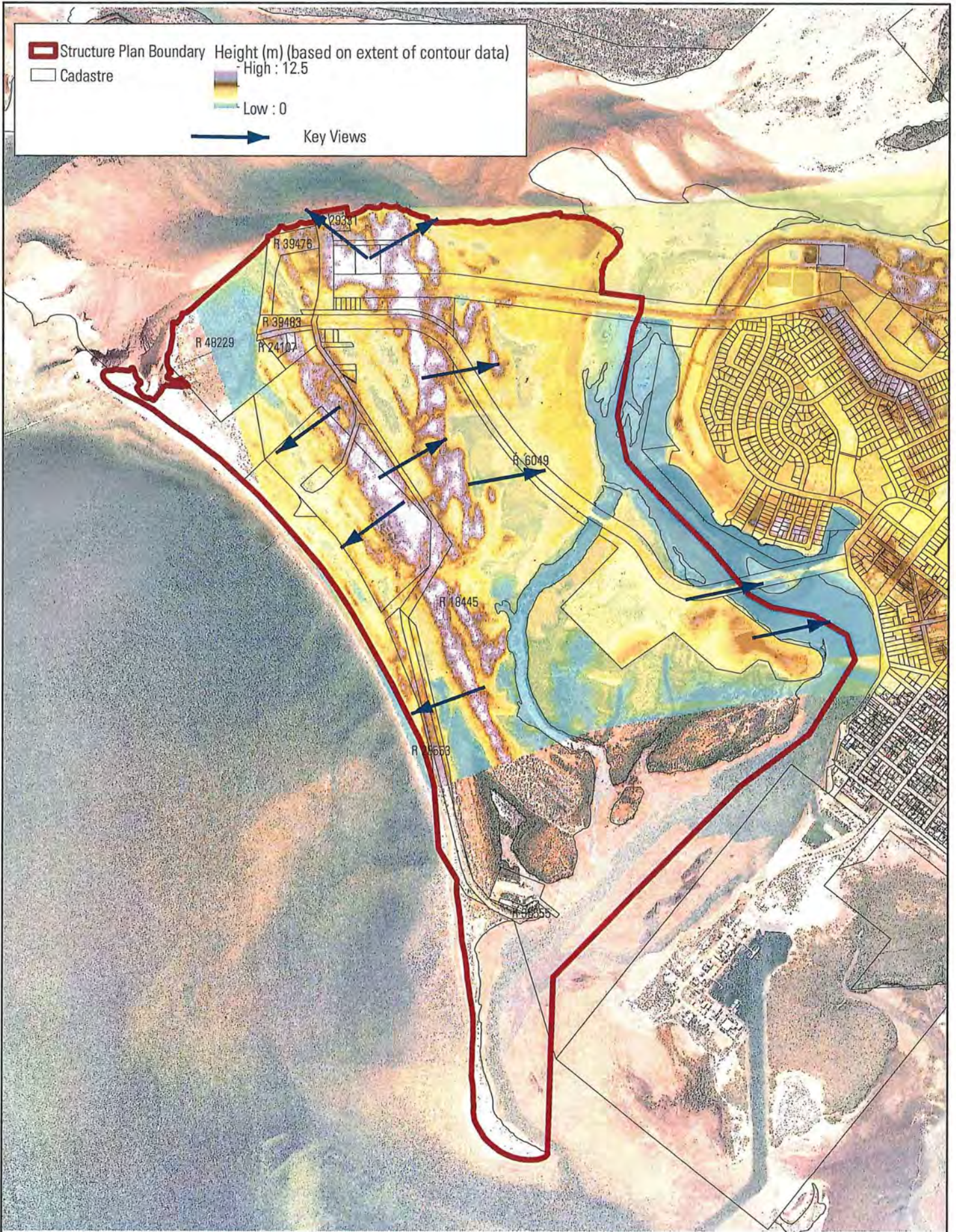
The landscape varies from low-lying areas through the central portions of the islands, to undulating dunes at the western and northern ends of Babbage Island to ocean and Fascine views where the edge of the islands meet the water. The Gascoyne River can be viewed at the northern end of Babbage Island. The water tank on Babbage Island is an interesting feature which is perched so high in the landscape that it can be viewed from many locations on the islands.

10.3 AREAS OF VALUE

The central areas of Babbage and Whitlock Islands largely consist of low-lying samphire plains. These areas become waterlogged in winter and pools of water accumulate, the blue colours of which contrast with the greens and reds of the vegetation. The edge of the low-lying plains are back dropped with either the mangrove trees on Whitlock Island or the vegetated dunes on Babbage Island.

Ocean and water views are generally not obtained from the low-lying areas as they are obstructed by the surrounding dunes. Views from the top of or on the opposite side of the dunes of the ocean, Fascine or Gascoyne River are of high value. The southern end of Babbage Island (Pelican Point) also has views of the Fascine, the town and the sand spit. It is anticipated that these views will be a major attraction for any future residential or tourist development. Views from the eastern side of Whitlock Island look out across the Fascine and towards the Carnarvon townsite which are also of high value.





11. HERITAGE



heritage

11.1 ABORIGINAL HERITAGE

A search of the Aboriginal Heritage Inquiry System (Department of Aboriginal Affairs) indicates that one Registered Aboriginal Site is located within the study area. The site covers the northern half of Babbage Island and is called the Carnarvon Fascine (Site ID 874). The site type is described as scatter, artefacts and scatter midden.

Aboriginal people still use the waterways and Fascine for recreation and social activities, and children often play, swim and fish on the sandy beach area to the east of Tramway Bridge.

Initial discussions between Shire Officers and the Yamatji Marlpa Aboriginal Corporation confirmed the heritage significance of the study with a general presumption against significant development of Babbage and Whitlock islands, with preference expressed for continued preservation of heritage and environment values and for board recreational use by the community. Accordingly, further input from the Yamatji Marlpa Aboriginal Corporation should be sought as part of the public consultation on the draft Structure Plan.

11.2 EUROPEAN HERITAGE

The Fascine is listed on the Register of National Estate (non-statutory archive) with the Place ID 18815. It is described as *unique to the town of Carnarvon and is an essential townscape element to the character of Carnarvon. The survival of the town and its growth is heavily linked with the Fascine and the early settlement of the town was based around the Fascine.* The name 'Fascine' is derived from the Latin 'bundle of sticks' due to the timber pile retaining wall built to prevent erosion of the river bank in case of floods. Public buildings, hotels, hostels and business houses were built behind the wall (along what is now Olivia Terrace) and a jetty was built in 1884-85.

One Mile Jetty is also listed on the Register of National Estate (non-statutory archive) with the Place ID 17038. It is described as *one of the few remaining timber jetties constructed during the most active period in the provision of marine facilities in WA between 1880-1910. The jetty is rare in being an element of a circular transferral system that still has largely intact fabric from the jetty to the receival points to the town. It remains, with the Busselton and Bunbury jetties, one of the last of its type on the WA coast. It is the second longest timber jetty in WA.* One Mile Jetty was built in 1897 and was the first port in Australia where livestock was exported regularly on a commercial basis by sea. It has a close association with the history of coastal shipping in WA and was essential to the development of Carnarvon. It enabled the development of pastoralism in the region by providing transport for cattle, sheep, pearl shell and sandalwood.

The Lighthouse Keeper's Cottage is listed on the Register of National Estate (non-statutory archive) with the Place ID 14522. *It is significant in demonstrating a way of life now seldom practised, maintaining the isolated light as part of a group of structures including the light tower, the Mile Long Jetty and the remains of the tramway. The cottage is important as an extant example of a typical timber and iron Public Works Department cottage.* The Lighthouse Keeper's Cottage was built in 1897 to house the lighthouse keeper and his family and was used until the late 1970's when the light became electric. The lighthouse opened as a museum in 1988 after community effort saw the preservation of the cottage. It is located on Babbage Island near One Mile Jetty and the tramline.

Sites listed on the State Heritage List (State Heritage Office) include:

- The Fascine
- One Mile Jetty and Tramway (State Registered Place)
- Babbage Island Causeway Bridge
- Prawning Jetty
- Meatworks.

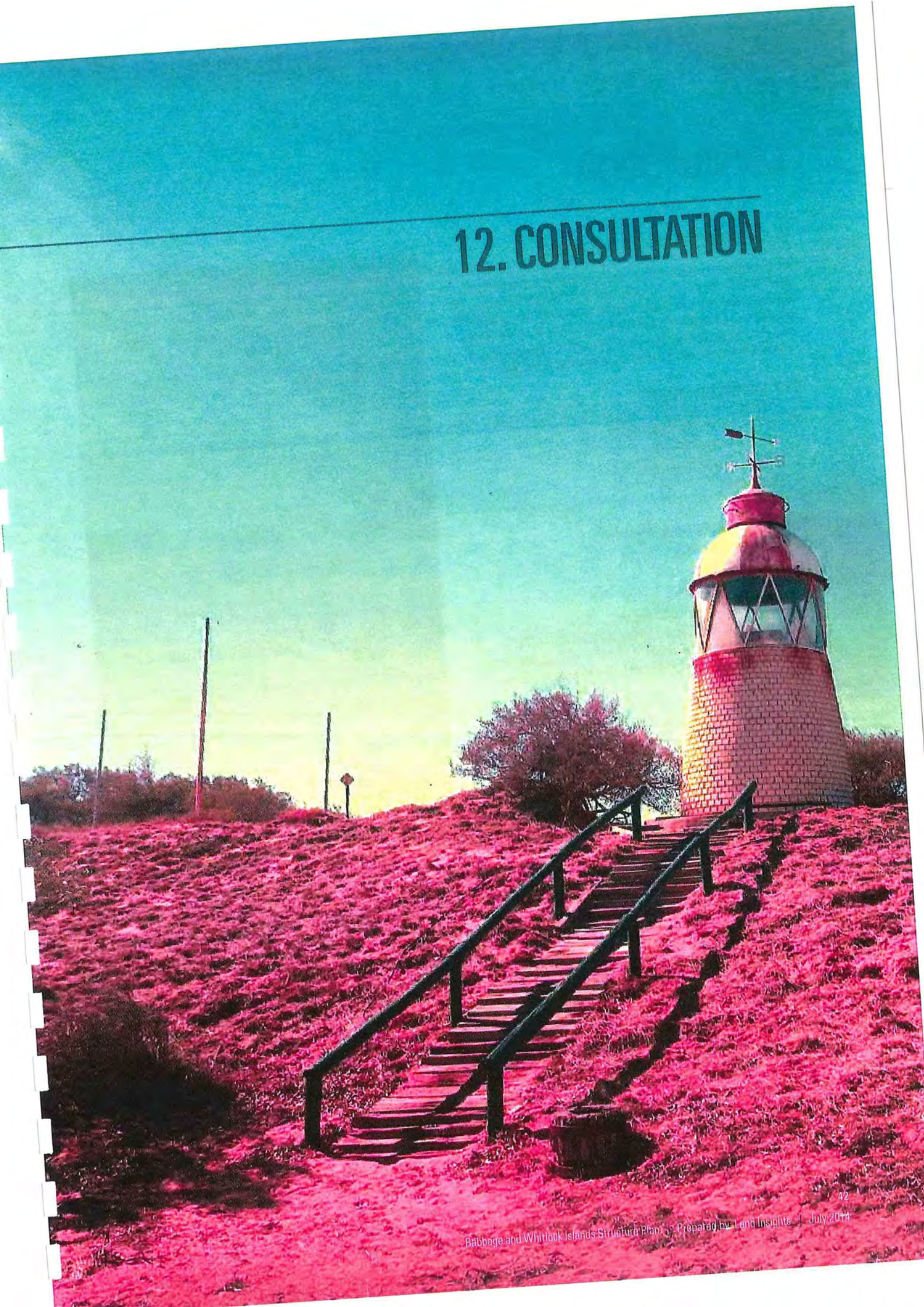
The old tramway was built with the purpose of transporting goods and passengers between town and the port of Carnarvon. It carried wool and other exports to the ships waiting in port and returned to town with goods from Fremantle. In the early 1900's the train stopped in the heart of town, at a goods yard at the rear of the Gascoyne Hotel (where the Civic Centre is today). The first steam locomotive to use the tramway and One Mile Jetty was the Kia Ora in 1909. The last steam train to use the jetty was in 1950 when they were replaced by diesel trains. State ships would visit Carnarvon twice a week at this jetty. It ceased to be used in 1966. Visitors can walk along the jetty to view marine life and the mouth of the Gascoyne River. The Kimberley Steam Loco retired in 1958 and is now displayed at the Railway Station Museum.

The Prawning Jetty was originally built for the Nor West Whaling Company in 1920. The company later turned its attention to the prawning industry. As previously mentioned this structure is derelict with its remains consisting of timber pylons and some bearers.

The Carnarvon Heritage Precinct includes One Mile Jetty, the old tramway, Kimberley steam trains, walk trails, railway station and the Lighthouse Cottage Museum. The precinct includes some tourist walk trails so that visitors can explore these sites. The Gascoyne River mouth Walk trail is 400m long and takes in views of the Gascoyne River and One Mile Jetty and includes 2 lookout points. The Tramway Walk trail starts at the Tramway Bridge and travels along the railway line to the heritage precinct and One Mile Jetty. The newly constructed interpretive centre, with heritage display areas and theatre, once opened will assist in further promoting the historic significance and heritage values of the study area, as well as Carnarvon and the Shire generally.



12. CONSULTATION



consultation

12.1 CONSULTATION MECHANISMS

A range of mechanisms have been used to efficiently gather relevant information for the project. These have included the formation of a project Working Group with members comprising relevant technical and interest groups; holding a community meeting and circulating questionnaires as well as identifying and writing to, or meeting with, relevant groups. A summary of the consultation outcomes to date is provided below.

12.2 WORKING GROUP

Members of the Working Group include:

- Shire of Carnarvon officers
- Shire of Carnarvon Councillors
- Tourism WA
- Landcorp
- Department of Environment Regulation
- Department of Lands
- Department of Water
- Carnarvon Heritage Group
- Gascoyne Development Commission

In October 2013 the Shire Council disbanded many of its working groups, including this one, in favour of a broader land use advisory group consisting mainly of the Shire and relevant State Government representatives.

Notwithstanding this change, the first Working Group meeting for this project was held on the 2nd May 2013. The purpose of the meeting was to introduce the Group to the project and to identify their values, issues and ideas regarding future use of the islands. The outcome of the meeting is summarised below.

Table 12.1 – Working Group Meeting outcomes

VALUES	ISSUES	CONSIDERATIONS
<ul style="list-style-type: none"> • Natural environment (vegetation, coastal flats, dunes, river, beach etc.) • Heritage • Isolated and quiet • Access • Separated from the mainland • Backdrop view for the town • Coastal rather than river environment • Tourism potential • Water frontage around island • Low-key development • Economic impetus for town development. 	<ul style="list-style-type: none"> • Suitability of soils • Cost of development (infrastructure) • Mobile dunes • Acid sulphate soils • Storm surge and flooding, impact of cyclones • Coastal setbacks • Environmental degradation (removal of mangroves, erosion of dunes, impact on wetlands, eutrophication etc.) • Community may be reluctant to change • Impact on views • Limited vehicle access 	<ul style="list-style-type: none"> • Increasing population • Ageing population • Need short-term accommodation • Link to other tourism site • High cost of infrastructure • Current lack of guidance for development • Capitalise on the qualities of the site, including natural features • Do not compromise values • Heritage and eco-tourism • People want to live near water • High and low tide boundaries • Economic drivers – this could be an opportunity to do something.

VISION IDEAS

Passive recreation, Passive recreation (golf course etc.), Tourism (and eco-tourism), Retain heritage, Focus on tourism and recreation, Limited residential and Retain natural environment and views



12.3 OTHER GROUPS

Letters were sent to key agencies and interest groups advising them of the project and inviting comment. The following were contacted:

- Department of Planning
- Department of Environment Regulation
- Department of Parks and Wildlife
- Department of Water
- Department of Transport
- Department of Fisheries
- Department of Regional Development and Lands
- Department of Aboriginal Affairs
- Carnarvon Heritage Group Inc.
- Gascoyne Development Commission
- Carnarvon Chamber of Commerce and Industry
- Landcorp
- Member for the North-west
- Tourism WA
- Carnarvon Tourism Alliance
- Yamatji Marpa Aboriginal Corporation.

Some of the agencies requested a meeting. These were held with the following:

- Landcorp
- Tourism Alliance
- Tourism WA
- Gascoyne Development Commission.

12.4 COMMUNITY MEETING

A community workshop was held at the Shire on the 5th June 2013. Members of the public were invited to attend a 2 hour workshop to hear about the project and were invited to share their ideas about future development on the islands. The workshop also focussed on obtaining background information. The ideas and information gathered from the workshop will be considered during the preparation of the development scenarios. The consultants and Shire Project Manager were also available on the afternoon of the 5th of June so that community members could come and chat in an informal setting about their ideas and values. Feedback from the community workshop includes:

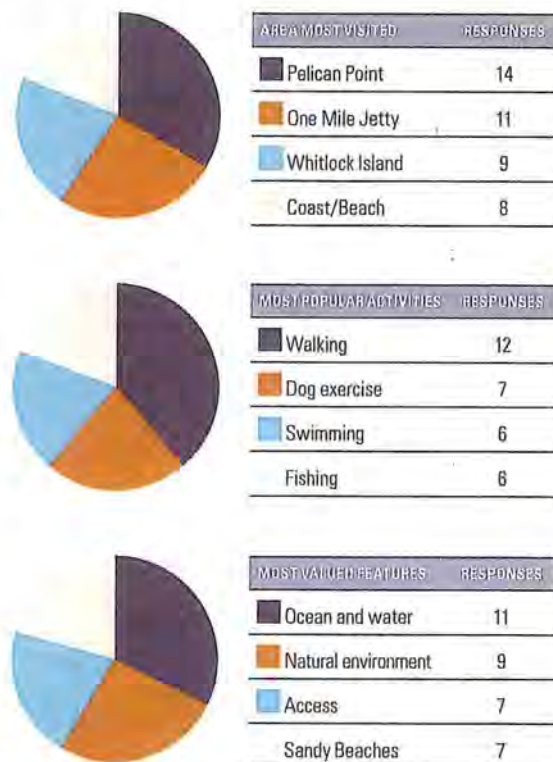
- No development of high density or tall buildings desired.
- The islands should be viewed as an important area for development and should be a priority for residential and recreational use.
- A caravan park should be proposed at the north-west corner of Babbage Island.
- Whitlock Creek should be dredged so it can flow at the northern end again and possibly a channel under Babbage Island Road.
- Establish a rock face on the western side of the coast near Pelican Point Road.
- Keep development on the eastern side of Whitlock Island unobstructed to avoid disturbing views from the mainland across to the island.

- Establish a resort on the eastern side of Whitlock Island and a waterpark.
- Upgrade Tramway bridge to allow trams to operate along it to provide alternative access.
- Establish a golf course on the south-east corner of Whitlock Island.
- Place a retirement village at the south-east section of Whitlock Island.
- Ensure new development is sustainable – use renewable energy, water tanks, etc.
- Alternatively, place the caravan park at the southern end of Babbage Island near the existing toilets and beach access.
- Place a memorial on the Islands for the HMS Sydney.
- If residential areas are proposed, incorporate a range of lot sizes.
- Sustainable development in the form of eco-friendly, renewable energy flagship development that incorporates 'cutting edge' technology and innovative building design trends, systems and materials.

12.5 COMMUNITY QUESTIONNAIRE

A community questionnaire was also distributed at the start of the project. The purpose of the questionnaire was to gain a general idea of how the islands are currently used and valued and what the community like and dislike about current development and their ideas for the future. The questionnaire provided a different way in which the community could express their ideas and values. The outcomes of the questionnaire are as follows:

Table 12.2 – Questionnaire Outcomes



The survey found that the most popular frequency for visits is once a week or once a month. Importance of environmental values was given a moderate rating by most participants.

What does the community most like about the islands?

- Natural environment
- Prime development land
- Plenty of space
- Beach walks
- Accessibility
- Peaceful and quiet.

What does the community dislike about the islands?

- Rubbish
- Wasted space
- Roads are poor standard
- Lack of action and development
- Unattractive beach (brown sand, eroding and seaweed).

What would the community do to change the islands?

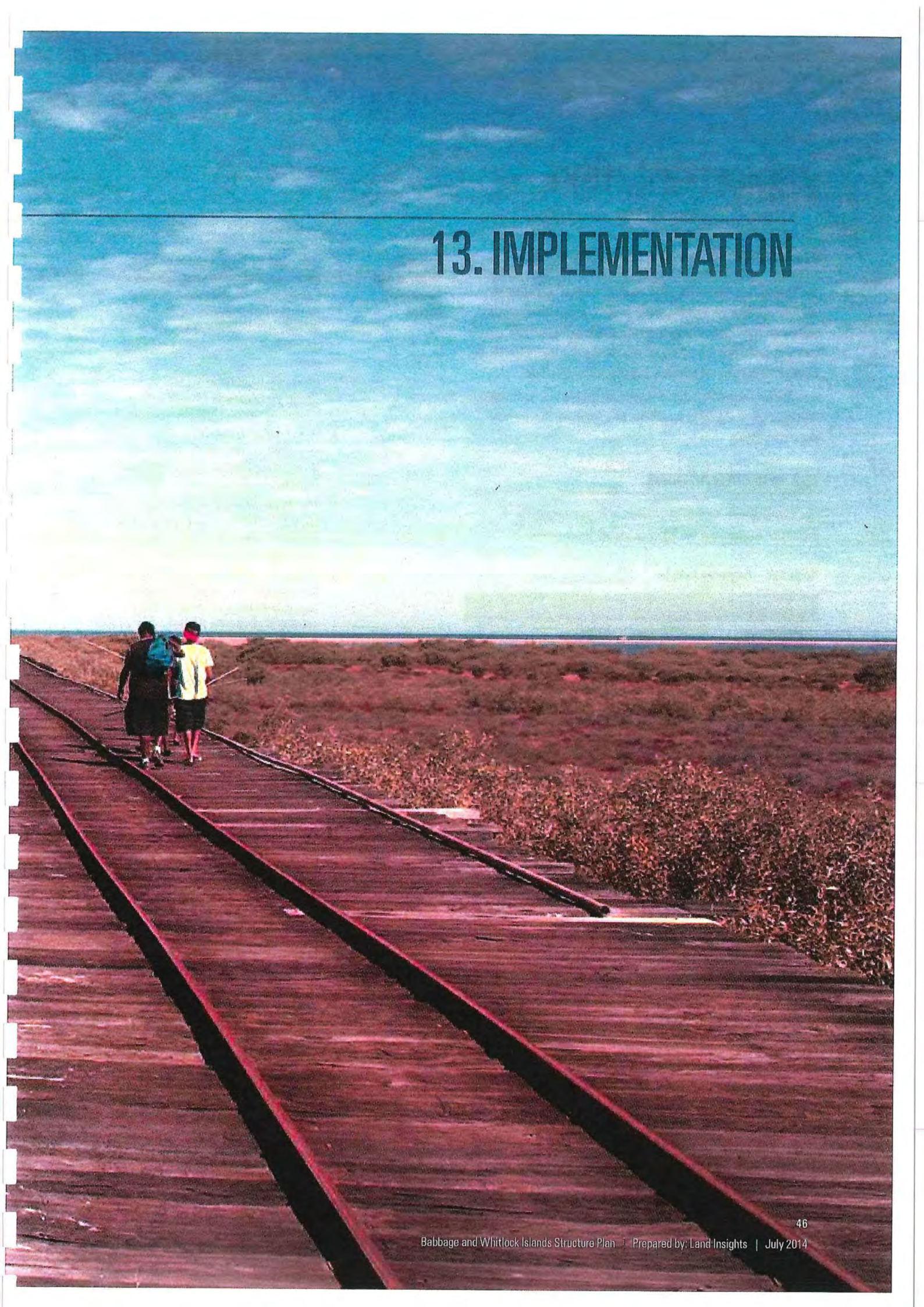
- A retirement village on Whitlock Island
- Residential development
- 9 hole golf course
- Caravan park
- Tourist resort/hotel.

Other comments and suggestions:

- Consider the impact of development on sand dune – they provide a natural windbreak
- Recreational playground on Whitlock Island
- Desperate need for development
- Best use of the islands is for a resort, caravan park, boating facilities, restaurant and bar
- Do not establish a golf course
- Lucky to have this place close to town
- It's a relaxing place.

The survey indicates that there is a variety of opinion on what features are most valued and of ideas and suggestions for the future use of the islands. These suggestions form the basis of the development scenarios prepared for the site.

13. IMPLEMENTATION



implementation

13.1 ADOPTION OF THE STRUCTURE PLAN

The Babbage and Whitlock islands Structure Plan shall be adopted by the Shire of Carnarvon Council and the WAPC as a strategic document that will form the basis of decision-making by the Shire and WAPC until such time as the Shire's Local Planning Scheme is amended to specifically include provisions for the statutory adoption of Structure Plans.

Once the Local Planning Scheme is amended the Babbage and Whitlock islands Structure Plan shall be adopted as a Statutory Structure Plan under the scheme.

13.2 REQUIRED ACTIONS

The following table summarises the Future Actions required to implement the Babbage and Whitlock islands Structure Plan.

Table 13.1 – Required Actions

PRECINCT	REQUIRED ACTIONS
Low Density Residential	No future action is required.
Tourist Development and/or Independent Living Accommodation	<ol style="list-style-type: none"> 1. Liaise with the Department of Lands to secure the conversion of UCL in the identified precinct to an appropriate tenure. 2. Liaise with the Department of Lands to alter the purpose of a portion of Reserve 18445 (as depicted on the plan) to allow the development of a golf course; and subsequently issue the Shire of Carnarvon with the Management Order for the reserve, incorporating a power to lease. 3. Work with a future tourism and/or independent living operator to progress an integrated Local Development Plan over the precinct. 4. Prepare an Environmental Management Plan in accordance with the requirements of EPA Bulletin 703 (Recommendation 2). 5. Support the owner of the Pelican Point tourist site in progressing a Local Development Plan that considers future use and development of the site, taking into account shoreline movement and storm surge. 6. Liaise with the Department of Health and Department of Environment Regulation regarding wastewater infrastructure systems to service the precinct.
Camping Ground	<ol style="list-style-type: none"> 1. Liaise with Department of Lands to have the precinct (currently UCL) created as a reserve and allocated to the Shire of Carnarvon, ensuring that the Management Order allows for the Shire to lease the land. 2. Liaise with the Department of Health and Department of Environment Regulation regarding wastewater infrastructure systems to service the precinct.

Foreshore Reserve and Recreation Nodes

1. Liaise with the Department of Water or any other suitable agency to seek their support to accept a Management Order for the portion of Reserve 18445 abutting the Gascoyne River (this may result in the creation of a new reserve across this area)
2. Liaise with Department of Lands to change the purpose of the reserve from Government Requirements to Foreshore.
3. Liaise with Department of Lands to change the purpose of the western portion of the reserve from Government Requirements to Foreshore.
4. The Shire of Carnarvon to accept the Management Order for this portion of the reserve (this may result in the creation of a new reserve across this area).
5. Liaise with the Department of Health and Department of Environment Regulation regarding wastewater infrastructure systems to service the precinct.

Conservation

1. Liaise with the Department of Parks and Wildlife or any other suitable agency to seek their support to accept a Management Order for the central portion of Reserve 18445 as depicted on the plan (which may need to be allocated to a new reserve).
2. Liaise with Department of Lands to change the purpose of the reserve from Government Requirements to Conservation.
3. Ensure that the proposed nine-hole golf course is appropriately designed for the unique conditions of Babbage Island, including minimising modification of the landscape and vegetation.

Heritage

1. Liaise with Carnarvon Heritage or any other suitable agency to seek their support to accept a Management Order for the portion of Reserve 24107 and Reserve 8952.
2. Liaise with the Yamatji Marpa Aboriginal Corporation during the preparation of Local Development Plans as required by the Structure Plan.
3. Finalise and endorse a Local Development Plan for the identified Heritage Precinct.

Storm Surge setback Special Control Area and Development Setback

1. Incorporate the Special Control Area into the Local Planning Scheme.

September 2013

BABBAGE AND WHITLOCK ISLANDS STRUCTURE PLAN

Outcomes Report



landinsights

PLANNING DESIGN ENVIRONMENT

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Prepared by

Land Insights

1/1 Alvan Street, Mt Lawley WA 6052
PO Box 289, Mt Lawley WA 6929

Phone (08) 9271 8506

Fax (08) 9370 5786

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1. INTRODUCTION



introduction

1.1 CONTEXT

Babbage and Whitlock Islands ("the islands") have been identified by the Shire of Carnarvon as a significant and unique site within the context of the broader town. There have, over 10-15 years, been several attempts to prepare a plan for the islands, however none have come to fruition. Some preliminary structure planning has occurred, but without a comprehensive analysis of the opportunities and constraints to underpin the concepts being explored.

Within this context, the Shire of Carnarvon has commissioned the preparation of a Structure Plan for the islands to guide planning, development and environmental management for the next 15 years. The aim of the Structure Plan is to provide firm direction in the areas of planning, development and infrastructure and provide guidelines to assist decision-makers and developers. The preparation of the Structure Plan will, by completion, have resulted in a comprehensive analysis of the following:

- Existing land uses
- The vision for future land use
- Capacity of existing services and infrastructure
- Environmental constraints
- Heritage values
- Ownership
- Tourism and recreation potential.

1.2 THE ISLANDS

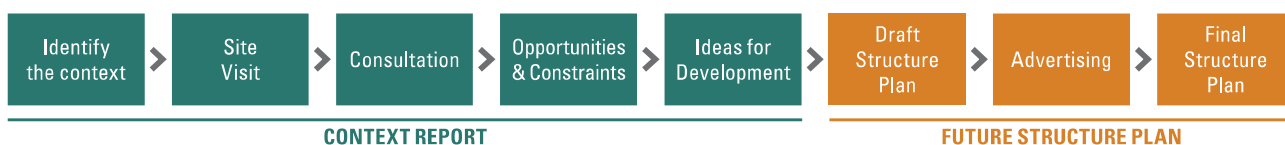
Babbage and Whitlock Islands are located off the west coast of Australia, to the west of the Carnarvon townsite. They are separated from the mainland by a waterway known as the Fascine. The waterway used to provide complete separation of the islands from the mainland, however they are now connected at the northern end of Babbage Island by the Causeway Bridge/Babbage Island Road. The two islands are separated by Whitlock Creek.

1.3 PURPOSE OF THIS REPORT

This report presents the outcomes of the opportunities and constraints assessment and an overview of the social, environmental, recreational and planning characteristics of Babbage and Whitlock Islands. It provides an analysis of relevant information upon which to base the Structure Plan.

1.4 KEY STEPS UNDERTAKEN AND FUTURE STAGES

Preparation of this report required a comprehensive review of all available literature and data on the Islands, consultation with stakeholders and the community for additional information on the history, land use and issues, and a site visit to observe opportunities and constraints first hand.



1.5 CONSULTATION

Consultation has, and will continue, to form an important component of the Structure Plan. Local knowledge, previous ideas and earlier plans are all important in various ways and need to be identified, captured and considered as part of the planning process. In this regard a number of consultation mechanisms have been employed to inform this Outcomes Report. Further consultation is also planned as the Structure Plan is prepared. To date, the key consultation mechanisms have included:

- A meeting was held with the Shire and key stakeholders (Steering Group) at the commencement of the project in May 2013. The purpose of the meeting was to discuss the purpose and objectives of the project, to gather preliminary information on the site and to compile a list of ideas and issues to consider. A follow up letter was sent to all members of the Steering Group to invite members to send any additional information and ideas. Additional meetings were held with some stakeholders from the Steering Group.
- A community meeting was held in June 2013. The purpose of the meeting was to provide an opportunity for the community to find out information about the project and to share their ideas and vision with the consultant team and the Shire. The meeting was publically advertised so that all community members were welcome to attend.

Details on the outcomes of this consultation are presented in Chapter 10.





2. LITERATURE REVIEW



literature review

A review of current government reports has been undertaken and relevant information identified in the table below, with an explanation on the implications on the Structure Plan. The focus of the literature review was to look at information relating to future expansion of the economy (such as mining, horticulture and tourism), the vision for future growth, the constraints to development and any other information relevant to Carnarvon or the study area.

NAME	AUTHOR	DATE	OUTCOMES	IMPLICATIONS
Future Directions: Sustainable Tourism and Land Use Scenarios for the Carnarvon-Ningaloo Coast	Department for Planning and Infrastructure	2003	Ningaloo, Coral Bay and Exmouth are the focus in this report, and Carnarvon is referred to as the regional centre, providing services such as health, education, sport and accommodation.	As the regional centre, there is potential for Carnarvon to be a tourist destination for tourists travelling along the coast.
Carnarvon Tourism Project	Carnarvon Tourism Project	2004	This report provides a clear vision of the Carnarvon Tourism Project for Babbage and Whitlock Islands. The main components of the vision include a water-front resort hotel, a golf course, tourist accommodation units and residential housing sites and transformation of the Fascine into a water playground. The project hoped to build on the existing assets within Carnarvon to create a holiday destination based around the water, heritage and environmental values.	The vision of the Carnarvon Tourism Project was identified in previous Structure Plans prepared for the islands. The ideas are still valid and will be considered in the design options.
Gascoyne Regional Development Plan	Gascoyne Development Commission Shire of Carnarvon Shire of Exmouth Shire of Shark Bay Shire of Upper Gascoyne	2010	Identifies the provision of residential land in Carnarvon to provide for future needs. It encourages any development proposals to take advantage of the coastal and waterfront areas and beaches as an attraction for residents. It identifies that key areas for development could include parts of Babbage and Whitlock Islands. Identifies Carnarvon as having an important horticultural industry, with less susceptibility to drought with better provision of water. This is expected to result in larger areas under crop and release of more land for farming which will result in more employment. Recent development at the Carnarvon Boat Harbour will result in expansion opportunities for businesses in fishing and aquaculture, also providing more employment opportunities. The report also mentions the possibility of Carnarvon being used as a base in the future for FIFO (instead of Perth as a base). It also identifies that there is potential to develop tourism products for those visitors looking for local produce and fine dining experience, more culturally oriented attractions, regional events/festivals, or a safe holiday environment for families with children.	An increase in horticulture and fishing industries will provide more job opportunities and employment, potentially resulting in a demand for employees which will bring people to the town.
Carnarvon Tourism Strategy	Shire of Carnarvon	2010	Identifies low-key tourism accommodation potential on Babbage Island and at the One Mile Jetty precinct. It suggests a 360 bed caravan park. Identifies Whitlock Island with potential for a resort, hotel, serviced apartments and preferably eco-orientated due to costs of infrastructure.	The proposals in the Strategy can be incorporated into Structure Plan. These ideas are also in line with the majority of feedback from consultation.

NAME	AUTHOR	DATE	OUTCOMES	IMPLICATIONS
Carnarvon Strategic Community Plan	Shire of Carnarvon	2011	<p>Community consultation shows that the community highly value the heritage aspects of the town and the islands and hope to build on this to enhance the uniqueness and attractiveness of the town.</p> <p>Key issues identified include housing affordability and range, tourism infrastructure and limited employment opportunities.</p>	The lack of housing availability and tourism infrastructure could be addressed in this Structure Plan. Some employment can be provided through any recreational or tourism operations requiring staff to operate them.
Economic Development Opportunities for the Gascoyne Region associated with Resource Sector Investment and Expansion	Gascoyne Development Commission	2012	<p>This report states that Carnarvon seeks to grow its permanent population from 6,500 people to 15,000 in the medium to long term. It also states that the shire is looking towards strengthening and expanding on the main economic drivers (of horticulture, tourism, fishing, pastoral and mining) to attract more people to the town.</p> <p>It identifies that upgrades to the airport are necessary in order to allow for more FIFO which could lead to employees from the resource sector using the town as their base and permanent home.</p>	The population growth expectations will influence the demand for housing and commercial land for employment, therefore there might be a need to develop on the islands.
Ningaloo Coast Regional Strategy	Department of Planning	2004	<p>The strategy specifically mentions the islands and starts that they are partially protected by a conservation reserve over the mangroves, wet samphire and mobile dunes and the sandy inter-tidal shorelines on Whitlock Island.</p> <p>It states that the objective of a management for the islands is to provide public access to public open spaces and conservation areas and to detail the actions necessary to ensure maintenance of these ecosystems. Carnarvon isn't listed as a tourist node.</p> <p>The Carnarvon Structure Plan encourages development of residential, recreation, cultural and tourist land uses. It identifies 'tourism development' across Whitlock Island 'public open space', 'residential' and 'tourism development' across Babbage Island (subject to detailed assessment).</p>	<p>The area relevant to the Strategy covers a large area, the information relating specifically to the islands implies that the objective of the management plan is to ensure public access is provided and to conserve areas of environmental value.</p> <p>It identifies future development for residential, public use and tourism on the islands subject to detailed investigation which should be considered further in the Structure Plan.</p>
Gascoyne Regional Planning and Infrastructure Framework	Department of Planning	2012	<p>One of the strategies in the framework is to identify sufficient and appropriately located land to accommodate growth.</p> <p>It identifies that expansion of the horticultural industry through the State Government's Gascoyne Food Bowl initiative will likely require expansion of industrial and commercial land. The provision of new water resources could expand the horticultural area by 400ha.</p> <p>It identifies the lack of services such as reticulated sewerage as a constraint to development as well as flood prone areas.</p> <p>The existing salt mine at Lake MacLeod at Cape Cuvier, north of Carnarvon, is identified as another economic contributor and identifies future plans to possibly expand the operation.</p>	The expected expansion of the horticulture area and the existing salt mine could result in increased employment opportunities and demand for land for development.

3. TENURE AND LAND USE



tenure and land use

3.1 TENURE

The land uses across the islands vary from recreation to conservation to historic uses. A majority of the islands are located within reserves with purposes including recreation and foreshore protection and for government requirements. Some freehold residential lots are located at the northern end of Babbage Island. Lots 626, 1044 and 1198 are associated with Nor-West Seafoods. These lots consist of a seafood processing plant and a camping/accommodation area for employees and are subject to existing leases.

Tenure across the islands is detailed in the table below:

TENURE	AREA	LOCATION	OWNERSHIP
Unallocated Crown Land	27ha	Northern side of Whitlock Island.	N/A
Reserve 18445 (Lot 301)	228ha	Remainder of Whitlock Island and central area of Babbage Island.	Not vested. Purpose – Government requirements.
Reserve 28553 (Lot 1048)	6.6ha	Along either side of the road through Babbage Island.	Shire of Carnarvon. Purpose – Recreation.
Reserve 35555 (Lot 1199)	0.056ha	Southern end of Babbage Island.	Shire of Carnarvon. Purpose – Parking.
Lot 1310 (P191833)	2.54ha	Southern end of Babbage Island.	Private.
Lot 1312 (P191833)	0.45ha	Southern end of Babbage Island.	State of WA.
Lot 626 (P206109)	26ha	Babbage Island.	State of WA.
Lot 1044 (P170870)	0.8ha	Babbage island.	State of WA.
Lot 1198 (P193764)	0.36ha	Babbage Island.	State of WA.
Reserve 48229 (Lot 300 and 1366)	33.5ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – Recreation and foreshore protection.
Reserve 39476 (Lot 1233)	3.2ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – Recreation and foreshore protection.
Reserve 24107 (Lot 1231)	0.66ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – Historic museum site.
Reserve 8952 (Lot 1232)	0.24ha	Northern end of Babbage Island.	Minister of Transport. Purpose – Navigation Beacon Site.
Reserve 39483 (Lot 501)	1.37ha	Northern end of Babbage Island.	Carnarvon Heritage Group. Purpose – Heritage purposes.
Lot 628 (P162444)	0.133ha	Northern end of Babbage Island.	Private.
Lot 634 (P162444)	0.1ha	Northern end of Babbage Island.	Private.
Lot 637 (P162444)	0.1ha	Northern end of Babbage Island.	Private.
Lot 638 (P162444)	0.1ha	Northern end of Babbage Island.	Private.
UCL (Lots 627, 630, 633, 635, 636, 643, 644, 698, 834, 1234, 3000)		Various lots throughout the northern end of Babbage Island.	N/A.
Lot 914 (P168739)	1.3ha	Northern end of Babbage Island.	State of WA and Shell Co of Australia.
Reserve 29331 (Lot 1049)	0.7ha	Northern end of Babbage Island.	Shire of Carnarvon. Purpose – Public Recreation.
UCL	66ha	North-eastern side of Babbage Island.	N/A.

A large portion of UCL on the northern end of Whitlock Island was filled with sand several years ago to prepare the site for residential development. This development did not proceed (and subsequent geotechnical investigations have found that the site will need to be modified to make it suitable for residential development) and it remains UCL.

3.2 ZONING AND RESERVATIONS

The Shire of Carnarvon Town Planning Scheme No. 10 identifies a number of zones across Babbage and Whitlock Islands including:

- Residential R20 (northern end of Whitlock Island and Babbage Island)
- Residential Development (central area of Babbage Island)
- Special Use – Residential/Tourist and Reserve Uses – Babbage Island Area 1 (northern end of Babbage Island)
- Private Club and Institution – Babbage Island Area 1 (Southern end of Babbage Island and majority of Whitlock Island)
- Fascine Waterway Development (north-eastern side of Whitlock Island)
- Important Local Road Reserve (Pelican Point Road and Babbage Island Road).

There is no zone along the western side of Babbage Island. The entire Study Area is identified in the Scheme as a Subdivision Guide Plan Development Area Boundary.

It is anticipated that the Structure Plan will provide a framework for possible rationalisation and updating of scheme reserves and zones across the site, and will also address the scheme requirements of 'Babbage Island Area 1'.

3.3 RECREATION AND TOURISM

A number of historic structures are located on Babbage Island including the tramway, One Mile Jetty and the Lighthouse Keepers Cottage museum. The area is known collectively as the Carnarvon Heritage Precinct and the historic values of the area are an important attraction

for tourists. A walk trail is provided alongside the old tramway all the way from the mainland through to the heritage precinct. Community consultation undertaken for the Carnarvon Strategic Community Plan in 2011 shows that the community highly values the heritage features of the islands and consider that these values give the town a unique point of interest which sets them apart from other towns on the coast.

The islands are also used for a range of low-key recreational uses such as fishing, swimming and walking. Tourist accommodation is located at the southern end of Babbage Island (Pelican Point). A boat launching ramp is also provided at this location.

A toilet amenities block has recently been constructed on the western side of Babbage Island close to the sandy beach area. The intention was to provide further facilities and car parking for recreational use of the beach area. However, the beach area has suffered severe erosion recently and the shoreline is moving eastwards. The unstable nature of this area means that it is not the ideal location for a permanent recreation area. Beach access is also provided along Binning Road behind the seafood factory. The historic Prawning Jetty is located here which adds a point of interest. Access to this location, while functional, will probably require upgrading.

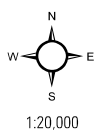
The Fascine is an important nursery for fish and recreational fishing takes place in these waterways from beaches, boats and jetties. Fishing is also popular from One Mile Jetty and the northern end of Babbage Island. The sandy beach area to the east of Tramway Bridge on the mainland is used by children and families for swimming and playing on the playground.

3.4 FISHING

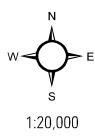
Fishing takes place from beaches, boats and jetties in the waters of the Fascine, from One Mile Jetty, Prawning jetty Pelican Point, Mangrove Point, Pickles Point and Dwyer's Leap. Estuarine and marine species found in the area include mullocky, flathead, flounder, whiting, tailor, snapper, mackerel, tuna, herring, shark, trevally and bream. Other marine creatures caught include mud crabs, prawns, scallops and crayfish.

Boat launching facilities are provided at Pelican Point at the southern end of Babbage Island and at the Fishing Boat Harbour in Carnarvon.

- Structure Plan Boundary Tenure
- Cadastre
- Crown Allotment
- Lease
- UCL and/or Water
- Reserve
- Road



- █ Structure Plan Boundary
- Heritage Walk
- Cadastre
- * Recreation and/or Tourism Sites



4. ENVIRONMENT



environment

4.1 BACKGROUND

Babbage and Whitlock islands are located at the mouth of the Gascoyne River, to the west of the Carnarvon townsite. The islands are separated by the town by the south branch of the Gascoyne River (known as the Fascine). The Babbage Island Road causeway was constructed in 1987 to provide access from the main land to Babbage Island, which effectively severed the Fascine from the river.

A majority of the islands has remain relatively undisturbed from human activity and large areas of remnant vegetation remain, as well as other potentially significant environmental features such as wetlands, coastal dunes and a creek.

The natural features of the islands, and their being so close to the Carnarvon townsite, are important to the local community and are one of the key attractions of the locality. Further, the natural features of the islands will partially dictate the type and extent of development that could be supported.

4.2 CLIMATE

The study area is situated mid-way along the Western Australian coast and experiences a 'Semi-desert Mediterranean' climate which is characterised by warm, wet winters (May-July) and hot dry summers (October – March). The range in average temperature throughout the year is not high with the lowest average temperature being 25.8°C and the highest average temperature being 29°C (<http://www.bom.gov.au/jsp/ncc/cdio/weatherData/>). The mean annual rainfall for Carnarvon is 230.5mm (<http://www.bom.gov.au/jsp/ncc/cdio/weatherData/>).

Winds are dominantly moderate to strong southerlies but some seasonal and temporal differences exist. For example, in summer the winds are predominantly moderate to strong southerlies in the morning which switch to moderate to strong south-westerlies in the afternoon. In winter the winds are predominantly moderate to light easterlies and south-easterlies in the morning which shift to moderate south-westerly to southerlies in the afternoon. Carnarvon can also experience strong wind events such as gale force winds and heavy rains associated with cyclones. The most damaging winds occur from the south to south-west in summer which can cause wind erosion damage.

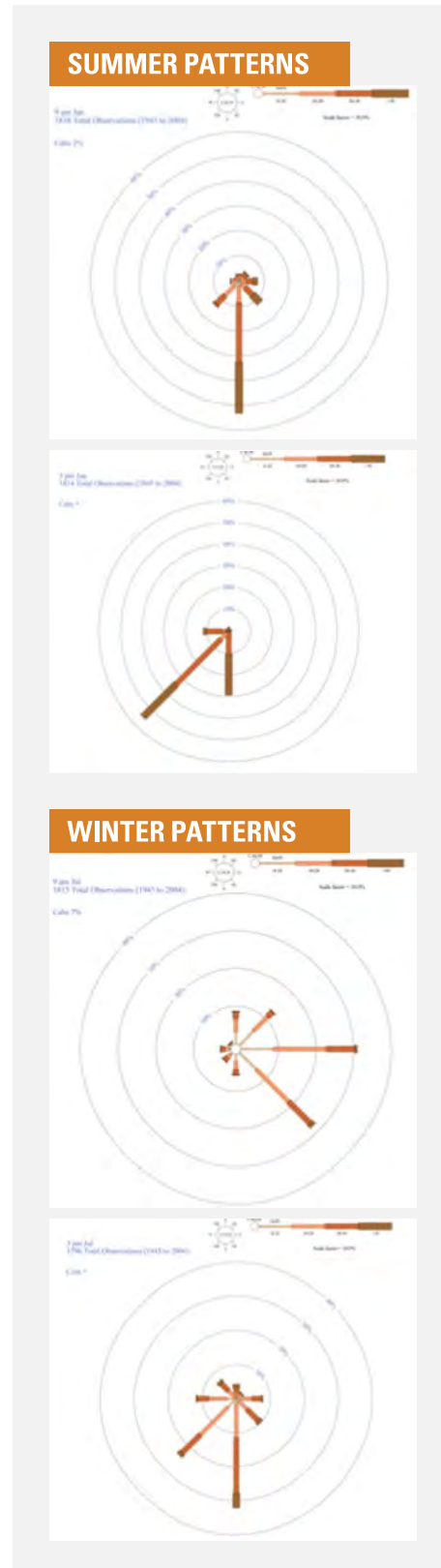
4.3 SOILS AND LAND CAPABILITY

The soils and land capability across Babbage Island have previously been assessed by DAFWA and detailed in their report *An Assessment of Land Capability for Residential Land Uses – Babbage Island, Carnarvon* (DAFWA, 1987). Much of the information below is based on information from that report.

SOIL LAND SYSTEMS

The land systems across the study area include;

- Coastal land system (predominantly the dunes and dune flats of unconsolidated to poorly consolidated sand)
- Littoral land system (tidal and supratidal flats composed of river alluvium).



LAND CAPABILITY

Land Capability across the islands was considered for both residential and tourist development with and without the provision of deep sewer. A summary of requirements for each use are identified in the following table.

LAND USE	REQUIREMENTS
Residential/ tourist development with deep sewerage	<p>Essential</p> <ul style="list-style-type: none"> land should be free from effects of storm surge, flooding, wave erosion or slope instability. land should not be susceptible to a degree of erosion hazard which would prohibit its sustained use or cause off-site effects detrimental to adjacent land users or the community. <p>Desirable</p> <ul style="list-style-type: none"> soil depth and drainage conditions permit trench excavation for provision of services or deep sewerage without excessive cost. land is sufficiently free from waterlogging or inundation to provide easy access and on-site trafficability. land is not excessively saline so that tree, garden or lawn establishment becomes prohibitive.
Residential/ tourist development with on-site effluent disposal	As above, but including the need for soils in effluent disposal areas to be sufficiently permeable and absorptive to accept and purify effluent. Ground water or surface water pollution should be prevented if these resources might be extracted for domestic use or garden water supply.

Source: DAFWA 1987

The majority of the islands has 'Low' to 'Very Low' capability for both land uses, with the main limiting factor being risk or wave erosion, storm surge hazard, wind erosion and salinity. When development is considered without deep sewer, further limitations are identified with the soil absorption and purification ability, again resulting in the majority of the site being classified as 'Low' or 'Very Low'.

FURTHER INVESTIGATIONS – WHITLOCK ISLAND

The Geotechnical Investigation Report by SKM (2005) for Whitlock Island found that the subsurface profile consisted of:

UNIT	DEPTH TO TOP OF UNIT	UNIT THICKNESS	UNIT DESCRIPTION
1		0.0m to 2.5m	Fill, sand
2	0.0m to 2.5m	0.4m to 1.0m	Organic silt/organic clay
3	2.0m to 7.0m	3.0m to 5.5m	Sand
4	6.0m to 11.0m	1.5m to 4.0m	Silty Clay
5	12.0m to 15.0m	>3.0m	Silty sand/clayey sand
6	12m		Cap rock

Importantly, the report found that fill was placed across the site in an uncontrolled manner over a layer of organic material and was classified as Class 'P' from the guidelines in AS2870 (Class P is defined as *sites which include soft soils, such as clay or silt or loose sands*). The report had the following conclusions:

- A majority of the mangrove topsoil was not excavated and removed prior to placement of fill
- Fill was placed without any form of compaction which has resulted in varying density of fill
- The thickness of organic material ranged from 0.4m to 1.0m. Serious structural damage is likely to occur to foundations and services if construction occurs on existing fill.
- Liquification of submerged sand layers is not expected to occur in the event of a 50 year seismic event.
- The soil profile is likely to result in issues with the development of standard residential structures. To mitigate risk of instability, soil improvement will need to be undertaken.
- It was recommended that Unit 2 organic material is removed prior to construction (i.e. full excavation and stockpiling of Unit 1 and organic soil, tree roots and other deleterious material).

From this information it appears that there will be a significant requirement for site geotechnical remediation to support any form of significant development on this portion of Whitlock Island.

GEOMORPHOLOGY

The sand spit off the southern end of Babbage Island is at the entrance to the Carnarvon Fascine, and acts as a physical barrier to storm surge and waves, but is vulnerable to erosion, especially during cyclonic events. Since closure of the Fascine the spit has generally migrated southwards and eastwards, although further migration is limited by the tidal flushing of the entrance channel (TWA 2009).

The sandy beach area at the south-western side of Babbage Island is subject to severe erosion and the sandy areas have recently receded eastwards, significantly reducing the beach area. As a result, the dunes are moving eastwards and are slowly covering Pelican Point Road.

4.4 VEGETATION

BACKGROUND

Carnarvon is located within the Wooramel Subregion of the Carnarvon Region as classified by IBRA (2001). Vegetation in the area is dominated by arid perennial shrubs. The vegetation communities within and surrounding Carnarvon includes mangroves and samphires surrounded by acacia woodland. Shrublands and low woodlands of Acacia species are located on the dune systems. The floodplains are characterised by Gascoyne blubush and other low halophytic shrublands. The mangrove areas are generally dominated by *Avicennia marina* and *Rhizophora stylosa*. The mangrove vegetation and seagrass communities support diverse ecosystems and fish nurseries and also help to mitigate storm surge damage and provide shoreline stability.

Babbage and Whitlock Islands comprise mangroves, wetlands, inland salt marshes and sand dunes. The different vegetation communities found across the islands are described below.

VEGETATION COMMUNITIES

Mangroves

Mangroves are found throughout low-lying areas and cover most of Whitlock Island. They are highly productive ecosystems and have significant conservation value. In addition to their environmental and habitat value, mangroves also provide a source of nutrients to the water and act as a buffer against wave action by binding the soil with their complex root system. This helps to minimise erosion, reduce storm surge damage and maintain coastline stability.

The mangroves provide a breeding area, nursery and feeding area for various fish species and prawns, thereby playing a significant role in replenishing fish stocks and maintaining the commercial and recreational fishing industries. These areas also provide important habitat for many species of waterbirds.

Mudflats and Sandy Shores

The tidal mudflats on the Fascine provide rich feeding areas for waterbirds, including migratory birds. Bird species which are known to feed on tidal mudflats in Carnarvon include the Bartailed Godwit, Grey-Tailed Tattler, Ruddy Turnstone, Great Knot, Red Knot and various species of Terns.

Terrestrial Communities

A majority of Babbage Island is covered with saline alluvial plains covered with samphire, saltbush and low shrubs. These vegetation communities are found in the low-lying areas throughout the central and eastern parts of the island.

The elevated sand dunes along the western and northern parts of Babbage Island comprise shrubs and low trees which are typical of dunal vegetation communities. The vegetation on the dunes helps to bind the sand to reduce the effect of wind and erosion.

Threatened Flora

A search of the DPaW databases identified several species of threatened flora that have been recorded within and around the islands. It is recommended that a Level 2 flora survey be conducted in future prior to further development occurring on the site to further identify and protect any threatened species.

Threatened Ecological Communities

No Threatened Ecological Communities are listed on the DPaW database. Further detailed studies are required in order to confirm this.

4.5 HABITAT AND FAUNA

The mangroves and tidal flats support a wide variety of bird species. There are known to be approximately 200 bird species within a 60km radius of Carnarvon. Approximately 30% of these birds are migratory species which are protected under international agreements. Some species nest amongst the mangroves and others nest on the ground. Bird species which are known to feed on tidal mudflats in Carnarvon include the Bartailed Godwit, Grey-Tailed Tattler, Ruddy Turnstone, Great Knot, Red Knot and various species of Terns. Birds and ground

dwelling mammals also use the vegetation over the dunes as habitat.

The intertidal habitat areas along the Fascine and Whitlock Creek and the swampy low lying areas on Babbage Island provide important foraging habitat. Crustaceans and other invertebrates are the main source of food in these areas.

A search of DPaW databases indicates that there have been recorded sightings of species on and around the islands that fall into the category of 'Rare or likely to become extinct', 'Birds which are protected under an international agreement' and 'other specially protected fauna'. It is recommended that a Level 2 fauna survey for targeted species be conducted in future prior to further development occurring on the site.

4.6 HYDROGEOLOGY

Groundwater

The Carnarvon basin is a sedimentary basin which extends from Geraldton to Port Hedland. The Birdrong Sandstone aquifer is the main aquifer in this basin and can be as much as 600m below the surface. Superficial and alluvial sediments occur on the coastal plain overlying the sedimentary rocks of the Carnarvon Basin.

The Gascoyne River alluvium is the most important aquifer for the town of Carnarvon. It is heavily reliant on direct recharge from rainwater. Groundwater levels are generally within 5 to 10 metres of the surface, and become more saline towards the coast.

Surface Water

The islands are surrounded by water. The Gascoyne River mouth adjoins the northern end of Babbage Island and along the causeway and the Fascine runs along the eastern side of Babbage and Whitlock Islands. Before the causeway was built, the Gascoyne River flowed straight into the Fascine. Whitlock Creek separates the two islands, although it does not always contain water. Low-lying areas across Babbage and Whitlock Islands become swampy during the winter months.

Whitlock Creek separates Whitlock Island from Babbage Island. The creek is largely silted and doesn't flow for a majority of the time. This might be as a result of past dredging and changes to the natural water flow surrounding the islands such as the creation of the causeway to Babbage Island.

Flood management

Carnarvon has experienced four major flood events in the past 50 years, the most recent as a result of Cyclone Steve in 2000. As a result, a flood study of the Gascoyne River was undertaken. It found that a majority of Whitlock Island and large sections of Babbage Island are at risk of inundation during a storm surge. This severely limits future expansion of the townsites unless engineering works are undertaken. The Gascoyne Coast Regional Strategy recommended a minimum elevation of 4.2m AHD to be allowed for development near the coast to accommodate future flood events and storm surge.

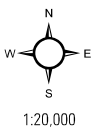
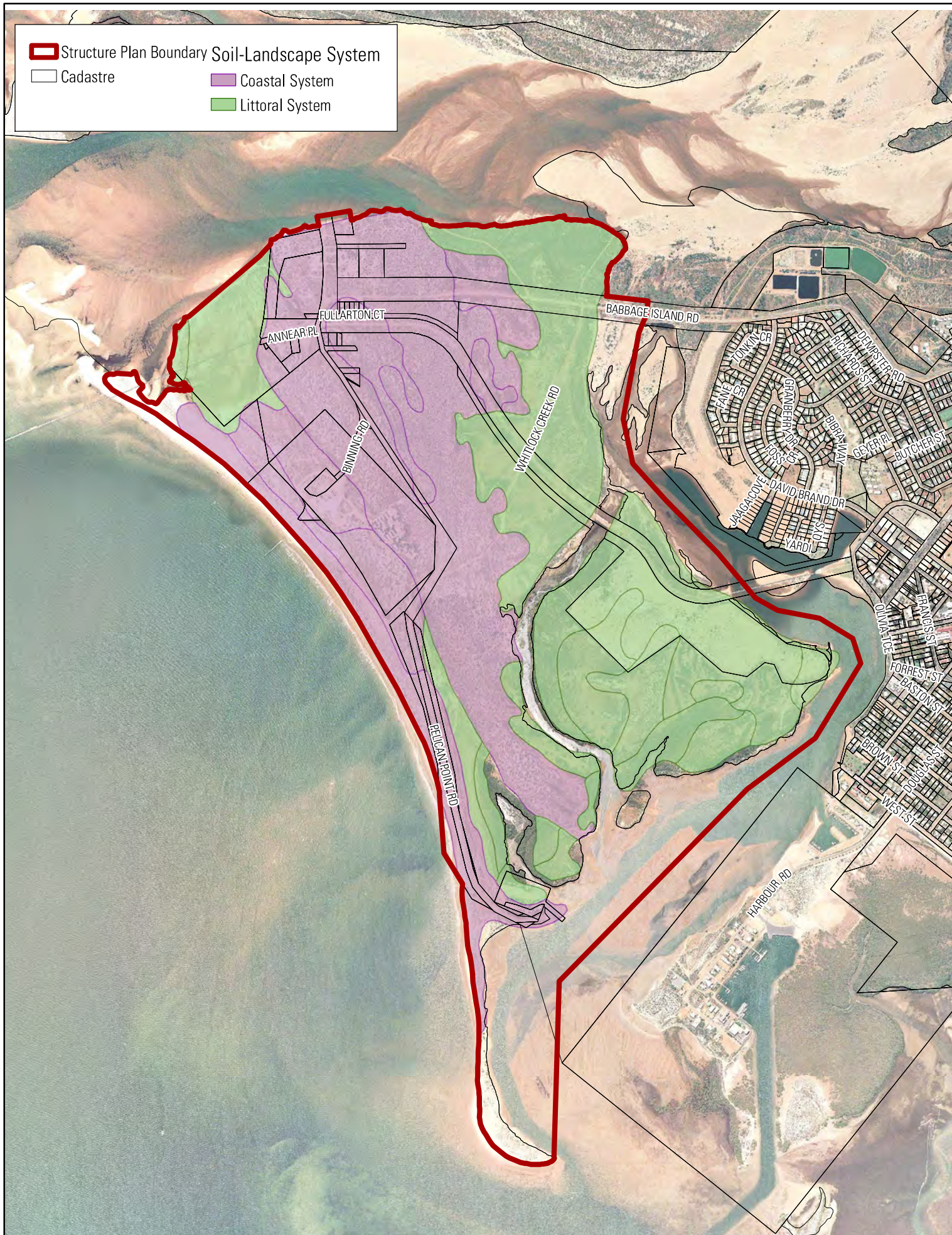
Further detailed information is provided in the following chapter.

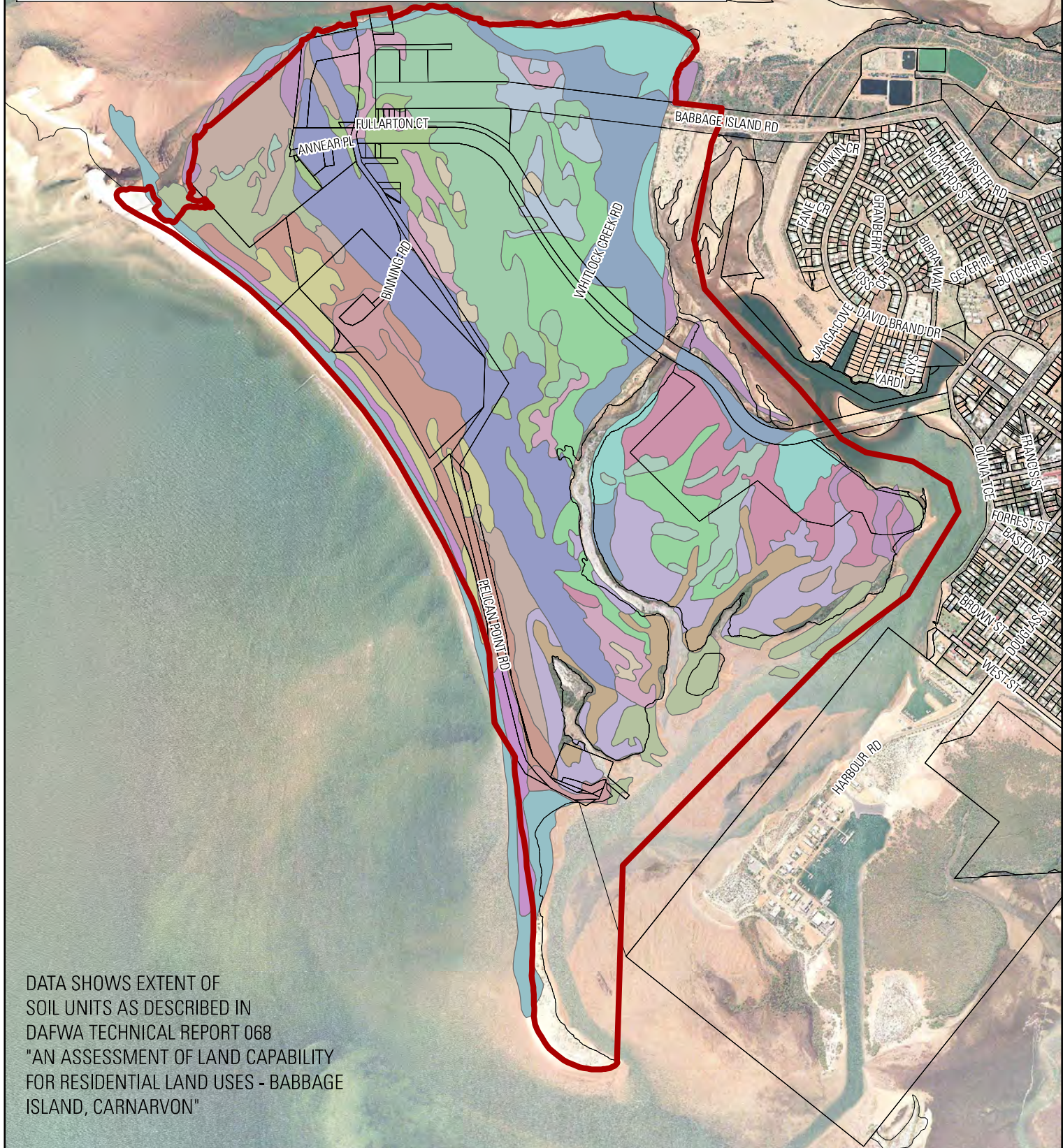
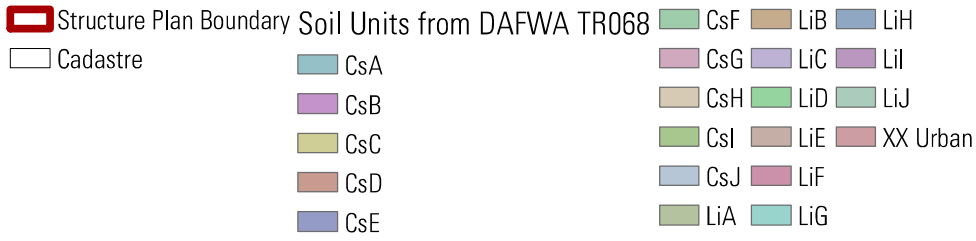
Structure Plan Boundary Soil-Landscape System

Cadastre

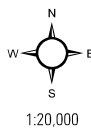
Coastal System

Littoral System





DATA SHOWS EXTENT OF
SOIL UNITS AS DESCRIBED IN
DAFWA TECHNICAL REPORT 068
"AN ASSESSMENT OF LAND CAPABILITY
FOR RESIDENTIAL LAND USES - BABBAGE
ISLAND, CARNARVON"



Structure Plan Boundary Land Capability - Sewered Development (Residential and Tourism Land Uses)

Cadastre

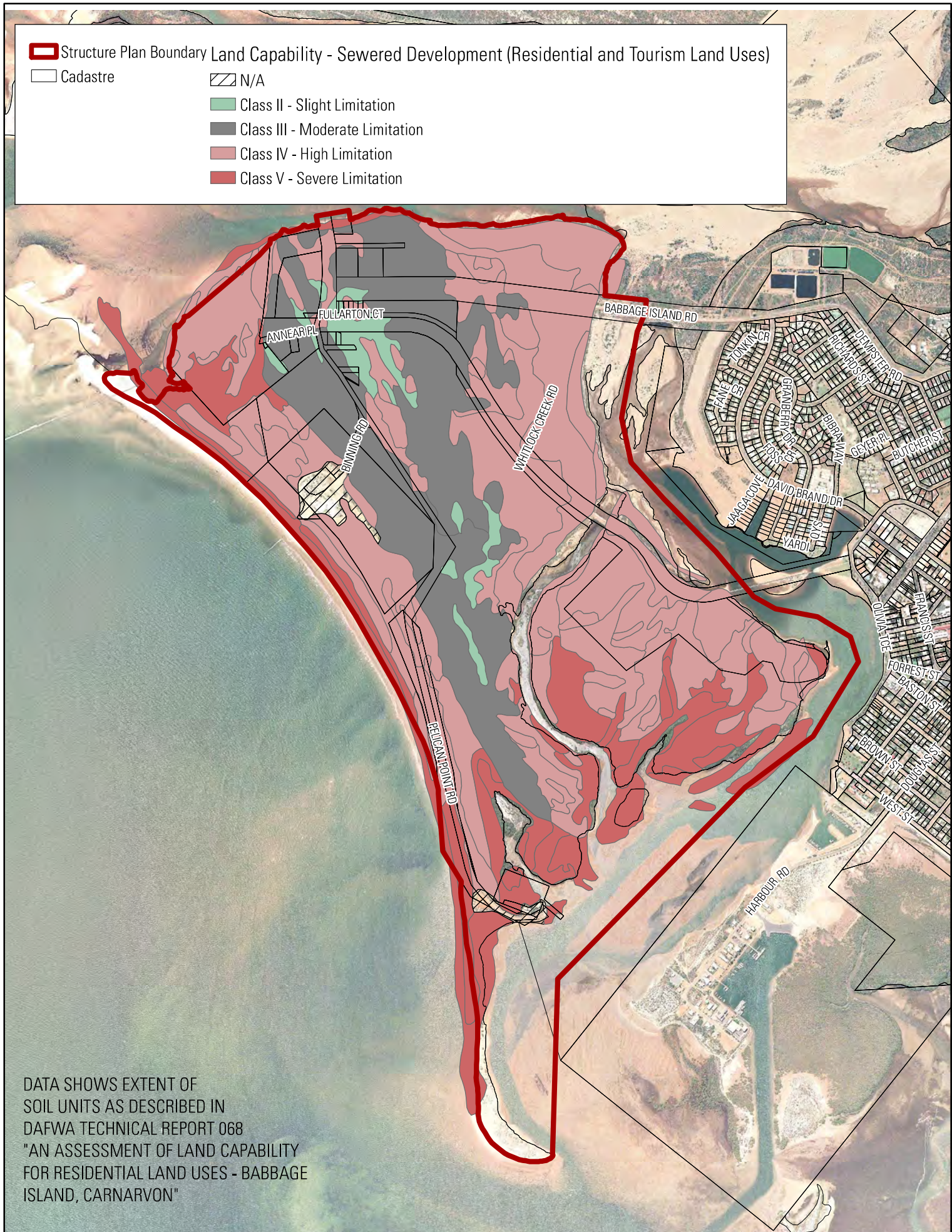
N/A

Class II - Slight Limitation

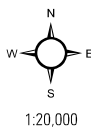
Class III - Moderate Limitation

Class IV - High Limitation

Class V - Severe Limitation



DATA SHOWS EXTENT OF
SOIL UNITS AS DESCRIBED IN
DAFWA TECHNICAL REPORT 068
"AN ASSESSMENT OF LAND CAPABILITY
FOR RESIDENTIAL LAND USES - BABBAGE
ISLAND, CARNARVON"



Structure Plan Boundary Land Capability - Unsewered Development (Residential and Tourism Land Uses)

Cadastre

N/A

Class III - Moderate Limitation

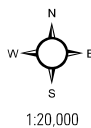
Class IV - High Limitation

Class V - Severe Limitations

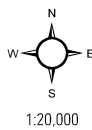
No Data Attributes (likely Class IV)



DATA SHOWS EXTENT OF SOIL UNITS AS DESCRIBED IN DAFWA TECHNICAL REPORT 068 "AN ASSESSMENT OF LAND CAPABILITY FOR RESIDENTIAL LAND USES - BABBAGE ISLAND, CARNARVON"



- ▭ Structure Plan Boundary
- Cadastre
- Native Vegetation Extent



5. COASTAL PROCESSES



coastal processes

5.1 BACKGROUND

Babbage and Whitlock Islands make up the southwest lip of the Gascoyne River mouth, towards the northern end of Shark Bay. The islands were formed from the on-going release of sediment by the river, which may deposit vast volumes of sand and silt into the coastal waters during strong flooding events. The sheltered nature of the site, particularly from ocean swell waves (Diagram 5.1) has caused formation of the low, flat Gascoyne floodplain over millennia. The low topography and high sediment load have also enabled the river to have a highly mobile mouth, in geomorphic terms, creating a very broad deltaic structure, with multiple active and inactive channels. The modern river delta is to the north of two relict deltas, now draining much smaller catchment areas through Boodalia and Brown channels.

At the time of European settlement in the last 19th Century, the Gascoyne River mouth had three distinct channels ("arms") with the southern and central channels separating the islands from the mainland. The active depositional nature of the channels is suggested by the offshore contours, which show characteristic bulges at the main entrance (the north and central channels) and west of Babbage Island sand spit. Carnarvon town site was built to the east of the river mouth, with the adjacent part of the southern channel named the Fascine following construction of timber walling from 1910-1925. The structure of the Fascine remained dynamic, particularly during the impact of tropical cyclones, which alternated between channel cutting, overbank flooding and sediment deposition.

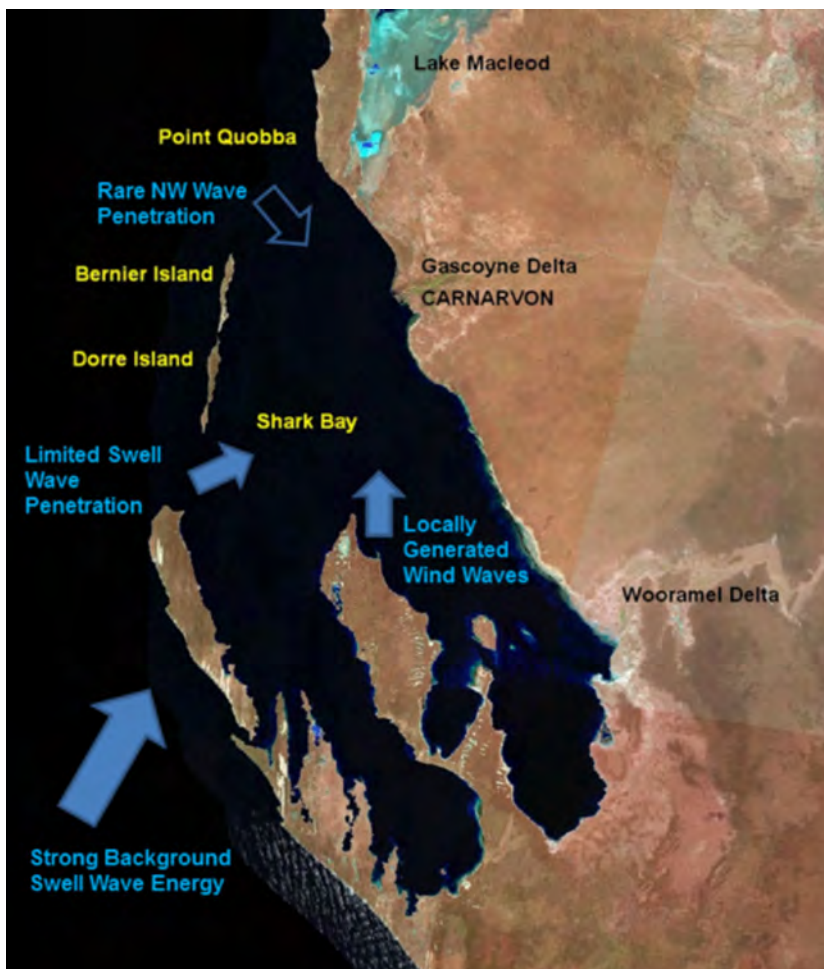
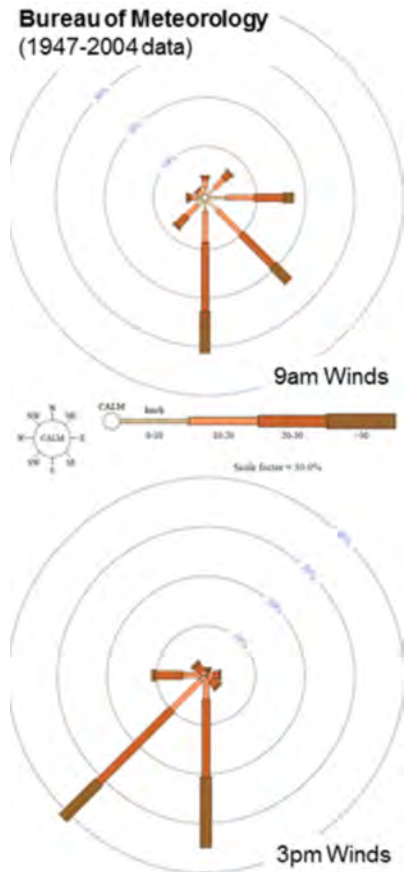


Diagram 5.1: Influences on Carnarvon Coastal Wave Climate.





Extract from Hydrographic Chart WA982 (Department of Transport).

Following massive deposition and flooding in 1974 and 1980, a river flood strategy developed for Carnarvon recommended closure of the southern Gascoyne channel. A levee was constructed at its northern end in 1986, connecting Babbage Island to the mainland. It was identified that subsequent to closure the Fascine would evolve progressively, particularly with movement of Babbage Island sand spit, which had previously been limited by flood events. The enclosed water body was recognised to have considerable development potential, for both land and water based activities, leading to a State Development Deed, with a series of works throughout the Fascine, including dredging, reclamation, walling and construction of canal estates. Some dredged material was placed on a portion of Whitlock Island, to raise low lying areas.

5.2 COASTAL AND CHANNEL CHANGE

Changes to the Carnarvon coast are illustrated by comparison of historical aerial imagery (Diagram 5.2). Natural processes have continued to cause change at the Gascoyne river mouth and adjacent coast (Diagram 5.3), with observed changes within the Fascine being largely related to closure of the southern Gascoyne channel (Diagram 5.4). Changes along Babbage Island coast are caused by a mixture of natural and imposed processes, with the dramatic spit formation and extension caused by the closure, whilst wider erosion and accretion patterns apparently relate to flood-driven sediment supply.

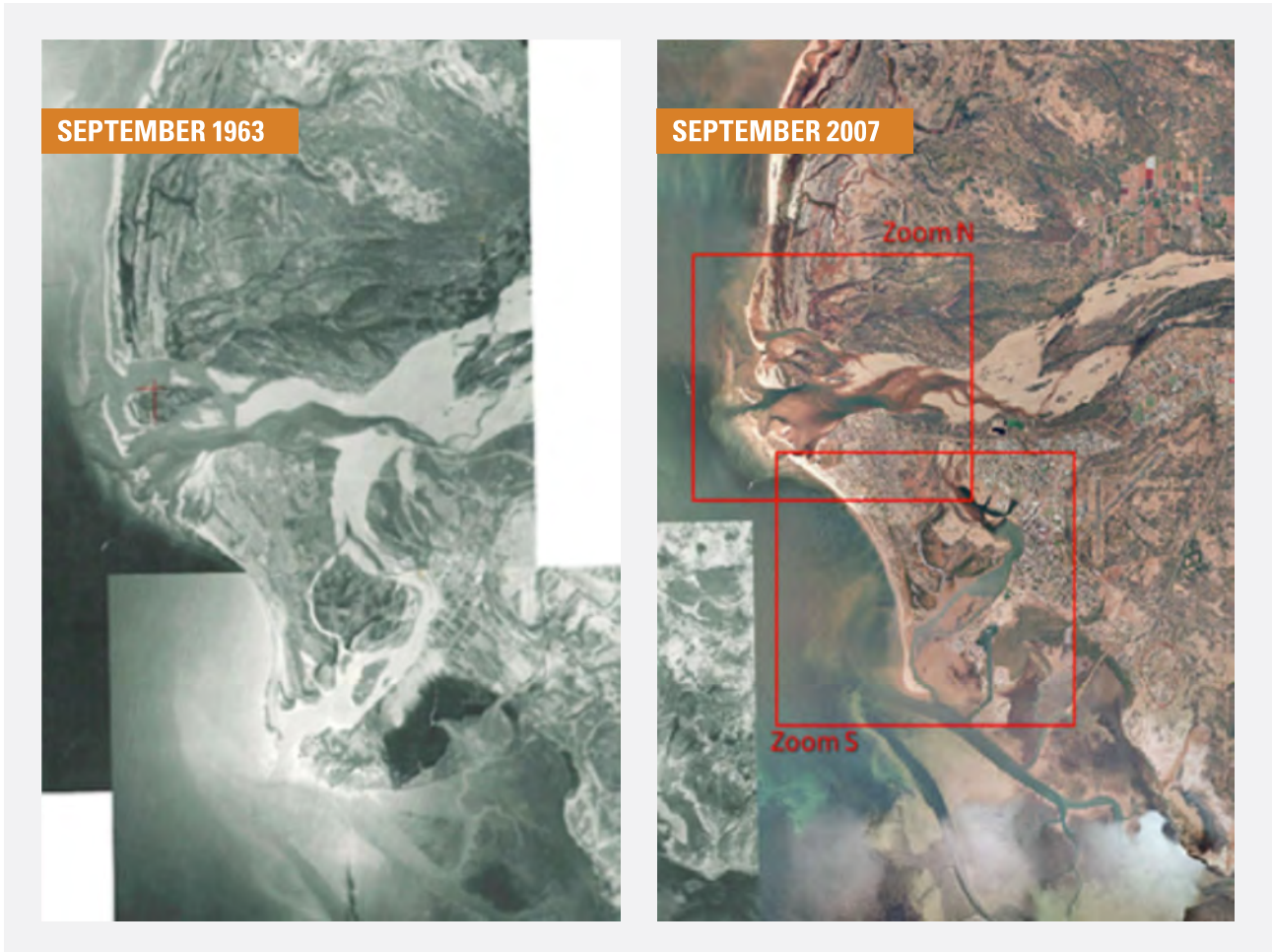


Diagram 5.2: Aerial Photography Camarvon (1963 and 2007). Areas shown in red boxes are shown at a finer spatial scale in Diagram 5.3 and Diagram 5.4.

The dynamic nature of Gascoyne River mouth in response to runoff flooding events determines that changes evident between snapshots (Diagram 5.3) are not necessarily reflective of a behavioural trend. Individual floods may cut a wider and deeper channel, cause the channel to move laterally, or result in sand deposition, depending upon the event. However, the historic behaviour (1885 onwards) generally matches deltaic geomorphology, with the river mouth, shoals and spits gradually advancing westward.

SEPTEMBER 1963



SEPTEMBER 2007



Diagram 5.3: Aerial Photography Carnarvon Zoomed North.

The imposed change of closing the southern Gascoyne channel has provided a series of coastal responses (Diagram 5.4) that are still progressing today. These include:

- Increased enclosure of the Fascine by Babbage Island spit
- Sedimentation inside the enclosed water body, particularly at the northern end
- Colonisation of low-lying fringing areas by mangroves
- Gradual choking of Whitlock Creek (also called Oyster Creek)
- Change to the patterns of shoreline change (erosion & accretion) along the ocean coast, with focal erosion north of the Pelican Point boat ramp.

SEPTEMBER 1963



SEPTEMBER 2007



Diagram 5.4: Aerial Photography Carnarvon Zoomed South.

5.3 IMPLICATIONS

Observed foreshore dynamics, including both erosion and accretion, may provide constraints to the active use of Babbage and Whitlock Islands.

FORESHORE COMPONENTS AND ASSOCIATED CONSTRAINTS

FORESHORE COMPONENT	CONSTRAINT	POTENTIAL MANAGEMENT
Babbage Island River Bank	This foreshore has eroded historically due to southward movement of the channel. Low lying land to the west has infilled with mangroves and sediment.	Setback or River training works. River training baffles have previously been installed. Their effectiveness against a severe flood is uncertain.
Babbage Island Ocean Coast	Whilst generally accreting, this coast is subject to cycles of erosion and accretion depending upon Gascoyne River flood events. Potential long-term effects of sea level rise.	Setback. The generally accreting nature of this coast suggests that limited intervention is likely to be a practical approach.
Babbage Island Spit	This is an ephemeral feature, occurring in response to closure of the southern Gascoyne channel. Supply from the shoal feeding the spit will gradually reduce, such that it is supplied only by alongshore transport, and hence unlikely to be stable long-term.	No practical management. The unstable nature of this feature suggests short-term use only (i.e. no fixed infrastructure).
Babbage Island Southern Foreshore	Mangrove colonisation has caused advance of the shoreline, but results in very low-lying land, subject to inundation, particularly due to potential sea level rise.	Setback. Avoid mangrove areas due to environmental sensitivity.
Whitlock Creek	The absence of river floods to scour the creek channel has resulted in on-going sedimentation. This has been further exacerbated by reduced tidal flows from the northern Fascine area.	Maintain channel or avoid use. Gradual infill will occur. Therefore either the creek should not be considered a reliable feature, or it should be maintained through excavation.

Whitlock Island Foreshore	Mangrove colonisation has caused advance of the shoreline, but results in very low-lying land, subject to inundation, particularly due to potential sea level rise.	Setback / Infill. Avoid mangrove areas due to environmental sensitivity. Previously raised areas require a higher elevation to mitigate flood risk.
Babbage Island Northern Foreshore	The absence of river floods to scour the creek channel has resulted in on-going sedimentation.	Maintain basin or avoid use. Infill will continue to occur, with potentially poor water quality. The basin should not be considered a reliable feature, or it should be maintained through excavation.

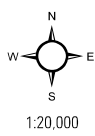
FLOODING HAZARDS AND COASTAL SETBACKS

The plan at the end of this section depicts anticipated shoreline movement over a 100 year timeframe, taking into account on-going maintenance and upgrading of existing walling around the Fascine.

Furthermore, the shaded area on the plan depicts a modelled flood extent of an extreme Tropical Cyclone impact after a sea level rise of 0.88m. This approximately corresponds to the setback position of updated State Planning Policy 2.6.

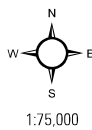
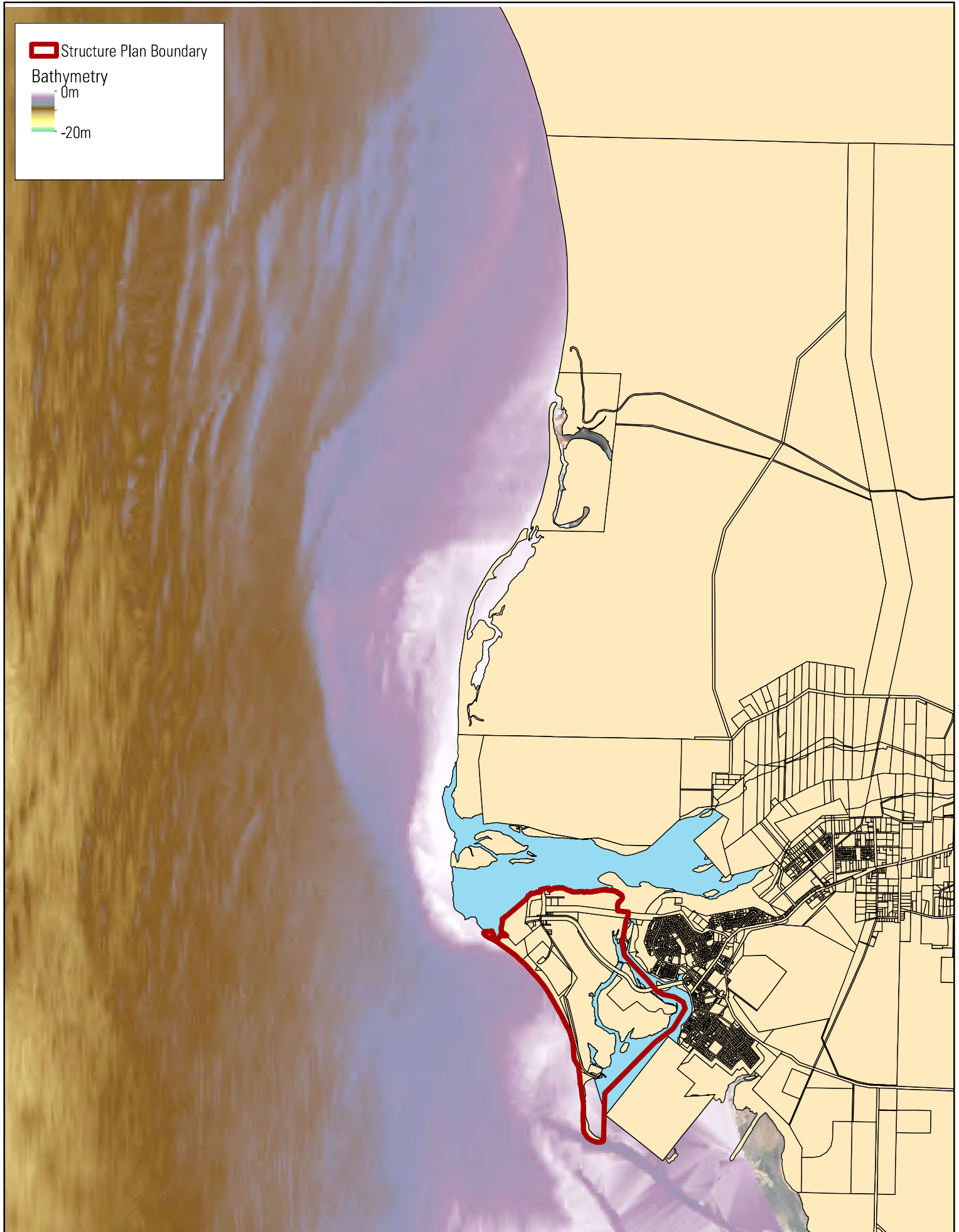
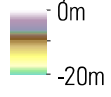
Development can occur within the flood extent area, however will require some form of risk mitigation, including for instance raising ground levels, and developing a warning system and evacuation plan. It should be noted however that such mitigation measures are likely to be extremely expensive to implement, and may also raise significant environmental concerns in relation to filling of mangrove areas. The default position suggested in this report is to avoid development within affected areas.

- █ Structure Plan Boundary
- █ Shoreline Movement - 100 year
- Cadastre
- TC Storm Surge Inundation Risk (approx SPP2.6 setback line)

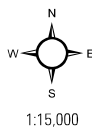
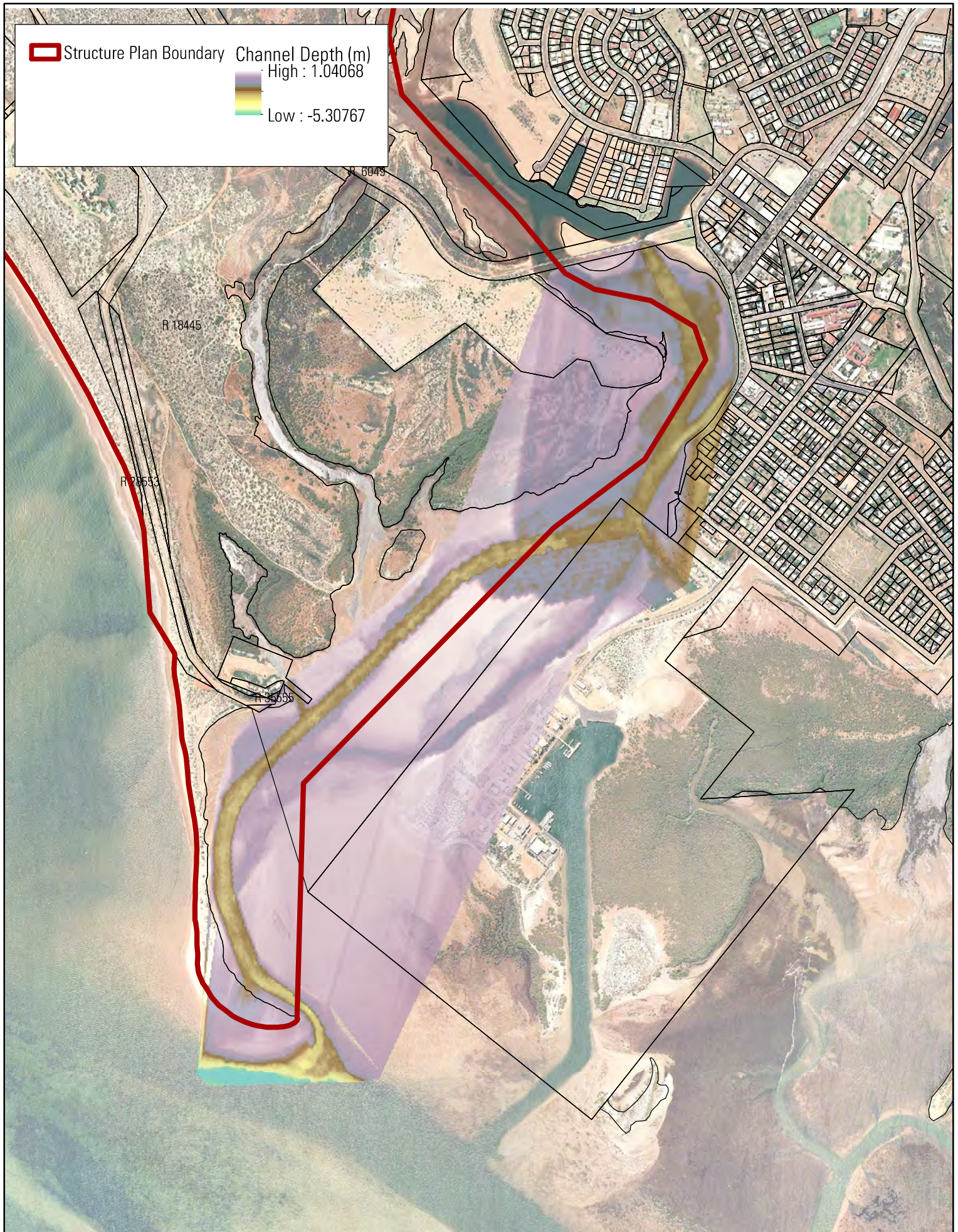


Structure Plan Boundary

Bathymetry



Structure Plan Boundary Channel Depth (m)
High : 1.04068
Low : -5.30767



6. TOURISM



tourism

6.1 GOVERNMENT DIRECTION

Tourism in Carnarvon has been a topic for a number of years, particularly the last 10 years. The tourism potential of the town, particularly the islands, has been discussed in a number of publications. They identify the potential of Carnarvon due to its waterfront/beach location and natural environment and its proximity to many regional attractions including Ningaloo Marine Park, Coral Bay, Kennedy Range National Park, Blowholes Reserve, Mt Augustus National Park, Monkey Mia and Shark Bay.

6.2 CURRENT AND FUTURE MARKETS

The background information provided in this section has kindly been provided by Tourism WA and is based on ABS analysis and discussion with local operators/tourism centre.

CURRENT MARKET	
Total Rooms in June Quarter 2012 (AECgroup supply audit)	400
Current Occupancy Rate (YE June 2012)	77.9%
Current ADR (YE June 2012)	\$160
Average Annual Growth in ADR (YE June 2006-2012)	7.6%
FUTURE MARKET	
Room Nights Available - Low Growth Scenario (YE December 2022) (AECgroup supply audit)	136,391
Room Nights Available - Trend Growth Scenario (YE December 2022) (AECgroup supply audit)	159,088
Average Rooms in YE December 2022 - Low Growth Scenario (AECgroup supply audit)	375
Average Rooms in YE December 2022 - Trend Growth Scenario (AECgroup supply audit)	436
Occupancy in YE December 2022 - Low Growth Scenario	86.7%
Occupancy in YE December 2022 - Trend Growth Scenario	74.6%
Average Daily Rate (ADR) in YE December 2022 - Low Growth Scenario	\$255
ADR in YE December 2022 - Trend Growth Scenario	\$208
ADR Average Annual Growth (YE December 2012-2022) – Low Growth Scenario	5.2%
ADR Average Annual Growth (YE December 2012-2022) – Trend Growth Scenario	3.1%

6.3 VISITATION STATISTICS

As illustrated in the figure below, total visitor numbers to the Carnarvon Shire have exhibited significant volatility – typical of a destination dominated by leisure tourism. There was a slight upward trend from the year ending (YE) June 2000 to YE June 2007, averaging 135,079

per year and growing at an average annual rate of 1.7%. Subsequently however, to YE June 2010, this trend reversed, trending downwards at an average annual rate of 16.2%. The last two years however, have witnessed a modest recovery in visitor numbers at an average annual rate of 7.3%, with 102,676 visitors in YE June 2012. But over the whole period from YE June 2000 to YE June 2012, this still represents an average annual rate of decline in visitation of -2.2%.

Domestic overnight visitors were the dominant visitor type in Carnarvon LGA, averaging 76.7% of total visitation from the YE June 2000 to the YE June 2006, followed by 15.4% international visitors and 7.9% day trip visitors. However, from the YE June 2006 to the YE June 2012, domestic overnight visitation lost some of this share, down to an average of 67.6%. Day trip visitation had gained share to 16.3%, approximately matching international visitation at 16.2%. However, domestic overnight visitation still remains the largest share of total visitation.

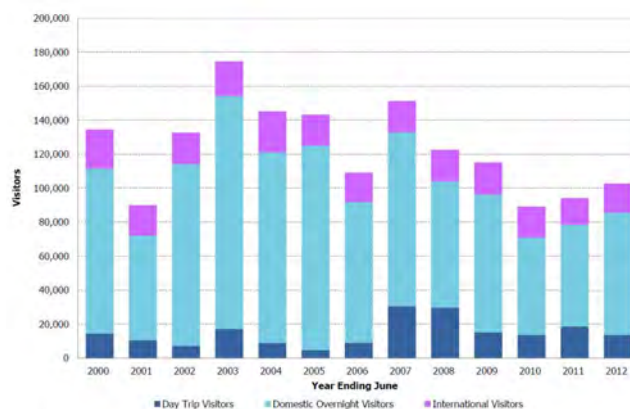


Diagram 6.1: Source: TRA (2012)

6.4 REASONS FOR VISITING CARNARVON

The figure below illustrates that the dominant reason for visitation to the Carnarvon LGA was holiday/leisure. This share fluctuated quite significantly between a low of 53.5% and a high of 76.3%, but trended quite flatly over the whole period from the YE June 2000 to the YE June 2012, averaging 63.6%. This was followed by other visitation (15.6%), business visitation (12.7%) and visiting friends and relatives visitation (8.1%).

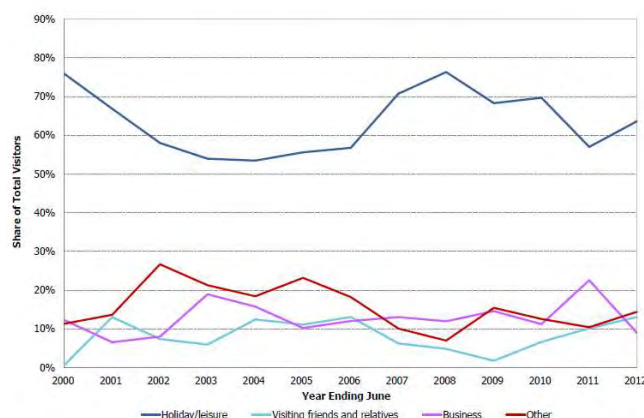


Diagram 6.2: Source: TRA (2012)



6.5 TRENDS

According to the Carnarvon Visitor Centre, visitor numbers have been decreasing recently, though performance has been quite good this year. This is consistent with the falls in visitation surrounding the GFC in Diagram 6.1, and subsequent slow recovery. The Shire also highlighted strong visitation in areas north of Carnarvon to Coral Bay, especially during school holidays (about 5,000 per year). There is a mix of holiday/leisure, grey nomads, backpackers that visit the LGA too (note that the ABS has stopped accounting for backpackers, which account for 800-1,000 visitors per year). Business visitation is also supposedly increasing – an opinion which may be biased by the sharp spike in business visitation in the YE June 2011 in Diagram 6.2. The visitor centre also revealed that during the summer months, many overseas backpackers from Ireland, France, Germany and England visit the area. Visitors have also supposedly increased their lengths of stay in the LGA over the last 1-2 years. However, visitation numbers may have been skewed by the clean-up crews in the area following recent floods and fires.

6.6 TOURIST ACCOMMODATION

EXISTING ACCOMMODATION

Existing tourist accommodation (Carnarvon Beach Canal Retreat) on the islands is located at the southern point of Babbage Island (Reserve 28553). A boat ramp is also located at this site.

Camping is prohibited on the islands and no formal camping facility is provided.

ACCOMMODATION DEMAND

Research undertaken for Tourism WA in February 2012, culminating in the report entitled A Strategic Approach to Caravan and Camping Tourism in Western Australia, summed up the state of tourism accommodation in the town. This research indicated that

there is a feeling amongst stakeholders that although the town has a range of lower end accommodation, such as caravan parks, backpackers and three star motels, most of this accommodation is relatively dated and in need of refurbishment. There is also strong consensus that the limited accommodation available in Coral Bay at present (there are only three land owners who operate a three star resort, two caravan parks and a backpacker hostel), is in need of upgrading.

While the report goes on to identify Coral Bay as a key location in the broader Shire, there are opportunities for Carnarvon, including the islands, to capitalise on demand.

6.7 LOCAL TOURISM ATTRACTIONS

HERITAGE

The Carnarvon Heritage Precinct is located at the north-west corner of Babbage Island (on Reserves 24107 and 8552 and UCL) on Annear Place. The Precinct includes the Old Tramway, a tram ride on the 'Coffee Pot Train' along One Mile Jetty, Lighthouse Keepers Cottage Museum, Railway Station Museum and facilities such as toilets, shelters and a small shop. The area is decorated with old tractors, farm equipment, wagons and train pieces. Visitors can walk along the jetty and tramway, explore the museums and heritage sites and fish off the jetty.

The Precinct is a popular tourist attraction and has significant potential for further development as a tourist node. There is also potential for other tourist facilities to be developed in the area to take advantage of the heritage and interesting features of the site. An increase in visitation could also mean that more funds can be obtained through visitor fees which will help with maintenance of the precinct. Tourist development which can be considered on the island includes a caravan park and recreational facilities such as a golf course.

The community consultation undertaken for the Carnarvon Strategic Community Plan in 2011 shows that the community highly value the heritage aspects of the town and the islands and hope to build on this to enhance the uniqueness and attractiveness of the town.

Tourists can commence their exploration of the islands and its heritage at the start of the tramway on the mainland. The tramway crosses the Fascine and bypasses the Whitlock Island station and Babbage Island Station on its way across the islands to the Heritage Precinct. The stations consist of a quaint iron train station seating area and platform.

This allows people to follow the same route that trains travelled in years past on their way between the old Woolshed and the jetty.

NATURAL FEATURES

The natural environment is an attraction to tourists who are seeking escape from cities and relaxation in nature. The islands are largely undisturbed and contain large areas of vegetation and other natural features such as native fauna, wetlands, creeks, beaches and sand dunes. It is important that, while development takes place on the islands, that proper consideration of environmental impact takes place and that areas are set aside for consideration, recreational use and as public open space. This will ensure enjoyment of the natural environment for future generations.

ACTIVITIES

A number of recreational activities are possible on the islands such as fishing, boating, swimming, walking, bird-watching and sunbathing. Other possible future recreational activities could include camping, golf and a variety of water sports. These holiday-making past-times attract tourists to a location.

OTHER ATTRACTIONS

The facilities currently located on the mainland also help to attract

visitors and tourists to the local area and they might also choose to explore the islands.

The Tramway Bridge provides a pedestrian link between the mainland and the island. Some ideas have been discussed in the past about operating the tram along the bridge and through the islands to provide an alternative mode of transport other than walking. However, this would depend on the ability of the bridge to hold an operating tram.

A children's playground has recently been developed on the mainland where the Tramway Bridge begins. New toilet facilities have also been developed at this spot.

6.8 REGIONAL TOURIST ATTRACTIONS

Tourist attractions surrounding Carnarvon include Ningaloo Marine Park, Coral Bay, Kennedy Range National Park, Blowholes reserve, Mt Augustus National Park, Monkey Mia and Shark Bay. The relative close proximity of these attractions to Carnarvon makes it a good base for people needing a convenient place to stay to visit these attractions or as a stop-over on their way to other sites.

7. TRAFFIC AND INFRASTRUCTURE



traffic and infrastructure

7.1 ROADS

The only access point by car is along Babbage Island Road located at the northern end of the island. This road leads to the Carnarvon Heritage Precinct. Pelican Point Road extends south along the western side of the island. Sections of this road are being threatened by movement of sands dunes in an easterly direction across the road. The management of this road is being considered separately. Whitlock Creek Road is a 4WD track which leads from Babbage Island Road across the centre of the island and connects mid-way along Pelican Point Road.

Main access to the islands will be along Babbage Island Road which is classified as a Local Distributor Road under Main Roads WA Functional Road Hierarchy. Under this classification, Babbage Island Road is expected to carry up to 7,000 vehicles per day. Its current configuration as a 2 lane sealed road allows the road to carry up to 13,000 vehicles per day at a Level of Service of "C". Current traffic volumes are in the order of 1,150 vehicles per day.

Currently the intersections along Babbage Island Road consist of un-channelised standard "T" junctions with the exception of Babbage Island Road and Robinson Road intersection which is channelised. It is anticipated that the current intersections will continue to operate at a satisfactory level of service following development on Babbage and Whitlock Islands.

7.2 JETTIES

Two jetties are located on the western side of Babbage Island. One Mile Jetty is a heritage jetty and is no longer used for significant transport. Its main purpose is as a tourist attraction and for fishing. Prawning Jetty is located just south of One Mile Jetty and has been used for many decades for the whaling and prawning industry. It is currently used by Nor-West Seafoods.

7.3 WATER

There is currently a 375 diameter water main providing water reticulation to Babbage Island. It is understood that earlier enquiries to the Water Corporation indicated that further aquifers in the Carnarvon area have been identified which are capable of being developed to supply proposed development on Babbage and Whitlock Islands. As the Structure Plan is further developed it will be necessary to liaise with the Water Corporation in determining future water sources to service the increase in population associated with any proposed development.

7.4 POWER

Overhead power lines currently supply power to Babbage Island. This is needed to service the homes, Nor-West Seafood factory and campsite and the Carnarvon Beach Canal Retreat accommodation facilities. Current supply can be extended to service the Babbage and Whitlock Island areas. Capacity would need to be determined in association with further development of land use types and quantum.










7.5 WASTEWATER

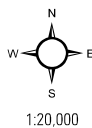
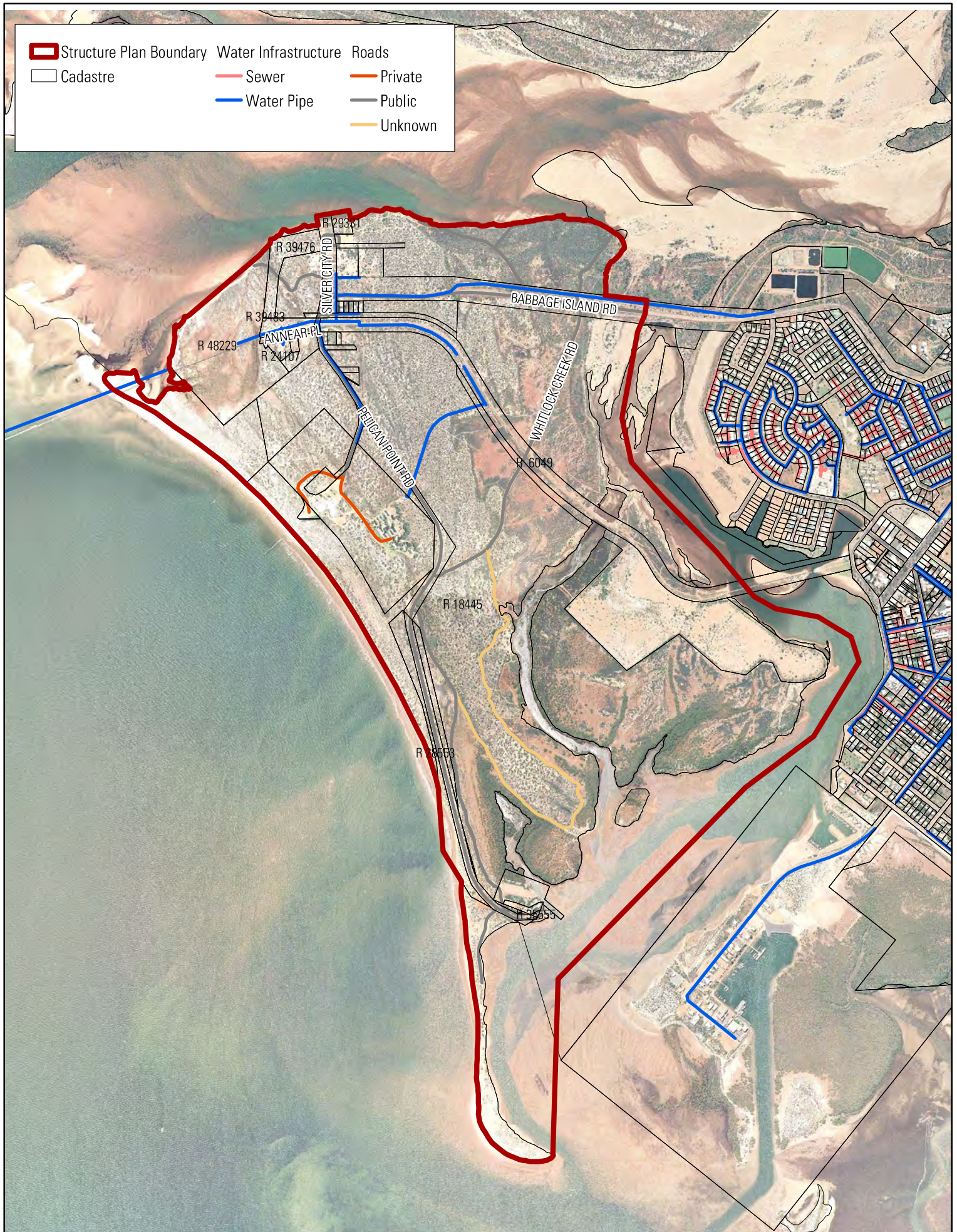
The capacity of the existing wastewater system to accommodate additional flows from Babbage and Whitlock Islands has not been determined; however should development include single residential components, it may be necessary to provide a pressure system and dependent on development density, a possible upgrading of the treatment plant.

A previous land capability assessment reported that onsite septic effluent disposal systems would generally not be recommended for Babbage Island as the soils of the Littoral System do not readily absorb or purify septic effluent because of their poor drainage status and the generally low permeability of surface clay layers. In addition some areas of the Littoral System are susceptible to storm surge which would cause septic systems to fail. Soils of the Coastal System would not readily purify septic effluent because of their very low clay content and very rapid drainage status. However the report did indicate that if superficial aquifers are not to be used for domestic water supply, and given the general aridity of the climate, it may be desirable to allow septic effluent to be added to the soil to increase the chances of survival for introduced vegetation. Alternative options include the use of wastewater recycling systems which currently have the capacity to cater for up to 13,300 persons per day.

7.6 STORMWATER

Water from site facilities and development can be discharged into soakwells onsite. Larger event flows would need to be directed to silt traps and then to infiltration and nutrient stripping basins, or to amenity areas, such as Public Open Space areas, for re-use. Design will aim at managing potentially nutrient rich stormwater runoff so that it is directed away from native vegetation areas and does not discharge directly onto or adjacent to existing native vegetation areas, such as samphire and mangrove communities.

- | | | |
|---|--|---|
|  Structure Plan Boundary |  Water Infrastructure |  Roads |
|  Cadastre |  Sewer |  Private |
| |  Water Pipe |  Public |
| | |  Unknown |



8. VISUAL CONSIDERATIONS



visual considerations

8.1 INTRODUCTION

The landscape character and visual aspects of a location are valuable for intrinsic purposes, for quality of life and enjoyment and for economic benefit. Visual landscape planning looks at the character of the landscape and helps to better understand the scenic quality and sense of place to identify areas of high value. This in turn helps to inform which land uses are more compatible or desirable.

The study area has been visited twice to view the features of the islands, including the visual aspect. A detailed visual impact assessment has not been conducted across the site to date. The methods for visual planning assessment and guidelines for planning are outlined in Visual Landscape Planning in Western Australia (WAPC, 2007).

8.2 TYPES OF LANDSCAPES

The study area consists of a number of different landscapes which vary due to the landform, topography, vegetation, existence of water, existing buildings and other features.

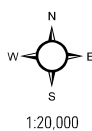
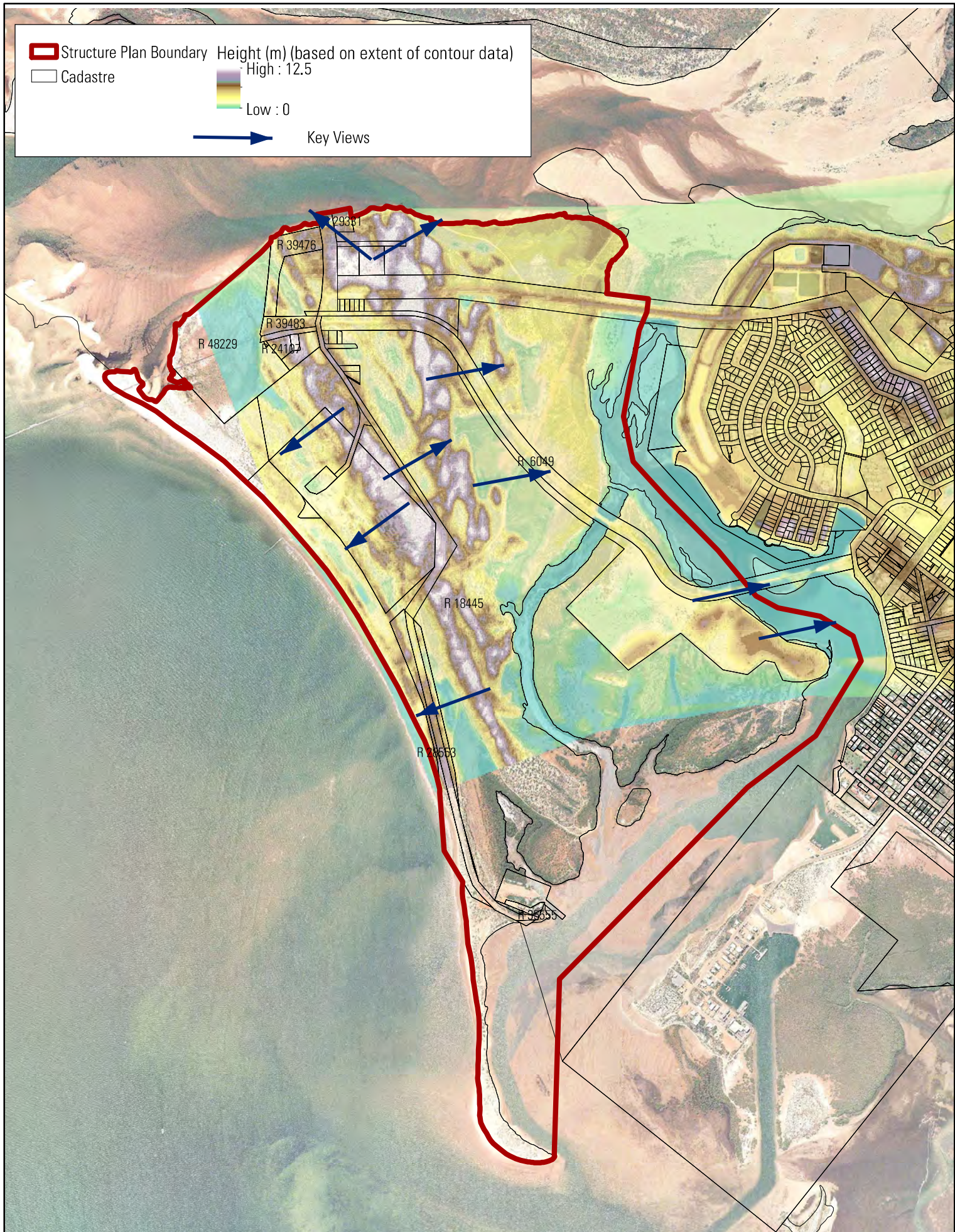
The landscape varies from low-lying areas through the central portions of the islands, to undulating dunes at the western and northern ends of Babbage Island to ocean and Fascine views where the edge of the

islands meet the water. The Gascoyne River can be viewed at the northern end of Babbage Island. The water tank on Babbage Island is an interesting feature which is perched so high in the landscape that it can be viewed from many locations on the islands.

8.3 AREAS OF VALUE

The central areas of Babbage and Whitlock Islands largely consist of low-lying samphire plains. These areas become waterlogged in winter and pools of water accumulate, the blue colours of which contrast with the greens and reds of the vegetation. The edge of the low-lying plains are back dropped with either the mangrove trees on Whitlock Island or the vegetated dunes on Babbage Island.

Ocean and water views are generally not obtained from the low-lying areas as they are obstructed by the surrounding dunes. Views from the top of or on the opposite side of the dunes of the ocean, Fascine or Gascoyne River are of high value. The southern end of Babbage Island (Pelican Point) also has views of the Fascine, the town and the sand spit. It is anticipated that these views will be a major attraction for any future residential or tourist development. Views from the eastern side of Whitlock Island look out across the Fascine and towards the Carnarvon townsite which are also of high value.



9. HERITAGE



heritage

9.1 ABORIGINAL HERITAGE

A search of the Aboriginal Heritage Inquiry System (Department of Aboriginal Affairs) indicates that one Registered Aboriginal Site is located within the study area. The site covers the northern half of Babbage Island and is called the Carnarvon Fascine (Site ID 874). The site type is described as scatter, artefacts and scatter midden.

Aboriginal people still use the waterways and Fascine for recreation and social activities, and children often play, swim and fish on the sandy beach area to the east of Tramway Bridge.

9.2 EUROPEAN HERITAGE

The Fascine is listed on the Register of National Estate (non-statutory archive) with the Place ID 18815. It is described as *unique to the town of Carnarvon and is an essential townscape element to the character of Carnarvon. The survival of the town and its growth is heavily linked with the Fascine and the early settlement of the town was based around the Fascine.* The name 'Fascine' is derived from the Latin 'bundle of sticks' due to the timber pile retaining wall built to prevent erosion of the river bank in case of floods. Public buildings, hotels, hostels and business houses were built behind the wall (along what is now Olivia Terrace) and a jetty was built in 1884-85.

One Mile Jetty is also listed on the Register of National Estate (non-statutory archive) with the Place ID 17038. It is described as *one of the few remaining timber jetties constructed during the most active period in the provision of marine facilities in WA between 1880-1910. The jetty is rare in being an element of a circular transferral system that still has largely intact fabric from the jetty to the receival points to the town. It remains, with the Busselton and Bunbury jetties, one of the last of its type on the WA coast. It is the second longest timber jetty in WA.* One Mile Jetty was built in 1897 and was the first port in Australia where livestock was exported regularly on a commercial basis by sea. It has a close association with the history of coastal shipping in WA and was essential to the development of Carnarvon. It enabled the development of pastoralism in the region by providing transport for cattle, sheep, pearl shell and sandalwood.

The Lighthouse Keeper's Cottage is listed on the Register of National Estate (non-statutory archive) with the Place ID 14522. *It is significant in demonstrating a way of life now seldom practised, maintaining the*

isolated light as part of a group of structures including the light tower, the Mile Long Jetty and the remains of the tramway. The cottage is important as an extant example of a typical timber and iron Public Works Department cottage. The Lighthouse Keeper's Cottage was built in 1897 to house the lighthouse keeper and his family and was used until the late 1970's when the light became electric. The lighthouse opened as a museum in 1988 after community effort saw the preservation of the cottage. It is located on Babbage Island near One Mile Jetty and the tramline.

Sites listed on the State Heritage List (State Heritage Office) include:

- The Fascine
- One Mile Jetty and Tramway (State Registered Place)
- Babbage Island Causeway Bridge
- Prawning Jetty
- Meatworks.

The old tramway was built with the purpose of transporting goods and passengers between town and the port of Carnarvon. It carried wool and other exports to the ships waiting in port and returned to town with goods from Fremantle. In the early 1900's the train stopped in the heart of town, at a goods yard at the rear of the Gascoyne Hotel (where the Civic Hotel is today). The first steam locomotive to use the tramway and One Mile Jetty was the Kia Ora in 1909. The last steam train to use the jetty was in 1950 when they were replaced by diesel trains. State ships would visit Carnarvon twice a week at this jetty. It ceased to be used in 1966. Visitors can walk along the jetty to view marine life and the mouth of the Gascoyne River. The Kimberley Steam Loco retired in 1958 and is now displayed at the Railway Station Museum.

The Prawning Jetty was originally built for the Nor West Whaling Company in 1920. The company later turned its attention to the prawning industry. The timber jetty has rail tracks running along its length and is fenced to prevent public access.

The Carnarvon Heritage Precinct includes One Mile Jetty, the old tramway, Kimberley steam trains, walk trails, railway station and the Lighthouse Cottage Museum. The precinct includes some tourist walk trails so that visitors can explore these sites. The Gascoyne River mouth Walk trail is 400m long and takes in views of the Gascoyne River and One Mile Jetty and includes 2 lookout points. The Tramway Walk trail starts at the Tramway Bridge and travels along the railway line to the heritage precinct and One Mile Jetty.



10. CONSULTATION



consultation

10.1 CONSULTATION MECHANISMS

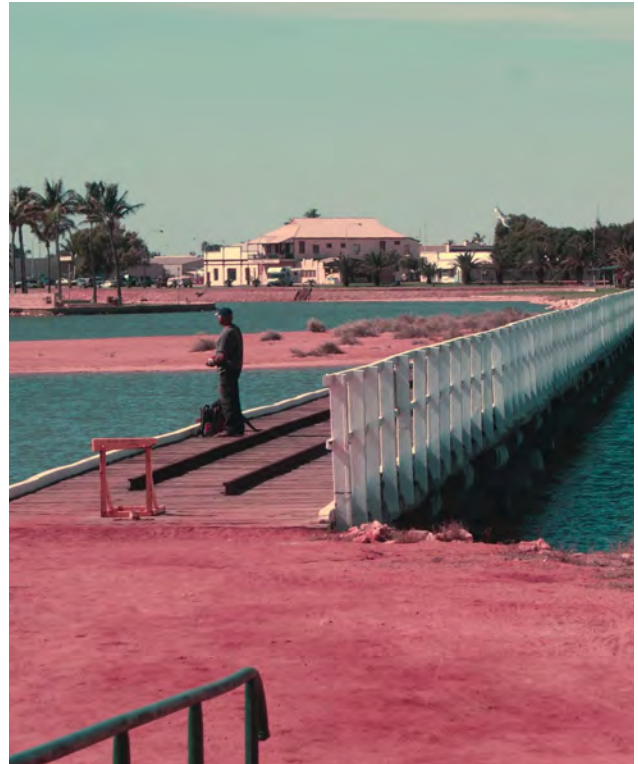
A range of mechanisms have been used to efficiently gather relevant information for the project. These have included the formation of a project Working Group with members comprising relevant technical and interest groups; holding a community meeting and circulating questionnaires as well as identifying and writing to, or meeting with, relevant groups. A summary of the consultation outcomes to date is provided below.

10.2 WORKING GROUP

Members of the Working Group include:

- Shire of Carnarvon officers
- Shire of Carnarvon Councillors
- Tourism WA
- Landcorp
- Department of Environment Regulation
- Department of
- Gascoyne Development Commission

The first Working Group meeting was held on the 2nd May 2013. The purpose of the meeting was to introduce the Group to the project and to identify their values, issues and ideas regarding future use of the islands. The outcome of the meeting is summarised below.



VALUES	ISSUES	TRENDS
<ul style="list-style-type: none"> • Natural environment (vegetation, coastal flats, dunes, river, beach etc.) • Heritage • Isolated and quiet • Access • Separated from the mainland • Backdrop view for the town • Coastal rather than river environment • Tourism potential • Water frontage around island • Low-key development • Economic impetus for town development. 	<ul style="list-style-type: none"> • Suitability of soils • Cost of development (infrastructure) • Mobile dunes • Acid sulphate soils • Storm surge and flooding, impact of cyclones • Coastal setbacks • Environmental degradation (removal of mangroves, erosion of dunes, impact on wetlands, eutrophication etc.) • Community may be reluctant to change • Impact on views • Limited vehicle access 	<ul style="list-style-type: none"> • Increasing population • Ageing population • Need short-term accommodation • Link to other tourism site • High cost of infrastructure • Current lack of guidance for development • Capitalise on the qualities of the site, including natural features • Do not compromise values • Heritage and eco-tourism • People want to live near water • High and low tide boundaries • Economic drivers – this could be an opportunity to do something.



VISION IDEAS

Passive recreation

Passive recreation (golf course etc.)

Tourism (and eco-tourism)

Retain heritage

Focus on tourism and recreation

Limited residential

Retain natural environment and views

10.3 OTHER GROUPS

Letters were sent to key agencies and interest groups advising them of the project and inviting comment. The following were contacted:

- Department of Planning
- Department of Environment Regulation
- Department of Water
- Department of Transport
- Department of Fisheries
- Department of Regional Development and Lands
- Department of Indigenous Affairs
- Carnarvon Heritage Group Inc.
- Gascoyne Development Commission
- Carnarvon Chamber of Commerce and Industry
- Landcorp
- Member for the North-west
- Tourism WA
- Carnarvon Tourism Alliance
- Yamatji Marlpa Aboriginal Corporation.

Some of the agencies requested a meeting. These were held with the following:

- Landcorp
- Tourism Alliance
- Tourism WA
- Gascoyne Development Commission.

10.4 COMMUNITY MEETING

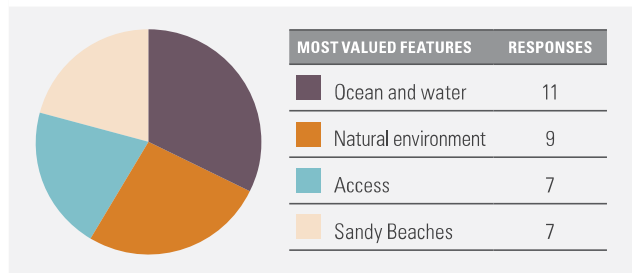
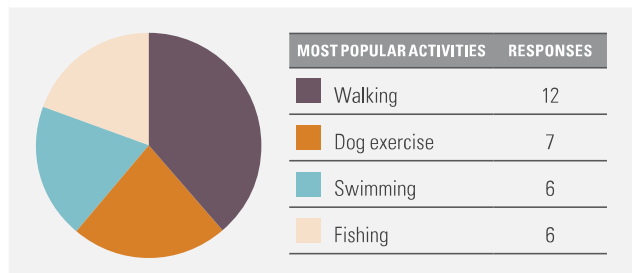
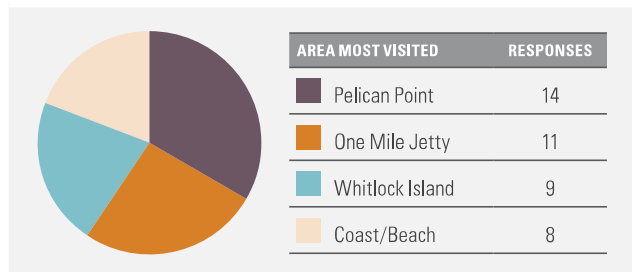
A community workshop was held at the Shire on the 5th June 2013. Members of the public were invited to attend a 2 hour workshop to hear about the project and were invited to share their ideas about future development on the islands. The workshop also focussed on obtaining background information. The ideas and information gathered from the workshop will be considered during the preparation of the development scenarios. The consultants and Shire Project Manager were also available on the afternoon of the 5th of June so that community members could come and chat in an informal setting about their ideas and values. Feedback from the community workshop includes:

- No development of high density or tall buildings desired
- The islands should be viewed as an important area for development and should be a priority for residential and recreational use
- A retirement village is needed and could be located on the islands
- A golf course could be established
- A caravan park should be proposed at the north-west corner of Babbage Island
- Whitlock Creek should be dredged so it can flow at the northern end again and possibly a channel under Babbage Island Road
- Establish a rock face on the western side of the coast near Pelican Point Road

- Keep development on the eastern side of Whitlock Island unobstructed to avoid disturbing views from the mainland across to the island
- Establish a resort on the eastern side of Whitlock Island and a waterpark
- Upgrade Tramway bridge to allow trams to operate along it to provide alternative access
- Establish a golf course on the south-east corner of Whitlock Island
- Place a retirement village at the south-east section of Whitlock Island
- Ensure new development is sustainable – use renewable energy, water tanks, etc.
- Alternatively, place the caravan park at the southern end of Babbage Island near the existing toilets and beach access
- Place a memorial on the Islands for the HMS Sydney
- If residential areas are proposed, incorporate a range of lot sizes.

10.5 COMMUNITY QUESTIONNAIRE

A community questionnaire was also distributed at the start of the project. The purpose of the questionnaire was to gain a general idea of how the islands are currently used and valued and what the community like and dislike about current development and their ideas for the future. The questionnaire provided a different way in which the community could express their ideas and values. The outcomes of the questionnaire are as follows:



The survey found that the most popular frequency for visits is once a week or once a month. Importance of environmental values was given a moderate rating by most participants.

What does the community most like about the islands?

- Natural environment
- Prime development land
- Plenty of space
- Beach walks
- Accessibility
- Peaceful and quiet.

What does the community dislike about the islands?

- Rubbish
- Wasted space
- Roads are poor standard
- Lack of action and development
- Unattractive beach (brown sand, eroding and seaweed).

What would the community do to change the islands?

- A retirement village on Whitlock Island

- Residential development
- 9 hole golf course
- Caravan park
- Tourist resort/hotel.

Other comments and suggestions:

- Consider the impact of development on sand dune – they provide a natural windbreak
- Recreational playground on Whitlock Island
- Desperate need for development
- Best use of the islands is for a resort, caravan park, boating facilities, restaurant and bar
- Do not establish a golf course
- Lucky to have this place close to town
- It's a relaxing place.

The survey indicates that there is a variety of opinion on what features are most valued and of ideas and suggestions for the future use of the islands. These suggestions form the basis of the development scenarios prepared for the site.

11. OPPORTUNITIES AND CONSTRAINTS



opportunities and constraints

11.1 BACKGROUND

This chapter discusses the opportunities and constraints to future development on the islands. It considers community desires from the consultation period, existing land uses, demand for development, environmental values, services and infrastructure and access.

Opportunities for development generally consist of:

- Attractiveness of the location (environmental values, landscape, views, aesthetics, character etc.)
- Heritage values
- Proximity to services and infrastructure
- Adequate road and pedestrian access
- Provide for demand.

Constraints to development generally consist of:

- Environmental constraints (such as areas of high environmental value, wetland areas,
- Heritage sites
- High costs of services and infrastructure
- High costs to provide access
- Lack of demand.

11.2 COMMUNITY DESIRES

Feedback from the consultation conducted early in the project suggests that there is some variety in the community desires for the future of Babbage and Whitlock Islands. Some would like there to be no change, others would like to see a focus on recreational and tourist development (such as camping and caravan parks) and some are optimistic about seeing how feasible it would be to develop a range of land uses on the islands such as residential, recreational and tourism.

The openness of the community to explore development and planning options for the islands is a major opportunity and allows some creativity in this process. Other opportunities and constraints should also be considered.

11.3 EXISTING LAND USES

A majority of the study area is undeveloped which provides a significant opportunity for development as there is a limited amount of land which is already being used. In addition, some of the existing land uses such as the heritage precinct and the tourism and recreational sites at the southern end of Babbage Island provide an opportunity for associated tourism development.

The location of the old tramway which crosses through Whitlock Island and the northern end of Babbage Island is a minor constraint as this will need to be preserved.

11.4 DEMAND FOR DEVELOPMENT

The demand for residential land will need to be further investigated by the Shire and developers in order to determine whether there is a need to develop the islands for this use. This will depend on the

number of people moving to the town, the attractiveness of the location, employment opportunities, the cost of land and the availability of land elsewhere in the town. Other areas of the town are also being considered in separate Structure Plans currently. At current growth rates, and taking into account possible future land releases in Carnarvon, coupled with the likely high cost of development on the islands, it is anticipated that residential development will not be a viable or desirable outcome.

There is considered to be potential for further promotion and development of the islands as a tourist site in association with the heritage precinct. Currently, there is nowhere for visitors to stay as camping is prohibited and the only formal accommodation is provided at Pelican Point. There might be opportunity for the development of a camping and caravan site at the northern end of the island. A camping and caravan site could also be an option at the southern end of Babbage Island near the beach area, however this site has a few issues such as a receding coastline, limited shelter from winds and the low-lying wet areas behind the dunes are not considered suitable for development.

There could also be opportunity for the development of a 4 (or possibly) 5 star beachside resort on Whitlock Island which will offer a range of recreational activities. It is expected that the resort will provide high quality facilities and activities which will mean that people will travel specifically to Carnarvon to stay there.

Alternatively, this site could be developed as a low-key tourist site which will require less initial investment and infrastructure. The site could be self-servicing (such as solar panels and rainwater tanks) which could further increase the feasibility of the development.



The development of a retirement village is another option. There might be some demand for this land use as there are currently no retirement villages in Carnarvon. It is noted that some retirees stay in caravan parks for extended periods while travelling and might prefer a permanent base in the town.

11.5 ENVIRONMENT

A majority of the islands have been relatively undisturbed, and, as such, consist of vegetation in very good condition. The vegetation not only has environmental value in itself, it also provides important habitat for native fauna, including nursery areas within the mangroves for fish and feeding areas on the tidal flats for waterbirds. Pristine areas also attract tourists who are seeking an escape from the urban environment and new residents who want to live closer to nature. Therefore, it is important to retain the natural environment to encourage these land uses (which can also provide an economic benefit to the town).

11.6 SERVICES AND INFRASTRUCTURE

The islands are not currently well serviced with power, water, gas or wastewater. Feasibility studies for the proposed development on northern Whitlock Island previously found that costs could exceed millions of dollars to provide power, water and gas from the mainland. It was decided that this made the project unfeasible.

If residential and commercial land uses are proposed on the islands, the provision of services and infrastructure should be considered as

this could be a major constraint to this type of development. Low key recreational and tourist land uses could be a better option for the islands if the provision of services and infrastructure is not feasible.

11.7 ACCESS

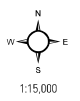
Access is currently via Babbage Island Road at the northern end of the site. If intensive development occurs on the islands this might require the need for more access points to reduce congestion on Babbage Island Road and to increase safety in the case of an emergency, however preliminary investigations reveal that road and intersection standards are appropriate. Some upgrades to the existing access might also be necessary.

Access is already provided through Babbage Island. Pelican Point Road provides access to the southern end and Whitlock Creek Road provides access through the centre of the island. Whitlock Creek Road is a gravel road and will need to be upgraded to facilitate any development within this area. Pelican Point Road is being threatened to be covered by dunes at the southern end so some upgrades might be required along this road also.

The existing road access could provide an opportunity for further development of low-key recreation or tourism development. Some upgrades and extensions to the road system might be required.

Pedestrian access can be obtained via Tramway Bridge and along the old tramway line which runs through the centre of the islands and leads towards One Mile Jetty. It is unlikely that the bridge will be upgraded to allow for anything other than pedestrian use.

Structure Plan Boundary	Opportunities and Constraints	Roads	Recreation Tourism Sites	Sewer	Setback Line
Cadastre	Constraint	Private	State Register of Heritage Places (Permanent Listing)	Water Pipe	Storm Surge Inundation Risk
	Opportunity	Public	Aboriginal Heritage Sites		
	Opportunity and Constraint	Unknown			



12. SCENARIOS



scenarios

12.1 BACKGROUND

Three scenarios for the future use and development of the islands have been developed, each providing a different level of planning intervention and possible outcome. The purpose of considering development scenarios is to explore the implications of different approaches to long-term planning on the islands in relation to the various opportunities and constraints described earlier. In this regard it is anticipated that development of the islands will likely occur over several years, with possibly no significant, if any, change occurring in the short to medium term. As a result the scenarios consider a very broad land use classification that will likely flow into the future Structure Plan, with the detail to be considered based on economic and technical considerations at the time of development.

In this regard, the three scenarios have been developed with particular themes:

1. Residential
2. Tourism and Recreation
3. Conservation and Amenity

For each scenario the following considerations are addressed.

DESCRIPTION

What is the scenario? What will it involve? What outcomes is it aiming to achieve?

WHY IS THE SCENARIO INCLUDED

Each scenario has been chosen to reflect a real, but different, possibility for the future use and development of the islands. By testing different scenarios the positive and negative aspects can be explored, along with implementation opportunities.

WHAT ARE THE POSSIBLE OUTCOMES

This is an essential consideration for each scenario. The key likely outcomes are identified and described.

WHAT ARE THE DRIVERS OF CHANGE?

Implementation is fundamental to success. Each scenario will have different levels of implementation difficulty, and it is important to assess what will drive the change suggested under each scenario.

12.2 COMMON THEMES

A number of common land uses and activities appear on all three scenarios. It is considered that these form an acceptable development type and that they should, in some form, appear on the final Structure Plan.

HERITAGE PRECINCT

The protection of the tramway reserve and the One Mile Jetty heritage precinct are important elements of the islands that should be retained and enhanced.

RECREATION NODE

A recreation node has been shown north of the Heritage Precinct on each plan. The exact form of development within this node may change slightly within each scenario however, based on tourism demand,

attractiveness of the island as a destination, lack of comparable sites and the proximity to the town centre, it is considered worthwhile to progress with recreation uses in or around this locality.

Further recreation nodes have been identified near the beach access adjacent to the Prawning Jetty to reflect the current use of this locality, with another focused on the car park area near the new toilet facilities where public access to the beach is provided.

CONSERVATION

The low-lying mangrove areas (predominantly on Whitlock Island) and the elevated sand dunes at the southern end of Babbage Island are identified as areas for protection and conservation on each scenario. These areas have been identified for conservation as they have the most constraints for development due to their low-lying nature or strong prevailing winds. It also presents an environmental benefit by identifying and protecting areas from development.

12.3 SCENARIO 1 – RESIDENTIAL THEME

DESCRIPTION

Residential development is the focus of this scenario. It is envisaged that the identified portion of the site would be developed as low to medium density permanent housing, comprising primarily detached dwellings. This is a form of development that is typical of Carnarvon however the location on Babbage Island would likely result in this residential precinct being highly sought after.

A limited residential/tourism node has been identified on Whitlock Island to cater for semi-permanent residents of the Shire. It is anticipated that such a facility would be centrally managed and restricted to retirees or those over 55 years of age. It may appeal to those who regularly visit the Shire on an annual basis for several months and who currently stay long-term in caravan parks out of town. Conversely, it may provide an opportunity for existing residents to downsize and remain very close to the town centre. The possibility of a tourism component could also be considered.

The balance of the island, comprising mainly the lower lying areas, has been identified for conservation purposes which would preclude any further vegetation removal or changes to the landscape.

In summary this scenario includes:

- Protection of the heritage precinct
- Development of a low-key tourism node for camping adjacent to the Gascoyne River
- A large portion of land that has been designated for residential purposes. This area could theoretically cater for 1200 lots at a density of R20 (min 500m² lots)
- Development of a managed permanent residential resort for over 55's on Whitlock Island
- Small tourist development as an ancillary development to the residential resort on Whitlock Island
- Creation of a conservation reserve or Public Open Space over low lying areas on the eastern half of the islands, as well as the elevated area to the south of Babbage Island that is exposed to strong prevailing winds.

WHY IS THIS SCENARIO INCLUDED?

The islands are considered prime real estate and residential development of various intensities and types has been considered previously. Residential development may provide a longer term and alternative housing choice for existing and future residents of the Shire.

POSSIBLE OUTCOMES

Substantial residential development on the islands

This scenario would see a potentially large residential estate established on the island. The land would be elevated and offer both good ocean and inland views. Over time it is expected that the land would become quite valuable and would offer a unique permanent residential address in the town.

Limited tourism development – nothing much for tourists

With residential development being the main focus, the use of the islands for tourism development will not be as significant. The character of the island will largely be driven by the large residential component.

Lower lying areas reserved for conservation purposes.

A large residential population will require a proportionate area of public open space. This scenario provides for this by identifying the lower lying areas of the islands as Conservation and Recreation. Under this scenario, the land uses within the Conservation and Recreation area would likely have a greater focus on local recreation needs. Management would be very important with potential impacts associated with the adjoining residential development, including for instance increased use, domestic animals, weed management and water management, to be addressed as required.

Management of development process

Given the likelihood of limited residential demand in Carnarvon over the medium to long term, it is likely that any residential development would occur in stages. Each stage would need to be carefully managed to control and environmental degradation during the development process – particularly in relation to the removal of the vegetation (which binds loose sand) and exposing sand dunes to the strong prevailing winds.

Possible enclave

The residential development on the island will likely become exclusive over time. While in close direct proximity to the Carnarvon town centre, the route from the island to the town centre is circuitous. This could create a situation whereby the residential development develops the character of an exclusive enclave with somewhat limited connection to the remainder of town.

Development costs

Development and post-development environmental and servicing requirements will be significant given the location and features of the locality.

WHAT ARE THE DRIVERS OF CHANGE?

The high development and servicing costs on the islands will ensure that development occurs only when there is likely to be a sufficient demand for prime residential land. At this stage it appears that there are limited economic drivers in the Shire or broader region that could deliver such a demand.

12.4 SCENARIO 2 – RECREATION AND TOURISM THEME

Description

This scenario promotes low-level development on the islands that caters predominantly to the public. The development proposed is comparatively low key, recognising the land qualities of the islands. This scenario includes the following:

- Protection of the heritage precinct
- Development of a low-key tourism node for camping adjacent to the Gascoyne River
- Development of a nine-hole golf course
- Development of a regionally-significant adventure playground
- Creation of a Conservation precinct over low-lying areas across Whitlock Island (to provide an opportunity for remediation of low-lying mangrove areas) and the elevated lands that are subject to strong prevailing winds
- Development of a small tourism node for 3-4 star accommodation on Whitlock Island.

WHY IS THIS SCENARIO INCLUDED?

Use of the islands for recreation purposes has been raised as a future vision during the consultant process. The exact form of recreation is still to be considered, however this scenario shows recreation uses that require a larger land area to allow this option to be further explored.

POSSIBLE OUTCOMES

High level of public use

This scenario encourages public use of the site with the provision of recreation facilities to complement the natural location of the islands and the heritage features contained thereon. The island offers a unique environment for the establishment of a golf course, which could become a destination in its own right over time. The low key tourism nodes, coupled with an adventure playground, would result in the islands becoming a family-friendly tourist destination.

Management of low lying areas

A golf course and adventure playground (or other recreation facility) would likely be developed on the lower lying areas of the island, protected from the strong prevailing winds. Environmental management of these areas would need to be carefully considered – particularly in relation to water balance, nutrient management and potential flooding/inundation risk.

Protection of dune systems

This scenario placed the majority of the development proposed in lower lying areas, thus protecting the majority of the potentially mobile dune systems from impact.

Development and servicing costs restrained

The low level of development infrastructure on the island would restrain the cost of serving and infrastructure required.

WHAT ARE THE DRIVERS OF CHANGE?

Investment from the Shire and/or a private recreation club would be needed to implement the majority of this scenario. The development

of the small tourism node on Whitlock Island would likely be privately-funded and therefore subject to economic viability assessment.

Shire or private club investment (in conjunction with Shire) would be required to see the majority of this scenario transpire. Tourism operators would need to consider the feasibility and components of a tourism node.

12.5 SCENARIO 3— CONSERVATION AND AMENITY THEME

DESCRIPTION

This scenario reflects an approach of minimal intervention on the islands, almost to the point of maintaining the status quo in terms of land use, but with improved management structures in place to maintain the environmental features of the islands.

In summary this theme includes:

- Protection of the heritage precinct
- Development of a low-key tourism node for camping adjacent to the Gascoyne River
- Reservation of the majority of the islands for conservation purposes
- Permitting low-key recreation uses in identified areas (most likely subject to a management plan)
- Environmental remediation of degraded areas
- Maintaining public access and ownership.

WHY IS THIS SCENARIO INCLUDED?

This scenario reflects the significant environmental features (and therefore development constraints) that are present on the islands. This scenario provides the opportunity for the islands to be managed with

an environmental focus, while allowing for low-key recreation pursuits such as walking, cycling and fishing.

POSSIBLE OUTCOMES

Land use on the island remains relatively unchanged

Existing land uses across the island will remain unchanged under this scenario. There are opportunities to rationalise land tenure, reserve purposes and TPS zones and reserves to reflect the intent to retain the islands in as much of a natural state as possible.

Filled areas of mangroves are remediated

Removal of poor quality fill and remediation of mangrove areas on Whitlock Island could occur under this scenario. No development would occur in this locality.

Management plan prepared to facilitate environmental management and low-key recreation

It is anticipated that an island-wide management plan is prepared to guide the use and management of the islands, with a focus on wetlands, mangroves and coastal locations.

Appropriate public access provided for

While the island would be managed for conservation purposes, public access could still be provided. The management plan referred to above would provide details on how a network of appropriately managed walk/cycle pathways could be established to link recreation nodes around the coast.

WHAT ARE THE DRIVERS OF CHANGE?

Shire agreement, possibly in conjunction with the Department of Parks and Wildlife, would be required to affect Town Planning Scheme changes and reserve purpose changes to reflect a conservation and recreation use. There would be limited or no private sector investment in the islands under this scenario.



Structure Plan Boundary Scenario 1 - Residential Theme

- Cadastre
- Residential
- Over 55 Residential and Tourist Node
- Recreation
- Heritage Precinct
- Conservation

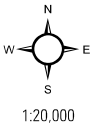
Residential Precinct
 Medium-Low density residential estate developed to capture both ocean and inland views. Approximately 1200 lots based on R20.

Recreation Precinct
 Low-key camping site to be established. Possibly managed by the Shire.

Heritage Precinct
 Heritage Precinct to be developed and promoted in accordance with approved Structure Plan.

Conservation/POS Precinct
 Public Open Space and Conservation Reserve to be used predominantly by local residents of the island. Management of the area will be required to limit environmental degradation.

Residential and Tourism Node
 Centrally managed residential park with ancillary tourism accommodation.



- Structure Plan Boundary Scenario 2 - Tourism & Recreation Theme
- Cadastre
- Scenario 2 Heritage
- Scenario 2 Conservation
- Scenario 2 Heritage
- Scenario 2 Recreation
- Scenario 2 Tourism

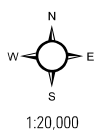
Recreation Precinct
 Golf Course spanning either side of Babbage Island Road. Outdoor activity area, for instance Adventure Playground, to be constructed behind dunes adjacent to heritage trail. Gof Club rooms to be developed in this location to provide focus of development and facilitate security of playground area.

Recreation Precinct
 Low-key camping and RV parking site to be established. Possibly managed by the Shire.

Heritage Precinct
 Heritage Precinct to be developed and promoted in accordance with approved Structure Plan.

Conservation Precinct
 Reserve areas to be managed for conservation purposes. Public access permitted but managed in accordance with a Management Plan.

Tourism Node
 Centrally managed good quality 3-4 star tourist accommodation. Size to be determined, but should be limited to area identified that is not affected by inundation risk.



- Structure Plan Boundary Scenario 3 - Conservation and Amenity Theme
- Cadastre
- Scenario 3 Conservation
- Scenario 3 Heritage
- Scenario 3 Tourism
- Scenario 3 Recreation

Recreation Precinct
Low-key camping site to be established. Possibly managed by the Shire.

Heritage Precinct
Heritage Precinct to be developed and promoted in accordance with approved Structure Plan.

Conservation Precinct
Reserve areas to be managed for conservation purposes. Public access permitted but managed in accordance with a Management Plan.

Conservation Precinct
Filled mangrove areas to be remediated.

