GOVERNMENT OF WESTERN AUSTRALIA

Western Australian Planning Commission

Our ref: SPN/0419
Enquiries: Luke Pickersgill
(Luke.Pickersgill@dplh.wa.gov.au)

Shire of Dandaragan
PO Box 676
JURIEN BAY WA 6516

Transmission via electronic mail to: council@dandaragan.wa.gov.au

Dear Sir/Madam

EXTENSION OF APPROVAL PERIOD - TURQUOISE COAST DEVELOPMENT STRUCTURE PLAN

Pursuant to Clause 28 (2), Part 4, Schedule 2 of the *Planning and Development (Local Planning Schemes) Regulations 2015*, the Western Australian Planning Commission on 18 June 2024, resolved:

1. Approved an extension of the approval period for the Turquoise Coast Development Structure Plan for a further period of ten years, expiring on 19 October 2035.

Advice:

a. This approval is for the Jurien Bay Structure Plan only. Separate approval(s) would be required if the approval period for structure plans covering Areas 1, 2A and 3 was to be requested;

b. Future structure planning, subdivision and development is expected to occur in accordance with the requirements of State Planning Policy 3.7: Planning in bushfire prone areas and the findings and recommendations of the Bushfire Hazard Level Assessment prepared by Emerge Associates (Doc No. EP22-038(03)-004 SPL) dated December 2023;

c. At the time of any future structure planning or subdivision application, coastal hazards are to be assessed in accordance with the requirements of State Planning Policy 2.6 Coastal planning applicable at that time;

d. Special Residential zones are no longer supported by the Commission and larger residential lots should be designated as future Residential zones in any future structure plans or amendments;

e. Attention may be required to manage potential land use compatibility issues in Area 3 between the General Industry zone and Residential zone;

A copy of the current approved structure plan is attached to this emailed correspondence.

Yours sincerely

Sam Boucher.

Ms Sam Boucher
Secretary
Western Australian Planning Commission
25 June 2024

TURQUOISE COAST DEVELOPMENT,

JURIEN BAY STRUCTURE PLAN

AMENDMENT NO. 1

JULY 2009

Prepared by:

MGA
Town Planners

26 Mayfair Street,
West Perth WA 6005
Postal: P O Box 104,
West Perth WA 6872

Ph: 9321 3011
Fax: 9324 1961
Email: mga@global.net.au

ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the Shire of Dandaragan Town Planning Scheme No. 6.

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

23 June 2009

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**

Resolution of the Council of the Shire of Dandaragan on 7 AUGUST 2008

And the seal of the Municipality was pursuant to the Council's resolution hereunto affixed in

the presence of:

.....

President, Shire of Dandaragan

Date: 30.7.2009

SHIRE OF DANDARAGAN
Common Seal

Chief Executive Office, Shire of Dandaragan

.....

Date: 21.7.09

Turquoise Coast Development, Jurien Bay Structure Plan

Amendment No. 1

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1. INTRODUCTION

The Turquoise Coast Development at Jurien Bay is subject to a hierarchy of planning instruments created under the Shire of Dandaragan's Local Planning Scheme, guiding the subdivision and development of the area. The development site is zoned "Special Development" and the provisions of this zone require an overall Structure Plan to outline the broad development strategy. Below this tier, local structure plans, described as "Development Plans", provide a flexible, more detailed blue print for development of neighbourhoods including a zoning regime. Finally in certain instances, Detail Site Plans can be introduced providing planning control over the development of individual lots.

The Turquoise Coast Structure Plan was approved in November 2003 and as discussed, applies to land zoned "Special Development". Since approval of the Structure Plan, Amendment No. 23 to Council's Scheme was Gazetted on 16 June 2006 including Recreation Reserve 35716 in the "Special Development" zone. Accordingly, the Scheme requires that this land should be incorporated into the Structure Plan and ultimately a Development Plan before any development of this land can occur. In readiness, it is therefore proposed that this land be included in the Structure Plan and added to Cell 2. The Structure Plan amendment also allocates possible uses to the reserve and deletes a proposal for a large area of open space adjacent to the north-eastern boundary of Cell 2 which was previously seen as a possible exchange area for Reserve 35716.

A further amendment to the Structure Plan is proposes a triangular shaped area of land (Cell 3) at the junction of Bashford Street and Indian Ocean Drive to be used for a mix of Industrial and Special Residential purposes. Currently, the Structure Plan shows this Cell to be Special Residential with a portion of Highway Commerce. The amendment also contemplates a boundary adjustment between Cells 2 and 3.

2. INCLUSION OF RESERVE 35716

Reserve 35716 was vested in the Crown under Section 20A of the old Town Planning and Development Act for the purposes of "recreation" in 1978. The land was vested as part of the subdivision process of Victoria Location 8837, a large lot generally south of Lindsay Street/York Street. The reserve measured over 13ha in area and created POS in advance of the 10% policy requirement.

Figure 1 is a copy of the Plan of Survey (Plan 12410) creating the Reserve and **Figure 2** shows the reserve in the context of the subdivision of Location 8837 at the time the land transferred to the current owner, Ardross Estates Pty Ltd. The development remains well in credit in terms of POS as illustrated by **Figure 3**.

Reserve 35716 therefore comprises a large area of land which is generally flat with elevations ranging from approximately 3 metres to 4 metres AHD. Ocean surrounds the locality of Reserve 35716 to the north, west and south with the result that only a thin fresh water lens overlies brackish groundwater. Accordingly, there is a very limited supply of groundwater for irrigation.

Structure planning envisages the separation of the existing Jurien Bay High and Primary Schools by an area of open space. It is planned that active recreation be provided at a joint facility at this location rather than developing Reserve 35716. A joint school/public active recreation area will make best use of limited water supplies for reticulation.

Reserve 35716 has no particular environmental assets creating a conservation imperative. An environmental report associated with the Turquoise Coast Development leading to publication of EPA Bulletin 1031 identified large areas of land which should be conserved. Reserve 35716 is not contiguous to any of these conservation areas and therefore cannot be usefully added to the areas of conservation land.

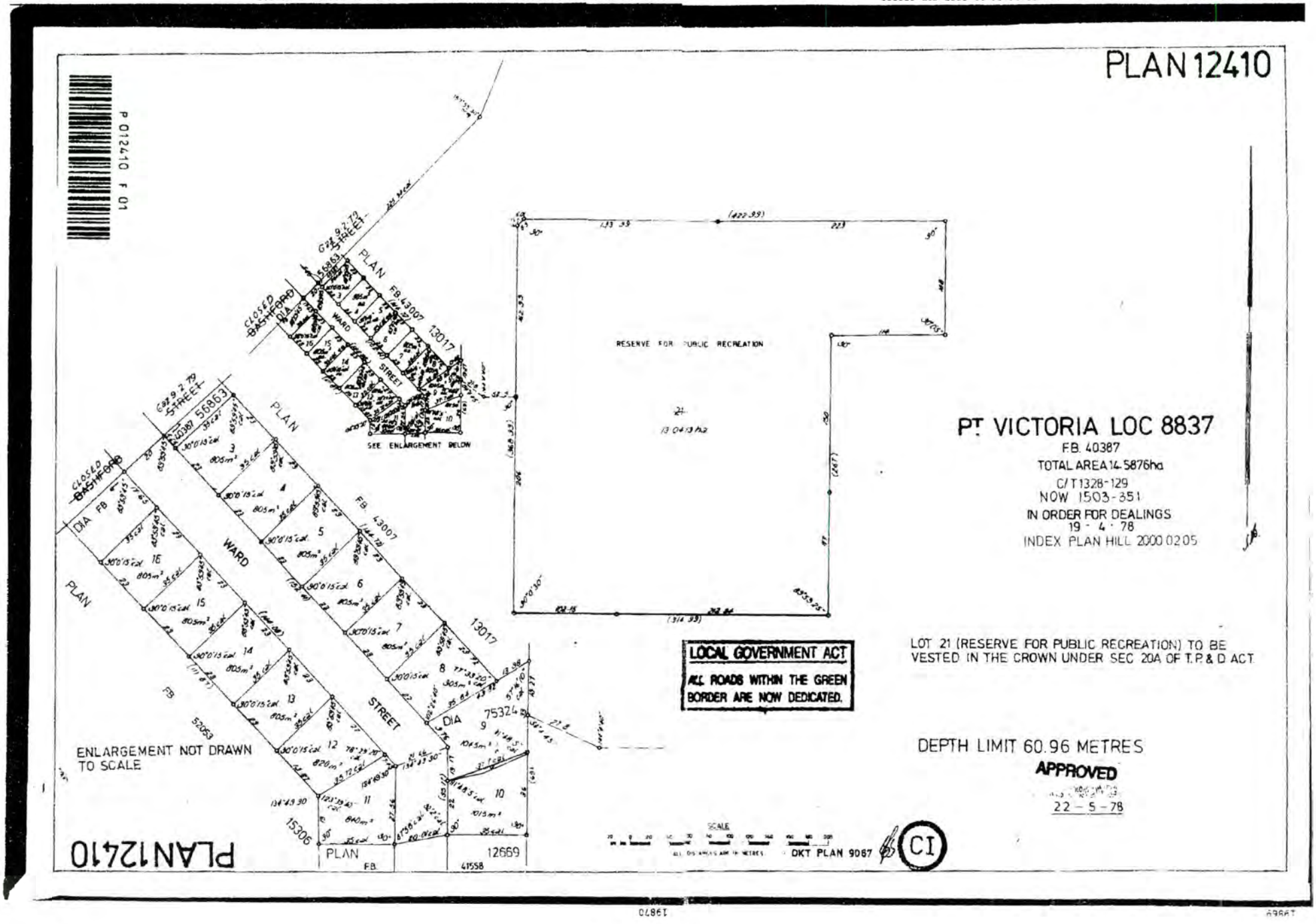
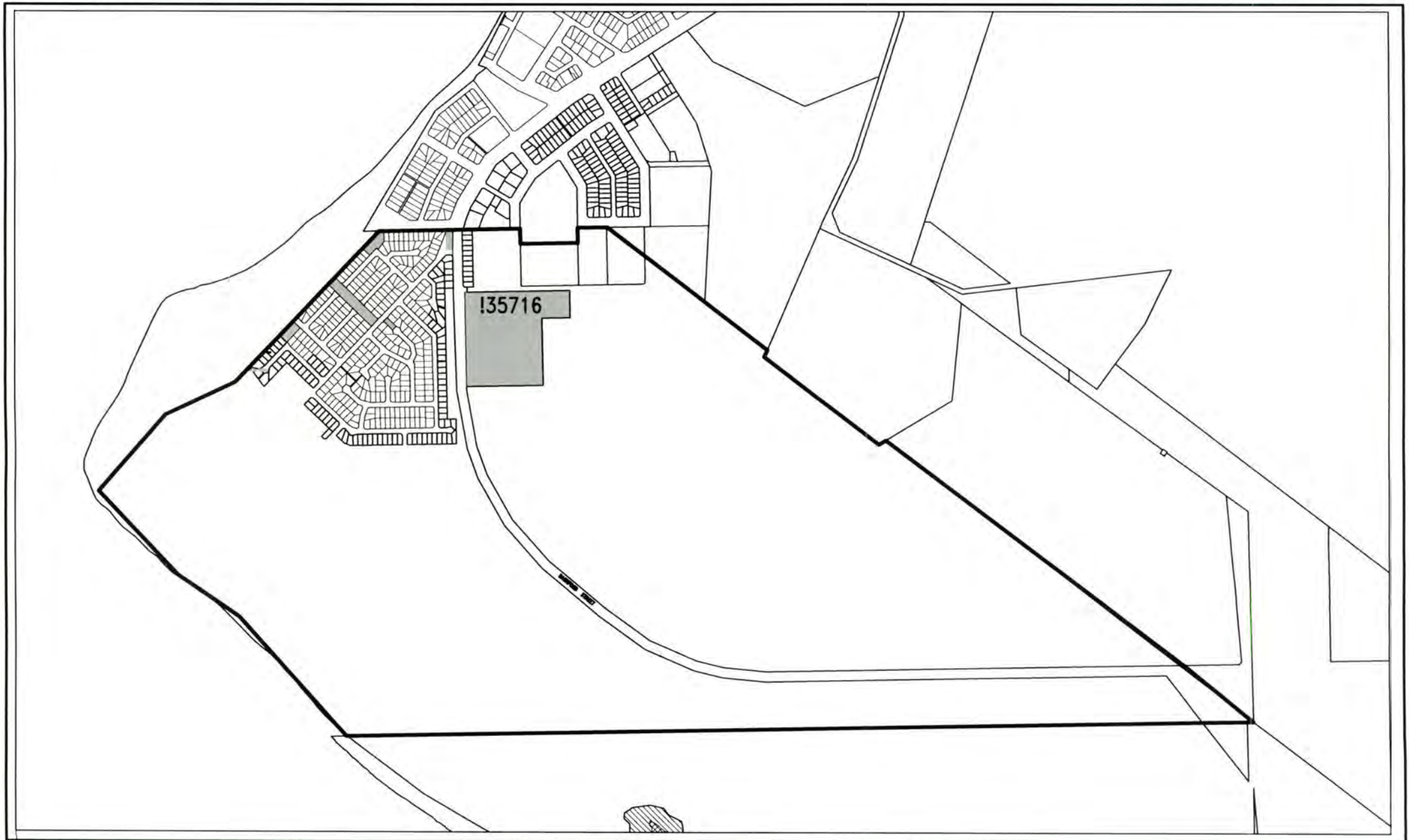


Figure 1



NOTES:

25mm at scale

M G A
TOWN PLANNERS
Ph: (08) 9321 3011
Fx (08) 9324 1961
email: mga@global.net.au

A4

Metres 0 500

Scale 1:20,000

Date: 30 April 2007

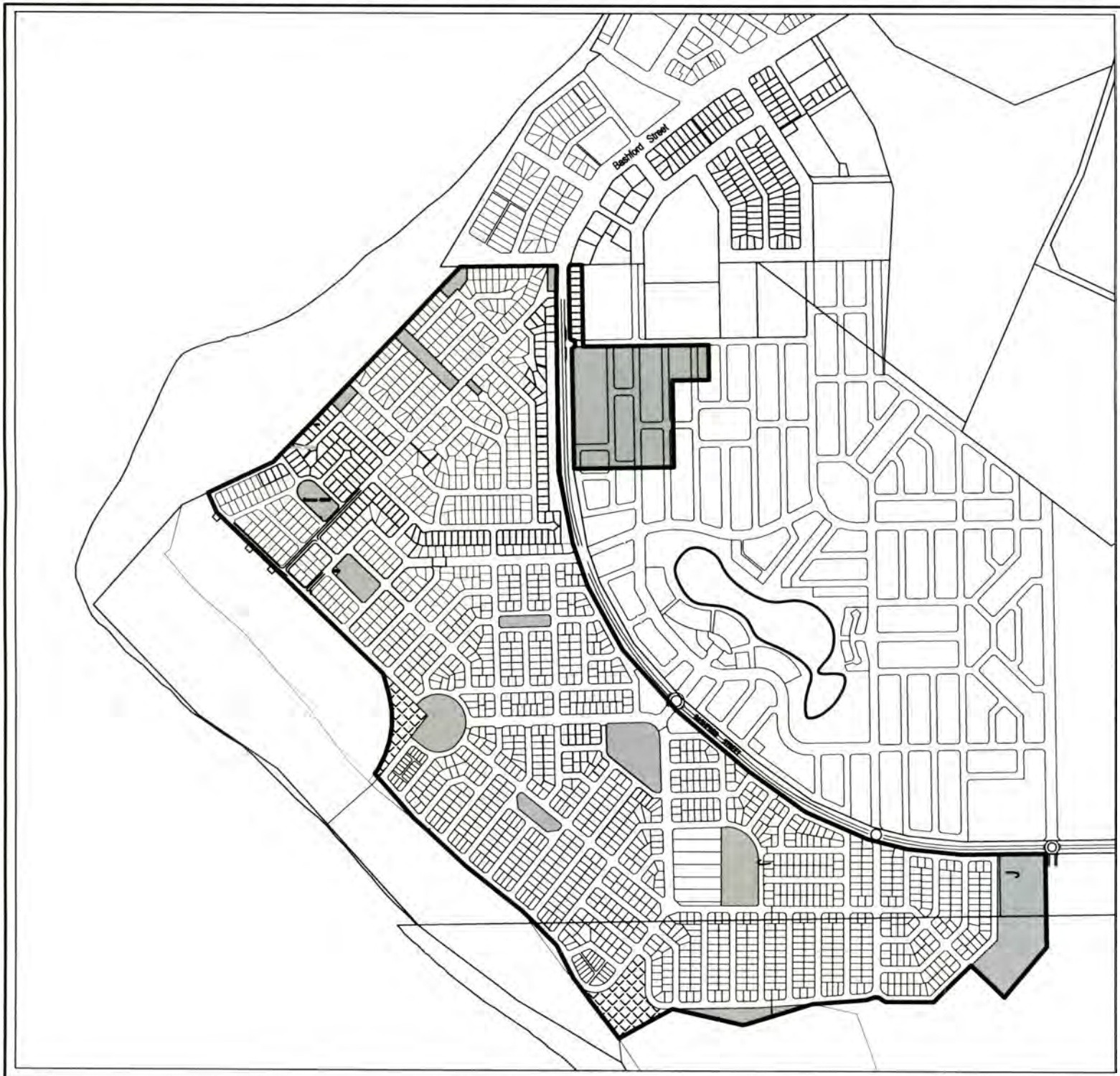
Ref: 1919/Cell3Rezone/POS Feb07/Fig2

All dimensions and areas subject to survey

Figure 2

RESERVE 35716

JURIEN BAY



NOTES:

25mm at scale

Subdivided Area	240.2766ha
Deductions	
School	3.5003ha
Tourist	4.4526ha
Total Deductions	7.9529ha
Nett Subdivided Area	232.3237ha
10% POS	23.2324ha
Actual POS	32.8388ha
Excess POS	9.6064ha

Subdivided Area

Open Space

Tourist

School

NOT TO SCALE | A4

Date: 19 June 2007

Ref: 1919/Cell3rezone/POS Feb-7/Fig3-change

All dimensions and areas subject to survey

M G A
TOWN PLANNERS
Ph: (08) 9321 3011
Fax: (08) 9324 1961
email: mga@global.net.au

Figure 3
POS SCHEDULE
JURIEN BAY

The prospects of Reserve 35716 being developed for recreational purposes are limited. Whether it is used for recreation or not, it needs to be subject to a Structure Plan and a Development Plan by virtue of its inclusion in the Special Development zone consequent on Scheme Amendment No. 23.

3. POSSIBLE ALTERNATIVE USES OF RESERVE 35716

Reserve 35716 has frontage to Bashford Street, the main street of Jurien Bay and is adjacent to the existing urban development of the town. It is also close to the proposed lagoon which has been constructed in a trial form and is currently undergoing monitoring and fine tuning. The reserve therefore occupies a strategic site which is both exposed and accessible.

A range of uses are candidates for this site and could include such functions as tourism, a visitor centre, residential, special housing (eg. aged persons/nursing home) as well as open space. It is therefore proposed to indicate Reserve 35716 as "Mixed Use" and "Residential" in the expanded Structure Plan.

4. OPEN SPACE AT NORTH-EASTERN BOUNDARY OF CELL 2

It was originally suggested that the recreational function associated with Reserve 35716 be relocated to a position adjacent to the town's golf course and part of the old stock route. Ultimately, if the golf course was reticulated then there may also be an opportunity to reticulate and develop the relocated open space reserve.

Council was however, concerned about the utility of a reserve in this position and it seems more likely that the reserve will be absorbed into the lagoon area and/or general open space provision within Cell 2 or not relocated at all. The area of "Open Space" shown at the north-eastern boundary of Cell 2 is therefore proposed to be deleted and replaced with "Residential".

5. CHANGE OF USE FOR CELL 3

The amendment to the Structure Plan also involves the area indicated as Cell 3, a triangular shaped parcel at the junction of Bashford Street and Indian Ocean Drive. Currently it is shown on the Structure Plan as predominantly "Special Residential" with the eastern apex of the triangle being shown as "Highway Commerce".

This cell was therefore always intended to be developed for a mix of large lot residential and commercial purposes. While there is no definition of what "Highway Commerce" is precisely, the phrase implies that it would comprise business relying heavily on exposure to passing traffic such as traditional showroom style development, perhaps accommodation for the travelling public and uses such as road houses.

Power supplies to Jurien Bay need to be upgraded in the medium to long term and Western Power is planning a new high tension power line entering the area near the junction of Bashford Street and Indian Ocean Drive. A sub-station near this location is therefore proposed so that power supplies from there on can be distributed by underground cables. The sub-station site will be over 1ha in area and will generally be incompatible with a residential environment but much more consistent with a light industrial/business park.

An assessment therefore has been made of the supply and likely demand for industrial land at Jurien Bay. Currently, approximately 110ha is zoned for industry at Jurien Bay compared with a total of approximately 200ha of urban land. A comparison has been made of the ratio of industrial land to urban land at Margaret River and Busselton, representing two communities serving coastal rural and tourism economies. In those cases, industrial land equalled approximately 10% of the urban land.

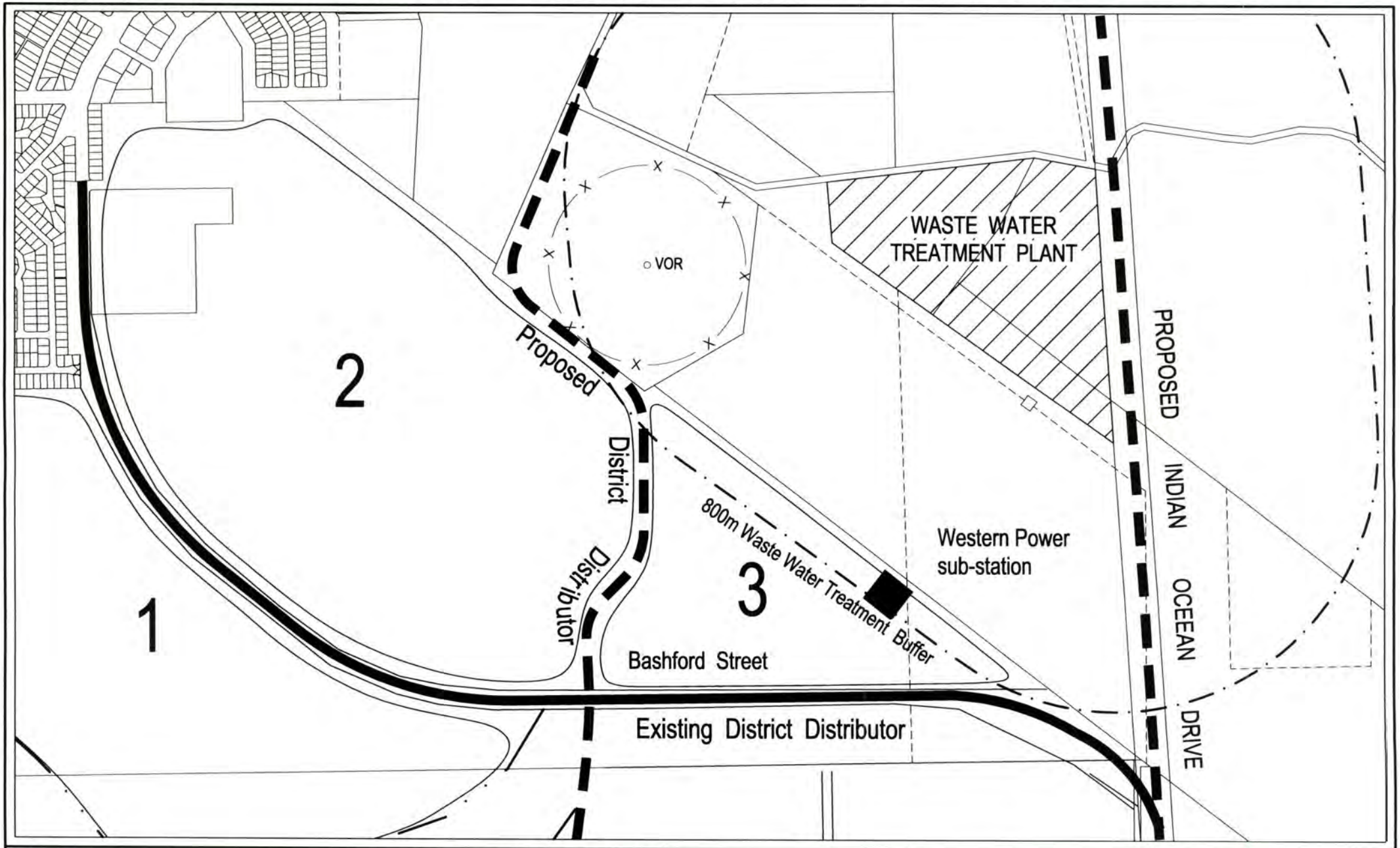
Bearing this proportion in mind, the Jurien Bay Townsite appears well endowed with Industrial zoned land however the Turquoise Coast Development will ultimately raise the total area of urban land from 200ha to approximately 1600ha suggesting an ultimate need for approximately 160ha of Industrial zoning.

This Structure Plan amendment proposes to add approximately 24ha to the inventory of land zoned for industrial style activity raising the total supply to 134ha, closer to the 10% target.

With the completion of the Indian Ocean Drive link within the next few years, the Bashford Street/Indian Ocean Drive junction will become the primary point of entry into the town of Jurien Bay with the result that the visual quality of this area is of appropriately located to meet technical as well as aesthetic requirements.

Cell 3's location near the Indian Ocean Drive is convenient for businesses serving not only Jurien Bay but also other coastal communities to the north and south. As well as absorbing the requirement for a sub-station site, the use of land in this area for industrial style purposes also results in land within a waste water treatment plant buffer being used for a non-sensitive purpose. Further, the cell is served by two future bus routes and the landform is flat and therefore readily developed for industrial / commercial purposes. Being to the north and east of residential areas (existing and proposed) it is also downwind of housing development. **Figure 4** places Cell 3 into context with these influences.

Bashford Street is already a major point of entry to the town of Jurien Bay and its significance will increase with the completion of Indian Ocean Drive. It is important therefore, that the view from Bashford Street is protected to maintain an aesthetically pleasing entry. Further, the western side of Cell 3 is adjacent to proposed residential development so that it is equally important that the quality of the outlook from this residential area is protected. The amendment therefore shows



NOTES:

25mm at scale

M G A
TOWN PLANNERS
Ph: (08) 9321 3011
Fx (08) 9324 1961
email: mga@global.net.au

A4

Metres 0 375

Scale 1:15,000

Date: 19 June 2007

Ref: 1919/Cell3rezne/24april2007 amend/Fig4

All dimensions and areas subject to survey

Figure 4

FACTORS AFFECTING DEVELOPMENT OF CELL 3

Bashford Street and the residential development proposed in Cell 2, to be buffered from future industrial development by a Special Residential belt.

6. ADJUSTMENT TO BOUNDARY BETWEEN CELLS 2 AND 3

The distributor road separating Cells 2 and 3 is realigned so that it provides the boundary between development and a buffer around an existing air navigation aid. The realignment also increases the area of Cell 2 while diminishing the area of Cell 3 and consequently, the amount of land dedicated for Special Residential and Industrial purposes.

The realignment also results in land impacted by the odour buffer around the existing waste water treatment plant being used for road purposes, creating a defensible boundary between residential uses and the buffer.

7. STRUCTURE PLAN AMENDMENTS

The proposed amendments to the Structure Plan are illustrated on **Figure 5** and include:

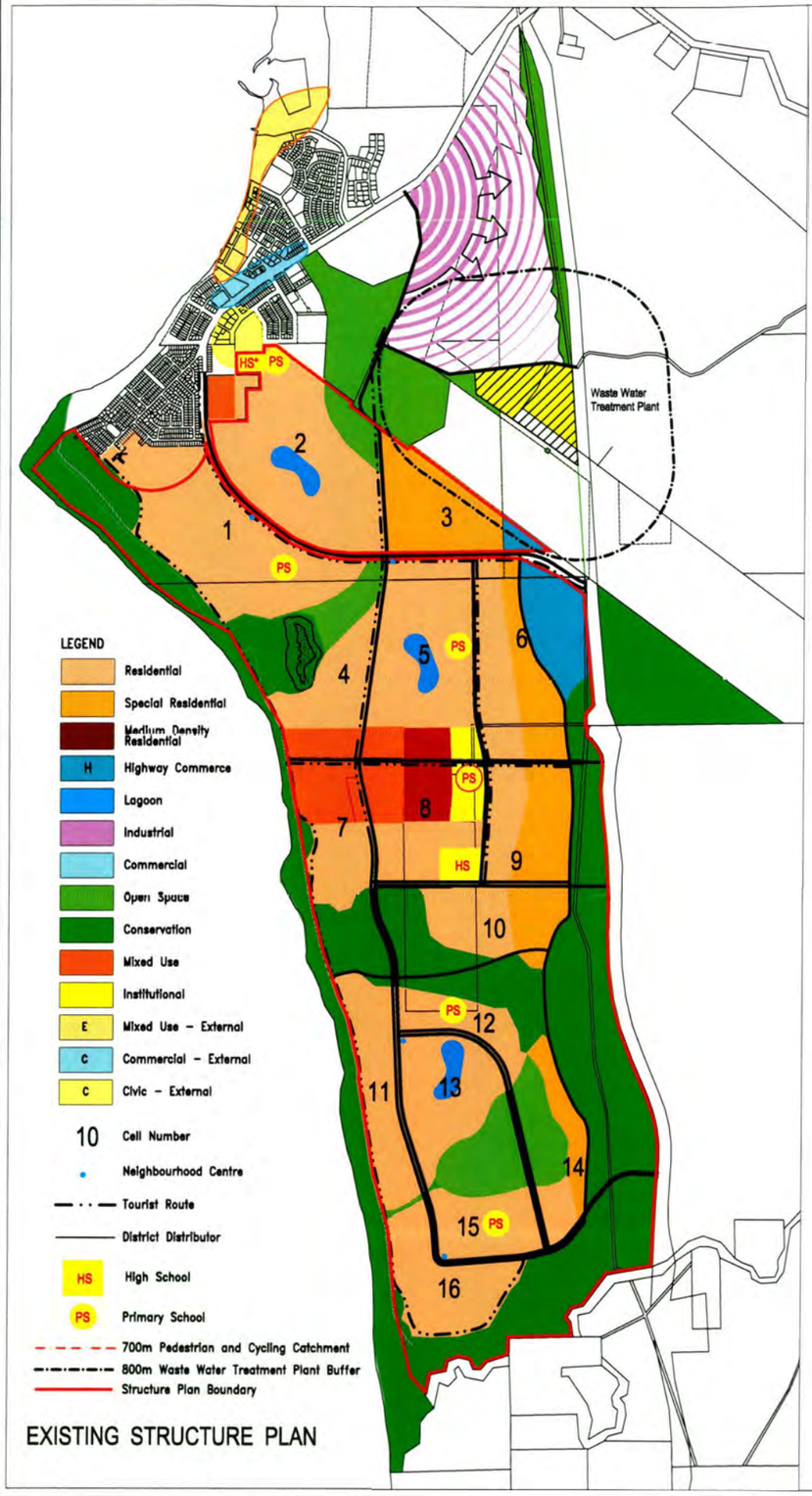
a) Adjusting the Structure Plan area to include Reserve 35716.

b) Showing the area of Reserve 35716 to be used for Residential and Mixed Use purposes.

c) Showing the Open Space area adjacent to Cell 2's north-eastern boundary and the Jurien Bay Golf Course to be "Residential".

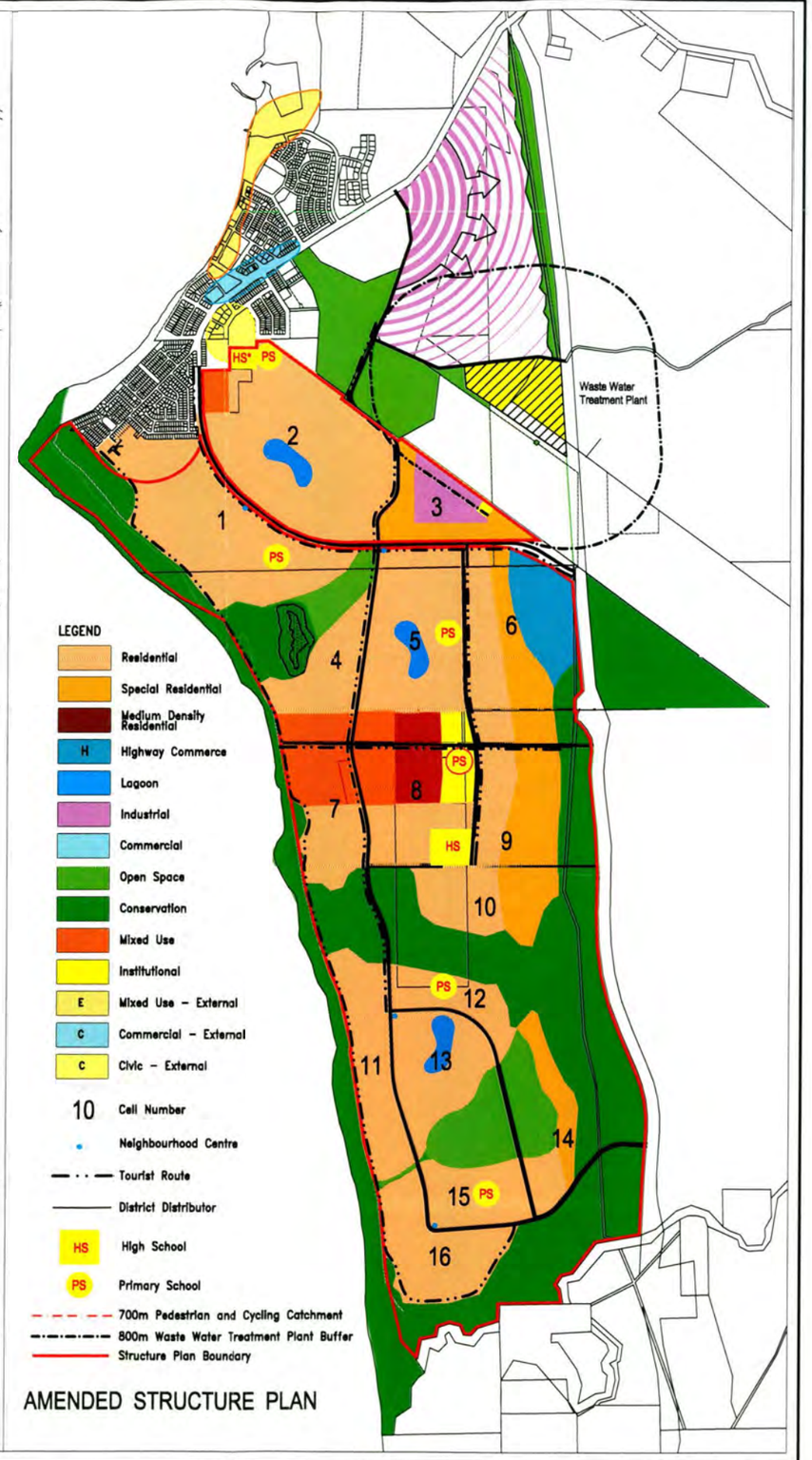
d) Showing Cell 3 to change from Special Residential and Highway Commerce to Special Residential, Industrial and Institutional (Western Power).

e) Adjusting the boundary between Cells 2 and 3.



EXISTING STRUCTURE PLAN

PROPOSED STRUCTURE PLAN MODIFICATIONS



AMENDED STRUCTURE PLAN

NOTES:

25mm on original

MGA
TOWN PLANNERS
Ph: (08) 9321 3011
Fax: (08) 9324 1961
email: mga@global.net.au

A3

N

0 Kilometres 2.5

Scale 1:50,000

Date: 13 July 2009
Ref: 1919/July 09 amend struct/A3LB

All dimensions and areas subject to survey

Figure 5
STRUCTURE PLAN MODIFICATION
JURIEN BAY

TURQUOISE COAST DEVELOPMENT

JURIEN BAY

Structure Plan

for ARDROSS ESTATES PTY LTD

NOVEMBER 2003

Prepared by:

MGA
TOWN PLANNERS

26 Mayfair Street,
West Perth WA 6005
Postal: PO Box 104,
West Perth WA 6872

Ph: 9321 3011
Fax: 9324 1961
Email: mga@global.net.au

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PREFACE

This vision for Jurien Bay is based upon its identification as the primary centre serving the Central Coast Region, an extensive region adjoining the Perth metropolitan area. As Perth grows, the Central Coast will be required to provide urban, employment, recreation and tourism opportunities for the growing population and visitors. The Turquoise Coast development at Jurien Bay is therefore pivotal to achieving these objectives.

Recent urban estates from Esperance to Kununurra, a distance of some 4,000km around the Western Australian coast bear a similarity based on urban design/planning policies and common practice. The Turquoise Coast development proposes to break this mould by recognising the importance of the natural landscape in characterising places. This Structure Plan therefore adopts the vision of creating a project which departs from conventional metropolitan styles of urbanisation in preference for nodes of development within a natural setting incorporating principles of environmental sustainability. This vision is to permeate through to the detailed, local design level to create new communities which are immediately recognisable as "Jurien Bay" and therefore distinct from any other urban area.

1. INTRODUCTION

This Structure Plan has been prepared on behalf of Ardross Estates Pty Ltd and applies to an area of approximately 2,000 ha stretching along the coast to the south of the Jurien Bay townsite and down to the Hill River. The Structure Plan is bordered on the east generally by the alignment of Indian Ocean Drive.

Figure 1 outlines the Structure Plan area.

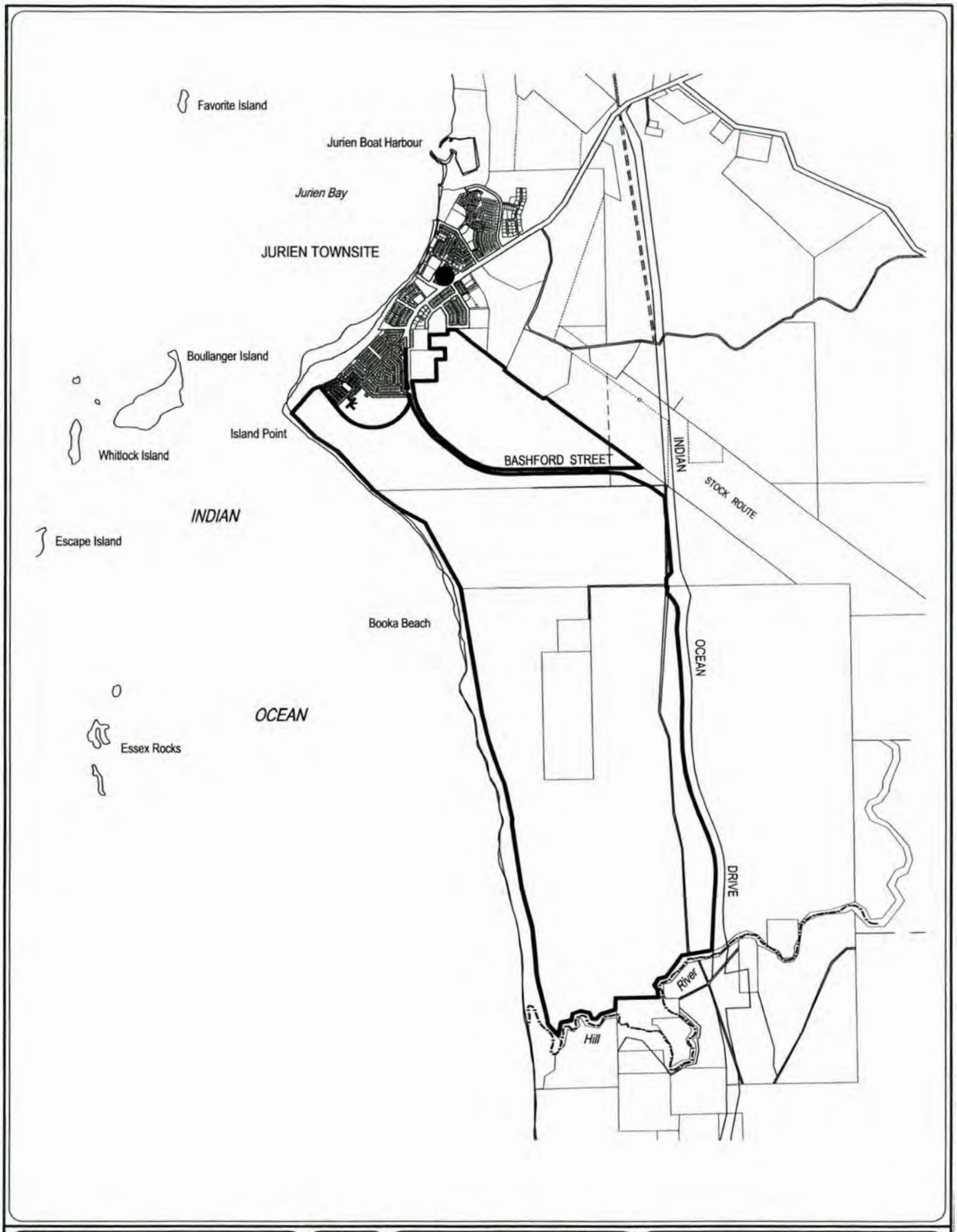
The Plan is the result of a consultative process involving a number of agencies including the:

- Shire of Dandaragan
- Department for Planning and Infrastructure
- Department of Environmental Protection and the Environmental Protection Authority
- Water & Rivers Commission
- Department of Conservation & Land Management including the Marine Conservation Branch
- Water Corporation
- Main Roads Western Australia
- Wheatbelt Development Commission
- WA Tourism Commission

Additionally, the process has included the local community and their contribution is also gratefully acknowledged.

The consultant team on the project has included :

- MGA Town Planners
- ATA Environmental & Dr Alan Tingay – Environment
- Sinclair Knight Merz – Civil & Traffic Engineering
- MP Rogers & Associates – Coastal Engineering
- CSD Network – Community Consultation
- Jim Davies & Associates - Flood Studies
- McDonald Hales & Associates- Archaeology & Ethnography



Notes/Revisions

N

0 Metres 1625

SCALE 1:65000

Date : 27 June 2002 Ref. 1919/27Jun02context/SPA

STRUCTURE PLAN AREA
JURIEN BAY
Figure 1

Mitchell Goff and Associates Town and Regional Planners Tel. (08) 9321 3011 Fax (08) 9324 1961

In addition the Water Corporation has contributed its advice in relation to the preparation of a total Water Management Plan for Jurien Bay.

2. BACKGROUND

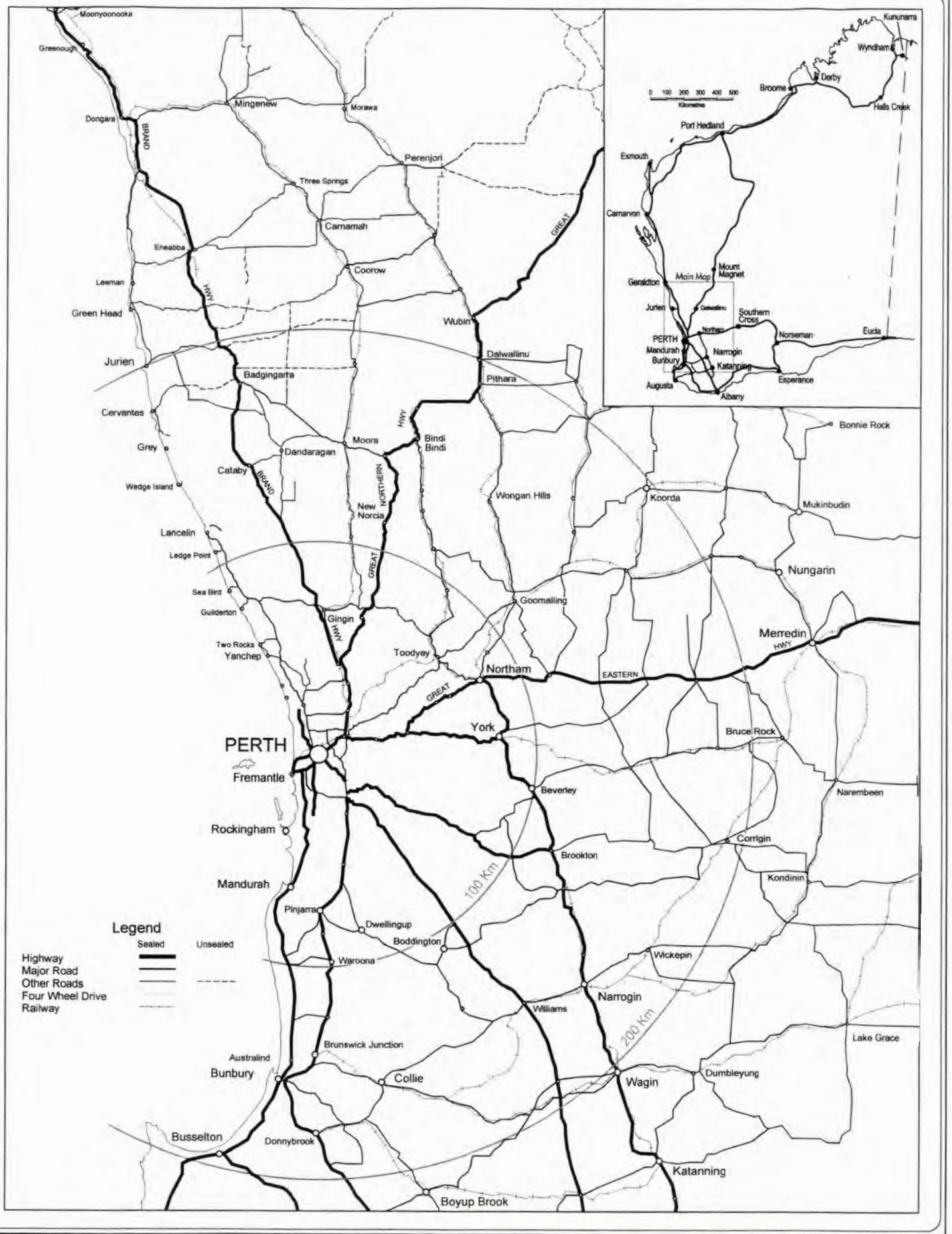
2.1 STATE CONTEXT

Jurien Bay is 200 kms north of central Perth 'as the crow flies'. Road access is, however, indirect and is facilitated by the Brand Highway some 50 kms inland from the coast. The indirect nature of this route results in Jurien Bay being some 280 kms by road from Perth. **Figure 2** places Jurien Bay into context in terms of its relationship to the State. A 200 kms arc is scribed around Perth, illustrating that Jurien Bay is the same distance north of the City as Busselton is to the south. Whereas, however, Jurien Bay is approximately 280 kms away by road, Busselton is only some 225 kms.

Better road connections to the south have in part resulted in the Busselton and Augusta/Margaret River region becoming the State's premier playground for holidaymakers.

There is, however, an argument to counter-balance the location of holiday targets by developing attractions to the north of the Metropolitan Region, particularly since a majority of the metropolitan population resides to the north of the River.

The area surrounding Jurien Bay is rich in attractions which could sustain holiday and tourist industries. Best known is the Pinnacles Desert within the Nambung National Park. The Pinnacles attract over 100,000 international visitors per annum, and is the site most visited by international tourists outside the Perth metropolitan area. It therefore eclipses the rugged coastal scenery, forests and wine-making region in the Cape Naturaliste to Cape Leeuwin region as a target of international tourism. Despite the high rate of visitation, there is little development within the Jurien Bay area to extend the length of stay beyond a day-trip and to economically benefit the local area. With improvements to road access, it is anticipated that the numbers of visitors to the Nambung National Park will increase from the current total of around 200,000 (including international visitors) to approximately 400,000.



Notes/Revisions

N

0 Kilometers 62.5

SCALE 1:2,500,000

Date : 12 Oct. 2000 Ref. 1919\statecontxt\fg2

STATE CONTEXT MAP
JURIEN
Figure 2

Mitchell Goff and Associates Town and Regional Planners Tel. (08) 9321 3011 Fax (08) 9324 1961

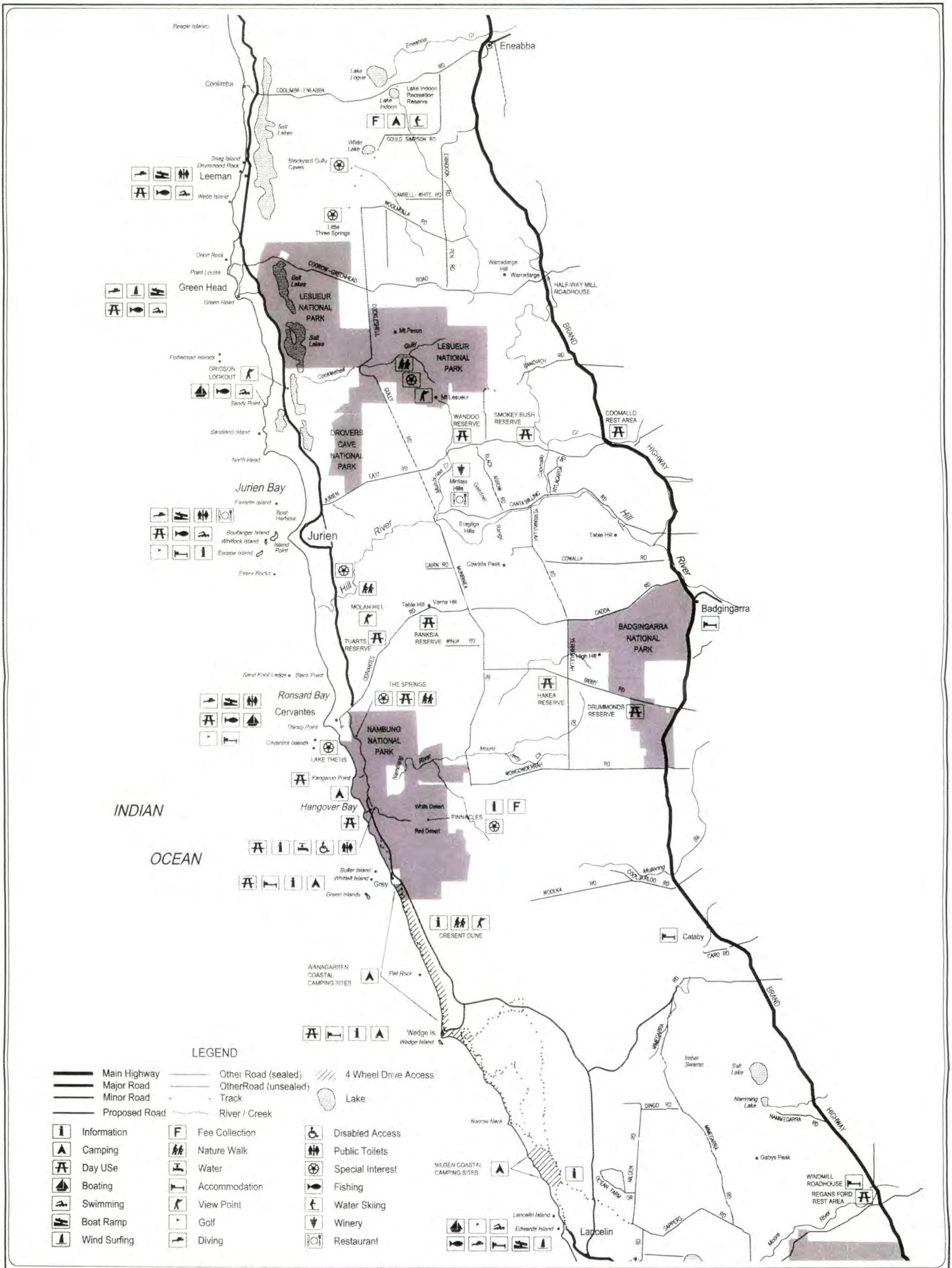
The area contains numerous other attractions which are little known and little developed. These are identified on **Figure 3** and include Lesueur National Park with its wildflowers, spectacular breakaways and wandoo forests. Also to the north of Jurien Bay is the Stockyard Gully National Park containing a cavernous tunnel some hundreds of metres in length, rivalling Tunnel Creek within the State's Kimberley Region. Offshore islands punctuate the coastal scenery providing a range of eco-tourist opportunities as well as quiet, protected beaches. Inter-connecting reefs between the islands create surfing breaks and protect in-shore waters from large, open ocean swells creating opportunities for boating, sailboarding, etc. Protected bays at Sandy Cape, Sandilands, and other indentations along the coast provide a variety of opportunities for holidaymakers and tourists.

Extensive limestone reef systems conspire with warm currents from the tropical north and cool currents from the temperate south to produce highly diverse and abundant marine life creating ideal diving conditions. The marine bio-diversity has resulted in the creation of a Marine National Park being initiated.

2.2 REGIONAL CONTEXT

The Central Coast Regional Strategy provides the regional context in which the Turquoise Coast proposal has developed. The Strategy represents a collaborative effort of local authorities within the region, including the Shires of Dandaragan, Carnamah, Coorow, Gingin and Irwin as well as the Wheatbelt Development Commission and State Government agencies including the Department for Planning and Infrastructure and the Department for Conservation & Land Management, Department of Environmental Protection, Department of Minerals & Energy and the Department of Land Administration.

The Strategy was released for public comment in June 1994, and finalised in September 1996. In view of the breadth of community involvement through local authorities represented on the Steering Committee and extent of public consultation, it may be concluded that the Strategy represents the goals and aspirations of communities scattered through the region from the metropolitan area in the south to Dongara in the north.



Notes/Revisions

N

0 Metres 20000

SCALE 1:400,000

Date : 28 June 2002 Ref No. 1919/tourism/Fig3-T/fFig3

JURIEN BAY DISTRICT TOURISM DEVELOPMENT PLAN
Figure 3

Mitchell Goff and Associates
Town and Regional Planners
Tel. (08) 9321 3011 Fax. (08) 9324 1961

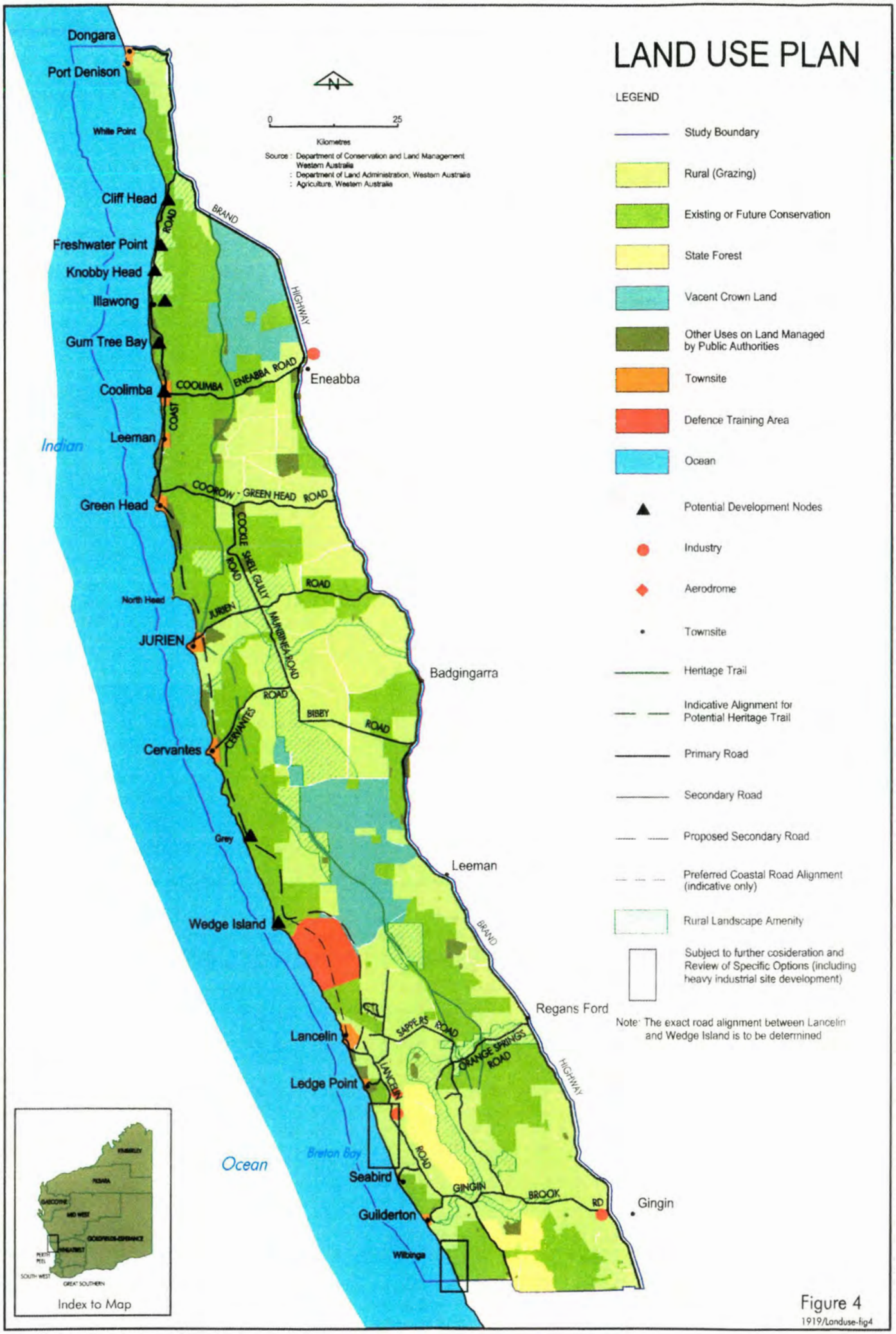
Figure 4 presents the Land Use Plan developed within the Central Coast Regional Strategy.

Key elements of the Plan include large areas of conservation land, particularly along the coast. It will be noted that there are few areas of non-conservation land on the coast over the length of the region. Land identified as rural land, and therefore not set aside for conservation purposes, exists to the south of Guilderton as well as at Breton Bay, a site nominated as being an area of possible industrial development. Further northwards the only substantial area of coastal frontage which is not identified for conservation purposes, is located south of the Jurien Bay townsite. This is the site of the proposed Turquoise Coast development.

The Central Coast Regional Strategy recognises a hierarchy of settlements within the region, ranging from a district centre at the head of this hierarchy, to major local centres, potential centres, minor local centres and recreation and tourism nodes. It is significant that the townsite of Jurien Bay which is central to this region, has been nominated as the district centre for the region. The Strategy acknowledges that there is sufficient land for short term expansion to the east and north, and unlimited expansion potential to the south.

A further major element of the Central Coast Regional Strategy concerns the alignment of a coastal road from Lancelin in the south through to Green Head in the north. South of Lancelin, the extension of Wanneroo Road provides a connection to the metropolitan region, and to the north of Green Head the road is shown to be completed to Dongara.

Since preparation of the Central Coast Regional Strategy, the coastal road has been constructed from Green Head through Jurien Bay to Cervantes, and exists for a distance of some 12 kms south of Cervantes to the Pinnacles Desert within the Nambung National Park. Only the link from Lancelin to Cervantes remains to be completed, and this work is scheduled to be undertaken by the end of 2005.


LAND USE PLAN
LEGEND
Study Boundary
Rural (Grazing)
Existing or Future Conservation
State Forest
Vacant Crown Land
Other Uses on Land Managed by Public Authorities
Townsite
Defence Training Area
Ocean
Potential Development Nodes
Industry
Aerodrome
Townsite
Heritage Trail
Indicative Alignment for Potential Heritage Trail
Primary Road
Secondary Road
Proposed Secondary Road
Preferred Coastal Road Alignment (indicative only)
Rural Landscape Amenity
Subject to further cosideration and Review of Specific Options (including heavy industrial site development)
Note: The exact road alignment between Lancelin and Wedge Island is to be determined
0
25
Kilometres
Source : Department of Conservation and Land Management Western Australia
: Department of Land Administration, Western Australia
: Agriculture, Western Australia
Dongara
Port Denison
White Point
Cliff Head
Freshwater Point
Knobby Head
Illawong
Gum Tree Bay
Coolimba
Leeman
Green Head
North Head
JURIEN
Cervantes
Grey
Wedge Island
Lancelin
Ledge Point
Seabird
Guilderton
Wilbinga
Eneabba
Badgingarra
Leeman
Regans Ford
Gingin
BRAND HIGHWAY
ENEABBA ROAD
COOLIMBA COAST ROAD
COOROW - GREEN HEAD ROAD
COCKLE SHELL GULLY ROAD
JURIEN ROAD
NAMBRONEA ROAD
CERVANTES ROAD
BISBY ROAD
SAPPERS ROAD
ORANGE SPRINGS ROAD
LANCELIN ROAD
GINGIN BROOK RD
Indian Ocean
Breton Bay
Index to Map
Figure 4
1919/Landuse-fig4

2.3 ZONING

The Structure Plan area is zoned "Special Development" under the Shire of Dandaragan's Town Planning Scheme No.6.

This zone does not create any particular land use provisions, and therefore contemplates a wide range of uses over the land. Land use and development patterns are to be determined through a tiered planning framework.

The first requirement under this framework involves the preparation and approval of a Structure Plan. The Structure Plan generally applies to the whole of the site and sets down the basic framework around which more detailed plans described as Development Plans are to be prepared on a neighbourhood-by-neighbourhood basis.

The third tier in the planning hierarchy concerns the preparation of Detailed Site Plans in instances where greater consideration and design control is considered appropriate.

The Scheme requires that a Structure Plan should establish the urban form for the development area in general terms, showing land use disposition and density, movement systems and services, as well as other matters which in the opinion of the Council are relevant to the orderly and proper planning of the estate. The detail required includes :

(a) major transportation and movement systems;
(b) a hierarchy of centres;
(c) service commercial areas;
(d) landscape protection areas;
(e) major conservation and recreation areas;
(f) proposals for sewerage, drainage and other physical infrastructure services; and
(g) details derived from any ethnographic, heritage or cultural study conducted in relation to the estate.

This Structure Plan therefore addresses these requirements.

2.4 MEMORANDUM OF UNDERSTANDING

The Developers have entered a Memorandum of Understanding (MOU) with the Dandaragan Shire Council and the Western Australian Planning Commission, which also contains some guiding principles in relation to the estate's development in addition to the requirements contained under the Council's Town Planning Scheme.

The MOU contained a statement of objectives which included:

(a) The facilitation of resort development at Jurien Bay, broadening the economy of the region, creating employment and general economic benefit to the community.

(b) Proper provision for employment, not only in the hospitality industry but in primary, secondary and service industries which are established to serve the expanding population.

(c) Proper planning for a growing population resulting from new employment opportunities and the general opening of the Central Coast Region as a consequence of the scheduled completion of Indian Ocean Drive.

(d) Proper provision for the expansion of the townsite of Jurien Bay, including the setting aside of appropriate land requirements and the provision of necessary infrastructure.

(e) The programming of the necessary engineering services.

(f) The creation of viable communities with high degrees of self-sufficiency in terms of employment and social infrastructure.

The MOU also required the setting aside of appropriate reserves along the ocean foreshore, and in other areas as a consequence of environmental studies and in addition, the Developer is obliged to co-operate with the Water Corporation in the preparation of a water management plan.

A range of performance standards was also set under the MOU. These included :

- The Structure Plan should accommodate a target that by year 2020 average personal car trips not exceed 7.5 kms per trip.

- The provision of essential infrastructure shall be negotiated with servicing agencies in accordance with prevailing government policies.

- Planning for new residential areas should ensure that there is a high level of integration and connectivity to the existing community.

- An urban development infrastructure programme being prepared and agreed to by servicing agencies as part of the structure planning process, that includes the upgrading of facilities for the adequate provision of power, water and reticulated sewerage.

- Planning for a town centre to be robust to enable the function of the centre to evolve over time without the need for large areas or undeveloped land in the centre of town.

- Planning for the town centre and future neighbourhood centres to provide a high degree of accessibility for pedestrians, cyclists, as well as motorists through a permeable and inter-connected network of streets.

- The town centre and future neighbourhood centres must be located on local and district distributor streets in order to support and sustain retail and business viability.

- The future town centre to include civic areas and public space, which will be ceded to the Crown free of cost, and will be in addition to the 10% public open space requirement.

- Planning to include provision for services and facilities commensurate with the anticipated size and function of the Jurien Bay townsite. Facilities include, but are not limited to, police and emergency services, hospitals and medical centres, libraries, civic areas, community halls and meeting areas for social and sporting events, aged persons complexes and facilities.

- Increases in population should be directly proportional to the employment growth. The Structure Plan should accommodate a target of 1.4 jobs per household by including sufficient land and appropriate layout for business and related activities.

- Street networks are to be planned to facilitate a wide variety of business and home-business opportunities.

- The lot layout is to provide for a mix of lot sizes, and includes smaller residential lots and integrated medium density.

- Public open space is to be provided and located throughout the development to satisfy the need for playgrounds, local parks, active sporting areas and regional or district open spaces.

- The Structure Plan to provide for well-distributed public open space which will contribute to the legibility and character of the development, is cost-effective to maintain and contributes to on site infiltration of stormwater run-off.

- No further degradation occurring to wetlands or areas of high conservation value.

- The existing estuarine systems being recognised and protected during the planning and development of the site.

- There will be no reduction on the quality of underground water.

- Street networks being orientated east-west and north-south to promote efficient solar access and allow for cooling breezes.

- The Resort development site being connected to the future town centre by a major arterial road.

- Planning to include a boulevard or major road linking the proposed Resort development directly to the existing Jurien Bay townsite.

- Planning for the future Resort complex remote from the Jurien Bay townsite to include provision for convenient access for workers, tourists and the delivery of services to and from the Jurien Bay townsite.

- Planning for the future Resort development to include public, commercial and/or public civic space.

2.5 ENVIRONMENT

2.5.1 *EPA Advice*

The rezoning of the Structure Plan area was initiated prior to the 1996 changes to the *Environmental Protection Act 1986* which allow the Environmental Protection Authority to undertake environmental impact assessment of scheme amendments. Nevertheless, it was considered essential that the environmental parameters within which development planning should occur, should be established up-front. Failure to establish these parameters would potentially lead to individual assessment of each subdivision application creating an administrative nightmare and possibly inconsistent outcomes.

Consultation with the Authority resulted in the suggestion that the Environmental Protection Authority could give advice under Section 16j of the Act. To gain this advice, the Structure Plan area has proceeded through a process commensurate with a standard environmental impact assessment including data collection, analysis and reporting with the report having been released for public examination and comment leading to consideration by the Environmental Protection Authority and the publication of conditions and recommendations in Bulletin 1031 dated October 2001.

The key environmental factors identified through the review process were :

(a) Nature conservation and biodiversity;
(b) Declared rare and priority flora, and other significant flora;
(c) Hill River and estuary;
(d) Wetlands;
(e) Coastline;
(f) Beach ridge plain;
(g) Landform and landscape;
(h) Ground and surface water;
(i) Solid and liquid waste disposal;
(j) Marine environment;
(k) Enhanced greenhouse effect; and
(l) Environmental sustainability.

In addressing these factors, the landowner has prepared a number of documents including a comprehensive Environmental Report and a Strategy for Native Conservation and Bio-diversity which contain a number of commitments summarised below :

"

- *establish conservation reserves on the site to protect the key environmental features including the coastline, the Hill River and its estuary, wetlands, a vegetated portion of the beach ridge plain at Island Point, and the lower slopes of the Spearwood dunes;*

- *establish conservation reserves on the site to protect a transept of vegetation and landform types (the proposed transept forms an east-west corridor roughly through the centre of the site;*

- *cede for conservation purposes an 86 hectare lot owned by Ardross Estates Pty Ltd (this lot is on the east side of the development site;*

- *prepare Management Plans for the above reserves;*

- *retain additional vegetation and fauna habitat in multi-purpose public open space reserves;*

- *liaise with CALM regarding the major neighbouring reserves and proposed Marine Park to ensure that population growth in the region can be managed without detriment to the environmental values of CALM reserves;*

- *consult with CALM, as is occurring at the time of publication of this report, to determine CALM's requirements for protection of flora priority species and species of interest; carry out targeted flora surveys, and subsequently cede land to the satisfaction of CALM if significant species are identified; and*

- *incorporate a series of environmental management measures in all future development plans to ensure ongoing environmental protection as the population expands (these measures to include best management practices of water sensitive urban design to minimise the pollution of sensitive environments and prevent adverse impacts on the hydrology of wetlands and the Hill River)."*

In setting out its deliberations the Environmental Protection Authority dealt first with Nature Conservation and Bio-diversity and provided the following advice :

" *(a) The EPA considers that Ardross Estates' Strategy for Nature Conservation and Biodiversity (Tingay 2001) provides an appropriate basis for the retention of natural areas, and supports the Strategy to the extent that the Strategy ensures:*

- *Significant and scarce habitats and vegetation on the site will be protected, notably:*

  ⇒ *the coastline;*

  ⇒ *the beach ridge plain;*

  ⇒ *the Hill River, the Hill River estuary and adjoining buffer;*

⇒ *wetlands and adjoining buffers; and*

⇒ *a portion of the vegetation of the lower Spearwood Dunes within a bushland reserve of sufficient dimensions to ensure its long term survival;*

- *Key landscape elements, and typical landscape and vegetation elements, will be protected, generally identified or referred to in the Conservation Strategy;*

- *Targeted flora studies will be undertaken to the requirements of CALM, and any areas recommended by CALM to be set aside for the protection of significant species will be ceded for conservation purposes;*

- *Bushland corridors that link the above areas on the site with adjoining off-site bushland areas, and include natural sequences of vegetation and landforms, will be reserved. In this regard, the EPA supports the east-west corridor through roughly the centre of the site, provided that the corridor is at least 500 metres wide in average width, with all parts of the corridor to be at least 400 metres wide;*

- *Additional natural and semi-natural areas will be retained through the detailed planning process. Open space areas in this category may include some recreational open space that retains bushland; semi-natural areas required by management plans such as the Water Management Plan to protect key ecosystem processes; and, following more detailed*

planning studies, additional coastal foreshore reserve and wetland buffer areas, and buffer areas around any dunes that are to be retained to accommodate any sand blow that may affect residential amenity, and movements, if any, of those dunes;

- *Off-site conservation measures will be implemented. See point (b) below;*

- *Environmental management plans that describe procedures to minimise disturbance in the long term to key remnant vegetation on and adjoining the site will be prepared, then implemented, at appropriate stages in the development process;*

- *Schedules will be developed, and subsequently implemented, for the collection of baseline environmental data and the monitoring of ecosystems;*

- *Periodic review of appropriate elements of the Conservation Strategy will occur, to ensure that environmental objectives continue to be met as development occurs on the site and incrementally in the Central Coast Region; and*

(b) *An important component of the Strategy for Nature Conservation and Biodiversity is the identification of off-site conservation measures. The EPA agrees that the ceding of the 86 hectare site on the eastern side of Indian Ocean Drive fulfills the requirement for off-site conservation measures, taking into account the proposed on-site conservation measures.*

(c) The EPA recommends that at the initial stages of planning for the site a long term vision is developed that focuses on integration with the natural attributes of the site and environmental sustainability. Development of the site is expected to occur in accordance with development policies or guidelines that ensure that the overall vision is progressed.

(d) The portion of land to be cleared prior to each stage of development should not exceed the expected short term demand for land.

(e) The EPA notes that some access and infrastructure will be required through conservation areas in the Turquoise Coast Development. The EPA advises that these should be carefully located to minimise environmental impacts, and should be minimised as far as practical.

(f) The EPA's expectations regarding the timing of the implementation of conservation measures, and the future role of the EPA as development proceeds, are provided in Section 3 'Future Role of the EPA'."

Under the heading "Declared rare and priority flora, and other significant flora", the Environmental Protection Authority provided the following advice :

" *The EPA endorses the initiatives that the land owner is making in consultation with CALM with respect to significant flora, to the extent that the initiatives are consistent with the following:*

- *Targeted flora survey work to determine whether significant flora species are present on the properties will be carried out. The timing and methods used in these surveys will be to the satisfaction of CALM.*

- *Areas with populations of flora that are considered by CALM to be significant will be protected by reservation for conservation purposes. These areas should preferably be shown in the Structure Plan, or alternatively an adequate process to protect these areas should be described at the structure planning stage and then pursued. The areas that may need to be set aside for the protection of significant flora would be additional to the areas shown in the Conservation Strategy (Tingay 2001) if they are located outside the nominated conservation areas.*

- *Management plans for significant plant populations will be prepared by the land owner in consultation with CALM, before ground disturbing works near the populations occur. The management plans will be subsequently implemented."*

The EPA considers that its objectives for declared rare and priority flora and other significant flora, can be met provided that its advice above is followed.

Since giving this advice, a targeted flora survey has been completed to CALM's satisfaction and minor adjustments made to the proposed reserve system to accommodate populations of flora.

Advice in respect of the Hill River and estuary included the following :

" *The EPA supports the work done to identify land for conservation adjoining the Hill River, and the proposed conservation measures, and expects implementation of the following advice:*

- *The Conservation Strategy will provide for a bushland corridor reserve adjoining Hill River that:*

⇒ *is in all places at least as wide as that agreed by WRC;*

⇒ *will incorporate the total floodplain associated with a 1 in 100 year flood event; and*

⇒ *links with on-site and potential off-site open space networks, through links with the coastal foreshore to the west, and the north-south corridor on the eastern side of the site that adjoins Indian Ocean Drive;*

- *A Hill River Bushland Management Plan will be prepared before development occurs, to protect the riverine and estuarine environments and natural processes. This should be to the satisfaction of all*

relevant authorities. Some limited passive recreation facilities may be provided in the foreshore area agreed by the WRC, but other facilities should be outside that boundary. Areas with different management priorities should be identified in the Hill River Bushland Management Plan.

- *Protection of the water regime (including water quality, water quantity and seasonal flow) supporting the Hill River will be addressed in the overall Water Management Plan for the site. Further, the detailed drainage plans for the adjoining stages of development and the Hill River Bushland Management Plan should provide more detailed prescriptions for protection of the Hill River water regime.*

Taking into account the advice of WRC and the landowner's commitments, the EPA considers that its objectives for the protection of the Hill River and estuary can be met provided that its advice is implemented."

Subsequent to the preparation of the "Environmental Report", the landowner has commissioned a detailed survey of possible wetlands within the site. This study resulted in the identification of 18 wetlands in addition to the two discussed within the "Environmental Report". Three of these additional wetlands were reported to be in poor condition and not recommended for protection. The other wetlands are to be protected resulting in the following Environmental Protection Authority advice:

" (a) The EPA supports the inclusion of all the wetlands in the network of reserves shown in the Conservation Strategy.

(b) The EPA accepts that the environmental values of three of the wetlands that are on the beach ridge plain have been severely reduced by historic clearing and agricultural use.

(c) Buffers associated with the wetlands also require reservation, and protection. The Environmental Protection Authority agrees that the buffer around the large wetland in the northern part of the property should not be less than the buffer shown in the Environmental Report. The wetland buffers elsewhere are to be based on detailed site studies and reflect the latest methodology for wetland buffer determination, at the time of reservation.

(d) The primary objective of the portion of the open space reserve that incorporates each wetland and its buffer should be conservation of the natural attributes and functions of the wetland. The buffer should not perform an urban drainage function. Passive recreational use and minor complementary facilities within the buffer may be acceptable. Other recreational facilities should be outside the buffer.

(e) Management plans for the wetland areas and their buffers, and for urban water management near the wetlands, should be prepared before development and implemented. It is considered that the EPA's objectives for wetlands may be met provided there is satisfactory implementation of its advice. "

EPA advice on the coastline and coastal foreshore reserves contained the following :

"(a) The EPA expects that the final coastal foreshore will be, in all places, of sufficient width to accommodate:

- *The following physical coastal processes – long term shoreline movements, absorption of the impact of a sequel of severe storm events, allowance for global sea level rise, and allowance for the maintenance of natural coastal processes;*
- *Maintenance of coastal ecological systems and processes (eg sustainable habitat for coastal flora and fauna) in the long term; and*
- *Coastal landscape and coastal features that have value for social, cultural and economic reasons, including visual amenity, tourism, recreation and cultural heritage.*

It is expected that the foreshore will be wider, in places, than shown in the figures in the Conservation Strategy and Ardross Estates' Environmental Report, to ensure, into the long term, that the foreshore reserve can accommodate physical and ecological processes, as well as providing for human amenity and culture. The boundary of the foreshore reserve should also reflect practical, aesthetic and natural lines. It should not unduly dissect dune landforms. In places, the foreshore may need to be increased to include entire dunes. It is noted that Department of Transport advice relates setback lines to the line of established vegetation or the toe of the erosion scarp at the time of subdivision and notes that this line may be in a different place to the present line should development not occur in some places for many years.

At this stage it is expected that the final coastal reserve will be determined through the planning process, taking into account the evolving State Coastal Planning Policy.

(b) The coastal foreshore reserve is expected to link with other areas or corridors of open space both on the property, as shown in the Conservation Strategy, and adjoining the property, as part of an overall open space network for the locality; and

(c) A Coastal Foreshore Management Plan should be prepared before clearing and development near the coastline occurs, to the satisfaction of the relevant authorities.

It is considered that the EPA's objectives for the coastline may be met provided there is satisfactory implementation of its advice."

Two beach ridge plains occur within the Structure Plan area. the older plain is to the east and south-east of the existing townsite and is generally cleared and degraded. The second plain is at Island Point and in part retains vegetation cover. The landowner has committed to protecting a representative sample of this plain and this has been identified in the "Strategy for Nature Conservation and Bio-diversity", prompting the following Environmental Protection Authority advice :

" (a) The EPA endorses the inclusion of most of the vegetated portion of the beach ridge plain in the north west corner of the site, in a reserve for conservation purposes, and expects that it will be no less in size than the proposed reserve shown in the Conservation Strategy (Tingay 2001).

(b) *As for all conservation reserves, a Management Plan for the beach ridge plain reserve should be prepared before clearing and development near the proposed reserve occurs, to the satisfaction of the relevant authorities. The Management Plan should be subsequently implemented in accordance with the specifications in the Plan."*

The EPA considers that its objectives for the beach ridge plain landform can be met provided that its advice is implemented.

Landform and landscape are significant in defining the character of an area as well as for their environmental and scientific values. This significance is recognised in the Environmental Protection Authority's advice as follows :

"Taking into account the environmental significance of the locality, the EPA's advice on landform and landscape is as follows:

(a) *The EPA expects that natural areas and natural character will be retained and managed through the implementation of on-site and off-site conservation measures as outlined in the EPA's advice in Section 2.1. Key areas to be protected from point of view of landform and landscape are summarised in (d) below;*

(b) *The EPA urges that during all stages of the planning process, planning of the urban fabric will integrate with the natural landscape and landforms, and with planning for the overall open space network for the site. The EPA recommends that further investigations are carried out during the planning process, to address visual amenity and opportunities for urban design to relate to the natural landscape and landforms.*

(c) *The EPA expects development to occur in accordance with development policies or guidelines that ensure that an overall vision for coastal development is maintained in the long term. The EPA envisages that the vision should be clearly focussed on the natural setting and on maintaining a sense of an "environmental living zone" with development to occur in nodes such that the site retains an overall sense of natural landform and setting. Development should allow the retention of the natural character and characteristic landforms as far as practical, and particularly where vistas are experienced.*

(d) *Development of the site should provide for the retention of the key landscape and landform elements and representative portions of all landforms and vegetated landscapes, on the site. These elements are considered to include:*

- *The coastline and its foreshore, including some coastal dunes;*
- *The vegetated portion of the cuspate headland at Island Point;*
- *The Hill River valley and the Hill River estuary;*
- *Wetlands and their buffers;*
- *A landscape protection zone generally adjoining Indian Ocean Drive;*
- *Prominent dunes in the south east of the site*
- *Bushland corridors that enable some natural sequences of vegetation types and landforms to be retained; and*
- *Additional portions of a range of landform and vegetation types in local open space.*

The EPA considers that its objectives can be met provided that there is satisfactory implementation of its advice. "

In response to the Central Coast Regional Strategy and the identification of Jurien Bay as the major urban centre serving the region, the Water Corporation is preparing a Water Management Plan with the co-operation of the developer. Against this background, the EPA has provided the following advice:

"(a) The EPA expects the Water Management Plan to integrate with land use planning to ensure a good environmental outcome. For this project, the Water Management Plan is expected to address both a water supply to meet urban needs, and the disposal of water that is surplus to urban needs.

A primary objective of the Water Management Plan should be to demonstrate that development will occur without adversely affecting the hydrological regime of the Hill River system, wetlands, conservation areas, the proposed Jurien Bay Marine Park, ecological processes generally, and the water regime that supports other existing and potential beneficial uses of the groundwater and surface water resource.

If the Water Management Plan is developed in stages, the EPA expects that the first report will support the Structure Plan for the site. This report should describe the overall objectives of the Water Management Plan, and the process that will ensure that, at full development of the site, the objectives and criteria for protection of the beneficial uses of the groundwater and surface water resource will be met.

At the structure planning stage, the EPA expects that the Water Management Plan will identify the location of any major facilities required for stormwater management and water supply (if on-site), and any multi purpose corridors to be used for stormwater. The elements of the stormwater system should integrate with the open space system where appropriate. With respect to stormwater management, the Water Management Plan report that accompanies the proposed Structure Plan for the site should describe the key elements of the proposed system and provide sufficient information to demonstrate that at full development the stormwater management system will be capable of achieving environmental objectives.

The use of Water Sensitive Urban Design principles is strongly supported, including, where possible, at-source treatment and infiltration of stormwater, and the use of treatment trains that are ecologically sound.

At the structure planning stage, the likely source or sources for the water supply and approval processes for water supply, should be described.

(b) *The Water Management Plan should be implemented in accordance with the specifications in the Plan.*

(c) *It is recommended that the brief for a comprehensive Water Management Plan be prepared to the satisfaction of the relevant authorities. These would include the WRC, Water Corporation, EPA, the Shire of Dandaragan and CALM. If the Water Management Plan is prepared in stages, the timing and detail required in each report should be agreed by the relevant authorities.*

The brief should include the following requirements (this is not necessarily an exhaustive list of requirements and will depend on the input from other agencies):

1. *Develop the objectives and criteria for hydrological changes and export of nutrients and other pollutants, associated with the development of the site.*
2. *Develop an overall strategy for the management of landuse and water to ensure that the developed objectives, criteria and targets can be met. Identify all potential activities that may impact on water that may arise from the development of the site.*
3. *Undertake surface and groundwater analyses, modelling and investigations which demonstrate that the overall strategy is likely to ensure that the objectives, criteria and targets can be met.*

4. *In addressing urban water needs, propose the method of water supply, sources, distribution and management arrangements. If the supply is off-site discuss water supply options and the process that will be followed to gain approval for the use of the water supply. Address the promotion of efficient water use, and the use of on-site bores for non-potable uses.*
5. *Include an assessment of the quality and quantity of water needed by the ecosystems on and off the site that may be affected by the water resource of the site, and the periods during which those ecosystems will need that water, including any actions or restrictions needed to protect the water resource and the environment, and how these should be implemented.*
6. *Include an assessment as to whether the taking or use of water from the resource will have detrimental effect on the quantity and quality of water that is available from any other nearby water resource.*
7. *Assess the capacity of the resource to meet the demands for water on a continuing basis and make proposals for regular monitoring of the capacity of the resource to meet those demands.*
8. *Recommend strategies and responsibilities for surface and groundwater monitoring pre-development; and for monitoring, maintenance and, if necessary, remedial action (contingency planning), post-development.*
9. *Describe opportunities for use and reuse, detention and treatment of water emanating from the study area.*

10. *Describe management strategies and the most relevant best management practices for water pollutant and nutrient management. Recommend management measures that minimise recurrent maintenance whilst ensuring an ecologically responsible outcome. The Water Management Plan should address a range of mechanisms that will lead to manageable levels of nutrients and other pollutants in groundwater and surface water.*
11. *Outline procedures for the stages in implementation and management, and include review procedures for the Water Management Strategy.*

The EPA considers that its objectives for ground and surface water can be met provided that its advice is followed."

The development is to be generally deep sewered and in accordance with normal circumstances, the local authority will be responsible for solid waste collection and disposal. This is reflected in the Environmental Protection Authority's advice on waste management.

" (a) At the structure planning stage, it should be shown that there are practical locations and methods for sewage disposal and solid waste disposal, for the proposed urban development, that are environmentally sound. Any waste disposal sites that the development may require, either on or off the site, should be located and managed to avoid significant impacts on the natural environment and on the health and amenity of the community. Before development, the options and broad procedures for achieving environmentally sustainable management of liquid and solid wastes produced by the development, should be identified, including a system for waste reduction, reuse and recycling. It is expected

that this step would need to interrelate with any waste management strategy for the general region.

(b) Before development occurs, the Water Management Plan should identify potential wastes that may end up in the ground or surface water systems, and provide prevention and management measures. The EPA considers that its objectives for solid and liquid waste disposal can be met provided that its advice is followed.

The EPA considers that its objectives for solid and liquid waste disposal can be met provided that its advice is followed. "

The Structure Plan Area adjoins the proposed Jurien Bay Marine Park as discussed earlier. Advice from the Environmental Protection Authority prescribes a consultative approach to development planning to manage potential impacts on the marine park.

" (a) At the structure planning stage, a process should be described to identify:

- *potential impacts on the proposed Marine Park arising from the development;*
- *appropriate studies that should be undertaken in consultation with CALM; and*
- *procedures for ensuring that development occurs in a way that is consistent with the purposes of the Park.*

(b) The EPA's advice on ground and surface water, the coastline, landform and landscape, and solid and liquid waste disposal is also relevant to the protection of the proposed Marine Park.

The EPA considers that its objectives for this factor can be met provided that its advice is followed."

Greenhouse gas emission is a topical issue also recognised by the EPA in its advice on the project:

" *(a) The EPA expects that the documentation supporting the Structure Plan and subsequent applications for approval (as relevant) will consider what can be done to promote environmental sustainability, and will demonstrate an appropriate response in terms of the following:*

- *Ensuring the healthy functioning of key ecological processes and key areas of natural ecosystems;*
- *Protecting bio-diversity;*
- *Limiting greenhouse gas and other air quality emissions;*
- *Reducing the use of materials and energy in infrastructure, transport, communities, services, housing etc. compared with conventional development, and promote the use of renewable energy and recycled materials;*
- *Managing wastes through minimising the production of waste and promoting recycling, and ensuring environmentally acceptable locations are available to process wastes from the development;*
- *Reducing the demand for fresh water, compared with conventional development, and promote the reuse of water;*
- *Protecting the community from pollution and adverse amenity impacts; and*

- *Promoting a vision for environmentally sensitive development, and the development of a community ethos that supports sustainable development and caring for the local environment.*

The EPA expects that the documentation supporting the Structure Plan will outline a vision for environmentally sensitive development and environmental sustainability with respect to the site, and the opportunities and the process for promoting this vision at subsequent stages of planning and development. This process should then be implemented. The EPA recommends the development of urban design guidelines at appropriate stages of planning, to progress the vision for environmentally sensitive and sustainable development on the site.

(b) Compliance with the EPA's overall advice will contribute to sustainable development of the site.

(c) The objective in the Memorandum of Understanding to incorporate innovative, energy efficient and ecologically sustainable forms of development is strongly supported. In this regard, the development should where possible incorporate the principles of walkable neighbourhoods, "greenhouse" neighbourhoods, local employment and activity centres linking with a public transport network. The site should be planned to minimise dependence on private vehicular transport and to promote a public transport system. The subdivisional lot layout should be conducive to energy-efficient housing design and estate maintenance. For example, lots should achieve good exposure for solar energy systems.

(d) The EPA urges that particular care is taken by the planning authorities and the developer to ensure that the initial urban constructions reflect the site-specific vision for environmentally sensitive development. The EPA recognises that the initial housing, tourism developments, estate design and stormwater drainage management systems, and activity/community nodes can to a large extent set the tone for, and inspire, subsequent development.

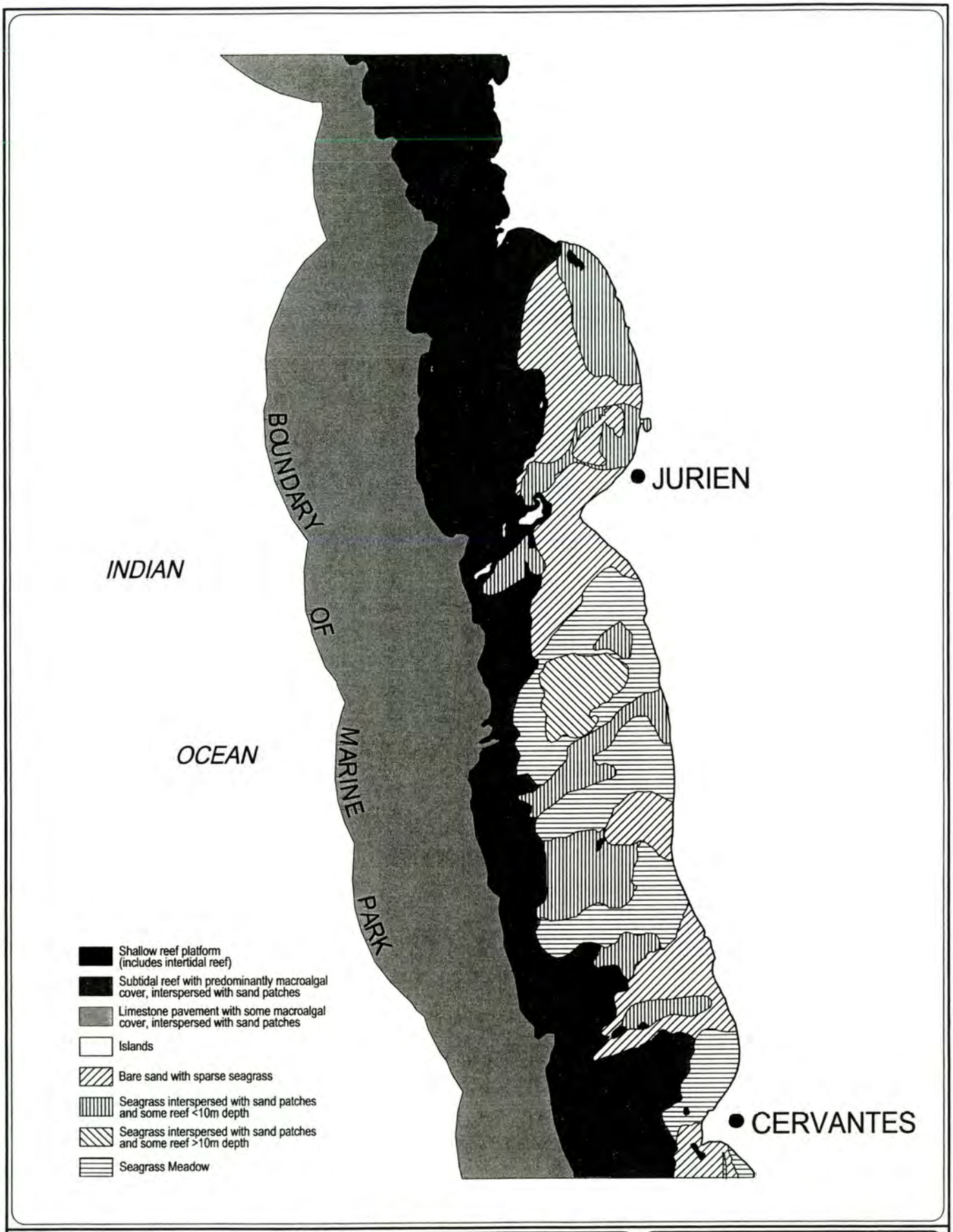
(e) It is noted that local models for sustainable development and for the assessment of the sustainability of settlements have yet to be developed. As appropriate models and strategies are developed these should be adopted and implemented through the ongoing development of the site.

The EPA considers that its objectives for sustainable development can be progressed provided that its advice is followed."

2.5.2 *Proposed Jurien Bay Marine Park*

The Jurien Bay Marine Park is proposed to cover Western Australian territorial waters from approximately Green Head in the north to Wedge Island in the south. An Indicative Management Plan (2000) has been prepared by the Marine Parks & Reserves Authority/CALM, identifying the extent of the Marine Park and recommending management strategies.

The Indicative Management Plan characterises and maps seabed conditions (major benthic habitats) within the proposed Marine Park, and shows that to the north of Booka Valley, the seabed comprises bare sand with sparse seagrass and to the south, seagrass meadow. **Figure 5** shows the benthic habitats adjacent to the Structure Plan area.



Notes/Revisions

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Date : 18 June 2002 Ref. 1919/benthic/1

MAJOR BENTHIC HABITATS WITHIN PROPOSED JURIEN BY MARINE PARK

Figure 5

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In addition, the Indicative Management Plan proposes use zones over the proposed Marine Park. **Figure 6** shows that Island Point has a 100 metre wide Special Purpose (Shore Based Activities) Zone in front of a Sanctuary Zone which extends down to the headland forming the southern boundary of Booka Valley. Further south, there is a General Use Zone with an off-shore Special Purpose (Aquaculture) Zone.

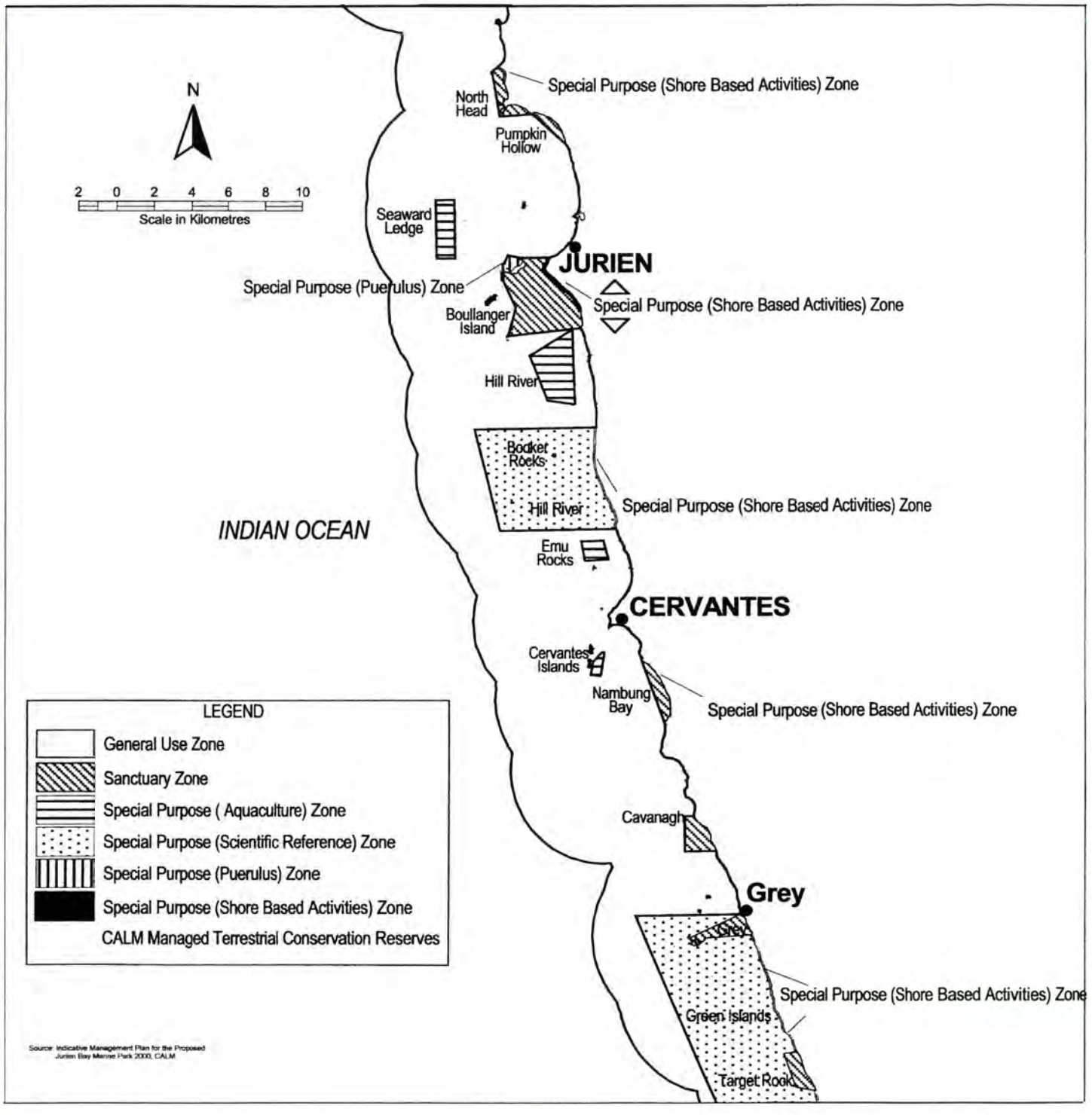
These Zones have little impact in determining the use of the adjacent land area. They do not restrict activities such as beach bathing, surfing, windsurfing, etc. No fishing (including beach fishing) is permitted in the Sanctuary Zone. Beach and boat fishing are therefore prohibited at Booka Valley, but permitted within 100 metres of the shore at Island Point. Structures are permissible in all zones subject to assessment.

The Indicative Management Plan establishes a range of Management Objectives and Targets for the various ecological values within the park, as well as for social values which include recreational and commercial activities.

2.6 COMMUNITY CONSULTATION

There has been considerable community consultation in relation to planning proposals for Jurien Bay. This consultation commenced with the Central Coast Regional Strategy identifying Jurien Bay as the district or primary centre for the region.

The Strategy was first published in 1994 as a draft for public comment and finalised in 1996. In August 1996, the project proponents convened an "open day" at the Jurien Bay Community and Recreation Centre. This event included a display with opportunities for the public to discuss the proposition of Jurien Bay's growth with the proponents and a questionnaire survey to help gauge community attitudes.



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Date : 28 May 2002 Ref. 1919/marinepark/mar

MARINE PARK USE ZONES
JURIEN BAY
Figure 6

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Over 150 people attended including a local school group and 124 questionnaires were returned. Generally, there was widespread community support for the growth of Jurien Bay.

Subsequently, during the advertising of Amendment No.13 to the Shire of Dandaragan Town Planning Scheme, proposing the inclusion of the Structure Plan area within a "Special Development" zone, a public meeting was held to outline planning processes to follow and to answer questions. It is fair to say that most concerns about development emanated from squatters at Booka Valley.

Between 28 August and 23 October 2000, the Environmental Report on the concept of development was advertised, inviting public submissions. The Environmental Protection Authority's Bulletin 1031 records the submissions received; there was one individual submission, three from environmental groups and six from government agencies. The range of issues covered are summarised in the Bulletin.

On January 31 / February 1, 2002 a workshop was conducted at Jurien Bay in the town's Community Centre. Participants included government agencies as well as representatives of Council, the Jurien Bay Progress & Tourism Association and the Cervantes Progress & Ratepayers' Association. At the end of each day, members of the public were invited to attend to review progress, ask questions and become involved in discussion. Approximately two dozen members of the public attended each of the consultative sessions.

Perhaps the key issues to arise related to firstly, the issue of whether the new development should be integrated with the existing township, or whether the character and lifestyle of the existing town should be protected by creating it as a separate development. The community consensus very definitely favoured integration.

Secondly, there was broad consensus that Booka Valley should be a focus for a regional beach and tourism activity. The restriction of distributor road crossings of the east-west conservation strip to only one was also favoured.

A continuous drive and dual-use path along the beach front was also a clear desire of the public who participated in the workshop process. Concern was expressed about the possible location of industry and the quality of "entry statements" into the town of Jurien Bay.

Other issues were identified as still requiring resolution, and these may be summarised to include :

- staging and implementation issues
- the future of the Jurien Bay airstrip
- employment
- creation of tourist attractions
- groundwater impacts, particularly the Hill river

3. THE SITE

3.1 SITE ANALYSIS

The Environmental Report prepared in relation to the EPA's S16j advice is a public document which has been advertised for public comment and reviewed in the light of submissions. That Report provides a detailed analysis of site conditions and it is therefore not proposed to repeat the analysis in this Plan, particularly as the environmental impact assessment process followed has resulted in the identification of conservation reserves and therefore the land areas considered suitable for urbanisation.

Notwithstanding the discussion above, an understanding of landform, soil conditions and vegetation is essential to the physical planning of development.

a) *Landform*

Figure 7 is a Digital Terrain Model of the site with the boundaries of the proposed conservation reserves draped over the landform. In general, the landform is relatively flat with the pattern of relief falling into three generalised descriptive units.

The first of these units comprises the beach ridge plain in the northern part of the site. This unit is particularly flat with relief limited to only several metres coinciding with historic coastline positions.

In places, recent coast dunes overly the beach ridge plain along the foreshore strip and further south, these dunes intrude further inland. They exist in ridges as well as forming parabolic systems. The dunes are relatively steep but only moderate in height, with a relief of around 10 metres above the otherwise flat landscape.

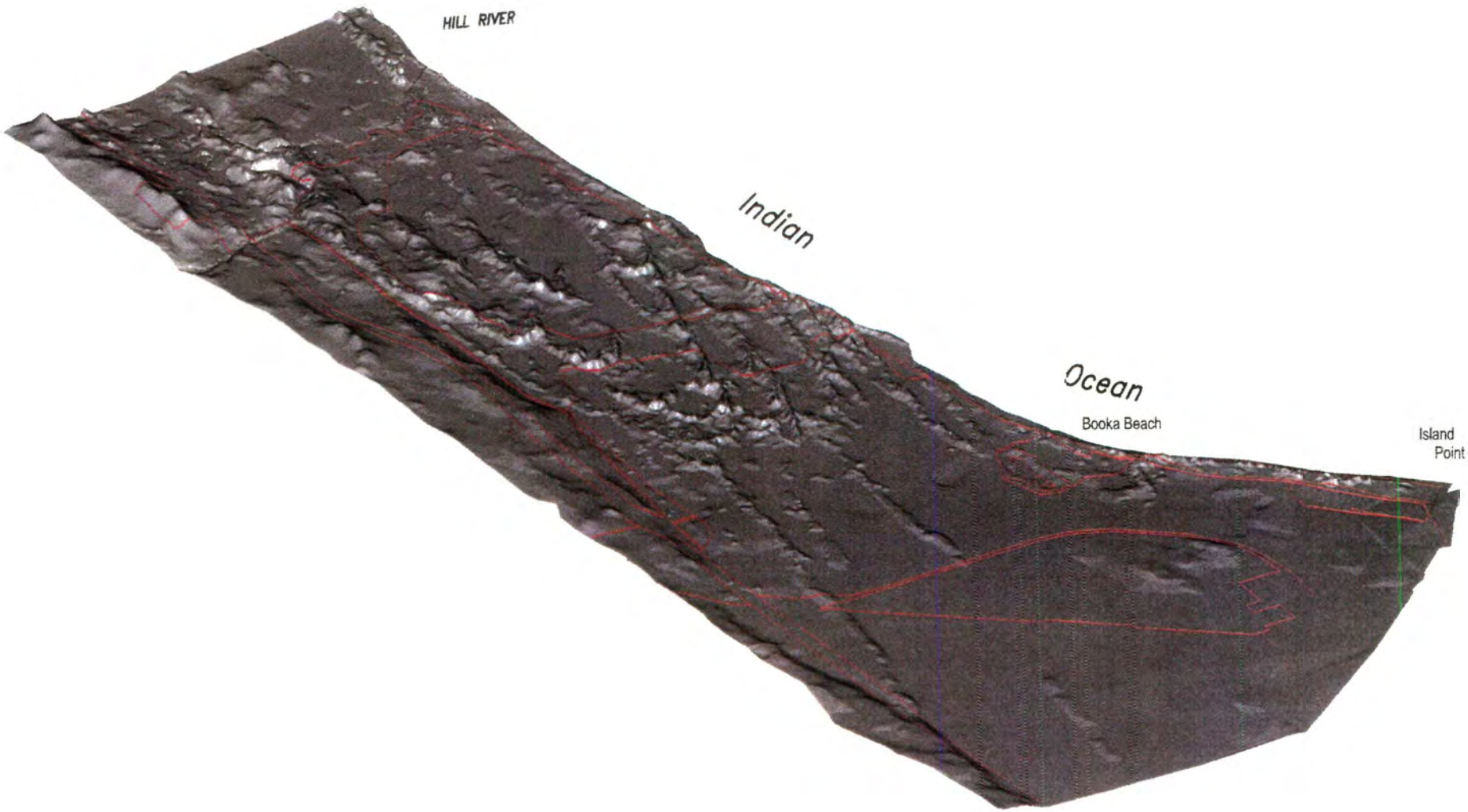
Further to the east lies the older, Spearwood dune system which is more gently graded and rounded.

Overall the landform poses no particular constraint to development other than, the general lack of gradient has implications for drainage design and sewerage services utilising gravity flow.

b) *Soils*

Soils are generally calcareous sands with limestone outcropping on the coast, particularly south of Booka Valley and limestone at shallow depth in the Spearwood dunes down the eastern side of the Structure Plan area.

The Environmental Report concluded that there were no karst landforms identified within the proposed development areas and no surface geological indications of such landforms.



Notes/Revisions

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SCALE N.T.S.

Date : 31 July 2002 Ref. 919/oblique-v/A4

LANDFORM - OBLIQUE VIEW OF SITE
5 TIMES VERTICAL EXAGGERATION
Figure 7

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Town and Regional Planners
Tel. (08) 9321 3011 Fax (08) 9324 1961

c) *Vegetation*

Approximately the northern third of the property is cleared with the balance under a blanket of relatively low, coastal heath. **Figure 8** is an aerial photo of the site allowing the vegetated areas to be discerned.

Apart from the conservation reserves identified through the environmental review process, there are no particular specimens or clumps of vegetation which leap out as being essential landscape elements to be taken into account through the Structure Planning exercise. Rather, the heath vegetation has a more subtle influence on defining the character of the site.

3.2 CONTEXT ANALYSIS

The context of the site comprises a blend of man-made and natural features.

Jurien Bay itself extends from North Head in the north to Island Point in the south. The townsite of Jurien Bay is located on the southern shore of the bay, towards Island Point. Immediately to the north of the existing townsite area is the Jurien Bay boat harbour. Offshore there are a number of sizeable islands including Favorite Island, Boullanger Island, Whitlock Island and Escape Island. Whilst these islands are nature reserves, it is understood that managed access is likely to be made available, particularly to Favorite and Boullanger Islands which have sandy, protected beaches attractive for public use. To the south of Island Point the beach front is varied, including a rapidly eroding foreshore immediately to the south of the point, followed by a stable sandy beach backed by low dunes at Booka Valley, and then further south a mix of rocky shelf and sandy beach down to the Hill River. The beach at Booka Valley has been identified as the most suitable site for a regional beach and focus for tourist activity.

Notes/Revisions

N

0 Metres 1375

SCALE 1:55,000

Date : 28 May 2002 Ref. 1919/may2002/context

AERIAL PHOTOGRAPHY OF SITE
JURIEN BAY
Figure 8

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The Jurien Bay townsite itself generally comprises a narrow strip of urbanisation following the coastline to the south of the boat harbour. The main street through the town is Bashford Street which has been adopted into the interim route of Indian Ocean Drive. Ultimately, Indian Ocean Drive is proposed to bypass the town centre with Bashford Street comprising a loop off the main north-south route.

Jurien Bay's town centre is generally situated along Bashford Street between Roberts Street and Doust Street. Notwithstanding that general observation, significantly the town's hotel/motel is situated on White Street. For the most part, the town's commercial development is confined to the area north of Bashford Street. To the south of Bashford Street, particularly in the area of Bailiff, Batt and Hamersley Streets, is the main civic and community precinct comprising the Police Station, Council Offices and Chamber; with new facilities under construction, the town's Library, a new Medical Centre and the district High School and Primary School. Further to the north-east along Bashford Street but still on the southern side, are the main recreation facilities comprising an oval, tennis courts, bowling club and golf course, together with an indoor recreation and community centre.

A mixed-use area has tended to develop along the beach front from approximately the centre of the town up to the boat harbour. This area comprises a mix of tourist accommodation, commercial development, development associated with the fishing industry; as well as recreation and residential. It is likely that the mixed character of this coastal strip will be strengthened with the future development of a site earmarked for tourist accommodation on the southern headland of the boat harbour.

Industrial development occurs on the eastern side of the town, to the north and south of Bashford Street. Also to the east of the town is the local airstrip, on a north/north-east to south-west trend. At the southern end of the airstrip is a stock route, heading inland towards the south-east. The town's wastewater treatment plant is situated to the north of that stock route, and as will be discussed later, it is probable that a new wastewater treatment plant will be developed to accommodate the town's expansion to the east of the existing plant.

Water supply infrastructure is situated on high land to the north of the Jurien Bay East Road and to the east of Indian Ocean Drive. This infrastructure comprising storage tanks for gravitational feed is generally well removed from the townsite area and this Structure Plan area.

Indian Ocean Drive is a recently completed single carriage way dual lane road extending on the eastern side of the Structure Plan area until it intersects with Bashford Street. To the north of Bashford Street, the road is yet to be constructed.

Finally, the conservation reserves including the reservation parallel to Indian Ocean Drive, the foreshore reserve along the Hill River, the east/west strip through the centre of the site, as well as coastal reserves including the beach ridge plain in the north, have considerable influence in defining the pattern of Jurien Bay's development and hence the proposals of this Structure Plan.

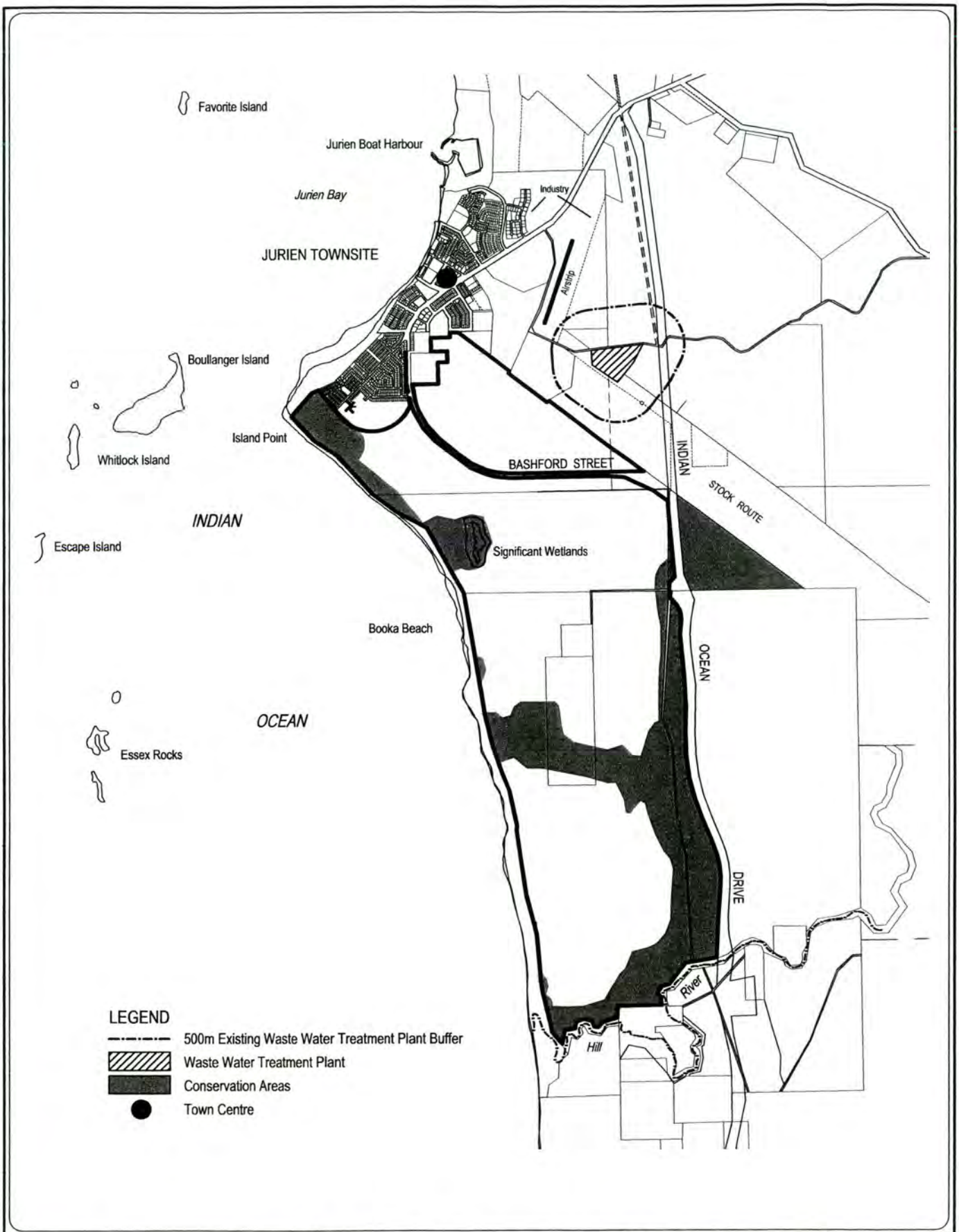
The contextual elements influencing the urban form and briefly described above, are located on **Figure 9** - Context Analysis.

4. PROPOSED STRUCTURE PLAN

4.1 FUNCTION

An understanding of Jurien Bay's function or reason for being is pivotal to this Structure Plan. The base industry is the fishing industry, in particular exploitation of the rock lobster fishery. Tourism is also a major industry and the town also has a reputation as a retirement centre. Since the town's role as a district centre was identified in the Central Coast Regional Strategy, several administrative functions have located in the town including the principle offices of the Dandaragan Shire Council and the regional offices of CALM.

Insight to Jurien Bay's function can be gained from demographic data and to this extent, preliminary results of the 2001 Census have recently become available.



Notes/Revisions

N

0 Metres 1625

SCALE 1:65000

Date : 27 June 2002 Ref. 1919/27Jun02context/l1

CONTEXT ANALYSIS
JURIEN BAY
Figure 9

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The town's population has shown a steady rise over the last two decades as demonstrated by **Table 1**.

Table 1 Jurien Bay – Population Change 1981 to 2001

Year	Population	Increase %	Increase in No. of People pa
1981	449		
1986	730	62.6	56
1991	830	13.7	20
1996	933	12.4	21
2001	1153	23.6	44

Table 2 shows age characteristics of Jurien Bay's population at 2001, providing a comparison with the State as a whole. The table reveals the elevated proportion of retirees living in Jurien Bay.

Table 2 Age Characteristics - Jurien Bay 2001

	Age	*Persons*	*Prop.%*	*WA Prop.%*
Pre-School	(0-5)	112	9.8	8.1
School	(6-17)	166	14.5	17.9
Young Adult	(18-24)	76	6.7	9.7
Adult	(25-44)	296	25.9	30.0
Middle Age	(45-59)	227	19.9	19.1
Retired	(60 & over)	275	24.1	15.3

At 2001, Jurien Bay had a total of 808 dwellings of which 307 or 38% were unoccupied indicating a high proportion of weekenders/holiday homes in the town.

Table 3 shows the industry of employed persons in Jurien Bay at 1996, the 2001 employment data not yet available. The Table indicates the importance of the fishing industry to Jurien Bay, particularly with regard to the fact that much of the manufacturing industry is likely to supply the fishing industry. Construction, retailing and administration are also major industries.

Table 3 Industry of Employed Persons - Jurien Bay 1996

Industry	*Persons*	*Prop.%*	*WA Prop.%*
Agriculture, Forestry, Fishing	33	10.4	4.9
Mining	6	1.9	3.7
Manufacturing	32	10.1	10.1
Electricity, Gas & Water Supply	11	3.5	0.9
Construction	42	13.3	7.2
Wholesale Trade	3	0.9	5.7
Retail Trade	34	10.8	13.5
Accommodation, Cafes & Restaurants	10	3.3	4.3
Transport & Storage	15	4.7	4.0
Communication Services	7	2.2	1.7
Finance & Insurance	6	1.9	3.3
Property & Business Services	15	4.7	9.9
Government Administration & Defence	19	6.0	4.1
Education	29	9.2	7.3
Health & Community Services	15	5.7	9.4
Cultural & Recreation Services	0	0.0	2.1
Personal & other services	15	4.7	4.0
Non-Classifiable	3	0.9	1.5
Not stated	18	5.7	2.4

Because the fishing industry is a managed and regulated industry, it is not likely to grow significantly. The other functions of Jurien Bay are likely to continue, however. It will remain a centre with attraction to retirees and those wanting a holiday home as well as an administrative centre supplying regional education, retail and manufacturing needs. Urban growth will ensure construction remains a major employer.

The implications for structure planning are not only to supply the land needs for these uses, but to have regard to the implications for urban form. The urban design policy "Liveable Neighbourhoods" advocates neighbourhoods focused on a centre within a 450 metre radius walkable catchment. The impact of a high proportion of vacant holiday homes will need to be considered in relation to the siting of centres during Development Plan preparation.

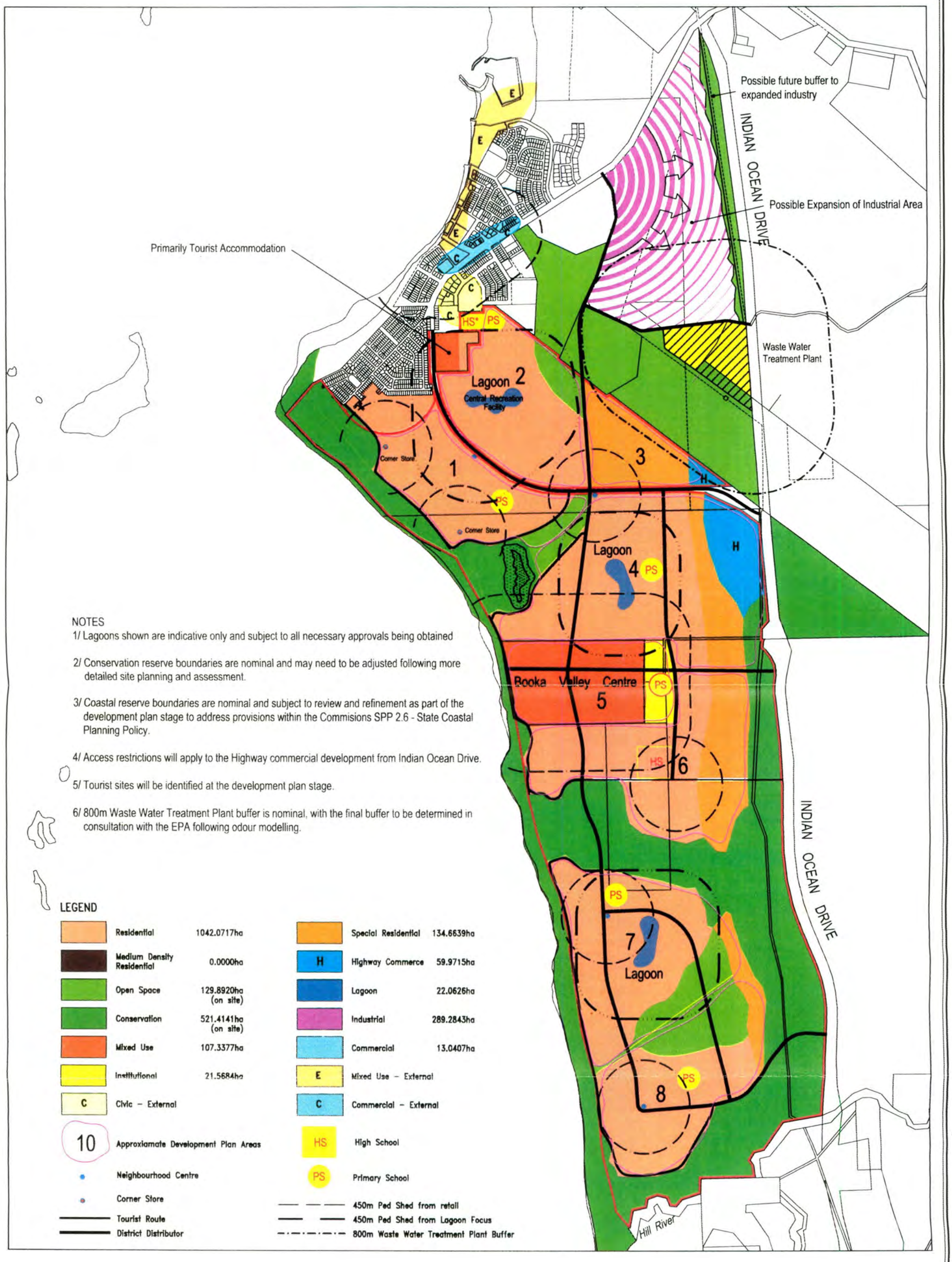
4.2 PLAN DESCRIPTION

This Structure Plan proposes an urban, tourism and holiday community within a unique environment comprising nodes of development retaining a high degree of "naturalness". This is in part achieved by setting aside large areas of land for the protection of biodiversity as well as utilising landscaping policy and providing a variety of open spaces including semi natural reserves. The plan aims to achieve high levels of sustainability as defined through the "triple bottom line" approach of environmental, economic and social sustainability. These issues are canvassed in the proponent's environmental reporting, as well as being consequent on EPA advice's and the MOU entered with Council and the WAPC

Figure 10 shows the proposed Structure Plan over the Special Development Zone area at Jurien Bay, and for reasons of placing the plan in context, illustrates some planning proposals for land beyond the boundaries of the Zone.

The public consultation process and the MOU highlighted a need for integration between the new development and the existing town. In large part this is seen, particularly by the public, as supporting the existing town centre including the commercial and community facilities rather than the creation of new, competing facilities which could lead to the demise or contraction of the existing centre.

Accordingly, the Structure Plan illustrates in a general way the expansion of the existing town centre, linking into a mixed use area



NOTES

1/ Lagoons shown are indicative only and subject to all necessary approvals being obtained

2/ Conservation reserve boundaries are nominal and may need to be adjusted following more detailed site planning and assessment.

3/ Coastal reserve boundaries are nominal and subject to review and refinement as part of the development plan stage to address provisions within the Commisions SPP 2.6 - State Coastal Planning Policy.

4/ Access restrictions will apply to the Highway commercial development from Indian Ocean Drive.

5/ Tourist sites will be identified at the development plan stage.

6/ 800m Waste Water Treatment Plant buffer is nominal, with the final buffer to be determined in consultation with the EPA following odour modelling.

LEGEND

	Residential	1042.0717ha		Special Residential	134.6639ha
	Medium Density Residential	0.0000ha	H	Highway Commerce	59.9715ha
	Open Space	129.8920ha (on site)		Lagoon	22.0626ha
	Conservation	521.4141ha (on site)		Industrial	289.2843ha
	Mixed Use	107.3377ha		Commercial	13.0407ha
	Institutional	21.5684ha	E	Mixed Use – External	
C	Civic – External		C	Commercial – External	
10	Approxiamate Development Plan Areas		HS	High School	
	Neighbourhood Centre		PS	Primary School	
	Corner Store			450m Ped Shed from retail	
	Tourist Route			450m Ped Shed from Lagoon Focus	
	District Distributor			800m Waste Water Treatment Plant Buffer	

Notes/Revisions

N

0 Metres 1750

SCALE 1:35,000

Date : 24 November 2003 Ref No. 1919/21Nov03/Final A3

STRUCTURE PLAN

Figure 10

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along the ocean foreshore up to and including the Jurien Bay boat harbour. To the south of the commercial area, the community precinct is shown to extend into the Structure Plan area to accommodate expansion of the existing high school onto a 10 ha site and re-establishment of the existing primary school on a separate site. There is potential for other community/civic functions to expand/locate in this precinct.

Additionally, the Structure Plan at Figure 10 shows how the proposed development relates to recreation areas to the north, including the town's golf course and the old stock route, parts of which are currently used for equestrian purposes.

Provision is also indicated for expansion of the town's industrial area to utilise the existing airstrip and land eastwards towards the future Indian Ocean Drive alignment. Community consultation resulted in expressions of concern about industry forming an entry statement to the town. An indicative landscape buffer is therefore shown. In many respects however, the existing industrial areas to the north and south of Bashford Street form the entry statement to the town as approached via Jurien East Road.

It would seem to be in the best interests of Jurien Bay's development that the airstrip be relocated to avoid flight paths over future housing. Two alternative locations include consolidating aircraft activity at Cervantes, a relatively short distance to the south since completion of the section of Indian Ocean Drive between the two towns or relocation out to a site at the corner of Jurien East Road and Munbinea Road, to the east of town.

Figure 10 shows the Structure Plan area divided into numbered cells indicating likely staging and future Development Plan areas. Progressive development southwards from the existing township is envisaged.

The EPA expressed its expectation that development would occur in nodes, and implied that an "environmental living zone" character be

created by using the conservation reserves and other natural and semi-natural open spaces to create the nodal effect. This objective is shared by the proponent. A green wedge is therefore shown between Cells 1 and 4, utilising conservation reserve around a large wetland area and extending it inland to meet a proposed large lot area in Cell 3 designed to complement the equestrian activities within the old stock route.

A second node of development is shown further south, focused on the beach at Booka Valley and incorporating Cells 4,5 and 6. A third node comprising Cells 7 & 8 is located down towards the Hill River.

The impact of green spaces is augmented by large lot areas, particularly towards the east of the Structure Plan area in Cells 7 & 8. A possible golf course is indicated in the southern node potentially dividing this area into two sub-nodes. Whether there will ultimately be justification for a second golf course at Jurien Bay is for posterity to tell, however the provision is made at this point.

The Structure Plan distinguishes between the conservation areas and large recreation spaces aimed at creating development nodes in a natural setting. Although the Plan draws this distinction between the open spaces, it is not intended that the area's marked for conservation should be isolated from public access. In particular, coastal and river foreshore reserves will have significant recreation functions which will need to be managed by the implementation of appropriate management plans.

Booka Valley is shown to be the focus of a mixed use area envisaged to contain a lively combination of tourist accommodation, commercial development and residential uses. It is likely that this area's character will change over time and intensify. As much as possible the retention of large, vacant areas of land is to be minimised, with preference to allowing interim uses to establish in line with requirements of the MOU.

Booka Valley is planned to be a regional beach. The high level of public use of this area is consistent with the proposals for the Marine Park in that beach fishing is not permitted at this location under the zoning proposals for the Park.

Commercial development including retailing is envisaged in this mixed use area. It is probable that it will ultimately contain a considerable amount of retail floor space, for the simple fact that site accumulation in the existing town centre will likely prove difficult because of the current subdivision pattern and it will not prove to be possible to accommodate all retail demands in this area. To this extent, the proposed mixed use area at Booka Valley some 3.5 kms to the south as the crow flies, and within a different node to that containing the existing town centre, is so situated that it warrants significant commercial development, particularly if targets such as the MOU requirement that average personal car trips should not exceed 7.5 kms per trip are to be met. The challenge will be to stage development so that the traditional town centre retains and strengthens its role along with the establishment of appropriate facilities at Booka Valley.

Cells 3 and 4 propose some highway commercial development to take advantage of exposure to Indian Ocean Drive and the Bashford Street entrance into the town. A roadhouse, motel for travellers passing straight through the area and other uses requiring a high level of exposure are anticipated. More detailed design and consideration of the development of these areas will need to be given at the Development Plan stage. Should the demands of these types of uses manifest themselves sooner rather than later, it may be necessary to

prepare Development Plans over smaller portions rather than the whole Cell. Indeed, this principle may apply to any of the suggested Cells.

The Plan indicates several possible "lagoons". These are modelled on Lake Alexander in Darwin, a large body of seawater pumped into a man-made basin. At Jurien Bay these lagoons would be constructed above the water table and isolated by impervious membranes. Seawater would be circulated to maintain a suitable quality of water for reasons of public health and to prevent hypersalinity. Drainage waters would also be isolated from the lagoons to avoid problems of eutrophication.

The proposal will need to be the subject of detailed investigation, however the Marine Parks Reserve Authority has notified its conditional agreement in principle **(Appendix 1)**.

The major road system is based on Indian Ocean Drive forming the regional connection linked by district distributors including Bashford Street to form a modified grid. In accordance with EPA advice, crossings of conservation reserves particularly the east-west strip, are minimised.

An outcome of the public consultation program was the desire for a continuous coastal drive. If implemented, this would represent another crossing of the east-west conservation link as well as creating a road separating wetland reserve from the ocean foreshore. The EPA has indicated that a continuous foreshore road is unacceptable because of crossings of conservation reserves. A continuous foreshore road is however provided adjacent to urban areas accommodating public access to beaches.

4.3 SUSTAINABILITY

Sustainability issues are addressed in the broader scale within this Structure Plan and will be addressed in greater detail under the subsequent planning stages. The following chart at **Table 4** relates the sustainability issues to the planning phases.

Table 4 SUSTAINABILITY CHART

Issue	Structure Plan	Development Plan	Subdivision
General Biodiversity & Natural Environment	Identify biodiversity reserves.	Establish reserve boundaries with higher degree of accuracy after carrying out detailed investigations. Develop management plans for adjacent reserves. Ascertain multi purpose POS which may retain some bushland to serve some biodiversity protection functions. Carry out visual impact studies.	Survey and vest reserves in Crown ownership at appropriate subdivision stage. Implement proposals of management plans.
Energy Efficiency & wise use of Natural Resources	Identify routes of efficient distributor road system. Identify trunk cycleway system. Identify public transport routes. Locate district scale destinations to maximise efficiency. Locate neighbourhood centres to take advantage of the "movement economy" and to be within efficient pedestrian/cycle catchments.	Establish efficient, interconnecting local street systems. Plan for pedestrian/cycle systems at the local level including access to public transport routes. Detail neighbourhood centres and establish design guidelines. Design residential lots so that a high proportion have solar efficiency.	Construct infrastructure including roads, cycleways and footpaths, with a view to minimising the number and length of vehicle trips. Create neighbourhood centre sites. Create residential lots with regard to solar orientation. Implement any sustainability strategies that may have been developed (having regard for government initiatives on sustainability).
Water Use	Integrate with preparation of Total Water Management Plan.	Plan to minimise domestic and public water use. Plan to recycle waste water. Infiltrate stormwater as close to source as possible. Continue to develop Water Management Plan and integrate development with Water Management Plan.	Integrate water efficient landscaping packages. Implement water efficient landscaping packages. Design public spaces to take advantage of wastewater recycling opportunities. Implement drainage strategies minimising piped systems.
Waste Management	Acknowledge Shire of Dandaragan Waste Management review.	Design lots and landscaping to limit green waste. Consider education programmes to limit waste and improve recycling.	Implement landscaping proposals and any waste minimisation programs agreed on.
Relationship to Marine Park	Development planning to be consistent with proposed Marine Park Zonings. Total Water Management Plan to duly regard water quality issues.	Design for all facilities including parking facilities at regional/district beaches to be sympathetic to the Marine Park. Design drainage systems to attenuate nutrient inputs and other potential pollutants.	Implement Development Plan proposals for parking and facilities. Implement drainage strategies.

4.4 DEVELOPMENT YIELDS

At this point in the tiered planning process established for the Special Development Zone, the level of detail is so coarse as to make the estimation of development yields indicative only. The preparation of Development Plans under the next tier will help to crystalise the ultimate development potential of the zone.

Overall, the site is expected to generate around 9000 residential lots together with around 1400 tourist beds, 500 caravan sites and up to 30,000m^2 of retail floor space. In addition, there will be provision for general commercial uses, open spaces, educational institutions, including 1.4 high schools and 6 primary schools, and community facilities. Not all of the commercial/tourism development will be accommodated within the Structure Plan area as the existing town centre is to remain the main central place not only of Jurien Bay but the whole region.

The 9000 residential lots can be expected to accommodate a maximum population of around 25,000 persons, however this total needs to be tempered by the expectancy of a higher than normal proportion of absentee ownership as well as a relatively high proportion of retiree households with a lower than usual occupancy rate.

Even so, as Jurien Bay grows, it is likely to become more "normal" in terms of its demographic profile. The larger the town, the less appeal it will have to holiday makers wishing to own their own holiday home. Similarly, retirees may wish to opt for a smaller, quieter location. These trends, however, remain to materialise.

It is important, therefore, to assess facilities demand on the maximum population. If that demand does not materialise, it is easier to delete a facility such as a school site rather than try to retro-fit a site in the

event that it is needed. A community development plan is discussed later.

The nature of the demographic/housing profile also has implications for the assessment of retail floor space demand. The Metropolitan Centres Policy suggests retail floor space should be provided at the ratio of 1.74m^2 per capita including 0.2m^2 per capita within the Perth CBD. "Suburban" space is, therefore, 1.54m^2 per capita.

The issue of absentee ownership needs to be balanced against the fact that Jurien Bay will be the main central place of a broad region and it can be expected that much of the higher order retail demand generated from this region will be attracted to Jurien Bay.

Bearing these factors in mind, it is estimated that retail floor space demand should, for structure plan purposes, be calculated at the ratio of 1.5m^2 per capita assuming an occupancy rate of 2.8 persons per dwelling. In addition, there will be demand as a result of tourist accommodation and caravan parks. Therefore, up to 40,000m^2 of retail floor space may ultimately be required with a substantial proportion of this potentially being added to the existing town centre.

Preliminary yields on a cell by cell basis follow in Table 5

Table 5 Preliminary Development Yields

Cell 1	1300 Lots
	200 tourist beds
	Local commercial
	Primary School
Cell 2	1050 lots
	200 caravan sites
	150 tourist beds
	Local Commercial
	Primary School
	Part High School
Cell 3	75 lots
	50 tourist beds
	General Commercial
Cell 4	2000 lots
	General commercial
	Primary School
	Local commercial
	100 caravan sites
Cell 5	Medium density residential
	District Centre
	400 tourist beds
	Primary School
	Institutional uses
Cell 6	1600 lots
	High School
	Local commercial

Cell 7	1800 lots
	Primary School
	Local commercial
	300 tourist beds
Cell 8	1300 lots
	Primary School
	Local commercial
	100 tourist beds
	200 caravan sites

The Structure Plan provides approximately 1100 ha of gross urban land, 75 ha of mixed use, 130 ha of low-density rural/residential, 60 ha of highway commercial and 20 ha of public purposes excluding school sites. In addition, there are some 519 ha of conservation reserve on-site and a further 86 ha off-site with other areas shown in large open spaces, lagoons and district reserves.

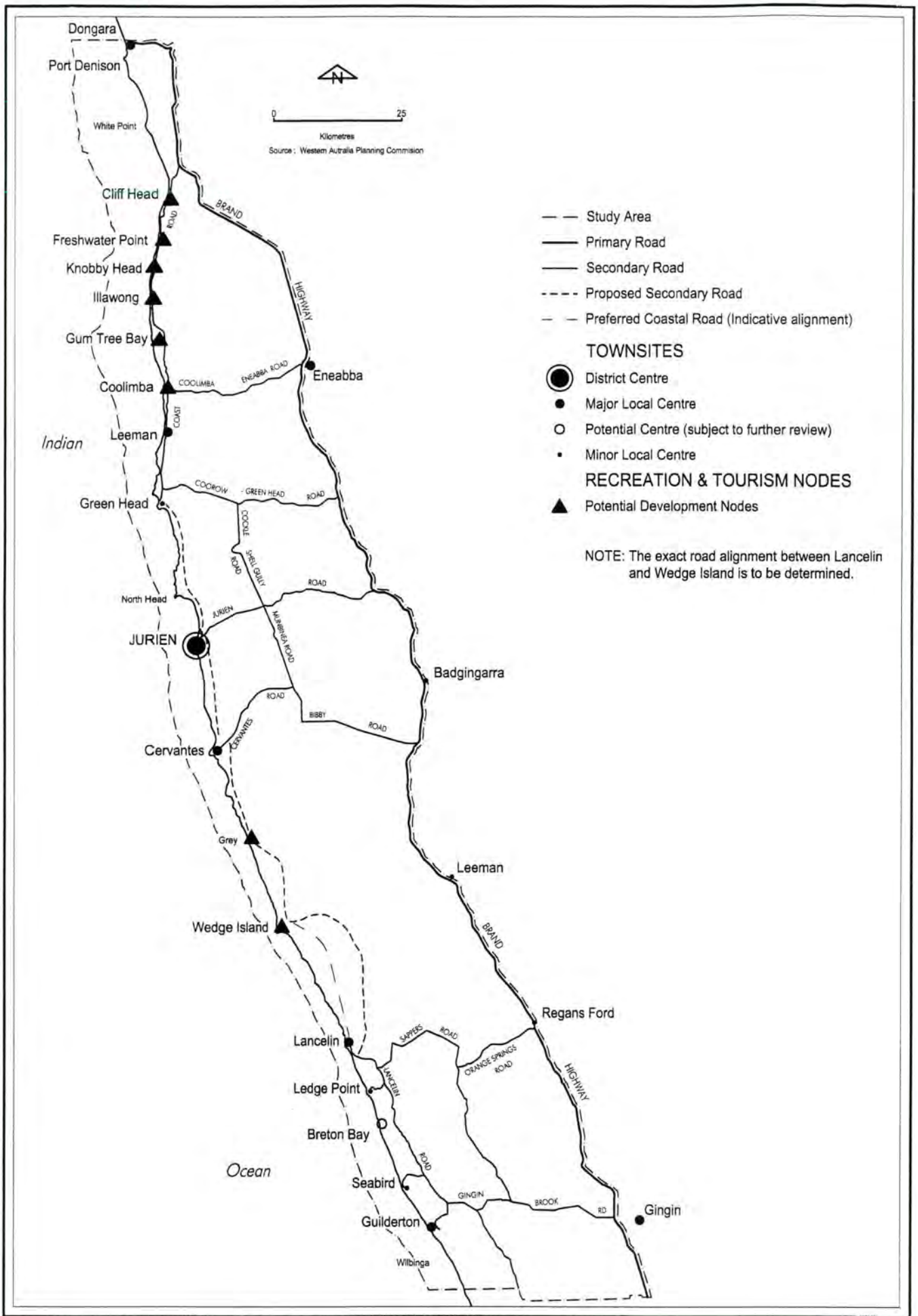
These areas are very approximate and will be refined in the detailed planning phases.

4.5 Commercial Centre Hierarchy

The Central Coast Regional Strategy establishes a proposed townsite hierarchy for the region showing Jurien Bay as the primary centre. **Figure 11** is a copy of the regional townsite hierarchy established under the Strategy.

The Turquoise Coast Structure Plan maintains the existing town centre as the major centre within the expanded Jurien Bay. In the terms used by the Metropolitan Centres Policy, this centre may be nominated as the "Regional Centre" in the three tiered hierarchy of:-

Regional Centre
District Centre
Local/Neighbourhood Centres



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NOTES:

M G A
TOWN PLANNERS
Ph: (08) 9321 3011
Fx (08) 9324 1961
email: mga@global.net.au

A4

Kilometres 0 25

Scale 1:1,000,000

Date: 18 Nov 2003 Ref. 1919/03/centcoast4

All dimensions and areas subject to survey

PROPOSED TOWNSITE HIERARCHY, CENTRAL COAST REGION

Figure 11

Already, the Town Centre or Regional Centre is the location of the majority of the town's retail space, office uses, medical centre and the seat of local government. it is expected to continue to grow as the major retail, office, community and entertainment centre. Being the major aggregation of these facilities and services, it can also be expected to be a preferred location of tourist facilities including the provision of convention facilities and accommodation for business travellers.

Booka Valley is shown as a mixed use area and is expected to accommodate a range of functions, including commercial and community uses. The relationship of Booka Valley to the Jurien Bay Town Centre might best be described by drawing the parallel between the relationship of Scarborough Beach to the Perth CBD. Booka Valley is planned to be a District Centre just as Scarborough is in the Metropolitan Centres policy. It is proposed to provide for weekly retail needs such as food, groceries and general household needs but, in view of the coastal location and the potential for tourist activity, "festival" retailing, cafes/restaurants and other entertainment functions are possible.

The Booka Valley mixed use area is shown to be adjacent to an area of community uses. The type and scale of these community uses will need to be considered against the scale and function of the Regional Centre at the traditional Town Centre and Booka Valley's role as the District Centre.

Traditionally the town centre within a country town dominates in terms of retail/office development because of economies of scale from the supply side of service provision and the fact that until the town expands beyond a certain size, congestion and accessibility are never real factors in terms of convenience from the demand side. Accordingly, whereas neighbourhood centres in the metropolitan area may contain up to 4,500m² of retail space, in the context of Jurien Bay they are expected to be much smaller.

Local/Neighbourhood Centres are sited to take account of the "movement" economy as well as providing the focii for walkable neighbourhood catchments.

Figure 12 shows the location of the proposed Commercial centres and their positions within the commercial centres hierarchy.

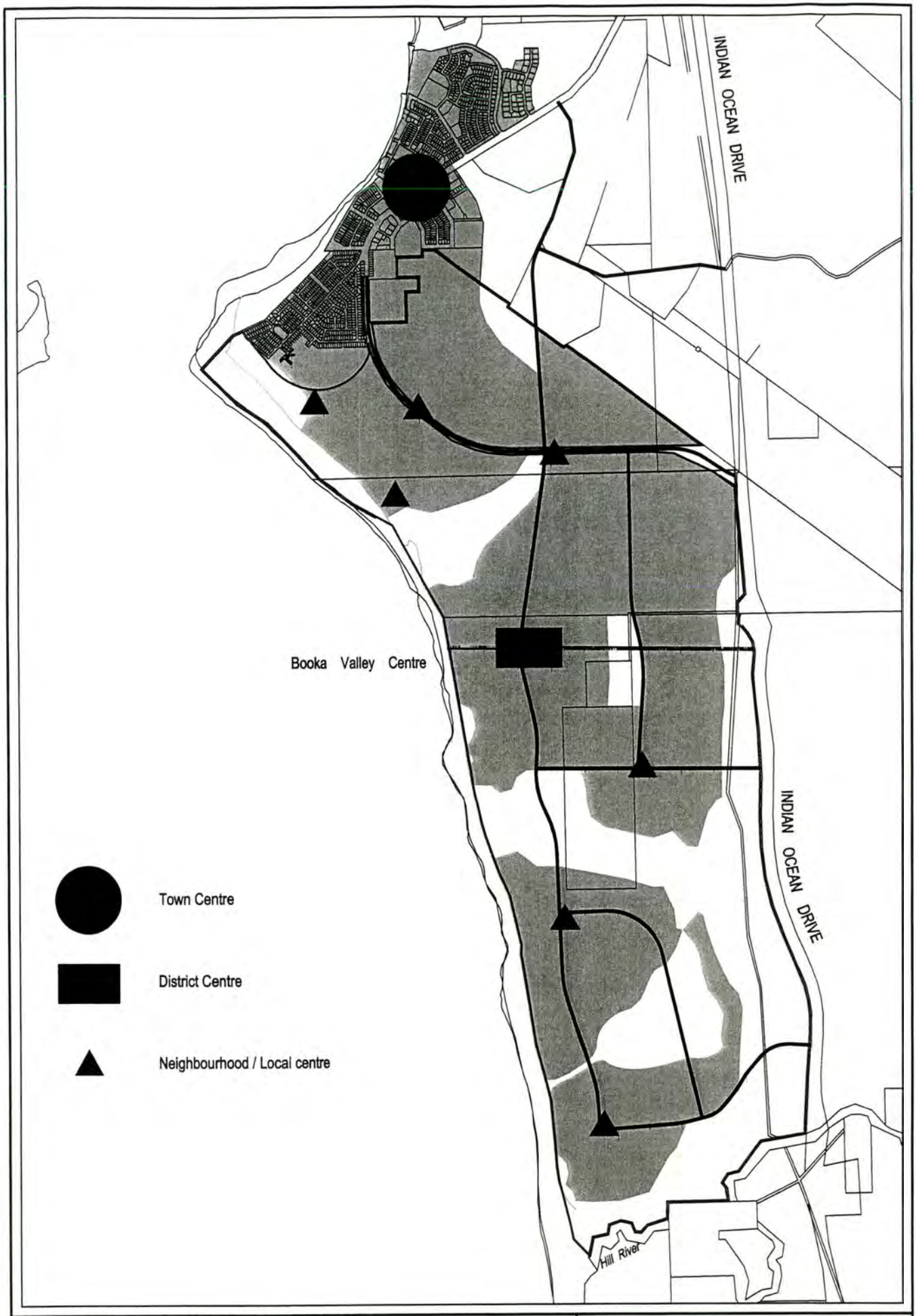
4.6 COMMUNITY DEVELOPMENT

The Education Department's advice dated 24 June 2002 at **Appendix 2**. The Department's advice has been incorporated into the Structure Plan and is reflected in Table 5 listing recommended ratios between population and social infrastructure.

In view of Jurien Bay's regional catchment, it is probable that private schools will establish in the town and given the particular characteristics of the area including the fishing industry, there may be potential for specialised tertiary campuses to develop.

Table 6 Recommended Ratios between Population and Social Infrastructure

FACILITY OR SERVICE	POPULATION RATIO	REC'D SITE AREA (Ha)	No. REQUIRED	PREFERRED LOCATION
Education				
Pre-School	4,000	.25	6	suburbs – quiet areas
Primary School (Govt)	5,000	3.5	6	suburbs near local park away from main roads
Full High School (Govt)	18,000	8	1.4	suburbs/public transport
Primary School (Catholic)	12,500	4	2	suburbs near local park
High School (Catholic)	37,500	8	1	suburbs/public transport
Primary School (Other)	20,000	4	1-2	suburbs
High School (Other)	50,000	8	0-1	suburbs/public transport
Technical College	60,000	15	1	central/public transport
TAFE/University	100,000	20/30		central/public transport



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M G A
TOWN PLANNERS
Ph: (08) 9321 3011
Fx (08) 9324 1961
email: mga@global.net.au

Metres 0 1125

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All dimensions and areas subject to survey

COMMERCIAL CENTRE HIERARCHY

TURQUIOSE COAST DEVELOPMENT

Figure 12

Table 6 (contd.) **Recommended Ratios between Population and Social Infrastructure**

FACILITY OR SERVICE	POPULATION RATIO	REC'D SITE AREA (Ha)	No. REQUIRED	PREFERRED LOCATION
Community Facilities				
Child Care				local centre
Senior Citizens' Centre				suburban near transport
Neighbourhood Centre/Hall				neighbourhood centre
District Centre/Hall				district centre
Library				central and district
Youth Centre				district, central and mixed business
Community Information Centre				central
Churches				
Catholic	80,000	2.5	1	central
Anglican	30,000	0.5	1	suburbs
Uniting	20,000	0.5	1	suburbs
Other	30,000	0.5	1	suburbs
Health				
Doctor	1,500			shopping centre
Dentist	2,500			shopping centre
Child Health Centre	5,000			local centre
Community Health Centre	10,000			district centre
Hospital (beds)	3.5/1,000	3		central
Nursing Home (beds)	40/1,000 (70+)	0.4		central
Hostel (beds)	52/1,000 (70+)	0.4		central
Local Active Recreation				
Football/Cricket	2,500	3.2		
Rugby League	20,000	1.6		
Soccer	7,000	1.2		
Hockey	3,000	0.3		
Tennis/Netball	600	0.6		
Basketball	1,000			
Bowls	1,000			
Swimming Pool	17,500			1 at regional rec centre, others suburban
Squash	2,500			mixed business areas
Police	1 Officer/400			1 central, 1 suburban
Fire	50,000	0.3		central and mixed business/industry

The Structure Plan sets aside area for public purpose/community uses to accommodate a range of these activities. In addition, it respects the facilities the community of Jurien Bay has worked to provide in the existing town centre and proposes that these facilities be supported in their existing locations and not replaced elsewhere in the development area.

In particular, these include the new Council offices, the new medical centre and the community and recreation centre.

4.7 EMPLOYMENT

The MOU requires that the Structure Plan make provision for 1.4 jobs per household, or a labourforce ratio of 50% of the total population of 25,000.

As discussed earlier, the current base industry at Jurien Bay is rock lobster fishing. Management of the fishery will not allow expansion and consequently, employment growth will be generated by other industries.

To this extent it is expected that tourism will become an alternative base industry, particularly following the completion of Indian Ocean Drive, and the Structure Plan provides for 1,400 tourist beds at Jurien Bay. ABS accommodation data indicates that 5-Star accommodation results in an employee to room ratio of 1.066 to one or 0.39 employees per bed. The ratio declines as the quality declines. However, across all standards of accommodation, the average ratio is around 0.2 employees per bed in Western Australia. 1,400 beds at Jurien Bay can therefore be expected to create around 280 direct jobs. Approximately double this number will likely be employed in cafes, restaurants, charters and tours, etc.

At 0.04 employees per square metre of retail floor space, the Plan provides for 1,600 jobs in the retail sector. Some 250 ha of industrial land is suggested in an expanded industrial area north of the Structure Plan area. At an average 20 workers per hectare, this area has capacity to employ 5,000 people including the 1,250 future jobs in manufacturing, and providing depots, etc for the 1,600 employed in construction.

As shown in Table 3, education and community services can be expected to employ around 7.3% of Jurien Bay's workforce of 12,500, or approximately 900 persons. Provision is made in the Plan for the necessary school sites.

50 hectares of land are set aside for highway commercial purposes which will be ideal for the accommodation of wholesale trades employing around 5.7% of the workforce, or 700 persons.

Around 20% of the workforce can be expected to be employed in finance, insurance, property, services, communications and administration.

There is potential to accommodate offices in an expansion of the existing town centre as well as the large mixed use area at Booka Valley. Other smaller categories of employment can be accommodated in the mixed use area, the expanded town centre, residential areas and neighbourhood centres such as personal services (eg hairdressers, etc).

Land is also set aside to accommodate the 9% to 10% of workers who will be engaged in the health industry. Whilst fishing may not grow significantly, employment growth in primary industries can be anticipated. There is potential for a viticulture industry near Jurien Bay, east of Munbinea Road. The expanding population and tourist market will create opportunities in horticulture and other specialised areas of primary industry such as honey production and the development of byproducts. These will be accommodated in the surrounding rural areas.

In summary, the Structure Plan makes adequate provision for 1.4 employees per household.

4.8 SERVICES

4.8.1 *Power*

Western Power advised in 1996 that capacity within the system existing at that time would allow an additional 300 lots (approximately). A minor system upgrade including the installation of a regulator would expand capacity by a further 900 lots.

Beyond these additional 1200 lots, a substantial upgrade of the distribution system from Cataby is required.

4.8.2 *Water Management Plan*

Framework for development of a Water Management Plan

The EPA provided advice to Ardross Estates, Turquoise Coast Development, Jurien Bay under section 16j (Bulletin 1031). This advice included the requirement to prepare a Water Management Plan (WMP) to the satisfaction of the relevant Authorities.

The Water Corporation is preparing the WMP which will incorporate the Jurien townsite. The WMP is being undertaken using a staged approach. The overall objectives of the Water Management Plan are outlined in this section and provides support for the Structure Plan. The water management planning process will guide sustainable water cycle management for full development of the site.

The Water Management Plan will encompass planning for both the sustainable provision of water for the development, and the necessary return of wastewater and stormwater to the environment. Planning for whole of water cycle management at the Structure Planning stage:

- ensures the early identification of water management strategies;

- provides adequate lead time for the collection of pre-, during- and post-development monitoring;
- identifies responsibilities for collection and analysis of monitoring data; and
- provides a guiding framework for the provision of water, wastewater and storm water services.

The EPA's expectation is that the Water Management Plan will identify the location of any major facilities for stormwater management and water supply (if on-site) and any multi-purpose corridors to be used for stormwater. It is also required that at the Structure Plan stage, it be shown that there are practical locations and methods available for treated wastewater management that are environmentally sound.

Key Environments

Key environments relevant to water management planning for this development include:

- known Cave Systems;
- groundwater dependent ecosystems in the area of influence of the potential borefield/s;
- wetlands in the development area;
- the Hill River; and
- the (Proposed) Jurien Bay Marine Park.

Investigation program

As part of the Water Management Plan, the Water Corporation has initiated a series of monitoring and modelling exercises to provide technical input to the development and assessment of water source development options and drainage and wastewater management strategies. These investigations are summarised in Table 7

Table 7

	Water source development	Wastewater management	Stormwater management
Monitoring & Investigations	Groundwater monitoring program		
	Drilling and testing program	Hill River sampling	
	Groundwater-dependent Ecosystems	Marine water quality monitoring	
		Infiltration testing	Wetland investigation
Modelling	Regional groundwater model	Local groundwater model	
		Oceanographic modelling	

The groundwater monitoring program provides input to the groundwater model, both in terms of the hydraulic characteristics of the aquifer and the baseline groundwater quality. The local groundwater model will be used to test a number of scenarios for wastewater and drainage management. Outputs from this scenario modelling will include:

- the post-development water table elevation; and
- the post-development nutrient and water fluxes at the coastline.

Nutrient & water volume fluxes at the coast will be input to the oceanographic model to determine the likely impact of different scenarios on water quality in the marine waters.

a) *Demand Management*

The WMP will address water use efficiency measures, both within and outside the house, with the aim to reduce demand accompanied with high level customer service. The installation of water efficient appliances will be strongly promoted. Detailed Development Plans (neighbourhood structure plans) will examine the prospects of reducing household water demand through landscaping guidance and possibly recycling. The potential for recycling will include an examination of groundwater recharge by wastewater disposal and abstraction of public space reticulation.

b) *Water Supply*

The Water Corporation currently supplies the existing settlement of Jurien Bay with reticulated water. This system is fed from a borefield developed to the north-east of the town.

In recognition of Jurien Bay's intended status under the Central Coast Regional Strategy, the Corporation has embarked upon the preparation of a Total Water Management Plan including the identification of potable groundwater resources capable of servicing the expanded Jurien Bay.

A comprehensive drilling and testing program has been undertaken near Jurien. Hydrogeological interpretations and preparation of a regional groundwater model is underway.

Water resources remain to be allocated between the environment, public drinking/domestic supplies and other beneficial uses. This allocation exercise will be the subject of negotiation with the Water and Rivers Commission to confirm the supply available to the town's development.

The water supply system proposed for the Turquoise Coast development is an expansion of the existing system which, in addition to the borefield, comprises storage tanks on elevated land. The land levels of the tank site(s) enables the town to be reticulated by gravity feed. Pipe systems will need to be upgraded along with supply tanks to service the new development.

c) *Wastewater Management*

Approximately 10% of Jurien Bay is currently deep sewered. There are no infill sewerage projects scheduled for the existing townsite. Wastewater from sewer connections gravitates to pumping stations, and is then pumped to a treatment plant situated to the east of the town. The existing wastewater treatment plant has the capacity to serve an additional 150 lots.

The wastewater treatment plant is capable of being upgraded to provide additional capacity but ultimately a new treatment facility will be required. Potential site assessments are occurring as part of the Total Water Management Plan. Potential sites include the existing wastewater treatment plant site, land owned by Ardross

Estates to the east of Indian Ocean Drive and Crown land adjacent to the existing site.

Buffer requirements are dependent upon the size of the wastewater treatment plant and the treatment technology. A buffer distance of 800m is generally recommended for a wastewater treatment plant of the capacity ultimately required. Final determination of buffer distance would require odour modelling in order to demonstrate acceptable odour levels outside this zone. The structure plan will be revised to reflect the final wastewater treatment plant site selection and buffer requirements upon completion of the WMP. The structure plan will provide for compatible land uses within the buffer area.

It is anticipated that the reticulation system will comprise a series of catchments gravitating into pumping stations that discharge to the wastewater treatment plant.

As part of the Water Management Plan the Water Corporation is investigating a range of treated wastewater management options, including groundwater recharge via infiltration of treated wastewater to the superficial aquifer. There may then be opportunity for indirect reuse of the treated wastewater on reserves and other public spaces.

d) *Drainage*

The Water Management Plan will address both the management of water quantity to provide protection from flooding, and the management of water quantity and water quality to protect receiving environments.

Managing water quantity

The specific objective of water quantity management is to achieve a post-development water regime that resembles, as closely as possible, the natural water regime. Infiltration of stormwater as near as possible to source (ie. where the rain falls) is the primary mechanism that is being considered in the Water Management Plan to achieve this objective. The high transmissivity of the aquifer in the development area provides preliminary evidence that this strategy is practical for the Turquoise Coast Development.

An alternative road design has been proposed for residential streets to achieve the aim of infiltrating at source. A suggested cross-section is shown in **Figure 13**. This layout accommodates footpaths and a narrow strip for Telecom and Western Power services adjacent to property boundaries, with the remainder of the "nature strip" to be contained within a central median. The central median can be used as a drainage swale, with paved surfaces to either side of the median graded down to the centre of the median to accommodate stormwater run-off in the swale where infiltration commences. Under this model, stormwater quantity would be managed via infiltration swales distributed throughout the development area, obviating the need for both piped drainage and infiltration basins at regular intervals.

Major storm events can be accommodated by allowing the swale drains to ultimately connect with larger areas of open space and if necessary, for these open spaces to be flooded on rare occasions. Calculations by Sinclair Knight Merz indicate that the swales could have capacity to between 150% and 200% of the run-off from a 1 in 100 year storm event of 10 hour duration. The ultimate storage capacity is dependent on the design details for the swale drain system.

It is noted that the Turquoise Coast development is very large and consequently likely to accommodate a variety of development styles. The treatment discussed above may be varied to meet different market demands and for more intense development. Community preferences, particularly those of permanent residents may necessitate a more traditional style of development, including street design with grassed verges and a single carriageway for traffic. Even in these circumstances, it is intended to maintain the principle of commencing infiltration close to the source of storm water.

Figure 14 illustrates a combination of central swale drains in road reserves with traditional street designs. It is common practice for run-off from a road surface to be accommodated on the surface within the gutter to either side of a road pavement for a distance of up to around 100 metres before the run-off drains through a gully into a piped system.

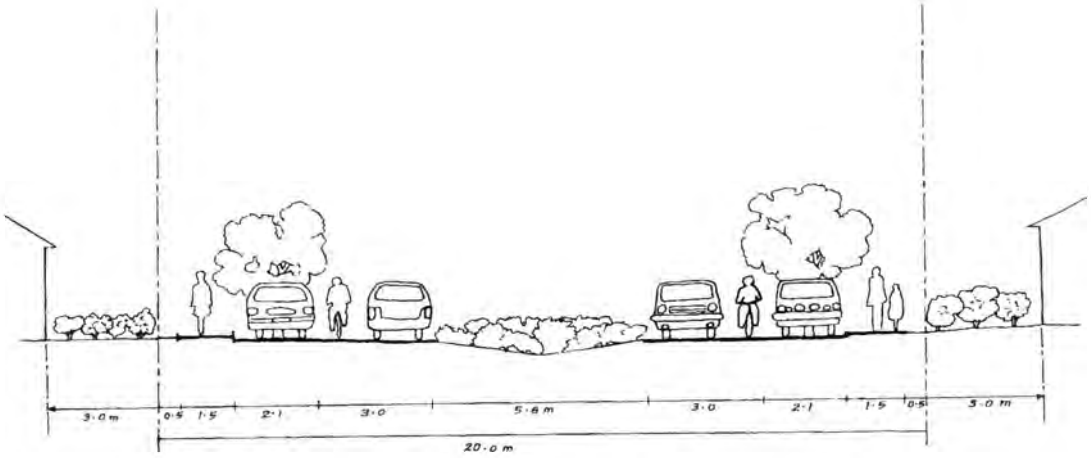

FIGURE 13. TYPICAL ROAD CROSS-SECTION

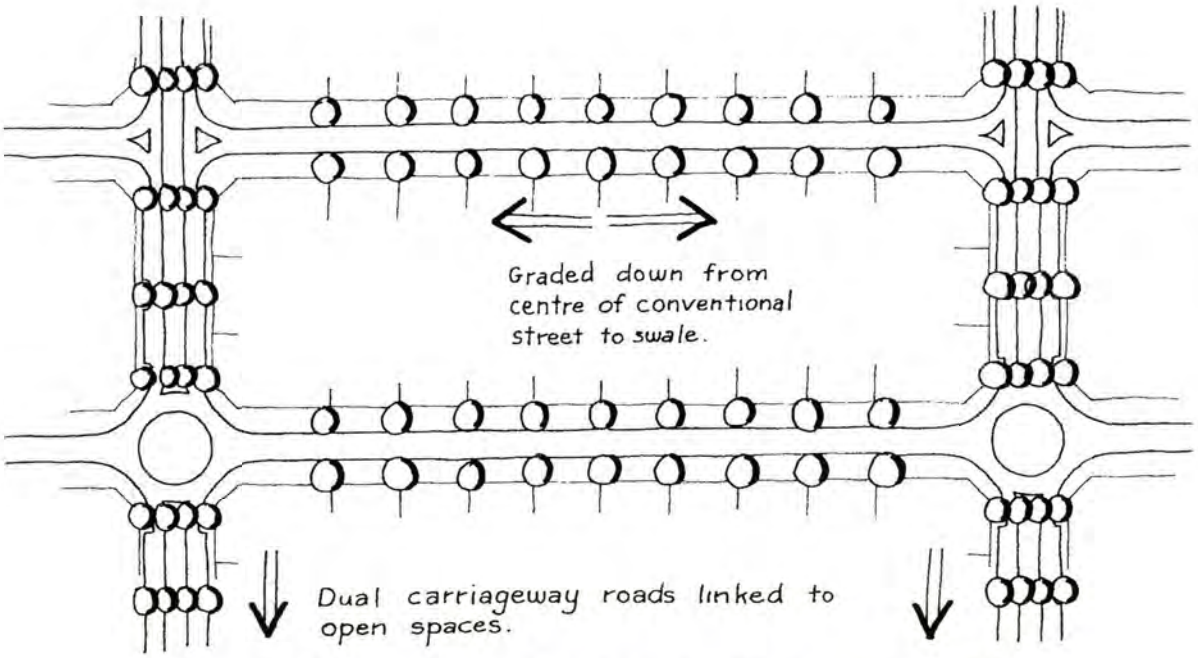

FIGURE 14. COMBINATION OF CONVENTIONAL ROAD DESIGN WITH SWALE DRAIN

Notes/Revisions	N	0 Metres SCALE N.T.S. Date: 22 May 2002 Ref: 1919/cmt/May2002base/13&14	ROAD DRAINAGE DETAILS Figures 13 and 14

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By placing roads with central swales 200 metres apart and grading "traditional" streets between down to the non-traditional, dual carriageway roads, all drainage can be handled on the surface and infiltration commenced within approximately 100 m of source. The dual carriageway roads incorporating the swale drains would need to connect to open spaces capable of accommodating major storm events, consistent with the technique described earlier.

In areas of intensive development such as commercial precincts and localities of high residential density, the alternative road layout shown in Figure 11 may be modified to incorporate infiltration swales on either one or both side/s of the road. Alternatively, innovations can be employed, even with piped drainage systems, to commence infiltration virtually at source. Soakage can be encouraged within the piped system and basins incorporated into landscaping associated with the more intensive development.
Areas of intensive development will, however, comprise relatively small portions of the overall development at no more than 2% of the total area.

From a planning perspective, the approach to storm water management involves integration with urban design. Proposed road treatments create storm water disposal options in a way that suits the physical environment of the area. Use of heath vegetation enhances the coastal character of the development, extending the beach side ambience into residential areas located behind the beachfront. It also minimises maintenance on housing lots, a high proportion of which are likely to be under absentee ownership. The technique illustrated and described here, of integrating road design with heath vegetation and swale drains facilitates storm water infiltration virtually at source, consistent with water sensitive urban design. The alternative treatments for more conventional style street systems and areas of intensive development are founded on the same principles.

Managing water quality

The Water Management Plan will reflect the Water and Rivers Commission's current approach to managing water quality for urban drainage. This approach places an emphasis on source control and water sensitive urban design (of which at-source infiltration forms a key component).

The application of fertiliser to parks and gardens, both public and private, is a diffuse source of nutrients to the groundwater underlying an urban development. Elevated nutrient concentrations in groundwater have the potential to impact on down-gradient environments, for example wetland and marine ecosystems. Native landscaping treatments provide an opportunity to reduce nutrient inputs. The Water Corporation is working closely with Ardross Estates to pursue landscaping strategies that demand both low water requirements and minimal fertiliser application. From a planning perspective, low-maintenance gardens are consistent with Jurien Bay's character as a holiday town and the high degree of absentee ownership expected. The proposed road design presented in Figure 11 is consistent with source control of nutrients. The design avoids verges, and thus overcomes the need for street lawns that require watering and fertilising, whilst also incorporating native heath vegetation in the central swale area.

It is anticipated that an education program aimed at preserving water resources and minimising nutrient inputs will be integral to the long-term success of source control. The proposed Jurien Bay Marine Park would provide a clear focus for a successful education program aimed at linking planting choices to moderated watering and fertiliser applications. There are many avenues through which community education can be facilitated. These include, but may not be limited to, material provided at the point of land sale, public notices at appropriate locations such as libraries, schools and community facilities, and possibly brochures attached to rate notices.

4.9 TRANSPORT

4.9.1 *Private Car Traffic*

Sinclair Knight Merz have forecast likely traffic volumes for the major road system within the Structure Plan, and reported as follows :

a) Road Network

There are five accesses from the Structure Plan area directly onto Indian Ocean Drive. These are shown on **Figure 15** – Structure Plan and are described as follows:

Access 1

This is the southernmost access and is located south of Cell 8.

Access 2

This is the next access from the south and is located south of Cell 6.

Access 3

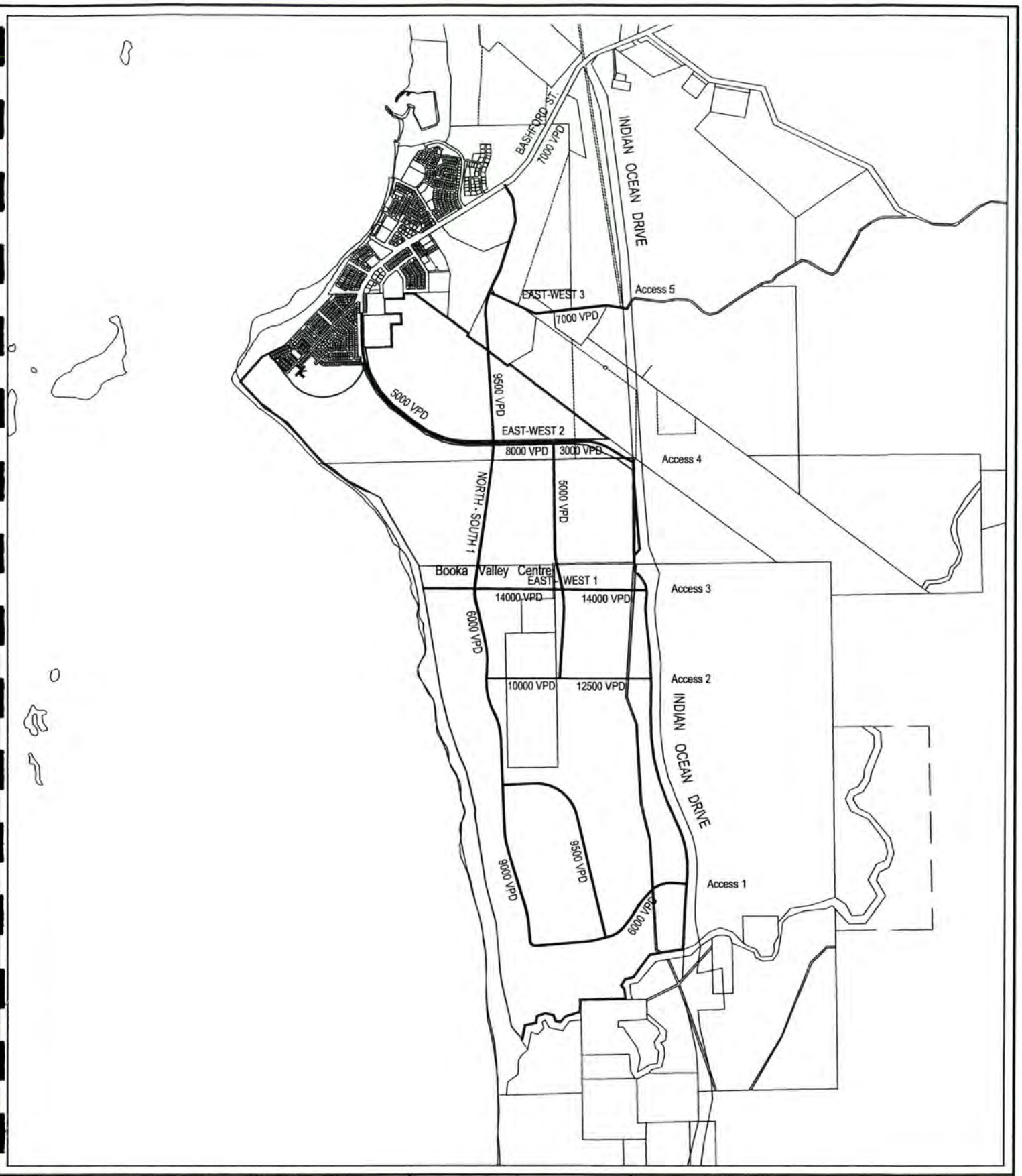
This is the middle access and is located north of Cell 9. It is noted that the road link shown north of this is an existing road reserve and therefore, is not proposed to connect to Indian Ocean Drive.

Access 4

This is the existing access to Jurien Bay from the south and is located north of Cell 4.

Access 5

In the ultimate design where the existing Indian Ocean Drive alignment is extended northwards to bypass Jurien Bay, an access is proposed to the north of Cell 3.



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M G A
TOWN PLANNERS
Ph: (08) 9321 3011
Fx (08) 9324 1961
email: mga@global.net.au

Metres 0 1500

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FORECAST TRAFFIC VOLUMES JURIEN BAY

Figure 15

As can be seen in Figure 13, there is a north south road link which runs from Access 1 to the northern end of the structure plan area connecting to the existing Bashford Street.

b) Traffic Forecast Assessment and Recommended Road Network

(i) Forecast Traffic Volumes and Road Hierarchy

The development is expected to generate approximately 55,000 to 65,000 vehicle trips per day (vpd). The internal trip productions are expected to generate in the order of 55,400 vpd and the total internal trip attractions are expected to generate in the order of 67,500 vpd.

These trips have been assigned to determine the daily traffic volume on the local road network (refer Figure 13). All of the forecast volumes are capable of being accommodated within the Liveable Neighbourhoods design profile for a District Distributor Integrator B.

(ii) Recommendations for Road Infrastructure

The key intersections and the appropriate recommended intersection treatment are shown in **Table 8.**

Table 8 Treatments at Key Intersections

INTERSECTION	RECOMMENDED INTERSECTION TREATMENT
Access 1/ Indian Ocean Drive	Traffic Signals*
New Access 2/ Indian Ocean Drive	Traffic Signals*
Access 3/ Indian Ocean Drive	Traffic Signals
Access 4/ Indian Ocean Drive	Traffic Signals
Access 5/ Indian Ocean Drive	Traffic Signals*
North south 1/ east west 1	Traffic Signals (large pedestrian flows)
North south 1/ east west 2 (existing)	Traffic Signals
North south 1 / east west 3	Traffic Signals (trucks for industrial area)
North south 1 / Bashford Street (existing)	Traffic Signals (trucks for industrial area)

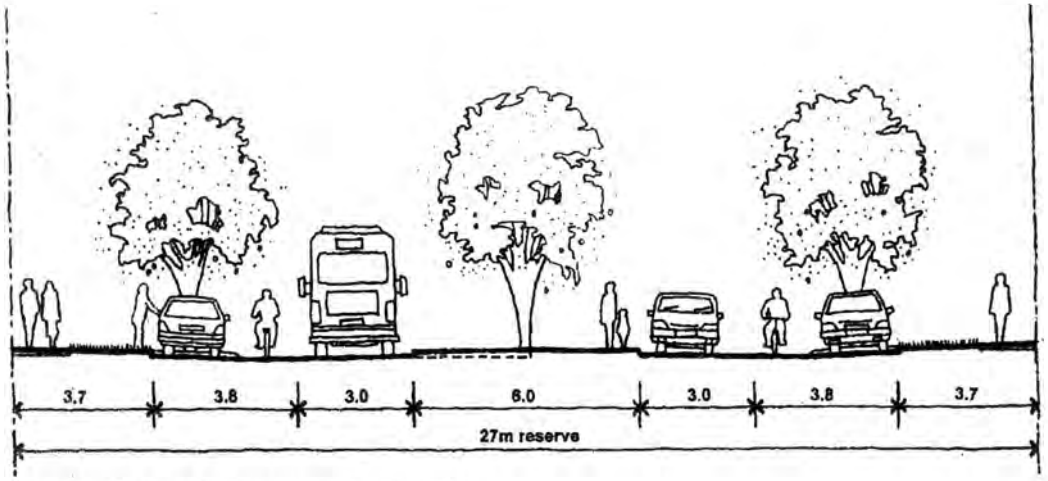
**Those intersections marked with an asterisk could be formed as roundabouts, however, this would depend on the design philosophy adopted for Indian Ocean Drive.*

The recommended road reserve width for the District Distributor Integrator B roads would be 27m. The cross section for a District Distributor Integrator B is shown in the attached extract from Liveable Neighbourhood guidelines (**Figure 16**).

This incorporates one traffic lane in each direction with a shared parking and cycle lane. There is a 6m median which allows for turning lanes and for additional lanes to be formed at signalised intersections.

This report has made recommendations for the required infrastructure for the draft structure plan area based on the forecast traffic volumes for the local road network.

Horizontal and vertical alignments, intersection geometry and sightlines may have implications on the proposed road infrastructure and therefore must be given further consideration at the future design stages.



District Distributor Integrator B

(under 15,000 vpd, 2 lanes with central median & parking bays)

Note: Central merian may be reduced along sections of the route where right turns are not required.

0 1 2 3 4 5m

Notes/Revisions

Source: Liveable Neighbourhoods

N

0 Metres 5

SCALE 1:200

Date : 24 Nov 2003 Ref.1919/crnt/X-section/xs

District Distributor Integrator B
Typical Cross-section
Figure 16

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c) A requirement of the MOU is that average personal car trips should not exceed 7.5 kms per trip. It is planned that a high proportion of local trips will be by bicycle. Car trips are primarily going to be used for accessing district destinations.

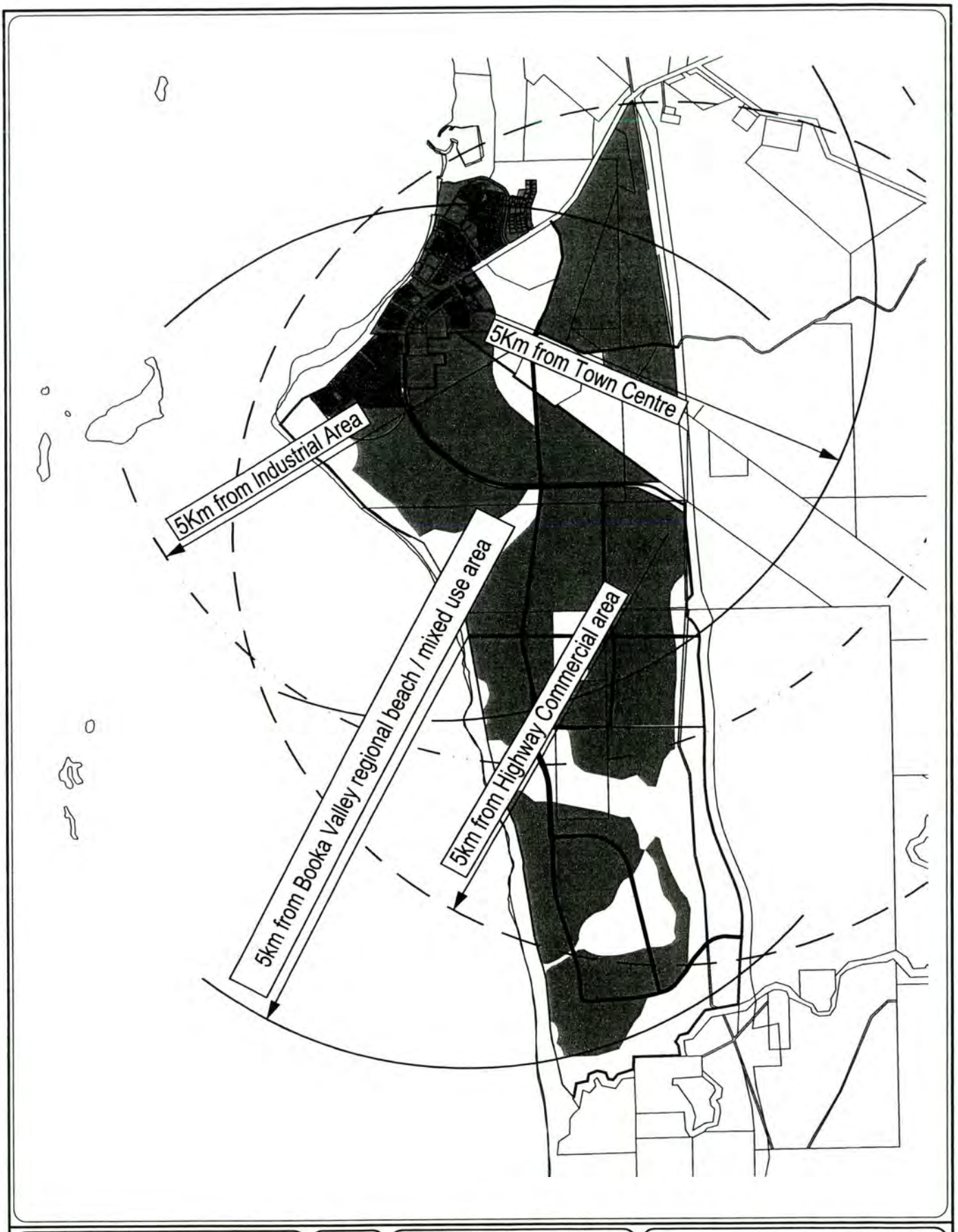
It would be unusual that many routes to district scale destinations would be direct, and it can normally be anticipated that several directional changes will be required. Taking these route factors into account suggests that a 5 km radius is more appropriate as an accessibility and trip length test than a 7.5 km radius.

Figure 17 therefore scribes 5 km radii around the existing Jurien Bay town centre, the proposed extended industrial area, the highway commercial area and the Booka Valley regional beach and mixed use area. It can be seen that in each case the radii around each of these primary district scale targets incorporates more than half (and in some cases nearly all) of the proposed urban land. It follows from this analysis that average personal car trips will indeed be less than 7.5 kms.

4.9.2 *Public Transport*

Amongst the possible outcomes arising from the workshop in January/February 2002 was the proposal for a light rail system to service public transport needs at Jurien Bay. Certainly this proposal is a lot more evocative than a standard bus system and from a marketing perspective, has appeal.

This option has, therefore, been considered and discounted for economic and logistical reasons. All of the expert advice suggests that a community like Jurien Bay with a relatively small population achieved over a comparatively long time frame could not justify a light rail system.



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Date : 24 Nov. 2003 Ref. 1919/crnt/14Nov03-struct/trav

AVERAGE TRIP LENGTH DIAGRAM
JURIEN BAY
Figure 17

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A bus service therefore has been included to provide the best and most practical means of public transport. Bus route design adopts a pedestrian catchment range of around 400 metres or a 5 minute walk. **Figure 18** shows how the proposed distributor road system provides a high degree of accessibility to public transport within the Structure Plan.

4.9.3 *Pedestrian / Cycle Movement*

It is proposed to adopt many of the features of Liveable Neighbourhoods in the more detailed planning phases of this project. These will include permeable street systems and road designs providing for cyclist traffic, particularly in the instance of distributor roads.

The flat landscape, nodal form of development and positioning of facilities such as neighbourhood centres make cycling a preferred form of local transport to be specifically encouraged through community education and promotion. It is also believed that the residential street design will encourage cycling in that the proposed median strips/swale drains will effectively narrow the bitumen or driving corridor, bringing about a reduction in traffic speeds. Cyclists sharing the roadway with vehicles will tend to "intimidate" car drivers, rather than the other way around.

In general, the primary cycleway system will follow the distributor roads, coastline, Hill River foreshore reserve and major open spaces. Primary cycle routes are shown on Figure 18.

The street system and provision of paths, usually on both sides of roads including residential streets, will accommodate and encourage pedestrians. Again, appropriate siting of neighbourhood centres encourages pedestrian activity.

Notes/Revisions

N

0 Metres 1500

SCALE 1:60,000

Date : 24 Nov 2003 Ref: 1919/cmt/14Nov03-struct/tran

BUS ROUTES AND CYCLEWAYS
JURIEN BAY
Figure 18

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The Plan shows neighbourhood centres at strategic locations on the distributor road network as required by the MOU. These are located to take advantage of the "movement economy". Neighbourhood/local centres are also located to serve walkover catchments of approximately 450 metre radii. These catchment boundaries are indicated on the Structure Plan as "ped sheds".

The 450 m radius approximates a 5 minute walk with the centre acting as a community focus comprising a compatible mix of uses providing for a variety of daily needs. The preferred location for the centre is at the intersection of important local streets, particularly where there is public transport. Interconnecting streets and strong links between neighbourhood/local centres and the town centre provide good accessibility, route choice and a pleasant, safe and efficient environment for pedestrian/cycle traffic.

Not all residential land is contained within a ped shed and to some degree this accommodates the likely higher than normal proportion of absentee owners expected at Jurien Bay.

4.10 SOLID WASTE DISPOSAL

The Dandaragan Shire Council currently provides a rubbish collection service disposing of waste in a landfill site off Canover Road. The site has capacity to accept waste for a further 10 years.

Council has recently received a Waste Management Review which recommends that in the longer term there should be a regional landfill facility near Badgingarra along the Brand Highway corridor. This would potentially also serve the Shire of Gingin and Moora.

4.11 COASTAL SETBACKS

Statement of Planning Policy 2.6 prescribes a formula for calculating minimum coastal setbacks for development. These setbacks are shown on **Figure 19** in respect of the Structure Plan. More detailed planning at the Development Plan stage will address requirements for landscape/visual amenity, ecological values, recreational requirements and public access.

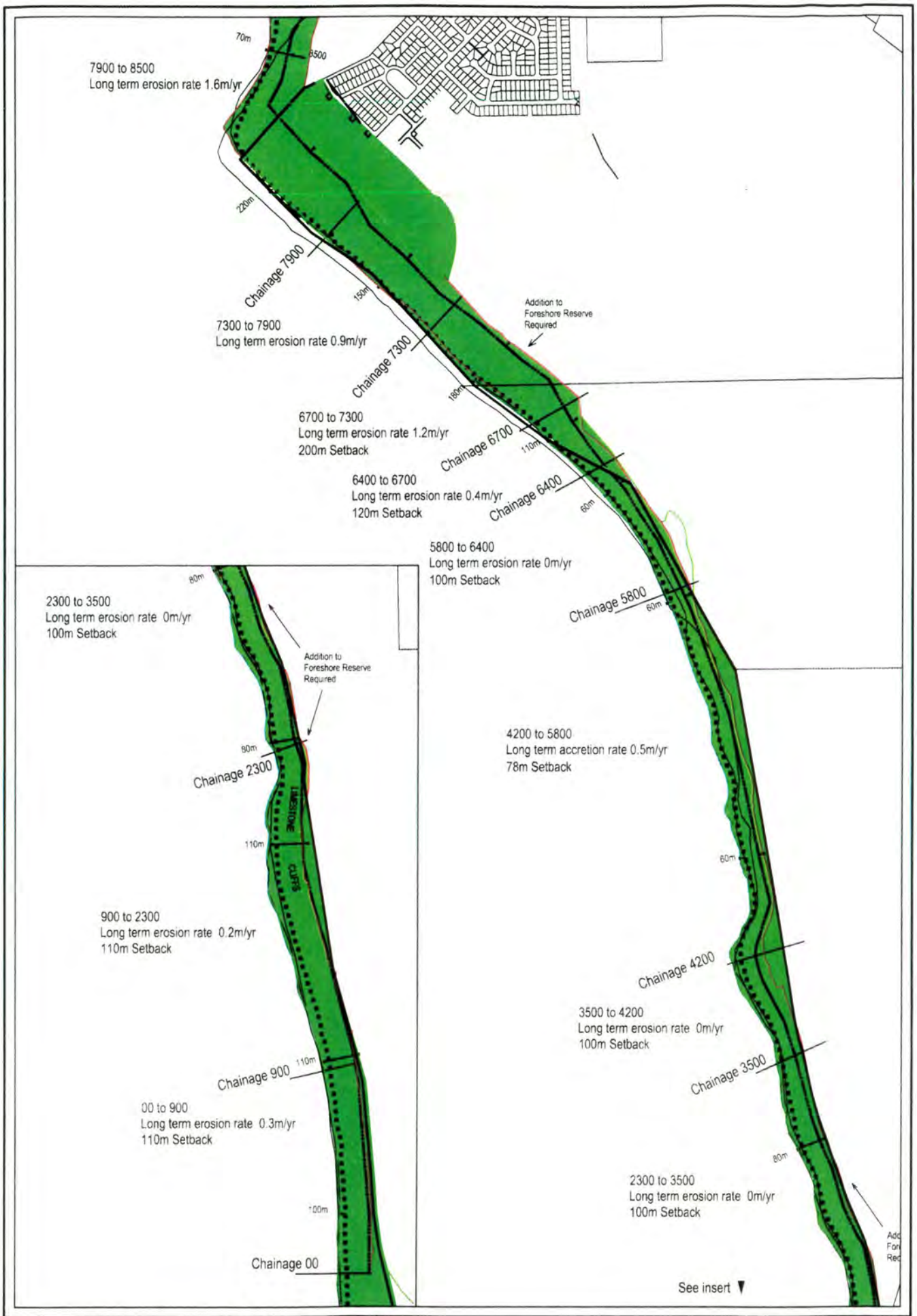
5. IMPLEMENTATION

Preparation of this Structure Plan is part of a tiered planning approach. The proposals of this Structure Plan cannot be implemented until more detailed local structure plans or Development Plans have been prepared and approved. Detailed proposals within the Development Plan will be guided by this Structure Plan.

It is envisaged that Cells 1 and 2 will be the first to be covered by Development Plans and to be the sites of initial development. They are clearly the logical development fronts from the point of view of servicing and the anticipated staging program will help achieve the aim of integrating the new development with the existing township. Conventional residential development is to be staged so that it occurs progressively southwards from the existing Jurien Bay settlement.

Depending on demands for alternative lifestyle, development may also occur relatively early within Cell 3, a proposed low density cell linked to possible equestrian/recreational opportunities within the stock route reserve. Pressure for resort accommodation at Booka Valley may also accelerate planning and development within the cells at Booka Valley.

Booka Valley's development as a mixed use area incorporating a district centre will have to be staged to reflect population growth. Development of this centre is unlikely to be justified until Jurien Bay's population approaches 12,500 persons.



NOTES: 25mm at scale

- Water Line
- Recommended Minimum Set-back to Development Rogers 1999
- 1998 Vegetation Line
- Existing Property Line
- Setback in accordance with SPP 2.6

MGA TOWN PLANNERS
Ph: (08) 9321 3011
Fx (08) 9324 1961
email: mga@global.net.au

A4

0 Metres 550

Scale 1:22,000

Date: 25 Nov. 2003 Ref. 1919/03/21Nov03/coast

All dimensions and areas subject to survey

COASTAL FORESHORE RESERVE PLAN

Figure 19