

LOCAL PLANNING STRATEGY

**Prepared for the
Shire of Coorow**



O'BRIEN PLANNING CONSULTANTS

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by

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1. INTRODUCTION

1.1 SCHEME REVIEW

The purpose of the Local Planning Strategy is to present an analysis of the investigations and surveys undertaken during the review of the Town Planning Scheme and to provide strategic guidance for the future development of the Shire. The Scheme Strategy is intended to provide an explanation of the content of the Scheme but it is not part of the Statutory Scheme.

This has also been prepared in accordance with the new Model Scheme Text which has introduced strategic planning into Town Planning Schemes. The report has therefore been prepared to include a Local Planning Strategy.

This report has been prepared in terms of the Planning Legislation Amendment Act 1995 which requires that new schemes be referred to the Environmental Protection Authority to determine if an environmental assessment is needed.

1.2 BACKGROUND

The Shire of Coorow Town Planning Scheme No 1 was gazetted on December 16, 1988 and therefore has been in operation for twelve years. The documentation for the Scheme was actually prepared in 1985 and originally adopted by Council in March 1986. Eleven amendments have taken place since the Scheme was gazetted. A number of significant initiatives and changes in the area have taken place that require consideration in the preparation of the Town Planning Scheme.

1.3 SCHEME OBJECTIVES

The Shire of Coorow Town Planning Scheme No 2 preparation has the following objectives and intentions:

- To examine changing land development in the Shire;
- To examine environmental aspects in the Shire;
- To examine the population structure of the Shire;
- To prepare development controls for the purpose of maintaining and improving the quality of the environment;
- To adopt development guidelines for the purpose of maintaining the quality of the rural environment;
- To make provision for other matters necessary or incidental to town planning and development generally; and
- To involve the community in the Scheme preparation.

1.4 SCHEME AREA

The Shire of Coorow is located approximately 280km north of Perth, via the Midlands Road. The Shire covers an area of 4137 km², approximately 25km of coastline and includes the townships of Coorow, Leeman, Green Head and Marchagee (Figure 1).

Scheme Maps have been prepared by the Ministry for Planning. A total of eight maps cover the Shire and townships. Three maps at a scale of 1:100,000 cover the rural areas of the Shire. Five maps cover the townships, namely Green Head (2), Coorow, Leeman and Marchagee.

Figure 1: Scheme Area

2. STATE AND REGIONAL PLANNING CONTEXT

2.1 INTRODUCTION

The Shire of Coorow Town Planning Scheme is one level of planning for the area. The following is a brief overview of the various levels of planning that have been undertaken in recent years. It is essential that the strategies are integrated to ensure that they work harmoniously to achieve their stated objectives.

2.2 STATE PLANNING STRATEGY

The State Planning Strategy was published in 1997 and sets out a wholistic framework for regional and local planning in Western Australia until the year 2029. The main goals of the strategy are to generate wealth, to preserve and enhance the environment and to build vibrant and safe communities (Figure 2).

The main strengths of the State Strategy are that it sets a common vision for land use planning in the State, it provides a guide to a number of State Department involved in infrastructure and service provision, it identifies likely changes and prepares for them and it establishes the mechanisms to ensure that they are implemented.

Some of the main driving forces for growth and change in Western Australia are relatively rapid population growth, which is expected to reach 2.7 million people by the year 2020, a range of positive economic opportunities, relative high economic growth rate and technological improvements. The implementation of the strategy is seen as being through regional plans and statutory region schemes.

The main implications of the State Planning Strategy for the Shire of Coorow are as follows:

- Coorow is part of the Mid West Region.
- Moora is the closest Regional Centre, to the south of the Shire in the Wheatbelt Region. The nearest Local Service Centre is Three Springs, to the north of the Shire.
- The western part of the Shire of Coorow is identified as a Minerals Resource Province and a water catchment.
- The eastern part of the Shire of Coorow is identified as a productive agricultural area under high to extreme risk from soil salinity.
- Strategic infrastructure includes the regional road network, electricity, telecommunications network and the gas pipeline.

The main Regional Strategies identified for the Mid West Region are:

- Diversification of the economic base in agriculture, mining, downstream processing and tourism.

Figure 2: State Planning Strategy

- Development of services and attractions at Geraldton to confirm its role as major centre north of Perth.
- Protection of coastal and marine environments.

2.3 CENTRAL COAST REGIONAL STRATEGY

At the next level of regional planning is the Central Coast Regional Strategy which was finalised in 1996. The Central Coast Region includes the coastal strip from the southern boundary of the Shire of Gingin to the Irwin River at Dongara. The western boundary includes a nearshore coastal zone and the eastern boundary is the Brand Highway.

The major issues that led to the preparation of the central Coast Regional Strategy are: access, protection and use of the coast; the need for a new road connection between Green Head and Lancelin, the future use and management of large areas of public land and the impact of Perth Metropolitan development, particularly on the southern parts of the region.

The stated purpose of the Central Coast Regional Strategy were: to establish agreed policies; to adopt a land use plan and to define a mechanism for ongoing co-operation and co-ordination between local and State government authorities.

The following are some of the main regional issues addressed in the strategy:

- Squatters
There were a large number of squatter shacks along the Central Coast. The strategy proposed that structures on Crown land be removed over a six year period. All the squatters in Coorow have been removed and the land is being rehabilitated.
- Development Nodes
The existence of squatter settlements is a clear indication that there is a demand for holiday accommodation, commercial fishing and recreation.
- Rural Residential Uses
There has been demand throughout the region for small lot rural subdivision. Such subdivisions have the potential to place unreasonable demands on infrastructure and can lead to further demands for services. If sited in appropriate places such developments can provide for an added lifestyle and should be considered on their merits. The opportunities for such subdivision in the Green Head and Leeman townsites should be investigated.
- Resource Development
The economy of the region is dependent on the development of natural resources for fishing, tourism, mining, natural gas production and agriculture. Other activities include beekeeping, wildflower picking, seed collecting and silviculture.
- Mineral and Energy Resources and Basic Raw Materials
The region is rich with limestone, limesand, gypsum, dolomite, gravel, sand, natural gas, coal and heavy mineral sands. Because the extent and nature of the mineral and energy resources and basic raw materials are not fully known it is important to research these

further before development takes place. Follow-up research is needed as part of basic raw materials project.

- **Tourism**
Tourism in the region relies on natural resources. Future expansion of this industry requires the development of tourist infrastructure and additional recreation facilities.
- **Marine Environment**
The region's environment is an important economic, conservation and recreation resource.
- **The Coast**
The Central Coast is dynamic and subject to continual processes of wind, waves and tides, and the effects of people and animals. Increased nutrient levels entering the ocean through groundwater and rivers may have an adverse impact on marine life. There is increasing competition for the use of coastal land for a range of uses.

An agreed **Land Use Plan** was prepared for the region (Figure 3). The plan indicates a broad range of anticipated land uses, potential development nodes, future industrial areas and future road alignments.

The main implications for the Shire of Coorow are as follows:

- The coastal townsites of Leeman and Green Head are surrounded by conservation reserves and coastal reserves.
- The coast road from Green Head to Jurien has already been constructed.
- There is a small area of Rural Landscape Amenity inland from Green Head.

A series of detailed planning units has been identified. These are based on catchment management units. Each unit is accompanied by statements such as; Planning Unit, Features, Land Uses to be Promoted, Major Issues, Planning and Management Guidelines.

2.4 CENTRAL COAST TOURISM STRATEGY

A Tourist Strategy was prepared for the Central Coast Region by Tourism co-ordinates in 1996. The strategy examined a broad range of issues such as; planning and development, development strategy, marketing, organisation, employment and training and research.

One of the main themes to emerge from the study was the regions **naturalness** as a basis for tourism, namely:

"To create, and be recognised as, a unique nature-based coastal destination offering recreational and ecological experiences to all visitors."

Figure 3: Central Coast Land Use Plan

The strategy outlines a series of priority objectives and their associated actions, namely; planning and development, marketing, organisation and training. With the future increase in tourism to the region using the Indian Ocean Drive there is opportunity, in the Shire of Coorow, to develop nature based tourism in the National Parks and Nature Reserves.

2.5 CENTRAL COAST BASIC RAW MATERIALS STRATEGY

A Basic Raw Materials Strategy was prepared by Landvision for the Central Coast Region in 1997. The main purpose of the study was to prepare a strategy to identify and protect important raw materials and to provide guidelines for extraction, taking surrounding and/or competing land uses into consideration.

The study examined the distribution and availability of resources in Coorow, planning considerations, general raw material issues and the market for raw materials.

The main basic raw materials in the Shire of Coorow are as follows:

- gravel
- yellow sand,
- limestone, and
- limesand.

There are a number of existing quarries in the area as well as a mineral sand mine.

The study concluded that:

- Quicklime/agricultural lime extraction is vital to the mining and agricultural sectors and needs to be protected.
- The usefulness of limestone for road base is variable and may need beneficiation/stabilisation or substituted with imported gravel or rock aggregate.
- The building industry requires basic raw materials in the vicinity of Green Head and Leeman.

The proposed strategy contained the following:

- A resource protection plan.
- Encourage a strategic planning approach.
- Incorporate the Conservation and Rehabilitation Guidelines for the Western Australian Quarry Industry in local Town Planning Schemes.
- Amend local Town Planning Schemes to include current tenements and long term licences in an appropriate zone.
- Continue to rehabilitate exhausted and dormant pits.

- A State Lime Strategy is being organised by the Department of Resources Development. The Shire of Coorow is considered to be an important source of limesand and limestone.

2.6 MARINE AQUACULTURE SITE ASSESSMENT

In 1997 the Mid West Development Commission prepared a study, "Technical Evaluation of Sites for Land Based Marine Aquaculture in the Mid West Region".

The study examined a range of characteristics including physical features, biological features, economic factors and land use aspects. The main sites identified were Geraldton, Hutt River, South Hutt and Kalbarri.

Green Head was identified as a **secondary** site owing to its proximity to infrastructure and services, the availability of good quality sea water close to the shore and the possibility of establishing a marine intake structure in a sheltered area within a few metres of the site boundary. The specific site is located next to the caravan park. The site is between 6 and 10 metres above mean sea level. The topography varies but the site is reasonably level and features limestone outcrops and surface sand. There is some opposition from the community to use the existing parks and recreation reserve for aquaculture.

Leeman was ranked in the study as a tertiary site. There are two potential sites in town, namely:

- Leeman (south) Lots 52 and 53, located in Reserve 34516 which is a Special Site for purposes associated with the fishing industry.
- Leeman (north) Lots 58 and 59, located on reserve 35091 which is vested for Government requirements but is zoned for residential purposes. (We do not consider that this site is suitable as it is zoned for residential purposes).

2.7 HERITAGE INVENTORY

A Municipal Inventory of Heritage Places was prepared by Mid West Heritage Inc in 1996. The study was prepared in conformity with Section 45 of the Heritage of Western Australia Act 1990. Places need not necessarily be buildings and may be historic sites of former buildings, activities or events as well as built structures such as mines, wells and roads.

Entry of a heritage place into the Municipal Inventory is a recognition of its importance to the community. Depending on the level of significance afforded to each place listed in the inventory a Management Category is allocated which provides a recommendation for the future conservation of the place.

Places recorded in the Municipal Inventory are not automatically entered into the Heritage Council's Register of Heritage Places. It is likely, however, that the sites will be included in the Heritage Council's database. Places that are entered into the Register are subject to development control and are protected under the Heritage of Western Australia Act 1990.

The Shire of Coorow Municipal Inventory identified 71 places as having heritage significance. The heritage places were divided into Town (34) Rural (25) Coastal (12).

It is intended that a **Heritage List** will be drawn from the Municipal Inventory and will be prepared as a separate document that will be kept available for public inspection.

2.8 CONCLUSIONS

The main conclusions which are relevant to the shire of Coorow as a result of the above examination of the State and regional Planning context are as follows.

2.8.1 State Planning Strategy

The main implications for the Shire of Coorow are as follows:

- Coorow is part of the Mid West Region with Geraldton as the Regional Centre.
- The western part of the Shire is identified as a minerals resource province and water catchment.
- The eastern part of the Shire is identified as a productive agricultural area under high to extreme risk from salinity.
- Strategic infrastructure includes the regional road network, electricity, telecommunications network and gas pipeline.

The main regional strategies include the following:

- Diversification of the economic base in agriculture, mining, downstream processing and tourism.
- Protection of the coastal and marine environment.

2.8.2 Central Coast Regional Strategy

The main implications for the Shire of Coorow are as follows:

- Removal of squatters over a six year period. (This has already been implemented).
- No Potential Development Nodes were identified in the Shire of Coorow and it is assumed that demand for holiday accommodation, commercial fishing, recreation and tourism will be satisfied in the existing townsites and as day visit sites in the coastal reserves.
- Rural residential uses, such as small lot subdivision, are generally in demand in the region. If such land uses are provided for they should be sited relatively close to existing towns where existing services are provided.
- The region is dependent economically on natural resource development and planning should facilitate such activities.

- Development should not be permitted to block or prevent basic raw materials from being used.
- Provision of tourist accommodation opportunities should be facilitated.
- The marine environment should be protected as a major resource.
- The coast is a key resource that needs to be well managed.

2.8.3 Central Coast Tourism Strategy

The main implications for the Shire are as follows:

- The main theme was to create and be recognized as a unique nature-based coastal destination offering recreational and ecological experiences to all visitors.

2.8.4 Central Coast Basic Raw Material Strategy

The main implications for the Shire are as follows:

- The main basic raw materials are gravel, yellow sand, limestone and limesand.
- Quicklime/agricultural lime extraction is vital to the mining and agricultural sectors and needs to be protected.
- The local limestone may require beneficiation/stabilization for use as a road base.
- The building industry in the vicinity of Leeman and Green Head requires basic raw materials.

2.8.5 Marine Aquaculture Site Assessment

The main implications for the Shire of Coorow are as follows:

- A secondary site was identified at Green Head.
- A tertiary site was identified at Leeman.

2.8.6 Heritage Inventory

The main implications for the Shire of Coorow are as follows:

- The Shire's inventory identified 71 places as having heritage significance.
- The Shire intend to prepare a Heritage List for their area.

3.0 PROFILE AND KEY ISSUES

3.1 LAND USE ISSUES

3.1.1 Introduction

The land uses of a region are largely dependent on the natural resources and environmental characteristics of the area. In the Coorow area, broadacre cropping and sheep and cattle grazing have been major determinants of land use. Natural features such as national parks and nature reserves adjacent to the coast also have an influential effect on land use. A wider variety of intensive agricultural industries have developed in recent years and illustrate there is economic potential within the area. The changing commodity prices for wool and grain, have, over the years, resulted in changes to the urban fabric. In this section, the human environment in the Coorow area will be examined.

3.1.2 Aboriginal And Settler Heritage

The Aboriginal people occupying the south west corner of the state, in an area extending from the south coast of Geraldton to the coast east of Esperance are collectively known as the Noongars.

These people led a nomadic lifestyle based on hunting and gathering, moving from the hills to the coastal plain in response to available food sources. This involved the systematic exploitation of available food sources such as marine and freshwater animals, marine shells species, terrestrial animals including birds, mammals and reptiles. Aborigines burned the bush to keep the forest open for hunting and aid the generation of grasses. This attracted Kangaroos and subsequently a major food source.

Aboriginal Archaeological evidence suggests that Aboriginal habitation existed in the Coorow area between 15,000 and 5,000 years ago. A midden site exists at Green Head, consisting of accumulations of mollusc shells of selected food species, associated with other archaeological material including stone artefacts, beach pebbles, charcoal, and vertebrae faunal remains (DPUD 1994).

The deposit includes numerous marine shells (such as limpet, turban, whelk, abalone and chiton) in association with calcrete and other stone artefacts on a sandy soil. The deposit has almost been completely destroyed, but the remaining number of artefacts indicate the site was originally quite dense. The site indicates that marine molluscs were included as a natural food resource in the traditional Aboriginal diet (DPUD 1994).

The first use of land by European settlers occurred when demand for additional grazing initiated extensive land exploration during the early 1800s. The land surrounding and including the Shire of Coorow, comprised chiefly of extensive sand plains and tracts of ironstone. Natural vegetation consisted of hard leafed shrubs from 1 to 3 metres in height with little grazing or agricultural potential.

European settlement resulted in Aborigines moving away from hunting and gathering, particularly on the most fertile land and fishing in rivers and streams on the coastal plain. European settlers employed Aborigines for seasonal work such as guarding stock, delivering mail, for general farm work and as guides and trackers.

The Town of Coorow was first settled by William and Sarah Long in 1862, and was officially gazetted in 1911. Shortly prior to this the Canning stock route was gazetted on the coastal plain in 1862. The Midland Railway linking Perth and Geraldton was completed shortly afterwards in 1864.

Despite the natural environment within the Coorow area, Dr L.V.H. Teale from the Western Australian Department of Agriculture, investigated the use of superphosphates and trace elements on cereals during 1939. Earlier interest in the land for agriculture occurred in 1902. The first sale of wheat was carried out from the Coorow District during 1907-08.

In 1947, farmers began to cultivate the sandplain areas with cereals and Western Australian Blue Lupins. Wheat, barley and oats followed between 1949 and 1959. The expansion of farmland during the 1950s and 1960s was due to the introduction of pasture legumes such as clover and lucerne. The Coorow area as part of the West Midlands, is one of the major areas of production.

War Service Farms were developed after 1953 in the Coorow-Green Head area.

3.1.3 Population

The Shire of Coorow recorded a population of 1383 at the 1996 census, 736 males and 647 females. The largest percentage of the Shire was in the 0-9 age group (20.0%). This is followed by the 30-39 age group with 18.3% of the population. The population declines in the 40-49 age group and the 50-59 age group at 13.9% and 11.2% respectively. The population further declines in the 60-69 age category (7.7%) and the over 70 age group (3.7%). The proportion of males is slightly higher than the population of females (6.4%).

The total population of the Shire has dropped in recent years after having been static in the 1980s;

1996 - 1,383	
	} -13.35%
1991 - 1,596	
	} +0.13%
1986 - 1,534	

These statistics indicate a strong percentage of young people, with few older people. The age groups below 39 years comprises 63.5% of the population. This indicates the population of the Shire is relatively young.

The population figures for 1996 were taken from ABS Basic Community Profile 1997, Cat. No. 2020.0. The 1991 Census total was taken from the WA Statistical Yearbook 1998 by the ABS. The 1986 Census total was obtained from the Shire of Coorow Annual Report 1997.

Table 1: Age and Sex (Percentages) of Shire Residents 1996

Age	Males %	Females %	Total %
0-9	10.2	9.8	20.0
10-19	4.6	5.5	10.1
20-29	7.9	7.2	15.1
30-39	10.3	8.0	18.3
40-49	7.2	6.7	13.9
50-59	6.7	4.5	11.2
60-69	4.9	2.8	7.7
70+	1.4	2.3	3.7
TOTAL	53.2	46.8	100.0

Source: Australian Bureau of Statistics: Basic Community Profile Catalogue No. 2020.0

Other selected statistics from the 1996 census are as follows:

- The majority of people are enumerated in private dwellings.
- Fifty seven percent of the population is enumerated in the same address as 5 years before.
- Nineteen individuals are of Aboriginal descent.
- Eighty seven percent of the population are Australian born.
- Eighty six percent of the population speaks only English.
- The following religious affiliations were enumerated: 29.2% Anglican, 20.9% Catholic, 2.2% Presbyterian and Reformed, 7.8% Uniting Church and 27.2% No Religion.
- Employment affiliations were enumerated: 41.6% of employed persons are employed in Agriculture, Forestry and Fish, 19% of employed persons are employed in Mining, 5.8% of employed persons are employed in Retail Trade, and, 5.8% of employed persons are employed in Education.
- The employment rate for the Shire is 9.5%.

Table 2: Total Males and Females in Coorow Towns, 1996 Census.

	Males	Females	Persons
Coorow	85	89	174
Leeman	278	253	531
Green Head	130	115	245
Remainder Shire	243	190	433
Totals	736	647	1,383

It should be noted that Census information may be misleading owing to the seasonal nature of the cray fishing industry. It is considered by some that the population of Green Head is similar to Leeman based on the number of dwellings.

3.1.4 Townsites

The Shire of Coorow contains four townsites; Coorow, Leeman, Green Head and Marchagee.

- **Coorow** is the administrative centre of the Shire and is located approximately 95 kilometres inland from the coast. The town grew from a siding on the Midland railway line linking Perth with Geraldton.
- **Leeman** is the larger of the two coastal settlements. It developed as a shorebase for the fishing industry this has been the main function of the town.
- **Green Head** is situated on a scenic coastal headland. The town has a golf course and caravan park and it is becoming a popular place for retirement.
- **Marchagee** is a townsite associated with the Midland railway line. It contains very little development.

The larger settlements of the Shire each have structure planning issues that will need to be addressed in the future. These townsites will be examined in more detail under Section 6 below.

3.1.5 Rural Areas of the Shire

The Shire of Coorow remains an established agricultural area. The eastern portion of the Shire has the more productive agricultural land, whilst the lighter sand plains in the western portion of the Shire are comparatively less productive. Nevertheless the Shire of Coorow has proven reliable as a well established agricultural area and should be recognised by the Scheme.

The intention of the Scheme is to ensure that rural/farming uses continue in the rural areas and to ensure that urban/non compatible uses do not creep into the Shire and either cause a nuisance for farmers or harm the existing farming. The Scheme also caters for more

intensive rural uses that have been introduced in recent years. This mainly relates to Garden Horticulture (Cut Flowers, Nurseries and Turf).

3.1.6 Agriculture

The economy of the Shire of Coorow is based on agricultural production. Intensive animal products, pasture animals products, broadscale cropping and horticultural cropping are the broad agricultural categories.

The agricultural sector of the Shire of Coorow is based on the traditional broadacre production of sheep and wheat (Table 3). The 1996/97 wheat crop produced 86,096 tons. During the same time period there were 286,127 sheep and lambs in the Shire. The rock lobster industry produced 665,400 kg during 1996/97 with a total value of \$17,290,000.

Table 3: Agricultural Production in the Shire of Coorow between 1995 and 1997.

Agricultural Products	1995/96	1996/97
Wheat	48,292 ha 71,043 tons	44,354 ha 86,096 tons
Oats	1,701 ha 1,980 tons	2,201 ha 3,137 tons
Barley	1,757 ha 2,627 tons	2,497 ha 4,348 tons
Lupins	24,326 ha 21,761 tons	23,481 ha 31,399 tons
Cattle	11,621	14,557
Pigs	671	685
Sheep	282,388	286,127
Rock Lobster	651,600 kg \$15,638,400	665,400 kg \$17,290,000

Source: Shire of Coorow Annual Report, 1997.

3.1.7 Community Services

The Shire of Coorow has a wide range of services for the local community.

Essential services provided in the Shire are water, (Leeman and Green Head serviced by the Water Authority), Electricity (from a major substation north of the Perth Metropolitan Region, with energy generated from the Muja, Kwinana and Bunbury Power Stations), and sewerage (Leeman is partly sewered and wastewater facilities being planned for Green Head).

Education Services in the Shire include primary schools at Leeman and Coorow. These towns also have pre-schools. A total of 150 students were at the Leeman Primary School during 1991. Student numbers have increased by around 15% since 1985.

Sporting facilities in the Shire provide for a number of sporting activities, namely: golf, bowls, badminton, basketball/netball, cricket, football, tennis and swimming.

The following **social groups** are present: Parents and Citizens Association, Leeman Country Club, Rotary, the Lions Club, Volunteer Bushfire Brigade, the Leeman Volunteer Sea Search and Rescue Group and the Green Head Ratepayers Association.

The Shire previously called for expressions of interest in **aged accommodation**. As an outcome land was set aside in Leeman for this purpose and discussions are currently being held with the Ministry for Housing in relation to a possible joint venture to construct units.

There is currently a church in Leeman and Coorow but not in Green Head. A possible church site in Green Head will need to be investigated after discussion with the church groups.

3.1.8 Infrastructure

- **Road Transport**

The Brand Highway is the primary road through the Shire of Coorow. This is located in a north south direction set inland from the coast. The Brand Highway does not pass through any townsites in the Shire.

The Midlands Road is the major road on the eastern side of the Shire. It follows a similar alignment to the Midland Railway line. The Coorow and Marchagee townsites are on the Midland Road and Rail line and are the main means of transporting grain and other products from the region.

The Indian Ocean Drive has recently been completed. It is located along the coast and joins Green Head south to Jurien and Leeman north to Dongara.

The east west connections are less well developed. The Coorow-Green Head Road is mainly bituminised. (There is presently 27 kilometres of gravel between the Brand Highway and Coorow and it is progressively being sealed).

- **Rail Transport**

As indicated in the above section the Shire is served by the Midland Rail line which passes through the townsites of Coorow and Marchagee.

- **Sea Transport**

There are jetties at Green Head and Leeman which are used mainly for offloading fishing produce. There are fish receival centres in both coastal towns.

- **Air Transport**

The main aircraft landing strip for the Shire is located south of the Leeman townsite. There are a few other informal landing strips in the Shire located on farms. Thought should be given to developing a landing strip near Coorow to serve the town and Midland Road in case of emergencies.

- **Water**

The Water Corporation supplies water to Coorow, Leeman and Green Head. The water is obtained mainly from deep aquifers.

- **Sewerage**

Leeman is partly sewerred and planning is underway for wastewater facilities at Green Head.

- **Electricity**

Electrical energy is supplied to the Shire via a wooden pole 132KV system based on the Perth Metropolitan Region. Substations at Eneabba, Three Springs and Cataby transform the high voltage to a 33,000 volt distribution system to surrounding areas.

3.1.9 Summary of Land Use Issues

Since the gazettal of the Shire of Coorow Town Planning Scheme No. 1, the following characteristics of the Shire have changed:

- The population of the Coorow Townsite and the rural areas has dropped slightly and Council has been actively pursuing mechanisms to encourage population and employment growth in the Coorow Townsite.
- Leeman and Green Head have experienced steady growth of about 4% per annum and much of this growth is related to people retiring to the coast, as such there is a growing need for aged persons facilities particularly medical facilities. (A multi-purpose health centre will be established in Leeman. There appears to be a growing need for aged persons accommodation).
- The coastline is experiencing increasing use by both local people and visitors and coastal management is a priority for Council and the community.
- Boat launching facilities are a community issue for the coastal townsites.
- Squatter shacks have been removed from the coast and Council is in the process of rehabilitating the coast and installing facilities for recreational use.

- Use and vesting of Crown land and maintenance of conservation reserves is a major issue now that the coastal road from Jurien to Cliff Head has been constructed.
- The Coorow townsite remains the service and administrative centre for the rural areas, however Leeman is now recognised as the service and administrative centre for the coast and has the facilities that will allow this role to be enhanced in the future.
- Leeman and Green Head have a growing role as tourist and holiday centres. Green Head is now supporting a more permanent residential population and there are plans for further expansion of the residential areas rather than for the provision of holiday/tourist sites and facilities.
- The mineral sands (titanium) mining industry remains a significant source of employment for the coastal areas, however, commercial and industrial activities have also expanded in the coastal townsites.
- Commercial activities remain limited in all the townsites even though Council has been actively encouraging economic expansion.
- Servicing provision in all townsites appears to be adequate, and the provision of deep sewerage at Green Head will occur with the next stage of subdivision.
- While education facilities appear to be adequate there is a need to provide for aged persons facilities in the townsites.
- Land care initiatives are a growing priority for the rural community.

3.2 ENVIRONMENTAL ISSUES

3.2.1 Introduction

An understanding of natural environmental processes is an important aspect of land use planning. As such an overview of the biophysical environment of the Shire is presented in this section. The following is a desktop study of the environment based upon publications which have reviewed the area in greater detail. Because of the Shire's location on the coast, both terrestrial and marine environments will be reviewed.

3.2.2 Climate

The Shire of Coorow is located in the Central Coast/Wheatbealt Region and experiences a Mediterranean climate which is characterised by cool, wet winters and hot, dry summers. Winter temperatures at the coast are generally warmer than inland areas due to the land-sea interface. In summer, it is reversed with coastal areas being significantly cooler due to the influence of the sea breeze.

Extreme temperature ranges recorded for the nearby town of Carnamah provide examples of the conditions experienced in the Shire of Coorow. The lowest temperature recorded during winter is -0.4°C and the highest is 29.0°C. The lowest temperature recorded during the summer is 8.6°C and the highest is 46.2°C.

The Shire of Coorow has an annual average rainfall of 392.9mm with May to September being the wettest months (Bureau of Meteorology), however, annual average rainfall at the coast is 564mm.

2.3.3 Geomorphology and Geology

The Shire of Coorow lies within the Perth Sedimentary Basin. This Basin extends south along the coast from the Murchison River to the south coast and to the Darling Fault (Department of Planning and Urban Development, 1994). The cadastral boundaries of the Shire extend from the coast for approximately 140km inland, to agricultural lands. In this extension, there are several geomorphic units which the landscape is based upon. These can be categorised to lie within three geological regions, the Coastal Plain, the Arrowsmith Region and the Dandaragan Plateau (Figure 4).

The Coastal Plain extends from the coast to the west of the Gingin Scarp and consists of:

- Quindalup Dune System;
- Tamala Limestone System;
- Eneabba Sandplain;
- Bassendean System; and
- Lagoonal Depressions.

The Quindalup Dune System is the dominant feature on the coastline of the Shire. It contains beach plains, foredunes, parabolic dunes, and mobile sand sheets. It is the most recently deposited material (less than 10,000 years BP) and consists mainly of calcareous fragments of marine origin. The Quindalup Dune System is considered a mobile dune system and is therefore an unstable land form. It is, however, kept intact by extensive vegetation cover with vegetation disturbance exacerbating the mobility of the sands. The dunes, generally, run almost parallel with the coastline forming a 'barrier' between the sea and inland sandplain. The dunes are oriented in a south-west direction in sympathy with the prevailing winds of the area.

Underlying the Quindalup Dune System is the Tamala Limestone System. It has essentially formed by the leaching of calcium carbonate through the soil profile over thousands of years. Soil depth, over the Tamala Limestone, is variable. For the most part, the topography is rolling with the limestone conforming with the old dune formation from which it was formed. Limestone, does however, outcrop offshore as semi-emergent reefs, stacks and islands and also along the coast as coastal cliffs. Exposure of the limestone throughout the dunes also occurs with deflation or erosion of the Quindalup sands revealing the underlying limestone material.

The Eneabba Plain is a low-lying area between the Tamala Limestone and the Gingin Scarp. It is a series of Pleistocene shorelines, lagoons and dune deposits overlain in places by a

series of low alluvial fans. It is, generally, well vegetated and supports a rich diversity of flora and fauna.

The Bassendean Dune System is a belt of coastal dunes and associated shoreline deposits which are believed to have accumulated during the early to middle Pleistocene, probably during interglacial periods of high sea level. The dunes consist mainly of quartz materials with the majority of the calcareous fragments have been leached through the profile. The profile is therefore, highly weathered, being extremely porous and nutrient deficient. The relief of this dune system has also altered over time with a variable landscape remaining. Interdunal depressions are still evident and may support a wetland or dampland.

Lagoonal depressions occur to the east of the Quindalup Dune System. They are remnants of a previous coastal shoreline. With a decline in sea level to its current level and the deposition of marine fragments to form the Quindalup Dune System, the lagoons were trapped in their inland position. They are seasonally inundated and are highly saline. The depression in which the lakes sit has, since the sea level decline, begun to fill with deposits of clay and marl, gypsum and salts.

The Arrowsmith Region extends east from the Eneabba Plain. Within the Shire of Coorow, it generally consists of Breakaway Zones with Gravel and small areas of Weathered Mesozoics. The landscape in this area has been dissected by geological erosion to produce gravelly rises, crests, slopes and valleys with deep sands, valley bottoms with duplex soils and alluvial flats some with closed depressions. The area dominated by Lesueur has shallow soils on gravel.

The Dandaragan Plateau forms the source area of the coastal drainage basins between the Irwin and Moore Rivers. The plateau has an elevation of between 200 and 300 metres above sea level and is largely undissected and generally, flat or gently undulating. It consists of a sand and laterite capping with sand depth varying from between 1 and 3 metres. The soils of the plateau are nutrient poor in the majority and highly porous. Rainfall, therefore, is generally absorbed into the soil profile and is transported seaward as sub-surface groundwater. The hydraulic conductivity of the profile would vary depending on the water holding capacity of the soil, sub soil compaction or the presence of aquicludes.

3.2.4 Hydrology

- **Groundwater**

There are three major underground aquifer bodies in the region: the superficial coastal plain aquifers, the deeper sandstone aquifers of the Parmelia/Leederville Formation underlying the Dandaragan Plateau and the deeper Yarragadee Formation underlying most of the region. There is little surface drainage of rainfall over the Dandaragan Plateau because of the highly porous soil profile of this region. The main superficial aquifers occur in the Bassendean Dune Systems where the water table is shallow. The water entering sub-surface

Figure 4: Topography

aquifers in both these areas travel seaward through the karst features of the Tamala limestone eventually exiting at points along the coast. There is, however, extensive salt water intrusion into this aquifer because of its connectivity with the sea. This intrusion would vary according to tide, storm surge and rainfall. Generally, a freshwater lens develops above the salt water intrusion due to the density difference between the two water bodies. Accessing freshwater supplies at the coast depends greatly on the extent of this fresh water lens and its water holding capacity. Freshwater would become more readily available moving inland, however, cyclic salt stores within the soil profile may also contribute to inland waters being brackish or saline. Appropriate management of groundwater sources is necessary to ensure that the fresh water lens is maintained and not exploited.

Aquifers are also influenced by the presence or absence of perennial vegetation. It is well known now that vegetation plays an important role in maintaining the quality of groundwater particularly in regard to secondary salinity which is a major contributor to land degradation within the agricultural areas of Western Australia. Vegetation cover also influences the recharge rate of some aquifers.

The Water and Rivers Commission is in the process of developing water source protection plans for Leeman and Green Head regional town water supply areas. The plans will detail protection strategies for the water sources and a framework for their gazettal under the Country Areas Water Supply Act 1947. The proposed Leeman Midway bore water reserve is located within the Lesueur National Park. The nature reserve objectives are entirely consistent with designating the water reserve a Priority 1 source protection area. Priority 1 (P1) source protection areas are defined to ensure that there is no degradation of the water source. P1 areas are declared over land where the provision of the highest quality public drinking water is the prime beneficial land use. P1 areas would typically include land under Crown ownership. P1 areas are managed in accordance with the principle of risk avoidance and so land development is generally not permitted although some activities are permitted. The Midland bore water reserve is a much smaller area consisting of Reserve 38501 and is also proposed for Priority 1 classification.

- **Surface Water**

The Shire of Coorow comprises four distinct surface drainage areas, only two of which drain directly into the Indian Ocean, namely:

- Gypsiferous Playa Lagoons (Figure 5).
These comprise a series of lagoons inland from the coast. These exist from north of Jurien to north of Coolimba.
- Eneabba Indoon Stockyard Basin.
This is a drainage basin in which the streams flow into a series of Claypans.
- Hill Drainage Basin.
This drainage area which comprises about a third of the Shire drains south into the Hill River and flows into the ocean south of Jurien in the Shire of Dandaragan.
- Moore River Basin.

The eastern part of the Shire is part of the Moore River Basin which drains south into the Moore River which flows into the ocean at Guilderton in the Shire of Gingin. The Coorow component of this basin forms a series of separate inland drainage sub-basins, such as Pinjarrega Lake.

There is no floodplain mapping in the Coorow area. The object of floodplain management is to promote the wise use of floodplains while minimizing flood risk and damage. Proposed development should not significantly impact upon major flooding and should be adequately protected from major flooding. The 1 metre 100 year flood has been adopted in Australia and overseas as the basis for floodplain management planning.

The Water and Rivers Commission has advised that rezonings and development applications should be referred to them to assess possible ecological impact on natural watercourses and riparian vegetation. They suggest that buffer zones between the development activity and the water course should be established to reduce the impact of erosion, siltation, excessive nutrient accumulation and weed invasion.

3.2.5 Vegetation

Recent studies have concluded that the underlying geology of a region is an important factor influencing the regional variation in composition in vegetation. The vegetation of the Shire of Coorow therefore consists of a number of vegetation systems which in some areas form a mosaic distribution (Figure 6). In general, however the vegetation systems consist of:

- Coastal heath and thicket;
- Coastal thicket;
- Scrubland with scattered trees;
- Scrub-heath; and small areas of
- Samphire.

Coastal heath and thicket occurs in the Quindalup Dune System and consists of salt and wind tolerant vegetation. Pioneer species, such as *Cakile maritima* and *Salsola kali* occupy the beach and incipient foredunes with species diversity increasing with distance from the shore. The windswept foredune areas support coastal heath species such as, *Olearia axillaris*, *Lepidosperma gladiatum*, *Alyxia buxifolia* and *Rhagodia baccata*. Species more tolerant of sand inundation occur in the lower portion of the foredunes. *Spinifex longifolius* and *Spinifex hirsutis* would be most common. Thicket species make an appearance at the dune crest and dune swale, with species such as *Acacia rostellifera* and *A. cyclops* being common.

Coastal thicket dominates the dune swales of the Quindalup Dune System. Swales are generally, more fertile and wetter than dune ridges and therefore have a denser vegetation coverage. Species most commonly found in these areas are *Lepidosperma gladiatum* and *Acacia spp.*

Figure 5: Wetlands, drainage and divides.

Scrubland with scattered trees occurs on the areas of coastal plain where sediment depth and nutrient availability is slightly higher. Salt and wind tolerance are not such an issue for these plants. Trees in these areas would consist, in the majority of *Banksia spp.* and small

Eucalypts. *Banksia prionotes*, *Dryandra sessilis* and *Calothamnus quadrifidus* would be among the dominant species with Blackboys, *Xanthorea preissii*, occurring throughout the area. The understorey would be extremely diverse and species rich. Banksias generally occur in deep sand in valley bottoms with Eucalypts occurring along drainage lines.

Scrub-heath is dominated by members of the Proteaceae family with *Hakea obliqua* being particularly common. *X. preissii* and *H. obliqua* become virtually absent in these areas, however, the cycad, *Macrozamia reidei* is more evident. *Banksia tricuspis* and *D. sessilis* occur predominantly in the Lesueur region. Some patches of woodland occur amongst the scrub-heath and consist of *Eucalyptus wandoo* and *Eucalyptus calophylla*.

Samphire areas are dominated by species of the Chenopod family such as *Halosarcia indica*. *Melaleuca raphiophylla* and *Banksia littoralis* occur in wetland areas which are less saline.

3.2.6 Fauna

With the Shire of Coorow extending from the coast and inland for some distance and supporting a range of vegetation types, the faunal species diversity is relatively high. However, many species are heath dependent and as such have been seriously affected by loss of habitat due to land clearing in the region. Further pressure has been placed on the fauna of the region due to the presence of feral animals as predators and competitors. Fire has also been devastating to animal populations in some areas.

While no records exist for the Shire of Coorow, the Central Coast region has been found to support 66 reptiles, 12 frogs, 4 bats, 5 freshwater fish, 17 terrestrial mammals, and at least 180 bird species. Seven species of feral animals are also recorded in the area with the cat, fox, rabbit and house mouse being most numerous. Several species have been recorded as locally extinct in the Lesueur National Park, these being the Woylie, Chuditch, Mardo, Dibbler, Quenda, Western Mouse and Heath Rat. These species could be reintroduced if foxes and cats could be controlled, suitable fire regimes were maintained and the area was kept free of *Phytophthora* (Dieback) (CALM, 1994). Carnaby's Black Cockatoo has been placed on CALM's Reserve List due to its significant decline since European settlement. This species relies on both heath and woodland for survival, feeding amongst heath and nesting in hollows of the *Eucalyptus wandoo*.

3.2.7 National Parks and Nature Reserves

- **Lesueur National Park**

The conservation value of the Lesueur area has been recognised since the early 1950s when Government Botanist, Charles Gardner recommended the area be reserved due to the continuing impact of land clearing on flora. No action was taken, however, owing to the discovery of coal deposits in the area. Proposals were put forward by the private sector and the Mines Department to mine these deposits and to develop a coal fired power station would service the electricity needs of the Perth region. Upon submitting a Notice of Intent

Figure 6: Vegetation Distribution

to the Environmental Protection Authority (EPA), the proponents were requested to prepare an Environmental Review and Management Program. The Department of Conservation and Land Management (CALM) was also asked to prepare a report on the nature conservation, recreation, landscape and education values of the Lesueur area. In 1991, the proponents withdrew their Notice of Intent. The EPA then recommended the area be declared an 'A' class reserve under the National Parks and Nature Conservation Authority. Lesueur National Park was gazetted an 'A' class reserve for National Park in January, 1992. The Park covers an area of approximately 26,987 hectares.

Lesueur National Park is one of three major areas of biodiversity in Western Australia. Eight hundred and twenty one species of plants have been recorded within the Lesueur, this being representative of almost 10% of the recorded flora of Western Australia and a third of the taxa in the Irwin Botanical District (CALM 1994). The Genera of *Acacia*, *Stylidium*, *Hakea* and *Melaleuca* dominate the taxa.

An exceptionally high number of plants reach their northern or southern limit in the area, many of which have disjunct distributions (CALM 1994). The Lesueur National Park also has 111 regionally endemic taxa, 9 endemic taxa and 7 declared rare flora. Fifty four additional taxa have been added to the Department of Conservation and Land Management's Priority List, which with further research may reveal additional declared rare flora. The reason for such high endemism in the taxa of this area is unknown but it is thought to be related to the long term habitat stability of the land form in a transitional rainfall zone (Figure 7).

CALM and the National Parks and Nature Conservation Authority have produced a Draft Management Plan for Lesueur National Park and Coomallo Nature Reserve which outlines

Figure 8 shows the locations of the National Parks and Nature Reserves of the central coast.

- **Stockyard Gully Nature Reserve**

This 'A' class reserve is located approximately 10km east of the Leeman townsite and cover an area of approximately 1,384.6 hectares. The Stockyard Gully Caves are found within the reserve and consist of a series of limestone caves. It is believed these caves were created by a semi-emergent river system. They run for an unknown distance underground.

- **Little Three Springs Nature and Travellers Reserve**

This reserve is located approximately 14km east of the Leeman townsite. Three freshwater springs occur within the reserve and are a popular attraction during the winter and spring. The springs are part of the Canning Stock Route and in the past hosted cattle herds being brought south from the Kimberleys.

- **Beekeepers Nature Reserve**

Beekeepers Nature Reserve is a large area of coastal heath and scrub to the east and north of Leeman. It extends northwards into the Shires of Carnamah and Irwin. It was created for

Figure 7: National Parks and Nature Reserves

the protection of flora and is a 'C' class reserve. It has similar conservation values to nearby Lesueur National Park. It covers an area of approximately 68,063 hectares.

- **South Eneabba Nature Reserve**

South Eneabba Nature Reserve is located on the Brand Highway in the north of the Shire. It is a 'C' class reserve and covers approximately 6,776 hectares. It is a representative portion of Kwongan vegetation of the Bassendean Dune System. It was created for the protection of flora and fauna.

- **Alexander Morrison National Park**

Alexander Morrison National Park is located along the Coorow-Green Head Road. It is named after Alexander Morrison, who was the Government botanist at the turn of the century. The park is a representative portion of the natural vegetation of the area before land clearing took place. It lies over sandstone and incorporates low lateritic breakaways. The vegetation of the Park is diverse with flowers occurring year round.

The Park covers an area of approximately 8,500 hectares and was created for the protection of flora, fauna and water.

- **Watheroo National Park**

Watheroo National Park is located in the south east of the Shire of Coorow. The majority of the Park lies in the Shire of Dandaragan. It covers approximately 39,937 hectares. The Park incorporates examples of a variety of vegetation systems with vegetation changing abruptly from Kwongan to Woodlands on the Darling Escarpment. Salt Lakes and their associated vegetation are also found in the Park.

- **Pinjarrega Nature Reserve**

Pinjarrega Nature Reserve lies between Watheroo National Park and Capamauro Nature Reserve and is found on the Coorow-Green Head Road. These reserves form a belt in a north-south alignment across the Shire of Coorow. Pinjarrega is an 'A' class reserve and was created for the conservation of flora and fauna. It covers an area of approximately 18,221 hectares.

- **Capamauro Nature Reserve**

Capamauro is a 'C' class reserve created for the conservation of flora and fauna. It covers an area of approximately 4,686 hectares and is found to the north of Pinjarrega Nature Reserve.

- **Marchagee Nature Reserve**

Marchagee is a 'C' class nature reserve created for the conservation of flora and fauna. It covers an area of approximately 578 hectares.

3.2.8 Marine Environment

- **Marine Processes**

Sea level fluctuations caused by glacial and interglacial episodes over the last 2 million years have resulted in the formation of the morphology of the coast. During the Pleistocene sea level fell to approximately 130m below its current level. In this time extensive dune fields, consisting in the majority of marine calcareous fragments, developed along the coast. Wind direction and force shaped a series of dune ridges which formed approximately parallel with the shoreline. Rainfall during this time provided a mechanism for calcium carbonate, from the marine fragments, to leach through the soil profile, precipitating out in a series of subsurface layers (forming Tamala limestone). Consequently, with the onset of the last interglacial episode, sea level again rose. Loose sediment was 'washed' into interdunal depressions resulting in the exposure of the underlying Tamala limestone. The loose sediment and subsequent erosion of the limestone over time has and is currently contributing to the morphology of the current coastline.

Those limestone ridges which were inundated during sea level rise, now form the submerged and semi-emergent reefs, islands and stacks offshore in the Leeman, Greenhead area. Some of the exposed limestone has been 'captured' by the mainland and now appears as rocky headlands.

During the Holocene (less than 10,000 years), marine derived sediment has been deposited shoreward, now creating an extensive onshore dune system, namely the Quindalup Dunes. Tamala Limestone underlies the majority of this dune system, and also extends under the sediment offshore. Evidence also exists which indicates that coral reef formations occurred along the coast. Fossilised coral markings can be found in some Tamala limestone formations.

- **Marine Biota**

- *Flora*

The influence of the offshore islands, reefs and stacks allows the development of protected inshore embayments which support an extensive array of algae and seagrass species. Landsat imagery has indicated that the most extensive areas of marine vegetation occur in the most sheltered waters (Hammond & Eliot, 1995).

Seagrass species, particularly, require shallow protected waters and are most commonly found in the lee of islands and reefs. The species *Posidonia australis*, *P. sinuosa*, *Amphibolis antarctica*, *A. griffithii*, *Halophila ovalis* and *Heterozostera tasmanica* are known to occur in the marine environment adjacent to the Coorow coast. Macroalgal species such as *Ecklonia radiata* and many *Sargassum spp.* dominate the algal community found attached to the reefs of islands and along the reefs themselves, on their seaward side.

Both algae and seagrass contribute to the food chain of the marine ecosystem while also providing habitat and substrate for many marine organisms. They are also important in sediment stabilisation, nutrient cycling while also contributing to the absorption of wave energy on the coastal fringe. Algal and seagrass wrack deposited on beaches also fulfils the above important functions.

- *Fauna*

Marine fauna along this portion of the coast is extensive and far beyond the scope of this report. However, it is recorded that 17 species of seabirds nest and roost on the islands of this portion of coast. Commonly seen seabirds include Silver Gulls, Bridled Terns, Crested Terns, Oyster Catchers and Ospreys. Many of the seabirds are migratory and are therefore, only seasonal visitors to the Western Australian islands and coast.

The Australian Sea Lion also inhabits the islands along the coast. This species is listed as a species in need of special protection under the *Wildlife Conservation Act 1950*.

Marine fishes in the area would make extensive use of the seagrass and algal communities and reef structures for protection, habitat and as a food source. These areas are particularly important for the juvenile stages of the Western Rock Lobster, which has significant economic benefit for the region.

The Department of Conservation and Land Management are exploring the possibility of developing the Jurien Marine Park in the nearshore adjacent waters of the Coorow coast with the northern boundary of the Park reaching Green Islets. This process is in its early stages with community consultation now occurring.

3.2.9 Coorow Coast

The Shire of Coorow is committed to provide visitor/recreation nodes along the coast between Point Louise and Leeman South Beach, formerly occupied by squatters. Council intends to develop a coastal drive from Leeman to Green Head along a controlled access.

A Coorow Coastal Plan was prepared in 1995 by Hammond and Eliot which assessed the environment and made management recommendations. The study identified four coastal sectors, namely:

- **Southern Border to Green Head Townsite**

The coastline along this sector is relatively unstable and has several large dune blowouts and bare sand sheets. The coastal heath and thicket vegetation is an important stabilising factor in this sector.

The main planning implications in this area are:

- Future vesting of the land between the coast and Indian Ocean Drive; and
- Limesand mining from the sand sheets.

- **Green Head Townsite**

This sector includes the coast from South Bay to Point Louise. The coast is rock armoured (Tamala Limestone) and stable. The coast has good quality landscape values and needs to be managed sensitively in terms of any buildings that may be required.

The main planning implications in this area are:

- Future development needs to be set back adequately from the sandy portions of coast.
 - Adequate access, by means of pedestrian paths and parking areas need to be provided.
 - Development of the tourist sites in the town need to be in harmony with the aesthetic character of the coastal reserve. Building height in particular needs to be carefully considered.
- **Coast between Green Head and Leeman**

This sector which includes 12 kilometres of coast was originally occupied by a large number of squatters. The shacks have now been removed and most of the previously occupied areas have been reinstated.

The main planning issues in this area are:

- Location of a cemetery
A site adjacent to the road between the towns has been identified. The site needs to conform with a number of requirements of the Metropolitan Cemeteries Board.
- Location of a Limesand Quarry
A quarry company has identified a deposit of limesand in the Shire's coastal reserve. The advantages of this location as against other opportunities in the area will need to be carefully considered.

- **Leeman Townsite**

This sector, as in Green Head, comprises Tamala Limestone headlands and pocket beaches and is generally stable. The town community are active in promoting the management of the coast.

The main planning issues in Leeman area:

- Development of holiday accommodation.
- Management of the southern area adjacent to the southward extension of the townsite.

3.2.10 Summary of Environmental Issues

The Shire of Coorow consists of several geomorphic units which in turn influence the presence/absence of vegetation communities. The majority of the Shire is inhabited by heath and scrub like vegetation which extends from the coast to inland areas. The species composition of the heath is extremely variable across the landscape, with high species diversity and endemism occurring in the Lesueur National Park region.

Much of the fauna in the area is dependent on the heath for food and shelter. Feral animals, land clearing and bushfires are a threat to their continued survival.

Groundwater quality throughout the Shire is variable. Recharge occurs on the Dandaragan Plateau in the east of the Shire and travels seaward beneath the ground or along drainage lines. A saltwater wedge which intrudes at the coast reduces the amount of freshwater available in this area, however, a freshwater lens occurs along much of the coast due to the

density difference between salt and freshwater. Care is needed that this lens is not over exploited.

The marine environment of the Coorow coast is a rich and diverse ecosystem. The presence of offshore islands, stacks and reefs ensures that the nearshore waters are relatively protected. This allows several seagrass communities to survive in their lee. Algal species also occur within the protected embayments, however, they are more abundant on the seaward side of these features.

Seabirds and sealions occur on the offshore islands with many birds being migratory. The Department of Conservation and Land Management are in the process of developing the Jurien Marine Park which will have its northern boundary at Green Islets.

The Shire of Coorow consists of an extensive area of land with notable environmental values. These values are an asset to the Shire and the people who choose to live there while also being important to the State.

4. PLANNING AND DEVELOPMENT IN THE VICINITY OF THE TOWNSITES

4.1 INTRODUCTION

Town Planning Scheme No 1 included strategic provisions for the ongoing development of each of the townsites in the Shire. These appear to have operated well in the past 10 years. It is now necessary to examine each of the townsites to review the strategic direction of each.

4.2 COOROW

The Coorow townsite is dominated by the Westrail reserve which virtually divides the townsite into two parts (Figure 8).

The eastern side is the most distinctly developed with commercial uses along Main Street, public purposes, residential area, industrial area and public open spaces.

The western side of the town has a residential area, golf course, recreation area, caravan park and grain receival depot.

The main planning **issues** in the town are as follows:

- The **industrial** area has moved beyond the townsite boundary and this should be amended to bring it into line with urban uses. The industrial area also requires that a road be constructed to facilitate subdivision and development of the area.
- The **residential** uses on the eastern side of town are fairly constrained. There is, however, scope to zone additional land for residential purposes on North Street, Spain Street and Main Street. There is also potential to develop a structure plan over Locations 2023 and 1274 on the eastern side of town.

The unused portion of the Church owned land at the corner of North Street and Spain Street is suitable for aged persons accommodation if the owners want the land used for such a purpose.

There has been some discussion about using the school oval for residential purposes. It is not considered that this is necessary in the short term with adequate residential land being available.

- The Westrail reserve is a mainly unused expanse to the west of Poynton Parade. There are a few weatherboard houses at the northern end of this area. The street frontage of this area along Poynton Parade has potential to be used for commercial purposes on condition that a service road is provided to reduce traffic entering and exiting from Poynton Parade.
- The **recreation** area is presently located on Rural zoned land. A Parks and Recreation Reserve would be a more appropriate land use purpose.

Figure 8: Coorow Townsite

- There are nine **rural** lots on the south western side of the town. These are generally used for semi-rural uses. These lots have potential to be used for Local Rural purposes and it is recommended that they be zoned accordingly.
- The Coorow-Latham Road to the east of the town is used by large road trains transporting grain to the CBH Facility. At present the heavy traffic enters town, passes the Shire Office and uses Bristol Street and South Street to access the grain terminal. It is proposed that a heavy traffic part-bypass be constructed to link the Coorow-Latham Road to South Street to improve the traffic flow.
- The Shire is presently preparing a townscape improvement plan for Coorow, Leeman and Green Head. There are a number of opportunities to improve the visual character of all three towns, Coorow in particular. Screening of advertising signs are simple ways of enhancing landscape quality. It is, however, beyond the scope of this project to go into such detail.

4.3 LEEMAN

The Leeman townsite is relatively constrained with the ocean in the west, the Carnamah Shire boundary in the north, lakes and nature reserves to the east and coastal reserves and nature reserves to the south (Figure 9).

The town has a well planned residential area with commercial, recreation and public purpose uses interspersed on the western side. A new subdivision has been planned to the south of the existing residential area. This is set out in Amendment 13 which was gazetted in May 1998.

On the eastern side of Leschenaultia Drive is the sewerage plant, and the industrial area. There is also an informal equestrian area to the east of the industrial area. (Leschenaultia Drive is the name of that portion of Indian Ocean Drive within the Leeman Townsite.

The main planning issues at Leeman are as follows:

- The **commercial** area of Leeman is not well located to serve the needs of the town which is expanding to the south. As much of the existing commercial area is undeveloped it is considered that this land should be rezoned for tourist accommodation. It is suggested that a new commercial area be planned on the eastern side of the Leschenaultia Drive to the north of Lake Street.
- There is a fairly large area to the east of Leschenaultia Drive that has potential for Local Rural subdivision. Owing to the fact that the soil is unconsolidated there would need to be strict control on clearing of vegetation. Some of this land adjacent to the lake is low lying and drainage issues need to be carefully assessed. This area was partly flooded in the winter of 1999. Also, a substantial bush buffer should be maintained along the eastern side of Leschenaultia Drive.

Figure 9: Leeman Townsite

4.4 GREEN HEAD

The Green Head townsite has developed in two distinct parts. The southern area comprises commercial, tourist and residential uses that are expanding to the east (Figure 10).

The Green Head golf course dominates the central area of the townsite and separates out the other developing area which consists predominantly of residential uses expanding to the north.

The main planning issues in Green Head are as follows:

- The **commercial** area, as in Leeman, is situated along the coast and is eccentric to the residential areas.
- The location of the golf course has created a barrier between the southern and north-western residential areas of town.
- The Mid West Development Commission identified a potential marine aquaculture site on the land between Grigson Street and Patton Street. Council will need to decide on the possibility if a developer makes an application.
- Future residential uses have expansion potential to the east and north.
- Opportunities for aged persons accommodation needs to be investigated.
- Rural residential uses should be considered in the eastern parts of the townsite on condition that an adequate buffer is maintained along Indian Ocean Drive and that controls are maintained on vegetation clearing.
- The coastline at Anchorage Bay is receding. An adequate development setback will need to be calculated before the adjacent coastal strip is built on. The setback should be calculated using the guidelines set out in the Western Australian Planning Commission Country Coastal Planning Policy No. DC 6.1.
- A church site needs to be identified.

4.5 MARCHAGEE

Marchagee is a townsite on the Midland railway line which never developed. It is proposed that it be zoned Rural Zone and that any future development be at the discretion of the Shire Council. Main Roads WA is concerned that the close proximity of the townsite to the Midlands Road could result in multiple access points. As this section of road has a legal speed limit of 90km/hr Main Roads would like to see modifications to the townsite layout to restrict access onto Midlands Road.

Figure 10: Green Head Townsite

5. COMMUNITY CONSULTATION

Three community consultation meetings were held in the Shire of Coorow. These were held in the towns of Coorow, Leeman and Green Head. Mr O'Brien asked the community about their values, concerns and visions for the respective town. The views of the public have been taken into consideration in the formulation of the Shire of Coorow Town Planning Scheme No. 2.

5.1 COOROW

A public meeting was held in Coorow on 10 June 1998 at 7pm relating to values, concerns and visions for the town in relation to the review of the Town Planning Scheme. The meeting was held at the Maley Park Function Centre. Approximately 14 members of the local community attended the meeting. The values, concerns and visions of the local community were identified as the following:

5.1.1 Values

- Agricultural industry - good
- Safe environment - crime free
- Good agricultural area
- Good environment
- Dry environment - good for asthmatics
- Great sporting facilities
- Good place to bring up kids
- Good school

5.1.2 Concerns

- Residential land - shortage?
- Water supply - quality/quantity
- More commercial needed
- Tree planting needed
- Want hobby farms
- East - Coorow - residential opportunities
- School grounds - too big - \$ back to Consolidated Revenue
- School oval - doublegees/weeds - don't need that size oval
- Catholic Church land suitable for aged accommodation
- Railway land commercial opportunities
- Loss of people from the town, ongoing problem
- Rates too low?
- Nothing for people to do
- Employment opportunities

- Presentation of town, needs enhancement

5.1.3 Visions

- Lifestyle lots
- More residential lots
- Grand plan, 30 years needed
- Talc mine, demand
- Horticulture lots needed in town
- Floriculture is potential use
- Railway land, landscaping/commercial opportunities
- Midlands Way (regional) wildflowers
- Townscape improvement
- Coorow, develop **promotion** scheme
- Involve community in activities and decisions
- Trees needed, greening town
- Limesand, agricultural lime is needed
- By-pass for town will improve safety and quality
- Aged persons accommodation suggested for school grounds
- Create walkways
- Provide rollerblading area
- Entry statement would improve

In summary, the values of the Coorow residents focus on the safe environment for the raising of children and the value of the surrounding agricultural area. The concerns of the Coorow residents range from the provision of additional land uses such as commercial and residential uses to how the town appears visually. The visions of the Coorow residents include the provision for a variety of more intensive agricultural industries in the townsite and the transformation of individual precincts into more appropriate land uses.

5.2 LEEMAN

The second public meeting was conducted in Leeman on 11 June 1998 at 4pm relating to Values, Concerns and Visions for the town in relation to the review of the Town Planning Scheme. The meeting was held at the Leeman Recreation Centre. Three members of the public were present. The public's values, concerns and visions included the following:

5.2.1 Values

- Small town
- Coastal lifestyle/environment
- Safe environment for children
- Good sports facilities (all in one place).

- Good fishing
- Close to Geraldton and Kalbarri
- Good crayfishing
- Limited visitors/tourists
- Little or no crime - safe environment
- Mine at Eneabba asset to the area

5.2.2 Concerns

- Development of roads and the township
- Child care facilities (opposite Shire)
- No Ambulance in emergency situations
- Employment opportunities lacking
- Foreshore parking
- Fix up turning bay for buses
- Billy Goat Bay will be lost

5.2.3 Visions

- Shopping centre
- Telecommunication centre (computer network link)
- Coastal walk
- Tourist buses/kiosk
- Office Space
- 2000m² lots.

In summary, the values of the Leeman residents relate to the safe environment for the raising of children and the advantages of the coastal lifestyle. The concerns of the Leeman residents focus on the provision of individual services, the preservation of natural assets and the general development of the town and connecting road network. The visions of the Leeman residents include the provision of more commercial and tourist-related uses, and the development of lot sizes of 2000m².

5.3 GREEN HEAD

The final public meeting was conducted in Green Head on 11 June 1998 at 7.30pm relating to values, concerns and visions for the town in relation to the review of the Town Planning Scheme. The meeting was held at the Green Head Town Hall. Approximately twenty members of the public were present. The following issues were identified by the local community:

5.3.1 Values

- Summer breeze/cooling

- Climate
- Beach
- Golf course
- Quiet, peaceful lifestyle
- Safe swimming at Dynamite Bay
- Safe/crime free

5.3.2 Concerns

- No playgrounds
- No public open space, new residential area
- No senior citizens facilities
- Property owners, clean up needed
- High transmission wires
- Power off in storms, poles blown over
- Vegetation/shade trees, greening town
- Seating/shade trees

5.3.3 Visions

- No tavern/pub (66% voted for a tavern/pub in a recent survey)
- Motel facility
- Retirement village
- Coastal parks/gardens
- Dual use paths, walk/cycle
- Boat launching jetty area
- Avoid splitting the town in two, keep it together
- Rural lots in townsite

In summary, the values of the Green Head residents relate to the advantages of the natural environment and associated lifestyle. The concerns of the community include the provision of additional facilities, such as the provision of public open space within the new residential area. The visions of the local residents include the provision of additional services whilst retaining the character of the town.

6. STRATEGIC PLAN

The Strategic Plan is intended to set out the Council's broad vision for the Shire of Coorow and the longer term directions for land use and development. The approach is to draw on the main strategic directions set out in regional and local strategies for the area and draw these into an integrated overall strategy.

6.1 OVERALL STRATEGIES

6.1.1 State Strategy

The Shire concurs with the key strategies for the Mid West Region, namely:

- Diversification of the economic base in agriculture, mining, downstream processing and tourism.
- Protection of coastal and marine environments.

6.1.2 Central Coast Regional Strategy

The Shire concurs with the key strategies in the Central Coast Regional Strategy, namely:

- The implementation of the Indian Ocean Drive connecting south to Perth will benefit the Shire.
- The phasing out of squatter settlements and replacing these with recreation and tourist accommodation facilities.
- The development of tourist attractions along the coast and in nature reserves and national parks will add to the attractions of the area.

6.1.3 Central Coast Tourism Strategy

The Shire concurs with the intent of the Central Coast Tourism Strategy, namely:

- The Shire recognises the potential to create, and be recognised as, a unique nature-based coastal destination offering recreational and ecological experiences to all visitors.

6.1.4 Central Coast Basic Raw Materials Strategy

The Shire concurs with the intent of the Central Coast Basic Raw Materials Strategy, namely:

- Protect basic raw material deposits such as gravel, yellow sand, limestone and limesand for the mining and agricultural sectors.

- Protect basic raw materials for the building industry in the vicinity of Leeman and Green Head.
- A Lime Roads program is being organized by Main Roads WA.

6.1.5 Marine Aquaculture Sites

The Shire concurs with the intent of the Mid West Development Commission's study on potential marine aquaculture potential, namely:

- A secondary level site was identified at Green Head, between Grigson Street and Patton Street.

6.1.6 Coorow Coastal Plan

The Shire of Coorow concurs with the intent of the Coorow Coastal Plan, namely:

- Implement the recommendations of the Coorow Coastal Plan including the following:
 - Vesting of coastal reserves south of Green Head to Shire boundary.
 - Limesand mining from the sand sheets subject to ongoing review of particular places.
 - Set development back from the coast.
 - Provision of pedestrian access.
 - Control of development, building height in particular.
 - Finalisation of a cemetery site depending on criteria specified.
 - Development of holiday accommodation in the Leeman townsite.

6.1.7 Heritage Inventory

The Shire concurs with the strategic intent of the Municipal Heritage Inventory.

- The Shire will prepare a **Heritage List** of places considered and have regard to these places when making planning decisions.

6.1.8 Local Planning Policies

The Shire concurs with the Local Planning Policies which it has prepared and will amend from time to time. These policies do not bind Council in decision making but need to be taken into consideration when making planning decisions.

6.2 SPECIFIC STRATEGIES

6.2.1. Development Strategy

In accordance with the Scheme Objectives Council have adopted the following policies:

- To maintain and develop the Coorow Townsite as the administrative and service centre for the Shire and the rural hinterland.
- To provide for the social and economic needs of permanent residents and holiday makers or temporary residents in Leeman and Green Head, whilst maintaining and protecting the quality of the coastal environment.
- To maintain and develop community facilities in the Leeman Townsite to support a permanent residential community, with provision for holiday accommodation and facilities.
- To develop and maintain Green Head as a townsite and as a holiday centre providing for a wide range of holiday activities in tourist accommodation sites.
- To ensure the continuation of the basic rural use within the Shire, encouraging where appropriate, the retention and expansion of present agricultural activities.
- To maintain Marchagee in its present form as a rural townsite. Review access onto midlands road to ensure ongoing traffic safety.

6.2.2 Coorow Townsite Strategy

- To retain the predominant low density character of the existing residential area.
- In the area coded R10/15, the R10 Code shall apply unless Council is satisfied that a satisfactory system of on-site effluent disposal can be achieved and continue to function effectively on a permanent basis under the R15 Code.
- To encourage the development of commercial facilities in the commercial zone to service the requirements of the town and the rural hinterland.
- To provide for the development of the industrial area in stages to cater for the industrial requirements of the townsite and the surrounding rural hinterland.
- To require, on all new commercial and industrial buildings that the external cladding of any walls facing a street, with a 3 metre return along side walls, shall be constructed of brick, stone, concrete or other approved material.

6.2.3. Green Head Townsite Strategy

• Residential Areas

To provide for diversity in housing type consistent with the Council's objective of developing the town as a holiday centre.

To provide for the requirements of residents wishing to carry out activities associated with their usual form of employment by making provision for;

- The storage of fishing boats and associated equipment.
- The storage of materials associated with additional uses approved by Council.

In the area coded R12.5/15, the R12.5 Code shall apply unless the council is satisfied that a satisfactory system of on-site effluent disposal can be achieved and continue to function effectively on a permanent basis under the R15 Code.

In areas where the R12.5/30 Code applies the provisions of the R12.5/15 Code shall apply unless Council is satisfied that comprehensive development proposals have been prepared which take into account;

- The need for a satisfactory system of effluent disposal to be provided which will continue to function effectively on a permanent basis.
- The effect the proposal will have on the residential amenity of the locality by reason of streetscape, building form, servicing, privacy between buildings, overshadowing and traffic circulation both on- and off-site.
- Any other matter required to be taken into account under the provisions of the appropriate residential planning code.

Additional Uses - The Council shall make provision within the Residential Zone for additional uses as specified in Schedule 2 and defined on the Scheme Map.

- **Commercial/Industrial Areas**

- Plan the commercial area with the purpose of rationalising access and car parking.
- Provide for the development of residential premises incidental to the commercial use.
- Give priority to the development of commercial facilities which satisfy the basic requirements of residents.
- Encourage the development of commercial facilities associated with the tourist industry.
- Require that on all new commercial and industrial buildings, the external cladding of any walls facing a street, with a 3 metre return along the side walls, shall be constructed of brick, stone, concrete or other approved material.

6.2.4 Leeman Townsite Strategy

- **Residential Areas**

To generally retain the low density residential character of the existing residential area, except in select localities where Council may approve medium density development.

The provisions of the R15 Code shall apply to all residential development.

In areas where the R15/30 and R15/40 Code applies, the provisions of the R15 Code shall apply unless Council is satisfied that comprehensive development proposals have been prepared which take into account;

- The need for a satisfactory system of effluent disposal to be provided which will continue to function effectively on a permanent basis.
- The effect the proposal will have on the residential amenity of the locality by reason of streetscape, building form, servicing, privacy between buildings, overshadowing and traffic circulation both on and off-site.
- Any other matter required to be taken into account under the provisions of the appropriate residential planning code.
- **Commercial/Industrial Area**
 - Encourage the development of commercial facilities in the Commercial Zone to service the requirements of residents in Leeman.
 - Require that on all new commercial and industrial buildings, the external cladding of any walls facing a street, with a 3 metre return along the side walls, shall be constructed of brick, stone, concrete or other approved material.

6.2.5 Rural Zone Strategy

The following are the basic objectives for the rural zone:

- To ensure the continuation of the basic rural use within the zone, encouraging where appropriate, the retention and expansion of present agricultural activities.
- To consider granting Planning Consent to non-rural uses where these can be demonstrated to be of benefit to the district and not detrimental to the area's natural resources and environment generally.
- To permit, subject to Planning Consent, development providing facilities for tourists, travellers and for recreational usage.

7. RECOMMENDATIONS

Based on investigations, research and community consultation undertaken in the preparation of the Shire of Coorow Town Planning Scheme No 2, it is recommended that:

- 7.1** The Shire should undertake detailed structure planning for Coorow, Leeman and Green Head to improve some of the structural issues that have been identified in the review.
- 7.2** The Shire should avoid subdividing productive agricultural land for small rural lots (hobby farms). This form of 'lifestyle' rural residential should be investigated in the existing townsites to help build up the town populations.
- 7.3** The Shire should consider the replanning of the commercial zones in Leeman and Green Head so as to make them more accessible to the expanding residential areas.
- 7.4** A landscape buffer should be provided adjacent the Indian Ocean Drive in the vicinity of Green Head to preserve the visual qualities of the tourist route.

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