



GINGIN WATER RESERVE WATER SOURCE PROTECTION PLAN

Gingin Town Water Supply



WATER RESOURCE PROTECTION SERIES

WATER AND RIVERS COMMISSION REPORT WRP 2 1997



WATER AND RIVERS
COMMISSION



Important information

The *Gingin Water Reserve water source protection plan* (1997, WRP no.2) was reviewed in 2013.

Please ensure you read the *Gingin Water Reserve drinking water source protection review* (2013, WRP no.144) alongside the 1997 plan to obtain all of the information about this drinking water source.

The 2013 review considers changes that have occurred in and around the Gingin Water Reserve since the completion of the 1997 *Gingin Water Reserve water source protection plan*. Additional recommendations have been prepared to ensure the ongoing protection of this public drinking water source area:

- amending the reduced boundary under the *Country Areas Water Supply Act 1947* (WA)
- conduct a groundwater assessment to improve the accuracy of the Gingin Water Reserve boundary.

You can find the 2013 *Gingin Water Reserve drinking water source protection review* at www.water.wa.gov.au > publications > find a publication > drinking water source protection reviews or by contacting the Department of Water on +61 8 6364 7600 or drinkingwater@water.wa.gov.au.

Gingin Water Reserve
Water Source Protection Plan
Gingin Town Water Supply

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Water and Rivers Commission
Policy and Planning Division

WATER AND RIVERS COMMISSION
WATER RESOURCE PROTECTION SERIES
REPORT NO WRP 2 1997



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Executive Summary

About the Water Reserve

Gingin is an agricultural centre located about 84 kilometres north of Perth in the Shire of Gingin. Water is supplied to the town by the Water Corporation from bores in the Leederville formation which is both confined and unconfined in the area.

There is little risk of contamination of the confined aquifer as the overlying layers provide a barrier to contamination. The unconfined aquifer has the potential to be contaminated by runoff from a sports oval and rural properties and septic tanks which are located upgradient of the Daw Street wellfield.

A Priority 3 water reserve consisting of a 300 metre radius centred about each well should be proclaimed to protect the immediate wellhead area.

About Water Source Protection Plans

Water Source Protection Plans establish the level of protection required within Water Reserves. The plans identify sources of contamination that should be investigated and set out programs for management of the resource.

The quality of water sources in country Western Australia is protected by proclaiming Water Reserves under the Country Areas Water Supply Act (1947). The Act's by-laws enable the Water and Rivers Commission to control potentially polluting activities, to regulate land use, inspect premises and to take steps to prevent or clean up pollution.

The Water and Rivers Commission aims to work proactively with planning agencies to incorporate water protection in the land planning process. Decisions on land use zoning and subdivision applications have a significant impact on the protection of water sources. The Commission supports the amendment of Town Planning Schemes and Development Strategies that reflect land use compatible with Water Source Protection Plans.

This Water Source Protection Plan provides a basis for establishing compatible land uses within the Water Reserve at Gingin and is a mechanism for practical implementation of the Commission's protection strategies. Local government decision makers, State planning authorities and operational staff are encouraged to recognise this document as a basis for ensuring the long term protection of this groundwater resource for generations to come.



Contents

1. INTRODUCTION	1
2. HYDROGEOLOGY.....	1
3. LAND USE - EXISTING AND PROPOSED	4
4. POTENTIAL FOR CONTAMINATION.....	4
5. PROPOSED PROCLAIMED AREAS	5
RECOMMENDATIONS	7
IMPLEMENTATION STRATEGY	8
REFERENCES	9
APPENDIX 1- ACCEPTABILITY OF LAND USES WITHIN PUBLIC DRINKING WATER SOURCE AREAS.....	10



1. Introduction

Gingin is an agricultural centre located 84 kilometres north of Perth via the Brand Highway (see **Figure 1**). The town water supply is supplied from groundwater pumped from a Water Corporation wellfield. The two bores off Edgar Street (1/84 and 1/85), shown in **Plate 1**, are screened in the lower Leederville Formation, drawing groundwater from depths ranging from 138 to 161 metres below ground level. The two bores located off Daw Street (1/75 and 2/75), depicted in **Plate 2**, are screened between 15 and 33 metres below ground surface and draw groundwater from the upper Leederville Formation. The Leederville formation is both confined and unconfined within the region. Unconfined aquifers are more vulnerable to contamination from inappropriate land uses than confined aquifers. Two abandoned production bores (1/64 and 2/64) are currently used as monitoring bores. Groundwater is aerated, then clarified and filtered to

remove iron prior to reticulation.

The climate of the region is described as Mediterranean with hot, dry summers and mild, wet winters. The long term average rainfall for Gingin is 724 millimetres. Most rainfall is recorded during the winter months, from May through to October.

2. Hydrogeology

Gingin is located on the eastern edge of the Swan Coastal Plain which forms part of the Perth Basin. The sediments of the Perth Basin in the Gingin area comprise the Leederville Formation overlying the Parmelia Formation. The Parmelia Formation consists of interbedded sandstone, siltstone, shale and claystone. The Leederville Formation consists of sandstone, siltstone and shale. The Coolyena Group consisting of a glauconitic shale, siltstone and silty to clayey sandstone forms a confining layer over the Leederville



Plate 1: Edgar Street Wellfield



Formation to the east of Gingin. West of Gingin the formation is unconfined and is recharged by direct rainfall infiltration.

The direction of groundwater flow is west and south west. The depth to water in the area varies from 3 to 5 metres below the ground surface in the Daw Street bores (1/75 and 2/75) and about 40 metres in the Edgar Street bores (1/84 and 1/85).



Plate 2: Daw Street Wellfield



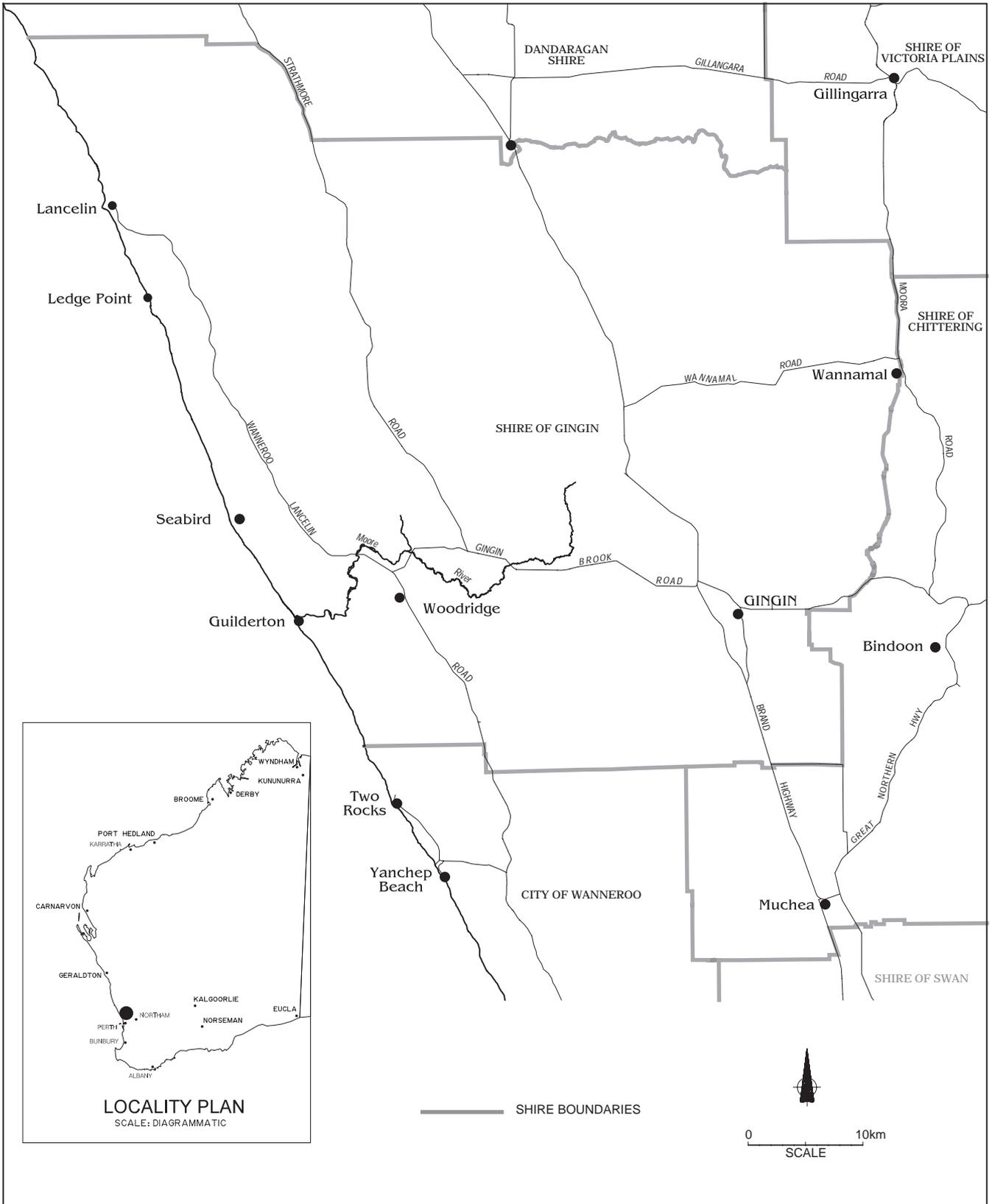


FIGURE 1. GINGIN LOCALITY MAP



3. Land Use - Existing and Proposed

Land to the north of the Edgar Street bores is used for cropping and grazing as shown in **Plate 3**. The township of Gingin is located to the south of the wellfield. Effluent disposal for the town is via septic tanks.

Land use in the vicinity of the Daw Street bores is used for special rural purposes. The wellfield is immediately downgradient of the school oval.

Future land use within the water reserve is likely to consist of urban development associated with the expansion of Gingin and continuation of the existing rural land use on the outskirts of town.

4. Potential for Contamination

The considerable depth to water and the confining nature of the overlying strata in the vicinity of the Edgar Street wellfield significantly reduces the likelihood of contamination. The existing rural and residential land uses in this area therefore do not pose a threat to the groundwater quality.

As the aquifer is unconfined around the Daw Street wellfield, there is the potential for contamination from fertilisers or herbicides that are be applied to the nearby sports oval or surrounding special rural properties. There is also the potential for contamination from septic tanks from the township of Gingin.



Plate 3: Agricultural land use surrounding the Edgar Street Wellfield



5. Proposed Proclaimed Areas

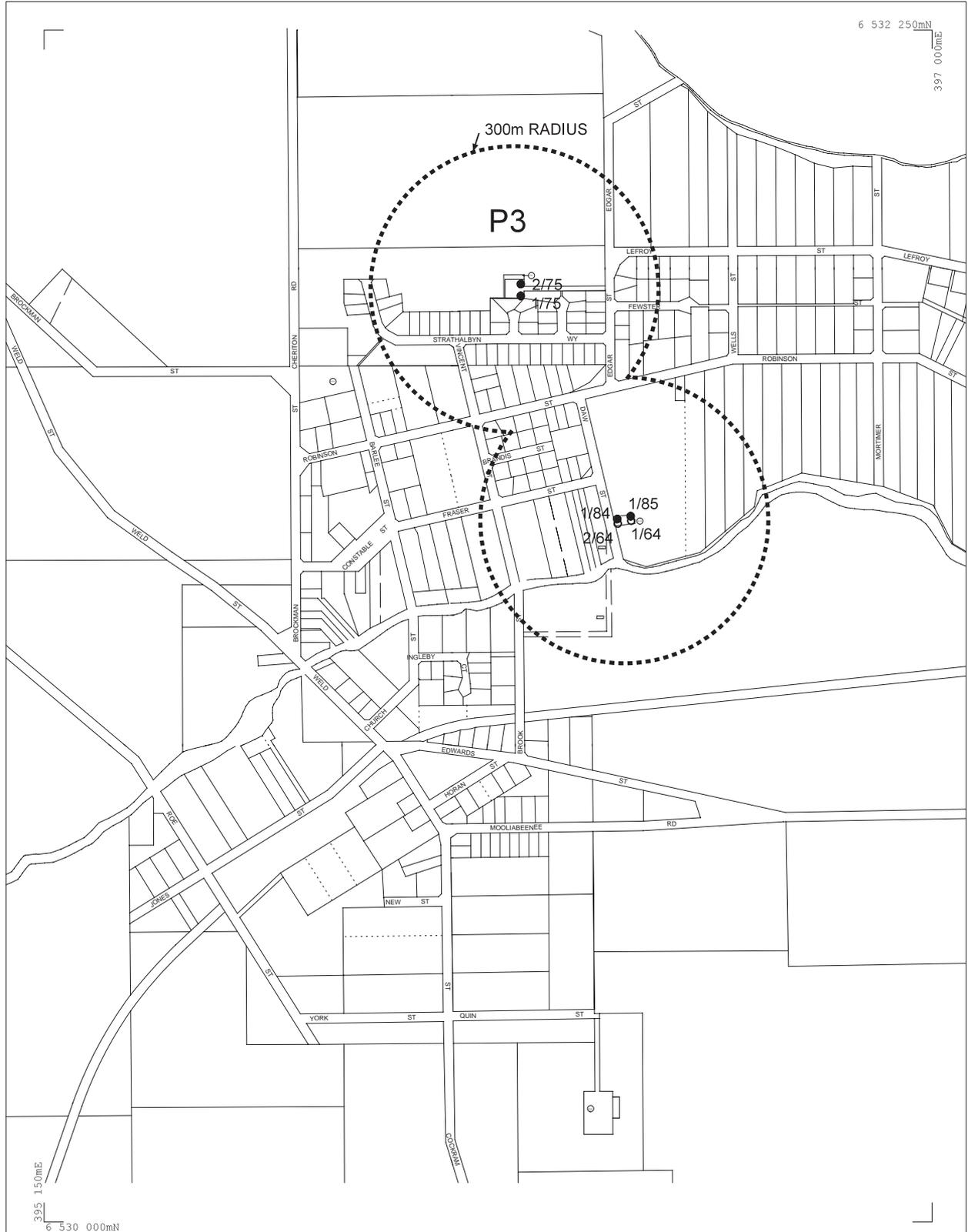
The Edgar Street wellfield should be protected by a water reserve consisting of a 300 metre radius, centred around the bores. This coincides with the wellhead protection zone, as shown in **Figure 2**. The water reserve should be classified as a Priority 3 (P3) source protection area. A P3 classification is justified on the following criteria:

- the confining, overlying, interbedded strata would limit the downward migration of contaminants;
- alternative groundwater supplies are available in the near vicinity of Gingin.

The Daw Street wellfield should be protected by a water reserve consisting of a 300 metre radius, centred around the bores. This coincides with the wellhead protection zone. (see **Figure 2**). The water reserve should be classified as a P3 source protection area for the following reason:

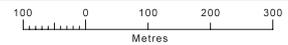
- alternative groundwater supplies are available in the near vicinity of Gingin.





395 150mE
6 530 000mN

6 532 250mN
397 000mE



- LEGEND:**
- Production Wells
 - Observation Wells
 - Priority 3 Source Protection Area



INDEX TO ADJOINING
1:100000
MAPS

1936	2036	2136
1935	2035	2135
2034	2134	

FIGURE 2.
GINGIN WATER RESERVE

Drawn by D.R.A Date 27/04/94



Policy and Planning Branch
Public Water Source Protection Section



Recommendations

1. The proposed Gingin Water Reserve should be gazetted under the Country Areas Water Supply Act 1947.
2. Planning Strategies should incorporate the management principles outlined in the Water and Rivers Commission's *Acceptability of Land Use Within Public Drinking Water Source Areas* (see Appendix 1) and reflect the Priority 3 classification given to the water reserve.
3. All development proposals within the Water Reserve which are likely to impact on water quality should be referred to the Water and Rivers Commission.
4. Signs should be erected along the boundaries of the Water Reserve to define the reserve and promote public awareness of the need to protect water quality.
5. A process should be put in place to address any spillage of pollutants within the Water Reserve.
6. A surveillance program should be established to identify any incompatible land uses or potential contaminant threats within the Water Reserve.
7. Implementation of these recommendations should be reviewed one year after this plan is endorsed. A full review of this protection plan should be undertaken approximately every five years.



Implementation Strategy

No.	Description	Implemented by	Timing
1	Gazettal of reserve.	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) 	1997/98
2	Incorporation into land planning strategies.	<ul style="list-style-type: none"> Shire of Gingin 	On-going
3	Referral of development proposals: <ul style="list-style-type: none"> Provide Shire of Gingin with guidelines for referral of development proposals. Referral of development proposals. 	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) Shire of Gingin, Ministry for Planning, Department of Environmental Protection 	1997/98 On-going
4	Erection of signs: <ul style="list-style-type: none"> Development guidelines for signage. Determine location and quantity of signs. Erect signs. 	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) Regional Manager, Swan Region (WRC) Regional Manager, Swan Region (WRC) 	1997/98 1997/98 1997/98
5	Emergency response procedures: <ul style="list-style-type: none"> Develop response plan. Inform WAHMEMS personnel of special requirements for water reserves. 	<ul style="list-style-type: none"> Project Manager, Regional Support Branch (WRC) Project Manager, Regional Support Branch (WRC) 	1997/98 1997/98
6	Surveillance: <ul style="list-style-type: none"> Develop guidelines for surveillance of water reserves. Implement surveillance program. 	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) Regional Manager, Swan Region (WRC) 	1997/98 On completion of surveillance guidelines
7	Review of this plan and recommendations.	<ul style="list-style-type: none"> Program Manager, Protection Planning, Water Quality Protection (WRC) 	Initial review 1998/99 Full review after 2002/03



References

Australian Groundwater Consultants, '*Groundwater Scheme Review - Gingin*', Water Authority of Western Australia, Report No. WG 22, July 1987.

Chong, V. '*Groundwater Scheme Review - Gingin*', Water Authority of Western Australia, Report No. WG 131, January 1992.

Holmes, D. '*Groundwater Protection Plans for the Shires of Dandaragan, Gingin, Moora and Victoria Plains - Goldfields and Agricultural Region*', Water Authority of Western Australia, Report No. WG 203, Draft, June 1995.

Holmes, D. '*Protection of Groundwater Resources Used for Drinking Water Supplies in Country Areas of Western Australia (Country Areas Groundwater Protection Policy)*', Water Authority of Western Australia, Draft, June 1995.

Mappin Marjoram, '*Local Rural Strategy*', Prepared for the Shire of Gingin, February 1995.

Mappin Marjoram, '*Development Strategy and Structure Plan for the Gingin Coastal Region*', Prepared for the Shire of Gingin, June 1992.

Water Authority of Western Australia, '*Gingin Groundwater Area Management Plan*', Report No. WG 160, October 1993.



Appendix 1- Acceptability of Land Uses Within Public Drinking Water Source Areas





WATER AND RIVERS COMMISSION

ACCEPTABILITY OF LAND USES WITHIN PUBLIC DRINKING WATER SOURCE AREAS

OVERVIEW OF PROTECTION FRAMEWORK

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission has developed policies for the protection of public drinking water source areas which are based on three levels of priority classification.

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 development is generally not permitted.

Priority 2 (P2) source protection areas are defined to ensure that there is no increased risk of pollution to the water source. P2 areas are declared over land where low intensity development (such as rural) already exists. Provision of public water supply is a high priority in these areas. P2 areas are managed in accordance with the principle of risk minimisation and so some development is allowed under specific guidelines.

Priority 3 (P3) source protection areas are defined to minimise the risk of pollution to the water source. P3 areas are declared over land where water supply needs co-exist with other land uses such as residential, commercial and light industrial developments. Protection of P3 areas is achieved through management guidelines rather than restrictions on land use. If the water source does become contaminated, then water may need to be treated or an alternative water source be found.

In addition to priority classification, **wellhead protection zones** and **reservoir protection zones** are defined to protect the water source from contamination in the immediate vicinity of production wells and reservoirs. Wellhead protection zones are usually circular, with a radius of 500 metres in P1 areas and 300 metres in P2 and P3 areas. Reservoir protection zones usually consist of a 2 kilometre area around the top water level of a reservoir and includes the reservoir itself. These zones do not extend outside water reserves. Additional restrictions apply within these zones.

LAND USE COMPATABILITY TABLE

This table is to be used as a guideline only. Further information relating to land use and developments within Public Drinking Water Source Areas including those not listed in the table can be obtained from the Commission.

This table does not replace the need for assessment by the Commission. Please consult the Commission regarding any land use proposals in Public Drinking Water Source Areas which may impact on water resources.



DEFINITIONS USED IN THE TABLE

<i>Compatible</i>	The development/land use is compatible with the management objectives of the priority classification.
<i>Incompatible</i>	The development/land use is incompatible with the management objectives of the priority classification.
<i>Restricted</i>	The development/land use may be compatible with the management objectives of the priority classification with appropriate site management practices. Restricted activities should be referred to the Commission for assessment on a case specific basis.
<i>Extensive</i>	Where limited additional inputs are required to the land to support the desired land use. eg supplementary feed in drought etc.
<i>Intensive</i>	Where regular additional inputs are required to support the desired land use. eg irrigation, additional feed, fertilisers.

AGRICULTURE - ANIMALS

Development	Priority 1	Priority 2	Priority 3
Apiary	Restricted	Restricted	Restricted
Aquaculture eg. marron farm, trout farm etc	Incompatible	Restricted	Restricted
Dairy Farming	Incompatible	Restricted	Restricted
Feedlots	Incompatible	Incompatible	Restricted
Livestock grazing (extensive)	Restricted	Compatible	Compatible
Livestock grazing (intensive)	Incompatible	Incompatible	Compatible
Piggery	Incompatible	Incompatible	Incompatible
Poultry farming (housed)	Incompatible	Restricted	Restricted
Stables	Incompatible	Restricted	Compatible
Stockholding and saleyards	Incompatible	Incompatible ⁷	Restricted ⁷

AGRICULTURE - PLANTS

Development	Priority 1	Priority 2	Priority 3
Broad acre cropping i.e. non-irrigated	Restricted	Compatible	Compatible
Floriculture (extensive)	Incompatible	Restricted	Compatible
Floriculture (intensive)	Incompatible	Incompatible	Restricted
Horticulture	Incompatible	Incompatible	Restricted
Hydroponic Horticulture	Incompatible	Restricted	Restricted
Orcharding	Incompatible	Restricted	Compatible
Potted Nurseries	Incompatible	Restricted	Compatible
Silviculture	Restricted	Restricted	Compatible
Turf Farms	Incompatible	Incompatible	Restricted
Viticulture	Incompatible	Restricted	Compatible



DEVELOPMENT - COMMERCIAL

Development	Priority 1	Priority 2	Priority 3
Aircraft Servicing	Incompatible	Incompatible	Restricted ⁶
Amusement Centre	Incompatible	Incompatible	Compatible ⁶
Automotive business	Incompatible	Incompatible	Restricted ⁶
Boat Servicing	Incompatible	Incompatible	Restricted ⁶
Caravan and trailer hire	Incompatible	Incompatible	Restricted ⁶
Carpark	Incompatible	Incompatible	Compatible
Consulting rooms	Incompatible	Incompatible ⁷	Compatible ⁶
Cottage Industries	Restricted	Incompatible ⁷	Compatible
Drive in take-away food shop	Incompatible	Incompatible	Compatible ⁶
Drive in theatre	Incompatible	Incompatible	Compatible ⁶
Dry Cleaning Premises	Incompatible	Incompatible	Restricted ⁶
Farm supply centre	Incompatible	Incompatible ⁷	Restricted
Fuel depot	Incompatible	Incompatible	Restricted
Garden Centre	Incompatible	Incompatible	Compatible
Local shop	Incompatible	Incompatible ⁷	Compatible
Market	Incompatible	Incompatible	Compatible ⁶
Milk depot	Incompatible	Incompatible	Restricted
Restaurant	Incompatible	Incompatible	Compatible
Service Station	Incompatible	Incompatible	Restricted
Transport Depot	Incompatible	Incompatible	Restricted
Veterinary Clinic/hospital	Incompatible	Incompatible ⁷	Restricted
Wrecking vehicles and machinery	Incompatible	Incompatible	Restricted

DEVELOPMENT - INDUSTRIAL

Development	Priority 1	Priority 2	Priority 3
General Industry	Incompatible	Incompatible	Restricted ⁶
Heavy Industry	Incompatible	Incompatible	Incompatible
Light Industry	Incompatible	Incompatible	Restricted ⁶
Power Stations	Incompatible	Incompatible	Incompatible

DEVELOPMENT - URBAN

Development	Priority 1	Priority 2	Priority 3
Aged and dependent persons accommodation	Incompatible	Incompatible	Compatible ⁶
Amenity building	Incompatible	Restricted	Compatible
Airports or landing grounds	Incompatible	Incompatible	Restricted ⁶
Cemetery	Incompatible	Incompatible	Restricted
Civic building	Incompatible	Restricted	Compatible ⁶
Club	Restricted	Restricted	Compatible ⁶
Community hall	Restricted	Restricted	Compatible
Family Day Care Centre	Incompatible	Restricted	Compatible ⁶
Funeral parlour	Incompatible	Incompatible	Compatible ⁶
Health Centre	Incompatible	Incompatible	Compatible ⁶
Hospital	Incompatible	Incompatible	Restricted ⁶
Medical centre	Incompatible	Incompatible	Compatible ⁶



EDUCATION/RESEARCH

Development	Priority 1	Priority 2	Priority 3
Education Centres	Restricted	Restricted	Compatible ⁶
Primary/Secondary Schools	Incompatible	Incompatible	Compatible ⁶
Scientific Research	Restricted	Restricted	Compatible
Universities	Incompatible	Incompatible	Restricted ⁶

MINING AND MINERAL PROCESSING

Development	Priority 1	Priority 2	Priority 3
Extractive Industries	Restricted ²	Restricted ²	Restricted ²
Mining/Mineral Exploration	Restricted ⁴	Restricted ⁴	Restricted ⁴
Tailings Dams	Incompatible	Incompatible	Restricted

PROCESSING OF ANIMALS/ANIMAL PRODUCTS

Development	Priority 1	Priority 2	Priority 3
Abattoirs	Incompatible	Incompatible	Incompatible
Cheese/butter factory	Incompatible	Incompatible	Restricted
Composting (using sewage sludge and animal products)	Incompatible	Incompatible	Restricted
Fish Processing	Incompatible	Incompatible	Incompatible
Tannery	Incompatible	Incompatible	Incompatible
Woolscourer	Incompatible	Incompatible	Incompatible

PROCESSING OF PLANTS/PLANT PRODUCTS

Development	Priority 1	Priority 2	Priority 3
Breweries	Incompatible	Incompatible	Restricted
Composting (not using sewage sludge or animal products)	Incompatible	Restricted	Restricted
Vegetable/food processing	Incompatible	Incompatible	Restricted
Wineries	Incompatible	Incompatible	Restricted

SUBDIVISION

Subdivision of land to lots of any size is incompatible within Priority 1 areas.

Development	Priority 1	Priority 2	Priority 3
Kennel Subdivisions	Incompatible	Restricted	Restricted
Rural with a minimum lot size of 4 ha (unsewered)	Incompatible	Compatible	Compatible
Rural with a minimum lot size of 1 ha (unsewered)	Incompatible	Incompatible	Compatible
Special rural with a minimum lot size of 2 ha (unsewered) ⁵	Incompatible	Restricted ⁸	Restricted ⁸
Special rural with a minimum lot size of 1 ha (unsewered) ⁵	Incompatible	Incompatible	Restricted ⁸
Urban Residential	Incompatible	Incompatible	Compatible ⁶



SPORT AND RECREATION

Development	Priority 1	Priority 2	Priority 3
Equestrian Centre	Incompatible	Incompatible	Compatible
Golf Courses	Incompatible	Incompatible	Restricted
Irrigated Recreational Parks	Incompatible	Restricted	Restricted
Motor sports i.e permanent racing facilities	Incompatible	Incompatible	Restricted
Public Swimming Pools	Incompatible	Restricted	Restricted
Rifle Ranges	Restricted	Restricted	Compatible
Temporary recreational activities (active) eg four wheel driving, rallies	Incompatible	Restricted ³	Restricted ³
Temporary recreational activities (passive) eg. horse riding, bush walking	Restricted	Restricted	Restricted

STORAGE OF DESIGNATED SUBSTANCES

Development	Priority 1	Priority 2	Priority 3
Above ground storage of designated substances	Restricted ⁷	Restricted ⁷	Restricted ⁷
Bulk Chemical Storage Facility	Incompatible	Incompatible	Incompatible
Underground Storage Tanks	Incompatible	Incompatible	Restricted

TOURISM ACCOMMODATION

Development	Priority 1	Priority 2	Priority 3
Bed and Breakfast	Incompatible	Restricted	Compatible
Caravan Parks	Incompatible	Incompatible	Restricted ⁶
Holiday accommodation eg farm chalets	Incompatible	Restricted ⁹	Compatible ⁶
Motel lodging house, hostels	Incompatible	Incompatible	Compatible ⁶

WASTE TREATMENT AND MANAGEMENT

Development	Priority 1	Priority 2	Priority 3
Deep well injection of effluent	Incompatible	Incompatible	Incompatible
Municipal Landfills	Incompatible	Incompatible	Restricted
Recycling depot	Incompatible	Incompatible	Restricted
Refuse transfer stations	Incompatible	Incompatible	Restricted
Sewers	Incompatible	Restricted	Acceptable
Used Tyre Storage Facility	Incompatible	Incompatible	Incompatible
Wastewater Treatment Plants	Incompatible	Incompatible	Restricted
Water Treatment Plants	Restricted	Restricted	Restricted

OTHER DEVELOPMENTS

Development	Priority 1	Priority 2	Priority 3
Caretakers house	Restricted	Restricted	Compatible
Construction Projects	Restricted	Restricted	Restricted
Forestry	Restricted ¹	Compatible	Compatible
National Parks	Compatible	Compatible	Compatible
Nature Reserves	Compatible	Compatible	Compatible
Radio and TV installation	Restricted	Restricted	Restricted
Major Transport Routes	Incompatible	Restricted ¹⁰	Compatible



-
1. Restrictions apply to fertiliser application rates with strict controls on the application of pesticides and field operations.
 2. Restrictions apply to the storage of fuels and chemicals with strict guidelines for rehabilitation.
 3. Restrictions on the use of fuel and chemicals apply.
 4. Subject to conditions placed on lease.
 5. Special rural development requires appropriate planning justification including provisions in the town planning scheme text.
 6. Must be connected to deep sewerage.
 7. May be permitted if this use is incidental to the overall land use in the area and is consistent with planning strategies.
 8. Restrictions apply to siting effluent disposal systems in areas with poor land capability and a shallow depth to groundwater.
 9. Restrictions apply on density of accommodation.
 10. Restrictions apply on road design and construction and the types of goods that may be carried.

June, 1997

