GOVERNMENT OF WESTERN AUSTRALIA

SOUTH COAST WATER RESERVE AND LIMEBURNERS CREEK CATCHMENT AREA WATER SOURCE PROTECTION PLAN

Albany Water Supply

WATER RESOURCE PROTECTION SERIES

WATER AND RIVERS COMMISSION REPORT WRP 44

2001

WATER AND RIVERS COMMISSION

WATER AND RIVERS COMMISSION
HYATT CENTRE
3 PLAIN STREET
EAST PERTH
WESTERN AUSTRALIA 6004

TELEPHONE (08) 9278 0300
FACSIMILE (08) 9278 0301
WEBSITE: http://www.wrc.wa.gov.au

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Water and Rivers Commission
Policy and Planning Division

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Acknowledgments

Contribution	Personnel	Title	Organisation
Program Direction	Tony Laws	Manager, Water Quality Protection	Water and Rivers Commission
Supervision	Ross Sheridan	Program Manager, Protection Planning	Water and Rivers Commission
Report Preparation	Jade Coleman	Senior Water Resources Planner	Water and Rivers Commission
Hydrogeology / Hydrology	Wen Yu	Hydrogeologist	Water and Rivers Commission
Drafting	Nigel Atkinson	Mapping Consultant	McErry Digital Mapping Pty Ltd

For more information contact:

Program Manager, Protection Planning
Water Quality Protection Branch
Water and Rivers Commission
3 Plain Street
EAST PERTH WA 6004

Telephone: (08) 9278 0300
Facsimile: (08) 9278 0585

Reference details

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Foreword

Water source protection plans

Water Source Protection Plans establish the level of protection required within Water Reserves and Catchment Areas. Catchment protection of water sources is considered a fundamental part of ensuring the provision of a safe drinking water supply.

Water Source Protection Plans identify sources of contamination that should be investigated and set out programs for management of the resource. The plans are developed in consultation with affected landowners and industry groups and relevant government agencies.

Proclaiming Water Reserves and Catchment Areas under the *Country Areas Water Supply Act* 1947 protects the quality of water sources in country Western Australia. 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 pro-actively 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 Limeburners Creek Catchment Area and South Coast Water Reserve 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 these water resources for generations to come.

Water quality 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 (PDWSAs) that include 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 land 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. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of risk minimisation and so some conditional development is allowed.

Priority 3 (P3) source protection areas are defined to manage the risk of pollution to the water source. P3 areas are declared over land where water supply sources need to 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 found.

In addition to priority classifications, wellhead protection zones are defined to protect the water source from contamination in the immediate vicinity of production wells. Wellhead protection zones are usually circular, with a radius of 500 m in P1 areas and 300 m in P2 and P3 areas. These zones do not extend outside Water Reserves and special conditions apply.

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Summary

This plan reviews existing protection boundaries for the water supply sources of the South Coast Water Reserve and Limeburners Creek to better reflect recharge areas and public water supply bore capture zones. Computer modelling of the groundwater has been used to scientifically define drinking water protection boundaries. Existing priority classifications have been reviewed to ensure consistency with the Commission's framework for public drinking water source protection.

This plan follows the release of *South Coast Water Reserve Community Newsletter No. 1* and *Draft South Coast Water Reserve and Limeburners Creek Catchment Area Water Source Protection Plan; Albany Town Water Supply*, which outlined these proposed changes to water quality protection in the area.

Albany is located on the southern coast of Western Australia, approximately 400 km south of Perth. Albany and the surrounding region obtain their water supply from a combination of groundwater and surface water sources. This plan addresses the surface water source of Limeburners Creek and the groundwater source of the South Coast Water Reserve.

The Limeburners Creek Catchment Area was proclaimed in 1959 to ensure protection of the Limeburners Creek source from potential contamination. The South Coast Water Reserve was proclaimed in 1968 to protect the groundwater from contamination.

The quality of the groundwater source is potentially at risk from increased development on the peninsula. The vulnerability of the groundwater system is highest in the southern portion of the Sandpatch sub-area where the aquifer is unconfined and clay layers found elsewhere in the system are absent.

The boundaries and priority classifications of the South Coast Water Reserve have been reviewed and modified to align with the capture zones of the existing public supply bores and recognise current land uses. The new protection area also allows for future expansion of the wellfield and removes unnecessary constraints on areas not required for public drinking water source protection.

The Limeburners Creek Catchment Area has been reviewed and modified to align with the surface and groundwater catchment of the pipehead dam.

This plan recommends that the proposed boundaries and priority classifications of the South Coast Water Reserve and the Limeburners Creek Catchment Area be incorporated into the City of Albany's Local Rural Strategy to guide land use planning.

This plan has been developed in consultation with affected landowners, land managers, the City of Albany, relevant State agencies and other interest groups.

Submissions received from the release of *South Coast Water Reserve Community Newsletter No. 1* and *Draft South Coast Water Reserve and Limeburners Creek Catchment Area Water Source Protection Plan; Albany Town Water Supply* have been formally considered and the issues raised are addressed in this plan.

1. Introduction

Albany is located on the southern coast of Western Australia, approximately 400 km south of Perth (Fig 1). The public drinking water supply for Albany comes from a combination of groundwater and surface water sources.

1.1 Existing water supply system

Surface water is obtained from pipehead dams on Angove Creek and Limeburners Creek. Protection of the Angove Creek sources will be addressed in a separate Water Source Protection Plans.

Limeburners Creek is a small surface water source that supplements the South Coast groundwater supply. The surface water source from Limeburners Creek (Fig 2) is a component of the South Coast source and is addressed in this water source protection plan.

The pipehead dam is a 2.8 m-high concrete structure. The resulting water storage is roofed. The physical catchment area is approximately 6 km^2. The creek has a mean annual flow of 500 ML a year with an estimated potential annual yield of 400 ML a year (Water and Rivers Commission, 1997).

Groundwater is abstracted from Water Corporation wellfields located 6 km south-west of Albany and extending west approximately 8 km and south-west of Princess Royal Harbour.

The wellfields consist of 41 production bores (37 of which are currently operational), 8 monitored saltwater interface bores and 19 water level monitoring bores (Fig 3). The production bores draw water from the Werillup Formation aquifer and the Tamala Limestone aquifer.

Currently, water quality monitoring of the bores follows the program recommended in Katsavounidis (1991).

1.2 Existing water source protection

The South Coast Water Reserve was proclaimed in 1968 under the *Country Areas Water Supply Act* 1947 (Fig 3). The Water Reserve was proclaimed to limit the risk of groundwater contamination from human activities.

The Limeburners Creek Catchment Area was proclaimed in 1959 under the *Country Areas Water Supply Act* 1947 to ensure protection of the Limeburners Creek source from potential contamination (Fig 2).

A groundwater quality protection plan was prepared for the area in 1992 (Katsavounidis, 1992). The plan details the existing protection areas and priority classifications (Figs 2 and 3). The elements of that plan were incorporated into the then Shire of Albany's Local Rural Strategy.

There is no existing priority classification assigned to Limeburners Creek Catchment Area, however a large portion of the Catchment Area overlapping the existing South Coast Water Reserve is currently designated for Priority 1 water source protection.

The Lake Seppings Catchment Area was proclaimed in 1959 under the *Country Areas Water Supply Act* 1947 to ensure protection of a supplementary water source for Albany used when the Two Peoples Bay source could not meet demand (Fig 1). The Catchment Area largely covers the residential area west of Lake Seppings within the City of Albany.

There is no further need for the supplementary supply to meet current demand and the water source is not contemplated by the Water Corporation as a future additional potable water supply to Albany.

1.3 Future water supply

It was identified that the Albany water sources under the existing scheme would be unable to meet predicted demand by the year 2000 (Water Corporation, 1997). In 1999 three production bores were drilled in the Werrilup wellfield west north-west of the existing wellfield. The wellfield is likely to extend further in this direction to meet future demand.

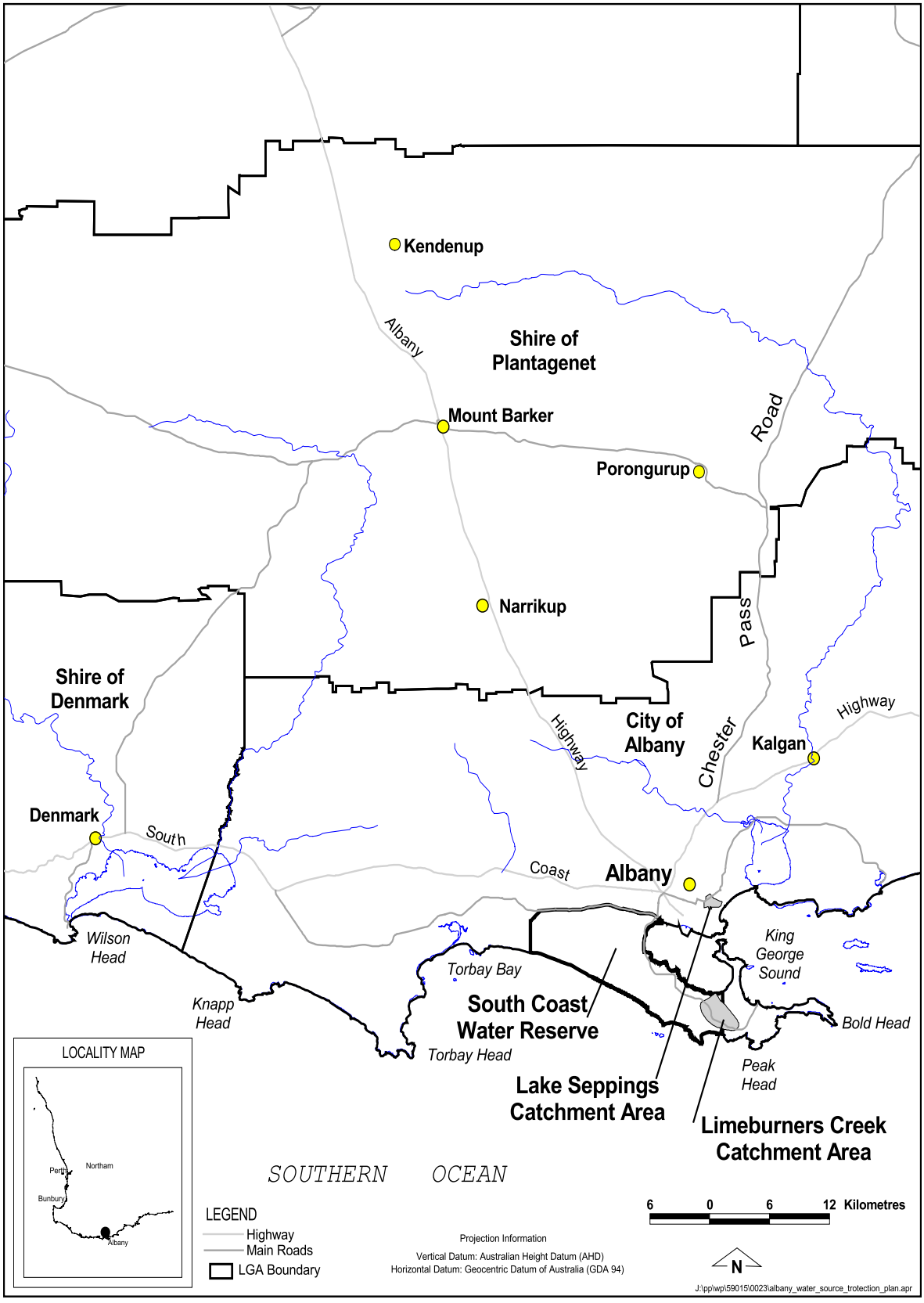

Figure 1. Albany locality map

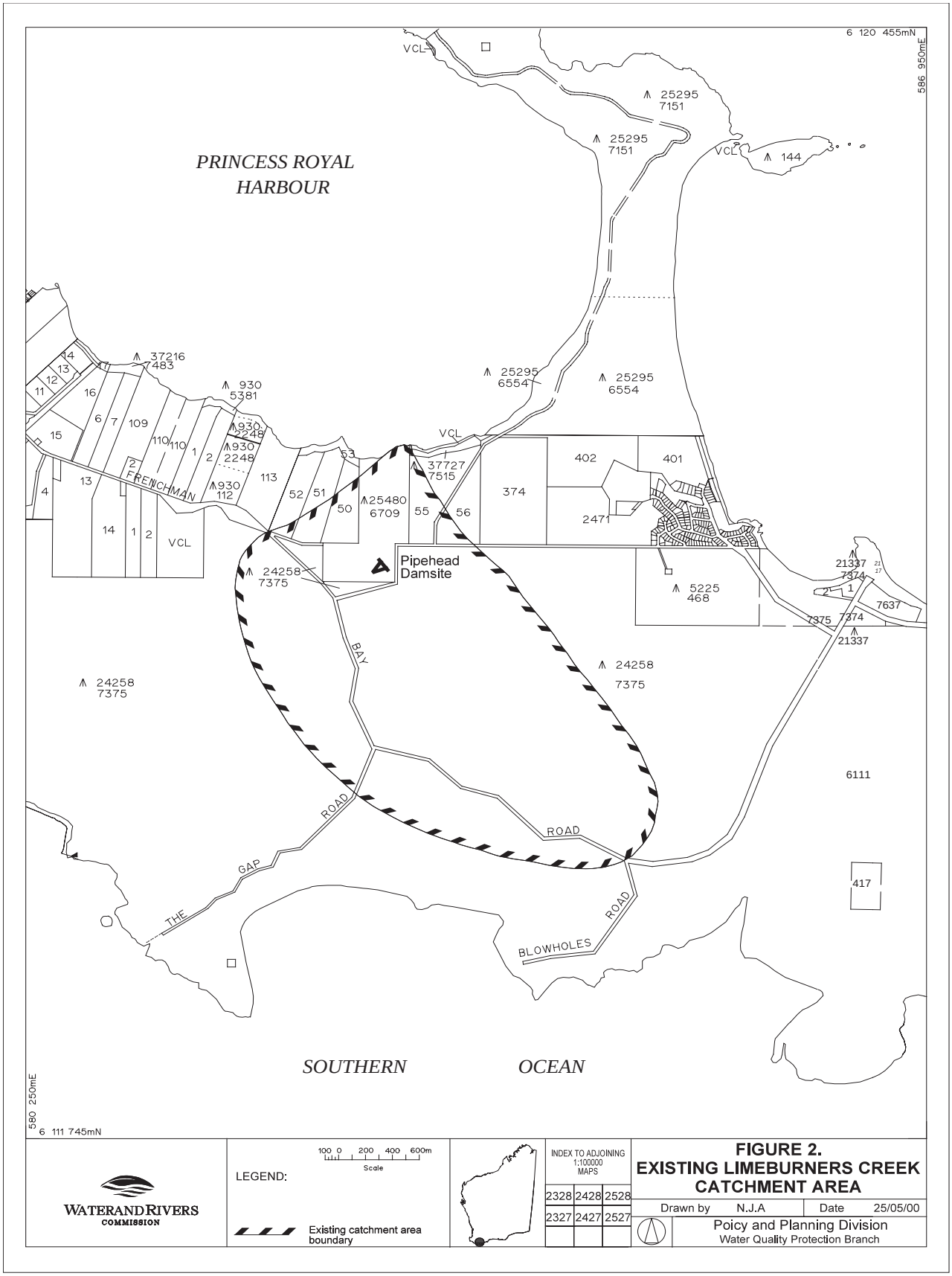

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Figure 2. Existing Limeburners Creek Catchment Area

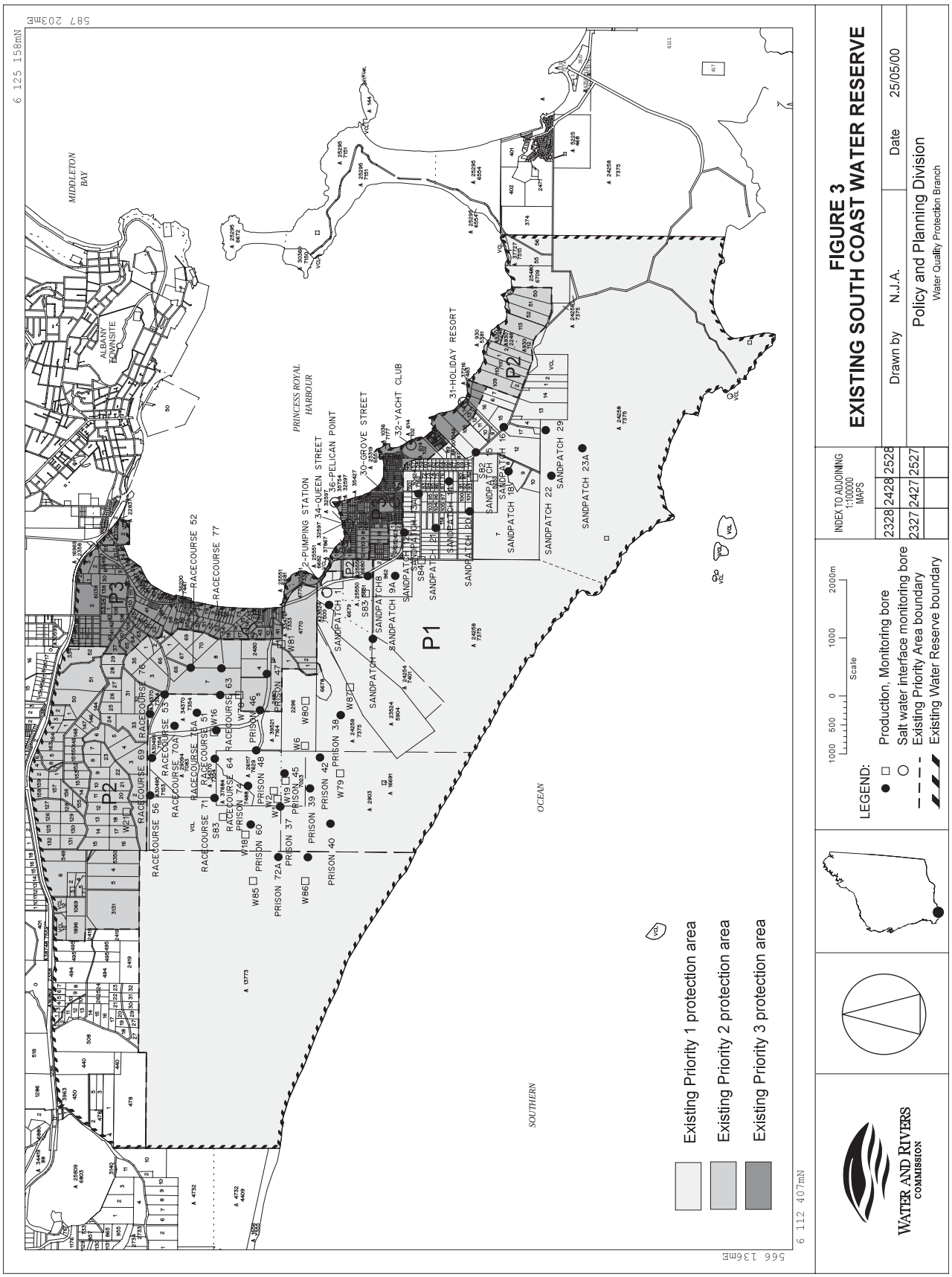

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Figure 3. Existing South Coast Water Reserve

1.4 Water resource allocation

Groundwater resource utilisation and conservation in Western Australia is administered by the Water and Rivers Commission in accordance with the *Rights in Water and Irrigation Amended Act* 2000. This Act requires the compulsory licensing of all artesian wells throughout Western Australia. In addition, non-artesian wells require licensing in specific areas, proclaimed under the Act as Groundwater Areas.

1.4.1 Albany Groundwater Area

The Albany Groundwater Area was proclaimed in 1979. The area was divided into six sub-areas based on groundwater flow systems to help manage the quantity of groundwater resources. The sub-areas within the South Coast Water Reserve are the Grasmere, Racecourse, Prison, Sandpatch and Frechmans Bay (Fig 4).

The Commission is currently preparing a draft Groundwater Management Plan for the Albany Groundwater Area. The draft plan will summarise the groundwater resource characteristics and abstraction details of the Albany Groundwater Area and develop groundwater management policies for each of the management sub-areas.

1.4.2 Current allocation licence for public supply

The Water Corporation is licensed by the Commission to draw water for public water supply purposes from the Sandpatch, Prison and Racecourse wellfields and Limeburners Creek. The total allocation for abstraction from these sources is 3.25 Gigalitres per year.

An initial interim licence for 600 Megalitres per year has been granted by the Water and Rivers Commission for the three new bores in the Werillup wellfield.

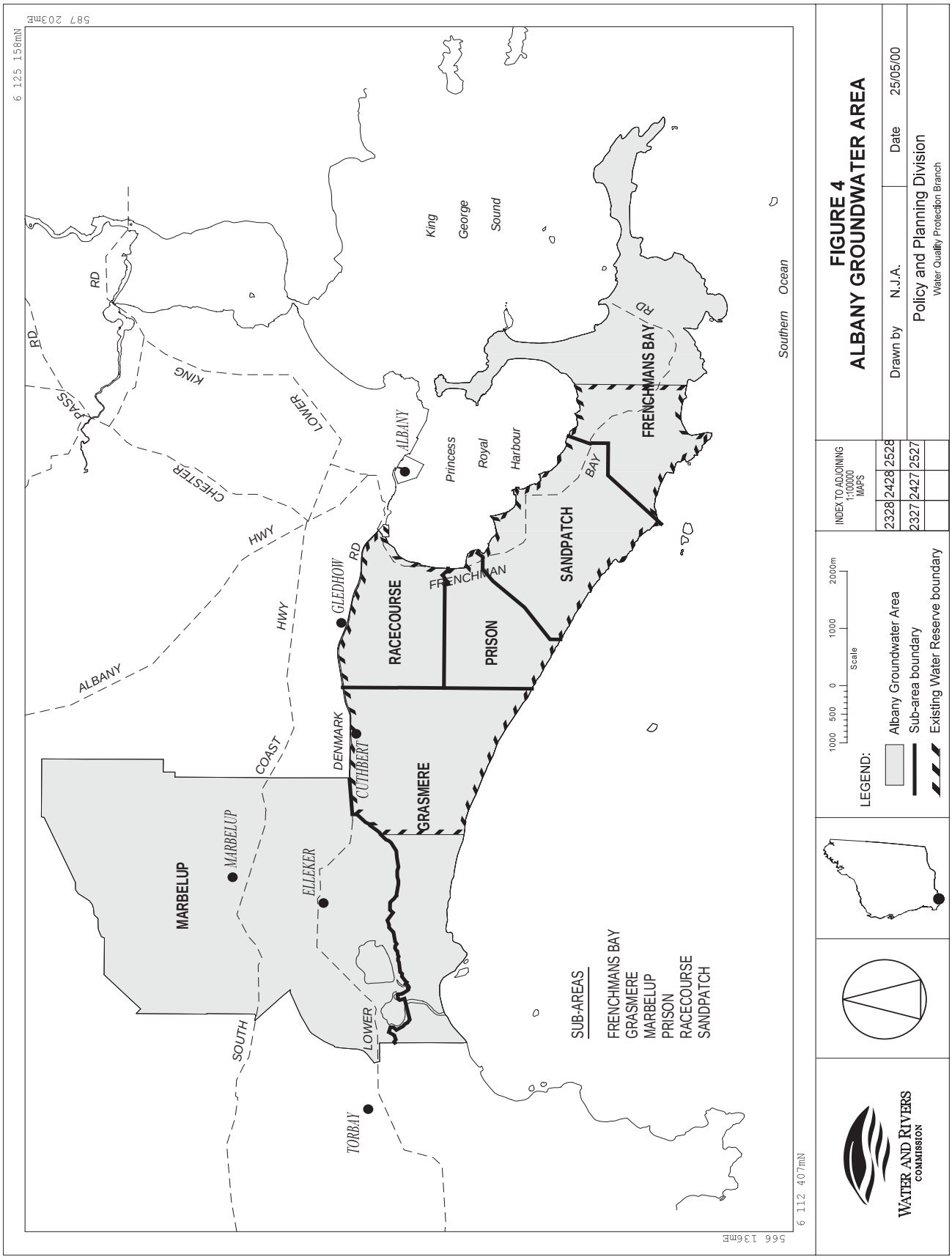
2. Physiography

The physiography within the South Coast Water Reserve is characterised by steep granite hills along the south western coast. Areas in the south western part of the peninsula reach heights of over 200 m AHD. Toward Princess Royal Harbour, the surface slopes gently towards the coast. In the Prison sub-area, numerous valleys run from the western part of the peninsula towards Princess Royal Harbour.

Drainage on the peninsula is dominated by Robinson Drain and Limeburners Creek. Both drain to Princess Royal Harbour and are hydraulically connected to groundwater flow.

3. Climate

The climate of the region is described as Mediterranean type with warm, dry summers and cool, wet winters. The long-term average annual rainfall for Albany is 936 mm (Water and Rivers Commission, 1997). The peak rainfall month is July with an average monthly rainfall of 125 mm (Katsavounidis, 1991).



Note: GIS Proj. ADG84, AMG Zone 50

Figure 4. Albany Groundwater Area

4. Hydrogeology and hydrology

The stratigraphic succession of the geological formations within the South Coast Water Reserve are from the surface, Tamala Limestone, Werillup Formation and the Precambrian basement.

In some areas, the upper Werillup Formation is a confining bed of siltstone and clay, hydraulically separating the Werillup Formation aquifer and the Tamala Limestone aquifer. Groundwater in the Werillup Formation below the clay is confined. A clay lens exists in the Prison and Racecourse sub-areas and the northern part of the Sandpatch sub-area. In these areas the public water supply source is relatively less vulnerable to contamination. However, a recent investigation into the impact of a production bore on the surface aquifer (Yu, 2000b) concluded that there is some connectivity between the surface and deep aquifers even in areas where the clay layer is present. Therefore there is a potential risk of contamination of the deep groundwater from overlying land use via the shallow groundwater.

To the east and west of the two-aquifer system, the clay lens degenerates into thin irregular layers of clay intermingled with layers of sand. In these areas an interconnected aquifer system exists.

In the southern part of the Sandpatch wellfield no significant clay layers are found. Here, the Tamala Limestone and the Werillup Formation form a single aquifer system.

Recharge to the one-aquifer zone is by direct infiltration of rainfall. In the two-aquifer zone, only the upper aquifer is recharged by direct infiltration of rainfall. The base aquifer is recharged only where the upper clays are missing. Here it is assumed most (80%) of the rainfall recharge enters the base aquifer (Katsavounidis, 1991).

Recharge to the groundwater system is primarily from rainfall infiltrating into the aquifers. The presence of a clay layer results in the build-up of a groundwater mound in the Racecourse wellfield area. Groundwater flows radially from the mound into the Grasmere valley to the north, Princess Royal Harbour to the east and Southern Ocean to the south and south west (URS/Dames and Moore, 2000).

The Limeburners Creek source is a spring discharge from the groundwater system where the watertable intersects the land surface. The catchment is entirely undisturbed natural vegetation.

4.1 Water quality

Water is of good quality and generally meets the Australian drinking water guideline parameters.

4.2 Water treatment

Mixing water from the various bores ensures the water quality generally meets the drinking water standards for iron. Aerating the water from the Prison and Racecourse wellfields prior to mixing in the South Coast reservoirs reduces the hardness and iron content. The water is also chlorinated and fluoridated and dosed with Calgon before being supplied to Albany (Water Corporation, 1997).

5. Existing and proposed land use

Land use zones and activities in the Water Reserve and Catchment Area are shown in Figure 5 and consist of:

- national park and other Crown reserves;
- various rural and semi-rural pursuits on land in private ownership;
- residential development; and
- recreation and tourism.

5.1 Crown land

The Torndirrup National Park covers a large proportion of the recharge area of the South Coast groundwater resource and the Limeburners Creek catchment. Torndirrup National Park provides opportunities for various forms of low impact recreation. The Bibbulmun Track passes through the South Coast Water Reserve. In addition, various other areas over the peninsula are zoned for Parks and Recreation.

The Albany Regional Prison is located within the South Coast Water Reserve.

Some sand extraction occurs on reserved land.

The Water Corporation's drinking water treatment plant is located within the South Coast Water Reserve.

A wind farm is proposed in the north western area of the Water Reserve. With appropriate management, this is an acceptable land use in the Priority 1 area.

5.2 Private land

5.2.1 Rural

Much of the land zoned Rural is used for equestrian pursuits.

Other major rural land use activities within the Water Reserve include horticulture and stock grazing. Horticultural activities are carried out particularly in the Racecourse, Prison and the northern part of the Sandpatch sub-areas. These areas are mostly cleared of vegetation and used for vegetable growing and beef farming. The former Shire of Albany's Local Rural Strategy identifies areas for protection of intensive agriculture. An area is located in the north west of the existing Water Reserve.

5.2.2 Residential

Along Princess Royal Harbour, land has been subdivided and zoned residential. Future residential development is expected to extend west and south along Princess Royal Harbour.

A conceptual plan for the Albany Wastewater system shows a wastewater pressure main from Goode Beach passing through the Little Grove area. This is a conditional land use in Priority 2.

5.2.3 Recreation and tourism

A range of recreation facilities are located on the peninsula. These include a golf course, rifle range, pony club, race course and motocross facility.

The area in and around the South Coast Water Reserve currently offers many popular tourist destinations. An increase in pressure for tourism developments such as bed and breakfast facilities and wildlife parks along the peninsula is already evident. Access to coastal tourist sites is also through the Water Reserve and Catchment Area.

6. Groundwater modelling

The existing Water Reserve boundary is based on general hydrogeological understanding of the groundwater source for the water supply production bores. The delineation predominantly follows cadastral boundaries. The Water and Rivers Commission has undertaken groundwater modelling of the South Coast Water Reserve area to refine the Water Reserve boundary. The modelling approach was considered necessary:

- to provide a scientifically based Water Reserve boundary that will sufficiently protect the public groundwater source from potential contamination;
- to address increasing pressures for development within the existing Water Reserve;
- to ensure areas not contributing to existing and future public water supply are excluded from the protection area; and
- to gain a greater understanding of the hydrogeology in the area.

6.1 Capture zone modelling of the existing water supply

The boundary of the proclaimed South Coast Water Reserve is based on a combination of hydrogeological knowledge of the groundwater source area for the production bores and cadastral boundaries. The boundary of the proclaimed Limeburners Creek Catchment Area is based on knowledge of the surface water source area and the topographical information available at the time of proclamation.

A study was undertaken to review the Water Reserve and Catchment Area boundaries to ensure they are based on rigorous scientific evidence. The Commission's study (Yu, 2000a) used the most up-to-

date data and internationally accepted groundwater modelling software to define the groundwater catchments for the groundwater scheme.

The area that contributes water to each production bore has been defined. This area is known as a capture zone. The amalgamation of the capture zone of each production bore forms the proposed Water Reserve boundary.

The boundary ensures that all recharge contributing to the public supply will be protected.

The modelling has also been used to re-evaluate the delineation of the Catchment Area boundary. The groundwater source area of the Limeburners Creek pipehead dam has been defined. The physical surface water catchment area of the Limeburners Creek pipehead dam has also been determined using the most up to date topographical information available. The groundwater source area is included within the physical catchment area. The proposed Catchment Area boundary is defined as the physical surface catchment of the Limeburners Creek pipehead dam.

6.2 Potential future water supply

The Water Corporation has identified an area of potential future water supply to the west north west of the existing wellfields. The identified area is within the area zoned Parks and Recreation (Fig 5) and is located within the proposed Water Reserve boundary. Modelling was not used to determine a protection boundary in this area as the Water Corporation is uncertain at this stage where future bores will be located.

7. Proposed proclaimed areas and priority classifications

7.1 Limeburners Creek Catchment Area

It is recommended that the existing Limeburners Creek Catchment Area and South Coast Water Reserve are abolished and the proposed Catchment Area and Water Reserve be gazetted under the *Country Areas Water Supply Act* 1947.

The proposed Limeburners Creek Catchment Area encompasses the hydrogeological and surface water catchment of the water supply source (Fig 7).

The proposed Limeburners Creek Catchment Area overlaps only a small portion of the proposed South Coast Water Reserve and should be classified for Priority 1 water source protection (Fig 7). The Priority 1 classification is justified, based on the following criteria:

- the source is strategic to the Albany water supply;
- the area represents the hydrogeological catchment of the pipehead dam; and
- the catchment is covered by the Torndirrup National Park and therefore land use is compatible with P1 protection objectives.

7.2 South Coast Water Reserve

The proposed South Coast Water Reserve encompasses the capture zones of existing public water supply bores and includes a portion of the existing Water Reserve to the north-west for protection of future water supply (Fig 8).

Given the range of land uses and zoning of the land, areas within the proposed Water Reserve should be classified for a combination of Priority 1, Priority 2 and Priority 3 water source protection. Figure 8 shows the recommended priority classification. The decision process used to determine the appropriate level of water source protection is shown in Appendix 2. It is considered this approach will strongly secure the key recharge areas in the Water Reserve while giving appropriate recognition to approved land use in other areas.

Figure 6 highlights the difference between the existing and proposed classifications. The areas shown are based on precincts identified in the current Local Rural Strategy. Table 1 is a discussion on the justification of each classification and considerations for land use planning.

Table 1. Discussion on justification of each priority classification and considerations for land use planning

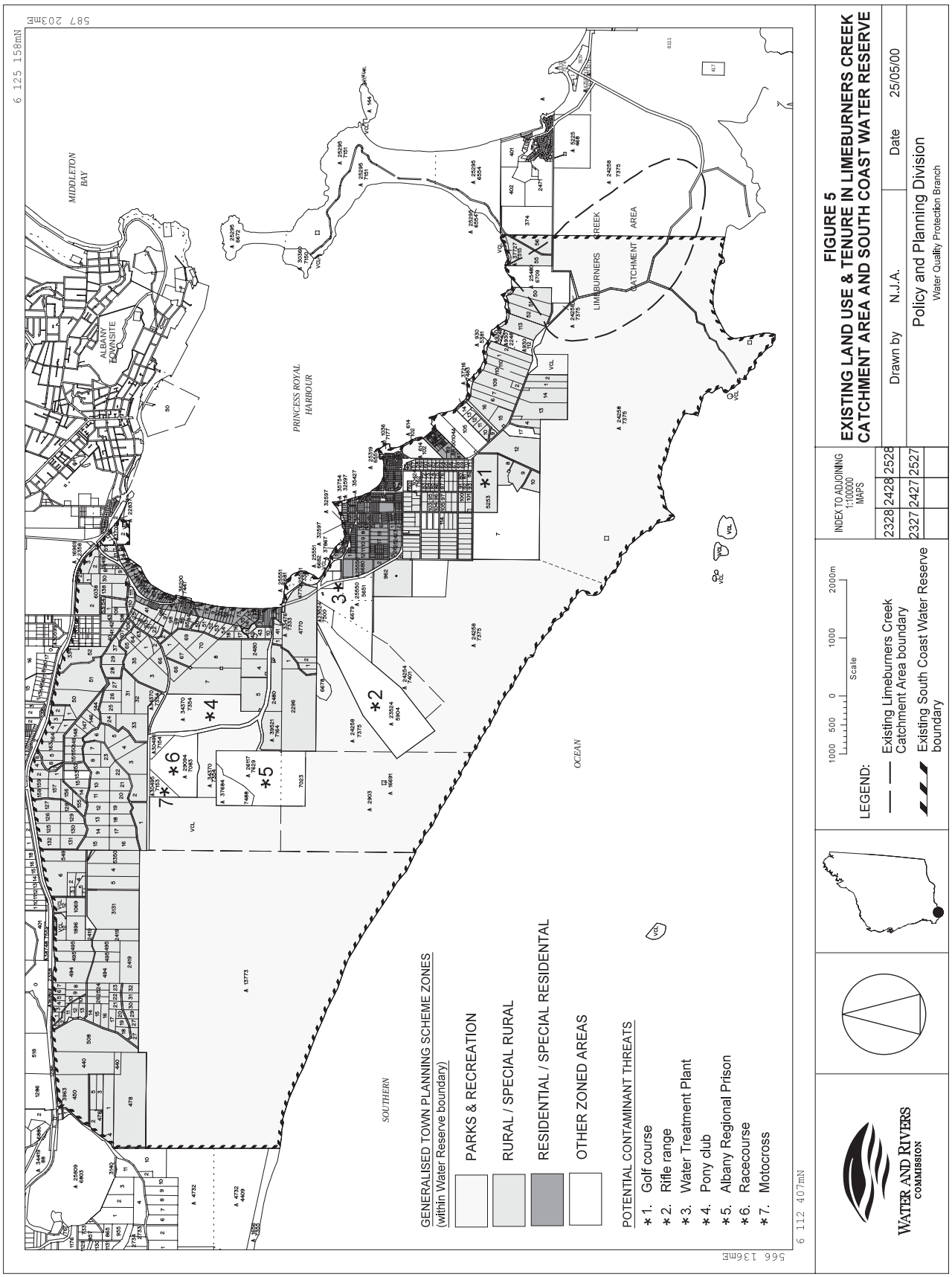
Area	Proposed priority classification	Justification for priority classification	Recommendations for land use planning
A	P1	• The area covers important recharge areas for the wellfield. • The land is zoned Parks and Recreation under the City of Albany's Town Planning Scheme and therefore land use is compatible with P1 protection objectives. • The area has an existing P1 classification.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P1 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
B	P1	• The area covers important recharge areas for the wellfield. • The land is in Government Reserve and therefore long-term land use should be compatible with P1 objectives. • The area has an existing P1 classification.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P1 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
C	P1	• The area covers important recharge areas for the wellfield. • The land is in Government Reserve and therefore long term land use should be compatible with P1 objectives. • The area has an existing P1 classification.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P1 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
D	P1	• The area overlies groundwater that is particularly vulnerable to contamination and is drawn into strategic, high yielding drinking water supply bores. • The area covers the most important recharge areas for the wellfield. • The area has an existing P1 classification.	• Current land use can continue. • No further subdivision. • Applications for new developments or extensions of existing developments should be consistent with the requirements of the current Conservation zoning.
E	P1	• The area overlies groundwater that is particularly vulnerable to contamination and is drawn into strategic, high yielding drinking water supply bores. • The area covers important recharge areas for the wellfield. • The area has an existing P1 classification.	• Current land use can continue. • Existing constraints to protect water quality should continue • No further subdivision. • To protect groundwater resources there is a need to encourage or retain existing vegetation and exclude stock. • There is a need to preclude intensive agriculture.

Table 1 continued

Area	Proposed priority classification	Justification for priority classification	Recommendations for land use planning
F	P1	• The area covers important recharge areas for the wellfield. • The land is in Government Reserve and therefore long-term land use should be compatible with P1 objectives. • The area has an existing P1 classification.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P1 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
G	P2	• The land is currently zoned Rural or Special Rural under the City of Albany's Town Planning Scheme and land uses are generally compatible with P2 protection objectives. • The area has an existing P2 classification. • The public water supply aquifer is vulnerable to contamination from overlying land uses. • Further expansion of intensive agriculture is controlled in some areas under the Local Rural Strategy. • Appropriate best management practices are employed on existing intensive agricultural properties.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P2 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
H	P2	• The land is currently zoned Rural or Special Rural under the City of Albany's Town Planning Scheme and land uses are generally compatible with P2 protection objectives. • The area has an existing P1 classification. • The land overlies groundwater that is vulnerable to contamination. • Both long-term water supply and private land use values are important and need to be recognised.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P2 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).

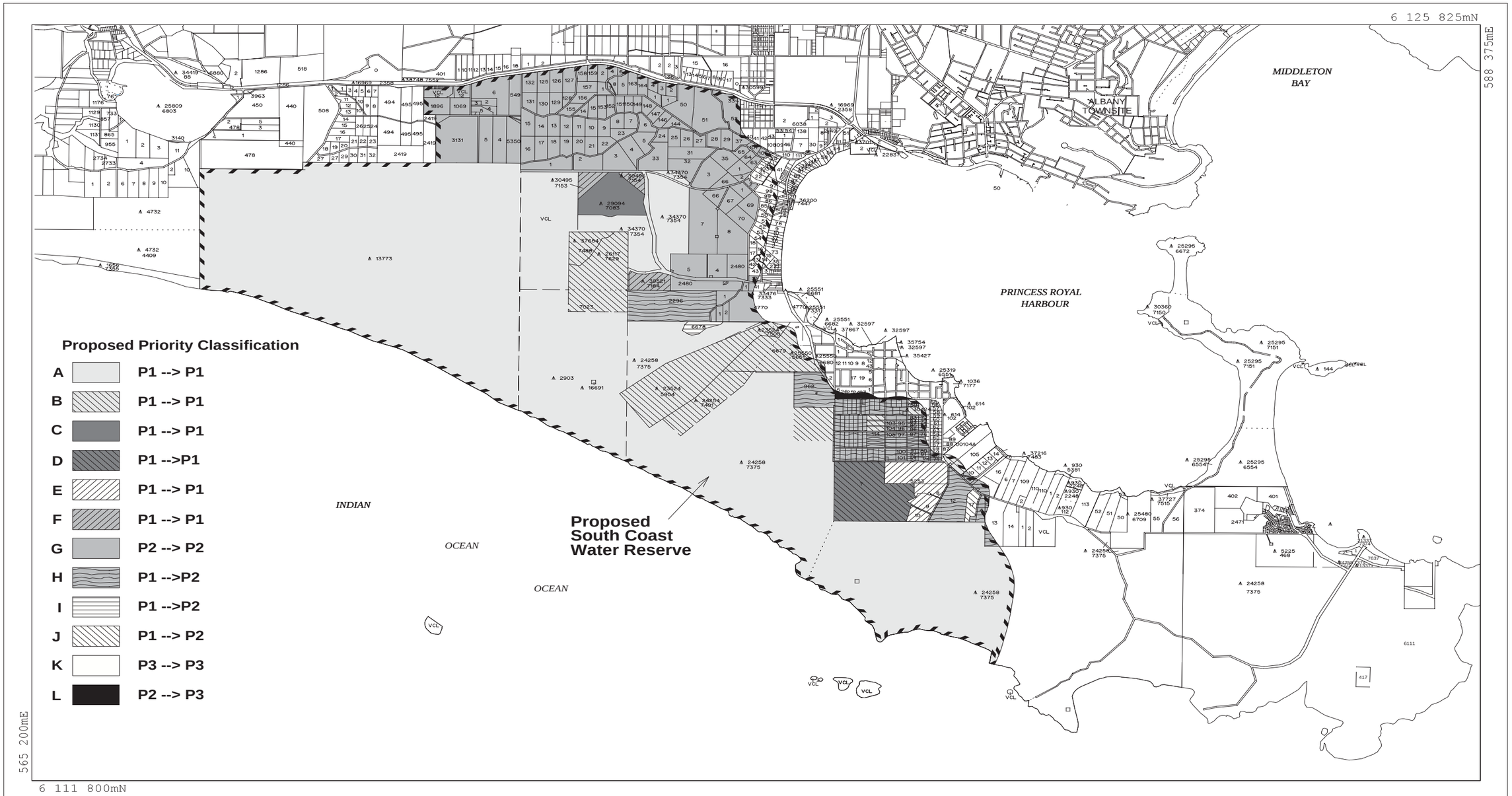
Table 1 continued

Area	Proposed priority classification	Justification for priority classification	Recommendations for land use planning
I	P2	• The land is currently zoned Rural under the City of Albany's Town Planning Scheme and land uses are generally compatible with P2 protection objectives. • The area has an existing P1 classification. • The land overlies groundwater that is vulnerable to contamination. • Both long-term water supply and private land use values are important and need to be recognised.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P2 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
J	P2	• The land is currently zoned Holiday Accommodation under the City of Albany's Town Planning Scheme and land uses are generally compatible with P2 protection objectives. • The area has an existing P1 classification. • The land overlies groundwater that is vulnerable to contamination. • Both long-term water supply and private land use values are important and need to be recognised.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P2 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
K	P3	• The land is zoned Rural under the City of Albany's Town Planning Scheme and land use is compatible with P3 protection objectives. • The area has an existing P3 classification. • Water quality may be degraded given the land use in the area.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P3 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).
L	P3	• The land is zoned Residential Development under the City of Albany's Town Planning Scheme and land use is compatible with P3 protection objectives. • The area has an existing P2 classification. • Water quality may be degraded given the land use in the area.	• Current land use can continue. • Applications for new developments or extensions of existing developments should be compatible with P2 objectives (refer to the Commission's *Land Use Compatibility in PDWSAs*).



Note: GIS Proj. ADG84, AMG Zone 50

Figure 5. Existing land use and tenure in Limeburners Creek Catchment Area and South Coast Water Reserve



Note: GIS Proj. ADG84, AMG Zone 50

Figure 6. Differentiation of proposed Priority classification areas

7.3 Wellhead protection zone (WHPZ)

Wellhead protection zones should be defined consisting of a 500 m radius around each bore in Priority 1 areas and a 300 m radius around each bore in Priority 2 and Priority 3 areas. These zones do not extend outside the boundary of the proposed Water Reserve.

8. The impact of water source protection planning

A newsletter was released in July 2000 to gain preliminary comment from landowners before preparing a draft plan. The consultation phase of the draft plan identified issues and concerns to be considered before the finalisation of the Water Source Protection Plan.

Specific issues raised following the release of *South Coast Water Reserve Community Newsletter No. 1* and *Draft South Coast Water Reserve and Limeburners Creek Catchment Area Water Source Protection Plan Albany Town Water Supply* have been considered and addressed in this plan.

General issues raised throughout the State regarding the impact of water source protection planning are addressed below.

8.1 Common areas of concern about the impact of water source protection planning

8.1.1 New restrictions on existing land uses

The Commission's water source protection planning recognises existing approvals and does not prohibit currently approved land use activities. In other words, landowners can continue to undertake currently approved land use activities. This may also be the case for activities that are considered incompatible with the assigned priority classification.

It is only when a landowner applies to the local authority to expand an existing operation or develop the land for a particular use that the Commission will provide advice to the local authority based on the activities that may be compatible with the relevant priority classification. This applies similarly to P1, P2 and P3 areas.

8.1.2 Compensation for development constraints

The issue of compensation is often raised through water source protection planning. The existing water source protection legislation, the *Country Areas Water Supply Act* 1947, does not contain any provision for compensation when a protection area is proclaimed.

Sometimes, because of the importance of the water source, land in private ownership may be designated for Priority 1 protection. Existing land use can continue in line with planning approvals and development proposals will be assessed in accordance with Priority 1 objectives.

Properties can also change ownership and existing approved land use can continue following transfer.

Landowners in Priority 1 areas may approach the Commission to consider the purchase of their property. Any purchase by the Commission is subject to the availability of funds and other priorities for purchase. Sales are negotiated on fair market value and resumptions of property are not undertaken.

8.2 Specific issues raised during consultation

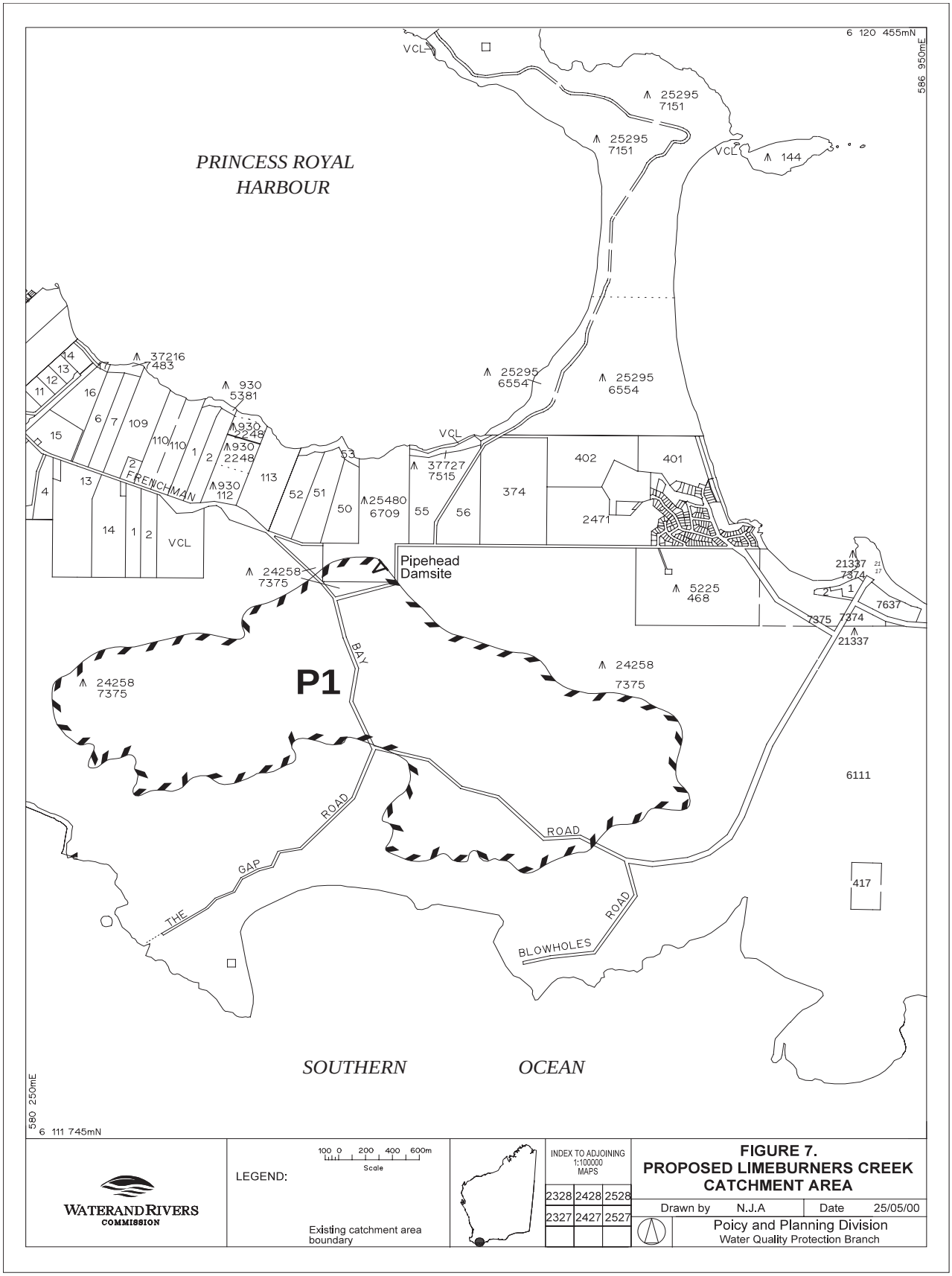
Community submissions from the release of *South Coast Water Reserve Community Newsletter No. 1* raised concern about three main issues. These are outlined in Table 2 along with the Commission's early consideration of the issues. Other issues and considerations for management are addressed in Table 1.

Table 2. Consideration of issues raised by consultation

Issue	Consideration	Recommendation
Part of Area H (along Humphrey Road) not proposed for P1 and Area E proposed for P1.	Area E is totally within the capture zones of strategic drinking water supply bores Sandpatch 15 and/or Sandpatch 18. Combined, these bores supply approximately 30% of the total water sourced from the Sandpatch wellfield. The area also overlies groundwater that is particularly vulnerable to contamination. While this part of Area H also overlies groundwater that is particularly vulnerable to contamination, the land is only partially within the capture zone of Sandpatch 15. Most of this part of Area H is within the capture zone of Sandpatch 16, which is a relatively low yielding bore. The Commission considered designating the portion of Area H within the capture zone of Sandpatch 15 as P1, but this was not considered appropriate for the following reasons: • capture zone boundaries are influenced by the intensity and timing of pumping from production bores and boundaries may vary in time within the protection area boundary. Therefore the definition of a firm hydraulic boundary between the P1 and P2 areas is not appropriate; and • the P2 classification provides a reasonable level of water source protection and ensures the risk of contamination is minimised, while giving a range of land use options to landowners.	Area E proposed P1. Area H proposed P2.
Part of Area G being an established horticultural area and not compatible with P2 protection.	Part of Area G has traditionally been used for horticulture. This area is also an important area for public drinking water source protection and has been proposed to remain a P2 protection area. Horticultural activities are considered incompatible with the protection objectives of P2. However, the Commission recognises the historical use of the area for horticulture. Under the proposed drinking water protection strategy, landowners will be able to: • continue horticultural operations in accordance with original approvals; and • change property ownership and continue the existing approved horticultural operation or any other land use compatible with P2 protection. Changing Area G to P3 is not appropriate as expanded horticulture, or other intensive land uses, could be established and pose a much increased risk to groundwater quality.	Area G proposed P2.

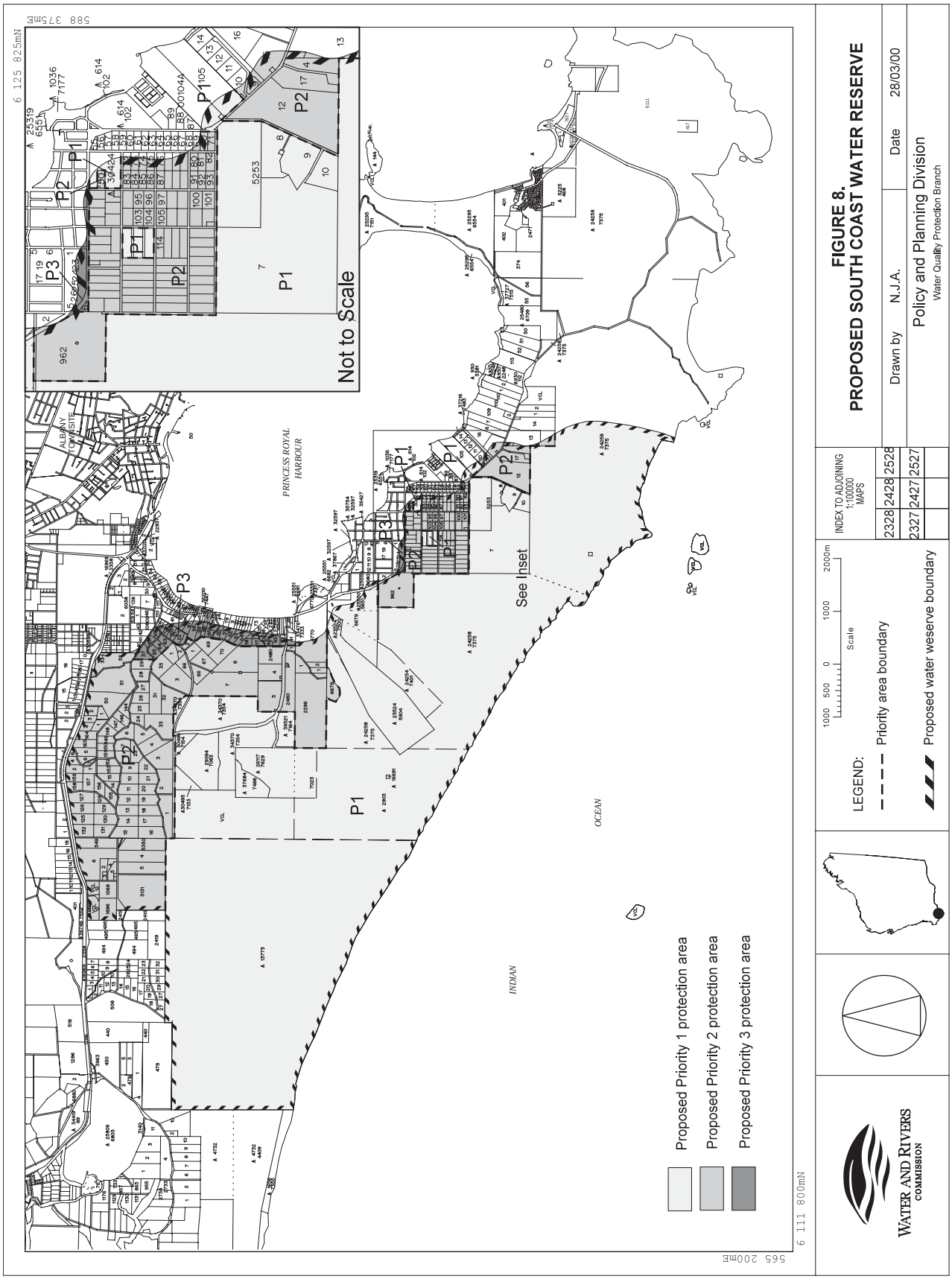
Table 2 continued

Issue	Consideration	Recommendation
Part of Area H (Princess Royal Harbour 5) proposed to change from P1 to P2. Submission considered it should be P3.	The area designated as Princess Royal Harbour (PRH) 5 in the City of Albany's Local Rural Strategy is part of Area H. This area is proposed to be re-classified from P1 to P2. Submissions received questioned why the area was not being proposed for P3 protection. Under the P2 classification the Commission would not oppose subdivision down to 2 ha (i.e. Special Rural zoning) provided conditions are in place to protect groundwater and the proposal is supported by the City of Albany. The Commission would support rezoning from Rural to Special Rural in this area. The Commission recognises that some properties within the area are as small as 1 hectare. A P3 classification is not supported as it would allow for further intensive development beyond the current land use risks which would pose an unacceptable increased risk of contamination to a strategic water resource. The Land Use Compatibility Table (Appendix 1) outlines the acceptability of land uses with P2 objectives. For example, bed and breakfast accommodation, farmstay accommodation and nurseries (potted plants) are not excluded by the P2 classification. Furthermore, current land uses such as residential retreats with limited stock numbers and no other agricultural activities are consistent with the P2 classification.	Area H proposed P2.
Provide more flexibility in the 300 m-Wellhead Protection Zones.	Wellhead Protection Zones are defined to protect the immediate area of the bore from land use activities that could potentially result in direct contamination. For example, storage of large quantities of fuel or chemicals (i.e. 5000 litres) would not be acceptable in Wellhead Protection Zones because if a tank was to burst, it is likely that fuel or chemicals could directly contaminate production bores. Generally, rural or special rural land uses would not be restricted by the Wellhead Protection Zone.	Defined Wellhead Protection Zones of 500 m in P1 and 300 m in P2.



Note: GIS Proj. ADG84, AMG Zone 50

Figure 7. Proposed Limeburners Creek Catchment Area



Note: GIS Proj. ADG84, AMG Zone 50

Figure 8. Proposed South Coast Water Reserve

9. Management of potential water quality risks

The objective of this plan is to protect these water sources in the interest of providing safe drinking water to Albany, however the rights of existing approved land uses to continue in the South Coast Water Reserve is recognised.

The existing priority classifications of the South Coast Water Reserve have been reviewed to ensure consistency with the Commission's current framework for public drinking water source protection. Some existing priority classifications have been modified to better reflect land tenure, land use and zoning, while maintaining an appropriate level of protection for the drinking water source.

The proposed water source protection planning for the area recognises the rights of landowners to continue established, approved land use activities. The Commission will encourage non-conforming land uses to adopt best management practices to minimise risk to water resources, through industry-based guidelines.

The proposed priority classifications will ensure future development within the South Coast Water Reserve is consistent with the objectives for water source protection in the area.

9.1 Potential water quality risks

Experience in Western Australia and overseas shows the link between groundwater quality and land uses in the catchment. Groundwater is a valuable resource which, if contaminated or polluted, is very expensive, and sometimes impossible, to clean up. Therefore it is essential that the activities with the lowest contamination risk occur above the most important groundwater sources.

In Western Australia, a large number of cities and towns rely on groundwater sources for public drinking water supply. In some country regions, groundwater is the sole water supply source for drinking purposes. These resources may also be limited in quantity and to ensure a continued water supply, appropriate water quality protection is required to avoid the source becoming polluted.

Sources of groundwater contamination are referred to as either point sources or diffuse sources. Point sources of contamination refer to cases where contamination is localised and is centred on one or more identifiable structures (e.g. sewage or effluent discharge). Diffuse sources of contamination refer to cases where contamination originates from a widespread area and cannot be ascribed to a sole source (e.g. agricultural runoff). Both point sources and diffuse sources of contamination are of comparable significance and concern, and may detrimentally affect the chemical and microbiological quality of groundwater.

A number of chemicals, both organic and inorganic, and some pesticides, are of concern in drinking water from a health perspective because some are toxic to humans and some are suspected of causing cancer (NHMRC & ARMCANZ, 1996). Nitrates are of particular concern if found in drinking water. The national guideline limit for nitrate in drinking water is 50 mg/L to protect bottle fed babies under 6 months of age.

The most common and widespread health risk associated with drinking water is contamination by human or animal excreta - either directly or indirectly with the micro-organisms contained in faeces. Drinking water should not contain organisms capable of causing disease.

There are a number of barriers in a water distribution system that may be put in place to ensure the safety of drinking water. The primary barrier is to protect against the risk of contamination in the first instance.

The Commission's priority classification system, associated water quality objectives and ultimate land use controls aim to avoid, minimise or manage the risk of groundwater contamination - depending on the vulnerability of the source to contamination, the strategic nature of the source and the existing land use in the area.

Groundwater quality monitoring of the source should recognise potential contamination risks from land use and ensure key characteristic parameters are included.

9.2 Best management practices

There are opportunities to significantly reduce risks to water quality by carefully considering site design and management practices. The adoption of best management practices for land use activities is encouraged to help protect water quality.

To assist the adoption of sound environmental practices, guidelines for specific industries are being progressively developed in conjunction with other agencies (e.g. Agriculture Western Australia and the Department of Environmental Protection) and the relevant peak industry body (e.g. Vegetable Growers Association). Examples include recently released dairy guidelines and viticulture guidelines. These guidelines incorporate a practical, commonsense approach to environmental management issues and are aimed at avoiding any unreasonable burden to the industry.

The Commission recommends these guidance documents to landowners and managers as best practice for water quality protection.

Education (e.g. signs and informative material) is a key strategy to highlight water quality protection measures to people.

On freehold land the Commission aims to inform landowners and managers on protection of public drinking water sources through environmental management guidelines and other informative material. The Commission recommends the use of best management practice for water quality protection through the provision of management advice.

9.3 Land use planning

Establishing appropriate protection mechanisms in statutory land use planning processes is essential to secure the long-term protection of water sources.

It is appropriate that the proposed Water Reserve and Catchment Area and priority classifications be recognised in the City of Albany's Local Rural Strategy and subsequently in the Town Planning Scheme.

The City of Albany have recognised the importance of the South Coast Water Reserve and the Local Rural Strategy is being revised based on the proposed changes to water quality protection within the South Coast Water Reserve (contact the City of Albany for further information).

9.4 Emergency response

Escape of chemicals during unforeseen incidents and use of chemicals during emergency response can cause groundwater contamination. The City of Albany's Local Emergency Management Advisory Committee, through the Albany Emergency Management District, should be familiar with the location and purpose of the Limeburners Creek Catchment Area and South Coast Water Reserve. A locality plan should be provided to the Fire and Rescue Services headquarters for the HAZMAT Emergency Advisory Team. The Water and Rivers Commission should have an advisory role to any HAZMAT incident in the Limeburners Creek Catchment Area or South Coast Water Reserve.

Personnel who deal with WESTPLAN-HAZMAT incidents within the area should be given ready access to a locality map of the Catchment Area and Water Reserve. These personnel should receive training to ensure an understanding of the potential impacts of spills on the groundwater resource.

9.5 Surveillance and by-law enforcement

The quality of public drinking water sources in country areas is protected by proclaiming Water Reserves and Catchment Areas under the *Country Areas Water Supply Act* 1947. Declaration of these areas allows by-laws to be established to protect water quality.

The Commission considers by-law enforcement, through on-ground surveillance of land use activities in

water supply catchments as an important water quality protection mechanism. Catchment surveillance, and subsequent contact with visitors to the catchment, is also important in raising the general level of awareness of the need to protect water quality.

Signs are erected in water supply catchments to advise of the catchment location, activities that are prohibited or regulated and other water quality protection measures.

9.6 Land use, potential water quality risks and recommended strategies

Table 3 details the existing land uses in the catchment and the potential water quality risks, and leads through a discussion to a recommended strategy for managing the risk.

The discussion and recommended strategies balance the need to protect water quality for the community in the long-term, with the rights of landowners to continue to utilise land for lawful purposes.

The location of these risks is illustrated in Figure 5.

Table 3. Land use, potential water quality risks and recommended strategies

Activity	Potential water quality risks	Consideration for management	Recommended protection strategies
Private land			
Equestrian pursuits	The potential water quality risks associated with this activity are nutrient and pathogen contamination from animal excreta.	Land use occurs in P2 protection areas. Keeping horses is a conditional activity within P2 areas and can be managed to meet water quality objectives. The area is an established equestrian area. Some properties may have stock densities greater than that consistent with P2 objectives.	*Acceptable activity with best management practice* • Develop and implement best management practice guidelines in consultation with peak industry bodies and operators. • Develop and implement development approval criteria with the City of Albany, recognising the P2 classification and the established equestrian activities. • Promote water quality protection best management practices with landowners.
Intensive agriculture	The potential water quality risks associated with this activity are nutrient and chemical contamination from the use of significant quantities of fertilisers and pesticides.	Land use poses a potential risk to water quality and occurs in P2 protection areas. Intensive agriculture is an incompatible land use in P2 areas. Landowners have the right to continue their current land use. Intensification of the land use in the P2 area is undesirable. The City of Albany's Local Rural Strategy identifies areas for future development of intensive agriculture outside of the proposed Water Reserve.	*Manage as non-conforming land use* • Landowners can continue current activities, with best management practices being encouraged. • Oppose intensification of land use through the planning approval process. • Support changes in land use within existing approvals that reduce groundwater contamination risks.
Urban residential development	The potential water quality risks associated with this activity are nutrient and pathogen contamination from household septics, nutrient and chemical contamination from the use of fertilisers and pesticides on gardens, and hydrocarbon contamination from fuel and oil storage and spills.	Land use occurs in P3 protection areas. Urban development is a conditional activity within P3 areas and can be managed to meet water quality objectives.	*Acceptable activity with controls such as connection to deep sewerage* • Ensure deep sewerage is made available to the area. • Ensure connection to deep sewerage through the planning approval process. • Limit lot sizes to 1 ha minimum in P3 areas where sewer is unavailable. This is consistent with the draft Country Sewerage Policy 1999. • Promote water quality protection.

Table 3 continued

Activity	Potential water quality risks	Consideration for management	Recommended protection strategies
Rural living in P1 areas	The potential water quality risks are nutrient and pathogen contamination from household septic tanks and gardens.	The area is strategic for drinking water supply. Landowners have the right to continue their current land use. Intensification of land use is undesirable. Proposed planning controls under the Local Rural Strategy and Town Planning Scheme adequately limit development and subdivision.	*Maintain existing planning controls* • Ensure the Local Rural Strategy and Town Planning Scheme adequately control development. • Encourage the operator to adopt best management practices. • Oppose intensification of land uses through land planning process. • Support changes within existing approvals that reduce groundwater contamination risks.
Rural/Special Rural areas	The potential water quality risks are nutrient and pathogen contamination from household septic tanks and gardens.	Some areas are subdivided to a density inconsistent with the water quality objectives. The proposed priority classification and associated controls under the Local Rural Strategy will ensure further subdivision is consistent with the water quality objectives. Some septic tanks are located within 100 m of production bores.	*Acceptable activity with controls* • Ensure the Local Rural Strategy and Town Planning Scheme adequately control development. • Promote water quality protection. • Evaluate the risks from existing septic tanks within 100 m of production bores.
Crown land			
Groundwater injection of wastewater from Albany Regional Prison	The potential water quality risks are nutrient and pathogen contamination from the Prison's wastewater disposal site. The pipeline passes through the Prison wellfield and there is the risk of contamination from possible leaks or breakages.	Land use poses a potential risk to water quality of new production bores and is located within a P1 protection area. The hydrogeology of the area suggests that the risk of water contamination is minimal, however wastewater disposal is an incompatible land use in P1 areas. Of greater concern is the potential for groundwater contamination due to leakage from the pipeline that transfers wastewater through the Prison wellfield to the disposal site. The waste disposal is registered with the Department of Environmental Protection.	*Manage as non-conforming land use* • Ensure appropriate management controls and monitoring of the wastewater disposal system (including the pipeline) is in place. • Ensure the Prison is connected to deep sewerage when available in the area. • Evaluate other potential risks (i.e. fuel or chemical storage).

Table 3 continued

Activity	Potential water quality risks	Consideration for management	Recommended protection strategies
Water Corporation's drinking water treatment plant	The potential water quality risks are chemical and hydrocarbon contamination from the storage of chemicals and fuels.	Land use occurs in a P1 protection area. Water treatment plants are a conditional land use within P1 areas and can be managed to meet water quality objectives.	*Acceptable activity with best management practice* • Ensure compliance with the Commission's *Water Quality Protection Note : Toxic and Hazardous Substances in PDWSAs*.
Extractive industries	The potential water quality risks are hydrocarbon contamination from the storage of fuels, nutrient and pathogen contamination from waste disposal systems and the loss of water through evaporation and inappropriate rehabilitation.	Land use activity occurs within P1 protection areas. Extractive industries are a conditional land use within P1 areas and can be managed to meet water quality objectives.	*Acceptable activity with written approval* • Ensure compliance with the Commission's *Statewide Policy No. 1 : Policy and Guidelines for Construction and Silica Sand Mining in Public Drinking Water Source Areas* and *Water Quality Protection Note: Extractive Industries within Public Drinking Water Source Areas*.
Recreation			
Golf course	The potential water quality risks are nutrient contamination from the use of fertilisers, and chemical contamination from the use of pesticides and storage of diesel for use on greens.	The area is strategic for drinking water supply. Landowners have the right to continue their current land use. Intensification of land use is undesirable. .	*Manage as non-conforming land use* • Ensure the Local Rural Strategy and Town Planning Scheme adequately control development. • Encourage the operator to adopt best management practices. • Oppose expansion of facility that increases groundwater contamination risks, through land planning process.
Pony club	The potential water quality risks are nutrient and pathogen contamination from animal excreta.	Land use occurs on Reserve vested with the City of Albany in a P1 protection area. Pony clubs are an incompatible land use in P1 areas. The current land use can continue, however expansion that increases the risk of groundwater contamination will be opposed.	*Manage as non-conforming land use* • Ensure conditions of lease incorporate water quality protection measures. • Encourage the operator to adopt best management practices. • Oppose expansion of facility that increases groundwater contamination risks, through land planning process.

Table 3 continued

Activity	Potential water quality risks	Consideration for management	Recommended protection strategies
Race course	The potential water quality risks are nutrient and pathogen contamination from septics and animal excreta.	Land use occurs on Reserve vested with the City of Albany in a P1 protection area. Race courses are an incompatible land use in P1 areas.	*Manage as non-conforming land use* • Ensure conditions of lease incorporate water quality protection measures. • Encourage the lessee to adopt best management practices. • Oppose intensification of facility that increases groundwater contamination risks, through land planning process.
Motocross	The potential water quality risks are hydrocarbon contamination from fuel storage and spills.	Land use occurs on Reserve vested with the City of Albany in a P1 protection area. Motocross facilities are an incompatible land use in P1 areas.	*Manage as non-conforming land use* • Ensure conditions of lease incorporate water quality protection measures. • Encourage the lessee to adopt best management practices. • Oppose intensification of facility that increases groundwater contamination risks, through land planning process.
Rifle range	The potential water quality risks are nutrient and pathogen contamination from septics and heavy metal contamination from lead.	Land use occurs on Reserve in a P1 protection area. Rifle ranges are an incompatible land use in P1 areas.	*Manage as non-conforming land use* • Ensure conditions of lease incorporate water quality protection measures. • Encourage the lessee to adopt best management practices. • Oppose intensification of facility that increases groundwater contamination risks, through land planning process.

Recommendations

1. The existing Lake Seppings Catchment Area, Limeburners Creek Catchment Area and South Coast Water Reserve should be abolished and the proposed Limeburners Creek Catchment Area and proposed South Coast 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 *Land Use Compatibility in Public Drinking Water Source Areas* (Appendix 1) and reflect the Priority 1 classification given to the Catchment Area and the Priority 1, Priority 2 and Priority 3 classifications given to the Water Reserve.

3. All development proposals in the proposed Catchment Area and Water Reserve that are likely to impact on water quality should be referred to the Water and Rivers Commission.

4. Signs should be erected to define the protection areas and promote public awareness of the need to protect water quality. Signs erected on CALM-managed land and along the Bibbulman Track should conform with CALM signage standards.

5. Incidents covered by WESTPLAN–HAZMAT in the Limeburners Creek Catchment Area and the South Coast Water Reserve should be addressed through the following measures:

- The Local Emergency Management Advisory Committee (through the Albany Emergency Management District) being familiar with the location and purpose of the Limeburners Creek Catchment Area and South Coast Water Reserve;
- The locality plan for the Limeburners Creek Catchment Area and South Coast Water Reserve being provided to the Fire and Rescue Services headquarters for the HAZMAT Emergency Advisory Team;
- The Water and Rivers Commission advising the HAZMAT Emergency Advisory Team during incidents in the Limeburners Creek Catchment Area and South Coast Water Reserve; and
- Personnel dealing with WESTPLAN-HAZMAT incidents in the area given ready access to a locality map of the Catchment Area and Water Reserve and training to understand the potential impacts of spills on the groundwater resource.

6. A surveillance and by-law enforcement program should be established to identify any incompatible land uses or potential contaminant threats within the proposed Catchment Area and Water Reserve. The responsibility of surveillance and by-law enforcement for South Coast Water Reserve is delegated to the Water Corporation. Limeburners Creek Catchment Area should also be delegated to the Water Corporation.

7. Review the groundwater quality monitoring program of production wells to ensure key characteristic parameters are included. Routinely review water quality analysis results to detect any increasing trends.

8. The strategies detailed in Table 2 *Land use, potential water quality risks and recommended strategies* should be adopted.

9. Implementation of these recommendations should be reviewed annually. A full review of this protection plan should be undertaken after five years.

Implementation strategy

No	Description	Implemented by	Timing
1.	Gazettal of Catchment Area and Water Reserve.	Program Manager, Protection Planning (WRC).	2000-01
2.	Incorporation into land planning strategies.	City of Albany.	ongoing
3.	Referral of development proposals: (i) WRC to provide the City of Albany with guidelines for referral of development proposals. (ii) referral of development proposals.	(i) Program Manager, Protection Planning (WRC) (ii) Shire of Albany, Ministry for Planning, Department of Environmental Protection and Department of Minerals and Energy.	(i) 2000-01 (ii) ongoing
4.	Erection of signs: (i) develop guidelines for signage. (ii) determine number and location of signs required. (iii) erect and maintain signs.	(i) Program Manager, Protection Planning. (ii) Regional Manager, South Coast Region (WRC), Regional Business Manager WC. (iii) Regional Manager, South Coast Region (WRC), Regional Business Manager WC.	(i) 2000-01 (ii) 2000-01 (iii) to be determined

(contd)

No	Description	Implemented by	Timing
5.	Incidents covered by WESTPLAN–HAZMAT in the Limeburners Creek Catchment Area and South Coast Water Reserve should be addressed through the following measures:		
	(i) the Local Emergency Management Advisory Committee (through the Albany Emergency Management District) being familiar with the location and purpose of the Catchment Area and Water Reserve;	(i) Local Emergency Management Advisory Committee (through WRC South Coast Region).	(i) 2000-01
	(ii) the locality plan for the Catchment Area and Water Reserve being provided to the Fire and Rescue Services headquarters for the HAZMAT Emergency Advisory Team;	(ii) WRC (South Coast Region).	(ii) 2000-01
	(iii) the Water and Rivers Commission advising the HAZMAT Emergency Advisory Team during incidents in the Catchment Area and Water Reserve; and	(iii) WRC (South Coast Region).	(iii) ongoing
	(iv) personnel dealing with WESTPLAN-HAZMAT incidents in the area given ready access to a locality map of the Catchment Area and Water Reserve and training to understand the potential impacts of spills on the groundwater resource.	(iv) Local Emergency Management Advisory Committee.	(iv) ongoing
6.	Surveillance and by-law enforcement program:		
	(i) delegate surveillance and by-law enforcement of Limeburners Creek Catchment Area to Water Corporation.	(i) Water and Rivers Commission.	(i) 2000-01
	(ii) implement the surveillance program.	(ii) Water Corporation.	(ii) ongoing

(contd)

No	Description	Implemented by	Timing
7.	Water quality monitoring program:		
	(i) review the monitoring program for production bores as per the recommendations.	(i) Water Corporation.	(i) ongoing
	(ii) review results and advise WRC of any adverse trends or results.	(ii) Water Corporation.	(ii) as required
	(iii) determine action on any adverse results.	(iii) Water and Rivers Commission and Water Corporation.	(iii) as required
8a.	Equestrian pursuits in Priority 2 areas:		
	(i) develop and implement best management practices.	(i) WRC, in consultation with AGWEST and peak industry bodies and operators.	(i) 2000-01
	(ii) develop and implement development approval criteria.	(ii) WRC in consultation with City of Albany.	(ii) 2000-01
	(iii) promote water quality protection best management practice.	(iii) WRC (South Coast Region).	(iii) 2000-01
8b.	Existing intensive agricultural developments in Priority 2 areas:		
	(i) minimise adverse impacts on the groundwater source through implementation of best management practices.	(i) WRC (South Coast Region), in consultation with AGWEST and landowners.	(i) ongoing
8c.	Urban residential development:		
	(i) existing and new residential development within the Water Reserve should be connected to deep sewerage.	(i) Water Corporation.	(i) ongoing
	(ii) promote and inform landowners on water quality protection.	(ii) WRC (South Coast Region)	(ii) ongoing

(contd)

No	Description	Implemented by	Timing
8d.	Rural living: (i) ensure Local Rural Strategy and Town Planning Scheme recognise the drinking water protection strategy.	(i) Water and Rivers Commission and City of Albany.	(i) 2000-01
8e.	Special Rural areas: (i) promote and inform landowners on water quality protection. (ii) evaluate the risks to water quality from existing septic tanks within 100 m of production bores.	(i) WRC (South Coast Region). (ii) WRC (South Coast Region and Water Quality Protection Branch).	(i) ongoing (ii) 2001-02
8f.	Albany prison: (i) ensure appropriate controls and monitoring of wastewater disposal are in place. (ii) the prison should be connected to deep sewerage. (iii) evaluate other potential risks.	(i) WRC (South Coast Region). (ii) Water Corporation in consultation with prison management. (iii) WRC (South Coast Region).	(i) 2000-01 (ii) when sewerage is made available in the area (iii) 2000-01
8g.	Water treatment plant: (i) review chemical storage and security at the facility to ensure compliance with *Water Quality Protection Note : Toxic and Hazardous Substances in PDWSAs*.	(i) WRC (South Coast Region), in consultation with Water Corporation.	(i) 2000-01

(contd)

No	Description	Implemented by	Timing
8h.	Extractive industries: (i) review activities occurring within the Water Reserve to ensure compliance with *Statewide Policy No. 1 : Policy and Guidelines for Construction and Silica Sand Mining in PDWSAs*. (ii) apply policy and guidelines in future approvals.	(i) WRC (South Coast Region), in consultation with industry management. (ii) WRC (South Coast Region), City of Albany, Department of Minerals and Energy.	(i) 2000-01 (ii) ongoing
8i.	Golf course: (i) ensure the Local Rural Strategy and Town Planning Scheme adequately control development. (ii) review current management practices and encourage implementing best management practices.	(i) Water and Rivers Commission. (ii) WRC (South Coast Region), in consultation with facility management.	(i) 2000-01 (ii) 2000-01
8j.	Pony club: (i) review current lease conditions and include appropriate water quality protection measures. (ii) review current management practices and encourage implementing best management practices.	(i) City of Albany, in consultation with WRC (South Coast Region). (ii) WRC (South Coast Region), in consultation with the City of Albany and lessee.	(i) to be determined (ii) ongoing

(contd)

No	Description	Implemented by	Timing
8k.	Race course: (i) review current lease conditions and include appropriate water quality protection measures. (ii) review current management practices and encourage implementing best management practices.	(i) City of Albany, in consultation with WRC (South Coast Region). (ii) WRC (South Coast Region), in consultation with the City of Albany and lessee.	(i) to be determined (ii) ongoing
8l.	Motocross: (i) review current lease conditions and include appropriate water quality protection measures. (ii) review current management practices and encourage implementing best management practices.	(i) City of Albany, in consultation with WRC (South Coast Region). (ii) WRC (South Coast Region), in consultation with the City of Albany and lessee.	(i) to be determined (ii) ongoing
8m.	Rifle range: (i) review current lease conditions and include appropriate water quality protection measures. (ii) review current management practices and encourage implementing best management practices.	(i) City of Albany, in consultation with WRC (South Coast Region). (ii) WRC (South Coast Region), in consultation with the City of Albany and lessee.	(i) to be determined (ii) ongoing
9.	Review of this plan and recommendations: (i) review implementation strategy annually. (ii) full review after 5 years.	(i) Water Quality Protection Branch (WRC). (ii) Water Quality Protection Branch (WRC).	(i) 2001-02 (initial review) (ii) 2005-06 (full review)

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Glossary

Abstraction	Pumping groundwater from an aquifer.
Allocation	The quantity of groundwater permitted to be abstracted by a well licence, usually specified in kilolitres/year (kL per year).
Alluvium (alluvial)	Detrital material which is transported by streams and rivers and deposited.
Aquifer	A geological formation or group of formations able to receive, store and transmit significant quantities of water.
Bore	A narrow, lined hole drilled to monitor or withdraw groundwater.
Capture Zone	An area contributing groundwater flow to public water supply bores.
Catchment	The area of land which intercepts rainfall and contributes the collected water to surface water (streams, rivers, wetlands) or groundwater.
Confined Aquifer	An aquifer that is confined between shale and siltstone beds and therefore contains water under pressure.
Diffuse Source Pollution	Pollution originating from a widespread area, e.g. urban stormwater runoff, agricultural runoff.
Effluent	The liquid, solid or gaseous wastes discharged by a process, treated or untreated.
Groundwater	Water which occupies the pores and crevices of rock or soil.
Hydrogeology	The study of groundwater, especially relating to the distribution of aquifers, groundwater flow and groundwater quality.
Leaching / Leachate	The process by which materials such as organic matter and mineral salts are washed out of a layer of soil or dumped material by being dissolved or suspended in percolating rainwater; the material washed out is known as leachate. Leachate can pollute groundwater and waterways.
m AHD	Australian Height Datum. Height in metres above Mean Sea Level +0.026 m at Fremantle.
Nutrient Load	The amount of nutrient reaching the waterway over a given time (usually per year) from its catchment area.

Nutrients	Minerals dissolved in water, particularly inorganic compounds of nitrogen (nitrate and ammonia) and phosphorus (phosphate), which provide nutrition (food) for plant growth. Total nutrient levels include the inorganic forms of an element plus any bound in organic molecules.
Pesticides	Collective name for a variety of insecticides, fungicides, herbicides, algicides, fumigants and rodenticides used to kill organisms.
Point Source Pollution	Specific localised source of pollution, e.g. sewage or effluent discharge, industrial waste discharge.
Pollution	Water pollution occurs when waste products or other substances, e.g. effluent, litter, refuse, sewage or contaminated runoff, change the physical, chemical, biological or thermal properties of the water, adversely affecting water quality, living species and beneficial uses.
Public Drinking Water Source Area	Catchment Areas, Water Reserves and Underground Water Pollution Control Areas proclaimed under the *Metropolitan Water Supply Sewerage and Drainage Act 1909* or the *Country Areas Water Supply Act* 1947.
Recharge	Water infiltrating to replenish an aquifer.
Recharge Area	An area through which water from a groundwater catchment percolates to replenish (recharge) an aquifer. An unconfined aquifer is recharged by rainfall throughout its distribution. Confined aquifers are recharged in specific areas where water leaks from overlying aquifers, or where the aquifer rises to meet the surface.
Runoff	Water that flows over the surface from a catchment area, including streams.
Saltwater Intrusion	The inland intrusion of saltwater into a layer of fresh groundwater.
Scheme Supply	Water diverted from a source (or sources) by a water authority or private company and supplied via a distribution network to customers for urban, industrial or irrigation use.
Stormwater	Rainwater which has runoff the ground surface, roads, paved areas etc, and is usually carried away by drains.
Treatment	Application of techniques such as settlement, filtration and chlorination to render water suitable for specific purposes including drinking and discharge to the environment.
Unconfined Aquifer	An aquifer containing water, the upper surface of which is lower than the top of the aquifer. The upper surface of the groundwater within the aquifer is called the watertable.
Wastewater	Water that has been used for some purpose and would normally be treated and discarded. Wastewater usually contains significant quantities of pollutant.
Watertable	The upper saturated level of the unconfined groundwater.
Wellfield	A group of bores to monitor or withdraw groundwater.
WESTPLAN – HAZMAT	Statewide protocols for emergency response incidents.

Appendices

Appendix 1. Land use compatibility in Public Drinking Water Source Areas
Appendix 2. Priority classification decision process
Appendix 3. Extractive industries within Public Drinking Water Source Areas
Appendix 4. Toxic and chemical storage in Public Drinking Water Source Areas

Appendix 1. Land use compatibility in Public Drinking Water Source Areas

LAND USE COMPATIBILITY IN PUBLIC DRINKING WATER SOURCE AREAS

Purpose

These notes provide the Commission's views on practices and activities related to the quality of the State's water resources. They are recommendations only, and may be varied at the discretion of the Commission.

The notes provide a basis for developing formal guidelines in consultation with key stakeholders.

Scope

These notes apply to land use within Public Drinking Water Source Areas (PDWSAs).

PDWSAs include Underground Water Pollution Control Areas, Water Reserves and public water supply Catchment Areas declared under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909*, and the *Country Areas Water Supply Act 1947*.

The notes are not intended to override the statutory role and policy of other State or local government authorities. Project proponents will need to fulfil their legal responsibilities including those covering land use planning, environmental, health and building permit matters.

PDWSA Protection Framework

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission has policies for the protection of public drinking water source areas that include three levels of priority classification of lands within PDWSAs.

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.

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. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of **risk minimisation** and so conditional development is allowed.

Priority 3 (P3) source protection areas are defined to **manage the risk of pollution** to the water source. P3 areas are declared over land where water supply sources need to co-exist with other land uses such as residential, commercial and light industrial developments.

Protection of P3 areas is achieved through **management guidelines** for land use activities. If the water source does become contaminated, then water may need to be treated or an alternative water source found.

In addition to priority classifications, **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 buffer area around the top water level of a reservoir and include the reservoir itself. These zones do not extend outside water reserves. Special conditions apply within these zones.

Tables showing land use compatibility with the Commission's PDWSA protection strategy

These tables should be used as a guideline only. More detailed information on the Commission's requirements in the form of activity guidelines or notes is available for some land uses. These can be found on the 'Protecting Water' web page on the Commission's Internet site (www.wrc.wa.gov.au). Alternatively information relating to land use and development within PDWSAs, including those not listed in the tables, can be obtained from the Commission's Water Quality Protection Branch.

The Commission recognises that many activities were established before the introduction of these tables. The Commission will negotiate with the operators of such activities to develop appropriate management practices to minimise the impact on water resources.

These tables do not replace the need for activity assessment by the Commission. Please consult the Commission for advice on any land use proposals in Public Drinking Water Source Areas that may impact on water resources.

Definitions used in the following tables

Compatible	The land use is compatible with the management objectives of the priority classification.
Conditional	The land use can be compatible with the management objectives of the priority classification, with appropriate site management practices. All conditional developments / activities should be referred to the Commission for assessment on a case specific basis.
Incompatible	The land use is incompatible with the management objectives of the priority classification. Any such development proposals received may be referred for formal Environmental Impact Assessment under Environmental Protection Act,
Extensive	Where limited additional inputs are required to support the desired land use, e.g. supplementary animal feed only during seasonal dry periods.
Intensive	Where regular additional inputs are required to support the desired land use, e.g. irrigation, fertilisers and non-forage animal feed dominates.

More information

We welcome your comment on these notes. They will be updated from time to time as comments are received or activity standards change. The Commission is progressively developing Water Quality Protection

Notes and Guidelines covering land uses described in the following tables. Advice on available guidance documents may be obtained by contacting the Commission.

If you wish to comment on the notes or require more information, please contact the Commission's Water Quality Protection Branch at the Hyatt Centre in East Perth.
Phone: (08) 9278 0300 (business hours) or Fax:(08) 9278 0585.
E-mail: use the {feedback} section at our Internet address (http://www.wrc.wa.gov.au) citing the topic and version.

Tables showing land use compatibility with PDWSA protection objectives

AGRICULTURE - ANIMALS

Land use	Priority 1	Priority 2	Priority 3
Animal saleyards and stockyards[14]	Incompatible	Incompatible[7]	Conditional[7]
Apiaries on Crown land	Conditional	Conditional	Conditional
Aquaculture e.g. crustaceans, fish, algae	Incompatible	Conditional	Conditional
Dairy sheds	Incompatible	Incompatible[11,15]	Conditional[15]
Feedlots	Incompatible	Incompatible	Conditional
Livestock grazing - pastoral leases	Conditional	Compatible	Compatible
Livestock grazing - broad acre (extensive)	Incompatible	Conditional[11]	Compatible
Livestock grazing (intensive)	Incompatible	Incompatible	Conditional[11]
Piggeries	Incompatible	Incompatible	Incompatible
Poultry farming (housed)	Incompatible	Conditional	Conditional
Stables	Incompatible	Conditional	Compatible

AGRICULTURE - PLANTS

Land use / practices	Priority 1	Priority 2	Priority 3
Broad land cropping i.e. non-irrigated	Incompatible	Conditional[1]	Compatible
Floriculture (extensive)	Incompatible	Conditional	Compatible
Floriculture (intensive)	Incompatible	Incompatible	Conditional
Horticulture- hydroponics	Incompatible	Conditional	Conditional
Horticulture - market gardens	Incompatible	Incompatible	Conditional
Orchards	Incompatible	Conditional	Compatible
Nurseries (potted plants)	Incompatible	Conditional	Compatible
Silviculture (tree farming)	Conditional	Conditional	Compatible
Soil amendment (clean sand, loam, clay, peat)	Incompatible	Conditional	Compatible
Soil amendment (industry byproducts & biosolids),	Incompatible	Incompatible	Conditional
Turf farms	Incompatible	Incompatible	Conditional
Viticulture (wine & table grapes)	Incompatible	Conditional	Compatible

DEVELOPMENT - COMMERCIAL

Land use	Priority 1	Priority 2	Priority 3
Aircraft servicing	Incompatible	Incompatible	Conditional[6]
Airports or landing grounds	Incompatible	Incompatible	Conditional[6]
Amusement centres	Incompatible	Incompatible	Compatible[6]
Automotive businesses	Incompatible	Incompatible	Conditional[6]
Boat servicing	Incompatible	Incompatible	Conditional[6]
Catteries	Incompatible	Compatible	Compatible
Caravan and trailer hire	Incompatible	Incompatible	Conditional[6]
Chemical manufacture / formulation	Incompatible	Incompatible	Conditional[6]
Consulting rooms	Incompatible	Incompatible[7]	Compatible[6]
Concrete batching and cement products	Incompatible	Incompatible	Conditional
Cottage Industries	Conditional	Conditional	Compatible
Dog kennels	Incompatible	Conditional	Conditional

Land use	Priority 1	Priority 2	Priority 3
Drive in / take-away food shops	Incompatible	Incompatible	Compatible[6]
Drive -in theatres	Incompatible	Incompatible	Compatible[6]
Dry cleaning premises	Incompatible	Incompatible	Conditional[6]
Dye works	Incompatible	Incompatible	Conditional[6]
Farm supply centres	Incompatible	Incompatible[7]	Conditional
Fertiliser manufacture / bulk storage depots	Incompatible	Incompatible	Conditional
Fuel depots	Incompatible	Incompatible	Conditional
Garden centres	Incompatible	Incompatible	Compatible
Laboratories (analytical , photographic)	Incompatible	Incompatible	Conditional[6]
Markets	Incompatible	Incompatible	Compatible[6]
Mechanical servicing	Incompatible	Incompatible	Conditional[6]
Metal production / finishing	Incompatible	Incompatible	Incompatible
Milk transfer depots	Incompatible	Incompatible	Conditional
Pesticide operator depots	Incompatible	Incompatible	Incompatible
Restaurants and taverns	Incompatible	Incompatible	Compatible[6]
Service stations	Incompatible	Incompatible	Conditional[6]
Shops and shopping centres	Incompatible	Incompatible[7]	Compatible[6]
Transport & municipal works depots	Incompatible	Incompatible	Conditional
Vehicle parking (commercial)	Incompatible	Incompatible	Compatible
Vehicle wrecking and machinery	Incompatible	Incompatible	Conditional
Veterinary clinics / hospitals	Incompatible	Incompatible[7]	Conditional[6]
Warehouses	Incompatible	Incompatible[7]	Conditional[6]

DEVELOPMENT - INDUSTRIAL

Land use	Priority 1	Priority 2	Priority 3
Heavy industry	Incompatible	Incompatible	Incompatible
Light or general industry	Incompatible	Incompatible	Conditional[6]
Power stations / gasworks	Incompatible	Incompatible	Incompatible
Petroleum refineries	Incompatible	Incompatible	Incompatible

DEVELOPMENT - URBAN

Land use	Priority 1	Priority 2	Priority 3
Aged and dependent persons group dwellings	Incompatible	Incompatible	Compatible[6]
Cemeteries	Incompatible	Incompatible	Conditional
Civic buildings	Incompatible	Conditional[7]	Compatible[6]
Clubs -sporting or recreation	Incompatible	Conditional	Compatible[6]
Community halls	Incompatible	Conditional[7]	Compatible
Family day care centres	Incompatible	Incompatible[7]	Compatible[6]
Funeral parlours	Incompatible	Incompatible	Compatible[6]
Health centres	Incompatible	Incompatible	Compatible[6]
Hospitals	Incompatible	Incompatible	Conditional[6]
Medical, veterinary, dental centres	Incompatible	Incompatible	Compatible[6]
Toilet blocks and change rooms	Incompatible[7]	Conditional	Compatible

EDUCATION / RESEARCH

Land use	Priority 1	Priority 2	Priority 3
Community education centres	Conditional[7]	Conditional[7]	Compatible[6]
Primary / secondary schools	Incompatible	Incompatible	Compatible[6]
Scientific research	Conditional	Conditional	Compatible
Tertiary education facilities	Incompatible	Incompatible	Conditional[6]

EXPLORATION, MINING AND MINERAL PROCESSING

Land use	Priority 1	Priority 2	Priority 3
Extractive industries (sand, clay, peat and rock)	Conditional[2]	Conditional[2]	Conditional[2]
Mineral and energy source exploration	Conditional[4]	Conditional[4]	Conditional[4]
Mining	Conditional[4]	Conditional[4]	Conditional[4]
Mineral processing	Incompatible	Incompatible	Conditional[4]
Oil or gas extraction / decontamination for transport	Conditional[4]	Conditional[4]	Conditional[4]
Tailings dams	Incompatible	Incompatible	Conditional[4]

PROCESSING OF ANIMALS / ANIMAL PRODUCTS

Land use	Priority 1	Priority 2	Priority 3
Animal product rendering works	Incompatible	Incompatible	Incompatible
Abattoirs	Incompatible	Incompatible	Incompatible
Dairy product factories	Incompatible	Incompatible	Conditional[6]
Food processing	Incompatible	Incompatible	Conditional[6]
Manure stockpiling /processing facilities	Incompatible	Incompatible[7]	Conditional
Tanneries	Incompatible	Incompatible	Incompatible
Wool-scourers	Incompatible	Incompatible	Incompatible

PROCESSING OF PLANTS / PLANT PRODUCTS

Land use	Priority 1	Priority 2	Priority 3
Breweries	Incompatible	Incompatible	Conditional[6]
Composting / soil blending (commercial)	Incompatible	Incompatible	Conditional
Forestry product processing- pulp & paper, timber preservation, or wood fibre works	Incompatible	Incompatible	Conditional
Vegetable / food processing	Incompatible	Incompatible	Conditional[6]
Wineries	Incompatible	Conditional[15, 18]	Conditional[15]

SUBDIVISION

Land use	Priority 1	Priority 2	Priority 3
Rural subdivision to a minimum lot size of 4 ha	Incompatible	Compatible	Compatible
Rural subdivision to a lot size less than 4 ha	Incompatible	Incompatible	Incompatible
Special rural subdivision to a minimum lot size of 2 ha	Incompatible	Conditional[8,9]	Conditional[8]
Special rural subdivision to a lot size between 1 and 2 ha	Incompatible	Incompatible	Conditional[8,9]
Special rural subdivision to a lot size less than 1 ha	Incompatible	Incompatible	Incompatible[9]
Urban subdivision	Incompatible	Incompatible	Compatible[6]
Industrial subdivision	Incompatible	Incompatible	Conditional[6]

Note: Subdivision of lots to any size within Priority 1 areas is incompatible

SPORT AND RECREATION

Land use	Priority 1	Priority 2	Priority 3
Equestrian centres	Incompatible	Incompatible	Compatible
Golf courses	Incompatible	Incompatible	Conditional[1]
Motor sports i.e. permanent racing facilities	Incompatible	Incompatible	Conditional
Public swimming pools	Incompatible	Incompatible	Conditional
Recreational parks -irrigated	Incompatible	Incompatible	Conditional[1]
Rifle ranges	Incompatible	Conditional	Compatible

STORAGE/ PROCESSING OF TOXIC AND HAZARDOUS SUBSTANCES (THS)

Land use	Priority 1	Priority 2	Priority 3
Above ground storage of THS	Conditional	Conditional	Conditional
Underground storage tanks for THS	Incompatible	Incompatible	Conditional

TOURISM ACCOMMODATION.

Land use	Priority 1	Priority 2	Priority 3
Bed and breakfast accommodation	Incompatible	Conditional[16]	Compatible
Caravan parks	Incompatible	Incompatible	Conditional[6]
Farm stay accommodation	Incompatible	Conditional[16]	Compatible
Motels, hotels, lodging houses, hostels, resorts	Incompatible	Incompatible	Compatible[6]

WASTE TREATMENT AND MANAGEMENT

Land use	Priority 1	Priority 2	Priority 3
Injection of liquid wastes into groundwater	Incompatible	Incompatible	Incompatible
Landfills -Class I, II or III	Incompatible	Incompatible	Conditional
Landfills -Class IV and V	Incompatible	Incompatible	Incompatible
Recycling depots	Incompatible	Incompatible	Conditional
Refuse transfer stations	Incompatible	Incompatible	Conditional
Sewers (gravity)	Incompatible	Incompatible	Compatible
Sewers (pressure mains)	Incompatible	Conditional	Compatible
Sewage pump stations	Incompatible	Conditional	Conditional
Used tyre storage / disposal facilities	Incompatible	Incompatible	Incompatible
Wastewater treatment plants	Incompatible	Incompatible	Conditional
Wastewater application to land	Incompatible	Incompatible[17]	Conditional

OTHER DEVELOPMENTS

Land use	Priority 1	Priority 2	Priority 3
Caretaker's housing	Incompatible[7]	Conditional	Compatible
Communications receivers / transmitters	Conditional	Conditional	Conditional
Construction projects (not shown elsewhere)	Conditional	Conditional	Conditional
Drinking water treatment plants	Conditional	Conditional	Conditional
Forestry	Conditional[1]	Compatible	Compatible
Major transport routes	Incompatible	Conditional[10]	Compatible
Construction /mining camps,	Conditional	Conditional	Conditional
Prisons	Incompatible	Incompatible	Conditional[6]
National and Regional Parks[13]	Compatible	Compatible	Compatible
Nature reserves	Compatible	Compatible	Compatible

Table reference notes:

1. Conditions may limit fertiliser and pesticide application.

2. Conditions cover the storage of fuels and chemicals, the depth of excavation in relation to the watertable with specified guidelines for rehabilitation.

3. Conditions cover the storage and use of fuel and other chemicals.

4. Conditions placed via the Department of Minerals and Energy lease and / or Environment Minister's /Department of Environmental Protection approval.

5. Special rural development must have appropriate provisions under the Town Planning Scheme, to prevent introduction of land uses and practices that pose an unacceptable risk to water resources.

6. Must be connected to deep sewerage, except where exemptions apply under the current Government Sewerage Policy.

7. May be accepted if this facility is necessary to support acceptable land use in the area and is consistent with State and local government planning strategies.

8. Lots should only be created where land capability allows effective on-site soakage disposal of treated wastewater. Conditions apply to siting of wastewater disposal systems in areas with poor land drainage and / or a shallow depth to groundwater, animals are held or fertiliser is applied. Alternative wastewater treatment systems, where approved by the Health Department, may be accepted with maintenance requirements.

9. An average rather than minimum lot size may be acceptable if the proponent can demonstrate that the water quality objectives of the source protection area are met, and caveats are placed on titles of specified blocks stating that further subdivision cannot occur.

10. Conditions cover road design, construction and the types of goods that may be carried.

11. May be permitted if animal stocking levels (number of animals per hectare) are consistent with source protection objectives.

12. May be permitted if the type, volume and storage mechanisms for chemicals are compatible with water quality protection objectives.

13. Visitor and management infrastructure and facilities must be appropriately sited and maintained.

14. This does not include on-farm / pastoral lease stockyards used for animal husbandry.

15. Waste management practices must be compatible with source protection objectives.

16. Conditions apply on density of accommodation in Priority 2 areas.

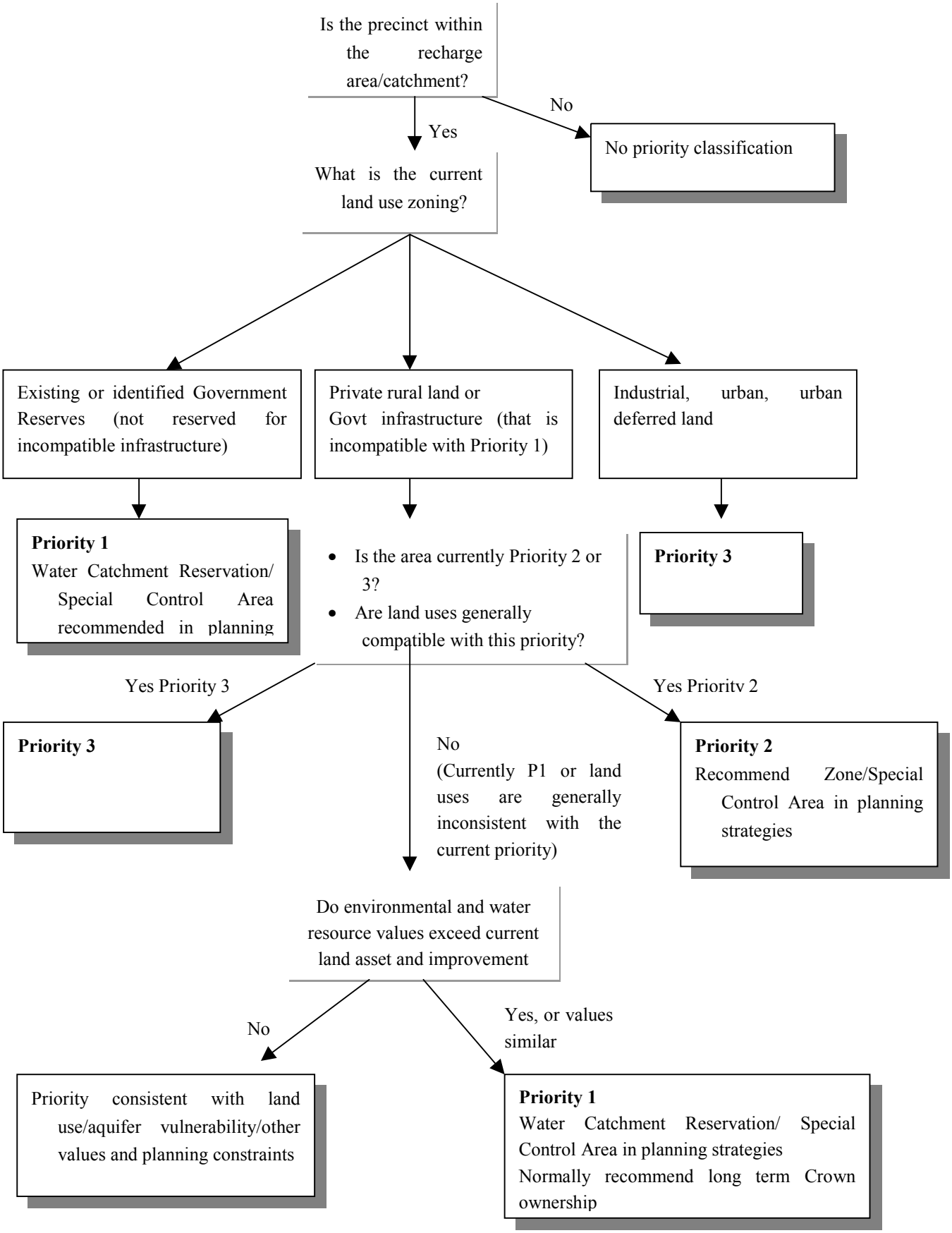
17. May be permitted if the quantity and quality are compatible with water quality protection objectives.

18. Size of annual grape crush does not exceed 500 tonnes and grapes sourced from operator's vineyards within the P2 area.

Version : 28 June 2000

Appendix 2. Priority classification decision process

Decision making process for assignment of priority classifications and planning recommendations



Appendix 3. Extractive industries within Public Drinking Water Source Areas

EXTRACTIVE INDUSTRIES WITHIN PUBLIC DRINKING WATER SOURCE AREAS

Purpose

These notes provide the Commission's views on practices and activities related to the quality of the State's water resources. They are recommendations only, and may be varied at the discretion of the Commission.

The notes provide a basis for developing formal best management practice guidelines in consultation with key stakeholders.

Extractive industries have the potential for direct impact on water quality via turbid runoff from disturbed soils or indirectly from chemicals used and wastes stored on-site.

Scope

These notes apply to the establishment, operation and rehabilitation of extractive industries within Public Drinking Water Source Areas (PDWSAs) across the State. This note addresses the extraction of four basic raw materials - gravel, clays, hard rock and limestone. For operations outside PDWSAs the Commission endorses the *Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines*.

Specific requirements for the operation and management of sand mining activities within PDWSAs are defined within the Commission's *Policy and Guidelines on Construction and Silica Sand Mining in Public Drinking Water Source Areas* and are therefore not addressed within this document.

Commission's drinking water source management strategy

The Water and Rivers Commission is responsible for managing and protecting Western Australia's water resources. The Commission utilises policies for the protection of public drinking water sources that include three levels of priority classification of lands within PDWSAs.

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 typically include land under Crown ownership. P1 areas are managed in accordance with the principle of **risk avoidance.** Land development is generally unacceptable in P1 areas .

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. Protection of public water supply sources is a high priority in these areas. P2 areas are managed in accordance with the principle of **risk minimisation** and so some development is accepted under specific conditions.

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

In addition to Priority areas, 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 buffer area around the top water level of reservoirs and include the reservoir itself. These zones do not extend outside water reserves. Special conditions apply within these zones. For further details refer to Water Quality Protection Note (WQPN) – *Land Use Compatibility in Public Drinking Water Source Areas.*

General recommendations

Siting considerations

The Commission considers extractive industries are a generally acceptable land use in PDWSAs subject to conditions designed to meet water source protection objectives. Proponents should submit a notice of intent to operate an extractive industry to the Commission for approval, with details of measures proposed to protect water resources. Special focus shouldbe given to the storage of chemicals, stormwater management and rehabilitation.

Within P1 water source protection areas: The Commission requires a minimum of 3 metres of undisturbed soil / rock profile as a buffer between the base level of the excavated area and the maximum anticipated watertable. In special circumstances, this buffer may be reduced to a minimum of 2 metres, if the operator can demonstrate effective risk management measures and acceptable rehabilitation to a final 3 metre buffer.

Within P2 and P3 areas: The Commission requires a minimum of 2 metres of undisturbed soil/ rock profile as a buffer between the base level of the excavated area and the maximum anticipated watertable.

The Commission's *Perth Groundwater Atlas* provides information on maximum watertables in the Perth Metro Region. In other areas, a qualified and experienced environmental consultant should be engaged to determine the maximum anticipated watertable for the site in liaison with the Commission.

Chemical Storage

Elevated tank systems may have a maximum capacity of 5000 litres, unless the Commission is satisfied that there are special circumstances warranting additional storage. Elevated chemical storage tank systems (including fuels) must not be installed within wellhead protection zones.

Above ground bulk (> 250 litres) chemical storage may be installed in P1, P2 and P3 areas with prior written approval of the Commission and in compliance with the WQPN - *Toxic and Hazardous Substance Storage in PDWSAs.* All vehicle and plant fuelling facilities (including mobile generators) should be placed and operated within low permeability bunded compounds ($<10^{-9}$ m/sec) designed to allow recovery of any chemical spill without losses to the environment. The WQPN -*Above Ground Chemical Storage Tanks in PDWSAs* provides guidance on this issue Mobile tanks should conform with the WQPN - *Temporary Above Ground Fuel Storage in PDWSAs*.

Underground storage tank systems (USTs) may not be installed within a P1 or P2 areas or within wellhead protection zones. USTs may be installed in P3 areas where approved with conditions from the Commission.

Surface Water Management

All stormwater runoff should be initially contained on site to remove sediments and turbidity. Overland stormwater flows from outside of the project area should be diverted via bypass drains / earthen bunds around disturbed surfaces and stockpiled matter. Sedimentation basins should be designed and maintained as described in the *Mining and Mineral Processing Guideline No 6 -Minesite Stormwater*

In P1 areas, the following buffer distances from disturbed areas to surface water resources are recommended:

Description	Minimum buffer dimension in metres		
	Standard	Quality Assured	Best Practice
To reservoir top water level	200m	150m	100m
To streams within 1000 m of a reservoir	200m	100m	50m
4th order streams	100m	50m	30m
3rd order streams	50m	30m	20m
2nd order streams	30m	20m	20m
1st order streams	20m	15m	15m

Notes : 1. Stream order is determined by the number of tributaries

2. Interpretation of the information on minimum buffer zone dimensions:

- Standard: Involves limited but tolerable risk minimisation, containment and intervention capability;
- Quality Assured : With approved QA contaminant containment process and effectively trained operators; &
- Best Practice: With QA and trained operator processes, plus 24 hour supervision and intervention capability and track record of contamination avoidance.

In P2 and P3 areas: a minimum vegetated buffer of 50 m to surface water bodies is recommended.

Any surface waters flowing from areas disturbed by the project or site de-watering, should pass through effective settling pits designed to minimise turbidity. The pits should be designed and maintained to provide a minimum of 2 hours runoff storage resulting from a 10 year return frequency storm event, when calculated in accordance with the Institution of Engineers current version of *Australian Rainfall and Runoff*. The pits should be operated with a surface scum trapping system which prevents discharge of floating matter.

Waste Management

Extractive industry operations may generate waste from employee amenities, mechanical servicing and washdown of mechanical equipment. Routine servicing and washdown of operating equipment is unacceptable in P1 and P2 PDWSAs. Running repairs may be conducted if measures are in place to prevent fluid loss to the environment. Routine servicing and washdown are accepted in P3 areas where the operator can demonstrate effective procedures for the capture and transport of waste liquids to an approved disposal site.

All wastes from on-site employee amenities should be managed to the requirements of the local government authority. The wastewater system (i.e. septic tanks or alternative treatment unit) should be installed on site with prior approval from the Commission and in accordance with Health Department requirements.

All stockpiled material awaiting transport off-site or held for rehabilitation should be located within the upstream catchment of turbidity control facilities.

Excavated areas should have security fencing and be locked to prevent access outside operating hours. All fencing should be maintained in serviceable condition to guard against illegal waste dumping and vandalism.

Accidents and emergency response

An environmental response program should be in place for accidental chemical spills. The Department of Environmental Protection (DEP) should be notified immediately after a spill providing details and proposed corrective actions. The program should include adequate warning and communications systems, provision of support equipment, responsibility designation and training of response personnel.

A fuel management plan must be in place that has been approved by the Department of Minerals and Energy and addresses the following criteria:

- Fuel spill prevention at storage areas;
- Details of fuel transport and refuelling;

- A contingency plan for dealing with fuel spillage;
- A groundwater monitoring program for petroleum hydrocarbons.

Site closure and rehabilitation

The site operator should prepare and implement on pit closure, a rehabilitation plan that prevents adverse environmental impacts such as dust, erosion, silt deposition, and turbidity. The rehabilitation plan should also satisfy the relevant local and State government agencies.

The site should be rehabilitated to an environmental condition that ensures the maintenance of background water resource quality and is compatible with the intended end land use. A qualified and experienced consultant should prepare the plan for the operator to be submitted to the Commission for approval. The plan should (in addition to standard rehabilitation details required by other government agencies) include:

- Detailed information on the types, sources and quantities of materials to be used for backfilling;
- An assessment of the potential groundwater contamination threats posed by the materials used for backfilling, including leach test (US EPA TCLP) analysis for any materials used on-site that may pose a threat to water quality;
- Proposals for any pesticide application at the site;
- Methods of site remediation and clean up after mining operations;
- Details of end land uses.

Statutory requirements

Acts regulating extractive industries include:

- *Town Planning and Development Act 1928*
- *Mining Act 1978*
- *Environmental Protection Act 1986*
- *Country Areas Water Supply Act 1947*
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909, and*
- *Rights in Water and Irrigation Act 1914*

Where groundwater is to be abstracted on-site, a licence will be required under the *Rights in Water and Irrigation Act 1914.* Advice on licensing requirements can be obtained by contacting the Commission's regional offices.

More information

The Commission welcomes your comment on these notes. They will be updated from time to time as comments are received or recommended practices change.

If you wish to comment or require more information, please contact the Commission's Water Quality Protection Branch, Hyatt Business Centre, 3 Plain Street, East Perth 6004.
Phone: (08) 9278 0300 (business hours); fax: (08) 9278 0585; or
E-mail: use <feedback> section at our internet address – www.wrc.wa.gov.au, citing title and version.

Appendices

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Appendix 4. Toxic and chemical storage in Public Drinking Water Source Areas

TOXIC AND HAZARDOUS SUBSTANCES IN PUBLIC DRINKING WATER SOURCE AREAS

Purpose

To provide information for issues or activities that may impact on the quality of the State's water resources.

These notes provide a basis for future development of best management practice guidelines in consultation with key stakeholders.

Scope

These notes apply in Public Drinking Water Source Areas to the storage and use of toxic and hazardous substances (THS) that may harm water resources if released in sufficient quantities into the environment. THS include:

- Substances described in the current Schedules of the *Poisons Act 1964,*
- Concentrates and substances listed in Schedule Classes 3 to 9 of the *Explosive and Dangerous Goods Act, Classification Order of 1988*, and
- Herbicides described in Circular PSC 88 (Health Department of WA, October 1993).

THS quantities of less than 25 litres if solely used for hygiene or similar non-commercial purposes, are excluded from these recommendations. However care in the handling and use of all THS is needed to avoid harm to people and the environment.

Public Drinking Water Source Areas (PDWSAs) describe sites declared under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* and the *Country Areas Water Supply Act 1947* for the management and protection of sources of water used for public drinking water supply. They include Underground Water Pollution Control Areas (UWPCAs), Water Reserves and Catchment Areas.

Preamble

The following statements reflect the Commission's current position. They are recommendations only and may be varied at the discretion of the Commission.

Approvals

Proposals for use and storage of toxic or hazardous substances in UWPCAs should be referred to the Water and Rivers Commission for assessment and approval. The proposal should include:

- A completed application for a permit from the Commission. Forms are available from Commission offices;
- A site plan showing proposed activities and areas where THS are to be stored, handled or used;
- A description of the maximum quantities of THS stored and used, and the processes involving their use;
- Details of any THS contaminated waste, its management, treatment and disposal;
- Design details of bunded compounds used for secondary containment of stored THS; and

- Contingency plans for preventing pollution resulting from fires, explosions, storms, vandalism or significant chemical spills.

Storage of THS should also comply with the *Explosive and Dangerous Goods Act 1961* and regulations. Proponents should contact the Department of Minerals and Energy for guidance on this Act's requirements.

The use of pesticides in Public Drinking Water Source Areas should comply with both the Commission's Draft Policy *Pesticide use in Public Drinking Water Source Areas* and with the requirements of the Health Department of WA.

Pesticide operators do not require a specific permit from the Commission to service sites in Public Drinking Water Source Areas. However, operators are encouraged to review the Commission's draft policy on the matter.

Storage facilities and management practices

Facilities should be constructed and managed so that under all conditions THS cannot escape to the environment, i.e. normal operations, equipment malfunction or foreseeable emergencies.
THS should be stored in secure chemical-resistant containers. Containers of capacity < 250 litres should be held in weatherproof buildings on reinforced concrete floors either graded to sumps or with perimeter bunding. Flooring, drains and collection sumps should be sealed with protective coatings (where necessary) to resist seepage, damage or deterioration resulting from contact with the stored materials. Bunded compounds should have a storage capacity of 110% of the largest chemical container and 25% of the capacity of all containers held within the compound.

THS formulation, mixing, processing, container transfers and decanting should occur within the weatherproof buildings or approved equivalent containment facility.

Bunded compounds with vehicle access should be protected by ramps that permit safe passage of personnel and vehicles, while maintaining effective containment capacity.

THS bulk storage tanks with capacity > 250 litres should conform to the Commission's Water Quality Protection Note: *Above Ground Chemical Storage Tanks in Public Drinking Water Source Areas*. Transfer of liquids from bulk tankers to storage should occur within chemical-resistant sealed and bunded areas that permit recovery of any spills. Any underground tanks containing THS where approved should conform to the Commission's Water Quality Protection Note: *Underground Chemical Storage Tanks in Public Drinking Water Source Areas*.

There should be no storage of THS containers outside weatherproof and bunded areas, whether they contain chemicals or are empty.

THS use

THS should only be applied to land to match the manufacturer's intended use of the chemical and should be the **minimum** quantity consistent with achieving the desired result. Operators should always-

- be trained in the safe use of the chemicals,
- ensure that application equipment is in good repair and delivers chemicals at the correct rate ,
- apply chemicals strictly in accordance with manufacturers / suppliers instructions,
- observe withholding period recommendations (including when rainfall may leach chemicals into the soil),
- follow material safety data sheets, and
- recycle unused chemicals.

Stormwater Management

Stormwater from roofs and clean paved areas, where practical should be directed away from areas where THS are stored or used. Uncontaminated stormwater may be drained to soaks or off-site drainage systems.

Waste Disposal

Chemical wastes, e.g. containers, residues or THS contaminated litter from spill clean-up, should not be discharged to site drainage or soakage. They should be effectively contained until reused or disposed of outside of any PDWSA as approved by regulatory agencies.

Signage

Signs should be erected and maintained where clearly visible at all entrances to the site advising:

"THIS SITE IS IN A PUBLIC DRINKING WATER SOURCE AREA.
UNCONTROLLED RELEASE OF CHEMICALS CAN HARM THE ENVIRONMENT.
PLEASE REPORT INCIDENTS TO THE WATER CORPORATION-PHONE 1800 626 636".

Contingency Plan

There should be provision to immediately reclaim and contain any spilt THS. The site should have stocks of absorbent material for cleaning up spilt THS fluids. THS contaminated absorbent materials should be disposed outside of any PDWSA as approved by the Department of Environmental Protection.

Employees should be trained in the safe management of THS, what to do in the event of a THS spillage emergency and the implications of loss of these chemicals to the environment.

More information

The Commission welcomes your comment on these notes. They will be updated from time to time as comments are received or industry standards change.

If you wish to comment on the notes or require more information, please contact the Commission's Water Quality Protection Branch at the Hyatt Centre in East Perth.
Phone: (08) 9278 0300 (business hours), fax: (08) 9278 0585 or
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