Greater Bunbury Region Scheme

Western Australian Planning Commission

Report and recommendations of the Environmental Protection Authority

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Summary and recommendations

The Western Australian Planning Commission (WAPC) has prepared a Region Scheme for the Greater Bunbury Region, known as the Greater Bunbury Region Scheme (GBRS), pursuant to the *Western Australian Planning Commission Act 1985*. The WAPC, the Responsible Authority, proposes to recommend to the Minister for Planning and Infrastructure that the GBRS be submitted to Parliament for final approval. This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposed Scheme as required under section 48D of the *Environmental Protection Act 1986*.

The GBRS was referred to the EPA by the WAPC in August 1996. The EPA decided that the GBRS should be formally assessed due to potential impacts of the new zones and reserves in the Scheme. The new zones and reserves are those that differ from the zone or reserve shown in an existing town planning scheme for the subject land.

Environmental submissions received during the public consultation period

The public consultation period (3mths standard + 3 mths extension) closed on 16 February during which time 272 written submissions were received; 169 (62%) of these were concerned with environmental matters. Only those submissions raising environmental issues are considered by the EPA. The other submissions and issues are being considered by the WAPC separately.

Close to half of the environmental issues raised in the submissions relate to Regional Open Space (ROS). These issues were raised by either landowners with properties affected by proposed ROS or people requesting additional land to be included in ROS reserves.

Strategy for the EPA to identify regionally significant natural areas in its consideration of the Greater Bunbury Region Scheme portion of the Swan Coastal Plain

As part of its assessment of the GBRS the EPA has prepared a *Strategy for the EPA to identify regionally significant natural areas in its consideration of the Greater Bunbury Region Scheme portion of the Swan Coastal Plain* (hereinafter referred to as the Natural Areas Strategy) to assist in evaluating the natural values of the new zones and new infrastructure and Regional Open Space reserves in the GBRS against set criteria. As part of its assessment of the GBRS, the EPA has also undertaken biological surveys of a number of sites consistent with the criteria set out in the Natural Areas Strategy.

To encompass current recognised levels of remnant native vegetation retention the objective of the Natural Area Strategy is to achieve a standard level of native vegetation retention of at least 30% of the pre-clearing extent of the ecological communities on the Swan Coastal Plain.

For the Greater Bunbury Region (except for lands identified in the 'GBR Constrained Area') this means the objective is to seek to:

- retain at least 30% of the pre-clearing extent of the ecological communities in the GBR, where greater than 30% of an ecological community remains on the Swan Coastal Plain
- preferentially locate developments in cleared areas, where 30% or less of the pre-clearing extent of the ecological community remains on the Swan Coastal Plain.

It has been found that much of the Swan Coastal Plain has been altered to such an extent that 12 of the 15 vegetation complexes within the Greater Bunbury Region have 30% or less of their area remaining on the Plain. As a consequence, for the targets to be met by the EPA all remaining vegetation in these complexes is in need of retention and some level of protection.

Within the 'Greater Bunbury Region Constrained Area' of the Swan Coastal Plain the EPA's objective is to to:

- retain at least 10% of the pre-clearing extent of the ecological community in the 'Constrained Area' of the Greater Bunbury Region where greater than 10% of the ecological community remains on the Swan Coastal Plain (the natural region); or
- retain all remaining areas of each ecological community in the 'Constrained Area' of the GBR where 10% or less than 10% of this ecological community remains on the Swan Coastal Plain.

The application of the criteria and the specific policy statements within the terms of the Natural Areas Strategy required the further identification of the regionally significant sequences of ecological communities within and between the major landform elements. While the EPA recognises that the systematic identification of regionally significant natural areas, and the mechanisms to protect these areas, is proposed to be achieved through the update of the remainder of the System 6 and part System 1 area in a similar co-ordinated program to *Bush Forever*, the EPA is of the opinion that sufficient information has been gathered to broadly identify a series of regionally important ecological linkages as depicted in Appendix 4.

Sites assessed by the EPA

After considering the potential environmental impacts of the new zones and reserves and the issues raised in the submissions the EPA determined that the following sites were likely to have significant environmental impacts and should be assessed in detail:

- Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant (Urban Deferred), Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind (Urban Deferred) and Lot 3 Paris Road (south), Australind (Urban zone)
- Lots 313-317 south of Harewoods Road, South Dalyellup (Urban Deferred)
- Reserve 31012 Harewoods Road, Dalyellup (Urban Deferred zone)
- Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup (Urban Deferred zone)
- Lot 871 Prowse Road, Capel (south) (Urban zone)

- Lot 2 Harvey (Urban zone)
- Kemerton Industrial Area Expansion
- Port Installation reserve and adequacy of the adjacent ROS reserve boundary alignment
- Raymond Road
- South Western Highway (northern section between the northern boundary of the GBRS and the Preston River)
- Port Access Road
- Boyanup Bypass Road
- Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton (Public Purpose Reserve)
- Locations 7 and 14 Buffalo Road, Binningup
- Twin Rivers - Pt Lot 211 Barnes Avenue, Australind
- Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
- College Grove - Lot 1000 Bussell Highway
- Muddy Lakes – Minninup Road, Capel
- Pt Loc 632 Parade Road, Glen Padden
- Reserve 670 North Boyanup Road, Davenport (Industrial zone)
- Lot 15 North Boyanup Road
- Bunbury Outer Ring Road
- Glen Iris Service Corridor
- Lot 35 Spurr Street, Capel (Urban Deferred)
- Lots 8 and 10 Ferguson River Foreshore, Picton
- Lots 1 and Pt Lot 5 North Boyanup Road, Davenport
- Dalyellup Beach Estate Tourist Precinct– Pt Loc 497 Dalyellup Road

In addition to the the above sites the EPA has also assessed or provided advice in relation to the following matters:

- Special Control Area No. 1 - Water Catchments
- Special Control Area No. 2 - Kemerton Industrial Zone Buffer
- Special Control Area No. 3 - North Capel
- Public Water Supply Catchment Policy
- Floodplain Management Policy
- Strategic Agricultural Resource Policy
- Strategic Minerals and Basic Raw Materials Resource Policy
- Wetland Management
- Waterway Management
- Acid sulfate soils
- Alcoa Wagerup

Strategy to conserve regionally significant natural areas on the Swan Coastal Plain
The EPA recognises the need to update the conservation recommendations on the Swan Coastal Plain portion of the GBRS as a priority. It considers that this work should be

undertaken as part of a wider coordinated program to update conservation recommendations across the non-metropolitan portions of the southern Swan Coastal Plain, and the Darling and Whicher Scarps. The review of conservation recommendations on the country portions of the Swan Coastal Plain is needed to complete an update of the EPA System 6 and System 1 recommendations that was initiated in 1995, but deferred pending completion of recommendations for the metropolitan area through Bush Forever.

The EPA supports the completion of the System 6 and System 1 update on the Swan Coastal Plain and adjacent Scarps as a 'whole of government' program through a similar co-ordinated approach, as used for Bush Forever. It considers that an adaptation of the criteria developed for the Natural Area Strategy would provide an appropriate basis for this review. Consideration of the ecological linkage requirements and mechanisms promoting re-establishment of ecological linkage, including hydrological and wetland function, should be an important component of the program.

Right of appeal and condition setting

Section 100 (2) of the *Environmental Protection Act 1986* states that the responsible authority (WAPC), any decision making authority or any other person which or who disagrees with the content of, or any recommendations in this report, may lodge with the Minister for the Environment an appeal in writing setting out the grounds of that appeal.

Section 101 (2a) of the *Environmental Protection Act 1986* states that the Minister for the Environment shall consult, and attempt to reach agreement with, the responsible Minister (Minister for Planning and Infrastructure) on deciding the outcome of appeals.

Once any appeals lodged under Section 100 (2) have been determined the Minister for the Environment shall consult the Minister for Planning and Infrastructure and, if possible agree on conditions to which the GBRS should be subject if the Scheme is to be implemented.

Relevant environmental factors

Although a number of environmental factors were considered by the EPA in the assessment, it is the EPA's opinion that the following are the environmental factors relevant to the proposed GBRS, which required evaluation in this report.

(a) Protection and management of regionally significant remnant vegetation;

(b) Protection and management of regionally significant watercourses and wetlands; and

(c) Separation of incompatible land uses - buffer requirements for noise and air quality.

Conclusion

The EPA has considered the GBRS and has concluded that the Scheme can be implemented to meet the EPA's objectives provided the following recommendations and conditions are implemented.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the scheme being assessed is the Greater Bunbury Region Scheme.

2. That the Minister considers the report on the following issues and associated relevant environmental factors as set out in Section 2:

   a) Issues raised in the environmental submissions received during the public consultation period;

   b) Assessment of new urban zones with potentially significant environmental impacts;

   c) Assessment of the potentially significant environmental impacts of the new Kemerton Public Purpose Reserve;

   d) Assessment of the potentially significant environmental impacts of the new Port Installation zone;

   e) Assessment of new road and rail reserves with potentially significant environmental impacts;

   f) Assessment of other zones and reserves with potentially significant environmental impacts;

   g) Assessment of the adequacy of Regional Open Space reserves;

   h) Assessment of Special Control Areas;

   i) Assessment of policies linked to the Greater Bunbury Region Scheme; and

   j) Regionally significant environmental issues of concern to the EPA.

3. The Minister notes that the EPA has concluded that the EPA's objectives can be met, provided the recommended conditions summarised in Section 14 and set out in detail in Appendix 14 are incorporated by the Responsible Authority into the GBRS and implemented at the appropriate level of planning.

4. That the Minister in consultation with the Minister for Planning and Infrastructure imposes the conditions recommended in Appendix 14 of this report.

5. The Minister notes the EPA's advice in Appendix 15 of this report.

6. That the Minister notes that the EPA has deferred the assessment of a number of environmental factors, as shown in Section 15, so that the EPA would have the opportunity to assess proposals impacting on these environmental factors in more detail at the appropriate stage of the planning process.

7. That the Minister notes that where any development proposal complies with the Greater Bunbury Region Scheme and raises no additional environmental factors and does not impact on the deferred factors, the development proposal will not normally be subject to further assessment under Part IV of the *Environmental Protection Act 1986*. However, future development proposals may still require

works approval, licensing and pollution control conditions under the Environmental Protection Act 1986 where applicable.

Conditions

Having considered the Responsible Authority's proposed environmental conditions and the information provided in the report, the EPA has developed a set of conditions which the EPA recommends be imposed if the Scheme is approved.

Matters addressed in the conditions include:

1 Management Plans

The following Environmental Management Plans may be required and shall be implemented in accordance with the provisions of the Management Plans, to the satisfaction of the Western Australian Planning Commission:

1) Environmental Management Plans for schemes, subdivisions and developments;
2) Environmental Management Plans for industrial development with the Kemerton Industrial Area and Special Control Area No. 2;
3) Drainage, Nutrient and Water Management Plan; and
4) Acid Sulfate Soil Management Plan.

2 Biological Survey

As part of a scheme amendment or application to subdivide or develop land which has the potential to impact on regionally significant native remnant vegetation or native fauna, a biological survey may be required, including a search for Declared Rare Flora and Fauna, Priority Flora, Threatened Flora Communities and Threatened Fauna, to be undertaken.

3 Connection to Reticulated Sewerage

Subdivisions and developments shall be connected to reticulated sewerage where:

1) the Average Annual Maximum Groundwater Level is less than 1.2 metres below the natural ground surface; or

2) subsoil drainage is proposed or will be required as a part of development, unless the responsible authority and the EPA agree that there are special circumstances applying to a particular subdivision or development.

4 Land to be reserved

All or portions of the following sites shall be reserved for conservation:

1) Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant
2) Reserve 31012 Harewoods Road, Dalyellup
3) Port Installation Reserve

4) Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)
5) Twin Rivers - Pt Lot 211 Barnes Avenue, Australind
6) College Grove - Lot 1000 Bussell Highway
7) Pt Loc 632 Parade Road, Glen Padden
8) Reserve 670 North Boyanup Road, Davenport
9) Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
10) Lot 10 Ferguson River foreshore, Picton
11) Pt Lot 1 North Boyanup Road, Davenport

5 Realignment of Primary Regional Road Reserves

Portions of the following Primary Regional Road Reserves shall be realigned:

1) Port Access Road
2) Bunbury Outer Ring Road

Other Advice

In addition to the above environmental conditions the EPA provides advice and comment on the following matters:

1. Deferred factors

A number of environmental factors have not been included in the EPA's assessment due to the broad scale of the assessment or because insufficient information is available at this stage of the planning process. The EPA has decided that these factors should be "deferred" to ensure that the EPA has the opportunity to assess future local government scheme amendments, subdivisions or development proposals, whichever comes first, so that a more detailed consideration of the potential environmental impacts can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

The deferred factors are:

1) All Rural zoned land in the GBRS
Deferred factors – remnant vegetation and wetlands

2) All land in the Greater Bunbury Region Scheme
Deferred factor – site contamination

3) Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant
Deferred factors – remnant vegetation, fauna and ecological linkage

4) Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind
Deferred factors— remnant vegetation, fauna and ecological linkage

5) Lots 313-317 south of Harewoods Road, South Dalyellup
Deferred factors — remnant vegetation, fauna and ecological linkage

6) Reserve 31012 Harewoods Road, Dalyellup
Deferred factors — contamination.

7) Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup
Deferred factor — remnant vegetation

8) Lot 871 Prowse Road, Capel (south)
Deferred factors — remnant vegetation, fauna and ecological linkage

9) Lot 2 Harvey (Urban zone)
Deferred factors — remnant vegetation, fauna and ecological linkage

10) Kemerton Industrial Expansion Area
Deferred factors — noise, air quality, remnant vegetation, groundwater quality, surface water quality and solid/liquid waste disposal

11) Port Installation reserve
Deferred factors — noise, air quality and marine water quality

12) Raymond Road
Deferred factors — wetlands, remnant vegetation and the impacts from road users on surrounding noise sensitive landuses

13) South Western Highway (northern section between the northern boundary of the GBRS and the Preston River)
Deferred factors — remnant vegetation, watercourses and the impacts from road users on surrounding noise sensitive landuses

14) Port Access Road
Deferred factors - the remnant vegetation, wetland, watercourses, fauna and noise.

15) Boyanup Bypass
Deferred factors — remnant vegetation, wetlands and the impacts from road users on surrounding noise sensitive landuses

16) Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton
Deferred factors — remnant vegetation, fauna and odour emissions

17) Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
Deferred factors — remnant vegetation, wetlands and fauna

18) Muddy Lakes – Minninup Road, Capel

Deferred factors — remnant vegetation, wetlands and fauna

19) Reserve 670 North Boyanup Road, Davenport
Deferred factors — remnant vegetation, fauna and ecological linkage

20) Lot 15 North Boyanup Road
Deferred factors — remnant vegetation and fauna

21) Bunbury Outer Ring Road
Deferred factors - the remnant vegetation, wetland, watercourses, fauna and noise.

22) Glen Iris Service Corridor
Deferred factors— noise, vibration, remnant vegetation and wetlands

23) Lot 35 Spurr Street, Capel
Deferred factors — remnant vegetation, wetlands and fauna

2. Primary Regional Road Reserves

The alignments of the following Primary Regional Road reserves in the GBRS meet the EPA's environmental objectives provided Environmental and Noise/Vibration Management Plans and Vegetation and Waterway Mitigation Strategies are prepared and implemented, when appropriate, to the satisfaction of the EPA:

1) South Western Highway;
2) Raymond Road;
3) Boyanup Bypass Road;
4) Bussell Highway;

Proposals to construct these roads should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986* to ensure that the management plans are prepared to the satisfaction of the EPA.

The Environmental Management Plans should include:

1) mapping of vegetation units and the condition of the vegetation units;
2) plot based descriptions and flora lists for each of the mapped vegetation units;
3) mapping of populations of priority species; and
4) the identification of fauna values of the remnants.
5) a description of existing environmental values, and the identification of the environmental outcome to be achieved through the implementation of this plan;
6) clear delineation of significant areas to be protected;
7) vegetation and/or wetland mitigation strategies
8) allocation of responsibilities and identification of timing and duration of implementation;
9) provision for routine monitoring of environmental values; and

10) provision of details of contingency plans in the event that the monitoring surveys indicate that the road is having or has had an adverse impact upon environmental values.

The Noise Management Plan should include:

1) detailed noise modeling for the whole proposal taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes;
2) acceptable noise and vibration levels, as agreed between the Main Roads Western Australia and the Department of Environmental Protection, to protect the amenity of adjacent residences; and
3) measures to manage the impact of traffic noise and vibration on adjacent residnces and residential areas.

The Vegetation Mitigation Strategy should off-set the impacts on particular vegetation complexes and should include:

1) the biological and environmental values of any vegetation to be impacted by the design and construction of the road;
2) a review of the design of the road, to avoid or minimize impacts on the vegetation; and
3) measures including the possible acquisition of other vegetated land, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

In considering the suitability of other vegetated land to mitigate the loss of any biological and environmental values caused by the construction of the proposed road the following matters will be considered by the EPA:

1) specific vegetation communities affected by the proposal;
2) specific vegetation communities on land proposed for acquisition to mitigate the loss of biological and environmental values caused by the proposal;
3) vesting and proposed management of the vegetation proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and
4) values and roles of this vegetation in maintaining conservation in the Greater Bunbury Region.

A Vegetation Mitigation Strategy should off-set the impacts on particular wetlands and should include:

1) the biological and environmental values of any wetlands to be impacted by the design and construction of the road;
2) a review of the design of the road, to avoid or minimise impacts on wetlands; and

3) measures including the possible acquisition of other or wetlands, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

In considering the suitability of other vegetated land and wetlands to mitigate the loss of any biological and environmental values caused by the construction of the road the following matters will be considered by the EPA:

1) specific category, or categories, of wetlands to be affected by the road construction;
2) vesting and proposed management of wetland areas proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and
3) values and roles of the wetlands in maintaining conservation in the Greater Bunbury Region.

3. Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant, Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind and Lot 3 Paris Road (south), Australind

It is the EPA's opinion that:

1) the remnant vegetation on the northern and western portions of Reserve 35061 should be reserved in the GBRS and appropriately managed;
2) the bushland on part Lots 27, 28 and 150 to the north of Paris Road should be conserved and managed as part of any future subdivision and development, whichever comes first; and

4. Lots 313-317 south of Harewoods Road, South Dalyellup

It is the EPA's opinion that:

1) remnant vegetation on Lots 315, 316 and 317 should be conserved and appropriately managed either as a ROS reserve in the GBRS or as part of future zoning, subdivision and/or development on the lots;
2) the extraction of sand and limestone from Lots 315, 316 and 317 is incompatible with the need to protect vegetation in this area;
3) immediate planning measures be implemented by the WAPC to manage and prevent any further development or change of land use on Lots 315, 316 and 317, until the GBRS has been proclaimed.

5. Reserve 31012 Harewoods Road, Dalyellup

It is the EPA's opinion that:

1) remnant vegetation on Reserve 31012 is regionally significant and should be reserved and appropriately managed;
2) appropriate land uses need to be determined for that portion of the site used as a municipal waste disposal site;

3) a site investigation be undertaken prior to any ground disturbing activities, to determine the extent and severity of contamination on that part of Reserve 31012 used as a waste disposal site. If the site is found to be contaminated as a result of this investigation, then a Site Remediation and Validation Report should be produced to the satisfaction of the Department of Environmental Protection.

6. Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup

It is the EPA's opinion that there is regionally significant remnant vegetation on the land proposed to be zoned Urban Deferred which should be conserved and appropriately managed as part of any future zoning, subdivision and/or development on the site.

7. Lot 871 Prowse Road, Capel (south)

It is the EPA's opinion that the Urban zoning on Lot 871 is environmentally acceptable subject to the remnant vegetation being conserved and protected as part of any future subdivision or development on the land.

8. Lot 2 Harvey (Urban zone)

It is the EPA's opinion that the Urban zoning on Lot 2 is environmentally acceptable subject to as much of the remnant vegetation being conserved and protected as possible (at least 60%), as part of any future subdivision or development on the land.

9. Kemerton Industrial Area Expansion

It is the EPA's opinion that:

1) areas of regionally significant bushland within SCA No. 2 should be reserved as ROS as a future amendment to the GBRS; and
2) Special Control Area No. 2 provides adequate separation between proposed industrial development and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

10. Port Access Road

It is the EPA's opinion that it would be preferable for the Port Access Road to follow existing road alignments between Harris Road and Moore Road. Although a re-alignment to the west of the currently alignment shown in the GBRS, designed and constructed to minimise impact on bushland, would be environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

11. Boyanup Bypass Road

It is the EPA's opinion that:

1) the road be designed and constructed to minimise impact on bushland and avoid any direct or indirect impacts on the Boyanup Billabong; and

2) Subject to point (1) the alignment of the Primary Regional Road reserve for the Boyanup Bypass is environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

12. Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton

It is the EPA's opinion that:

1) the proposal to establish waste water treatment plants on the Public Purpose reserve is environmentally acceptable subject to further investigation to select development sites with minimal potential environmental impacts on remnant vegetation and fauna; and
2) Special Control Area No. 2 provides adequate separation between the Public Purpose reserve and surrounding land uses to accommodate the impacts of odour emissions from waste water treatment plants in accordance with the EPA's environmental objectives and criteria for this environmental factor.

13. Locations 7 and 14 Buffalo Road, Binningup

It is the EPA's opinion that:

1) the proposed modification to the alignment of the ROS reserve boundary alignment on Location 14 is acceptable; and
2) the alignment of the ROS reserve boundary on Location 7 should be reviewed prior to any future zoning or subdivision on the subject land, whichever comes first, and amended where necessary.

14. Twin Rivers - Pt Lot 211 Barnes Avenue, Australind

It is the EPA's opinion that:

1) the current alignment of the ROS reserve does not adequately protect the regional natural values of the Pt Lot 211 Barnes Avenue;
2) in view of the regional natural values of Pt Lot 211 Barnes Avenue all of the site should be reserved;
3) if the Government decides not to preserve the whole of the area as a regional park, the EPA is of the view that the modified ROS alignment identified by the WAPC on 31 July 2003 should be adopted; and
4) arrangements be included in the Greater Bunbury Region Scheme to ensure that adequate funds are available for the WAPC to purchase areas of regional conservation value.

15. College Grove – Lot 1000 Bussell Highway

It is the EPA's opinion that:

1) a corridor between 300 and 500m be reserved in the GBRS and appropriately managed; and
2) some degree of flexibility (20 metres) be allowed in determining the final alignment of the northern ROS boundary to facilitate the final structure plan with no nett loss of ROS.

16. Muddy Lakes – Minninup Road, Capel

It is the EPA's opinion that:

1) the alignment of the ROS reserve boundary around Muddy Lakes should remain as shown in the advertised GBRS;
2) the alignment of the ROS reserve boundary should be amended to include the full extent of the wetland at the earliest opportunity;
3) Priority be given to implementing management arrangements (ie Government acquisition) in the Dalyellup/Minninup Lake Natural Area to prevent further degradation by current land use activities;
4) Interim planning mechanisms be put in place to ensure that conservation values in the Dalyellup/Minninup Lake Natural Area are protected from any further development or change of land use until suitable protection measures under the Greater Bunbury Region Scheme are provided; and
5) Further biological and hydrological studies be undertaken to ensure that the Dalyellup/Minninup Lake Natural Area is appropriately managed.

17. Reserve 670 North Boyanup Road, Davenport

It is the EPA's opinion that:

1) the southern portion on Reserve 670 should be reserved and appropriately managed because of its regional significance;
2) the remnant vegetation on the northern portion of Reserve 670 should be conserved primarily because of its faunal habitat values and value as an additional ecological linkage to Preston River; and
3) a portion of the remnant vegetation to the north of Reserve 670 should be conserved to provide a consolidated ecological linkage between Reserve 670 and the Preston River.

18. Lot 15 North Boyanup Road

It is the EPA's opinion that the remnant vegetation on Lot 15 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site.

19. Bunbury Outer Ring Road

It is the EPA's opinion that subject to the Bunbury Outer Ring Road being realigned, designed and constructed to minimise impact on:

1) a wetland near the intersection with the Australind Bypass;
2) wetlands to the north of Lillydale Road;and
3) bushland at the intersection with Bussell Highway

The alignment would be environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

20. Glen Iris Service Corridor

It is the EPA's opinion that:

1) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to adoption of a Special Control Area to prevent incompatible land uses being located in the buffer;
2) the alignment of the Glen Iris Service Corridor (Public Purpose Reserve, Rail Reserve and Regional Road Reserve) and the width of the Special Control Area are environmentally acceptable subject to Noise and Vibration Management Plans being prepared in accordance with the specifications in Section 2, above, prior to any additional infrastructure being constructed within the corridor;
3) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to the preparation and implementation of a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan; and
4) any proposal to construct infrastructure within the Glen Iris Service Corridor should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

21. Lot 35 Spurr Street, Capel

It is the EPA's opinion that the remnant vegetation on Lot 35 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site.

22. Special Control Area No. 2 - Kemerton Industrial Zone Buffer

It is the EPA's opinion that Special Control Area No. 2 provides adequate separation between the proposed industry and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

23. Special Control Area No. 3 - North Capel

It is the EPA's opinion that SCA No. 3 will provide adequate separation between current and future industrial operations and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

24. Public Water Supply Catchment Policy

The EPA supports the Public Water Supply Catchment Policy subject to the land use permissibility table being deleted and inclusion of reference to the WRC guidelines which determine land use permissibility

25. Floodplain Management Policy

The EPA supports the Floodplain Management Policy subject to the environmental values of floodplains being described in further detail consistent with the WRC's Western Australian Draft Floodplain Management Strategy.

26. Strategic Agricultural Resource Policy

The EPA recommends that the Strategic Agricultural Resource Policy should be modified to include the following statements:

1) There is a general presumption against clearing of native vegetation including within the Strategic Agricultural Resource Policy Areas where 30% or less of the Vegetation Complex remains;
2) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposed clearing will be assessed by the EPA in accordance with EPA's Guidance 10 (EPA, 2003); and
3) Native vegetation clearance is also proposed to be addressed through amendments to the *Environmental Protection Act 1986.* The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

27. Strategic Minerals and Basic Raw Materials Resource Policy

The EPA recommends that the Strategic Minerals and Basic Raw Materials Resource Policy should be modified to include the following statements:

1) There is a general presumption against clearing of native vegetation including within the Strategic Minerals and Basic Raw Materials Resource Policy Areas where 30% or less of the Vegetation Complex remains;
2) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposal will be assessed by the EPA in accordance with Guidance 10 (EPA, 2003);
3) After the resource has been recovered from a Strategic Minerals and Basic Raw Materials Resource Policy Area located within a cleared portion of an Ecological Linkage, the linkage should be restored using previously occurring native species of local provenance; and
4) Native vegetation clearance is also proposed to be addressed through amendments to the Environmental *Protection Act 1986.* The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

28. Strategy to conserve regionally significant natural areas on the Swan Coastal Plain

The EPA recognises the need to update the conservation recommendations on the Swan Coastal Plain portion of the GBRS as a priority. It considers that this work should be undertaken as part of a wider coordinated program to update conservation

recommendations across the non-metropolitan portions of the southern Swan Coastal Plain, and the Darling and Whicher Scarps. The review of conservation recommendations on the country portions of the Swan Coastal Plain is needed to complete an update of the EPA System 6 and System 1 recommendations that was initiated in 1995, but deferred pending completion of recommendations for the metropolitan area through Bush Forever.

The EPA supports the completion of the System 6 and System 1 update on the Swan Coastal Plain and adjacent Scarps as a 'whole of government' program through a similar co-ordinated approach, as used for Bush Forever. It considers that an adaptation of the criteria developed for the Natural Area Strategy would provide an appropriate basis for this review. Consideration of the ecological linkage requirements and mechanisms promoting re-establishment of ecological linkage, including hydrological and wetland function, should be an important component of the program.

29. Alcoa Wagerup

It is the EPA's view that measures be put in place by the Shires of Harvey and Waroona or the WAPC to provided an adequate buffer around the Alcoa refinery as a matter of priority.

30. Environmental Protection Amendment Bill 2002

The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill proposes new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process administered by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit. Permit applications will be assessed against criteria designed to assess impacts on:

- representation of ecological communities;
- biodiversity;
- rare species and communities;
- watercourses and wetlands;
- salinisation of land and water;
- land degradation;
- surface and ground water quality, and
- potential for flooding.

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1 Introduction

The Greater Bunbury Region Scheme (GBRS) defines the broad pattern of land use for the City of Bunbury and the Shires of Harvey, Dardanup and Capel. The main purpose of the GBRS is to provide the statutory basis for implementing region plans such as the *Bunbury - Wellington Region Plan* (WAPC, 1995) and *Greater Bunbury Structure Plan* (WAPC, 1995) to ensure that regional facilities such as regional open space and regional roads are provided. The GBRS includes regional reservations and broad land use zones (Appendix 1).

The *Western Australian Planning Commission Act 1985* (section 18) allows for statutory region schemes (similar to the Metropolitan Region Scheme) to be prepared for areas outside of Perth metropolitan region. The GBRS will enable land reserved for purposes such as Regional Open Space (ROS) to be purchased.

The GBRS was referred to the Environmental Protection Authority (EPA) by the Western Australian Planning Commission (WAPC) in August 1996. The EPA decided that the GBRS should be formally assessed due to potential impacts of the new zones and reserves. The new zones and reserves are those that differ from the zone or reserve shown in an existing town planning scheme for the subject land. The new zones and reserves assessed by the EPA are shown in Appendix 2.

In compiling this report, the EPA has considered the WAPC's Environmental Review, issues raised in public submissions, specialist advice from the Department of Environmental Protection (DEP), Water and Rivers Commission (WRC) and other government agencies, the WAPC's response to submissions and the EPA's own research and expertise.

The relevant environmental factors raised in the GBRS are identified in Section 2.3. A Strategy prepared by the EPA to assist in evaluating the natural values of new zones, infrastructure and ROS reserves in the GBRS against set criteria is described in Section 2.4. The issues raised by the GBRS requiring consideration and assessment by the EPA are identified in Section 3. The new zones and reserves requiring assessment by the EPA are identified in Section 3.2.

The conditions and procedures to which the Region Scheme should be subject, if the Minister determines that it may be implemented, are set out in Section 14. Section 15 provides the EPA's Other Advice, Section 16 presents the EPA's Conclusions and Section 17, the EPA's Recommendations.

A list of people and organisations that made submissions is included in Appendix 6. References are listed in Appendix 16 and recommended conditions are provided in Appendix 14. The EPA's advice is provided in Appendix 15.

Appendix 7 contains a summary of the public submissions and the Responsible Authority's responses. The EPA has considered issues raised in public submissions when identifying and assessing relevant environmental factors.

1.1 Right of appeal and condition setting

Section 100 (2) of the *Environmental Protection Act 1986* states that the responsible authority (being the WAPC), any decision making authority or any other person which or who disagrees with the content of, or any recommendations in this report, may lodge with the Minister for the Environment an appeal in writing setting out the grounds of that appeal.

Section 101 (2a) of the *Environmental Protection Act 1986* states that the Minister for the Environment shall consult, and attempt to reach agreement with, the responsible Minister (Minister for Planning and Infrastructure) on deciding the outcome of appeals.

Once any appeals lodged under Section 100 (2) have been determined the Minister for the Environment shall consult the Minister for Planning and Infrastructure and, if possible agree on conditions to which the GBRS should be subject if the Scheme is to be implemented.

1.2 Summary of the key characteristics of the Greater Bunbury Region Scheme

A summary of the key characteristics of the proposed GBRS is presented in Table 1. A description of the GBRS is provided in Section 1 of the Environmental Review document (WAPC, 1999d).

Table 1: - Key characteristics of proposed Greater Bunbury Region Scheme

Element	Description
Local Government Authorities included in Region Scheme:	City of Bunbury Shire of Harvey Shire of Dardanup Shire of Capel
Total area of new Urban zones:	124 hectares
Total area of new Urban Deferred zones:	838 hectares
Total area of new Industrial zones:	1051 hectares
Total area of Regional Open Space reserves:	16 850 hectares

2 Background

2.1 Scope of the EPA's assessment

The Instructions for the preparation of the Environmental Review were issued by the EPA in November 1996. The scope of the EPA's assessment as outlined in the Instructions was to focus on the "new zones" where the zoning shown in the GBRS differs from that shown in the existing local government district zoning scheme and represents a real change in proposed land use that has the potential for adverse environmental impacts.

The EPA has not assessed in detail the existing zones and reserves in local town planning schemes. Future subdivision or development in these areas may still require referral to the EPA pursuant to section 38 of the *Environmental Protection Act 1986.*

A number of environmental factors relating to particular zones or areas of land have not been included in the EPA's assessment due to the broad scale of the assessment or because insufficient information is available at this stage of the planning process. The EPA has decided that these factors should be deferred to ensure that the EPA has the opportunity to assess the potential impact of future proposals on these particular factors. The 'deferred factors' are listed in detail in Section 15.

2.2 Preliminary environmental factors

The preliminary environmental factors and issues raised by the GBRS as identified in the Instructions were:

- vegetation in existing and proposed conservation estate;
- regionally significant vegetation;
- fauna and habitat in existing and proposed conservation estate;
- regionally significant fauna and habitat;
- regionally significant wetlands;
- Leschenault Estuary - water quality;
- foreshore stability and dune protection;
- groundwater quality for future public water supply area;
- surface water quality existing water supply catchment areas;
- surface water quality;
- odour;
- gaseous emissions;
- solid waste disposal;
- noise and vibration;
- urban bushland; and
- regionally significant vegetation and wetlands in the rural areas.

These issues were addressed in the Environmental Review document.

2.3 Relevant environmental factors

Section 48D of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposed Scheme and on the conditions and procedures to which the proposed Scheme should be subject, if implemented. In addition, the EPA may make recommendations as considered necessary.

A number of relevant factors were identified from the EPA's consideration and review of all preliminary environmental factors generated from:

a) the Environmental Review document;

b) the EPA's advice to the WAPC on the *Bunbury – Wellington Region Plan* (EPA, 1993c) and *Industry 2030* (EPA, 1998c, 1999c); and

c) the public and government submissions and the WAPC's response to these submissions (Appendix 7).

The EPA also considered:

a) that there were alternative approvals processes which could ensure that a number of preliminary factors will be appropriately managed; and

b) a number of preliminary factors could not be assessed at the broad scale of the GBRS and should be deferred until a later stage of the planning process (Section 15).

Table 2: Environmental issues and relevant environmental factors raised by the Greater Bunbury Region Scheme

ISSUE	FACTOR	EPA OBJECTIVE
Biophysical		
Protection of biodiversity	Regionally significant wetlands and watercourses	To maintain the integrity, functions and environmental values of regionally significant wetlands.
	Regionally significant vegetation	To maintain the abundance, diversity, geographical distribution and productivity of regionally significant vegetation complexes.
	Regionally significant fauna	To maintain the abundance, diversity, geographical distribution and productivity of regionally significant fauna.
Pollution		
Separation of conflicting land uses. (Buffer requirements for air quality, odour and noise).	Air quality	To ensure that there is adequate separation between industry/facilities and incompatible land uses to enable the health, welfare and amenity of surrounding residences to meet statutory requirements and acceptable standards.
	Odour	To ensure that there is adequate separation between odorous industries/facilities and incompatible land uses to enable acceptable criteria for individual exposures to be met.
	Noise	To ensure that there is adequate separation between industry/facilities and incompatible land uses to ensure that noise levels meet statutory requirements and acceptable standards.
Protecting surface water quality	Water quality in Leschenault Inlet, wetlands and watercourses	To ensure that land uses that may pollute surface water catchments are not situated within public water supply surface water catchment areas.

Based on the above it is the EPA's opinion that the environmental issues and relevant environmental factors in Table 2 are relevant to the proposed scheme and require detailed evaluation in this report. The EPA's objective in relation to each issue and associated factor is also summarised in Table 2.

2.4A Strategy for the EPA to identify regionally significant natural areas in its consideration of the Greater Bunbury Region Scheme portion of the Swan Coastal Plain

The EPA has prepared a Strategy to identify regionally significant natural areas in its consideration of the Greater Bunbury Region Scheme portion of the Swan Coastal Plain (Appendix 3), hereinafter referred to as the Natural Areas Strategy, to assist in evaluating the natural values of new zones, infrastructure and ROS reserves in the GBRS against set criteria. The Natural Areas Strategy was adapted from the approach developed for Perth's Bushplan/Bush Forever to ensure a consistent application of the same regional data sets used in Perth's Bushplan/Bush Forever, and a common framework for further progression of the System 6 and Part System 1 Update process.

In August 2000 the EPA provided the draft Natural Areas Strategy to key stakeholders inviting comment on errors and omissions. A number of comments were received. The final strategy (Appendix 3) is different from the draft in that it has been altered to reflect the noted errors and omissions and includes additional information on the extent and nature of the remaining native vegetation in the Greater Bunbury Region.

The Natural Areas Strategy measures a particular area's natural values against the selection criteria for the identification of regionally significant natural areas developed for System 6 and Part System 1 Update and the Bushplan Project. Six criteria, updated to current policy standards and adapted to a largely rural environment, are used in the Natural Areas Strategy. These are listed below.

- Representation of ecological communities - Areas selected to represent the range of ecological communities and the places in which these communities merge.
- Diversity - Areas with a high diversity of landforms, flora and/or fauna species or communities in close association.
- Rarity - Areas containing rare or threatened communities or species, or species of restricted distribution.
- Maintaining ecological processes or natural systems - Maintenance of ecological processes or natural systems at a regional or national scale.
- Scientific or evolutionary importance - Areas containing evidence of evolutionary processes either as fossilised material or as relict species and areas containing unusual or important geomorphological or geological sites; including areas of recognised scientific and educational interest as reference sites or as examples of the important environmental processes at work.
- Protection of wetland, streamline, and estuarine fringing vegetation and coastal vegetation - Conservation category wetland areas including fringing vegetation

and associated upland vegetation, and coastal vegetation within the accepted coastal management zone.

The criteria, and their application to particular sites are described in more detail in Appendix 5. These same criteria are used in the EPA's Guidance 10 (EPA, 2003).

To encompass current recognised levels of remnant native vegetation retention in the application of the first criterion, Representation of Ecological Communities, the Natural Areas Strategy uses a standard level of native vegetation retention of at least 30% of the pre-clearing extent of the ecological communities on the Swan Coastal Plain.

For the Greater Bunbury Region (except for lands identified in the 'GBR Constrained Area') this means the objective is to seek to:

- retain at least 30% of the pre-clearing extent of the ecological communities in the GBR, where greater than 30% of an ecological community remains on the Swan Coastal Plain
- preferentially locate developments in cleared areas, where 30% or less of the pre-clearing extent of the ecological community remains on the Swan Coastal Plain.

Within the terms of this criterion, vegetation complexes, which are mapped for the entire extent of the southern Swan Coastal Plain, are used as the base mapping of ecological communities. Much of the Swan Coastal Plain has been altered to such an extent that 12 of the 15 vegetation complexes have 30% or less of their area remaining on the Plain. As a consequence, for the targets to be met by the EPA all remaining vegetation in these complexes is in need of retention and some level of protection. In recognition of this situation the following specific policy statement is applied:

The general protection of remnant native vegetation on the Swan Coastal Plain in the Greater Bunbury Region be achieved through the preferential location of developments in cleared areas.

Within the 'GBR Constrained Area' of the Swan Coastal Plain these levels are modified. The 'GBR Constrained Area' includes the consolidated urban, urban deferred and industrial zones. Generally the modified objective in the 'Constrained Area' is to:

- retain at least 10% of the pre-clearing extent of the ecological community in the 'Constrained Area' of the GBR where greater than 10% of the ecological community remains on the Swan Coastal Plain (the natural region) OR
- retain all remaining areas of each ecological community in the 'Constrained Area' of the GBR where 10% or less than 10% of this ecological community remains on the Swan Coastal Plain.

However, this does not limit application of all the criteria, especially the 'Rarity' and 'Maintaining Ecological Processes or Natural Systems' criteria. That is, an area in the 'Constrained Area' can be considered regionally significant if selection of the natural area is:

- from an ecological community already below 10% pre-clearing extent;

- a threatened ecological community; and/or
- part of a regionally significant sequence of ecological communities (ecological linkage).

Two specific policy statements are also developed in the Natural Areas Strategy to address those ecological communities where less than 10% remains. Most communities in this category are communities typical of the eastern side of the Coastal Plain (principally the Pinjarra Plain). In keeping with *Bush Forever* these areas are not the subject of individual recommendations and are covered by the following specific EPA policy statement:

> *There is a presumption that all areas of remnant native vegetation containing threatened ecological communities or vegetation of the major landform elements of which less that 10% currently remains on the Swan Coastal Plain will be retained and conserved in the Greater Bunbury Region.*

In these areas there is also a need to consider restoration of ecological function. This can be approached through the identification of a series of regionally significant ecological linkage opportunities. Within these 'linkage areas' the restoration of ecological communities and landscape rehabilitation between and around the small remaining remnants on the eastern side of the Plain will be a priority. This issue can be covered by the following specific EPA policy statement:

> *There be proactive planning for the restoration of ecological communities and landscape rehabilitation between and around selected sequences of the small remaining remnants on the eastern side of the Swan Coastal Plain in the Greater Bunbury Region.*

The application of the criteria and the specific policy statements within the terms of the Natural Areas Strategy for the assessment of the GBRS required the further identification of the regionally significant sequences of ecological communities within and between the major landform elements (hereafter referred to as ecological linkages) as identified in the Ecological Linkages Plan (Appendix 4). While the EPA recognises that the systematic identification of regionally significant natural areas, and the mechanisms to protect these areas, is proposed to be achieved through the update of the remainder of the System 6 and part System 1 area in a similar co-ordinated program to *Bush Forever* (Government of WA, 2000a), the EPA is of the opinion that sufficient information has been gathered to broadly identify a series of regionally important ecological linkages.

In identifying these ecological linkages the EPA is mindful of the following:

- naturally vegetated areas (in particular the larger relatively intact remnants) in the area of the Linkages should be priorities for retention and protection, to meet the criteria for regional significance against at least two criteria, that is 'Representation of ecological communities' and 'Maintaining of ecological processes or natural systems';
- specific values of the natural areas in the vicinity of each Linkage have generally not been identified, the definition of these areas is dependent on a description of the areas' specific area values and a consideration of these against the criteria; and

- the area of the ecological linkages could provide a focus for the restoration of ecological communities and landscape rehabilitation between and around the small remaining remnants on the eastern side of the Swan Coastal Plain.

Two types of linked (or potentially linked) sequences of ecological communities were identified in the EPA's Strategy, vegetated sequences and river corridors. This same grouping is used here to list the 16 ecological linkages identified in the Greater Bunbury Region (see list below and Appendix 4). The vegetated sequences and river corridors identified in the Natural Areas Strategy are incorporated in this list. The name, or part name, from the EPA's Strategy is given in brackets after each named linkage.

Vegetated sequences

a) North/south Ecological Linkages
- Yalgorup/Myalup/Leschenault Coastal
- McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup (Kemerton Buffer Link; Wellesley River, part Brunswick and Collie Rivers; part Dalyellup/Gelorup/Preston River/Plateau Link)
- Maidens/Muddy Lake/Ludlow Coastal

b) East/west Ecological Linkages (most of these are relatively short, only three go from the coast to the Plateau)
- Yalgorup/Riverdale Road/Yarloop (Riverdale Road Transect)
- Myalup/Kemerton
- Leschenault/Kemerton
- Leschenault/Eaton
- Maidens/Preston River (Ocean to Preston River Corridor or Region Park)
- Dalyellup/Gelorup/Crooked Brook (part Dalyellup/Gelorup/Preston River/Plateau Link)
- Capel/Boyanup
- Wonnerup/Ludlow River/Gibson Forest

River Corridors or River Ecological Linkages
- Brunswick River
- Collie River
- Ferguson River
- Capel River
- Preston River (portion of the Preston River in the City of Bunbury outside of the Mandurah/ Kemerton/ Twin Rivers/ Preston River/ Gwindinnup Ecological Linkage

At this stage the location of the Corridors is shown in the 'Constrained' portion of the Greater Bunbury Region and indicated beyond this boundary. A final detailed identification of these Linkages, beyond the boundaries of the 'Constrained' portion of the Greater Bunbury Region, will be developed through the update of the remainder of the System 6 and part System 1 area in a similar co-ordinated program to *Bush Forever*.

3. Issues raised by the Greater Bunbury Region Scheme requiring consideration and assessment by the EPA

There are a range of issues raised by the GBRS requiring consideration and assessment by the EPA. These issues include:

- environmental submissions received during the public consultation period (Appendix 7);
- new Urban and Urban Deferred zones with potentially significant environmental impacts (Section 4);
- assessment of Kemerton Industrial Area Expansion (Section 5)
- the potentially significant environmental impacts of the new Port Installation zone and adequacy of the adjacent ROS reserve boundary alignment (Section 6);
- new road and rail reserves with potentially significant environmental impacts (Section 7);
- the new Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton (Section 8);
- adequacy of new Regional Open Space reserves (Section 9);
- Assessment of zones and reserves raised in submissions and other matters with potentially significant environmental impacts (Section 10);
- Special Control Areas (Section 11);
- policies linked to the Greater Bunbury Region Scheme (Section 12); and
- regionally significant environmental issues of concern to the EPA (Section 13);

3.1 Environmental submissions received during the public consultation period

There were 272 written submissions received on the GBRS during the public consultation period; 169 (62%) of these were concerned with environmental matters. The issues raised in the submissions not concerned with environmental issues do not need to be considered by the EPA and are being considered by the WAPC separately.

Close to half of the environmental issues raised in the submissions relate to ROS. These issues were raised by landowners with properties affected by proposed ROS or people requesting additional land to be included in ROS reserves.

In response to the concerns raised in the submissions the following work was undertaken by the Department for Planning and Infrastructure (DPI), on behalf of the WAPC:

- additional independent environmental investigations of particular sites proposed to be included in new zones or reserves and the subject of environmental submissions; and

- survey of specific boundaries to ensure they reflect the extent of regional values.

Appendix 7 summarises the environmental issues raised in the environmental submissions and documents the WAPC's comments and the EPA's recommendation in relation to each issue.

3.2 Assessment of new zones and reserves with potentially significant environmental impacts

One of the objectives of the EPA's assessment is to assess the "new zones and reserves" in the GBRS. These are the zones and reserves in the GBRS which differ from those in the existing local government district zoning scheme.

However, not all of the new zones and reserves in the GBRS have the potential to have significant environmental impacts requiring the EPA's assessment. Table 3 below identifies the new zones and reserves that have the potential to cause significant impacts to the environment and require further assessment by the EPA.

Table 3: Identification of the new zones and reserves in the Greater Bunbury Region Scheme

New zones and reserves	Description of proposal and potentially significant environmental impacts	EPA comments
Urban and Urban Deferred		
Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant (Urban Deferred), Lots 27, 150, 151, 1 and 21 Paris Road (north), Australind (Urban Deferred) and Lot 3 Paris Road (south), Australind (Urban zone)	Regionally significant remnant vegetation	Further EPA assessment required (Section 4.1).
Lot 1 Australind Bypass, Eaton (Urban zone)	There is no regionally significant vegetation on the subject land. Therefore, the EPA is of the view that the proposed Urban Deferred zoning is environmentally acceptable because it is unlikely that future urban development on the subject land will cause any regionally significant environmental impacts.	No objections to the proposed Urban Deferred zoning. No further EPA assessment required as part of the GBRS assessment. It should be noted that future urban development on the subject land may be subject to any relevant environmental conditions imposed on the GBRS.
Lot 0 Ditchingham Place, Treendale (Urban and Urban Deferred zones)	There is no regionally significant vegetation on the subject land. Therefore, the EPA is of the view that the proposed Urban Deferred zoning is environmentally acceptable because it is unlikely that future urban development on the subject land will cause any regionally significant environmental impacts.	No objections to the proposed Urban Deferred and Urban zoning. No further EPA assessment required as part of the GBRS assessment. It should be noted that future urban development on the subject land may be subject to any relevant

New zones and reserves	Description of proposal and potentially significant environmental impacts	EPA comments
		environmental conditions imposed on the GBRS.
Dalyellup (east) Bussell Highway (Urban Deferred zone)	The subject land is predominantly cleared. There is an EPP wetland on the subject land. The EPA considers that the proposed Urban Deferment zoning is environmentally acceptable subject to the EPP wetland being appropriately conserved and managed to protect and maintain its values. Any locally significant remnant vegetation on the subject land could be protected through the subdivision and development process.	No objections to the proposed Urban Deferred zoning. No further EPA assessment required as part of the GBRS assessment. It should be noted that future urban development on the subject land may be subject to any relevant environmental conditions imposed on the GBRS.
Lots 313-317 south of Harewoods Rd, South Dalyellup (Urban Deferred zone)	Regionally significant remnant vegetation	Further EPA assessment required (Section 4.2).
Reserve 31012 Harewoods Road, Dalyellup (Urban Deferred zone)	Regionally significant remnant vegetation	Further EPA assessment required (Section 4.3).
Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup (Urban Deferred zone)		Further EPA assessment required (Section 4.4).
Burekup (Urban Deferred zone)	There is no regionally significant vegetation on the subject land. Therefore, the EPA is of the view that the proposed Urban Deferred zoning is environmentally acceptable because it is unlikely that future urban development on the subject land will cause any regionally significant environmental impacts.	No objections to the proposed Urban Deferred zoning. No further EPA assessment required as part of the GBRS assessment. It should be noted that future urban development on the subject land may be subject to any relevant environmental conditions imposed on the GBRS.
Maitland Road, Capel (north) (Urban Deferred zone)	There is no regionally significant vegetation on the subject land. Therefore, the EPA is of the view that the proposed Urban Deferred zoning is environmentally acceptable because it is unlikely that future urban development on the subject land will cause any regionally significant environmental impacts. Locally significant stands of vegetation should retained where possible as part of the future subdivision and/or development of the land.	No objections to the proposed Urban Deferred zoning. No further EPA assessment required as part of the GBRS assessment. It should be noted that future urban development on the subject land may be subject to relevant environmental conditions imposed on the GBRS.
Lot 871 Prowse Road, Capel (south) (Urban zone)	Potential impacts on remnant vegetation	Further EPA assessment required (Section 4.5).
Lot 2 Harvey (east) (Urban zone)	Potential impacts on remnant vegetation	Further EPA assessment required (Section 4.6).
Industrial		
Kemerton	The expansion of the Kemerton Industrial area has	Further EPA assessment required (Section 5).

New zones and reserves	Description of proposal and potentially significant environmental impacts	EPA comments
Industrial Area Expansion	the potential to impact on regionally significant remnant vegetation, wetlands and watercourses. The expansion also has the potential to have impacts on sensitive landuses caused by noise and air quality.	
North Capel Industrial zone	It is proposed, under the GBRS, to include additional land (Wellingtom Loc 4130) that is already developed and operating as part of the North Capel industrial complex in the Industrial zone. The adequacy of SCA No. 3 in providing an adequate buffer area around the North Capel Industrial Area is assessed in Section? The EPA advises that SCA No. 3 will provide adequate separation between current and future industrial operations and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.	No objections to the proposed Industrial zoning. No further EPA assessment required as part of the GBRS assessment.
Port Installation		
Port Installation zone and adequacy of the adjacent ROS reserve boundary alignment	The remnant vegetation and wetlands within the proposed Port Installation zone do not have regionally significant conservation values. Remnant vegetation of local value could be maintained through subdivision and development processes. The area on the east side of the Collie River adjacent to the delta supports natural vegetated areas of Flooded Gum and Swamp Sheoak which adds a significant habitat component to the adjacent regional open space. The area also consolidates the size and shape of the regional open space and reduces the edge to area ratio.	Further EPA assessment required (Section 6).
Primary Regional Road and Rail Reserves		
Perth-Bunbury Highway	The Primary Regional Road reserve for Perth-Bunbury Highway, between the northern boundary of the GBRS and Australind, has been widened to facilitate the upgrading of the highway. The proposed upgrading has been completed. No significant environmental issues were raised by the upgrading that has been constructed and or are raised by the upgrading still to be constructed.	No further EPA assessment required as part of the GBRS assessment.
Raymond Road	The road reserve for Raymond Road is proposed to be widened so that Raymond Road can be upgraded. The proposed widened road reserve passes near a Conservation category wetland and through areas of remnant vegetation.	Further EPA assessment required (Section 7.1).
South Western Highway (northern section between the northern boundary of the GBRS and Preston River)	The road reserve for this portion of the South Western Highway is proposed to be widened so that the Highway can be duplicated. There is remnant vegetation within the widened road reserve.	Further EPA assessment required (Section 7.2).
South Western Highway (southern section between the Bunbury Outer Ring Road and	The Primary Regional Road reserve for South Western Highway (south), has been widened to facilitate the duplication of the highway. The proposed upgrading has been completed.	No further EPA assessment required as part of the GBRS assessment.

New zones and reserves	Description of proposal and potentially significant environmental impacts	EPA comments
the southern boundary of the GBRS, excluding the Boyanup Bypass)		
Coalfields Highway (between the South Western Highway and the eastern boundary of the GBRS)	The Primary Regional Road reserve for Coalfields Highway has been widened to facilitate the upgrading of the highway. Part of the proposed upgrading has been completed and further upgrading is still proposed. No significant environmental impacts were raised by the upgrading that has been constructed and no significant issues are raised by the upgrading still to be constructed.	No further EPA assessment required as part of the GBRS assessment.
Port Access Road	Potential impacts on regionally significant remnant vegetation and wetlands	Further EPA assessment required (Section 7.3).
Boyanup Bypass Road	Potential impacts on regionally significant remnant vegetation and a wetland.	Further EPA assessment required (Section 7.4).
Bussell Highway	The Primary Regional Road reserve for Bussell Highway, has been widened to facilitate the upgrading of the highway. The dual carriageway has been constructed for the full length of the highway within the GBRS area.	No further EPA assessment required as part of the GBRS assessment.
Public Purpose Reserves		
Lot 310 and Part of Lots 23, 35 and 205 Marriot Road, Kemerton	Odour emissions from the wastewater treatment plant have the potential to impact on sensitive landuses. The plant also has the potential to impact on remnant vegetation	Further EPA assessment required (Section 8).
Glen Iris Relief Floodway	The land requirements for the floodway reserve were determined by the Water and River and Commission before being included in the GBRS.	No further EPA assessment required as part of the GBRS assessment.
Regional Open Space Reserve		
Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)	Regionally significant remnant vegetation and watercourse	Further EPA assessment required (Section 9.1).
Locations 7 and 14 Buffalo Rd, Binningup	Regionally significant remnant vegetation and wetlands	Further EPA assessment required (Section 9.2).
Twin Rivers - Pt Lot 211 Barnes Avenue, Australind	Regionally significant remnant vegetation and regionally significant wetlands	Further EPA assessment required (Section 9.3).
Picton Waters – EPP Lake on portion of Lots 40-44 Jeffery Road, Picton	Regionally significant wetlands	Further EPA assessment required (Section 9.4).
College Grove - Lot 1000 Bussell Highway	Regionally significant remnant vegetation and wetlands	Further EPA assessment required (Section 9.5).
Muddy Lakes- Minninup Rd, Capel	Regionally significant remnant vegetation and regionally significant wetland	Further EPA assessment required (Section 9.6).

4. Assessment of new Urban and Urban Deferred zones with potentially significant environmental impacts

The new urban zones in the GBRS requiring further EPA assessment, as identified in Table 3, are as follows:

4.1 Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant (Urban Deferred), Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind (Urban Deferred) and Lot 3 Paris Road (south), Australind (Urban zone)

Description
Reserve 35061 is zoned Urban Deferred in the GBRS (Appendix 1). The land is currently zoned Public Utilities in the Shire of Harvey Town Planning Scheme No. 1. The waste water treatment plant on the site has been decommissioned

Lots 27, 150, 151, 1 and 21 to the north of Paris Road are proposed to be zoned Urban Deferred in the GBRS. Lot 3 to the south of Paris Road is proposed to be zoned Urban in the GBRS. Lot 27 and 3 are currently zoned Public Utilities and General Farming, respectively, in the Shire of Harvey Town Planning Scheme No. 1 and are new zones for the purposes of the EPA's assessment of the GBRS.

An amendment to rezone Lot 28 from General Farming to Residential was referred to the EPA pursunt to section 7A1 of the *Town Planning and Development Act 1928* in November 1999. The EPA decided to "not assess" the proposed amendment.

In arriving at a decision to "not assess" the amendment and to provide publicly available environmental advice, the EPA was satisfied that a portion of the remnant vegetation on the site would be protected as part of the eventual residential development of the land.

Following the preparation of a Natural Area Strategy (Appendix 3) and a more comprehensive assessment of the regional natural values, which indicate that the site has regional natural values that should be conserved (as discussed below), the EPA recommends that a more significant portion of the bushland on Lot 28 be conserved.

Submissions
A number of submissions state that all or part of Reserve 35061 should be reserved as ROS.

WAPC's response to submissions
The WAPC advises that its environmental study (HGM, 2002) concludes that the northern and western portions of Reserve 35061 contain vegetation of regional conservation value, particularly in terms of providing for an extension to the adjacent

Wardandi Reserve, but that the balance of the reserve either supports wastewater treatment infrastructure or is otherwise degraded. Based on this information, the WAPC has recommended that the northern and western portions of this site should be included in an ROS reserve (Map7 – Appendix 8).

EPA Assessment

The EPA considers that all of Reserve 35061 and part Lots 27, 28 and 150 are regionally significant because the sites meets four of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Diversity;
- Maintaining Ecological Processes or Natural Systems; and
- General Criteria for the protection of wetland, streamline and estuarine fringing vegetation.

The natural attributes of the sites that contribute to meeting these criteria being met are listed below:

- Substantial representative area of upland and wetland natural vegetation of Bassendean Complex – Central and South;
- Contain a wetland likely to be included within the Conservation category classification;
- Relatively diverse containing a wide range of flora (estimated over 120 taxa in area), including four priority taxa being *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Jacksonia sparsa* (P4);
- The remnant vegetation consolidates the Wardandi Reserve to form a significant stepping stone of bushland area in two Ecological Linkages; and
- It is part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage (Appendix 4) and the Brunswick River Ecological Linkage (Appendix 4), being contiguous with Brunswick River (System 6 area C67) to west and, together with bushland to the north, forms an important node in the ecological linkage across the river bend in the Brunswick River (System 6 area C67).

Summary

It is the EPA's opinion that:

(a) the remnant vegetation on the northern and western portions of Reserve 35061, as shown on Map 1 (Appendix 9), should be reserved in the GBRS and appropriately managed;

(b) the bushland on part Lots 27, 28 and 150 to the north of Paris Road should be conserved and managed as part of any future subdivision and development, whichever comes first; and

(c) the environmental factors remnant vegetation, fauna and ecological linkage should be deferred until the subdivision or development stages ,whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

4.2 Lots 313-317 south of Harewoods Road, South Dalyellup (Urban Deferred)

Description
Lots 313-317 are situated approximately 8.5km south of the Bunbury CBD and the eastern parts of these lots are designated as Urban Deferred in the GBRS (Appendix 1). The subject land is currently zoned Rural under the Shire of Capel Town Planning Scheme.

The landowner is seeking approval from the EPA for the extraction of sand and limestone at Lots 313-317, Gelorup. The EPA is currently formally assessing this proposal pursuant to Section 38 of the *Environmental Protection Act 1986* (EPA Assessment No. 1394), separately from its assessment of the GBRS.

The proponent has not submitted a draft Public Environmental Review for the proposed extraction of sand and limestone, so the timing of the EPA's assessment of the proposal is unknown. The S48A process requires the EPA to meet certain statutory timeframes in its assessment of the GBRS. The EPA will, therefore, consider the environmental values of Lots 313-317 and potential impacts of the proposed Urban Deferred zoning as part of its assessment of the GBRS, prior to assessing the proposal for extraction of sand and limestone.

Submissions
A number of submissions objected to the eastern parts of Lots 313-317 being designated as Urban Deferred on the basis that it will result in clearing of Tuart woodland, destruction of habitat and EPP wetland, impact on adjacent conservation reserves and remove an important conservation link between System 6 area C71 and the coastal ROS south of Dalyellup.

The EPA and WAPC responses to the specific comments made in the submissions concerning Lot 313-317 are included in Appendix 7 and the EPA's consideration of a number of the general issues raised in the submissions is described below.

WAPC response to submissions
The WAPC advises that its environmental study concludes that the eastern parts of the southern three lots proposed to be zoned Urban Deferred (Lots 315, 316 and 317) have regionally significant conservation value due to the east-west link they provide between two conservation areas and the vegetation condition. The study notes that current activity on the property is degrading conservation values. Given the conservation values of the southern three lots the WAPC advises that it would be inappropriate to indicate their suitability for future urban development. However, these values may be retained with an appropriate rural use over the land. The WAPC further advises that the southern three lots should be zoned Rural and the EPA should note observations from the WAPC's environmental study.

EPA Assessment

Lots 313-317 are part of an outstanding coastal regionally significant natural area (Dalyellup/Minninup Swamp Natural Area). The values of the regional coastal bushland block are:

- Landscape diversity (west-east catenary sequence): coastal foredune, coastal dune, wetland, upland and lowland;
- Geomorphological diversity (west-east catenary sequence): Quindalup Dunes-Quindalup Dune wetlands, Quindalup/Spearwood Dune interface wetlands-Spearwood Dunes;
- Vegetation structural unit diversity (west-east catenary sequence): Foredunes, Peppermint scrub, Peppermint/Tuart woodland, wetlands dominated by combinations of Peppermint, Tuart,, Swamp Banksia, *Melaleuca* and sedges, Tuart/Peppermint forest, Marri, Tuart/Jarrah over Banksia woodland;
- Part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage (Appendix 4) and part of the Maidens/Muddy Lake/Ludlow Coastal Ecological Linkage (Appendix 4);
- Species diversity; more than 225 flora; and
- Outstanding habitat values: diverse habitat types support a range of fauna, including species listed under State and Commonwealth legislation.

The eastern parts of Lots 315-317 are considered to be a regionally significant natural area of high value because the site meets two of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities; and
- Maintaining Ecological Processes and Natural Systems.
- The natural attributes that contribute to these criteria being met and making them suitable for protection as part of the coastal bushland block are listed below and described in detail in Sheet 4 (Appendix 5):
- The vegetation on the site is representative of Spearwood Dune vegetation of the Karrakatta Complex Central and South Vegetation Complex) of which 29.5% remains of the original extent of this complex on the Swan Coastal Plain. Only 9% of what remains is currently secured on the Swan Coastal Plain in protected areas;
- Representative of the southern *Eucalyptus gomphocephala - Agonis flexuosa* woodlands (floristic community type 25) which is the largest representation of this floristic community type in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage (Appendix 4);
- The site contains the most southern high Spearwood Dune (25m) on the Swan Coastal Plain, alongside a Spearwood Dune flat which is a distinct landform/vegetation unit within the Karrakatta Central and South Vegetation Complex in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage (Appendix 4). The dune supports significantly different vegetation (dominated by Tuart) to

that in the Dalyellup Reserve (System 6 area C71) (which is dominated by scattered Marri, Tuart and Jarrah);

- The subject land contains a relatively large area of native vegetation (approx. 57ha) of compact shape, contiguous with other natural areas to east and west;
- The subject land provides the only opportunity to link the proposed Dalyellup ROS portion of the Dalyellup/Minninup Swamp Natural Area and adjacent bushland to the east (System 6 area C71 - Dalyellup Reserves). Other areas of its type in the linkage have already been developed for housing or have been approved for subdivision. Decreasing the extent of the linkage would reduce the habitat function;
- Contained an area of vegetation in Very Good condition which has been subject to recent degrading activities, however the vegetation on this site is considered to have the ability to recover from these activities; and
- The site contains Tuart and Peppermint Open Forest to Woodland which is significant breeding habitat for bird species utilising tall trees or hollows and species of wetland birds that feed in adjacent wetlands and significant habitat for animals moving between the different habitats of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage and the Maidens/ Muddy Lakes/ Ludlow Coastal Ecological Linakge (Appendix 4).

The EPA is concerned that further degradation of the natural values of the site and recommends that planning measures be implemented by the WAPC to manage and prevent any further development or change of land use on the eastern parts of Lots 315, 316 and 317.

The EPA notes that Bush Forever recognised that the 10% target is unlikely to be achieved for the Karrakatta Central and South complex in the Perth Metropolitan Region but that there are opportunities for conservation of this complex outside of the Perth Metropolitan Region and Lots 315, 316 and 317 represent such an opportunity.

Summary

It is the EPA's opinion that:

(a) the remnant vegetation on Lots 315, 316 and 317 should be conserved and appropriately managed either as a ROS reserve in the GBRS or as part of future zoning, subdivision and/or development on the lots;

(b) the extraction of sand and limestone from Lots 315, 316 and 317 is incompatible with the need to protect vegetation in this area;

(c) the environmental factors remnant vegetation, fauna and ecological linkage should be deferred until the subdivision or development stages ,whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986*; and

(d) immediate planning measures be implemented by the WAPC to manage and prevent any further development or change of land use on Lots 315, 316 and 317, until the GBRS has been proclaimed.

4.3 Reserve 31012 Harewoods Road, Dalyellup (Urban Deferred zone)

Description
Reserve 31012 is situated approximately 8km south of the Bunbury CBD and proposed to be zoned Urban Deferred in the GBRS (Appendix 1). The subject land is currently reserved for Public Purposes in the Shire of Capel Town Planning Scheme No. 7.

A portion of the 13.2 ha site has been used by the Shire of Capel as a waste disposal site. There is remnant vegetation on the balance of the site (Map 3 - Appendix 9).

EPA Assessment
A portion of Reserve 31012 is considered by the EPA to be regionally significant because it meets four of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Rarity;
- Maintaining Ecological Processes or Natural Systems; and
- General Criteria for the protection of wetland, streamline and estuarine fringing vegetation.

The natural attributes of Reserve 31012 that contribute to these criteria being met are listed below:

- Characteristic of damp Spearwood Dune flat vegetation of the Bunbury area Karrakatta Complex Central and South which is uncommon;
- Contains populations of at least one species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Western Ringtail Possum);
- The naturally vegetated area of the Reserve is of a quality and type that makes it a significant contribution to the C71 conservation area and to the broader Dalyellup/Gelorup/Crooked Brook Ecological Linkage (Appendix 4); and
- The naturally vegetated area of the Reserve has some wetland characteristics and is of a quality and type that designates the wetland areas as Conservation category.

The WAPC has advised that the environmental qualities of the northern portion of the site are significant and on this basis the northern portion of the site should be reserved as ROS while the remainder of the site is to remain Urban Deferred as advertised (Map 4 - Appendix 8).

A portion of Reserve 31012 has been used in the past as a municipal waste disposal site and is considered to be potentially contaminated. Appropriate landuses need to be determined for the site. It is recommended that as a condition of subdivision or development, whichever comes first, a site investigation be undertaken prior to any ground disturbing activities, to determine the extent and severity of contamination on that part of the site used as a waste disposal site. If the site is found to be contaminated as a

result of this investigation, then a Site Remediation and Validation Report should be produced to the satisfaction of the Department of Environmental Protection.

Summary
It is the EPA's opinion that:

(a) the remnant vegetation on Reserve 31012, as shown on Map 3 (Appendix 9) , is regionally significant and should be reserved and appropriately managed;

(b) appropriate landuses need to be determined for that portion of the site used as a municipal waste disposal site;

(c) a site investigation be undertaken prior to any ground disturbing activities, to determine the extent and severity of contamination on that part of Reserve 31012 used as a waste disposal site. If the site is found to be contaminated as a result of this investigation, then a Site Remediation and Validation Report should be produced to the satisfaction of the Department of Environmental Protection; and

(d) the environmental factor contamination should be deferred until the subdivision or development stages of that part of the site used a municipal waste disposal site, whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

4.4 Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1, 4, 66 and Part Lot 138 Timperley Road, Boyanup (Urban Deferred zone)

Description
A number of lots on the east side of the Boyanup townsite are proposed to be zoned Urban Deferred (Appendix 1). The subject lots have an area of 234ha and are currently zoned Special Rural in the Shire of Capel Town Planning Scheme No. 7. There are 35ha of remnant vegetation on the subject lots (Map 4 - Appendix 9).

The WAPC has approved a structure plan over the subject land.

Submissions
A submission objected to the Urban Deferred zone east of Boyanup due to the impact on a poorly represented vegetation complex and the adjacent State Forest.

WAPC's response to submissions
The WAPC advises that its environmental study concludes that remnant vegetation on Lots 1, 4, 66, 97, 138 and 139 and along the southern boundary of Loc 4402 is of regionally significant conservation value and that this vegetation should be protected. The approved structure plan for this area includes the vegetation on Loc 4402 in a foreshore reserve but identifies the remainder for residential development. As this area is currently zoned Special Rural in Shire of Capel TPS No.7, protection of the remnant vegetation can be considered as part of future rezoning and/or subdivision proposals or as part of a structure plan review.

EPA Assessment

The remnant vegetation on the subject lots proposed to be zoned Urban Deferred is considered to be regionally significant because it meets four criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Rarity;
- Maintaining Ecological Processes and Natural Systems; and
- General Criteria for the protection of wetland, streamline and estuarine fringing vegetation.

The natural attributes of remnant vegetation on the lots proposed to be zoned Urban Deferred on the east side of Boyanup that contribute to meeting the criteria are listed below:

- Contains areas of vegetation representative of Kingia, Swan, Guildford and Cartis Complexes;
- All native vegetation in the Boyanup area is significant. Remnants 2, 3 and 4 would be much greater if the bushland area to the south/east of these remnants could be protected, particularly the vegetated creekline. Vegetated creeklines of this quality with contiguous upland area are rare on the Swan Coastal Plain/Foothills/Plateau interface;
- Diversity of flora and significant flora: *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Drosera marchantii* subsp. *marchantii* (P4), *Jacksonia sparsa* (P3); *Acacia pulchella* var. *goadbyi*, *A. urophylla*, *Johnsonia lupulina*, *Styphelia tenuiflora*, *Kennedia coccinea*, *Adiantum aethiopicum* and *Eucalyptus haematoxylon;*
- This area is significant in the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage (Appendix 4) and Capel/Boyanup Ecological Linkage (Appendix 4) containing the only area of its type known to occur in the linkage not already developed for housing or with subdivision approval;
- Contains significant habitat for bird species which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance; and
- Significant linkage value for species moving between the different habitats of the Capel/Boyanup Ecological Linkage (Appendix 4) and the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage (Appendix 4).

Summary

It is the EPA's opinion that:

(a) the remnant vegetation on the land proposed to be zoned Urban Deferred, as shown on Map 4 (Appendix 9), is regionally significant and should be conserved and appropriately managed as part of any future zoning, subdivision and/or development on the site; and

(b) the environmental factor remnant vegetation should be deferred until the subdivision or development stages ,whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

4.5 Lot 871 Prowse Road, Capel (south) (Urban zone)

Description
Lot 871 is situated on the south side of the Capel townsite and proposed to be zoned Urban in the GBRS (Appendix 1). The 26ha lot is currently zoned Rural in the Shire of Capel Town Planning Scheme. The proposed Urban zone includes approximately 6ha of bushland.

EPA Assessment
The site supports remnant vegetation with significant fauna habitat and ecological linkage values. The drainage line on the east side of Lot 871 supports remnant riverine woodland of *Melaleuca rhaphiophylla, M. preissiana* and *Eucalyptus rudis* which is a significant fauna linkage as well as providing habitats for amphibians.

The west side of Lot 871 supports a combination of wetland and upland vegetation of *Melaleuca rhaphiophylla, M. preissiana, Regelia* sp., *Banksia attenuata, B. ilicifolia, Eucalyptus marginata* and *E .calopylla* which provide habitat for a number of bird species.

Summary
It is the EPA's opinion that:
(a) the Urban zoning on Lot 871 is environmentally acceptable subject to the remnant vegetation being conserved and protected as part of any future subdivision or development on the land; and
(b) the environmental factors remnant vegetation, fauna and ecological linkage should be deferred until the subdivision or development stages ,whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

4.6 Lot 2 Harvey (Urban zone)

Description
Lot 2 is situated on the east side of the Harvey townsite and proposed to be zoned Urban in the GBRS (Appendix 1). The 15ha lot is currently zoned Rural and Residential in the Shire of Harvey Town Planning Scheme. The proposed Urban zone in the GBRS includes approximately 7 ha of bushland. The land to the south and east of the proposed Urban zone is included in the Korijekup Nature Reserve which is proposed to be reserved as ROS in the GBRS.

Submissions
The Wildflower Society of WA states that the proposed new Urban zone at Harvey should be included in an ROS reserve.

WAPC's response to submission
The WAPC has advised that the subject land contains existing pockets of Department of Conservation and Land Management (DCLM) infrastructure in a bushland setting. Only the pockets of infrastructure are zoned residential in Shire of Harvey TPS No.1. Any future subdivision or development proposal would be subject to separate assessment.

EPA Assessment
The 7ha of bushland within the proposed Urban zone is disturbed and the EPA considers that the vegetation is well represented in the Korijekup Nature Reserve. However, in recognition of the values of the native vegetation in the area proposed to be zoned Urban it is recommended that, when the area is subdivided or developed, as much of the native vegetation as possible (at least 60%) should be retained and the interface between the Nature Reserve and development should be managed to minimise the impact on the Nature Reserve. For example a strategic fire plan be developed for the urban lands (all fire access tracks being located in the urban land) and a road be situated between the urban lands and the Nature Reserve.

Summary
It is the EPA's opinion that:

a) the Urban zoning on Lot 2 is environmentally acceptable subject to as much of the remnant vegetation being conserved and protected as possible (at least 60%), as part of any future subdivision or development on the land; and

b) the environmental factors remnant vegetation, fauna and ecological linkage should be deferred until the subdivision or development stages ,whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

5. Assessment of Kemerton Industrial Area Expansion

Description
Kemerton Industrial Area is approximately 17km north-east of Bunbury. The industrial area was established with the primary purpose of accommodating heavy resource processing industries. The GBRS proposes to include an additional 955ha (taking the total industry core to 2106 ha) of land within the Kemerton Industrial zone, consistent with the *Kemerton Expansion Study Final Concept Plan* adopted by the WAPC as part of *Industry 2030 - Greater Bunbury Industrial Land and Port Access Planning* (*Industry 2030*) (WAPC, 2000b).

Industry 2030 was released by the WAPC for comment in 1998. The EPA provided advice to the WAPC on the *Industry 2030* report under Section 16(j) of the *Environmental Protection Act 1986* (EPA, 1998c and 1999c). The majority of the EPA's advice is reflected in the *Kemerton Expansion Study Final Concept Plan* for the Kemerton Industrial Area.

Special Control Area No. 2 (SCA No. 2) is discussed in Section 11.2.

Submissions

A considerable number of submissions raised concerns about a wide range of potential environmental impacts from the expansion of the Kemerton Industrial area. The main issues raised in the submissions were concerned with:

- Noise and odour impacts impacts on surrounding land uses;
- impacts on remnant vegetation, wetlands, watercourses; and
- the impact that future industrial development within the Kemerton Industrial Area will have on visual amenity, particularly along the northwest ridge of the new industry core.

The EPA and WAPC responses to the specific comments made in the submissions concerning the Kemerton Industrial Area are included in Appendix 7 and the EPA's consideration of a number of the general issues raised in the submissions is described below.

EPA Assessment

The main environmental issues raised by the additional 955ha of additional Industrial zoned land in Kemerton can be summarised as:

a) Protecting regionally significant vegetation

b) Protecting wetlands and watercourses;

c) Buffer requirements for noise and air quality;

d) Maintaining a sustainable groundwater balance;

e) Protecting water quality in Wellesley River and Leschenault Inlet;

f) Solid and liquid waste disposal; and

g) Protecting visual amenity.

As part of its assessment of the GBRS the EPA is able to assess the buffer requirements of the Kemerton Industrial Expansion Area and the potential impacts on significant wetlands, vegetation and water balance. However, due to the broad scale of the GBRS it is inappropriate for the EPA to assess the potential impacts of potential industrial developments. The EPA recommends that the assessment of groundwater quality, surface water quality and solid/liquid waste disposal be deferred to ensure that the EPA has the opportunity to assess future subdivisions and development proposal within the Kemerton area. Further information relating to these environmental factors will be required with applications to subdivide or develop the land, so that the proposal can be considered by the EPA pursuant to Part IV of the *Environmental Protection Act 1986*.

(a) Vegetation

In its submission to the WAPC on *Industry 2030* the EPA advised (EPA, 1998c) the WAPC that the:

- proposed expansion of the Kemerton Industrial Area could have a significant impact on regionally vegetation and conservation values;
- Draft Kemerton Structure Plan may require modification to protect vegetation of regional significance pending the outcome of a vegetation survey; and
- Draft Kemerton Structure Plan should not be finalised until the vegetation had been surveyed and assessed in terms of its regional significance and in accordance with criteria adopted by the EPA.

The then Department of Resource Development undertook vegetation surveys, following which the EPA provided additional advice to the WAPC (EPA, 1999c – Appendix 10). The EPA's advice identified areas of significant vegetation in the Draft Kemerton Structure Plan area. The EPA's recommendations resulted in the proposed expansion of the industrial core area being significantly reduced and large areas of regionally significant remnant vegetation are now included within the expanded buffer. The EPA recommended that these areas be provided with a high level of protection through the planning system (EPA, 1998c). The EPA notes that the SCA No. 2 does not highlight the need for regionally significant remnant vegetation to be protected.

The EPA also advised (EPA, 1999c) that some areas of remnant vegetation within the industrial core be shown as "Vegetation Management" to ensure these values are retained and protected within the industrial estate.

(b) Wetlands, watercourses and water balance

The main wetlands of regional conservation value are situated outside the new industrial land within the Kemerton Industrial Area. Due to the high watertable and the presence of significant wetlands adjacent to the proposed industrial core, the EPA advised the WAPC (EPA, 1998c) that a water and drainage management plan should be adopted by government which should aim to protect water levels in significant wetlands and water quality in these wetlands and the Wellesley River.

The WAPC has suggested an environmental management measure requiring the preparation of an environmental management plan demonstrating how vegetation, groundwater and wetlands at Kemerton will be protected from adverse impacts of development. The environmental management plan shall also include a detailed water management strategy dealing with drainage and nutrient management, water level and water quality criteria, a water monitoring program and details of contingency actions available.

The EPA recommends that a condition be imposed on the GBRS reflecting the environmental management measure suggested by the WAPC.

(c) Buffer requirement for noise and air quality

The SCA No. 2 in the GBRS is intended to identify the land which is likely to be subject to off-site impacts, such as noise, odour and dust from the current and future operations within the Kemerton Industrial Area and ensure that land uses incompatible with industry, including single dwellings, are not permitted within the buffer, thereby ensuring the long term operation of the industrial area.

The EPA provided detailed comments on the noise and air quality modeling used to determine the buffer requirements for the Kemerton Expansion Study in its advice to the WAPC on *Industry 2030* (EPA, 1998c). These comments are summarised below.

i. Noise

The modelling and assessments conducted for noise and air quality indicate that noise emissions are the most constraining factor, meaning that noise requires the largest buffer area in order to meet the EPA's criteria.

The *Kemerton Expansion Study Final Concept Plan* (WAPC, 2000b) divides the industrial core into categories for different industries. The "allowable noise levels" or "noise quotas" for individual industrial lots within the industrial expansion area have been modeled on the criteria outlined in the EPA's *Draft Guidance Statement for Environmental Noise* (EPA, 1998b) and will enable acceptable noise levels to be achieved within the buffer area (SCA No. 2) identified in the *Kemerton Expansion Study Final Concept Plan* (WAPC, 2000) pursuant to the *Noise Regulations 1997* (WA Government, 1997).

ii. Air quality

The EPA is satisfied that the appropriate modeling has been conducted and the proposed buffer identified in the *Kemerton Expansion Study Final Concept Plan* (WAPC, 2000b) is adequate to ensure that air quality standards can be met outside the buffer area.

The EPA advises that new project proposals may still need to be assessed under Part IV of the *Environmental Protection Act 1986* and issued with a works approval and licence under Part V of the *Act*.

Overall the EPA considers that, for the assumed industry characteristics with respect to sound power levels and air emissions, the SCA No. 2 around the Kemerton Expansion area provides adequate separation between the proposed industry and surrounding landuses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

(d) Visual Amenity

A submission suggested that ridgeline and vegetation management guidelines for the western and northern expansion areas of Kemerton need to be provided in the GBRS to address issues raised in *Industry 2030*.

The WAPC advises that the *Kemerton Expansion Study Final Concept Plan* designates the ridgeline as a Ridge Development Control Area where development will be subject to special planning controls to ensure visual impacts are minimised and suggests that these special planning controls be included as an environmental condition on the GBRS.

The special planning controls should require that an environmental management plan be prepared to manage potential impacts on a number of environment matters, including visual amenity, to ensure recommendations regarding development control along the ridgeline are implemented through future subdivision and development proposals.

In order to minimise impacts on visual amenity, consideration should be given to landscape protection in the form of building setbacks, re-contouring, screen planting requirements and other measures.

Summary

It is the EPA's opinion that:

a) the Kemerton Industrial Expansion Area and SCA No. 2 can be managed to meet the EPA's objectives provided a condition is imposed on the GBRS requiring that prior to subdivision or development being approved, whichever comes first, within the Kemerton Industrial Area or the SCA No. 2 an Environmental Management Plan is to be prepared and implemented to manage the potential impacts of the subdivision or development on remnant vegetation, wetlands, fauna and visual amenity;

b) areas of regionally significant bushland within SCA No. 2 should be reserved as ROS as a future amendment to the GBRS;

c) Special Control Area No. 2 provides adequate separation between proposed industrial development and surrounding landuses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors; and

(d) The environmental factors noise, air quality, remnant vegetation, groundwater quality, surface water quality and solid/liquid waste disposal should be deferred until the land is subdivided and/or developed for industrial purposes so that the EPA can conduct a detailed environmental assessment pursuant to Part IV of the *Environmental Protection Act 1986.*

6 Assessment of the potentially significant environmental impacts of the new Port Installation reserve and adequacy of the adjacent ROS reserve boundary alignment

Description
An additional 40ha of land is proposed to be reserved as Port Installation in the GBRS for expansion to the existing Port of Bunbury (Appendix 1). The land is currently zoned Rural in the City of Bunbury Town Planning Scheme No. 6. The area to be rezoned Port installation is intended to be used as a dockyard area and for support industry. The Bunbury Port Authority plans to extend the Inner Harbour by dredging to the south east of the basin, to allow for two additional ship berths and associated onshore facilities. This proposal will require separate referral to the EPA for assessment pursuant to the *Environmental Protection Act 1986*

Submissions
The Bunbury Port Authority lodged a submission stating that the ROS in the port area is excessive and will restrict the operations of the port.

WAPC response to submissions
The WAPC advises that the WRC agrees that the block of ROS for the Preston River Oxbow can be reduced where the proposed ROS buffer exceeds 50m width. The Bunbury Port Authority, WRC and City of Bunbury also agree that there are high conservation values at the Preston River delta that need to be protected and that public access to and along the Leschenault Estuary foreshore needs to be accommodated, but that the ROS proposed by the GBRS is excessive between the western end of the waterbird habitat area and the man-made cove. There is an intention to construct a road between port industry and the estuary foreshore but the location and alignment of such a road has not been set. For these reasons, the WAPC has advised that the alignment of the ROS reserve boundary alignment, between the western end of the waterbird habitat area and the south-west corner of the proposed ROS around the man-made cove, should be modified to be at least 50m from the high water mark (Map 9 – Appendix 8). Further revisions to proposed ROS boundaries can be considered when more detailed planning for the port area is finalised.

The WAPC recommends that the ROS boundaries proposed for the Preston River Oxbow and the Leschenault Estuary foreshore between Turkey Point and Preston River be modified in accordance with Map 9 (Appendix 8).

EPA Assessment
The modification to the alignment of the ROS proposed by the WAPC is supported by the EPA because it will expand the ROS reserve to include a significant fauna area on the east side of the Collie River. The modification will also consolidate the size and shape of the ROS and reduce the boundary to area ratio.

The EPA considers that the proposed Port Installations reserve is not likely to have any regionally significant environmental impacts on remnant vegetation or wetlands. Any remnant vegetation or wetlands of local value could be conserved through subsequent subdivision and development processes and managed appropriately. However, the EPA recommends that future proposals on the subject land that may have significant impacts on adjoining land from emissions such as noise and air quality will require referral to EPA pursuant to Part IV of the *Environmental Protection Act 1986*.

Summary
It is the EPA's opinion that:

(a) subject to the alignment of the ROS reserve being modified as proposed by the WAPC (Map 9 - Appendix 8) the Port Installation reserve can be managed to meet the EPA's objectives for remnant vegetation, fauna and foreshores; and

(e) the environmental factors noise, air quality, marine water quality and should be deferred until the land is subdivided and/or developed for port installation purposes so that the EPA can conduct a detailed environmental assessment pursuant to Part IV of the *Environmental Protection Act 1986*.

7. Assessment of new road and rail reserves with potentially significant environmental impacts

The new road and rail reserves identified in Table 3 as requiring further EPA assessment, are as follows:

7.1 Raymond Road

Description
The Primary Regional Road reserve for Raymond Road is proposed to be widened in the GBRS.

EPA Assessment
The Raymond Road Primary Regional Road Reserve crosses a tributary of the Collie River and there are small patches of remnant vegetation within the Primary Regional Road Reserve.

The EPA is of the view that because the land within the reserve is substantially cleared and the reserve is of sufficient width to enable the upgrade to be designed to avoid or minimise impacts on remnant vegetation, the proposed Primary Regional Road Reserve alignment is environmentally acceptable subject to Environmental Management Plans, and Vegetation and Waterway Mitigation Strategies being prepared in accordance with the specifications in Section 15.

Noise and Vibration Management Plans to ensure that potential impacts on surrounding residents are appropriately managed should also be prepared.

Summary
It is the EPA's opinion that:

a) the alignment of the Primary Regional Road reserve for the Raymond Road is environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Waterway Mitigation Strategies being prepared in accordance with the specifications in Section 15; and

b) the environmental factors wetlands, remnant vegetation and the impacts from road users on surrounding noise sensitive landuses should be deferred until the design phase of the Raymond Road upgrade so that a more detailed consideration of the potential environmental impacts of the project and its construction can be undertaken by the EPA pursuant to Part IV of the *Environmental Protecion Act 1986.*

7.2 South Western Highway (northern section between the northern boundary of the GBRS and the Preston River)

Description
The Primary Regional Road reserve for that portion of the South Western Highway between the northern boundary of the GBRS and the Preston River is proposed to be widened so that the Highway can be duplicated.

Submissions
A number of submissions received in relation to South Western Highway objected to the proposed widening of the Highway due to the potential impacts on remnant vegetation.

A number of submissions also objected to the proposed widening because of the potential noise and vibration impacts on nearby residents.

WAPC response to submissions
The WAPC advises that the proposed South Western Highway widening alignment has largely been determined by the alignment of the existing Highway. The width of the proposed Primary Regional Road reserve for the South Western Highway is 90m. Only 30m of this is required for the actual road pavement, 15m of which already exists. There are few sections of the proposed South Western Highway widening that affect remnant vegetation and for those that do there is flexibility to avoid significant stands as part of the road design.

Potential noise and vibration impacts will be addressed by Main Roads WA (MRWA) during design and construction stages.

EPA Assessment
MRWA commissioned a study (GHD, 2000) to identify the condition of roadside vegetation along the South Western Highway. The results of the study will be used by MRWA during the planning and design of the Highway upgrade.

The study did identify particular environmental issues that will require further consideration and should be considered as constraints during the planning and design phases of the upgrade program. These issues included protecting significant areas of remnant vegetation and noise and vibration impacts on sensitive land uses.

The EPA is of the view that because the land within the reserve is substantially cleared and the reserve is of sufficient width to enable the duplication to be designed to avoid or minimise impacts on areas of significant environmental value, the proposed Primary Regional Road reserve alignment is environmentally acceptable subject to Environmental Management Plans, and Vegetation and Waterway Mitigation Strategies being prepared in accordance with the specifications in Section 15.

Noise and Vibration Management Plans should also be prepared to ensure that potential impacts on surrounding residents are appropriately managed.

Summary
It is the EPA's opinion that:

a) the alignment of the Primary Regional Road reserve for the South Western Highway is environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Waterway Mitigation Strategies being prepared in accordance with the specifications in Section 15; and

b) the environmental factors remnant vegetation, watercourses and the impacts from road users on surrounding noise sensitive landuses should be deferred until the design phase of the South Western Highway upgrade so that a more detailed consideration of the potential environmental impacts of the project and its construction can be undertaken by the EPA pursuant to Part IV of the *Environmental Protecion Act 1986*.

7.3 Port Access Road

Description
For many years planning studies have identified the need for a new road to serve as a heavy haulage link between the Bunbury Port and the proposed Bunbury Outer Ring Road.

Currently around 60,000 trucks access the port each year. With the predicted growth of the Bunbury Port, this number is expected to increase to around 90,000 trucks each year by 2005/6.

Main Roads WA has advised that the proposed Port Access Road (PAR) will be constructed to carry traffic underneath the Australind Bypass and South Western Highway and over the Preston River, Harris Road, Ferguson River and the Picton-Boyanup Road.

The PAR will ultimately be upgraded to dual carriageway standard between the Bunbury Outer Ring Road and Temple Road, and will remain as a single carriageway from this point to the Bunbury Port.

Submissions and WAPC response
The Wildflower Society of WA lodged a submission objecting to the impact of the Port Access Road on remnant vegetation.

WAPC response to submissions
The WAPC advises that the alignment of the southern end of the PAR is under review and subject to further assessment. The WAPC recommends that the current alignment be retained until after the alignment has been reviewed and changes to the alignment of the PAR be included as a future amendment to the GBRS.

The EPA's consideration of these issues is described in the Assessment section below and the EPA and WAPC responses to other more specific comments made in the submissions concerning the proposed PAR are included in Appendix 7.

EPA Assessment
Two issues are addressed in this section, noise impacts from the PAR on nearby sensitive land uses and impacts on regionally significant natural areas.

Noise
The EPA has concluded that noise from the PAR can be adequately managed at the time of construction to ensure the impact on noise sensitive premises meets levels acceptable to the Department of Environmental Protection. When considering applications to construct residential dwellings near the road alignment that may be lodged prior to construction, decision-making authorities should take account the potential noise impacts from the PAR.

Regionally significant natural areas
The impact of the PAR reserve on natural areas can be addressed at two levels, the general impact on broad natural values and impact on specific areas.

7.3.1 General Impact on broad natural values

The PAR traverses:

a) two major landform elements;
b) two rivers;
c) several basin wetlands; and
d) two Ecological Linkages.

The impacts of the PAR reserve are considered in relation to these broad natural values.

a) Major landform elements

The PAR reserve traverses the interface between the Bassendean Dunes and Pinjarra Plain and a small section of the Spearwood Dunes. Table 4 lists the two vegetation complexes from within these major landform elements traversed by the PAR reserve . A third major landform element is also included in the table as the vegetation on the Ferguson River is mapped as Southern River Complex, but is more typical of vegetation associated with the Swan Complex of the Pinjarra Plain.

Table 4: Total remnant vegetation remaining on the southern Swan Coastal Plain (SCP) and the Greater Bunbury Region (GBR) within those vegetation complexes occurring in the alignment of the major roads proposed in the Draft GBRS. The vegetation complexes are grouped in the major landform elements.

Major Landform Units/ Vegetation Complex	Original GBR (ha)	Remaining GBR (ha)	% of each remaining in GBR	% of each remaining on SCP
Pinjarra Plain				
Swan Complex	5646	906	16	16
Combinations of Bassendean Dunes / Pinjarra Plain				
Southern River Complex	16070	3320	21	20
Spearwood Dunes				
Yoongarillup Complex	13448	4437	33	45

b) Rivers

The PAR reserve traverses two rivers, the Preston and Ferguson Rivers. Native vegetation is present where the road crosses the Ferguson River. This is significant as there are very few areas of intact riverine vegetation on the Swan Coastal Plain remaining.

The native vegetation on the Ferguson River has a canopy of native tree species and a relatively intact understorey (Appendix 11 and specific values outlined below). As most riverine vegetation has very few native species in the understorey this vegetation is considered to have high natural value. As most of the vegetation along the Ferguson River appears to be less intact, the EPA recommends that the road crossing be relocated to lessen this impact.

c) Wetlands

The PAR reserve traverses a series of wetlands. Most of these wetlands are areas of palusplain that have been allocated Multiple Use management categories (WRC, 2002) as they have been significantly impacted by agricultural use (both clearing and grazing). The larger, most intact wetlands impacted by the PAR reserve (Areas 8, 9 and 10 - Appendix 11) are considered in the section below on specific areas. The wetland in Area 8 is not mapped by WRC (2002).

d) Ecological Linkages (EPA, 2003)

The PAR reserve traverses two ecological linkages the north-south McLarty/ Kemerton/ Twin Rivers/Preston River/ Gwindinnup Ecological Linkage and the Ferguson River Ecological Linkage (Appendix 4).

There are only two large remnants within the Constrained portion of the GBR in the vicinity of the McLarty/ Kemerton/ Twin Rivers/ Preston River/ Gwindinnup Ecological Linkage. The PAR reserve impacts significantly on one of these, Area 9. This large, intact area of native vegetation impacted by the road is considered in the section on specific areas below. The proposed River crossings are located within Ecological Linkages (Appendix 4).

7.3.2 Area specific impacts

This section categorises four natural areas in relation to the potential impact of the proposed road on the natural values of the areas. The areas are identified on a plan in Appendix 11.

a) Areas where the Port Access Road reserve should be realigned

The EPA recommends that the PAR reserve be realigned to avoid three natural areas because the road would impact on the entire area or a critical portion of the area and the information available identifies each area as being regionally significant. The natural areas impacted by the proposed alignment of the PAR reserve included in this category are described below.

Area 9: Barbetti's/CSBP Lot 5 (north of Waldrot Road)

Area 9 is the largest individual remnant affected by the proposed road. The native vegetation in this area is associated with a large wetland, principally palusplain, area to the west, a central upland sandy ridge and further palusplain to the east. The western wetlands and most of the sandy ridge are mapped within the Southern River vegetation complex and the eastern part of the ridge and eastern wetlands in the Guildford vegetation complex. Large portions of the wetlands have been cleared for pasture and much of the remaining natural vegetation is grazed. Area 9 is in predominantly Good to Degraded condition with patches in Very Good to Excellent condition. The best quality vegetation is in the two triangular remnants to the north of the area that appear to have not been subject to grazing. A study by Main Roads considered the area as being of "some value".

Area 9 is considered to be a regionally significant natural area as it meets three criteria, being:

- Representation of Ecological Communities,
- Maintaining Ecological Processes and Natural Systems; and
- General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation.

The natural attributes that contribute to the area meeting these criteria are:

- The area contains a series of upland and wetland vegetation units typical of vegetation of the Southern River vegetation complex (and to a lesser extent the Guildford complex) in predominantly Good to Degraded condition with patches in Very Good to Excellent condition;
- The area contains a wetland area which supports a mosaic of vegetation units allied with Pinjarra Plain vegetation;
- The area contains a palusplain wetland area supporting patches of vegetation of a quality and type consistent with a Conservation category wetland and a population of the priority species *Acacia flagelliformis*;
- It is one of only two large remnants within the Constrained portion of the GBR in the McLarty/ Kemerton/ Twin Rivers/ Preston River/ Gwindinnup Ecological Linkage (Appendix 4) (the other remnant is contiguous with Area 7 on the Bunbury Outer Ring Road reserve);
- The upland and wetland habitats are likely to maintain a diverse bird assemblage with significant feeding and breeding area; and
- Together with Area 10, forms a consolidated bushland area with a diversity of vegetation units and flora, which provides a variety of habitats for fauna.

The road is proposed to be located on the western side of Area 9, within the wetland/upland transition area. Realignment of the reserve in the cleared area of the wetland, marginally further to the west, would limit impact on this remnant.

Area 10: Bushland between Boyanup/Picton road and railway

The native vegetation in this area contains part of a wetland area (palusplain, not mapped by WRC 2002) and an associated upland. Four vegetation units can be distinguished in this location: *Melaleuca preissiana* Low Open Woodland over a mosaic of shrub, sedge and herb dominated units, *Pericalymma ellipticum* and *Hakea varia* Closed Heath, *Eucalyptus calophylla* Open Low Forest and an upland area of *Eucalyptus marginata* and *Banksia attenuata* Open Low Forest to Woodland.. A study by Main Roads WA considered the wetland area as being 'locally and regionally significant' and a second study advised that the area should be realigned to avoid all of Area 10 and the remainder of this reserve (here placed in Area 9). Taking into account all the values of the area it is considered to be a regionally significant natural area as it meets four criteria, being:

- Representation of Ecological Communities;
- Rarity;
- Maintaining Ecological Processes and Natural Systems; and
- General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation.

The natural attributes that contribute to the area meeting these criteria are:

- Contains a series of upland and wetland vegetation units typical of vegetation of the Southern River vegetation complex in predominantly excellent to good condition;
- Contains a wetland area which supports a mosaic of vegetation units allied with Pinjarra Plain vegetation;
- Contains a wetland area supporting vegetation of a quality and type consistent with a Conservation category wetland;
- It is the location of a series of significant species associated with wetlands of the Pinjarra Plain including, *Schoenus brevisetis* and *Acacia flagelliformis* which are both priority species;
- It is the location of *Caladenia speciosa* and *Verticordia attenuata,* two priority species;
- Is located in the south McLarty/ Kemerton/ Twin Rivers/ Preston River/ Gwindinnup Ecological Linkage (Appendix 4);
- The area has some level of protection, being a DCLM miscellaneous reserve; and
- With Area 9 forms a consolidated bushland area with a diversity of vegetation units and flora which provides a variety of habitats for fauna.

The EPA recommends that PAR reserve should be realigned to avoid impacting on Area 10.

Area 11: Ferguson River
Three vegetation units are distinguished in Area 11. These units are *Eucalyptus calophylla, E. rudis* and *Melaleuca rhaphiophylla* Forest in the river bed, *Eucalyptus calophylla* Open Forest to Woodland on the banks and *Banksia attenuata* and *Kunzea glabrescens* Low Woodland on the highest locations. While the understorey is significantly weed invaded nearly 40 native plant species are present in the understorey. This vegetation is considered to be a regionally significant natural area as it meets five criteria, being:

- Representation of Ecological Communities;
- Diversity;
- Rarity;
- Maintaining Ecological Processes and Natural Systems; and
- General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation.

The natural attributes that contribute to the area meeting these criteria are:

- Contains a series of vegetation units typical of vegetation of the Swan vegetation complex in good to degraded condition;
- Contains nearly 40 native species, a high diversity of plant species for its type;
- It is the location of a series of significant species associated with riverine remnants on the SCP including, *Darwinia citriodora, Trymalium floribundum* and *Acacia urophylla*;

- It is located in the Preston/Ferguson River Ecological Linkage (Appendix 4);
- It is likely to contain populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum; and
- The area has some level of protection, being a reserve for Park, Recreation and Drainage.

While the area is in need of restoration work, road works in the area of the reserve will further degrade the area and destroy many of the remaining natural values. A study for Main Roads WA also considered Area 11 had significant values and that the location of the proposed crossing be reconsidered.

The EPA recommends that PAR reserve should be realigned to avoid impacting on Area 11.

b) Impact appears to be minor

Area 8: Just north of the junction of BORR and PAR (south of Waldrodt Road)

The native vegetation in this area is associated with a sumpland within the Southern River vegetation complex and is in degraded condition. As the vegetation is significantly impacted and is in the 'Constrained' portion of the GBR (Map 1 – Appendix 3) it is not considered a priority for protection.

The EPA considers that the potential impacts of the PAR reserve on Area 8 appear to be minor and no offsets or changes to the reserve or road alignment are required.

Summary

Having particular regard to the:

a) WAPC's response to submissions concerning environmental issues raised in relation to the PAR Primary Regional Road reserve; and
b) studies commissioned by Main Roads WA to identify potential environmental impacts of the PAR Primary Regional Road Reserve;
c) alternative alignment for the PAR provided by Main Roads WA as shown in Appendix 12.

It is the EPA's opinion that:

a) The PAR Primary Regional Road Reserve should be realigned to avoid impacting on:
   - Area 9: Barbetti's/CSBP Lot 5;
   - Area 10: Bushland between Boyanup/Picton road and railway; and
   - Area 11: Ferguson River.
b) It would be preferable for the Port Access Road to follow existing road alignments between Harris Road and Moore Road although Option 2 shown on the map of Port Access Road Realignment Options between Moore Road and Harris Road (Appendix 11) is acceptable;

c) Environmental and Noise/Vibration Management Plans, and Vegetation and Waterway Mitigation Strategies be prepared prior to construction in accordance with the specifications in Section 15

d) As a consequence of the limitations of the flora and fauna survey done for this assessment the following need to be included in the Management Plans to clearly identify the specific impacts of the roads on natural values:
   - mapping of vegetation units and the condition of the vegetation units;
   - plot based descriptions and flora lists for each of the mapped vegetation units;
   - mapping of populations of priority species; and
   - the identification of fauna values of the remnants.

e) the environmental factors remnant vegetation, wetland, watercourses, fauna and the impacts from road users on surrounding noise sensitive landuses should be deferred until the design phase of the Port Access Road upgrade so that a more detailed consideration of the potential environmental impacts of the project and its construction can be undertaken by the EPA pursuant to Part IV of the *Environmental Protecion Act 1986.*

7.4 Boyanup Bypass Road

Description
The Primary Regional Road reserve for the Boyanup Bypass is part of the long term planning by Main Roads WA.

The road reserve is situated near an EPP Lake (also referred to as Boyanup Billabong) and the southern end of the alignment traverses through an area of remnant vegetation.

Submissions
One submission received in relation to the Boyanup Bypass objected to the proposal due to the potential impacts on Boyanup Billabong.

The EPA's consideration of this issue is described in the Assessment section below and the EPA and WAPC responses to other more specific comments made in the submissions concerning the proposed Boyanup Bypass are included in Appendix 7.

WAPC response to submissions
The WAPC advises that its environmental study concludes that Boyanup Billabong is not regionally significant. Accordingly, the proposed alignment does not need to be modified at this point. However, the study recommends the southern extremity of the proposed alignment be modified to avoid regionally significant remnant vegetation. The WAPC advises that DPI and Main Roads WA should investigate the possibility of modifying this section of the proposed reserve prior to finalisation of the GBRS.

EPA Assessment
The EPA notes that the WAPC's environmental study concludes that Boyanup Billabong is not regionally significant and is aware that the landowner did not give permission for

access during field survey. Therefore, the mapping in the environmental study is inferred. However the unusual location of the wetland and local information that describes the Billabong as being associated with an impeding quartzite layer suggests that the wetland has significant natural value. The EPA also noted that the road reserve does not directly impact on the wetland, although drainage from the road has the potential to indirectly affect the wetland.

The EPA is of the view that, because the road reserve does not directly impact on the Boyanup Billabong and the reserve is of sufficient width to enable the road to be designed to further avoid or minimise impacts on the wetland, the proposed alignment near the wetland is environmentally acceptable subject to Environmental Management Plans and Vegetation and Wetland Mitigation Strategies being prepared in accordance with the specifications in Section 15.

The southern extremity of the Boyanup Bypass passes through bushland that is considered to be a regionally significant natural area that meets three of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of ecological communities;
- Rarity; and
- Maintaining Ecological Processes and Natural Systems.

The natural attributes that contribute to meeting these criteria are listed below:

- A very good representation of foothills vegetation of the Cartis Complex containing a diversity of species and two priority flora species (*Caladenia speciosa* and *Acacia flagelliformis)*;
- Contains a population of Western Ringtail Possum which is declared Threatened under the *Wildlife Conservation Act* and is listed under the *Environmental Protection and Biodiversity Conservation Act 1999.*
- Contiguous with a significant area of vegetation of the Cartis Complex; and
- Located in the McLarty/ Kemerton/ Twin Rivers/ Gwindinup Ecological Linkage (Appendix 4).

It would be preferable for the Boyanup Bypass to be realigned to avoid the bushland. However, Main Roads WA has advised that to avoid the bushland the Bypass would need to be realigned to the east creating a new rail crossing and then deviate back across the rail reserve to meet up with the existing road to the south. Main Roads WA consider that this would be impractical.

Main Roads WA has indicated that to minimise the impacts on the bushland the road could be designed within the reserve in such a way that it is offset towards the railway line, with a wider vegetated verge to the west. This would ensure that a proportion of the existing remnant vegetation would be retained within the proposed road reserve, not withstanding that some will need to be cleared to accommodate the future road.

Acknowledging the constraints on realigning the Boyanup Bypass, the EPA is of the view that the proposed alignment of the Primary Regional Road reserve is acceptable subject to:

- the road being designed in such a maner as to minimise impacts on the bushland; and
- Environmental Management Plans and Vegetation and Wetland Mitigation Strategies being prepared in accordance with the specifications in Section 15.

Summary

It is the EPA's opinion that:

1) the road be designed and constructed to minimise impact on bushland and avoid any direct or indirect impacts on the Boyanup Billabong;
2) Subject to point (1) the alignment of the Primary Regional Road reserve for the Boyanup Bypass is environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared in accordance with the specifications in Section 15; and
3) the environmental factors wetlands, remnant vegetation and the impacts from road users on surrounding noise sensitive landuses should be deferred until the design phase of the Boyanup Bypass so that a more detailed consideration of the potential environmental impacts of the project and its construction can be undertaken by the EPA pursuant to Part IV of the *Environmental Protecion Act 1986.*

8. Assessment of the potentially significant environmental impacts of the new Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton

Description

There is an existing domestic waste water treatment plant (WWTP) on the proposed Public Purpose reserve north of Marriot Road. It is proposed that the Public Purpose Reserve may accommodate an expanded domestic WWTP to service the Eaton/Australind area and a WWTP for the Kemerton Industrial Area.

EPA Assessment

The EPA has previously advised the WAPC (EPA, 1999c) that there would be less impact on ecological values if wastewater treatment plant facilities in the Kemerton area were restricted to the north, or immediately south, of Marriott Road on Lot 310 and Part of lots 23, 35 and 205.

Odour emissions from WWTP's have the potential to impact on sensitive landuses and remnant vegetation. The EPA's generic buffer requirement for WWTP is 500m. Special Control Area No. 2 (SCA No. 2) around the Kemerton Industrial area provides a buffer

Control Area No. 2 (SCA No. 2) around the Kemerton Industrial area provides a buffer width in excess of 1000m which will more than adequately separate the proposed WWTP's from any incompatible land uses.

Summary
It is the EPA's opinion that:

(a) the proposal to establish waste water treatment plants on the Public Purpose reserve is environmentally acceptable subject to further investigation to select development sites with minimal potential environmental impacts on remnant vegetation and fauna;

(b) Special Control Area No. 2 provides adequate separation between the Public Purpose reserve and surrounding land uses to accommodate the impacts of odour emissions from the proposed waste water treatment plants in accordance with the EPA's environmental objectives and criteria for this environmental factor; and

(c) the environmental factors remnant vegetation, fauna and odour emissions should be deferred until the development stage so that a more detailed consideration of the potential environmental impacts of the waste water treatment plant and its construction can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

9 Assessment of the adequacy of new Regional Open Space reserves

The areas of ROS requiring further EPA assessment, as identified in Table 3, are as follows:

9.1 Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)

Description
Portions of Lots 0, 7 and 9 abutting the Brunswick River are proposed to be reserved as ROS in the GBRS (Appendix 1).

Submissions
A submission objected to the ROS reserve over the southern foreshore of Brunswick River east of Australind Bypass.

WAPC's response to submissions
In response to the submission the WAPC advises that the subject land had been identified as under consideration for conservation, protection and reservation in the *Greater Bunbury Structure Plan* (WAPC, 1995). However, the WAPC's environmental study concludes that apart from Lot 61, only the riparian corridor should be retained in ROS. A revised ROS boundary has been surveyed in consultation with the WRC, DEP and the landowner. Vegetation along the southern boundary of the proposed ROS has been identified in the WAPC's environmental study as having conservation value, and Eucalyptus woodlands further south as providing a conservation linkage. An

environmental management measure provides for preparation of an environmental management plan as part of any future GBRS rezoning proposal for these lots.

EPA Assessment
The EPA supports the proposed modification to the alignment of the ROS reserve as shown on Map 6 (Appendix 9).

Summary
It is the EPA's opinion that the ROS reserve over portion of Lots 0, 7 and 9 is environmentally acceptable subject to the alignment being modified as shown on Map 6 (Appendix 9) to consolidate the size and shape of the Brunswick River foreshore reserve.

9.2 Locations 7 and 14 Buffalo Road, Binningup

Description
Portions of Locations 7 and 14 are proposed to be reserved as ROS in the GBRS as shown in Appendix 1.

Submissions
A number of submissions suggested that most of Location 7 should be reserved as ROS. Other submissions suggested that the ROS reserve on Location 7 should be reviewed or removed.

A submission also suggested that the ROS reserve over Location 14 should only cover the remaining area of wetland.

The EPA's consideration of these issues is described in the Assessment section below and the EPA and WAPC responses to other more specific comments made in the submissions concerning the proposed alignment of the ROS reserve on Lot 7 and 14 are included in Appendix ?.

WAPC response to submissions
The WAPC advises that Location 7 is identified for future urban development in the *Greater Bunbury Structure Plan (1995)* and *Coastal and Lakelands Planning Strategy (1999)* subject to environmental assessment.

The WAPC's environmental study concludes the proposed ROS reserve over the degraded areas of Location 7 and 14 should remain because these areas are part of System 6 area C66 and represent the previous extent of the Leschenault Estuary. The WAPC concedes that the alignment of the ROS reserve boundary could be modified on Loc 14 to exclude two areas from the ROS reserve as shown on Map 8 (Appendix 8).

EPA Assessment
The EPA notes that the two areas on Location 14 proposed to be excluded from the ROS reserve as a result of the boundary realignment, appear to have low environmental value in their own right but act as a buffer to the wetland. The EPA agree that it is not

necessary that the two sites be retained as ROS, although they should be maintained as part of the buffer to the wetland.

The alignment of the ROS reserve boundary over Location 7 has not been ground truthed to determine if it is aligned with the areas of regional value. The ROS boundary alignment should be reviewed and amended, if necessary, prior to any change in the Rural zoning on Loc 7, or any subdivision of the property.

Issues to be considered as part of the review of the ROS alignment should include the extent of the Leschenault Estuary and Conservation Category wetlands outside the current ROS reserve boundary alignment and regional values of the western Quindalup Dune area.

Summary
It is the EPA's opinion that:
(a) the proposed modification to the alignment of the ROS reserve boundary alignment on Location 14 is acceptable; and
(b) the alignment of the ROS reserve boundary on Location 7 should be reviewed prior to any future zoning or subdivision on the subject land, whichever comes first, and amended where necessary.

9.3 Twin Rivers - Pt Lot 211 Barnes Avenue, Australind

Description
Pt Lot 211 Barnes Avenue, Australind is situated at the confluence of the Collie and Brunswick Rivers and is locally known as Twin Rivers (Map 8 – Appendix 9)

The site is 37 hectares in area and is partly zoned Residential and partly reserved for Recreation in the Shire of Harvey District Planning Scheme No. 1 (DPS No. 1). Prior to being released for public comment in August 2000 the WAPC reviewed the foreshore reserve shown in Shire of Harvey TPS No.1. As a consequence the GBRS was modified by the WAPC to provide a wider river foreshore ROS reserve in response to community and government agency concerns and based on technical assessment of conservation and recreation values and recognition of the current Residential zoning. The wider foreshore reserve recognises the significance of the foreshore as a wildlife corridor, the conservation value of other remnant vegetation on Lot 211 and the strategic importance of this site for recreation. The original GBRS ROS reserve boundary was similar to the Recreation boundary in the Shire of Harvey DPS No. 1.

A proposal to subdivide the Twin Rivers site was referred to the EPA by the WAPC for consideration under the *Environmental Protection Act* on the 28 September, 1999. The landowners, Marist Brothers Community, proposed to create 248 lots on the site, ranging in size from 600m^2 to 4,000m^2. The subdivision proposal was based on the Urban zone boundaries shown in the Shire of Harvey DPS No. 1.

The Chairmen of the EPA and WAPC met to discuss an appropriate way of dealing with the subdivision ahead of the finalisation of the GBRS, because it was thought that determination of the subdivision may pre-empt the WAPC and EPA assessments of the GBRS in terms of the subject land.

Following this meeting the DPI advised the proponent that it was unlikely the WAPC would approve a subdivision unless it was consistent with the modified ROS reserve boundaries in the GBRS. The Chairman of the EPA advised that, prior to it completing its assessment of the GBRS, a subdivision proposal would only likely be considered environmentally acceptable if it was unlikely to cause a significant environmental impact and was set well back from the GBRS ROS reserve boundary so as to not pre-empt any changes to the ROS boundary that the EPA may recommend as an outcome of its formal assessment of the GBRS.

In response to the changes to the GBRS and discussions with the Chairman of the EPA, the applicant submitted to the WAPC a revised subdivision design for Stage One of the Twin Rivers Estate (Map 8 - Appendix 9). Stage One was referred to the EPA by the WAPC on the 6 September 2001 and the EPA subsequently decided to "not assess" Stage One of the Twin Rivers subdivision.

In arriving at a decision to "not assess" the proposed Stage One subdivision and to provide publicly available environmental advice, the EPA acknowledged that the proposal was associated with potentially significant environmental impacts but considered that there was an adequate area of land being reserved to represent the environmental values and that conditions could be imposed on the subdivision by the WAPC to protect the environmental values of the site.

A number of appeals were received on the recommended level of assessment set by the EPA. The Minister for the Environment subsequently upheld a number of these appeals. The Minister remitted the proposal to the EPA pursuant to section 101(1)(b)(i) of the *Environmental Protection Act 1986* and recommended that the EPA consider making a decision on the level of assessment for the proposal following completion of the EPA's assessment of the GBRS.

Submissions
A significant number of submissions supported the inclusion of all of Lot 211 within an ROS reserve for the following reasons:

- provides a valuable range of vegetation types and habitats that are now limited in the area;
- provides a passive recreation and education resource;
- contains threatened fauna species such as Western Ringtail Possum, Baudins Cockatoo and possibly Quenda; and
- is recognized in LIMA's Waterways Protection Precinct and EPA System 6 report.

A number of submissions stated that the ROS boundary over Lot 211 should be reduced to reflect the Shire of Harvey Town Planning Scheme and that there is no justification for the ROS boundary shown in the GBRS.

The EPA and WAPC responses to the specific comments made in the submissions concerning the Twin Rivers site are included in Appendix 7 and the EPA's consideration of a number of the general issues raised in the submissions is described below.

WAPC response to submissions
The WAPC has recommended further modifications to the ROS reserve boundary on the Twin Rivers site as shown on Map 1 (Appendix 8) .

This modification is based on recommendations in the environmental study commissioned by the WAPC to review the adequacy of the proposed ROS. The study concluded that the entire Twin Rivers site has conservation value, although it conceded that the reserve proposed in the GBRS is acceptable given the current zoning, subject to minor modifications to the boundary alignment as shown on Map 1 (Appendix 8) to better protect regionally significant natural values and provide a practical boundary with the Urban land. The modification recommended by the DPI is intended to increase the corridor width along the foreshore and include more upland vegetation at the west of the site.

The WAPC has further advised, that, should it be decided by the Government that virtually the whole of the site is to be reserved, it is recommended that the subdivision boundary as shown on Map 1 be permitted. This boundary allows a practical rounding off of development at a road, separating residential use from ROS which is consistent with WAPC policy.

EPA Assessment
The Twin River site is considered by the EPA to be a regionally significant natural area of high value because it meets five of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Diversity;
- Rarity;
- Maintaining Ecological Processes or Natural Systems; and
- General Criteria for the protection of wetland, streamline and estuarine fringing vegetation.

The natural attributes of the Twin Rivers site that contribute to these criteria being met are listed below and described in detail in Sheet 12 (Appendix 5):

- The vegetation on the site is in Very Good to Good condition and representative of the Swan and Karrakatta Complex Central and South Vegetation Complexes. There is in excess of 10% of Karrakatta Complex Central and South Vegetation Complex remaining within the constrained area which meets the requirements of the criteria. However, there is close to only 10% of the Swan Vegetation Complex

remaining, the majority of which is generally significantly altered from its natural condition. The area of Swan Complex on the Twin River site is one of the best examples of its type;

- The site contains a Conservation category wetland with intact floodplain vegetation;
- The site is diverse for its type in respect to landforms, flora and fauna;
- The site is the the largest consolidated naturally vegetated remnant on the Collie and Brunswick Rivers with contiguous protected bushland areas to the north and south;
- The site is part of the McLarty/ Kemerton/ Twin Rivers/ Preston River/ Gwindinup Ecological Linkage and the Brunswick River and Collie River Ecological Linkage (Appendix 4);
- Location for two rare fauna species, Western Ringtail Possum, Baudin's Black Cockatoo and one plant species, *Diuris drummondii*. These species are recognised by the State and are subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999;*
- There is significant flora and fauna present on the site:
    - Flora - *Lasiopetalum membranaceum* (Priority 3); *Caladenia speciosa* (Priority 4); and
    - Fauna - two species protected under JAMBA/CAMBA treaties (Common Greenshank, Great Egret), one Priority 1 species (Square-tailed Kite), one Priority 4 species (Quenda) recorded. Of the fauna known to be present in the region, 9 other priority species utilise habitats similar to those present in the study area and are likely to be present also.

In addition to its particular natural values the EPA believes that the site also has regional value for its iconic status, similar to Kings Park and Mount Henry within the Perth Metropolitan area. The EPA believes that the GBRS provides an opportunity to protect these values and that there is a strong environmental case for recommending that the total site be conserved. Moreover, the area, although already zoned for urban purposes in the Shire of Harvey Town Planning Scheme, could contribute to the State/national conservation estate over the long term in the way that Kings Park does. The EPA recognises that this could involve a financial outlay to Government.

The EPA acknowledges that this recommendation is contrary to it's earlier advice in relation to the Stage One subdivision which indicated that Stage One could be managed to protect the natural values of the Twin Rivers site. This change in opinion has occurred because the EPA has reassessed the regional natural values of the site using the criteria being used to identify regionally significant natural areas within GBRS and has found that the whole site has values higher that previously indicated.

If the Government decides not to preserve the whole of the area as a regional park, the EPA is of the view that the modified ROS alignment identified by the WAPC in July 2003 should be adopted (Map 1 – Appendix 8).

Summary
It is the EPA's opinion that:

(a) the current alignment of the ROS reserve does not adequately protect the regional natural values of the Pt Lot 211 Barnes Avenue;

(b) in view of the regional natural values of Pt Lot 211 Barnes Avenue all of the site should be reserved;

(c) if the Government decides not to preserve the whole of the area as a regional park, the EPA is of the view that the modified ROS alignment identified by the WAPC in 31 July 2003 should be adopted; and

(d) arrangements be included in the Greater Bunbury Region Scheme to ensure that adequate funds are available for the WAPC to purchase areas of regional conservation value.

9.4 Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton

Description
Picton Waters is a proposed residential subdivision on Lot 40-44 Jeffery Road. The Picton Waters Structure Plan for the 73 ha site was referred to the EPA by the WAPC in 2001.

The ROS reserve shown in the GBRS over portion of Lots 40-44 Jeffrey Road, Picton (Map 15 - Appendix 8) is intended to provide protection to a lake identified in the *Environmental Protection (Swan Coastal Plain Lakes) Policy* (Lakes EPP)(EPA, 1992a). However, the ROS boundary alignment shown in the GBRS does not correspond with the gazetted EPP boundary alignment and a modification to the GBRS map is necessary to align the boundaries.

Documentation (BBG, 2002) was submitted to the EPA Service Unit, describing the environmental values of the wetland, to provide justification for the realignment of the wetland buffer boundary. The EPA Service Unit subsequently inspected the site and advised the landowner's consultants that it supports the realignment of the wetland buffer and ROS reserve alignment as shown on Map 15 (Appendix 8). The Picton Waters Structure Plan identifies the wetland buffer boundary that more accurately reflects the buffer around the EPP lake boundary.

Submissions
The landowner lodged a submission requesting that the ROS boundary be modified in accordance with the Picton Waters Structure Plan.

WAPC's response to submissions
In response to the submission the WAPC recommends that the proposed ROS boundary should be modified to accord with the revised wetland buffer alignment shown on Map 15 (Appendix 8).

EPA Assessment
The EPA Service Unit's primary objective in relation to reviewing the Structure Plan was to ensure that an adequate buffer was provided around the EPP Lake and the abattoir on the adjacent land.

Remnant vegetation
The development of the Picton Waters Structure Plan will require approximately 55 hectares of remnant vegetation to be cleared. This clearing is being off-set by the rehabilitation of the EPP wetland which will provide a net environmental benefit.

Wetland
The EPA Service Unit considers that the Picton Waters Structure Plan provides an adequate wetland buffer boundary around the EPP Lake subject to the preparation and implementation of a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan. These plans should also include that part of the wetland on the adjoining land holdings to the east.

Abattoir buffer
An abattoir is located to the west of the Picton Waters Structure Plan. The EPA's Guidance No. 3 for Industrial Residential Buffer Areas requires a 500m separation distance between a residential area and an abattoir.

The 500m buffer corresponds with the ROS reserve over the EPP Lake and therefore no incompatible development will take place, within the buffer, on the subject.

Summary
It is the EPA's opinion that the:
(a) the alignment of the ROS reserve boundary is environmentally acceptable subject to the preparation and implementation of a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan; and
(b) the environmental factors remnant vegetation, wetlands and fauna should be deferred until the land is subdivided or development, whichever comes first, so that a more detailed consideration of the potential environmental impacts of the subdivision can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986*.

9.5 College Grove - Lot 1000 Bussell Highway

Description
College Grove is a proposed residential estate situated on Lot 1000 corner of Bussell Highway and Somerville Drive, about 7km south of Bunbury. The development is a joint venture between the City of Bunbury (the land owner), Western Australian Land Authority (Landcorp) and the Department of Land Administration. One stage of the residential estate has been completed.

Lot 1000 is partly zoned Residential and partly reserved for Parks and Recreation under the City of Bunbury Town Planning Scheme No. 7. The GBRS reflects Town Planning Scheme No. 7 (Appendix 1).

Structure Planning
Structure planning for the College Grove Estate commenced in 1992. A structure plan was referred to the DEP for comment in 1998. The DEP advised the City of Bunbury (DEP, 1998) that the bushland corridor in the College Grove Structure Plan should be between 300-500 metres wide if the objectives of protecting the vegetation and ecological functions present in this part of the corridor are to be achieved. The structure plan was endorsed by the WAPC in 1998 with a 100m wide bushland corridor. The zoning and alignment of the ROS reserve boundary, in the GBRS, is consistent with the 1998 structure plan.

The 1998 structure plan has, again, been reviewed by the joint venture developer. The City of Bunbury forwarded the 1998 structure plan to the EPA Service Unit for review in June 2001. The EPA Service Unit's primary objective in relation to reviewing the 1998 Structure Plan was to ensure that a wider bushland corridor is provided along the southern boundary of Lot 1000 as part of the Ocean to Preston River Corridor.

Taking into account the site's natural values, the current urban zoning and planning, the EPA Service Unit renegotiated the alignment of the structure plan to provide a wider corridor, varying between 200-300 metre wide, along the southern boundary of the Lot 1000 (Map 9 - Appendix 9). The landowner modified the structure plan and the EPA Service Unit advised the landowners (EPA, 2002b) that the width of the bushland corridor shown in the modified structure plan was adequate and that the alignment of the ROS reserve boundary in the GBRS should be consistent with the modified structure plan. The modified structure plan has since been endorsed by the City of Bunbury. The WAPC has advised that it has not yet considered the modified structure plan but has recommended that the GBRS be modified in accordance with the ROS boundary alignment agreed with the EPA Service Unit.

Submissions
A number of submissions were received stating that further consideration should be given to including additional areas of remnant bushland in the Ocean to Preston River Park Corridor. There is local support for protecting the bushland on Lot 1000.

Members of the Bunbury community have formed an *Ocean to Preston Regional Park Advisory Group*. Various agencies are also represented on the advisory group.

WAPC response to submissions
The WAPC recommends that the GBRS should be modified in accordance with Map 2 (Appendix 8) with flexibility being given in determining the final alignment of the northern ROS boundary to facilitate the final structure plan.

The WAPC advises that the in determining the final boundary between Urban and ROS, the following factors should be taken into account:

- the possible closure of Centenary Road and its inclusion in ROS;
- the development lot yield should be sufficient to accommodate a community which will provide facilities such as schools; and
- recognising that the City of Bunbury has not opposed additional ROS over the Ocean to Preston River corridor at Loc 632 Parade Road.

The WAPC further advises that once the GBRS is operational, the WAPC will undertake a study to identify other areas for protection and/or inclusion in the Ocean to Preston River Park. The WAPC will also consider whether the Park can be enhanced by local open space through the consideration of adjoining structure plans.

EPA Assessment

Lot 1000 is a significant part of the Ocean to Preston River Corridor (Maidens/ Preston River Ecological Linkage) which is a unique bushland link between the coastal Maidens area and the Preston River (Appendix 4). The Ocean to Preston River Corridor was endorsed by the EPA in its advice to the WAPC on the *Bunbury-Wellington Region Plan* (EPA, 1993c) on the basis that it connects areas of regional and local importance, as well as providing a cross section of the vegetation, habitats and landforms from the coast to the Preston River.

The ecological linkage contains a sequence of vegetated landform elements typical of the Swan Coastal Plain in an atypical combination close to the Bunbury urban area. East-west transects are now rare on the Swan Coastal Plain south of the Perth Metropolitan Area.

Lot 1000 is considered by the EPA to be regionally significant because it meets four of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Rarity;
- Maintaining Ecological Processes or Natural Systems; and
- General Criteria for the protection of wetland, streamline and estuarine fringing vegetation.

The natural attributes of the site that contribute to meeting these criteria being met are listed below:

- It is the only prominent Spearwood Dune in the ecological linkage and includes the interface between Bassendean and Spearwood Dunes systems. It is a compact shape and contiguous with other natural areas to the east and west;
- It contains a substantial representation of the Karrakatta Central and South vegetation complex and includes southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (floristic community type 25 which is a significant representation of this unit in the Maidens/Preston River Ecological Linkage;

- Contains vegetation in Good to Very Good condition with significant tall habitat trees (Tuart);
- It supports a Western Ring-tailed Possum population which is listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments. This population is best conserved by maintaining a large area of suitable habitat;
- It contains significant fauna habitat supporting a number of bird species of regional conservation significance which have declined elsewhere on the Swan Coastal Plain because of habitat fragmentation including Yellow Robin, Scarlet Robin, Weebill, Broad-tailed Thornbill. This assemblage will be maintained in the long term by the retention of a significant bushland area; and
- Lot 1000 provides a key consolidated part of the corridor of sufficient size to maintain long term retention of the significant faunal assemblage. It has an important role in facilitating movement in both directions within the regional ecological linkage.

Lot 1000 is located within the 'constrained' portion of the GBRS, where the criterion for representation is greater than 10% retention. The constrained area of the GBRS is likely to currently protect more than 10% of the Karrakatta Central and South complex. However, the site is considered to meet the criterion of 'Representation of Ecological Communities' as it contains substantial representation of the naturally vegetated interface between the Karrakatta Central and South vegetation complex and Southern River vegetation complex. This interface of upland vegetation is not known south of Lot 1000 and is part of the only substantive occurrence of this interface on the 'constrained' portion of the GBRS.

As indicated by the environmental values described above, the majority of Lot 1000 is regionally significant and it would be desirable to reserve all of the site. However, the EPA considers that these values could be adequately represented in a lesser area of bushland.

The EPA recognises that the EPA Service Unit has agreed to a corridor width along the southern boundary of Lot 1000 varying between 200m and 300m wide. However, given the values of the site the EPA considers that a corridor of this width on Lot 1000 is inadequate and recommends that the corridor be increased in width to between 300m to 500m as shown on Map 9 (Appendix 9).

Summary
Having particular regard to the:

a) regional natural values of Lot 1000 and the opportunity the site presents in conserving a consolidated area of bushland within the Ocean to Preston River Corridor (Maidens/Preston River Ecological Linkage);
b) past history of the site, particularly the approved 1998 structure plan;
c) commitments to provide community infrastructure on Lot 1000 for the developed stages of College Grove; and

d) potential impacts that the proposed Urban zoning will have on the regionally significant natural values of Lot 1000;

it is the EPA's opinion that:

1) a corridor between 300 and 500m, as indicated on Map 9 (Appendix 9), be reserved in the GBRS and appropriately managed; and
2) some degree of flexibility (20 metres) be allowed in determining the final alignment of the northern ROS boundary to facilitate the final structure plan with no nett loss of ROS.

9.6 Muddy Lakes – Minninup Road, Capel

Description

Muddy Lakes (also known as Minninup Swamp) is situated approximately 13km south of the Bunbury CBD and 800m from the Indian Ocean.

Muddy Lakes and its fringes are contained within a number of properties which are currently zoned Rural in the Shire of Capel's Town Planning Scheme. The GBRS proposes to reserve part of the properties as ROS (Appendix 1). The ROS reserve boundary generally aligns with the boundary of the wetland.

Parts of the wetland provides valuable summer grazing for horses and livestock. The landowners are opposed to their land being reserved as ROS because of concern that it will restrict the availability of the areas for summer grazing.

Submissions

Submissions received in relation to Muddy Lakes were predominantly objecting to the ROS reserve set aside to protect Muddy Lakes because it will affect existing rural activities and businesses.

The EPA and WAPC responses to the specific comments made in the submissions concerning the Muddy Lake are included in Appendix 7 and the EPA's consideration of a number of the general issues raised in the submissions is described in the Assessment section below.

WAPC response to submissions

The WAPC advises that its environmental study concludes that, on their own, this wetland area has regionally significant natural values but that they also form part of a larger conservation area that supports natural values of outstanding regional significance that should be protected. The small portions of subject wetland that do not have regionally significant conservation value, form part of the consolidated area that would be compromised if these areas were excluded.

On this basis, the ROS reserve boundary should remain as indicated in the GBRS. There is no doubt that preventing stock access to the ROS, some of which is used for summer pasture, would have a significant impact on the agricultural productivity of some affected

properties. However, stock would not be prevented over this area by the GBRS until it is in Crown ownership. Even then there may be an option to lease some of the land back for grazing until restoration works commence. Notwithstanding these considerations, at some point in the future the GBRS will impact on the suitability of some properties for grazing. It is also likely that this area will be subject to pressure for closer subdivision in the future. For these reasons, a structure plan should be prepared to determine appropriate land use and management guidelines for the protection and enhancement of coastal and wetland resources in this general area. This could be undertaken in the context of the coastal management plan that will be prepared for this section of the coastline to provide management and landuse guidelines specific to particular sections.

EPA Assessment

The Muddy Lakes ROS reserve is part of a larger natural area of outstanding regional significance, the Dalyellup/Minninup Swamp Natural Area (part of the south Maidens/Muddy Lake/Ludlow Coastal Ecological Linkage)(Appendix 4). This area contains a very large consolidated vegetated area of Quindalup Dunes uplands and wetlands and the eastern predominantly vegetated sumplands and lake of the Minninup Swamp. Two areas of proposed ROS are located in the Dalyellup/Minninup Swamp Natural Area, Muddy Lakes ROS and the Dalyellup ROS. These areas of proposed ROS are centred on two EPP Lakes - Dalyellup and Muddy Lakes. The central area of the Dalyellup/Minninup Swamp Natural Area is not included in ROS (Map 10 - Appendix 9).

The Muddy Lake ROS reserve is considered to be a regionally significant natural area of outstanding value because it meets all six of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of ecological communities;
- Diversity;
- Rarity;
- Maintaining Ecological Processes or Natural Systems;
- Scientific or evolutionary importance; and
- General criteria for the protection of wetland and streamline and estuarine fringing vegetation and coastal vegetation.

The natural attributes of the Muddy Lakes ROS that contribute to meeting the criteria are listed below and described in detail in Sheet 14 (Appendix 5). Some of these natural attributes are shared with the Dalyellup/Minninup Swamp Natural Area.

- The largest and most southern area of vegetated parabolic Quindalup Dunes remaining on the Swan Coastal Plain;
- One of the few areas of Quindalup Dunes on the Plain with substantial wetland and upland areas.
- Substantial representative area of natural vegetation in Excellent to Good condition of the Quindalup and Vasse Vegetation Complexes. Less than 30% of the Vasse Complex remains vegetated on the Plain;
- The wetlands of the Vasse Vegetation Complex are highly variable and the sumplands of the Muddy Lake area (part of Minninup Swamp) are one of the few

examples of its type, the most similar known being the sumpland/lakes of Yanchep National Park;

- A highly diverse area with respect to diversity of Quindalup Dunes, wetlands, upland and wetland vegetation units, habitat and vertebrate diversity (100 vertebrate species recorded). The wetland and vertebrate diversity of the Dalyellup/Minninup Swamp Natural Area are considered unique on the southern Swan Coastal Plain;
- The communities of the Quindalup Dune damplands are considered to be either a threatened ecological community (floristic community type 19) or a rarer closely related ecological community. Floristic community type 19 is recognised by the State and is subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999;*
- The area has a rich and diverse bird assemblage. This distinctiveness is further emphasised by the number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury, and the number of species that are of regional conservation significance. Species of conservation significance in the area include Splendid Fairy-wren, Southern Emu-wren, White-browed Scrubwren, Weebill, Broad-tailed Thornbill, Yellow-rumped Thornbill;
- Location for three rare species of fauna - Western Ringtail Possum, Quokka and Baudin's Black Cockatoo. These species are recognised by the State and are subject to protection under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999;
- Only remaining Quokka population on the Swan Coastal Plain;
- High number of other significant vertebrate species: one species protected under JAMBA/CAMBA treaties (Great Egret), two Priority 4 species (Quenda and Water-rat) recorded, and 17 conservation significant species recognised as declining species on the Swan Coastal Plain (Government of Western Australia, 2000);
- Contains wetlands, Conservation category damplands, sumplands and lake areas of regional significance;
- Contains the area of the EPP Lake - Muddy Lake; and
- Part of two regional ecological linkages: the north-south Maidens/Muddy Lake/Ludlow Ecological Linkage and Dalyellup/Gelorup/Crooked Brook Ecological Linkage (Appendix 4).

The WRC has advised that grazing activities that occur adjacent to, or directly within the wetland, are likely to have a further impact on the wetland sytem and vice versa. These activities may impact on either the ecology, hydrology or both of this system and hence lead to a decline in the conservation values currently noted by the V&C Semeniuk Research Group (1998), Keighery *et al.* (2002) and HGM (2002).

A number of impacts arising from current land uses have degraded the conservation value of parts of the wetland. The cause of this degradation can be directly linked with the current land use practice, principally horse grazing. Grazing has led to extensive weed invasion from pasture species, principally *Pennisetum clandestinum* (Kikuyu), as well as the destruction of wetland plants and the disturbance of wetland sediment.

In order to support the high conservation values of the entire wetland system, the EPA considers that, although degraded, these areas should not be excluded from the proposed ROS. In fact, the EPA recommends that the full extent of the wetland boundary be included in the ROS reserve, to limit the likely impacts on the hydrology and ecology of this system by future land uses.

However, the DPI has advised that the ROS reserve boundary can not be modified without re-advertising the GBRS, therefore, the EPA recommends that the boundary be amended as a priority once the GBRS has been proclaimed.

In the meantime the EPA recommends that Muddy Lakes should be managed and protected for conservation purposes as a matter of priority. Short term management arrangements are required to prevent further degradation by the current land use activities. Further biological and hydrological studies will be required to ensure that the wetland is appropriately managed.

Contiguous regionally significant natural areas to the north of the proposed Muddy Lakes ROS reserve should also be managed in the short term and included in the ROS reserve once the GBRS has been promulgated.

Summary

Having particular regard to the:

a) Outstanding regional values of the Muddy Lakes Regional Open Space and the Dalyellup/Minninup Swamp Natural Area in general;
b) potential impacts that the continued operation of the current land uses within the wetland areas may have on the hydrology and ecology of the Dalyellup/Minninup Swamp Natural Area; and
c) the WAPC's advice that a structure plan should be prepared to determine appropriate land use and management guidelines for the protection and enhancement of coastal and wetland resources in this general area. This could be undertaken in the context of the coastal management plan that will be prepared for this section of the coastline to provide management and landuse guidelines specific to particular sections.

it is the EPA's opinion that:

a) the alignment of the ROS reserve boundary around Muddy Lakes should remain as shown in the advertised GBRS;
b) the alignment of the ROS reserve boundary should be amended to include the full extent of the wetland at the earliest opportunity;
c) Priority be given to implementing management arrangements (ie Government acquisition) in the Dalyellup/Minninup Lake Natural Area to prevent further degradation by current land use activities;
d) Interim planning mechanisms be put in place to ensure that conservation values in the Dalyellup/Minninup Lake Natural Area are protected from any further

development or change of land use until suitable protection measures under the Greater Bunbury Region Scheme are provided;

e) Further biological and hydrological studies be undertaken to ensure that the Dalyellup/Minninup Lake Natural Area is appropriately managed; and

f) the environmental factors remnant vegetation, wetlands and fauna should be deferred until the land is subdivided or development, whichever comes first, so that a more detailed consideration of the potential environmental impacts of the subdivision can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

10 Assessment of zones and reserves raised in submissions and other matters with potentially significant environmental impacts

There are a number of zones and reserves in the GBRS which were raised in submissions or raise significant environmental issues. Although these zones and reserves are not new, the EPA considers that they should be assessed to identify and prevent significant environmental impacts from occurring during future subdivision and development.

10.1 Pt Loc 632 Parade Road, Glen Padden

Description
Pt Location 632 is situated approximately 6km south of the Bunbury CBD and proposed to be zoned Urban in the GBRS (Appendix 1). The 32 hectare site is currently zoned Commercial in the City of Bunbury Town Planning Scheme No. 7. The land is owned by the City of Bunbury.

Submissions
A number of submissions were received stating that further consideration should be given to including additional areas of remnant bushland in the Ocean to Preston River Corridor. Pt Loc 632 is part of this corridor.

WAPC response to submissions
The WAPC has advised that Location 632 should be reserved as ROS based on the environmental values identified in its environmental study and the community's involvement in the management of the land.

The WAPC also recommends a small corner of Pt Loc 632 east of Parade Road be reserved as ROS. A submission on behalf of the main landowner in this area supports this modification. The WAPC recommends that the GBRS should be modified in accordance with Map 5 (Appendix 8).

The WAPC further advises that once the GBRS is operational, the WAPC will undertake a study to identify other areas for protection and/or inclusion in the Ocean to Preston

River Corridor. The WAPC will also consider whether the Corridor can be enhanced by local open space through the consideration of adjoining structure plans.

EPA Assessment
There is remnant vegetation situated on the majority of the land proposed to be zoned for urban purposes (Map 11 - Appendix).

Pt Loc 632 is considered to be a regionally significant natural area of high value because it meets four criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Diversity;
- Rarity; and
- Maintaining Ecological Processes and Natural Systems.

The natural attributes of Pt Loc 632 that contribute to meeting the criteria are listed below:

- Substantial representative area of bushland of Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation;
- Representative of the southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands;
- Contains vegetation in Very Good condition with significant tall habitat trees (Tuart);
- Includes fauna listed under the *Environmental Protection and Biodiversity Conservation Act 1999* and *WA Wildlife Conservation Act 1950* and subsequent amendments;
- Area of native vegetation (greater than 20ha) is of compact shape and is contiguous with other natural areas to west, south, north and east ;
- The Maidens/ Preston River Ecological Linkage (Appendix 4) is the only known sequence of this type on the Swan Coastal Plain; and
- This area is critical in the Ecological Linkage containing significant areas of its type

Summary
It is the EPA's opinion that all of the remnant vegetation on Pt Loc 632, as shown on Map 11 (Appendix 9), is regionally significant and should be reserved and appropriately managed.

10.2 Reserve 670 North Boyanup Road, Davenport (Industrial zone)

Description
Reserve 670 is situated approximately 6km south-east of the Bunbury CBD and proposed to be zoned Industrial in the GBRS (Appendix 1). The 16 hectare site is currently zoned Industrial Development in the City of Bunbury Town Planning Scheme No. 7.

Submissions
A number of submissions were received stating that further consideration should be given to including additional areas of remnant bushland in the Ocean to Preston River Regional Park. Reserve 670 is part of this corridor. A submission was also received objecting to proposed Industrial zone on Reserve 670 due to the impact on remnant vegetation.

WAPC response to submissions
The WAPC advises that its environmental study concludes that this site is part of a regionally significant vegetation corridor extending north to the Preston River and recommends that it should be protected. The WAPC recommends that the southern portion of Lot 670 be reserved as ROS.

Further environmental assessment of the northern portion of the site should be undertaken at the structure planning, subdivision or development stage. The WAPC has advised that once the GBRS is operational, the WAPC will undertake a study to identify other areas for protection and/or inclusion in the Ocean to Preston River Regional Park. The WAPC will also consider whether the Park can be enhanced by local open space through the consideration of adjoining structure plans.

EPA Assessment
The EPA considers that all of the remnant vegetation on Reserve 670 is regionally significant because the site meets three of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities,
- Maintaining Ecological Processes and Natural Systems; and
- General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation.

Reserve 670 is considered to be a regionally significant natural area of high value because there is remnant vegetation situated on Reserve 670 which would contribute to this site forming part of the Ocean to Preston River Corridor (Map 12 –Appendix 9).

Although the Reserve 670 is considered to be regionally significant natural area, the EPA acknowledges that parts of the northern portion of the reserve may be suitable for development. The EPA considers that the southern portion of the reserve should be reserved and the remnant vegetation on the northern portion of Reserve 670 should be conserved to provide an alternative ecological linkage to Preston River (Map 12 – Appendix 9).

The EPA also considers that a portion of the remnant vegetation to the north of Reserve 670 should be conserved to provide a consolidated ecological linkage between Reserve 670 and the Preston River.

Summary

It is the EPA's opinion that:

a) the southern portion on Reserve 670 should be reserved and appropriately managed because of its regional significance;

b) the remnant vegetation on the northern portion of Reserve 670 should be conserved primarily because of its faunal habitat values and value as an additional ecological linkage to Preston River;

c) a portion of the remnant vegetation to the north of Reserve 670 should be conserved to provide a consolidated ecological linkage between Reserve 670 and the Preston River; and

d) the environmental factors remnant vegetation, fauna and ecological linkage should be deferred until the northern of Reserve 670 and the land north of Reserve 670 is subdivided or development, whichever comes first, so that a more detailed consideration of the potential environmental impacts of the subdivision can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

10.3 Lot 15 North Boyanup Road

Description

Lot 15 North Boyanup Road is situated approximately 8km south-east of the Bunbury CBD and proposed to be zoned Industrial in the GBRS (Appendix 1). The 72 hectare site is currently zoned Industrial Development in the City of Bunbury Town Planning Scheme No. 7.

Lot 15 is included within the *Bunbury Industrial Park Structure Plan* which was endorsed by the WAPC on 25 October 2000. An application to subdivide the property was approved on the 6 November 2000 subject to a number of conditions requiring the protection of vegetation worthy of retention.

Submissions

Two submissions were received concerning Lot 15. One of the submissions stated that Lot 15 should be included in the Ocean to Preston River Regional Park and the other stated that Lot 15 should not require a detailed vegetation survey as it is subject to an approved structure plan.

WAPC response to submissions

The WAPC advises that because the site is already zoned for Industry in the City of Bunbury TPS No.7 and there is an approved structure plan for the area, further assessment should be undertaken at the subdivision stage, or should an amendment to the town planning scheme be required.

EPA Assessment

The EPA considers that the remnant vegetation on Lot 15 is regionally significant because the site meets two of the criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Rarity; and
- Maintaining Ecological Processes and Natural Systems.

The natural attributes of the site that contribute to these criteria being met are listed below:

- Characteristic of upland vegetation of the Bunbury area Southern River vegetation complex in Good to Degraded condition providing significant fauna habitat;
- Contains populations of at least one species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Western Ringtail Possum); and
- Forms part of the Ocean to Preston River Ecological Linkage and part of McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage (Appendix 4).

The EPA considers that the bushland on Lot 15 is a significant fauna habitat and a consolidated portion should be conserved to ensure that the regionally significant natural values of the site are protected and appropriately managed.

Summary
It is the EPA's opinion that:

a) the remnant vegetation on Lot 15, shown on Map 13 (Appendix 9), is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site; and

b) the environmental factors remnant vegetation and fauna should be deferred until the land is subdivided or development, whichever comes first, so that a more detailed consideration of the potential environmental impacts of the subdivision can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

10.4 Bunbury Outer Ring Road

Description
The concept for the Bunbury Outer Ring Road (BORR) was originally developed by Main Roads WA in the 1970's in conjunction with the preparation of the Bunbury Region Plan.

The BORR concept has been recognised in regional planning studies and forms a major component of the planned regional road network for the Greater Bunbury Region. The alignment of the Primary Regional Road reserve for the BORR links the Australind Bypass, north of Bunbury, to Bussell Highway, south of Bunbury, over a distance of approximately 19km (Appendix 1).

The reserve for the BORR is included in the City of Bunbury Town Planning Scheme No. 6, Shire of Dardanup Town Planning Scheme No. 3 and Shire of Capel Town Planning Scheme No. 7. The Primary Regional Road reserve is not a new reserve in the GBRS,

however, the road was the subject of an environmental submission and presents a number of potentially significant environmental impacts which require the EPA's assessment.

Submissions
The Wildflower Society of WA stated in its submission that more investigations are required to determine the alignment of the BORR.

WAPC response to submissions
The WAPC advises that the current alignment be retained until all other alternative alignments have been investigated. Changes to the alignment of the road will be included as a future amendment to the GBRS.

EPA Assessment
Two issues are addressed in the EPA's assessment of the BORR - noise and regionally significant natural areas.

Noise
The EPA has concluded that noise from the BORR can be adequately managed during the design and construction phases to ensure the impact on noise sensitive premises meets acceptable levels. Proposals to construct residential dwellings near the road alignment should take account of the potential noise impacts from the BORR

Regionally significant natural areas
The impact of the BORR Primary Regional Road Reserve on natural areas can be addressed at two levels, the general impact on broad natural values and the impact on specific areas.

10.4.1 General Impacts on broad natural values

The BORR Primary Regional Road Reserve traverses:

a) three major landform elements;
b) two rivers;
c) a series of basin wetlands; and
d) two Ecological Linkages.

The impacts of the BORR Primary Regional Road reserve are considered in relation to these broad natural values.

a) Major landform elements

The BORR reserve traverses the Spearwood Dunes, Pinjarra Plain and the Pinjarra Plain/Bassendean Dunes interface. Table 5 lists the vegetation complexes from within these major landform elements traversed by the BORR.

One vegetation complex, the Guildford Complex, has less than 10% of its original area remaining on the Swan Coastal Plain. As a consequence all of the areas of remaining native vegetation in this complex are regionally significant. Aerial photography and some ground truthing indicate that the BORR reserve traverses

little remaining native vegetation in this major landform element. The few areas that appear to be impacted are small and have not been considered to be of a type and quality that required individual descriptions.

Table 5: Total remnant vegetation remaining on the southern Swan Coastal Plain (SCP) and the Greater Bunbury Region (GBR) within those vegetation complexes occurring in the alignment of the major roads proposed in the Draft GBRS. The vegetation complexes are grouped in the major landform elements.

Major Landform Units/ Vegetation Complex	Original GBR ha	Remaining GBR ha	% of each remaining in GBR	% of each remaining on SCP
Pinjarra Plain				
Guildford Complex	*33294*	*1470*	*4.4*	*5.0*
Swan Complex	5646	906	16.0	15.6
Bassendean Dunes				
Bassendean Complex-Central and South	23969	9430	39.3	27.0
Combinations of Bassendean Dunes / Pinjarra Plain				
Southern River Complex	16070	3320	20.7	19.8
Spearwood Dunes				
Karrakatta Complex-Central and South	11686	6091	52.1	28.7

b) Rivers

The BORR reserve traverses the Preston and Ferguson Rivers. Very few areas of intact riverine vegetation on the Swan Coastal Plain remain. The native vegetation on the Preston River has an intact canopy of native tree species and provides significant fauna habitat. The understorey is predominantly non-native species. Most of the Preston River vegetation in the area of the road is in this condition and relocation of the crossing would not lessen any impact.

c) Wetlands

The BORR reserve traverses a series of wetlands. Most of these wetlands have been allocated Resource Enhancement and Multiple Use management categories as they have been significantly impacted by agricultural use (both clearing and grazing). One of these wetlands contains an area of EPP Lake (Area 4)(Appendix 11). The larger, most intact wetlands impacted by the BORR reserve is considered in the section on specific areas.

d) Ecological Linkages

The BORR reserve traverses three ecological linkages, the west-east Dalyellup/Gelorup/Crooked Brook Ecological Linkage, the north-south McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup Ecological Linkage and the Ferguson River Ecological Linkage (Appendix 4) (EPA, 2003).

There are only two large remnants within the Constrained portion of the GBR in the vicinity of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup Ecological Linkage. Portions of each of these remnants, Areas 7 and 9 (Appendix 11), appear to be within the BORR reserve. The BORR reserve also impacts one large remnant, Area 1 (Appendix 11), in the east Dalyellup/Gelorup/Crooked Brook Ecological Linkage. These larger, intact areas of native vegetation impacted by the road are considered in the section on specific areas. Both proposed River crossings are located within Ecological Linkages.

10.4.2 Area specific impacts

This section categorises nine natural areas in relation to the potential impact of the proposed roads on the natural values of the areas. The areas are identified on a plan in Appendix 11.

a) Areas where the BORR reserve should be realigned

The BORR reserve impacts significantly on four areas of native vegetation with significant natural value. The EPA recommends that the BORR be realigned to avoid these natural areas as the available information identifies the area as being regionally significant.

Area 1: Dalyellup Reserve (System 6 Area C71)

The area of *Eucalyptus marginata*, *E. calophylla* and *Banksia attenuata* Open Low Forest impacted by the road is a regionally significant natural area meeting two criteria, being:

- Representation of Ecological Communities and Maintaining Ecological Processes; and
- Natural Systems.

The values of the area that contribute to it meeting these criteria are that it:

- contains vegetation of the Karrakatta Central and South vegetation complex in Excellent condition;
- is part of a protected area;
- is managed for its conservation values; and
- is located in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage (Appendix 4).

Previous roadworks for the Bunbury to Busselton road (construction of a dual carriageway) significantly impacted the Dalyellup Reserve through clearing and inappropriate revegetation. Further road works in the area that impact on the reserve are unacceptable.

The EPA recommends that the BORR reserve should be realigned to avoid impacting on Area 1.

Area 3B: Wetland north of Lilydale Road and Area 4: Lot 2 Miles Property (and adjacent lot to the west) Bunbury Outer Ring Road

Area 3B contains vegetation worthy of retention and restoration. The native vegetation in Area 3B is associated with a sumpland and contains both upland and wetland vegetation of the Southern River vegetation complex. The vegetation has been significantly disturbed by grazing but is generally in Good condition. The most significant feature of this area is that the entire sumpland and associated wetland is a single compact unit. The study for Main Roads WA considered Area 3B to be 'locally and regionally significant' in recognition of the intactness of the wetland/upland unit.

The EPA recommends that the BORR reserve should be realigned to avoid impacting on Area 3B.

Area 4: Lot 2 Miles Property (and adjacent lot to the west) Bunbury Outer Ring Road

Area 4 covers an extensive area of wetland with vegetated upland being limited to the north western corner (adjacent to Lot 2). The wetland vegetation is in variable condition but, mostly in a Degraded to Completely Degraded condition, the entire area of Lot 2 being grazed in summer (inundated in winter/spring). Pasture species have been introduced to this area. The only portion of intact wetland vegetation (Excellent condition) is located on the south-eastern corner of the upland area (adjacent to Lot 2). This intact area is a small portion of the wetland. However, overall, the wetland has considerable cover of *Melaleuca rhaphiophylla* and, being inundated in winter/spring, would provide significant habitat for fauna.

The EPA recommends that the BORR reserve should be realigned to avoid impacting on Area 4.

Area 7: Hines Road/Australind Bypass

The native vegetation in this area (south of the Australind Bypass) contains the remains of a diverse wetland area and some associated upland. To the south west of the intersection there is a large naturally vegetated area. In the vicinity of the BORR there are areas of upland supporting *Banksia attenuata* Low Open Woodland and *Eucalyptus calophylla* and *Agonis flexuosa* Woodland. The later unit is adjacent to the wetland which contains areas of *Melaleuca rhaphiophylla* Low Woodland and *Melaleuca lateritia* Shrubland. To the south east is an area of *Melaleuca lateritia* Shrubland which has been significantly impacted by past roadworks. Clearing and changes to the hydrology of the wetlands have resulted in significant weed invasion throughout the remaining vegetation, especially to the south east. However the vegetation in this area is considered to be a regionally significant natural area meeting four criteria, being:

- Representation of Ecological Communities,
- Rarity;
- Maintaining Ecological Processes and Natural Systems; and

- General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation.

The values that contribute to meeting these criteria are that the area:

- Contains a series of vegetation units typical of vegetation of the Southern River vegetation complex in good to degraded condition;
- Contains a wetland supporting Pinjarra Plain vegetation;
- Is the location of a priority species, *Aponogeton hexatepalus*, which is becoming increasingly rare on the Swan Coastal Plain and should be considered for listing as Declared Rare Flora (was DRF until recently); and
- Is located in the north-south McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup Ecological Linkage (Appendix 4) and is part of one of the two large remnants within the Constrained portion of the GBR in the Ecological Linkage (the other remnant is Area 9).

While this area is in need of urgent restoration work, further road works in the area of the reserve will further degrade the area and destroy the remaining natural values. Two studies for Main Roads WA have considered the wetland area in the south-west corner of the intersection to be 'locally and regionally significant'.

The EPA recommends that the BORR reserve should be realigned to avoid impacting on the south western part of Area 7.

b) Impact considered to be able to be modified to be acceptable

The EPA considers that there are two areas where road could be aligned within the Primary Regional Road reserve to avoid impacting on bushland. In general the information available on these areas is not sufficient to adequately address regional significance.

Area 3A: Wetland adjacent to Pioneer Quarry, immediately north of Lilydale Road

The native vegetation in this area is associated with a sumpland although the western half has been cleared. This wetland is significant as it contains the only known remnant (with underlying basalt) in the vicinity of the basalt mine area. The wetland vegetation has been significantly disturbed by grazing and soil disturbance but continues to support a diversity of species on the eastern half. This area is worthy of retention and restoration and the road should be aligned to avoid impacting on the native vegetation in this area.

Area 5: Open Woodland on South Western Highway

This area of native vegetation has previously been identified as being a regionally significant natural area recommended for protection (Section 10.3) This area is worthy of retention and restoration and the road should be aligned to avoid impacting on the native vegetation in this area.

c) Areas where offsets should be provided to compensate for impacts on bushland

The EPA recommends that there is one area of bushland where an offset package should be provided to compensate for the loss of bushland caused by the alignment of the BORR. Bushland has been included in this category when the impact of the proposed roads appears to be unavoidable and the area of native vegetation is relatively large in proportion to the area of impact. In general the information available on these areas was not sufficient to fully address regional significance and identify the boundaries of the area that should be protected.

If the roads impact areas of native vegetation within the Guildford Complex it is expected that the impacts will be offset in this category.

Area 6: Preston River

While Area 6 contains vegetation worthy of retention and restoration, the road cannot be located to avoid crossing the river and similar vegetation occurs along most of the River. As a result the EPA expects vegetation impacts to be offset.

The EPA recommends that an offset package should be provided to compensate for the loss of bushland caused by the alignment of the BORR in Areas 6.

d) Impact appears to be minor

The EPA considers that there are two areas where the potential impacts of the BORR appear to be minor and no offsets or changes to the reserve or road alignment are required.

Area 2A: Property at the corner of Marchetti and Ducane Road

The native vegetation in this area is an isolated remnant of the Bassendean Central and South vegetation complex. The area contains a completely degraded area of wetland and associated upland of *Banksia ilicifolia* and *B. attenuata* Low Woodland. As the vegetation is significantly impacted by past grazing (Good condition) and is principally in the 'Constrained' portion of the GBR it is not considered a priority for protection.

Area 2B: Bushland at the intersection of Ducane Road with the PBOR, north-east of 2A

The native vegetation in this area is an isolated remnant of the Bassendean Central and South vegetation complex. From the aerial photographs the area appears to contain upland of *Banksia* Low Woodland. As the vegetation is apparently impacted by past grazing (Good to Degraded condition) and is principally in the 'Constrained' portion of the GBR it is not considered a priority for protection.

Summary

Having particular regard to the:

a) studies commissioned by Main Roads WA (MRWA) to identify potential environmental impacts of the BORR Primary Regional Road Reserve; and

b) WAPC's response to submissions concerning environmental issues raised in relation to the BORR Primary Regional Road reserve.

it is the EPA's opinion that:

a) The BORR Primary Regional Road Reserve should be realigned to avoid impacting on:
   - Area 1:Dalyellup Reserve (System 6 Area C71);
   - Area 3B: Wetland north of Lilydale Road;
   - Area 4: Lot 2 Miles Property;
   - Area 7: Hines Road/Australind Bypass;

b) The BORR should be aligned within the Primary Regional Road Reserve to avoid impacting on:
   - Area 3A: Wetland adjacent to Pioneer Quarry, immediately north of Lilydale Road; and
   - Area 5: Open Woodland on South Western Highway

c) An offset package should be provided to compensate for the loss of bushland cause by the alignment of the BORR on:
   - Area 6: Preston River; and
   - Guildford Complex remnants

d) Environmental and Noise/Vibration Management Plans, and Vegetation and Waterway Mitigation Strategies being prepared prior to construction in accordance with the specifications in Section 15.

e) As a consequence of the limitations of the flora and fauna survey done for this assessment and possible relocation of the Road reserve the following need to be included in the Management Plans to clearly identify the specific impacts of the roads on natural values:
   - mapping of vegetation units and the condition of the vegetation units;
   - plot based descriptions and flora lists for each of the mapped vegetation units;
   - mapping of populations of priority species; and
   - the identification of fauna values of the remnants.

f) the environmental factors remnant vegetation, wetland, watercourses, fauna and the impacts from road users on surrounding noise sensitive land uses should be deferred until the design phase of the BORR so that a more detailed consideration of the potential environmental impacts of the project and its construction can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

10.5 Glen Iris Service Corridor

Description
The Glen Iris Service Corridor is a proposed multiple-use service corridor for long term access to the Port of Bunbury from the Kemerton and Preston Industrial Estates and the South West region. The Service Corridor may accommodate a heavy haulage road, rail line, high pressure natural gas transmission line, fuel oil pipeline, power transmission lines and possibly conveyor services. The Service Corridor consists of a Public Purpose reserve and a Rail reserve in the GBRS (Appendix 1). The Port Access Road Regional Road reserve is also situated within the Service Corridor for part of its alignment. The potential environmental impacts of the Port Access Road are discussed separately in Section 7.3.

The Service Corridor extends from the South Western Highway in Picton, to Estuary Drive, near the Bunbury Inner Harbour. The corridor has a nominal width south of the Australind Bypass of 345m and currently includes a rail line.

The proposed corridor has the potential to impact on surrounding land uses due to noise and vibration emissions from road traffic, trains and the conveyor.

Submissions
A submission was received objecting to the industrial land adjacent to the Service Corridor being reserved as ROS.

Another submission also objected to the impact of the proposed reserve corridor on remnant vegetation.

The EPA's consideration of these issues is described in the Assessment section below and the EPA and WAPC responses to other more specific comments made in the submissions concerning the proposed Service Corridor are included in Appendix 7.

WAPC response to submissions
The WAPC advises that although it was proposed to include all but the southern portion of the recommended buffer on the western side of the Service Corridor in an ROS reserve it is now believed that reserving all of the buffer as ROS would sterilise the land. The long-term planning objective is to make the land to the east of Picton Waters available for uses compatible with the Service Corridor. The WAPC has recommended that the GBRS be modified to zone this land Urban, with a Special Control Area (SCA) over the buffer (Map 1 – Appendix 8).

The SCA is intended to provide the necessary control to prevent incompatible land uses from locating within the buffer. The WAPC recommends that the buffer on both sides of the Glen Iris Service Corridor should be included in a SCA and the GBRS should be modified in accordance with Appendix 7.

EPA Assessment

a) Buffer for noise and vibration

There have been two studies on the buffer requirements of the Service Corridor (Herring Storer Acoustics, 1999 & BSD, 1999). These studies both conclude that the width of the buffer along the western side of the Service Corridor is sufficient to ensure that surrounding sensitive land uses will not be exposed to unacceptable noise levels from road, rail and conveyor. The EPA Service Unit has also advised that noise emission levels at the edge of the buffer can meet the *Environmental Protection Noise Regulations 1997* provided a barrier is provided as close as possible to the proposed conveyor to reduce noise emissions.

b) Wetland

There is a Multiple Use category wetland on the land to the east of Picton Waters (Map 15 – Appendix 8). This wetland appears to be part of the same wetland that is within the ROS to the west. The EPA recommends that a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan be prepared for this wetland, including that part of the wetland on the adjoining land holdings to the west.

Summary

It is the EPA's opinion that:

a) the alignment of the Glen Iris Service Corridor (Public Purpose Reserve, Rail Reserve and Regional Road Reserve) and the width of the Special Control Area are environmentally acceptable subject to Noise and Vibration Management Plans being prepared in accordance with the specifications in Section 15 prior to any additional infrastructure being constructed within the corridor;

b) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to adoption of a Special Control Area to prevent incompatible land uses being located in the buffer;

c) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to the preparation and implementation of a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan;

d) the environmental factors noise, vibration, remnant vegetation and wetlands should be deferred until the land within the buffer is subdivided or development, whichever comes first, so that a more detailed consideration of the potential environmental impacts of the subdivision can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986*; and

e) any proposal to construct infrastructure within the Glen Iris Service Corridor should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986*.

10.6 Lot 35 Spurr Street, Capel (Urban Deferred)

Description
Lot 35 Spurr Street is situated on west side of the Capel townsite, adjacent to Bussell Highway (Map 14 – Appendix 9). The site is currently zoned Rural in the Shire of Capel Town Planning Scheme and proposed to be zoned Urban Deferred in the GBRS (Appendix 1).

Submissions
A submission stated that the remnant vegetation on Lot 35 is within the Southern River complex and contains an EPP wetland and possibly DRF and Priority Flora and should be protected.

WAPC's response to submissions
The WAPC advises that remnant vegetation on Lot 35 represents 16.8% of the total site area. More detailed site investigations could be required at the local rezoning stage to determine the amount of this remnant vegetation that should be retained in a local recreation reserve.

EPA Assessment
Lot 35 is considered to be a regionally significant natural area of high value because it meets four criteria being used to identify regionally significant natural areas in the EPA's assessment of the GBRS. These criteria are:

- Representation of Ecological Communities;
- Rarity;
- Maintaining Ecological Processes and Natural; and
- General Criteria for the protection of wetland, streamline and estuarine fringing vegetation.

The natural attributes of Lot 35 that contribute to meeting the criteria are listed below:

- Representative area of natural vegetation of the Southern River Vegetation Complex (on the Bassendean Dune /Pinjarra Plain interface);
- Containing upland and wetland vegetation units, the wetland area being of a quality and type consistent with a Conservation Category wetland;
- Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum;
- Contains populations of three significant flora (*Jacksonia sparsa* (P3), *Hypocalymma ericifolium*, *Astartea* sp "Brixton"); and
- A natural area in the Capel/Boyanup (Appendix 4) and Capel River Ecological Linkage.

The bushland on Lot 35 is part of the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage and consideration should be given in any future subdivision design to enhance ecological linkage values and protect the Conservation Category wetland.

Summary
It is the EPA's opinion that:

a) the bushland on Lot 35, shown on Map 14 (Appendix 9), is part of the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage and consideration should be given in any future subdivision design and/or development to enhance ecological linkage values and protect the Conservation Category wetland; and

b) the environmental factors remnant vegetation, wetlands and fauna should be deferred until the land is subdivided or development, whichever comes first, so that a more detailed consideration of the potential environmental impacts of the subdivision can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

10.7 Lots 8 and 10 Ferguson River Foreshore, Picton

Background
Lots 8 and 10 are situated approximately 8 km south-east of the Bunbury CBD. Portions of the lots were identified as ROS reserve in the advertised GBRS. The lots are currently reserved as Parks and Recreation in the City of Bunbury Town Planning Scheme.

Submissions
A submission stated that the proposed ROS for Ferguson River in Picton includes an existing residence and substantial property, including part of a nursery, and it should be reduced.

WAPC's response to submissions
The WAPC has advised in its response to submissions that the proposed ROS for Ferguson River in Picton does not include an existing residence but it has been reviewed in consultation with the WRC and some modifications have been recommended as acceptable as shown in the recommended modification plan (Map 13 - Appendix 8).

EPA Assessment
The EPA supports the proposed modification to the alignment of the ROS reserve on the eastern side of Lot 8 (Map 15 - Appendix 9). The proposed modification to the alignment of the ROS reserve on the eastern side of Lot 10 is not supported. The proposed ROS reserve should be retained to consolidate the size and shape of the foreshore reserve and to facilitate re-establishment of the ecological linkage between the Ferguson River and Reserve 5545 to the south-west.

Summary
It is the EPA's opinion that the portion of Lot 10, shown on Map 15 (Appendix 9) , should be reserved to consolidate the size and shape of the Ferguson River foreshore reserve.

10.8. Lots 1 and Pt Lot 5 North Boyanup Road, Davenport

Background
Lots 1 and Pt Lot 5 are situated approximately 6km south-east of the Bunbury CBD. Portions of the lots were identified as ROS reserve in the advertised GBRS. The site is currently zoned Special Use Abattoir and Parks and Recreation in the City of Bunbury Town Planning Scheme.

Submissions
A submission was received stating that ROS over southern portions of Lot 5 and Pt Lot 1 North Boyanup Rd, Davenport should be deleted because it will have a detrimental impact on an area of irrigated pasture as part of the existing abattoir operation.

WAPC's response to submissions
The WAPC has advised that its environmental study concludes that the proposed ROS over the southern portion of Lot 5 should be retained because it contains a Priority flora species and forms an integral part of the Ocean to Preston River Regional Park. However, the WAPC advises that the proposed Preston River foreshore ROS over Pt Lot 1 can be reduced (Map 3 - Appendix 8), although, the ROS corridor width should not be reduced below the 1 in 100 year flood line to ensure the recreation values of the river foreshore are not compromised.

Further assessment should be undertaken at the structure planning, subdivision or development stage, or through provisions should an amendment to the town planning scheme be submitted.

EPA Assessment
The EPA recommends that the remnant vegetation on Lot 1, shown on Map 12 (Appendix 9), be reserved and appropriately managed to consolidate the size and shape of the foreshore reserve.

Summary
It is the EPA's opinion that:
(a) the remnant vegetation on Lot 1, shown on Map 12 (Appendix 9), should be reserved to consolidate the size and shape of the Preston River foreshore reserve.

10.9 Dalyellup Beach Estate Tourist Precinct – Pt Loc 497 Dalyellup Road.

Background
Dalyellup Beach Estate is a proposed residential estate situated to the west of Bussell Highway, about 6 km south of the Bunbury CBD. A substantial portion of the residential estate has been subdivided and developed.

The Shire of Capel initiated Amendment No. 2 to Town Planning Scheme No. 7 to rezone the Dalyellup Beach Estate to "Development zone" to facilitate the subdivision and development of the Estate in accordance with the Dalyellup Beach Estate Local Structure. The amendment was subsequently referred to the EPA pursuant to Section 7A1 of the *Town Planning and Development Act 1928*. The EPA decided to not formally assess the amendment and provided advice to the Shire of Capel (EPA, 1998). The EPA's advice is outlined below.

The Urban/ROS boundary shown in the GBRS around the Dalyellup Beach Estate does not align with the boundary shown in the Structure Plan in several locations. A submission to the GBRS, lodged on behalf of the owner of Dalyellup Beach Estate, stated that the tourist precinct identified in the Structure Plan should be zoned as Urban in the GBRS until determination of an appropriate setback in this location following further investigation and the provision of sufficient justification.

The WAPC has advised that the alignment of the ROS and Urban boundary should remain as shown in the advertised GBRS.

The EPA's consideration of these issues is described below and the EPA and WAPC responses to other more specific comments made in the submissions concerning the proposed zoning of the Dalyellup Beach Estate are included in Appendix 7.

EPA Assessment

The land within the proposed tourist precinct, on a portion of Pt Loc 497 is part of an outstanding regionally significant natural area (Dalyellup/Minninup Swamp Natural Area). The values of the regional coastal bushland block are:

- Landscape diversity (west-east catenary sequence): coastal foredune, coastal dune, wetland, upland and lowland;
- Geomorphological diversity (west-east catenary sequence): Quindalup Dunes-Quindalup Dune wetlands, Quindalup/Spearwood Dune interface wetlands-Spearwood Dunes;
- Vegetation structural unit diversity (west-east catenary sequence): Foredunes, Peppermint scrub, Peppermint/Tuart woodland, wetlands dominated by combinations of Peppermint, Tuart,, Swamp Banksia, *Melaleuca* and sedges, Tuart/Peppermint forest, Marri, Tuart/Jarrah over Banksia woodland;
- Part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage and part of the Maidens/Muddy Lake/Ludlow Ecological Linkage (Appendix 4);
- Species diversity; more than 225 flora; and
- Outstanding habitat values: diverse habitat types support a range of fauna, including species listed under State and Commonwealth legislation.

The site meets three criteria, being:

- Representation of Ecological Communities, Diversity; and
- Rarity.

The natural attributes of the site that contribute to meeting the criteria are listed below. Some of these natural attributes are shared with the Dalyellup/Minninup Swamp Natural Area.

- Contains an area of vegetated Quindalup Dunes which is part of the largest most southern area of vegetated parabolic Quindalup Dunes remaining on the Swan Coastal Plain, and including Tuart/Peppermint forests in the eastern components of the dunes;
- Representative area of natural vegetation in Excellent to Good condition of the Quindalup Complex;
- The area has a rich and diverse bird assemblage. This distinctiveness is further emphasised by the number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury, and the number of species that are of regional conservation significance. Species of conservation significance in the area include Splendid Fairy-wren, White-browed Scrubwren, Weebill, Broad-tailed Thornbill, Golden Whistler, Painted Button-quail;
- High number of other significant vertebrate species;
- Significant reptile species Bardick (*Echiopsis curta*) found on coastal dune site;
- One Schedule 1 species (Western Ringtail Possum), one Priority 4 species (Quenda) recorded; and
- Part of two ecological linkages: Dalyellup/Gelorup/Crooked Brook and Maidens/Muddy Lakes/Ludlow Ecological Linkages (Appendix 4).

Protecting the remnant vegetation on the proposed tourist precinct site will consolidate the ROS and enable better management with a hard edge. The eastern portion of the area is a high ridge and is a significant visible area for migrating birds from ROS areas to the south and south-east. It also has significant old habitat trees which provide nesting sites for bird species that feed in adjacent areas.

This view is consistent with the advice that the EPA provided to the Shire of Capel in relation to Amendment No. 2 in 1998, which noted that in earlier planning studies this land had been identified as part of a future conservation reserve. The EPA advised that due to the environmental values of the site it should be conserved.

Summary
It is the EPA's opinion that the remnant vegetation within the tourist precinct site on Pt Loc 497, south of Dalyellup Road Road, as shown on Map 6 (Appendix 9) , is part of regionally significant bushland and ecological linkage and should remain the ROS reserve and be appropriately managed.

11. Assessment of Special Control Areas

The potential environmental impacts and submissions received in relation to the Special Control Areas are described and assessed below.

11.1 Special Control Area No. 1 - Water Catchments

Description
Special Control Area No. 1 (SCA No. 1) includes all, or part of, the proclaimed surface water catchment areas which are managed as Priority 1 and 2 Source Protection Areas by the WRC (Appendix 1).

Under the GBRS, the WAPC and local governments, in considering development applications within the SCA's, will be required to have due regard to the purpose of the SCA and the objectives of the associated proposed *Public Water Supply Catchment Policy* (refer Section 12.1), which principally are to prevent land uses or development which would prejudice the quality of water supplies for public use. SCA No. 1 provisions and associated policy also specifies the need for the WAPC to consult with the WRC regarding rezoning proposals, subdivision and development.

Submissions
A number of submissions were received from landowners objecting to the inclusion of their property within SCA No. 1 on the basis that it will restrict future development and impact on land values.

Another submission also suggested that Lot 1 Honeymoon Road, Harvey should not be included in the SCA No. 1 as it is not in the Harvey Dam catchment. The WAPC has advised that Lot 1 should not be included in SCA No. 1 and that the boundary be modified to exclude the land from the SCA.

EPA Assessment
Each of the property owners objecting to being included in the SCA No. 1 are located in declared Priority 2 water source protection areas. Existing approved uses and development in these areas would not be affected by SCA No.1. Restrictions would only apply to new land use and development proposals whether an SCA is created or not. Priority 2 classification does not prevent selling or leasing of property and there are a range of agricultural uses that are compatible with this classification. In many cases, land use and development typical of rural areas would be permitted subject to suitable controls and conditions to prevent pollution of public drinking water source areas. WRC will provide advice on these matters in considering future rezoning, subdivision and development proposals.

Summary
The EPA supports the re-alignment of the SCA No.1 to exclude Lot 1 Honeymoon Road, Harvey from SCA No. 1.

11.2 Special Control Area No. 2 - Kemerton Industrial Zone Buffer

Description
Special Control Area No. 2 (SCA No. 2) has been included in the GBRS to provide a buffer to the land currently zoned Industrial within the Shire of Harvey Town Planning Scheme No 1, as well as land to be zoned Industrial in the GBRS. The purpose of the SCA No. 2 is to identify the land likely to be subject to unacceptable emission levels, such as noise, odour and dust from the current and future operations within the Kemerton industrial area and ensure that land uses incompatible with industry, including single dwellings, are not permitted within the buffer, thereby ensuring the long term operation of the industrial area..

The SCA No. 2 provisions for the buffer area also specify the need for the WAPC or local government to refer any amendments to the GBRS or town planning scheme, and any subdivision or development applications within the SCA, to the EPA for assessment.

Submissions
A considerable number of submissions raised a range of concerns about the adequacy of the buffer SCA No. 2 around the Kemerton Industrial Area or questioned the need for the SCA over particular lots.

The EPA and WAPC responses to detailed and specific comments made in the submissions concerning SCA No. 2 are included in Appendix 7 and the EPA's assessment of whether the SCA provides adequate separation between the proposed industry and surrounding land uses is described in Section 5.

EPA Assessment
The EPA's assessment of the adequacy of SCA No. 2 as a separation buffer between the Kemerton Industrial Area and incompatible landuses has previously been described in detail in Section 5.

Summary
Having particular regard to the:

a) Noise andair quality conducted to determine the boundary of the SCA No. 2 (EPA, 1998c)
b) EPA's advice to the WAPC on Industry 2030 (EPA 1998c, 1999c) in relation to the remnant vegetation; and
c) Provisions for SCA No. 2 contained in the GBRS text;

it is the EPA's opinion that Special Control Area No. 2 provides adequate separation between the proposed industry and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors;

11.3 Special Control Area No. 3 - North Capel

Description
Special Control Area No. 3 (SCA No. 3) has been included in the GBRS to provide a buffer around the North Capel Industrial Area to ensure that incompatible land uses, including single dwellings, are not permitted near the industrial area.

The purpose of the SCA No. 3 is to identify the area surrounding the North Capel Industrial Area that is likely to be subject to unacceptable noise and odour emission levels from current and future industrial operations and ensure that land uses and development incompatible with the existing and proposed activities within the North Capel Industrial Area, including single residential dwellings, are not permitted within the buffer. The provisions for the SCA also require the WAPC or local government to refer any amendments to the GBRS or town planning scheme, and any subdivision or development applications affecting land within SCA No. 3, to the EPA.

Submissions
A submission was received stating that SCA No. 3 should be reduced and be based on better industrial practices.

In response, the EPA advises that the boundary of SCA No. 3 has been calculated based on noise emissions modelling for current and future industrial activities. Reducing the width of the buffer may expose sensitive land uses to unacceptable noise levels.

The WAPC has advised that Westralia Sands is negotiating with land owners affected by SCA No. 3 regarding compensation for loss of development rights.

The EPA and WAPC responses to other more detailed and specific comments made in the submissions concerning Special Control Area No. 3 are included in Appendix 7.

EPA Assessment
The EPA assessed the proposal by Westralia Sands Ltd to duplicate the synthetic rutile plant within the North Capel Industrial Area (EPA, 1992b). The EPA's assessment indicates that odour emissions from the plant could meet acceptable levels at the site boundary, although, there is potential for noise emissions from the industrial area to impact sensitive land uses off-site. A buffer is required to prevent noise emissions from the plant impacting on noise sensitive land uses.

The boundary of SCA No. 3 closely follows the projected 35dB(A) noise level contour identified in the noise modelling exercise conducted by Vipac Engineers & Scientists Pty Ltd on behalf of Westralian Sands Ltd (Vipac, 1998). The noise modeling took into account current and proposed industrial operations.

The EPA is satisfied that the:
a) SCA No. 3 will adequately buffer incompatible land uses from current and future industrial activities;

b) modelling to identify the SCA No. 3 boundary was conducted in accordance with the EPA's Guideline for the assessment of environmental noise (EPA, 1998b); and

c) 35dB(A) contour represents the lowest assigned level under the *Environmental Protection (Noise) Regulations 1997* and is the most appropriate contour to define the alignment of the SCA No. 3 boundary.

Summary

It is the EPA's opinion that:

(a) SCA No. 3 will provide adequate separation between current and future industrial operations and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

12. Assessment of policies linked to the Greater Bunbury Region Scheme

In recognition of the need to provide guidance for the protection of key natural resources and planning controls for surface water catchments and major river floodplains within the Greater Bunbury region, the WAPC prepared the following draft planning policies:

- Public Water Supply Catchment Policy;
- Floodplain Management Policy;
- Strategic Agricultural Resource Policy; and
- Strategic Minerals and Basic Raw Materials Resource Policy.

The GBRS text will provide the mechanisms for relevant planning strategies and policies to be linked to the Scheme by reference.

The submissions and potential environmental impacts of the policies are described and assessed by the EPA below. Advice is provided on a number of matters where the EPA believes the policies could be modified to avoid potential environmental impacts and or improve environmental management.

12.1 Public Water Supply Catchment Policy

Description

The Draft Public Water Supply Catchment Policy identifies public drinking water supply areas that have been proclaimed under the *Country Areas Water Supply Act 1947* within the GBRS area, which are currently used or have the potential to be used in the future as public drinking water supply sources. The policy aims to guide land uses or development that would have adverse impacts on the quality of the water supply sources. The policy must be taken into account by local governments in preparing town planning schemes and amendments, and in land use planning decisions affecting land within the Policy Areas.

The policy applies to the Special Control Area No. 1 (SCA No. 1) – Water Catchments as depicted in the GBRS. The EPA's recommendations in relation to SCA No. 1 are outlined in Section 1.1 above

Submissions
The Shire of Dardanup suggested in its submission that the land use permissibility table in the Public Water Supply Catchment Policy should be deleted. The WAPC has agreed that the table should be deleted and reference made instead to the WRC guidelines which determine land use permissibility. This would avoid the need to amend the policy each time the guidelines are modified.

Summary
The EPA supports the Public Water Supply Catchment Policy subject to the land use permissibility table being deleted and inclusion of reference to the WRC guidelines which determine land use permissibility

12.2 Floodplain Management Policy

Description
The Floodplain Management Policy has been prepared by the WAPC to formalise the consideration of floodplain management requirements by the responsible authorities within the Greater Bunbury Region, when preparing town planning schemes and considering subdivision and development applications within floodplains for rivers and the Leschenault Estuary.

The principal areas to which the draft policy applies are the defined floodplains for the Brunswick, Collie, Preston and Capel Rivers. The policy reflects the current presumption against more intensive development within floodways of major rivers and the need for minimum habitable floor levels for development within the flood fringe areas.

Submissions
The EPA and WAPC responses to comments in the submissions concerning the Draft Floodplain Management are included in Appendix 7.

EPA Assessment
While the Floodplain Management Policy focuses on providing guidance on appropriate land use and development within floodplains to mitigate flood damage as a result of a 1 in 100 year river flood event, it should be recognised that floodplains also have important environmental values. The Floodplain Management Policy should be modified to include the following description of the environmental values of floodplains.

"Flooding is a natural phenomenon upon which a number of environmental benefits depend. Floodplains, waterways and their associated wetlands, have a fundamental role in supporting flora and fauna habitats of special significance. Floods replenish wetlands, exchange nutrients and organisms and trigger stages in the life cycles of many

plants and animals." Western Australian Draft Floodplain Management Strategy (Sinclair Knight Merz, 2002)

Floodplains provide natural overland flow paths and storage areas where floodwaters remain for slow release as stream levels recede, thereby reducing the potential for channel erosion from high energy flows. Nutrients, debris and sediment settle out during this process, controlling high sediments and nutrient loads in waterways and contributing to floodplain productivity.

Riparian vegetation plays an important role in conserving the aquatic environment, providing shading, shelter and transport corridors for terrestrial and avian species.

Summary
The EPA supports the Floodplain Management Policy subject to the environmental values of floodplains being described in further detail consistent with the WRC's Western Australian Draft Floodplain Management Strategy.

12.3 Strategic Agricultural Resource Policy

Description
The main objectives of the Strategic Agricultural Resource Policy, prepared by the WAPC, are to:

- protect agricultural areas identified as being of State or regional significance from inappropriate development and land uses; and
- ensure the WAPC and local governments in preparing and reviewing town planning schemes and amendments, as well as when determining subdivision and development proposals have due regard to the protection of the strategic agricultural areas.

Submissions
It was noted in one submission that the Strategic Agricultural Resource Policy covers areas of remnant vegetation and that these areas should be identified and excluded from agriculture. This matter is discussed in detail in the EPA's assessment below.

The EPA and WAPC responses to other more detailed and specific comments made in the submissions concerning the Draft Strategic Agricultural Resource Policy are included in Appendix 7.

EPA Assessment
The EPA supports the introduction of strategic initiatives to facilitate integrated planning for the wise and sustainable use of agricultural resources in the Greater Bunbury Region and acknowledges that the Policy is primarily concerned with protecting agricultural land from inappropriate development and land uses.

However, there are a number of areas of potential conflict between the Strategic Agricultural Resource Policy areas and regional ecological linkages (Appendix 4). The

EPA considers that in addition to considering the appropriate land uses within strategic agricultural areas, the policy should also recognise that there are other potential environmental impacts that should be considered when determining the location and acceptability of new agricultural proposals.

Summary
Having particular regard to the impact that a number of identified strategic agricultural areas may have on natural areas, bushland and ecological linkages the EPA recommends that the Strategic Agricultural Resource Policy should be modified to include the following statements:

a) There is a general presumption against clearing of native vegetation including within the Strategic Agricultural Resource Policy Areas where 30% or less of the Vegetation Complex remains;
b) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposed clearing will be assessed by the EPA in accordance with Guidance 10 (EPA, 2003); and
c) Native vegetation clearance is also proposed to be addressed through the *Environmental Protection Amendment Bill 2002* which is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

12.4 Strategic Minerals and Basic Raw Materials Resource Policy

Description
The main objectives of the Strategic Minerals and Basic Raw Materials Resource Policy is to identify land containing mineral resources and basic raw materials of State or regional significance and to prevent such resources being sterilised by incompatible development and land uses.

The policy principally relates to important mineral sands, silica sand and basalt resource areas.

Submissions
A number of submissions state that the Policy areas have been delineated with no regard to remnant vegetation. In particular, it is noted that there is a substantial amount of good vegetation in the Strategic Minerals and Basic Raw Materials Resource Policy Area south of Capel and a Threatened Ecological Community and EPP wetlands nearby.

The EPA and WAPC responses to other more detailed and specific comments made in the submissions concerning the Strategic Minerals and Basic Raw Materials Resource Policy are included in Appendix 7.

EPA Assessment

The EPA supports the introduction of strategic initiatives to facilitate integrated planning for the wise use of basic raw materials and mineral resources in the Greater Bunbury Region and acknowledges that the Policy is primarily concerned with ensuring that there is adequate separation between basic raw materials and mineral deposits and incompatible land uses to protect the resources.

However, there are a number of areas of potential conflict between the Strategic Minerals and Basic Raw Materials Resource Policy areas and regional ecological linkages (Appendix 4). The EPA considers that in addition to considering the appropriate width of buffer areas between these incompatible land uses, the policy should also recognise that there are other potential environmental impacts that should be considered when determining the location and acceptability of new extractive or mining operation proposals.

Summary

Having particular regard to the impact that a number of identified resource deposits may have on natural areas, bushland and ecological linkages the EPA recommends that the Strategic Minerals and Basic Raw Materials Resource Policy should be modified to include the following statements:

a) There is a general presumption against clearing of native vegetation including within the Strategic Minerals and Basic Raw Materials Resource Policy Areas where 30% or less of the Vegetation Complex remains;

b) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposal will be assessed by the EPA in accordance with Guidance 10 (EPA, 2003);

c) After the resource has been recovered from a Strategic Minerals and Basic Raw Materials Resource Policy Area located within a cleared portion of an Ecological Linkage, the linkage should be restored using previously occurring native species of local provenance; and

d) Native vegetation clearance is also proposed to be addressed through the *Environmental Protection Amendment Bill 2002* which is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

13. Regionally significant environmental issues of concern to the EPA

The intention of the EPA's assessment of the GBRS is to focus on the regionally significant environmental issues raised by the "new zones". However, the EPA considers that it should also consider a number of other relevant and regionally significant environmental issues.

Advice is provided below in relation to some significant environmental issues. The WAPC should consider the best means of achieving the EPA's recommendations in relation to these issues in the Greater Bunbury Region.

13.1 Strategy to conserve regionally significant natural areas on the Swan Coastal Plain

The EPA recognises the need to update the conservation recommendations on the Swan Coastal Plain portion of the GBRS as a priority. It considers that this work should be undertaken as part of a wider coordinated program to update conservation recommendations across the non-metropolitan portions of the southern Swan Coastal Plain, and the Darling and Whicher Scarps. The review of conservation recommendations on the country portions of the Swan Coastal Plain is needed to complete an update of the EPA System 6 and System 1 recommendations that was initiated in 1995, but deferred pending completion of recommendations for the metropolitan area through Bush Forever.

The EPA supports the completion of the System 6 and System 1 update on the Swan Coastal Plain and adjacent Scarps as a 'whole of government' program through a similar co-ordinated approach, as used for Bush Forever. It considers that an adaptation of the criteria developed for the Natural Area Strategy (Appendix 3) would provide an appropriate basis for this review. Consideration of the ecological linkage requirements and mechanisms promoting re-establishment of ecological linkage, including hydrological and wetland function, should be an important component of the program.

Maintenance of ecological linkages is also a significant consideration on the Darling Plateau and between the Darling and Blackwood Plateaux, where the main blocks of State Forest are separated by substantial areas of private land developed for agriculture. The EPA notes that the Forest Management Plan is the primary mechanism addressing the conservation management issues on the Darling and Blackwood Plateaux.

13.2 Wetland Management

Discussion
Within the area of the southwest encompassing the Greater Bunbury Region Scheme, there is a great diversity of wetland types ranging from tidal mangroves, sand and mudflats, through to coastal lakes, swamps and marshes. Under the *Wetlands Conservation Policy for Western Australia* wetlands are defined as *"areas of marsh, fen,*

peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water at a depth of which at low tide does not exceed six metres" (Government of Western Australia, 1997). These systems support a rich diversity of plant and animal life and have varying hydrological regimes. Some of these systems are also valued for activities including recreation, tourism, fisheries, water supply and flood mitigation.

The Western Australian Government has formally recognised the importance of wetlands through the Wetlands Conservation Policy for Western Australia and *'is committed to identifying, maintaining and managing the State's wetland resources'* (Government of Western Australia, 1997). A specific objective of this Policy *is 'to prevent the further loss or degradation of valuable wetlands and wetland types, and to promote wetland conservation, creation and restoration'*(Government. of WA, 1997).

The EPA has recognised and endorsed the wetland mapping, classification and evaluation undertaken and maintained by the WRC. The EPA considers Conservation Category Wetlands (CCW) to be valuable and of sufficient significance to seek to avoid further loss and degradation of these wetlands. This has been formalised through the release of the EPA Guidance Statement No. 10. This document outlines that proposals that would result in direct loss of wetlands or have significant impacts on key conservation values are likely to undergo formal assessment by the EPA unless proposals can be redesigned to avoid the direct loss or significant impacts on wetlands. The wetlands that are covered by this criteria include Ramsar wetlands, wetlands of national significance (ANCA, 1996) and those wetlands currently identified by the Environmental Protection (Swan Coastal Plain Lakes) Policy, 1992.
In broad terms, the EPA's position on wetlands is as follows:

(a) Wetlands are valuable and must be recognised in all land use planning processes. Wetlands and wetland values should be identified as a part of planning, and managed according to values, state national and international policy.
(b) In early planning stages, proponents will be required to identify wetlands and wetland values, and ensure appropriate protection and management measures are in place to minimise impacts.
(c) Where a proposal or plan may impact upon wetland areas including their buffers, further studies may be required to be undertaken by a qualified consultant to demonstrate that impacts will either be minimised or the proposal amended to protect higher value wetlands and their buffer.
(d) Wetlands within Conservation policy areas, or listed on any relevant EPP, should be given the highest priority for protection within reserves or public open space.
(e) If a proposal likely to impact a CCW is unable to be modified then the EPA may require formal EPA assessment of the proposal.

The whole of Government position statement on wetlands and recognition for Government to protect high value wetlands (which now includes Conservation Category Wetlands), is summarised in the Wetlands Conservation Policy for Western Australia,1997 (Government of Western Australia, 1997).

Summary
To ensure that wetlands are adequately protected and managed it is the EPA's opinion that a condition should be imposed on the GBRS requiring that prior to amending the GBRS or local town planning scheme, or approving a subdivision or development, the WAPC or local governments may require an Environmental Management Plan to be prepared and implemented to manage the potential impacts of the proposed subdivision or development on any wetlands that may be impacted.

The Environmental Management Plan should address issues including, but not limited to:

- determination of the wetland boundary;
- drainage and nutrient management from land uses surrounding the wetland;
- demarcation of the wetland buffer area;
- determination of land uses proposed for wetland buffer areas;
- revegetation of deep rooted perennial vegetation and landscape management; and
- management of access and rehabilitation of the wetland area.

The EPA also advises that Swan Coastal Plain Wetlands Environmental Protection Policy is still being developed and is expected to be finalised in late 2003/ early 2004. The aim of this Policy is to declare and protect the environmental values of important wetlands on the Swan Coastal Plain by controlling activities that can degrade or destroy those environmental values. In summary, the Policy will prohibit filling, draining, mining, discharges or clearing of wetlands protected under the Policy without authorisation under the *Environmental Protection Act 1986.*

13.3 Waterway Management

Discussion
Waterways have important ecological functions and provide important links between landforms, are home to a wide range of plants, animals and micro-organisms, and many are unique to a particular region. They are an integral part of our heritage, places of spiritual and cultural significance and their amenity, social and economic values are enjoyed by all. Healthy waterways that provide for a range of environmental and human needs is the objective for Government's management of the State's waterways.

In the context of the GBRS, a waterway consists of a stream system, connected wetlands and the receiving lake, estuary or inlet at the base of the system, including floodplains and lake systems that overflow into rivers, as well as lakes and swamps that are predominantly stream fed. The form and extent of a waterway will vary according to the characteristics of the catchment. Boundary definition to reserves or management areas must be governed by these biophysical characteristics as well as the waterways services and values to be protected.

Catchment characteristics including geology, geomorphology, hydrology, vegetation, cultural uses and others, heavily influence the form and extent of waterways. These factors also influence the physical and chemical characteristics of the water that is

conveyed to receiving water bodies. The strong linkage between waterways and catchment means it is impossible to effectively manage waterways in isolation of land use planning and management.

The values and functions of waterways should be a core consideration in the development of regional and local planning schemes. The beneficial uses and environmental values of important river systems, defined through water resource planning and Environmental Protection Authority decisions, should be recognised in Statutory Region Schemes and other planning schemes or processes developed from them.

In broad terms, the EPA's position on waterways is as follows:
(a) Waterways and waterway values should be identified as a part of planning, managed according to values, and reflect state, national and international policy.
(b) Waterways within Conservation policy areas, or listed on any relevant EPP, should be given the highest priority for protection within reserves or public open space.

Summary
To ensure that wetlands are adequately protected and managed it is the EPA's opinion that a condition should be imposed on the GBRS requiring that prior to amending the GBRS or local town planning scheme, or approving subdivisions or developments, the WAPC or local governments may require an Environmental Management Plan to be prepared and implemented to manage the potential impacts of the proposed subdivision or development on any waterway that may be impacted.

The Environmental Management Plan should address issues including, but not limited to:
- determination of the waterway boundary;
- drainage and nutrient management from land uses surrounding the waterway;
- demarcation of the waterway buffer area;
- determination of land uses proposed for waterway buffer areas;
- revegetation of deep rooted perennial vegetation and landscape management; and
- management of access to waterway area.

13.4 Acid sulfate soils

Discussion
Acid sulfate soils (ASS) is the common name for soils containing iron sulfides or their oxidation products. Where ASS are exposed to air the iron sulfides oxidise producing sulfuric acid and toxic concentrations of dissolved metals such as aluminium, iron and arsenic. The acid and metals have often been responsible for environmental damage.

While the eastern coastline of Australia has had to deal with the problems from ASS for some time, Western Australia is more recently becoming aware that ASS problems can arise here from a wide range of developments in different parts of the State, particularly along the coast. Initial studies indicate that ASS do occur in seasonally waterlogged areas on the Coastal Plains between Perth and Busselton, including areas within the Greater Bunbury Region.

Appendix 13 gives an indication of the likely areas and probability of occurrence of coastal ASS, based on criteria from coastal survey work in Queensland and New South Wales, and information available from Land System and Soil-landscape system mapping conducted by the Department of Agriculture Western Australia. No detailed survey work has been conducted in the Greater Bunbury Region to clearly determine the actual extent of ASS, and hence the map is indicative only.

A High rating indicates that ASS are very likely to occur within 3 metres of the soil surface. A Moderate rating indicates that ASS could occur in some parts of the area, but are not common. A Low rating indicates that ASS are uncommon, and if they occur are expected to be localised. However, disturbance of localised areas of ASS within the low rating has the potential to lead to significant localised problems.

The disturbance of coastal ASS is most likely to be associated with urban, tourism and recreational developments.

The EPA's objective for acid sulfate soils is that development that potentially may impact on acid sulfate soils is planned and managed to avoid adverse effects of the natural and built environment, human activities and health.

In broad terms the EPA's position is as follows:

(a) It is preferable that soils and sediments exhibiting ASS characteristics are not disturbed. Disturbances of concern include excavation works; lowering of the groundwater table by dewatering or drainage works; and in some cases, filling;

(b) In the early stages of a project or plan, the possibility of the existence of acid sulfate soils on or near the site is investigated, with a view to avoiding disturbance to ASS; and

(c) When a project or plan may impact on an area where there is potential for acid sulfate soils, investigation by qualified people to the satisfaction of the relevant authorities should be carried out to demonstrate that there will be no disturbance caused to ASS.

The DEP and EPA positions in relation to ASS and recommended procedures for consideration of the issues through the planning framework is outline in the *Draft Guidance on Acid Sulfate Soils* (DEP, 2002).

Summary

Having particular regard to the potential impacts of acid sulfate soils it is the EPA's opinion that prior to amending the Greater Bunbury Region Scheme or local town planning schemes or approving subdivisions or developments, the Western Australian Planning Commission or local governments may require:

(a) a Preliminary Acid Sulfate Soils Assessment to be prepared where there is likely to be a significant risk of disturbing acid sulfate soils; or

(b) an Acid Sulfate Soil Management Plan to be prepared and implemented where the presence of an acid sulfate soils has been confirmed.

13.5 Alcoa Wagerup

Discussion
Alcoa operates an alumina refinery at Wagerup which commenced operations in 1984 and is currently licensed by the Department of Environmental Protection to produce 2.35 million tonnes per annum (mtpa) of alumina.

The refinery is located in the Shire of Waroona, within the Peel Region. However, noise and odour emissions from the refinery are reported to affect portions of the township of Yarloop and nearby rural areas within the Shire of Harvey which are situated within the Greater Bunbury Region.

When the plant was established, Alcoa acquired land around the refinery to provide a buffer between the refinery and incompatible land uses . The extent of the buffer was based on Alcoa's appreciation of the need at the time; and was primarily concerned with visual amenity and noise.

In 1996, the company commissioned a liquor burner, to improve efficiency by removing organics which build up in the process liquor. This resulted in increased odour and noise emissions. Alcoa has stated that improvements by way of pollution control equipment in 1998 and 2001 have reduced this to about 3% of the 1996 odour emission levels.

Until recently, Alcoa had plans to increase production to 3.3mtpa. Conditions set by the Minister for the Environment required buffer distances and amenity provisions to be implemented, to manage impacts of the proposed production expansion.

To meet the Minister's requirements, proposals under consideration include a buffer to be implemented through the Peel and Greater Bunbury Region Schemes or through the Shire of Waroona and Shire of Harvey local town planning schemes. Agreement has not been reached between the Department of Planning and Infrastructure, Shire of Waroona and Shire of Harvey on which type of Scheme would be most appropriate.

Community concerns, which initially emerged when the liquor burner was commissioned, have come to the fore following Alcoa's incremental expansion. Significant levels of community complaints have been received by Alcoa and DEP regarding noise, odour and health concerns.

Investigations so far have been unable to identify a causal agent. Accordingly, there is no clear scientific evidence of a link between the refinery and these community complaints, although a connection between refinery emissions and community health issues has been accepted by the Medical Practitioners' Forum established by the Government to advise it on this matter. Emission levels and ambient air quality have been measured and found to be many times lower than accepted health guidelines. Notwithstanding this, the DEP has been requiring Alcoa to progressively reduce all emissions from the refinery. Capital works completed in June 2002 contributed considerably to reducing emissions. Whilst

community complaints since these works have reduced, considerable numbers of complaints continue to be received by the DEP.

Procedure for providing a buffer
For noise impacts an area of influence has been defined in accordance with the *Environmental Protection (Noise) Regulations 1997* at the 35dB(A) contour. A high proportion of all the complaints received against the refinery come from residences within the 35dB(A) noise contour. This suggests that the 35dB(A) contour maybe a suitable method to define the overall area of influence for the refinery, in the absence of further technical analysis. Alcoa has sought a variation to the assigned noise levels under Regulation 17 of the *Environmental Protection (Noise) Regulations 1997* to address the noise issue as well as undertaking an extensive noise reduction program.

The Government has set up a committee to investigate community concerns and buffer requirements.

Summary
It is the EPA's view that measures be put in place by the Shires of Harvey and Waroona or the WAPC to provided an adequate buffer around the Alcoa refinery as a matter of priority.

14. Conditions

Section 48D of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the GBRS and on the conditions to which the GBRS should be subject. In addition, the EPA may make recommendations as it sees fit.

14.1 Recommended conditions

Having considered the Responsible Authority's proposed environmental conditions (environmental management measures) and the information provided in this report, the EPA has developed a set of conditions. A number of the conditions are generally consistent with the management measures originally proposed in the Environmental Review, although a number of new conditions has been added during the assessment process. The conditions are presented in detail in Appendix .

Matters addressed in the conditions include:

1 Management Plans
The following Environmental Management Plans may be required and shall be implemented in accordance with the provisions of the Management Plans, to the satisfaction of the Western Australian Planning Commission:

1) Environmental Management Plans for schemes, subdivisions and developments;

2) Environmental Management Plans for industrial development with the Kemerton Industrial Area and Special Control Area No. 2;
3) Drainage, Nutrient and Water Management Plan; and
4) Acid Sulfate Soil Management Plan.

2 Biological Survey

As part of a scheme amendment or application to subdivide or develop land which has the potential to impact on regionally significant native remnant vegetation or native fauna, a biological survey may be required, including a search for Declared Rare Flora and Fauna, Priority Flora, Threatened Flora Communities and Threatened Fauna, to be undertaken.

3 Connection to Reticulated Sewerage

Subdivisions and developments shall be connected to reticulated sewerage where:

1) the Average Annual Maximum Groundwater Level is less than 1.2 metres below the natural ground surface; or

2) subsoil drainage is proposed or will be required as a part of development, unless the responsible authority and the EPA agree that there are special circumstances applying to a particular subdivision or development.

5 Land to be reserved

All or portions of the following sites shall be reserved for conservation:

1) Reserve 35061 Paris Road, Australind - Decommissioned Wastewater Treatment Plant
2) Reserve 31012 Harewoods Road, Dalyellup
3) Port Installation Reserve
4) Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)
5) Twin Rivers - Pt Lot 211 Barnes Avenue, Australind
6) College Grove - Lot 1000 Bussell Highway
7) Pt Loc 632 Parade Road, Glen Padden
8) Reserve 670 North Boyanup Road, Davenport
9) Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
10) Lot 10 Ferguson River foreshore, Picton
11) Pt Lot 1 North Boyanup Road, Davenport

6 Realignment of Primary Regional Road Reserves

Portions of the following Primary Regional Road Reserves shall be realigned:

1) Port Access Road
2) Bunbury Outer Ring Road

15. Other advice

In addition to the recommended environmental conditions (Section 14) the EPA wishes to provide advice on a range of environmental matters related to the GBRS.

Matters addressed in the advice include:

1. Deferred factors

A number of environmental factors have not been included in the EPA's assessment due to the broad scale of the assessment or because insufficient information is available at this stage of the planning process. The EPA has decided that these factors should be "deferred" to ensure that the EPA has the opportunity to assess future local government scheme amendments, subdivisions or development proposals, whichever comes first, so that a more detailed consideration of the potential environmental impacts can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

The deferred factors are:

1) All Rural zoned land in the GBRS
Deferred factors – remnant vegetation and wetlands

2) All land in the Greater Bunbury Region Scheme
Deferred factor – site contamination

3) Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant
Deferred factors – remnant vegetation, fauna and ecological linkage

4) Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind
Deferred factors— remnant vegetation, fauna and ecological linkage

5) Lots 313-317 south of Harewoods Road, South Dalyellup
Deferred factors — remnant vegetation, fauna and ecological linkage

6) Reserve 31012 Harewoods Road, Dalyellup
Deferred factors — contamination.

7) Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup
Deferred factor — remnant vegetation

8) Lot 871 Prowse Road, Capel (south)
Deferred factors — remnant vegetation, fauna and ecological linkage

9) Lot 2 Harvey (Urban zone)
Deferred factors — remnant vegetation, fauna and ecological linkage

10) Kemerton Industrial Expansion Area
Deferred factors — noise, air quality, remnant vegetation, groundwater quality, surface water quality and solid/liquid waste disposal

11) Port Installation reserve
Deferred factors — noise, air quality and marine water quality

12) Raymond Road
Deferred factors — wetlands, remnant vegetation and the impacts from road users on surrounding noise sensitive landuses

13) South Western Highway (northern section between the northern boundary of the GBRS and the Preston River)
Deferred factors — remnant vegetation, watercourses and the impacts from road users on surrounding noise sensitive landuses

14) Port Access Road
Deferred factors - the remnant vegetation, wetland, watercourses, fauna and noise.

15) Boyanup Bypass
Deferred factors — remnant vegetation, wetlands and the impacts from road users on surrounding noise sensitive landuses

16) Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton
Deferred factors — remnant vegetation, fauna and odour emissions

17) Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
Deferred factors — remnant vegetation, wetlands and fauna

18) Muddy Lakes – Minninup Road, Capel
Deferred factors — remnant vegetation, wetlands and fauna

19) Reserve 670 North Boyanup Road, Davenport
Deferred factors — remnant vegetation, fauna and ecological linkage

20) Lot 15 North Boyanup Road
Deferred factors — remnant vegetation and fauna

21) Bunbury Outer Ring Road
Deferred factors - the remnant vegetation, wetland, watercourses, fauna and noise.

22) Glen Iris Service Corridor
Deferred factors— noise, vibration, remnant vegetation and wetlands

23) Lot 35 Spurr Street, Capel
Deferred factors — remnant vegetation, wetlands and fauna

2 Primary Regional Road Reserves

The alignments of the following Primary Regional Road reserves in the GBRS meet the EPA's environmental objectives provided Environmental and Noise/Vibration Management Plans and Vegetation and Waterway Mitigation Strategies are prepared and implemented, when appropriate, to the satisfaction of the EPA:

1) South Western Highway;
2) Raymond Road;
3) Boyanup Bypass Road;
4) Bussell Highway;

Proposals to construct these roads should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986* to ensure that the management plans are prepared to the satisfaction of the EPA.

The Environmental Management Plans should include:

1) mapping of vegetation units and the condition of the vegetation units;
2) plot based descriptions and flora lists for each of the mapped vegetation units;
3) mapping of populations of priority species; and
4) the identification of fauna values of the remnants.
5) a description of existing environmental values, and the identification of the environmental outcome to be achieved through the implementation of this plan;
6) clear delineation of significant areas to be protected;
7) vegetation and/or wetland mitigation strategies
8) allocation of responsibilities and identification of timing and duration of implementation;
9) provision for routine monitoring of environmental values; and
10) provision of details of contingency plans in the event that the monitoring surveys indicate that the road is having or has had an adverse impact upon environmental values.

The Noise Management Plan should include:

1) detailed noise modeling for the whole proposal taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes;
2) acceptable noise and vibration levels, as agreed between the Main Roads Western Australia and the Department of Environmental Protection, to protect the amenity of adjacent residences; and
3) measures to manage the impact of traffic noise and vibration on adjacent residnces and residential areas.

The Vegetation Mitigation Strategy should off set the impacts on particular vegetation complexes and should include:

1) the biological and environmental values of any vegetation to be impacted by the design and construction of the road;
2) a review of the design of the road, to avoid or minimize impacts on the vegetation; and
3) measures including the possible acquisition of other vegetated land, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

In considering the suitability of other vegetated land to mitigate the loss of any biological and environmental values caused by the construction of the proposed road the following matters will be considered by the EPA:

1) specific vegetation communities affected by the proposal;
2) specific vegetation communities on land proposed for acquisition to mitigate the loss of biological and environmental values caused by the proposal;
3) vesting and proposed management of the vegetation proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and
4) values and roles of this vegetation in maintaining conservation in the Greater Bunbury Region.

A Vegetation Mitigation Strategy should off set the impacts on particular wetlands and should include:

1) the biological and environmental values of any wetlands to be impacted by the design and construction of the road;
2) a review of the design of the road, to avoid or minimise impacts on wetlands; and
3) measures including the possible acquisition of other or wetlands, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

In considering the suitability of other vegetated land and wetlands to mitigate the loss of any biological and environmental values caused by the construction of the road the following matters will be considered by the EPA:

1) specific category, or categories, of wetlands to be affected by the road construction;
2) vesting and proposed management of wetland areas proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and
3) values and roles of the wetlands in maintaining conservation in the Greater Bunbury Region.

3 Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant, Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind and Lot 3 Paris Road (south), Australind

It is the EPA's opinion that:

1) the remnant vegetation on the northern and western portions of Reserve 35061 should be reserved in the GBRS and appropriately managed;
2) the bushland on part Lots 27, 28 and 150 to the north of Paris Road should be conserved and managed as part of any future subdivision and development, whichever comes first; and

4 Lots 313-317 south of Harewoods Road, South Dalyellup

It is the EPA's opinion that:

1) remnant vegetation on Lots 315, 316 and 317 should be conserved and appropriately managed either as a ROS reserve in the GBRS or as part of future zoning, subdivision and/or development on the lots;
2) the extraction of sand and limestone from Lots 315, 316 and 317 is incompatible with the need to protect vegetation in this area;
3) immediate planning measures be implemented by the WAPC to manage and prevent any further development or change of land use on Lots 315, 316 and 317, until the GBRS has been proclaimed.

5 Reserve 31012 Harewoods Road, Dalyellup

It is the EPA's opinion that:

1) remnant vegetation on Reserve 31012 is regionally significant and should be reserved and appropriately managed;
2) appropriate landuses need to be determined for that portion of the site used a municipal waste disposal site;
3) a site investigation be undertaken prior to any ground disturbing activities, to determine the extent and severity of contamination on that part of Reserve 31012 used as a waste disposal site. If the site is found to be contaminated as a result of this investigation, then a Site Remediation and Validation Report should be produced to the satisfaction of the Department of Environmental Protection; and

6 Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup

It is the EPA's opinion that there is regionally significant remnant vegetation on the land proposed to be zoned Urban Deferred which should be conserved and appropriately managed as part of any future zoning, subdivision and/or development on the site.

7 Lot 871 Prowse Road, Capel (south)

It is the EPA's opinion that the Urban zoning on Lot 871 is environmentally acceptable subject to the remnant vegetation being conserved and protected as part of any future subdivision or development on the land.

8 Lot 2 Harvey (Urban zone)

It is the EPA's opinion that the Urban zoning on Lot 2 is environmentally acceptable subject to as much of the remnant vegetation being conserved and protected as possible (at least 60%), as part of any future subdivision or development on the land.

9 Kemerton Industrial Area Expansion

It is the EPA's opinion that:

1) areas of regionally significant bushland within SCA No. 2 should be reserved as ROS as a future amendment to the GBRS; and
2) Special Control Area No. 2 provides adequate separation between proposed industrial development and surrounding landuses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

10 Port Access Road

It is the EPA's opinion that it would be preferable for the Port Access Road to follow existing road alignments between Harris Road and Moore Road. Although a re-alignment to the west of the currently alignment shown in the GBRS, designed and constructed to minimise impact on bushland, would be environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

11 Boyanup Bypass Road

It is the EPA's opinion that:

1) the road be designed and constructed to minimise impact on bushland and avoid any direct or indirect impacts on the Boyanup Billabong; and
2) Subject to point (1) the alignment of the Primary Regional Road reserve for the Boyanup Bypass is environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

12 Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton

It is the EPA's opinion that:

1) the proposal to establish waste water treatment plants on the Public Purpose reserve is environmentally acceptable subject to further investigation to select development sites with minimal potential environmental impacts on remnant vegetation and fauna; and
2) Special Control Area No. 2 provides adequate separation between the Public Purpose reserve and surrounding landuses to accommodate the impacts of odour emissions from waste water treatment plants in accordance with the EPA's environmental objectives and criteria for this environmental factor.

13 Locations 7 and 14 Buffalo Road, Binningup

It is the EPA's opinion that:

1) the proposed modification to the alignment of the ROS reserve boundary alignment on Location 14 is acceptable; and
2) the alignment of the ROS reserve boundary on Location 7 should be reviewed prior to any future zoning or subdivision on the subject land, whichever comes first, and amended where necessary.

14 Twin Rivers - Pt Lot 211 Barnes Avenue, Australind

It is the EPA's opinion that:

1) the current alignment of the ROS reserve does not adequately protect the regional natural values of the Pt Lot 211 Barnes Avenue;
2) in view of the regional natural values of Pt Lot 211 Barnes Avenue all of the site should be reserved;
3) if the Government decides not to preserve the whole of the area as a regional park, the EPA is of the view that the modified ROS alignment identified by the WAPC in 31 July 2003 should be adopted; and
4) arrangements be included in the Greater Bunbury Region Scheme to ensure that adequate funds are available for the WAPC to purchase areas of regional conservation value.

15 College Grove – Lot 1000 Bussell Highway

It is the EPA's opinion that:

1) a corridor between 300 and 500m be reserved in the GBRS and appropriately managed; and
2) some degree of flexibility (20 metres) be allowed in determining the final alignment of the northern ROS boundary to facilitate the final structure plan with no nett loss of ROS.

16 Muddy Lakes – Minninup Road, Capel

It is the EPA's opinion that:

1) the alignment of the ROS reserve boundary around Muddy Lakes should remain as shown in the advertised GBRS;
2) the alignment of the ROS reserve boundary should be amended to include the full extent of the wetland at the earliest opportunity;
3) Priority be given to implementing management arrangements (ie Government acquisition) in the Dalyellup/Minninup Lake Natural Area to prevent further degradation by current land use activities;
4) Interim planning mechanisms be put in place to ensure that conservation values in the Dalyellup/Minninup Lake Natural Area are protected from any further development or change of land use until suitable protection measures under the Greater Bunbury Region Scheme are provided; and
5) Further biological and hydrological studies be undertaken to ensure that the Dalyellup/Minninup Lake Natural Area is appropriately managed.

17 Reserve 670 North Boyanup Road, Davenport

It is the EPA's opinion that:

1) the southern portion on Reserve 670 should be reserved and appropriately managed because of its regional significance;
2) the remnant vegetation on the northern portion of Reserve 670 should be conserved primarily because of its faunal habitat values and value as an additional ecological linkage to Preston River; and
3) a portion of the remnant vegetation to the north of Reserve 670 should be conserved to provide a consolidated ecological linkage between Reserve 670 and the Preston River.

18 Lot 15 North Boyanup Road

It is the EPA's opinion that the remnant vegetation on Lot 15 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site.

19 Bunbury Outer Ring Road

It is the EPA's opinion that subject to the Bunbury Outer Ring Road being realigned, designed and constructed to minimise impact on:

1) a wetland near the intersection with the Australind Bypass;
2) wetlands to the north of Lillydale Road;and
3) bushland at the intersection with Bussell Highway

the alignment would be environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

20 Glen Iris Service Corridor

It is the EPA's opinion that:

1) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to adoption of a Special Control Area to prevent incompatible land uses being located in the buffer;
2) the alignment of the Glen Iris Service Corridor (Public Purpose Reserve, Rail Reserve and Regional Road Reserve) and the width of the Special Control Area are environmentally acceptable subject to Noise and Vibration Management Plans being prepared in accordance with the specifications in Section 2, above, prior to any additional infrastructure being constructed within the corridor;
3) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to the preparation and implementation of a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan; and
4) any proposal to construct infrastructure within the Glen Iris Service Corridor should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

21 Lot 35 Spurr Street, Capel

It is the EPA's opinion that the remnant vegetation on Lot 35 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site.

22 Special Control Area No. 2 - Kemerton Industrial Zone Buffer

It is the EPA's opinion that Special Control Area No. 2 provides adequate separation between the proposed industry and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

23 Special Control Area No. 3 - North Capel

It is the EPA's opinion that SCA No. 3 will provide adequate separation between current and future industrial operations and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

24 Public Water Supply Catchment Policy

The EPA supports the Public Water Supply Catchment Policy subject to the land use permissibility table being deleted and inclusion of reference to the WRC guidelines which determine land use permissibility

25 Floodplain Management Policy

The EPA supports the Floodplain Management Policy subject to the environmental values of floodplains being described in further detail consistent with the WRC's Western Australian Draft Floodplain Management Strategy.

26 Strategic Agricultural Resource Policy

The EPA recommends that the Strategic Agricultural Resource Policy should be modified to include the following statements:

1) There is a general presumption against clearing of native vegetation including within the Strategic Agricultural Resource Policy Areas where 30% or less of the Vegetation Complex remains;
2) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposed clearing will be assessed by the EPA in accordance with EPA's Guidance 10 (EPA, 2003); and
3) Native vegetation clearance is also proposed to be addressed through amendments to the *Environmental Protection Act 1986.* The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

27 Strategic Minerals and Basic Raw Materials Resource Policy

The EPA recommends that the Strategic Minerals and Basic Raw Materials Resource Policy should be modified to include the following statements:

1) There is a general presumption against clearing of native vegetation including within the Strategic Minerals and Basic Raw Materials Resource Policy Areas where 30% or less of the Vegetation Complex remains;
2) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposal will be assessed by the EPA in accordance with Guidance 10 (EPA, 2003);
3) After the resource has been recovered from a Strategic Minerals and Basic Raw Materials Resource Policy Area located within a cleared portion of an Ecological Linkage, the linkage should be restored using previously occurring native species of local provenance; and
4) Native vegetation clearance is also proposed to be addressed through amendments to the Environmental *Protection Act 1986*. The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

28 Strategy to conserve regionally significant natural areas on the Swan Coastal Plain

The EPA recognises the need to update the conservation recommendations on the Swan Coastal Plain portion of the GBRS as a priority. It considers that this work should be undertaken as part of a wider coordinated program to update conservation recommendations across the non-metropolitan portions of the southern Swan Coastal Plain, and the Darling and Whicher Scarps. The review of conservation recommendations on the country portions of the Swan Coastal Plain is needed to complete an update of the EPA System 6 and System 1 recommendations that was initiated in 1995, but deferred pending completion of recommendations for the metropolitan area through Bush Forever.

The EPA supports the completion of the System 6 and System 1 update on the Swan Coastal Plain and adjacent Scarps as a 'whole of government' program through a similar co-ordinated approach, as used for Bush Forever. It considers that an adaptation of the criteria developed for the Natural Area Strategy would provide an appropriate basis for this review. Consideration of the ecological linkage requirements and mechanisms promoting re-establishment of ecological linkage, including hydrological and wetland function, should be an important component of the program.

29 Alcoa Wagerup

It is the EPA's view that measures be put in place by the Shires of Harvey and Waroona or the WAPC to provided an adequate buffer around the Alcoa refinery as a matter of priority.

30 Environmental Protection Amendment Bill 2002

The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill proposes new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process administered by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit. Permit applications will be assessed against criteria designed to assess impacts on:

- representation of ecological communities;
- biodiversity;
- rare species and communities;
- watercourses and wetlands;
- salinisation of land and water;
- land degradation;
- surface and ground water quality, and
- potential for flooding.

16. Conclusions

The EPA has concluded that the GBRS can be implemented to meet the EPA's objectives provided the conditions set out in Appendix 15 are imposed and enforced.

In addition to the environmental conditions the EPA has provided advice in Appendix 16 in relation to a number of issues where an environmental condition would not be appropriate at this stage of the planning process.

17. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

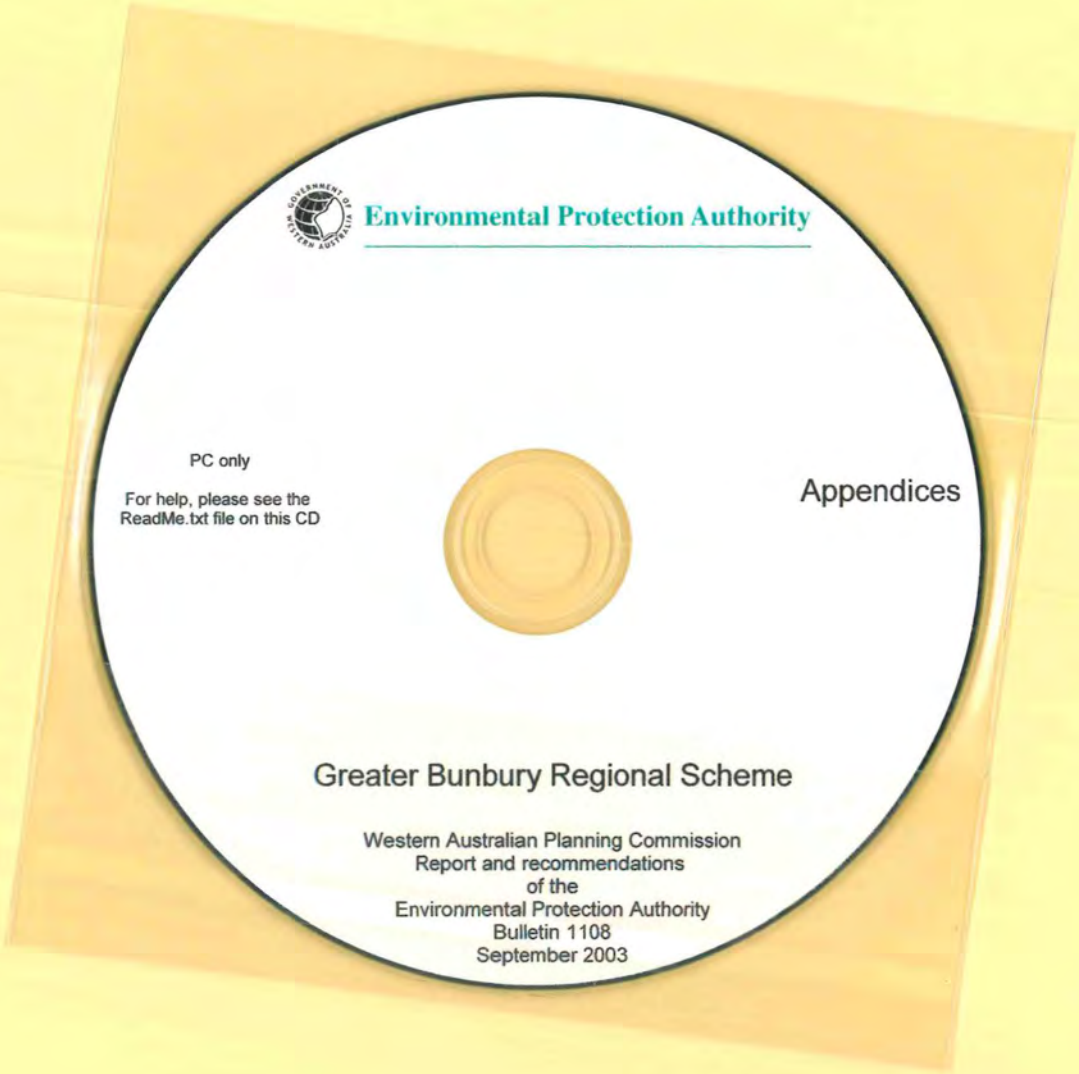
1. That the Minister notes that the scheme being assessed is the Greater Bunbury Region Scheme.
2. That the Minister considers the report on the following issues and associated relevant environmental factors as set out in Section 2:
    a) Issues raised in the environmental submissions received during the public consultation period;
    b) Assessment of new urban zones with potentially significant environmental impacts;
    c) Assessment of the potentially significant environmental impacts of the new Kemerton Public Purpose Reserve;
    d) Assessment of the potentially significant environmental impacts of the new Port Installation zone;
    e) Assessment of new road and rail reserves with potentially significant environmental impacts;

f) Assessment of other zones and reserves with potentially significant environmental impacts;
g) Assessment of the adequacy of Regional Open Space reserves;
h) Assessment of Special Control Areas;
i) Assessment of policies linked to the Greater Bunbury Region Scheme; and
j) Regionally significant environmental issues of concern to the EPA.

3. The Minister notes that the EPA has concluded that the EPA's objectives can be met, provided the recommended conditions summarised in Section and set out in detail in Appendix 14 are incorporated by the Responsible Authority into the GBRS and implemented at the appropriate level of planning.
4. That the Minister in consultation with the Minister for Planning and Infrastructure imposes the conditions recommended in Appendix 14 of this report.
5. The Minister notes the EPA's advice in Appendix 15 of this report.
6. That the Minister notes that the EPA has deferred the assessment of a number of environmental factors, as shown in Section 15, so that the EPA would have the opportunity to assess proposals impacting on these environmental factors in more detail at the appropriate stage of the planning process.
7. That the Minister notes that where any development proposal complies with the Greater Bunbury Region Scheme and raises no additional environmental factors and does not impact on the deferred factors, the development proposal will not normally be subject to further assessment under Part IV of the *Environmental Protection Act 1986*. However, future development proposals may still require works approval, licensing and pollution control conditions under the Environmental Protection Act 1986 where applicable.

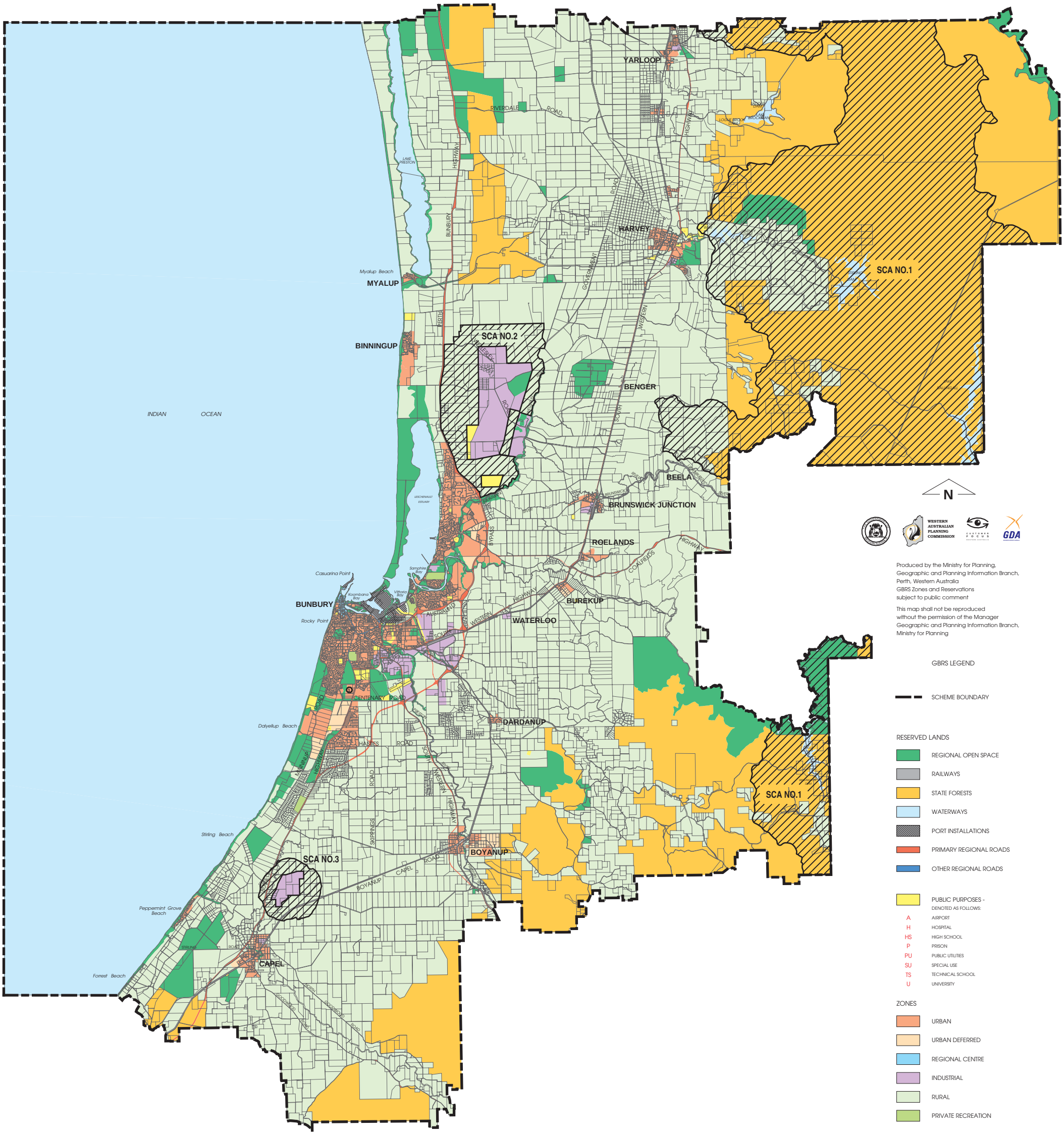
Appendices

Please note all appendices are contained on the compact disc in the sleeve on the inside of the rear cover.

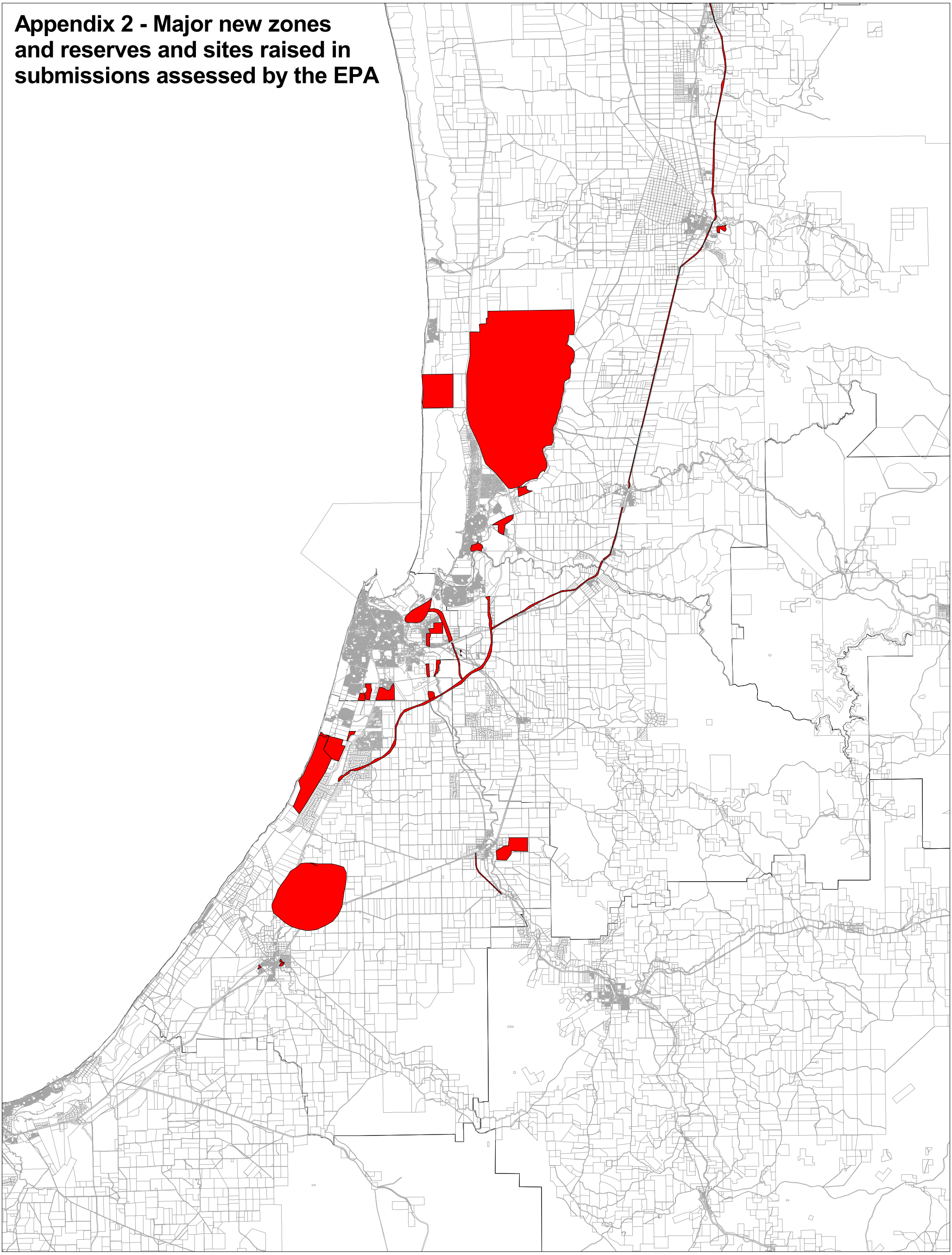

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Appendices
Greater Bunbury Regional Scheme
Western Australian Planning Commission
Report and recommendations
of the
Environmental Protection Authority
Bulletin 1108
September 2003

GREATER BUNBURY REGION SCHEME

5 4 3 2 1 0 5
kilometres



Appendix 2 - Major new zones and reserves and sites raised in submissions assessed by the EPA



Major new zones and reserves and sites raised in submissions assessed by the EPA

Cadastral Boundaries

Local Government Authority Boundaries

0 10 20 km

Department of Environmental Protection

A STRATEGY FOR THE EPA TO IDENTIFY REGIONALLY SIGNIFICANT NATURAL AREAS IN ITS CONSIDERATION OF THE GREATER BUNBURY REGION SCHEME PORTION OF THE SWAN COASTAL PLAIN



MANEA PARK BUSHLAND

CONTENTS

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1 INTRODUCTION

The Environmental Protection Authority has been particularly concerned with the identification and protection of regionally significant natural areas since its inception. An initial, pivotal role, of the Authority was established through the Conservation Through Reserve System reports produced in the 1970's and early 1980's. In recent times the identification and protection of natural areas has become a co-operative program across a series of government agencies, particularly the Departments of Conservation and Land Management, Environmental Protection, Planning and Infrastructure, and the Water and Rivers Commission. However the Authority has maintained an active interest in the System 6 area, particularly the Swan Coastal Plain portion of this System (Map 1). This interest has been maintained as the Swan Coastal Plain has high natural values, is the most populous and densely settled area of the state and, together with the Wheatbelt, is the most heavily cleared area of the state.

As a consequence the Swan Coastal Plain is the focus for the largest number of development proposals brought to the Authority for the assessment of their environmental impacts. To deal with these development proposals in a proactive manner the Authority began an update of System 6 in 1994. The update focused on the Swan Coastal Plain from the Moore River to Dunsborough, including the Swan Coastal Plain portion of System 1 (Map 1) with the objective of reviewing the conservation recommendations for this region to take account of the more recent and much improved information on the flora and fauna of the Swan Coastal Plain. In 1996 this program was split with priority given to the Perth Metropolitan Region (PMR) of the Swan Coastal Plain. This process, the Bushplan Project, was completed with the release of *Bush Forever* (Government of WA 2000a & b).

The Authority recognises there is a continued need for the update of the remainder of System 6 and part System 1 area to be completed as proposed in *Bush Forever*, through a similar co-ordinated program, subject to government funding. In the meantime there is a need for the Authority to consider the Draft Greater Bunbury Region Scheme (GBRS). As a consequence this Strategy has been developed to respond to the Scheme in a manner consistent with the System 6 report, the update and *Bush Forever*.

The System 6 portion of the Greater Bunbury Region (GBR) on the Darling and Blackwood Plateaux is not addressed here. The *Regional Forest Agreement* (Government of WA 1999) and the Forest Management Plan currently being prepared are the primary policy documents for the identification of a comprehensive, adequate and representative system of protected areas in that portion of System 6[1].

2 THE SWAN COASTAL PLAIN

2.1 The Natural Values of the Swan Coastal Plain

To identify the value of a natural area at a regional level it is necessary to place the area in the appropriate **natural** regional context. The Greater Bunbury Region is conspicuously divided into two distinct landscape units: the ancient Archaean Block to the east expressed as the Darling Plateau, and to the west the Phanerozoic sedimentary deposits of the Perth Basin expressed as the Swan Coastal Plain. In 1995 these were identified as distinctive natural regions on a national scale being the Jarrah Forest and Swan Coastal Plain Interim Biogeographic Regions (Map 1, after Thackway and Cresswell 1995). This Strategy is concerned with the area of the Greater Bunbury Region (a planning region) which intersects with the Swan Coastal Plain Interim Biogeographic Region which is, hereafter, referred to as the Swan Coastal Plain. The System 6 and part System 1 Update covers the area south of the Moore River which is, hereafter, referred to as the southern Swan Coastal Plain (Map 1).

Compared with the Plateau the Swan Coastal Plain is of very recent origin, the soils of the Plain having been laid down in the Pleistocene and Holocene periods. The entire Plain is characterised by

[1] The EPA expects to provide separate advice on this area of the GBRS.

low relief and extensive areas which are subject to seasonal or intermittent inundation or waterlogging (wetlands).

Over 1700 native vascular plants are recorded on the southern Swan Coastal Plain (Keighery 1999). More than 70% of these are endemic to the south-west of WA and many are endemic to the Swan Coastal Plain. This outstanding level of species diversity is reflected in a high level of plant community diversity. The patterning of plant species distribution and of the communities in which they grow is determined by

- the soils which are patterned from east to west: the alluvial soils of the Ridge Hill Shelf; the Pinjarra Plain; the river valleys; and the aeolian soils of the Bassendean, Spearwood and Quindalup Dunes
- the degree of seasonal or intermittent waterlogging of these soils, and
- climatic gradients along the 500km long Plain.

The Swan Coastal Plain's diverse vertebrate fauna is driven by these same factors.

A series of regional, or part region (southern Swan Coastal Plain) vegetation, flora, fauna and wetland studies have described aspects of the natural diversity of the Swan Coastal Plain. These studies can be used to provide comparable information on each natural area for an assessment of regional value. These national and regional attributes are listed in Table 1. The national and regional studies were published or were in an advanced stage, in 1994 when the System 6 and part of System 1 Update began.

Table 1: National and Regional Information Sets for the Swan Coastal Plain (after table prepared by DEP - Conservation Branch in 1997).

LANDFORM AND SOIL (various sources)
VEGETATION AND FLORA Vegetation Types (Beard 1979a, b&c, Beard 1981; Smith 1973 & 1974 and Hopkins *et al.* 1996)* Vegetation Complex (Heddle *et al.* 1980 and CALM) Floristic Community Types (Gibson *et al.* 1994, DEP 1996)
WETLANDS Wetland Types (Hill *et al.* 1996a&b and as updated periodically by WRC) Consanguineous suite (Hill *et al.* 1996a&b) Wetland Management Objective (after Hill *et al.* 1996a&b, Semeniuk 1998 and as updated periodically by WRC) Lake's EPP (Government of WA 1992)
THREATENED ECOLOGICAL COMMUNITIES After English and Blyth 1997 and as updated periodically by CALM
THREATENED SPECIES CALM current Declared Rare and Priority Flora and Fauna Lists, reports, specific area survey
INTERNATIONAL AND NATIONAL SIGNIFICANCE Reference to international treaties, Commonwealth *Environment Protection and Biodiversity Act 1999*, listing on the register of the National Estate etc.

*Not applied in Government of WA (2000a&b), see Appendix 2 for description of the dataset.

This regional information is generally derived from mapped information in GIS formats. As a consequence it is necessary to verify the regional information, which is often extrapolated from limited ground survey, and identify the actual natural values of each area through specific area survey. Table 2 lists the individual area natural attributes that need to be collected through such survey. Collation of this information is an ongoing task.

The outlines, on which the Tables are based, were prepared in 1997 to form the basic template for descriptions of areas being considered for the System 6 Update, and for use by DEP officers in advising consultants preparing environmental assessment documents on natural areas on the Swan Coastal Plain. *Bush Forever* (Government of WA 2000b) outlines each of the studies (and the values

they describe) listed in Tables 1&2. One regional vegetation study was not used in *Bush Forever* and this is described in Appendix 2.

Table 2: Specific Area Information (after table prepared by DEP - Conservation Branch in 1997). Note: the limitations of any survey work should be clearly stated.

LANDSCAPE FEATURES
VEGETATION AND FLORA any existing information and specific area survey
STRUCTURAL UNITS should be mapped and related to on the ground descriptions
VEGETATION CONDITION should be mapped or recorded using standard terminology (Government of WA 2000b)
TOTAL FLORA including total flora (level of survey should be indicated), significant flora (DRF, priority taxa, range extensions, species at geographic limits etc.)
FAUNA including total fauna (level of survey should be indicated), significant fauna (DRF, priority taxa, range extensions, species at geographic limits etc.)
LINKAGE adjacent bushland areas

2.2 The Distribution of the Remaining Natural Areas on the Swan Coastal Plain

The Swan Coastal Plain has been significantly altered since European settlers introduced grazing animals and cleared the natural vegetation for housing, agriculture and mining. At times, housing, agriculture and mining, have also involved alteration of the landform. The remaining natural areas can be identified through mapping of the

- total extent and location of naturally vegetated areas remaining[2] (remnant native vegetation) and
- non-vegetated natural areas such as: water bodies (generally rivers, lakes and estuaries), bare ground (generally sand or mud) and rock outcrops.

Information on these remaining natural areas can be gained through use of the mapped information sets listed in Table 1, maps of remnant native vegetation and aerial photographs.

Recent mapping of remnant native vegetation on the southern Swan Coastal Plain (after Beeston *et al.* 2001) identifies that 78.7%[3] of the original native vegetation has been cleared (Table 3a and 3b). Some general trends are evident in these patterns of clearing, these include:

- the preferential clearing of the alluvial soils of the Ridge Hill Shelf and the Pinjarra Plain (eastern side of the Swan Coastal Plain) for agriculture, with 92.3% of the original native vegetation having been cleared (Table 3a) and as much as 95% of some sections having been cleared (Table 3b, Guildford Complex);
- past retention of the native vegetation on poor soils such as the sands of the Quindalup, Spearwood and Bassendean Dunes and rocky soils of the areas of outcropping Tamala Limestones into the Spearwood Dunes (in recent years with the expansion of urban and industrial areas these soils are now being preferentially cleared); and
- small size of most of the remnants with most (86%) of the remaining remnants, particularly those on the eastern side of the Plain, being less than 5ha in area (see Figure 1).

Table 3[4]: Native vegetation on the southern Swan Coastal Plain (SCP) grouped in the major landform elements (after Government of WA 2000b) for vegetation complexes occurring in the Greater Bunbury Region (GBR).

[2] This includes vegetated uplands and wetlands, non-vegetated wetlands are referred to as 'water bodies'.
[3] These figures are for the vegetation complexes in the GBR, not all vegetation complexes on the southern Swan Coastal Plain (see Table 3).

Information compiled at DEP from mapping of vegetation complexes after Heddle *et al.* (1980) and CALM (1998)[5], remnant native vegetation after Beeston *et al.* (2001) and secure tenure[6] (CALM 2002).

Table 3a: Native vegetation in the major landform elements on the SCP for those vegetation complexes occurring in the GBR.

Major Landform Elements	% of each remaining	% of each remaining in secure tenure
Foothills (Forrestfield Complex only)	17.4	0.3
Pinjarra Plain	6.9	0.4
Bassendean Dunes	27.0	0.7
Combinations of Bassendean Dunes/Pinjarra Plain	17.6	2.4
Spearwood Dunes	33.5	5.7
Quindalup Dunes	33.0	4.2
Marine (Estuarine and Lagoonal) Deposits	38.8	12.9

[4] It is important to keep in mind a series of issues related to estimates of the original and remaining areas of native vegetation. These include the following:

- Sources of the intersecting GIS datasets and modifications of these datasets
  Some issues related to the figures quoted in this Strategy are described below.
  - The remnant native vegetation mapping used in the Strategy uses Beeston *et al.* (2001) as the base data but this has been modified to remove plantations and an area of scattered trees over pasture.
  - Boundaries related to open water such as coastline, estuarine and lake boundaries – The coastline/estuarine boundary used in this document is that from Heddle *et al.* (1980), this differs from the coastline boundary used in EPA (2003).
- Limitations on the data
  The remaining native vegetation mapping used is derived from dated aerial photography (in this case 1998) with limited ground truthing. As a consequence the percentages of ecological communities remaining is generally an overestimate of that remaining at present and at the date of the Strategy. The principal factors contributing to this overestimation are:
  - the preferential mapping of treed landscapes, leading to some mapping of areas that are parkland cleared or completely degraded;
  - the inclusion of areas that are approved for clearing through development approvals and/or clearing permits; and
  - some areas that have been cleared since the time of the aerial photography.

It is therefore very important to bear these issues in mind when the percentage of the native vegetation remaining in a particular vegetation complex approaches 30% and, when comparing different sets of figures.

[5] Vegetation complex mapping for the Busselton area is now available on a limited basis from the Department of Conservation and Land Management. This mapping was done for the Regional Forest Agreement This mapping divides the Cartis Complex mapped in Heddle *et al.* (1980) and has been used to determine an area for this complex and the complexes on the small area of the GBR outside Heddle *et al.* in this document.

[6] Secure tenue = National Parks, Nature Reserves, Conservation Parks and 5(g) Reserves. This gives an indication of the percentage protected but does not include native vegetation in state forests, local government reserves, *Bush Forever* Sites (outside these categories) which has a level of protection.

Table 3b: Native vegetation on the southern Swan Coastal Plain (SCP) for those vegetation complexes found in the Greater Bunbury Region (GBR).

Major Landform Units/ Vegetation Complex	Original Area (ha) on SCP	Remaining on SCP		Remaining on SCP in secure tenure	
		Area (ha)	% original area	Area (ha)	% of original area
Foothills					
Forrestfield Complex	20169	3518	17.4	61	0.3
Cartis Complex#	NA	NA	NA	NA	NA
Pinjarra Plain					
Abba	53367	3199	6.0	77	0.1
Guildford Complex	92497	4662	5.0	143	0.2
Swan Complex	15783	2454	15.6	0.0	0.0
Dardanup Complex	9504	754	7.9	0.0	0.0
Serpentine River Complex	19856	2103	10.6	558	2.8
Bassendean Dunes					
Bassendean Complex-Central And South	87626	23635	27.0	572	0.7
Combinations of Bassendean Dunes / Pinjarra Plain					
Cannington Complex	16661	1659	10.0	883	5.3
Southern River Complex	57979	11501	19.8	882	1.5
Spearwood Dunes					
Karrakatta Complex-Central And South	51620	14811	28.7	1256	2.4
Cottesloe Complex-Central And South	45300	18474	40.8	3955	8.7
Ludlow	8673	2112	24.3	772	8.9
Quindalup Dunes					
Quindalup	54476	18000	33.0	2309	4.2
Marine (Estuarine and Lagoonal) Deposits					
Vasse Complex	11196	3287	29.4	1228	11.0
Yoongarillup Complex	26580	11367	42.8	3632	13.7

#The Cartis Complex is mapped in Heddle *et al.* (1980) and CALM (1998).
The areas mapped in CALM (1998) are apparently a subset of Heddle *et al.* and are only given for the GBR (see Table 4).

The remaining natural areas, both vegetated and non-vegetated, have been altered by a series of disturbance events associated with threatening land uses, both within and adjacent to the natural area. As a consequence, with respect to the remnant native vegetation mapping, areas are mapped that have been altered to such an extent that they can no longer be classed as bushland. Bushland areas are a smaller subset of the mapped remnant native vegetation, being areas that are intact or if altered still representative of the structure and floristics of the natural vegetation (see Appendix 1). Most regionally significant areas of native vegetation meet the definition of bushland. However, similarly with *Bush Forever* which focussed on the identification of areas of regionally significant bushland and wetlands, some regionally significant natural areas are native vegetation that no longer meets the definition of bushland.

3 THE GREATER BUNBURY REGION OF THE SWAN COASTAL PLAIN

3.1 The Natural Values of the Greater Bunbury Region of the Swan Coastal Plain

The Swan Coastal Plain in the Greater Bunbury Region shows the same high species and community diversity, in a landscape with little relief, as the remainder of the Plain. In addition, the Plain in the Bunbury area has a series of particular natural values associated with a series of distinctive features. These features are broadly outlined below, together with a listing of the regionally significant natural areas that have been identified by the EPA from a series of previous reports and studies. These reports and studies are:

- System reports – System 1 and System 6 (DCE 1976, 1983);
- Areas of threatened ecological communities: as defined by English and Blyth (1997), locations established in Gibson *et al*. (1994) and DEP (1996); and
- Areas of Threatened and Poorly Reserved Plant Communities: EPA (1994, derived from Gibson *et al*. 1994) these are shown in **bold.**

The majority of these areas are recognised in the Draft Greater Bunbury Region Scheme and the earlier, related planning document, *Bunbury-Wellington Region Plan* (Ministry for Planning 1995). A series of additional regionally significant areas are proposed in the Draft Greater Bunbury Region Scheme and other reports, these are not listed here.

- *Diversity of Foothills ecological communities*
  In the GBR the Darling and Whicher Scarps meet, the ecological communities changing from being the foothills of the Darling Plateau (Ridge Hill Shelf) to the foothills of the Blackwood Plateau. Harvey townsite is located near the junction of these two scarps.
  Previously identified areas (see Map 2)
  System 6: C86 - Dardanup Management Priority Area.
  Contains areas of threatened ecological communities/Threatened and Poorly Reserved Plant Communities: **Yarloop Townsite**

- *Extensive, highly cleared Pinjarra Plain*
  In the area of the GBR the Pinjarra Pain broadens and encompasses as much as two thirds of the Plain. However there are few remaining areas of native vegetation, the little remaining occurring in small remnants many of which are trees over pasture. It is expected that all remnants will contain threatened ecological communities.
  Previously identified areas (see Map 2)
  System 6: C62 - Wellard Road Nature Reserve, C64 - Byrd Road Nature Reserve, C65 - Benger Swamp
  Contains areas of threatened ecological communities/Threatened and Poorly Reserved Plant Communities: **Waterloo**, C62, C64, **Manea Park,** Kemerton Buffer Link

- *Most southern area of extensive Bassendean Dunes*
  The most southern areas of extensive Bassendean Dunes are found in the area of the GBR. South of Gelorup the Bassendean Dunes are reduced to isolated shallow sand ridges in a broader Pinjarra Plain. As a consequence the last extensive area of vegetated Bassendean Dunes on the Plain are found along Riverdale Road, in and north of the Kemerton area, and at Gelorup. The Bassendean Dunes in the GBR are broad low relief dunes often forming shallow sand sheets around extensive areas of wetland. These wetlands are varied and complex as a result of different underlying soils and inundation/waterlogging regimes. Some of the communities on these wetlands are threatened ecological communities.
  Previously identified areas (see Map 2)
  System6: C60 - Nature Reserves
  Contains areas of threatened ecological communities/Threatened and Poorly Reserved Plant Communities: Franklandia Nature Reserve (Reserve 1167), **Capel Nature Reserve and adjacent Bushland**

- *Undulating Spearwood Dunes*
  The most southern of the massive limestone ridges associated with the Spearwood Dunes occurs in Yalgorup National Park, north of the GBR. The Spearwood Dunes of the GBR are characterised by low relief generally forming extensive flats to the west and bounded to the east by dunes of slightly higher relief that merge into the Bassendean Sands. The higher eastern dunes are found from Myalup to Gelorup, south of Gelorup only the low dunes remain. The Spearwood Dunes are vegetated with *Banksia* woodlands and some of the most intact Tuart woodlands on the Plain.
  Previously identified areas (see Map 2)
  System 6: Part C56 – McLarty Management Priority Area, C54 -Yalgorup National Park, C57 - Myalup Management Priority Area and C61 – Lake Preston (Crampton Nature Reserve); C63 – Myalup Swamp and Mialla Lagoon, C71 - Dalyellup Reserves
  System 1: part 1.1.2 - Tuart Forest Reserve (extend beyond GBR)

- *Narrow Coastal Quindalup Dunes*
  A narrow band of mostly naturally vegetated Quindalup Dunes extends along the coast. Some of these dunes, such as the Maidens, are conspicuous high points in GBR. The Quindalup Dunes are characterised by coastal heathlands and near coastal woodlands. Large areas of these woodlands are dominated by Tuart and are the most extensive areas of Tuart woodland on Quindalup Dunes remaining on the Plain.
  Previously identified areas (see Map 2)
  System 6: C66 - Leschenault Inlet, C70 - The Maidens.

- *A diverse near coastal wetland belt*
  This includes a series of permanent water bodies, Lake Preston, the Leschenault Inlet Estuary and Wonnerup Estuary. Interspersed between these are a series of sumpland and dampland areas. These wetlands provide significant habitat for water birds including migratory species. The Wonnerup Wetlands are internationally significant (listed Ramsar Wetlands). Significant areas of these wetlands retain their cover of native vegetation. Some of these wetlands are formed on calcareous silts and a plant community associated with these silts is a threatened ecological community.
  Previously identified areas (see Map 2)
  System 6: Part C54 -Yalgorup National Park, C66 - Leschenault Inlet, C68 - Anglesea Island/Koombana Bay Inlet, C69 - Big Swamp
  System 1: part 1.1.3 – Wonnerup Estuaries (extend beyond GBR)
  Contains areas of threatened ecological communities: Hay Park, C54

- *Regionally significant sequences of ecological communities within and between the major landform elements*
  Two types of linked (or potentially linked) sequences of communities can be distinguished.
  Vegetated sequences
  Four predominantly vegetated sequences are evident, being: Riverdale Road Transect; Kemerton Buffer Link; Ocean to Preston River Park and the Dalyellup/Gelorup/Preston River/Plateau Link. It should be appreciated that these sequences have significant north/south components.
  Previously identified areas (see Map 2)
  Riverdale Road Transect: C57 - Myalup MP Area;
  Kemerton Buffer Link: C63 – Mialla Lagoon
  Ocean to Preston River Park: C70 - The Maidens, **Manea Park**
  Dalyellup/Gelorup/Preston River/Plateau: C71, C 86 - Dardanup Management Priority Area.

  River Corridors
  The Brunswick, Collie, Wellesley, Preston and Capel Rivers (and their tributaries) of the GBR form natural corridors between the coast and the Darling/Blackwood Plateaus, these are heavily cleared but significant natural areas are associated with each of these
  Previously identified areas (see Map 2)
  System 6: C67 - Brunswick, Collie and Wellesley Rivers

3.2 The Distribution of the Remaining Natural Areas of the Greater Bunbury Region on the Swan Coastal Plain

The natural areas of the Swan Coastal Plain in the GBR have also been significantly reduced and/or altered. Recent mapping of remnant native vegetation on the GBR Swan Coastal Plain (Beeston *et al.* 2001) identifies that clearing in the GBR is comparable with that described for the entire southern Swan Coastal Plain in that:

- 77.1% of the original vegetation has been cleared (after Table 4); and
- clearing has occurred in the same general pattern (see Table 4 and Figure 1 and section 2.2)., particularly in relation to the major landform elements (Table 3a&b).

Table 4[7]: Native vegetation on the southern Swan Coastal Plain (SCP) and the Greater Bunbury Region (GBR) within those vegetation complexes found in the GBR. The vegetation complexes are grouped in the major landform elements. Information compiled at DEP from mapping of vegetation complexes after Heddle *et al.* (1980) and CALM (1998), native vegetation after Beeston *et al.* (2001), and existing and proposed ROS after WAPC (2000)[8].

Major Landform Units/ Vegetation Complex	Remaining area for SCP as % of original area on SCP	Original Area (ha) in GBR	Remaining on SCP in GBR		Remaining on SCP in existing and proposed ROS in GBR	
			Area (ha)	% of original	Area (ha)	% of original
Foothills						
Forrestfield Complex	17.4	2066	475	23.1	144	7.0
Cartis Complex#	NA	1379	246	17.8	0	0.0
Pinjarra Plain						
Abba	6.0	9264	463	5.0	0	0.0
Guildford Complex	5.0	33294	1470	4.4	121	0.4
Swan Complex	15.6	5646	917	16.0	164	2.9
Dardanup Complex	7.9	5201	335	6.4	64	1.2
Serpentine River Complex	10.0	6990	1129	16.1	607	8.7
Bassendean Dunes						
Bassendean Complex-Central And South	27.0	23970	9430	39.3	720	3.0
Combinations of Bassendean Dunes / Pinjarra Plain						
Cannington Complex	10.0	1487	68	4.6	6	0.4
Southern River Complex	19.8	16070	3320	20.7	631	3.9
Spearwood Dunes						
Karrakatta Complex-Central And South	28.7	11686	6091	52.1	1587	13.6
Cottesloe Complex-Central And South	40.8	1334	602	45.1	455	34.1
Ludlow	24.3	1190	465	39.1	160	13.5
Quindalup Dunes						
Quindalup	33.0	6236	2531	40.6	1102	17.7
Marine (Estuarine and Lagoonal) Deposits						
Vasse Complex	29.4	3730	857	23.0	454	12.2
Yoongarillup Complex	42.8	13448	4437	33.0	1084	8.1

#The Cartis Complex is mapped in Heddle *et al.* (1980) and CALM (1998). These figures are after CALM (1998) which appears to be a subset of Heddle *et al.* and are only given for the GBR.

In recognition of this high level of clearing on the Plain in the GBR there is a need to preferentially locate developments in cleared areas on the Swan Coastal Plain.

While the general pattern of clearing across the southern Swan Coastal Plain is similar, the clearing patterns influence the area of native vegetation remaining in particular local government areas. Prior to urbanisation, coastal municipalities, will have larger areas of native vegetation remaining as they are predominantly located on the aeolian sands and Tamala Limestones. Municipalities primarily located on the eastern side of the Plain will have little remnant vegetation remaining.

The remaining natural areas, both water bodies and native vegetation, have also been variously altered by a series of disturbance events associated with adjacent land uses. That is the remnant native vegetation mapping includes significant areas that have been altered to such an extent that they can no longer be termed bushland, often being trees over non-native species.

[7] See footnote on Table 3.

[8] Existing and proposed ROS is used within the GBR as this is considered to better indicates the area of native vegetation with some level of protection.

4 IDENTIFICATION OF REGIONALLY SIGNIFICANT NATURAL AREAS IN THE GREATER BUNBURY REGION OF THE SWAN COASTAL PLAIN

4.1 Introduction

A series of regionally significant natural areas have been previously identified in the GBR (see Section 3.1). However, as the EPA needs to consider the regional significance of natural areas affected by proposed new zones and reserves as well as the adequacy of the proposed Regional Open Space reserves in the GBRS, a Strategy has been developed. This Strategy aims to establish a process to be used to identify particular areas that are suitable to contribute to a comprehensive, adequate and representative (CAR) system of reserved and protected areas in the Greater Bunbury Region portion of the southern Swan Coastal Plain. This Strategy measures an individual area's natural values (according to Table 1 and 2) against the selection criteria for the identification of regionally significant natural areas developed for System 6 and Part System 1 Update and the Bushplan Project (Table 5) to determine regional significance.

Table 5: Selection criteria for the identification of regionally significant natural areas on the southern Swan Coastal Plain (Government of WA 2000a and b).

REPRESENTATION OF ECOLOGICAL COMMUNITIES A number of areas selected to represent the range of ecological communities and the places in which these communities merge
DIVERSITY Areas with a high diversity of flora and/or fauna species or communities in close association
RARITY Areas containing rare or threatened communities or species, or species of restricted distribution
MAINTAINING ECOLOGICAL PROCESSES OR NATURAL SYSTEMS Maintenance of ecological processes or natural systems at a regional or national scale
SCIENTIFIC OR EVOLUTIONARY IMPORTANCE Areas containing evidence of evolutionary processes either as fossilised material or as relict species and areas containing unusual or important geomorphological or geological sites; Areas of recognised scientific and educational interest as reference sites or as examples of the important environmental processes at work
GENERAL CRITERIA FOR PROTECTION OF WETLAND, STREAMLINE, AND ESTUARINE FRINGING VEGETATION AND COASTAL VEGETATION Conservation category wetland areas including fringing vegetation and associated upland vegetation; Coastal vegetation within the accepted coastal management zone

These six criteria, updated to current policy standards and adapted to a largely rural environment, are proposed for use in the GBR. The criteria, and their application are described in more detail in Appendix 3.

The criteria relate to ecological communities[9] as the basis for addressing regional representation, as this is the level:

- at which the most comprehensive regional plot and map based information on the biological diversity of the Swan Coastal Plain is available (see Table 1); and
- on which both the National policies and *Urban Bushland Strategy* focus.

For the Greater Bunbury Region ecological communities are determined at the regional level using the most comprehensive Swan Coastal Plain regional datasets (Table 1) and, as necessary reference to specific area information (Table 2). Within the terms of this Strategy vegetation complexes, floristic community types and, those ecological communities listed as threatened, are considered to meet the definition of ecological communities.

[9] Ecological communities are 'naturally occurring biological assemblages that occur in a particular type of habitat' (English and Blyth 1997).

4.2 Application of the Criteria

To determine if a particular natural area is regionally significant the area's natural values (according to Table 1 and 2) are measured against the selection criteria. It is necessary to stage the application of the criteria as one aspect of 'Representation of Ecological Communities' requires consideration of all remaining areas of the ecological communities, here principally expressed as native vegetation. Other aspects of 'Representation of Ecological Communities' criterion and the remaining five criteria are then addressed.

4.2.1 Application of Representation of Ecological Communities Criterion in relation to the remaining areas of native vegetation

To encompass current recognised levels of remnant native vegetation retention this Strategy uses a standard level of native vegetation retention of at least 30% of the pre-clearing extent of the ecological communities on the Swan Coastal Plain. These levels have been most recently recognised in the *National Objectives and Targets for Biodiversity Conservation 2001-2005* (Commonwealth of Australia 2001) which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected. This level of recognition is in keeping with the targets set in the EPA's Position Statement on the 'Environmental protection of native vegetation in Western Australia: clearing of native vegetation, with particular reference to the agricultural area' (EPA 2000).[10]

For the Greater Bunbury Region (except for lands identified in the 'GBR Constrained Area' in Map 2 and described below) this means the objective is to seek to:

- retain at least 30% of the pre-clearing extent of the ecological communities in the GBR, where >30% of an ecological community remains on the Swan Coastal Plain
- preferentially locate developments in cleared areas, where 30% or <30% of the pre-clearing extent of the ecological community remains on the Swan Coastal Plain.

Within the terms of this criterion vegetation complexes, which are mapped for the entire extent of the southern Swan Coastal Plain, are used as the base mapping of ecological communities. It is evident from Table 4 that much of the Swan Coastal Plain is altered to such an extent that 12 of the 15 vegetation complexes have 30% or less of their area remaining on the Plain. As a consequence all remaining vegetation in these complexes is in need of retention and some level of protection for the targets to be met. In recognition of this situation the following specific policy statement is applied.
The general protection of remnant native vegetation on the Swan Coastal Plain in the Greater Bunbury Region be achieved through the preferential location of developments in cleared areas.

These levels are modified on the 'GBR Constrained Area' of the Swan Coastal Plain (Table 6). The 'GBR Constrained Area' includes the consolidated area urban, urban deferred and industrial zoned identified on Map 2[11]. This area has been defined in conjunction with the Department of Planning and Infrastructure in Bunbury. The modified objective on the 'Constrained Area' being to seek to:

- retain at least 10% of the pre-clearing extent of the ecological community in the 'Constrained Area' of the GBR where >10% of the ecological community remains on the Swan Coastal Plain (the natural region) OR

[10] It is important to note that the 'at least 10%' target adopted in the *Urban Bushland Strategy* (based on the IUCN 1991 guidelines) was only ever intended to apply to constrained urban environments. It is now well recognised that the 'at least 10%' target is inadequate to provide effective conservation of biodiversity. In 1997, in the preliminary stages of preparing the Draft GBRS the DEP advised MfP, that it was becoming increasingly recognised that '20% of the land surface should be retained under natural vegetation cover for biodiversity and soil conservation.'

[11] The Perth Metropolitan Region section of the Swan Coastal Plain has similarly been recognised as a 'Constrained Area' in Bush Forever.

- retain all remaining areas of each ecological community in the 'Constrained Area' of the GBR where 10% or <10% of this ecological community remains on the Swan Coastal Plain.

However this does not limit application of all the criteria, especially the 'Rarity' and 'Maintaining Ecological Processes or Natural Systems' criteria. That is an area in the "Constrained Area' can be considered regionally significant if selection of the natural area is:

- from an ecological community below 10% pre-clearing extent;
- a threatened ecological community; and/or
- part of a regionally significant sequence of ecological communities.

Table 6[12]: Native vegetation remaining on the southern Swan Coastal Plain (SCP) and the Greater Bunbury Region (GBR) Constrained Area within those vegetation complexes occurring in the GBR. The vegetation complexes are grouped in the major landform elements. All vegetation in those vegetation complexes in bold italics should be conserved under this Strategy.

Major Landform Units/ Vegetation Complex	Remaining area for SCP as % of original area on SCP	Original Area (ha) on SCP in GBR Constrained Area	Remaining on SCP in GBR Constrained Area		Remaining on SCP in existing and proposed ROS in GBR Constrained Area	
			Area (ha)	% of original	Area (ha)	% of original
Pinjarra Plain						
Guildford Complex	***5.0***	***572***	***75***	***13.2***	***2***	***0.4***
Swan Complex	15.6	917	196	21.4	116	12.6
Bassendean Dunes						
Bassendean Complex-Central And South	27.0	928	187	20.2	22	2.3
Combinations of Bassendean Dunes / Pinjarra Plain						
Southern River Complex	19.8	3862	1247	32.3	292	7.6
Spearwood Dunes						
Karrakatta Complex-Central And South	28.7	3040	1617	53.2	336	11.0
Quindalup Dunes						
Quindalup	33.0	993	354	35.7	187	18.9
Marine (Estuarine and Lagoonal) Deposits						
Vasse Complex	***29.4***	***814***	***56***	***6.9***	***32***	***3.9***
Yoongarillup Complex	42.8	2545	725	28.5	151	5.9

4.2.2 Application of all of the Criteria

The remaining criteria are then addressed in order to :

- **identify the particular area/s** of those ecological communities in the GBR
  - where >30% of an ecological community remains on the Swan Coastal Plain (that is, the actual areas, that will be identified, to collectively constitute at least 30% of the extent each of these ecological communities in the GBR) or
  - in the 'Constrained Area' where >10% of an ecological community remains on the Swan Coastal Plain (that is, the actual areas, that will be identified, to collectively constitute at least 10% of the extent each of these ecological communities in the 'Constrained Area' of the GBR); and
- **recommend** appropriate levels of protection for regionally significant areas identified by application of the criteria.

In applying the other aspects of 'Representation of Ecological Communities' criterion and the remaining five criteria a series of individual area attributes that apply to several criteria need to be highlighted. These are briefly outlined below. The criterion to which they apply are given in brackets after each attribute.

[12] See footnotes on Table 3.

Size and Shape (Representation of Ecological Communities, Maintaining Ecological Processes or Natural Systems)
Size is of key importance in determining the viability of natural areas for long term retention. In general, the capacity of an area to support the full species range of a given community will diminish with decreasing size. Shape determines the ratio of perimeter to area, the ratio being greater in more elongate patches. Elongate remnants may have value as connecting links, but the more extended they are the greater will be their susceptibility to weed invasion and disturbance.

Area selection is guided by the following general principles:

- a large remnant is preferable to a small one;
- a compact shape is preferable to an irregular or an elongate shape;
- replicates across the range of a community are preferable to a single area; and
- areas close to others or linked by natural areas are preferable to isolated ones.

The lower size limit of 20ha given in the *Urban Bushland Strategy* is accepted as a preferred lowest area limit, but smaller areas are significant where a community is seriously threatened or poorly reserved (less than 10% protected). Account is also taken of evidence from recent observations through comprehensive regional survey programs, which indicates that very small areas (to as small as 1ha) on certain soil types are resistant to weed invasion. Small areas may also be significant for fauna that have large home ranges extending beyond single areas. These areas also facilitate movement between patches, especially dispersal of offspring to new territories.

Vegetation Condition (Representation of Ecological Communities, Maintaining Ecological Processes or Natural Systems)
Remnants in largely undisturbed condition which retain the highest values are preferred; remnants with basic vegetation structure and floristics are intact (bushland) are the next best alternative. However, in cases where no other choices are available (generally where <30% remains), remnants in lesser condition are included. Areas containing scattered native species, especially a tree canopy, can retain vital roles as fauna habitat and ecological linkage for some species.

Uplands and Wetlands (Representation of Ecological Communities, Diversity, Maintaining Ecological Processes or Natural Systems)
The patterning of ecological communities on the Swan Coastal Plain is driven by the presence of wetlands, where the soils that are seasonally or intermittently waterlogged and/or inundated, and uplands, where the soils are not subject to this process. Natural areas containing both ecological community groups (uplands and wetlands) support the highest biodiversity and are a focus for protection.

Ecological Communities below 10 percent pre-clearing extent and threatened ecological communities (Representation of Ecological Communities, Rarity)
For those ecological communities where less than 10% remained, all areas are regionally significant, irrespective of the level of constraint on the land. Most communities in this category are communities typical of the eastern side of the Coastal Plain (principally the Pinjarra Plain), where the communities are highly fragmented and the remnants too numerous to be individually assessed at the strategic level. All of these remnants are regionally significant under the Rarity criterion, most containing threatened ecological communities. In keeping with *Bush Forever* these areas are not the subject of individual recommendations and are covered by the following specific policy statement:

> ***There is a presumption that all areas of remnant native vegetation containing threatened ecological communities or vegetation of the major landform elements of which less that 10% currently remains on the Swan Coastal Plain will be retained and conserved in the Greater Bunbury Region.***

In these areas there is also a need to consider restoration of ecological function. This can be approached through the identification of a series of regionally significant linkage opportunities.

Within these ‘linkage areas’ the restoration of ecological communities and landscape rehabilitation between and around the small remaining remnants on the eastern side of the Plain will be a priority. This issue can be covered by the following specific policy statement.

That there be proactive planning for the restoration of ecological communities and landscape rehabilitation between and around selected sequences of the small remaining remnants on the eastern side of the Swan Coastal Plain in the Greater Bunbury Region.

Relationship to other areas (Maintaining Ecological Processes or Natural Systems)
The importance of looking at the region's natural areas as an integrated ecological system is recognised, and the maintenance or establishment of linkage corridors is given a high priority. Areas adjacent to, or contiguous with, different communities may provide a necessary combination of habitats for particular fauna species.

Several other attributes are also taken into account. These are not related to the criteria for the identification of regionally significant natural areas.

Opportunities Outside the Greater Bunbury Region
This Strategy focuses on the Greater Bunbury Region portion of the Swan Coastal Plain; however, this is a planning boundary, representing only a portion of the Swan Coastal Plain. The possibilities for protecting additional areas, or to identify substitute areas outside the GBR to secure the desired minimum representation of ecological communities, is taken into consideration in the selection of areas. However, since the characteristics of a particular community will vary along its extent and with specific soil and moisture characteristics, replacement is not simply a matter of area-for-area exchange.

Ownership or reservation status
The objective of this Strategy is to identify areas of regional significance and to provide for their protection. Although it is important to recognise and take into account the values of natural areas in the planning process, the selection process should also recognise existing land use proposals. Hence, for example, publicly owned areas are preferred to those in private ownership; and, if privately owned, land zoned Rural is preferred to that zoned Urban, where opportunities to protect are more restricted. Where more than 30% of an ecological community is publicly owned or reserved and provides effective representation of the variation in the ecological community, the ecological community identified is provisionally considered to be adequately protected. The selection process then concentrates on landform units for which less than 30% of the ecological community has some degree of protection.

5 RESERVATION AND PROTECTION

This Strategy aims, within the limits of the natural areas available, to establish the process to be used to identify a comprehensive, adequate and representative (CAR) system of reserved and protected areas in the Greater Bunbury Region portion of the Swan Coastal Plain.

In terms of reserved areas this Strategy adopts the primary objective of the *National Strategy for the Conservation of Australia's Biological Diversity* (Commonwealth of Australia 1996) which is to 'establish and manage a comprehensive, adequate and representative system of protected areas covering Australia's biological diversity'.

Comprehensiveness, adequacy and representativeness are terms defined in the *National Strategy* as follows:

> '• comprehensiveness — the degree to which the full range of ecological communities and their biological diversity are incorporated within reserves
> • adequacy — the ability of the reserve to maintain the ecological viability and integrity of populations, species, and communities. (The interactions between reserves and surrounding areas should be taken into account in determining the reserve's ability to meet ecological viability and integrity criteria. Complementary management of the adjacent areas can play a significant role. In some instances, however, the ecological viability of the protected area itself will be paramount.)
> • representativeness — the extent to which areas selected for inclusion in the national reserves system are capable of reflecting the known biological diversity and ecological patterns and processes of the ecological community or ecosystem concerned.'

However it is accepted that conservation reservation alone will not adequately protect regionally significant areas. To achieve this, there is a need to combine a series of protection measures including conservation on private lands. Conservation reservation is considered to provide the highest level of protection and it is appropriate that this is applied to areas with the highest natural value. In general, areas from the following categories, will be priorities for reservation:

- 15%[13] of the pre-clearing extent of the ecological community on the Swan Coastal Plain;
- larger examples of threatened ecological communities or vegetation of the major land form element/s of which less that 10% currently remains;
- larger intact examples of contiguous areas of two or more ecological communities; and/or
- larger representative intact areas of an ecological community.

Inadequate funding is a major impediment in developing a CAR Reserves system. There is no equivalent of the Metropolitan Region Improvement Fund in the Bunbury Region (or elsewhere beyond the PMR). This is a broader issue for government consideration. An adequate funding mechanism, to both acquire and manage these lands, is a priority.

Mechanisms for off-reserve conservation could include conservation covenants, guided planning schemes, revolving funds and bushland/wetland banking and bushland/wetland mitigation. These protection measures need support through the development of new and improved tools integrated into an effective regional planning scheme. However, it must be understood that these measures also require adequate funding to support them so the outcomes are equitable.

[13] In keeping with percentages established in the Regional Forest Agreement.

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WRC - Water and Rivers Commission

7 APPENDECES

APPENDIX 1: Glossary – Definitions, Acronyms and frequently used Abbreviations

adequacy the ability of the reserve to maintain the ecological viability and integrity of populations, species, and communities. (The interactions between reserves and surrounding areas should be taken into account in determining the reserve's ability to meet ecological viability and integrity criteria. Complementary management of the adjacent areas can play a significant role. In some instances, however, the ecological viability of the protected area itself will be paramount.)

biological diversity/biodiversity means genetic diversity, species diversity and ecosystem diversity.

Bioregion means Interim Biogeographic Region as defined by Thackway and Creswell (1995).

bushland is land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation, and provides the necessary habitat for native fauna.

comprehensiveness the degree to which the full range of ecological communities and their biological diversity are incorporated within reserves

Constrained Area an area where there is an expectation that development will be able to proceed, this may include urban, urban deferred or industrial zoned land or land with existing development approvals.

Declared Rare Flora

> **Extant Taxa**: taxa which have been adequately searched for and are determined to be either rare, in danger of extinction, or otherwise in need of special protection in the wild, and have been declared under Section 23F of the *Wildlife Conservation Act* 1950 to be 'rare flora'.
>
> **Presumed Extinct Taxa**: taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, of which all known wild populations have been destroyed more recently, and which have been declared under Section 23F of the *Wildlife Conservation Act* 1950 to be 'rare flora'.

eastern side of the Swan Coastal Plain: the Foothills and Pinjarra Plain major landform elements. For a more comprehensive description see Government of WA (2000b).

ecological communities: 'naturally occurring biological assemblages that occur in a particular type of habitat' (English and Blyth 1997). The scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified. (Within the terms of this Strategy, vegetation complexes (Heddle *et al*. 1980), floristic community types (Gibson *et al.* 1994, DEP 1996) and, those ecological communities listed as threatened as defined in English and Blyth (1997), are considered to meet this definition for the Greater Bunbury Region.)

floristic community types are distinctive floristic assemblages identified on the southern Swan Coastal Plain in Gibson *et al.* (1994) and DEP (1996). The presence or absence of individual taxa in standard areas (plots, sites, quadrats) is used to define floristic groupings based on shared species.

Greater Bunbury Region (GBR) the area covered by the Bunbury, Capel, Harvey and Dardanup Local Government Authorities (LGAs).

major landform element: principally the Foothills, Pinjarra Plain, Bassendean Dunes, Spearwood Dunes, Quindalup Dunes and Marine (Estuarine and Lagoonal) Deposits (and combinations of these).

These are used to link the various regional datasets. For a more comprehensive description see Government of WA (2000b).

Metropolitan Region Scheme (MRS) means the town planning scheme for the Perth Metropolitan Region.

native vegetation is a category of vegetation adopted by *Bushplan* and Beeston *et al.* (2001) for mapping purposes, based on AGWEST Spatial Resource Information Unit classes:

> **remnant vegetation** most closely resembles the natural state of vegetation for a given area; most similar to identifiably remnant areas of similar vegetation types; understorey intact; of the greatest structural diversity/complexity in comparison to disturbed vegetation in the region; minimal disturbance by agents of human activity.
>
> **modified vegetation** degraded understorey; obvious human disturbance; saline incursions; high perimeter to area ratio; narrow corridors of vegetation along roads, railway lines.

natural area naturally vegetated area or non-vegetated areas such as water bodies (generally rivers, lakes and estuaries), bare ground (generally sand or mud) and rock outcrops.

natural region Interim Biogeographic Region as defined by Thackway and Creswell (1995).

Perth Metropolitan Region is the area covered by the *Perth Metropolitan Region Town Planning Scheme Act* 1959, as amended.

preservation means maintaining bushland in its existing state and preventing deterioration.

Priority Flora are plant taxa, lists of which are maintained by CALM, that are either under consideration as Threatened Flora but are in need of further survey to adequately determine their status, or are adequately known but require monitoring to ensure that their security does not decline.

protected refers to bushland which is under a management regime that provides for its continuing protection.

protection is all of the processes of ensuring the continued existence and viability of bushland, and may include preservation, maintenance, reinstatement, and restoration.

regeneration means the natural or assisted recovery of the natural integrity or condition of bushland.

regionally significant natural area A component of remnant native vegetation or water body that collectively aims to form a comprehensive, adequate and representative system of conservation areas. In order to establish whether an areas fall into this category they need to be either part of the existing or proposed conservation system or to meet, in part or whole, a range of criteria which are outlined in this Strategy.

representativeness the extent to which areas selected for inclusion in the national reserves system are capable of reflecting the known biological diversity and ecological patterns and processes of the ecological community or ecosystem concerned.'

reservation (reserve and reserved) refers to reservation under the *Land Act* 1933 (LA).

restoration means returning bushland to a known past state, or to approximate the original natural condition, by repairing degradation, removing exotic species, reinstatement, or allowing recovery.

southern Swan Coastal Plain the System 6/System 1 section of the Swan Coastal Plain between the Moore River and Dunsborough. This is not the entire Swan Coastal Plain Interim Biogeographic Region as identified in Thackway and Cresswell (1995).

Swan Coastal Plain Swan Coastal Plain Interim Biogeographic Region as defined by Thackway and Creswell (1995).

System 1 areas those specific localities (on the Swan Coastal Plain) as listed in The South West - System 1 in Conservation Reserves for Western Australia. Systems 1, 2, 3, 5 as recommended by the Environmental Protection Authority (Department of Conservation and Environment, 1976).

System 6 areas those specific localities as listed in The Darling System - System 6 Part II Recommendations for Specific Localities Report 13 Conservation Reserves for Western Australia as recommended by the Environmental Protection Authority (Department of Conservation and Environment, 1983).

Threatened Ecological Communities are naturally occurring assemblages of plants and animals listed by CALM as being threatened with extinction by human activity, or in danger of being destroyed or significantly modified by development and other pressures from people (English and Blyth 1997, 1999). They are ecological communities that have been assessed through a procedure (coordinated by CALM) and assigned to one of the following categories related to the status of the threat to the community: "Presumed Totally Destroyed", "Critically Endangered", "Endangered" or "Vulnerable" (English and Blyth, 1997). One of the criteria used to determine the categories is an estimate of the geographic range and/or the total area occupied and/or the number of discrete occurrences reduced since European settlement, where $\leq$ 10% is Critically Endangered and $\leq$ 30% is Endangered. On the Swan Coastal Plain a number of floristic studies and fresh water organism studies have delineated ecological communities in a form adequate for assessment (Government of Western Australia 2000b). So far 18 of the floristic community types identified by Gibson *et al.* (1994) have been assessed and determined to be threatened ecological communities.

Threatened Fauna are animal species likely to become extinct or which are rare, and declared so, under Section 14(2)(ba) of the *Wildlife Conservation Act* 1950.

Threatened Flora are plant species which are declared rare under Section 23F of the *Wildlife Conservation Act* 1950 as flora likely to become extinct or which are rare or otherwise in need of special protection. To be declared rare, plant species must meet well defined criteria, which include the thoroughness of searches for the species, its rarity and the danger of extinction (see Declared Rare Flora).

Threatened or Poorly Reserved Plant Communities: plant communities that have been recognised and mapped by the Environmental Protection Authority (1994). This series of bushland areas on the Swan Coastal Plain was considered to be in need of interim protection under the System 6 and Part System 1 Update Program. The majority of these areas are on the eastern side of the Swan Coastal Plain, with several from the west of the Plain. Studies by Keighery and Trudgen (1992) and Gibson *et al.*, (1994) were used to identify these areas. Bush Forever Sites update and supersede the Threatened and Poorly Reserve Plant Community Sites within the study area.

vegetation complexes As defined by Heddle *et al.*, (1980) and CALM (1998, unpublished) in relation to the landform-soil units determined by Churchward and McArthur (1980). The delineation of vegetation complexes is based on the concept of a series of vegetation associations forming regularly repeating complexes associated with a particular soil and landform unit.

vegetation condition is a rating given to vegetation to categorise disturbance related to human activities. This rating refers to the degree of change in the structure, density and species present in the

bushland in relation to undisturbed bushland of the same type. A series of scales of disturbance has been used by different people.

wetlands: 'areas of seasonally, intermittently or permanently waterlogged soils or inundated land whether natural or otherwise, fresh or saline, e.g. waterlogged soils, ponds, billabongs, lakes, swamps, tidal flats, estuaries, rivers and their tributaries' (Wetland Advisory Committee 1977). This definition is directly comparable with the definition of wetlands used in the State Wetland Conservation Policy (Government of Western Australia 1997) i.e. 'areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed more than six metres'. The former definition is preferred in this Strategy and in *Bush Forever* as it allows for the boundaries of the wetland to be readily determined on the basis of the vegetation.

zones refers to the classification of land in planning schemes for use and development, excluding land in reserves.

AGWEST	Agriculture Western Australia
DCE	Department of Conservation and Environment
DEP	Department of Environmental Protection
DPI	Department for Planning and Infrastructure
EPA	Environmental Protection Authority
GBR	Greater Bunbury Region
GBRS	Greater Bunbury Region Scheme
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Authority
MfP	Ministry for Planning
MRIF	Metropolitan Region Improvement Fund
MRS	Metropolitan Region Scheme
PMR	Perth Metropolitan Region
SCP	Swan Coastal Plain
WAPC	Western Australian Planning Commission
WRC	Water and Rivers Commission

APPENDIX 2: Vegetation Types

The first comprehensive descriptions of the Swan Coastal Plain vegetation within the context of the vegetation south west of Western Australia were made by Diels (1906). Maps of vegetation on the Swan Coastal Plain began with the work of Speck in his Masters of Science (1952) and Doctor of Philosophy (1958) theses. Speck's 1952 map is the basis of the map of vegetation of the Perth area in Seddon (1972).

In the 1960's and 70's two other studies, Beard (1979a, b & c) and Smith (1973, 1974), built on the work of Speck to map the vegetation types of the Swan Coastal Plain. Together the maps of Beard and Smith map the extent of the vegetation types on the Swan Coastal Plain at a 1 : 250 000 scale, Beard mapping the Pinjarra, Perth and Hill River and Moora Sheets and Smith the Collie and Augusta and Margaret River Sheets. While the units mapped are comparable it should be noted that Beard mapped the original extent of the vegetation types while Smith mapped the current extent.

Later Beard (1981) produced a map at a 1 : 1 000 000 scale for the entire Plain.

Beard's 1 : 250 000 maps were digitised in the late 1990's and early 2000's (Hopkins *et al.* 1996, 2001). Where mapping by Beard was not available at this scale (area of Smith's studies) the mapping by Smith, the Forest Department and aerial photographs were used to develop new linework (Hopkins pers. comm.).

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APPENDIX 3: Details of the Selection Criteria

The selection criteria for the Bushplan Project were developed with input from a workshop (established for the System 6 and Part System 1 Update Program) attended by conservation scientists, consultants, representatives of a range of key government agencies and the community. These draft recommendations were reviewed through a broadly based Technical Working Group and the Steering Committee established for the System 6 and Part System 1 Update Program (organised by DEP), and the Urban Bushland Advisory Group (advisory group to the Western Australian Planning Commission). These criteria, updated to reflect current policy standards and adapted to the largely rural environment of the GBR are to be used by the EPA to identify regionally significant natural areas in their consideration of the GBRS portion of the Southern Swan Coastal Plain. Each of the criteria is presented and discussed below.

Representation of Ecological Communities

Representation of ecological communities is achieved using a combination of regional information on landform and soils, vegetation type, vegetation complexes, floristic community types, wetlands and significant species and, to a lesser extent, other information on the specific area's natural values. This criterion is aimed at maximising the comprehensiveness and representativeness of the areas identified for conservation.

Comprehensive representation of ecological communities is achieved primarily by attempting to select replicate areas that represent each of the floristic communities, in each of the vegetation complexes in which they occur in the GBRS; and to cover the geographic extent (relation to both landform and range) of each community within the GBRS.

REPRESENTATION OF ECOLOGICAL COMMUNITIES

A number of areas selected to represent the range of ecological communities and the places in which these communities merge.

Scope

Regional representation will be primarily based upon the target of achieving:

- comprehensive and adequate representation of each floristic community type within each vegetation complex (in uplands and vegetated wetlands).
- comprehensive and adequate representation of each natural wetland group and wetland types within each group.

Inclusion guidelines

- Areas which are good examples of each floristic community type, selected to be representative of the vegetation of a geomorphic unit.
- Areas contributing to at least 30 percent of each vegetation complex in at least ten separate areas. In the defined constrained area this may be modified to at least 10%.
- Best available examples of each natural wetland group and wetland types within each group.
- Best available examples of places where ecological communities merge.[14]
- Areas of native vegetation which are good examples its type with particular reference to fauna habitat[14].
- Areas identified as being of national or international significance through treaty/convention/policy.

Exclusion guidelines

- Vegetation, which does not satisfy the definition of bushland, unless it is the good example of its type with particular reference to fauna habitat or it, constitutes one of the few examples of a particular ecological community[14].
- Areas which are not the best available examples of particular ecological communities (floristic community type/vegetation complexes[14]) because there are more appropriate (bigger, better condition, richer/more diverse) areas elsewhere.

[14] These Inclusion/Exclusion guidelines differ from those in EPA (2003) to improve their clarity.

Within an intensively settled and developed region such as the Swan Coastal Plain, clearing is extensive and the remaining bushland areas are generally fragmented. The overall extent of clearing and general pattern of clearing in the GBR is typical of the entire Plain. Several vegetation complexes are cleared to well beyond 90 per cent, such that the target of retaining greater than 30% of the natural vegetation in each complex cannot be uniformly met. However, within the area of the GBR some complexes retain significant areas of native vegetation, being more extensively cleared elsewhere. For example the Karrakatta Central South complex, retains more than 52% bushland in the GBR at present, but only 30% remains overall on the southern Swan Coastal Plain. In addition substantial areas of this vegetation complex in the PMR are subject to existing development proposals and Urban/Industrial Planning Zone, such that the target of protecting at least 10% will not be met in the PMR. As a consequence only 22% of this vegetation complex is potentially able to be protected. This is not typical of the highly cleared complexes, which are usually even more extensively cleared in the rural areas of the Plain than in the PMR.

Many areas will be selected primarily because they provide a good representation of one or more of the ecological communities on the Coastal Plain. Achieving a comprehensive, adequate and representative system of protected areas is a primary objective of conservation policy. As such, there is an emphasis on selecting areas that together provide a complete (comprehensive) representation of the ecological diversity found on the coastal plain.

Diversity

Diversity is an important supporting criterion, usually used in conjunction with representativeness. Within the primary objective of maximising representation, selections of are made to choose natural areas supporting a diversity of landform units and/or plant communities. Both structural and floristic diversity contribute to plant community diversity.

The diversity of species is assessed for both general diversity and diverse types of a particular plant community or combination of plant communities. Diversity within species is also taken into account to encompass known aspects of genetic diversity.

DIVERSITY

Areas with a high diversity of landforms, flora and/or fauna species or communities in close association

Scope

The conservation of important areas by virtue of their richness, diversity or complexity for their physical or biological attributes at the community, species or genetic level. This will be primarily based on areas supporting:

- a wide variety of landform units.
- a wide variety of flora and/or fauna species.
- unusual concentrations of subspecies or varieties occurring together.
- a wide representation of floristic community types in close proximity.
- species-rich examples of communities of their type.
- a wide variety of plant associations, assemblages or communities.

This criterion will commonly support other criteria for selection of representative areas.

Inclusion guidelines

- Areas with high flora diversity at the community, species or genetic level.
- Areas with a high diversity of plant associations, assemblages or communities relative to the area.
- Areas with a high diversity of faunal assemblages.

Exclusion guidelines

- significantly altered or man-made landform units
- Floristic community types which are replicated in many areas.
- Areas with low to moderate diversity at the community, species or generic level.

Rarity

Rarity is considered from a community and individual species perspective. Selection of Threatened Ecological Communities (after English and Blyth 1997) is a priority, related to this criterion and the representativeness criterion. The *National Objectives and Targets for Biodiversity Conservation 2001-2005* (Commonwealth of Australia 2001) recognise that ecological communities reduced to 10% or less of their original extent should be considered rare.

Protecting rare or restricted taxa of flora and fauna (may be species, subspecies or varieties) is achieved through the preferential selection of representative examples of communities that are known to support populations of these species.

RARITY

Areas containing rare or threatened communities or species, or species of restricted distribution

Scope
This criterion applies to aspects of the environment, which are rare or relatively rare, and can encompass any environmental, biological or ecological feature or phenomenon which can be regarded as outstanding because it is one of the few of its type.

Inclusion guidelines

- Threatened ecological communities.
- Habitats of rare, uncommon or restricted flora and/or fauna species and/or species outside of or at the limit of their range.
- Areas supporting rare, uncommon or restricted communities and/or communities outside of or at the limit of their normal range.

Exclusion guidelines

- Habitats of species or communities whose significance (as described above) is not established.
- Areas which, if supporting outlying species or communities, are replicated by better examples elsewhere.

Maintaining Ecological Processes or Natural Systems

The selection of areas for their role in 'maintaining ecological processes or natural systems' relates to the 'adequacy' objective of the National Strategy (Commonwealth of Australia 1996). This is the most difficult of the national criteria to achieve fully on the Swan Coastal Plain, given the extent of clearing and the fragmented nature of much of the remaining native vegetation.

The protection of remaining large areas of native vegetation, particularly those providing representation of two or more vegetation complexes, a range of floristic community types or contiguous upland and wetland areas, is an important component of this selection criterion. These larger areas represent core regional areas with the best opportunity for maintenance of a more complete range of ecological function. For the same reasons, the identification, protection and enhancement of remaining and/or potential linkages or corridors of bushland across the Plain is considered an important component of providing for the on-going viability (adequacy) of the protected areas.

A series of wetlands on the Swan Coastal Plain are of international importance for the protection of migratory waterbirds, serving to maintain ecological systems that extend beyond Australia.

It is notable that small bushland areas on the eastern side of the Plain have demonstrated an ability to maintain good condition after many years of isolation in an agricultural environment, provided they have not been subject to gross disturbance. For example, areas as small as one hectare (Bush Forever Site 78) and less than 200 metres wide (Bush Forever Site 360) have been recognised as regionally

significant in Bush Forever (Government of WA 2000a&b). Similarly reduced areas have been recognised in the GBRS at Waterloo and adjacent to the GBRS along Wonnerup Road. However here and elsewhere on the Plain there is a preference for larger areas (greater than 20 hectares) as these generally able to maintain good or better condition over time.

MAINTAINING ECOLOGICAL PROCESSES OR NATURAL SYSTEMS

Maintenance of ecological processes or natural systems at a regional or national scale

Scope
This criterion applies to areas which are important in the maintenance of existing processes or natural systems.
This criterion would normally be used in conjunction with other criteria for the selection of representative areas.
Inclusion guidelines
- Large areas in natural condition with natural processes intact or largely so.
- Fauna habitats providing specific requirements for feeding/breeding/nursery functions.
- Substantive wildlife corridors connecting bushland areas.
- Habitats for significant populations of migratory birds.

Exclusion guidelines
- Areas which are replicated by other areas supporting significant populations or in better condition.
- Areas not recognised as being of national or international significance for migratory birds.

Scientific or Evolutionary Importance

This criterion is intended to address areas supporting restricted specialist communities, for example, the Lake Clifton stromatalites, areas of scientific significance, such as study areas for regional studies and areas of evolutionary significance.

SCIENTIFIC OR EVOLUTIONARY IMPORTANCE

Areas containing evidence of evolutionary processes either as fossilised material or as relict species and areas containing unusual or important geomorphological or geological sites; Areas of recognised scientific and educational interest as reference sites or as examples of the important environmental processes at work

Scope
This criterion applies generally to areas which contain evidence of past ecological or biological processes, and unusual or important geomorphological or geological sites and to areas which have recognised value as research sites, type localities or to sites having reference or benchmark value.
This criterion will usually support other criteria for selection of representative areas.
Inclusion guidelines
- Areas with unusual or important geomorphological or geological sites
- Areas with remains of flora and fauna now extinct (fossil sites).
- Areas with primitive or relict flora or fauna surviving from earlier times.
- Areas with fossil or other records of identifiable past climates or environments.
- Long-term scientific/educational monitoring sites or study areas.

Exclusion guidelines
- Areas in which the evidence of past processes is not clearly established.
- Areas which are replicated by places with clearer evidence of the above or in better condition.
- Areas not identified as important geomorphological sites.
- Areas not identified as important geological sites.

General Criteria for Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation

Wetlands are recognised as an important feature of the Swan Coastal Plain where they are a focus of biological diversity and a key component for the maintenance of ecological functions associated with the hydrological cycle.

Conservation category wetlands (Hill *et al*. 1996a & b and Semeniuk 1998) have been identified as making a significant contribution to the protection of the diversity, representation and function of important examples of the remaining wetlands on the Swan Coastal Plain.

Streamline/riverine/estuarine fringing vegetation and coastal vegetation are also widely recognised as important, not only for conservation of biological diversity and the opportunities for linkage that they present, but also for maintenance of the stability of these environments and their protection as key areas of public open space and landscape diversity.

GENERAL CRITERIA FOR PROTECTION OF WETLAND, STREAMLINE, AND ESTUARINE FRINGING VEGETATION AND COASTAL VEGETATION

Conservation category wetland areas including fringing vegetation and associated upland vegetation; Coastal vegetation within the accepted coastal management zone

Scope

This criterion applies to Conservation management category wetlands, their vegetation (including fringing vegetation) and associated upland vegetation; streamline/riverine/estuarine fringing vegetation; and to coastal vegetation within the accepted coastal management zone.

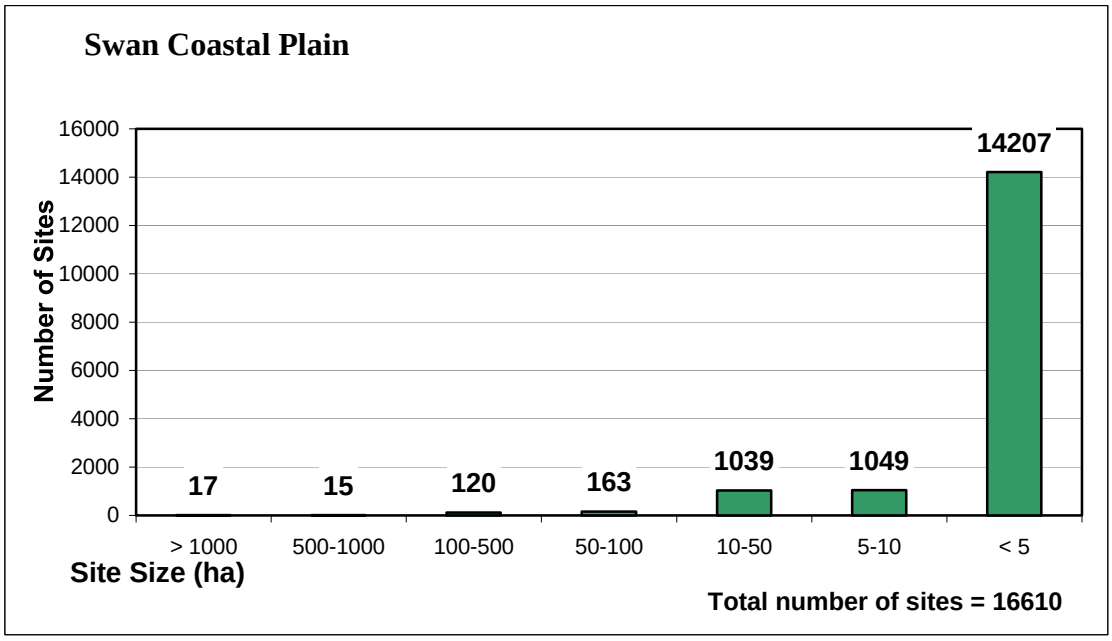
Inclusion Guidelines

- Conservation category wetlands and their native vegetation (including fringing vegetation) and associated upland vegetation.
- Streamline/riverine (channel wetlands) and estuarine fringing native vegetation.
- Coastal vegetation and natural landform units within the accepted coastal management zone. These areas may also be included in regionally significant natural areas that go beyond the coastal zone.
- Streamline/riverine (channel wetlands), estuarine and coastal areas that are part of a regional linked (or potentially linked) sequences of communities.

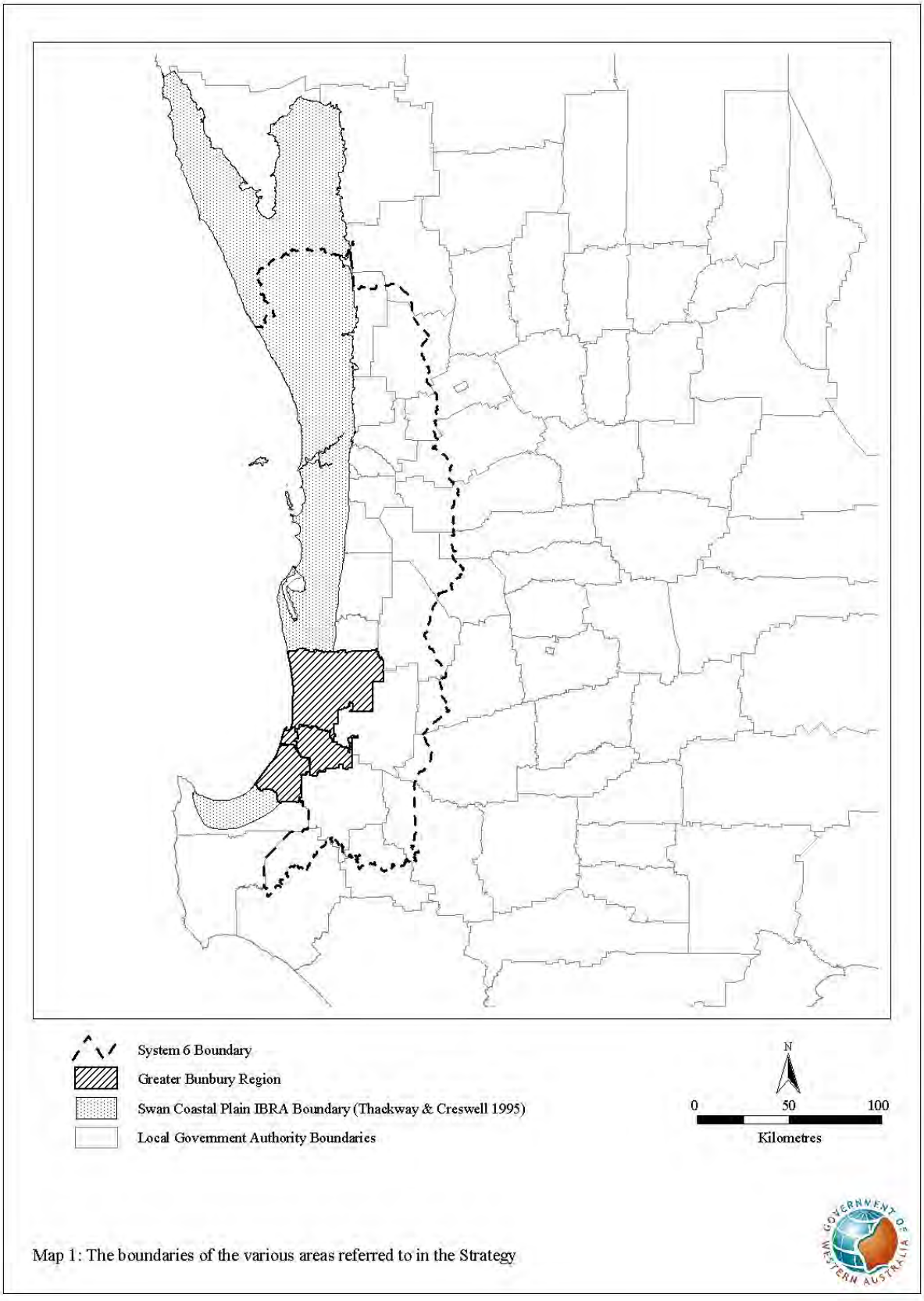
Exclusion Guidelines

- Significantly altered wetlands, such as Resource Enhancement and Multiple Use management category wetlands. At times, altered wetlands, may be considered to be regionally significant natural areas under other criteria.
- Cleared or developed coastlines.

Figure 1: Number of vegetated remnants against area size classes occurring on the Swan Coastal Plain (SCP) and occurring in the Greater Bunbury Region SCP

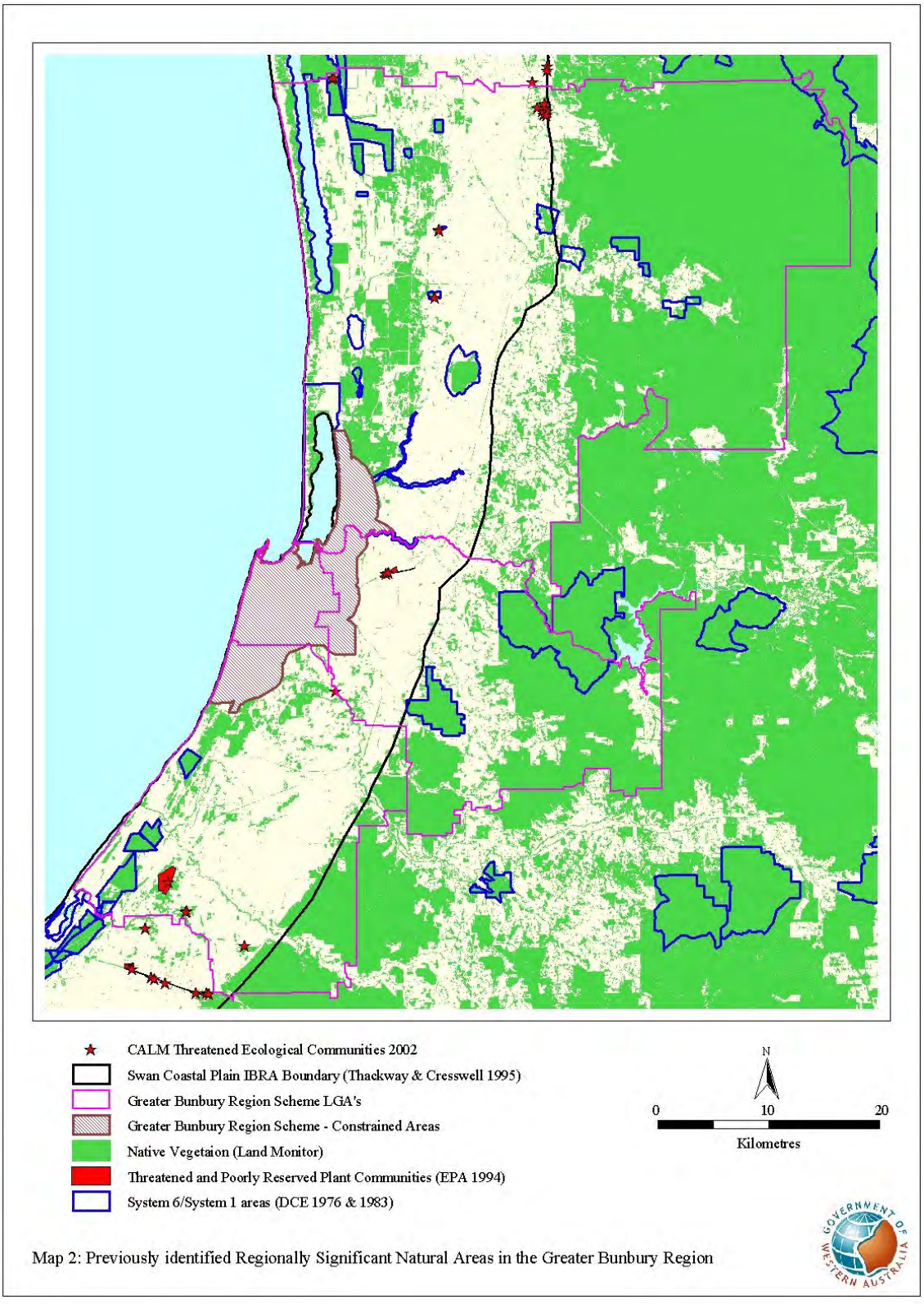


Map 1: The Boundaries of the Various Areas Referred to in the Strategy



Map 1: The boundaries of the various areas referred to in the Strategy

Map 2: Previously Identified Regionally Significant Natural Areas in the Greater Bunbury Region



Map 2: Previously identified Regionally Significant Natural Areas in the Greater Bunbury Region

ECOLOGICAL LINKAGES

(Regionally significant sequences of ecological communities within and between the major landform elements)

IN THE

GREATER BUNBURY REGION

A preliminary investigation of ecological linkages to support the EPA's identification of regionally significant natural areas in the Greater Bunbury Region portion of the Swan Coastal Plain.

CONTENTS

1 Introduction

2 THE IDENTIFICATION OF ECOLOGICAL LINKAGES IN THE GREATER BUNBURY REGION PORTION OF THE SWAN COASTAL PLAIN

3 REFERENCES

TABLE

Table 1: Listing of sixteen preliminary Ecological Linkages in the Greater Bunbury Region

MAPS

Map 1: Map of sixteen preliminary Ecological Linkages in the Greater Bunbury Region

1 INTRODUCTION

The EPA's Natural Areas Strategy (Appendix) briefly describes seven distinctive natural features in the Swan Coastal Plain portion of the Greater Bunbury Region (GBR), being:

- Diversity of Foothills ecological communities
- Extensive, highly cleared Pinjarra Plain
- Most southern area of extensive Bassendean Dunes
- Undulating Spearwood Dunes
- Narrow Coastal Quindalup Dunes
- A diverse near coastal wetland belt
- Regionally significant sequences of ecological communities within and between the major landform elements

These natural features were identified through a series of regional scale studies and information sets (mostly dating from before 1995). As part of this process, these earlier reports are combined with more recent reports and studies to make a preliminary identification of a series of '*Regionally significant sequences of ecological communities within and between the major landform elements'* within the GBR. For brevity these sequences are, hereafter referred to as, Ecological Linkages.

The EPA recognises that the systematic identification of regionally significant natural areas, and the mechanisms to protect these areas, is to be achieved through the update of the remainder of the System 6 and part System 1 area in a similar coordinated program to *Bush Forever* (Government of WA 2000a). However, in the interim, the EPA is of the opinion that sufficient information has been gathered to broadly identify Ecological Linkages in the GBR.

2 THE IDENTIFICATION OF ECOLOGICAL LINKAGES IN THE GREATER BUNBURY REGION PORTION OF THE SWAN COASTAL PLAIN

Seven Ecological Linkages were listed in the *Strategy for the EPA to identify regionally significant natural areas in its consideration of the Greater Bunbury Region Scheme portion of the Swan Coastal Plain* EPA (2002, Appendix). These were identified using the reports and studies listed below and the location of reserved land.

a) System reports – System 1 and System 6 (DCE 1976, 1983);
b) Areas of Threatened and Poorly Reserved Plant Communities: EPA (1994, derived from Gibson *et al.* 1994); and
c) Areas of threatened ecological communities: as defined by English and Blyth (1997), locations established in Gibson *et al.* (1994) and DEP (1996); and
d) the Kemerton Buffer Link (EPA, 1999c).

The majority of these areas are recognised in the Greater Bunbury Region Scheme (GBRS) and the earlier, related planning document, *Bunbury-Wellington Region Plan* (WAPC 1995).

During the EPA's assessment of the GBRS further consideration of a series of recent studies, or updates of previous information, resulted in the identification of 16 ecological linkages in the GBR. Information used in the determination of the configuration of the ecological linkages included the use of:

- mapping and/or locations of remnant vegetation (Beeston *et al.* 2001), vegetation complexes (Heddle *et al.* 1980 and CALM 1998), wetlands (Hill *et al.* 1996a&b, Semeniuk 1998 and WRC updates of the mapping), EPP Lakes (Government of WA 1992), floristic community types (after Gibson *et al.* 1994 and DEP 1996); threatened ecological communities (after English and Blyth (1997), significant fauna species (after Government of WA 2000b, CALM 2002) and significant flora species (Keighery 1999, Atkins 2001);

- information on the movement of bird species on the Plain (after Government of WA 2000b, Dell 2000);

(a) information on key natural areas being investigated in the ongoing flora, vegetation, wetland and fauna survey by government for the update of the remainder of the System 6 and part System 1 area (DEP 1996, Government of WA 2000b);

(b) specific flora, vegetation and fauna survey by DEP or for DPI (for example HGM 2002; DEP 2002&2003; Dell and Hyder-Griffiths 2002; Keighery *et al.* 2002) for the GBRS; and

(c) ongoing flora, vegetation and fauna survey for proposed developments.

Two types of linked (or potentially linked) sequences of ecological communities were identified in the EPA's Strategy, vegetated sequences and river corridors. This same grouping is used here to list 16 Ecological Linkages in the Greater Bunbury Region (see Table 1 and Map 1). The vegetated sequences are further divided into two groups – those that link North-South predominantly along landforms and vegetation complexes; and those that link East-West across landform and vegetation complexes.

The vegetated sequences and river corridors identified in the Natural Areas Strategy are incorporated in this list. At times the vegetated sequences and river corridors described in the Natural Areas Strategy have been split to reflect the direction of the linkage. The name, or part name, from the EPA's Strategy is given in brackets after each named linkage.

The location of the Corridors is shown in the Greater Bunbury Region Constrained Area and only indicated beyond this boundary.

In broadly identifying these 16 preliminary Ecological Linkages in the Greater Bunbury Region in the EPA was mindful of the following issues.

e) Individual natural areas in Ecological Linkages are only described when the particular site is being assessed as part of the EPA's consideration of the Greater Bunbury Region Scheme.

f) In general natural areas in the vicinity of each Linkage have not been identified. This identification process is expected to be achieved through the update of the System 6 and part System 1 area in a coordinated program similar to *Bush Forever*.

g) Naturally vegetated areas (in particular the larger relatively intact remnants) in the area of the linkages will be priorities for retention and protection, being expected to meet the criteria for regional significance against at least two criteria, that is 'Representation of ecological communities' and 'Maintaining of ecological processes or natural systems'.

h) The Ecological Linkages could provide a focus for the restoration of ecological communities and landscape rehabilitation between and around the small remaining remnants on the eastern side of the Swan Coastal Plain.

i) regionally significant natural areas have been, and will be, identified outside the general area of these Ecological Linkages.

Table 1: Listing of the preliminary Ecological Linkages in the Greater Bunbury Region
The name, or part name, from the EPA's Strategy is given in brackets after each named linkage.

Vegetated sequences
North-South Ecological Linkages
• Yalgorup/Myalup/Leschenault Coastal
• McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup (Kemerton Buffer Link; Wellesley River, part Brunswick and Collie Rivers; part Dalyellup/Gelorup/Preston River/Plateau Link)
• Maidens/Muddy Lake/Ludlow Coastal
East/west Ecological Linkages (most of these are relatively short, only three go from the coast to the Plateau)
• Yalgorup/Riverdale Road/Yarloop (Riverdale Road Transect)
• Myalup/Kemerton
• Leschenault/Kemerton
• Leschenault/Eaton
• Maidens/Preston River (Ocean to Preston River Park)
• Dalyellup/Gelorup/Crooked Brook (part Dalyellup/Gelorup/Preston River/Plateau Link)
• Capel/Boyanup
• Wonnerup/Ludlow River/Gibson
River Corridors or River Ecological Linkages
• Brunswick River
• Collie River
• Preston River (this linkage is that portion of the Preston River in the City of Bunbury outside of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup ecological Linkage)
• Ferguson River
• Capel River

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The mapping information in these studies is available in a GIS format.

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CALM - Department of Conservation and Land Management

#CALM 1998 *Vegetation Complex Mapping for the Swan Coastal Plain in the Busselton area.* An unpublished GIS dataset compiled by Mattiske and Havel for CALM.

CALM 2002 *Threatened and Priority Fauna List for Western Australia*. Unpublished report to the Department of Conservation and Land Management, Como, Western Australia.

DEP - Department of Environmental Protection

DEP 1996 *System 6 and Part System 1 Update Programme*. Unpublished bushland plot and area records and analysis.

DEP 2002 *Descriptions of flora, vegetation and fauna values of natural areas subject to rezoning under the draft Greater Bunbury Region Scheme.* Unpublished notes prepared for the Department of Environmental Protection.

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Department of Conservation and Land Management – refer to CALM

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EPA - Environmental Protection Authority

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HGM - Halpern Glick Maunsell Pty Ltd

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Keighery BJ, Keighery GJ and Santich S 2002 *A description of natural values of the south Bunbury to Capel coastal corridor*. Unpublished report for the Department of Environmental Protection, Western Australia.

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#Semeniuk ,V&C Research Group 1998 Evaluation of wetlands on the Southern Swan

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WAPC - Western Australian Planning Commission

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WRC - Water and Rivers Commission

Greater Bunbury Region Draft
Regionally Significant Ecological Linkages

Department of Environment
Government of Western Australia

YARLOOP
Yalgorup/Riverdale Road/
Yarloop Ecological Linkage
Yalgorup/Myalup/Leschenault
Coastal Ecological Linkage
MYALUP
Myalup/Kemerton
Ecological Linkage
BINNINGUP
Leschenault/Kemerton
Ecological Linkage
McLarty/Kemerton/Twin Rivers/
Preston River/Gwindinup
Ecological Linkage
MARBALUP
Brunswick River Ecological Linkage
BRUNSWICK JUNCTION
LESCHENAULT
INLET
AUSTRALIND
Leschenault/Eaton
Ecological Linkage
BUREKUP
WATERLOO
EATON
LESCHENAULT
Collie River Ecological Linkage
PICTON JUNCTION
DAVENPORT
Maidens/Preston River
Ecological Linkage
WITHERS
GELORUP
DALYELLUP
Ferguson River Ecological Linkage
DARDANUP
Dalyellup/Gelorup/Crooked Brook
Ecological Linkage
FERGUSON
CROOKED CREEK
McLarty/Kemerton/
Twin Rivers/Preston River/
Gwindinup Ecological Linkage
STRATHAM
BOYANUP
Maidens/Muddy Lake/Ludlow
Coastal Ecological Linkage
Capel/Boyanup Ecological Linkage
PEPPERMINT GROVE BEACH
GWINDINUP
Ludlow/Capel River
Ecological Linkage
CAPEL
Capel River Ecological Linkage
DONNYBROOK
Wonnerup/Ludlow River/
Gibson Forest
Ecological Linkage
LUDLOW
WONNERUP INLET

East-West Ecological Linkage
North-South Ecological Linkage
Riverine Ecological Linkage
Major Rivers
Lands With Some Level of Recognised Protection
Constrained Area
Greater Bunbury Region Scheme Boundary
Proposed ROS Areas
Remnant Vegetation (NLWRA) SW of WA

0 10 20 km

RESERVE 35061 AND LOTS 3, 27, 28, 150, PARIS ROAD, AUSTRALIND

INFORMATION	COMMENT
Background Information	
Area Name	**WASTEWATER TREATMENT PLANT (Reserve 35061) AND ADJACENT BUSHLAND**
Location	Reserve 35061 and Lots 3, 27, 28, 150, Paris Road, Australind
Size (ha)	Approximately 55ha native remnant vegetation
Reason for assessment	Proposed urban lands

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	-
Existing System 6 area	-
Adjacent System 6 Area	Adjacent to C67 Brunswick, Collie and Wellesley Rivers
Submission System 6 Update (6)	No
Others	

Environmental Considerations - Natural Attributes	
Landforms	
Vegetated Bassendean Sands upland and vegetated wetland	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Tauss (1996). Survey undertaken in adjacent bushland in spring 1996, 6 permanent 100m2 study sites were established DEP (2002): foot transects WWTP area March 2002 and edge inspection all Lots March and September 2002 HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; three plots 10X10m (1.1, 1.2, 1.3)
Summary of findings	**Vegetation:** Uplands: Bassendean Sands (Qpb: S8) *Banksia attenuata* Low Woodland; *Eucalyptus marginata/E. calophylla* Open Woodland; *Eucalyptus calophylla, E. marginata* subsp. *marginata, Banksia attenuata* and *Banksia ilicifolia* Open Woodland over *Kunzea glabrescens* Tall Open Scrub; *Kunzea glabrescens* Tall Closed Scrub *Eucalyptus marginata* subsp. *marginata, E. calophylla, Banksia attenuata* and *Banksia ilicifolia* Woodland over *Allocasuarina humilis* and *Xanthorrhoea brunonis* subsp. *brunonis* Shrubland Wetlands: *Kunzea glabrescens* Closed Tall Scrub with emergent *Melaleuca preissiana* and *Eucalyptus calophylla* **Area native remnant vegetation/Vegetation Condition:** 25% Excellent, 25% Very Good, 20% Degraded, 30% Completely Degraded (HGM 2002); Lot 28 70% Very Good to Excellent, 30% Degraded (DEP 2002) Tauss (1996) commented that the bushland within the area of the wastewater treatment plant is in very good condition **Total Flora:** 97 native taxa, 18 weed taxa (estimated >70% expected flora HGM 2002, compare with 117 native taxa after Tauss 1996)

	Significant Flora: *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Jacksonia sparsa* (P4)
Vegetation & Flora Survey Limitations	Sufficient survey to place regionally but no vegetation condition mapping
Regional	
Vegetation Complex	**Bassendean Dunes:** Bassendean Complex – Central and South (27% remaining on SCP, 2% of this in secure tenure) **Pinjarra Plain:** Swan Complex mapped but no vegetation typical of this complex
Vegetation types (Beard/Smith/Hopkins)	Mosaic: Medium Forest; Jarrah/Marri Low Woodland; Banksia Low Woodland (Beard draft)
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** not inferred **Supergroup 3: Uplands centred on Bassendean** *21a Central *Banksia attenuata – Eucalyptus marginata* woodlands *21c Low lying *Banksia attenuata* woodlands or shrublands
National/International Significance	
Fauna	
Area Specific	
Fauna Survey	HGM (2002): opportunistic vertebrate survey undertaken during 6 days in September 2002 Foot transects WWTP area DEP March 2002 and edge inspection of all Lots DEP March 2002 and DEP April 2003
Summary of findings	Birds 25 species (HGM 2002); 16 species (DEP 2002/03); total 33 species. Significant bird species: Australasian Shoveller, Little Eagle (breeding record), Common Bronzewing, Grey Shrike-thrush, Splendid Fairy-wren, White-cheeked Honeyeater and Yellow-rumped Thornbill Amphibians 2 species, reptiles 2 species, native mammals 1 species (HGM 2002)
Fauna Survey Limitations	Limited vertebrate survey HGM, limited opportunistic survey DEP
Regional	
National/International Significance	
Linkage Values	
Bushland linkage to west to river and north. Good condition vegetation of the area is adjacent to bushland to the west. This site represents an eastern extension of Wardandi Reserve that forms a link to Brunswick River (C67)	
Wetlands, Creeklines, Rivers, Estuaries	
Type	palusplain
Management Category	Multiple Use
Suite	**Pinjarra Plain:** Keysbrook (P.1)
Conclusions from survey	Not consistent with database (WRC 2003), dampland area located in Lot 28 and Lot 150, majority of area upland, not as mapped. As naturally vegetated wetland, contiguous with upland areas it is expected that this wetland would be best described as Conservation category
Other Attributes	
-	
Further field survey	
Comprehensive fauna survey required and further flora survey required to record all plant species as HGM 2002 estimated only 70% of flora species were recorded	

Consideration Against Criteria	**Criterion Met**

Representation of Ecological Communities **YES (not to a degree that it would be considered regionally significant on this criterion alone)**	
Regional vegetation representation	
Vegetation Complexes	Characteristic of upland and damp Bassendean Complex – Central and South in the Bunbury area. Within the Constrained Area 20.2% remains, 2.3% currently identified as proposed and existing ROS.
Floristic Community types	2, possibly 3 in area
Uplands and Wetlands	Mostly upland, small area wetland
Habitats	
Size and Shape: naturally vegetated area reasonable size (55ha) but contiguous Wardandi Reserve that forms a link to Brunswick River (C67)	
Vegetation Condition: Similar condition to C71, Very Good	
Relationship/proximity to:	
Naturally vegetated areas	Contiguous to west with Wardandi Reserve that forms a link to Brunswick River (C67), lots to north form discontinuous link to bushland contiguous northern section Brunswick River (C67)
Protected areas	Protected area west (Wardandi Reserve)
Other regionally significant naturally vegetated areas	Contiguous with Wardandi Reserve then to Brunswick River (C67), together form part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River Ecological Linkage
Comment: The majority of the naturally vegetated area of the WWTP and a portion of the northern lots centred on Lot 28 (see Map) is regionally significant due to its: • quality and type; and • location by which it consolidates the Wardandi Reserve to form a significant stepping stone of bushland area in the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River Ecological Linkage	
Diversity **YES**	
Landforms	Together with contiguous natural areas contains a series of landforms from river to upland, dampland
Flora	relatively diverse for type, with 97 native taxa recorded on limited survey
Fauna	Not completely known but likely to be diverse with 33 bird species, 2 amphibian species, 2 reptile species and 1 native mammal species recorded on limited survey
Comment:	
Maintaining Ecological Processes and Natural Systems **YES**	
Relationship/proximity to:	
Regional Ecological Link	Contributes to the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River Ecological Linkage in several ways, being contiguous with Brunswick River (C67) to west and together with bushland to the north forms a series of stepping stones to the Brunswick River (C67) to the north. By consolidating this area to the Wardandi Reserve contributes a significant area of natural vegetation to the Ecological Linkage
Creekline/River/Estuary	Through Wardandi Reserve contiguous with Brunswick River (C67)
Contains areas suitable for ecological restoration	It is recommended that the entire area of the WWTP be included in the area recommended for protection. The degraded part of the WWTP could be restored to reduce the edge to area ratio and increase the size of the area and adjacent lots to greater than 60ha for protection of conservation values Lots 27, 28, 150 should be proposed for protection
Comment: contributes significantly to the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River Ecological Linkage	

Scientific or Evolutionary Importance	**NOT KNOWN**
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: Small area wetland proposed to be retained, contributes diversity units	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The area as depicted on Appendix 9 meets 4 criteria, being: *Representation of Ecological Communities, Diversity, Maintaining Ecological Processes and Natural Systems, General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes that contribute to meeting these criteria are listed below:

- Substantial representative area of upland and wetland natural vegetation of Bassendean Complex – Central and South
- Contains a wetland likely to be included within the Conservation category classification
- Relatively diverse for its type containing a diverse flora (estimated over 120 taxa in area), including four priority taxa being *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Jacksonia sparsa* (P4)
- The remnant vegetation consolidates the Wardandi Reserve to form a significant stepping stone of bushland area in two Ecological Linkages
- It is part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River Ecological Linkage in several ways, being contiguous with Brunswick River (C67) to west and together with bushland to the north forms an important node in the ecological linkage across the river bend in the Brunswick River (C67)

Summary Comment in Relation to the Proposal

The naturally vegetated area of the WWTP Reserve and the adjacent vegetated lots are regionally significant as they are part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River Ecological Linkage.

PART LOT 1 WASHINGTON AVENUE, PART LOTS 3, 4 AND 8 BUSSELL HIGHWAY, LOC 632 PARADE ROAD, AND PART LOTS 302 AND 303, SOUTH BUNBURY, CITY OF BUNBURY

INFORMATION	COMMENT
Background Information	
Area Name	Shearwater Forest – Parade Road Bushland
Location	Part Lot 1 Washington Ave, part lots 3, 4 and 8 Bussell Hwy, Loc 632 Parade Road, and part lots 302 and 303, South Bunbury, City of Bunbury
Size (ha)	62.9ha (ca 36ha native remnant vegetation)
Reason for assessment	Determine regional significance of vegetation

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	No
Groundwater Source Protection Area	-
Existing System 6 area	No
Adjacent System 6 Area	C70 The Maidens
Submission System 6 Update	
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Spearwood Dune System (Sands derived from Tamala Limestone **–** Qts) **Yoongarillup** (Qha alluvium and Qhw swamp deposits mainly peaty sands)	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Bischoff (1999): consolidated vascular plant species list includes reference to work by 11 studies between 1990 - 1999 Alan Tingay and Associates (2000): South Bunbury & Brook Village Structure Plan Review. Environmental Assessment. Report for the Ministry of Housing. Report No. 2000/21 Ecoscape (2001): collation information and some new information for management plan. HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; three plots 10X10m (10.1, 10.2, 10.3) located in the area DEP (2002): Foot traverses, June 2002
Summary of findings	**Vegetation:** Spearwood Dune System (Sands derived from Tamala Limestone – Qts)*Eucalyptus gomphocephala, Corymbia calophylla* and *Eucalyptus marginata* subsp. *marginata* Open Forest over Low Woodland dominated by *Banksia attenuata, Banksia grandis, Agonis flexuosa* var. *flexuosa* and *Xylomelum occidentale* and combinations of these (approximately equivalent to EgAfBa, EgBa, EmBaBg, BgCcBa and CcEm, ATA Environmental 2001b; and "Woodland of *Banksia attenuata*, Marri and Tuart", Ecoscape 2001); *Eucalyptus gomphocephala*, Open Forest over *Agonis flexuosa* var. *flexuosa* Low Open Forest (approximately equivalent to EgAf (ATA Environmental 2001b) and "Woodland to tall open forest of Tuart and Peppermint with

	Jarrah and *Banksia attenuata* on Spearwood dunes" (Ecoscape 2001)) Wetlands: *Melaleuca rhaphiophylla* and *Melaleuca teretifolia* Low Open Forest with emergent *Eucalyptus rudis* subsp. *rudis* (approximately equivalent to Mr (ATA Environmental 2001b) and "Woodland of *Melaleuca rhaphiophylla* on poorly drained areas" (Ecoscape 2001)) and *Melaleuca rhaphiophylla* High Shrubland to Low Forest **Area native remnant vegetation/Vegetation Condition:** Whole area: 50% Very Good, 35% Degraded to Completely Degraded and 15% Cleared.Wetlands Good. Wetlands are highly disturbed, but the remnant wetland vegetation is considered important **Total Flora:** 146 native taxa, 62 weed taxa (HGM 2002, ATA Environmental 2001b) (estimated >80% expected flora). 106 native taxa (Bishoff 1999 for Usher i.e. Loc 632 Parade Road) **Significant Flora:** *Caladenia speciosa* (P4), *Jacksonia sparsa* (P4), *Lasiopetalum membranaceum* (P3) (HGM 2002)
Vegetation & Flora Survey Limitations	Limited survey but adequate for information for the assessment of regional significance of vegetation, however no vegetation condition mapping and only one visit in spring
Regional	
Vegetation Complex	Karrakatta Complex Central and South and Yoongarillup Complex
Vegetation types (Beard/Smith/Hopkins)	-
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *11 Wet forests and woodlands *18 Shrublands on calcareous silts (area within Site boundary degraded, not suitable to be identified as threatened ecological community) **Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes** *25 Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands
National/International Significance	Not known
Fauna	
Area Specific	
Fauna Survey	HGM (2002): Limited survey for birds, reptiles and mammals Reconnaissance survey DEP April 2003 Alan Tingay and Associates (1998): Detailed bird, reptile and mammal survey for Site 1 is equivalent to this area Bow (1999): Systematic trapping programme over a year for reptiles, amphibians and mammals
Summary of findings	Birds total 30 species, native mammals 3 species, reptiles 10 species, frogs 3 species There are a number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance. Eleven species of conservation significance in the area include Scarlet Robin, Splendid Fairy-wren, Weebill, Broad-tailed Thornbill, Painted Button-quail One Schedule 1 species (Western Ringtail Possum)
Fauna Survey Limitations	The fauna surveys were restricted to the lots west of Parade Road so did not include the wetland area to the east
Regional	

National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Linkage Values	
The Shearwater Forest – Parade Road Bushland is part of the Maidens/Preston River Ecological Linkage. Shearwater Forest – Parade Road Bushland is particularly significant in this Ecological Linkage as it contains both tall Tuart forest and Melaleuca wetlands in close proximity	
Wetlands, Creeklines, Rivers, Estuaries	
Type	Dampland
Management Category	Conservation, Resource Enhancement and Multiple Use
Suite	Big Swamp (Qu.6)
Conclusions from survey	Consistent with database (WRC 2003)
Other Attributes	
-	
Further field survey	
Further vegetation surveys at appropriate seasons required to document entire plant species list and other significant plant species, comprehensive faunal survey required for wetland part of area	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES (not to a degree that it would be considered regionally significant on this criterion alone)**
Regional vegetation representation	
Vegetation Complexes	Within the Constrained Area 53.2% Karrakatta Central and South Complex remains, 11.0% currently identified as proposed and existing ROS. 28.5% Yoongarillup Complex remains, 5.9% currently identified as proposed and existing ROS.
Floristic Community types	not known
Uplands and Wetlands	Approximately 2/3^{rds} of the site is upland and 1/3rd wetland
Size and Shape: A large remnant contiguous with adjacent ROS bushland	
Vegetation Condition: Upland area Very Good condition and wetland area Good to Completely Degraded. The upland area is one of the best condition areas of its type south of Bunbury.	
Relationship/proximity to:	
Naturally vegetated areas	to south, west and north
Protected areas	to west System 6 area C70 through ROS, to the south is the Shearwater Forest ROS and to north is Hay Park Bushland and to the east is College Grove Bushland
Other regionally significant naturally vegetated areas	C70, Shearwater Forest, Hay Park Bushland and College Grove area regionally significant.
Contains areas suitable for ecological restoration	Yes those areas highlighted in HGM 2002 as degraded would provide a valuable buffer to the wetland vegetation and could be restored to a similar condition to the remainder of the wetland area
Comment: Part of one of the best representations of Tuart Forrest of Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (FCT 25)	
Diversity	**YES**
Landforms	2
Vegetation Complexes	2
Floristic Community Types	not known
Vegetation units	not known
Flora	at least 160 native taxa
Fauna	high bird diversity with at least 30 species of birds in upland part of site
Comment:	
Rarity	**YES**
Vegetation Complex <10% remaining	

Threatened Ecological Communities	not known
Flora	Two Priority 4 species and one Priority 3 species
Fauna	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Comment:	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	The Shearwater Forest – Parade Road Bushland is part of the Maidens/Preston River Ecological Linkage
Creekline/River/Estuary	-
Contains areas suitable for ecological restoration	yes see above
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: Contains areas of Conservation category wetland which are located in a large area of wetland. The large wetland contains areas of threatened ecological community (in the hay park Bushland, north of Washington Ave.). The wetland area in the site is significant in connecting the site to the portion of the larger wetland north of Washington Ave.	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The area meets 4 criteria, being: *Representation of Ecological Communities, Diversity, Rarity, Maintaining Ecological Processes and Natural Systems.* The natural attributes that contribute to meeting these criteria are listed below:

- Substantial representative area of bushland of Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation (Location 632 and Lots 302&303);
- area of native vegetation of Yoongarillup Complex Vegetation (Lots 1&8) and wetland (lots 1,8,4&3) which is significant as part of the Maidens/Preston River Ecological Linkage and in providing wetland fauna habitat;
- Representative of the southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (floristic community type 25) which is a significant representation of this FCT in the Maidens/Preston River Ecological Linkage;
- Contains vegetation in Very Good condition with significant tall habitat trees (Tuart);
- Includes fauna listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments;
- Area of native vegetation (>20ha) is of compact shape and is contiguous with other natural areas to west, south, north and east;
- The Maidens/Preston River Ecological Linkage is the only known sequence of this type on the Plain; and
- This area is critical in the Maidens/Preston River Ecological Linkage containing significant areas of its type

Summary Comment in relation to the proposal

It is recommended that the areas as identified in Appendix 9 be protected. This includes the two areas identified as degraded (HGM 2002) which should be rehabilitated to provide additional wetland area and some buffer. This also includes a contiguous area to the north-east which will broaden the linkage across Washington Ave to Hay Park Bushland to the north

DALYELLUP BEACH ESTATE TOURIST PRECINCT

INFORMATION	COMMENT
Background Information	
Area Name	Dalyellup Beach Estate
Location	Lot 1
Size (ha)	ca 10ha (ha native remnant vegetation)
Reason for assessment	Proposed rezoning determine regional significance

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	None
Groundwater Source Protection Area	
Existing System 6 area	No
Adjacent System 6 Area	No
Submission System 6 Update	
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Quindalup Dunes (Qhs and Qhsm)	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Alan Tingay and Associates (1991 and 1998): Vegetation mapped for the Usher-Stratham Environmental Study Edge Inspection DEP April 2003
Summary of findings	**Vegetation:** Uplands: **Quindalup Dunes** (Qhs and Qhsm) *Eucalyptus gomphocephala* and *Agonis flexuosa* Forest; *Acacia cochlearis* and *Jacksonia furcellata* Heath; *Scaevola crassifolia, Diplolaena dampieri* and *Hemiandra pungens* Heath and *Agonis flexuosa* Scrub **Area native remnant vegetation/Vegetation Condition:** Predominantly Very Good. Identified as in Natural Condition (trees and understorey largely intact) Alan Tingay and Associates (1991). **Total Flora:** not known **Significant Flora:** not known
Vegetation & Flora Survey Limitations	Vegetation mapped and site visits for vegetation condition over a broader area. No floristic survey
Regional	
Vegetation Complex	Quindalup complex and a very small area of Vasse Complex
Vegetation types (Beard/Smith/Hopkins)	-
Floristic Community Types (FCT) *type inferred	Not known
National/International Significance	Not known
Fauna	
Area Specific	

Fauna Survey	Alan Tingay and Associates (1998): Site No's. 4 and 5 are equivalent to this area Reconnaissance survey DEP April 2003
Summary of findings	Birds 26 species (Alan Tingay and Associates 1998) 16 species (DEP 2003), total 29 species. Native mammals 3 species, reptiles 7 species, frogs 2 species (Alan Tingay and Associates 1998) The area has a rich and diverse bird assemblage. This distinctiveness is further emphasised by the number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury, and the number of species that are of regional conservation significance. Species of conservation significance in the area include Splendid Fairy-wren, White-browed Scrubwren, Weebill, Broad-tailed Thornbill, Golden Whistler, Painted Button-quail. Significant reptile species Bardick (*Echiopsis curta*) found on coastal dune site One Schedule 1 species (Western Ringtail Possum), one Priority 4 species (Quenda) recorded
Fauna Survey Limitations	All surveys are Autumn only. Surveys at other times would add additional species
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Linkage Values	
Contiguous with bushland to south and west Part of the Maidens/Muddy Lake/Ludlow Coastal Ecological Linkage and part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage	
Wetlands, Creeklines, Rivers, Estuaries	
Type	-
Management Category	-
Suite	Big Swamp (Qu.6) and Minninup (Qu.7)
Conclusions from survey	Consistent with database (WRC 2003)
Other Attributes	
Immediately south of Dalyellup Road the vegetation quality is very high and there are outstanding examples of the major coastal vegetation associations including Tuart/Peppermint forests in the eastern components of the dunes, Alan Tingay and Associates (1991)	
Further field survey	
Surveys at other times would add additional species. A comprehensive list of native flora and floristic community types is required	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Quindalup complex and a small area of Vasse Complex
Floristic Community types	Not known
Uplands and Wetlands	
Size and Shape Consolidates the compact size and shape of the adjacent ROS, South Dalyellup bushland and the Dalyellup Road to the north provides a hard edge to facilitate management.	
Vegetation Condition Vegetation quality is very high	
Relationship/proximity to:	

Naturally vegetated areas Protected areas Other regionally significant naturally vegetated areas	Contiguous with bushland to south and west Proposed ROS	
Contains areas suitable for ecological restoration		
Comment:		
Diversity		**YES**
Landforms	Vegetated Quindalup Dune	
Vegetation Complexes	2	
Floristic Community Types	Not known	
Vegetation units	4	
Flora	Not known	
Fauna	Has a good assemblage of Tuart woodland birds	
Comment:		
Rarity		**YES**
Vegetation Complex <10% remaining		
Threatened Ecological Communities	Not known	
Flora	None identified	
Fauna	One Schedule 1 species (Western Ringtail Possum), one Priority 4 species (Quenda) recorded	
Comment:		
Maintaining Ecological Processes and Natural Systems		**NO**
Relationship/proximity to: Regional Ecological Link Creekline/River/Estuary	 NA	
Contains areas suitable for ecological restoration		
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities		
Comment:		
Scientific or Evolutionary Importance		**NO**
Comment:		
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation		**NO**
Comment:		

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The site meets three criteria, being: *Representation of Ecological Communities*, *Diversity* and *Rarity*. The natural attributes of the site that contribute to meeting the criteria are listed below. Some of these natural attributes are shared with the Dalyellup/Minninup Swamp Natural Area

- Contains an area of vegetated Quindalup Dunes which is which is part of the largest most southern area of vegetated parabolic Quindalup Dunes remaining on the Swan Coastal Plain
- Representative area of natural vegetation in Excellent to Good condition of the Quindalup Complex.
- High number of other significant vertebrate species:
    - The area has a rich and diverse bird assemblage. This distinctiveness is further emphasised by the number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury, and the number of species that are of regional conservation significance. Species of conservation significance in the area include Splendid Fairy-wren, White-browed Scrubwren, Weebill, Broad-tailed Thornbill, Golden Whistler, Painted Button-quail.
    - Significant reptile species Bardick (*Echiopsis curta*) found on coastal dune site
- One Schedule 1 species (Western Ringtail Possum), one Priority 4 species (Quenda) recorded
- Part of two ecological linkages: Dalyellup/Gelorup/Crooked Brook and Maidens/Muddy Lakes/Ludlow Ecological Linkages

Summary Comment in relation to the proposal

Reserving the area south of Dalyellup Road will consolidate the ROS and enable better management with a hard edge. The eastern portion of the area is a high ridge and is a significant visible area for migrating birds from ROS areas to the south and south-east. It also has significant old habitat trees which provide nesting sites for bird species that feed in adjacent areas.

LOTS 313-317 SOUTH OF HAREWOODS ROAD, SOUTH DALYELLUP

INFORMATION	COMMENT
Background Information	
Area Name	South Dalyellup
Location	Wellington Location 41, Lots 313-317
Size (ha)	116.4 (75.1 remnant native vegetation) (HGM 2002)
Reason for assessment - area being assessed	Naturally vegetated proposed urban land between two conservation areas, identified in regional ecological linkage

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	NA
Groundwater Source Protection Area	
Existing System 6 area	
Adjacent System 6 Area	Adjacent to C71
Submission System 6 Update (6)	No
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Spearwood Dune System Sands derived from Tamala Limestone (Qts: S7) Vegetated Spearwood Dune	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Alan Tingay and Associates (1991): Vegetation map prepared from 1:10000 aerial photography and ground survey of different vegetation types during June 1991. No details on how the ground survey was undertaken DEP (2002): edge inspection March and September 2002 HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; two plots 10X10m (2.1, 2.2) located in the area Vegetation mapping for the area is known from Alan Tingay and Associates (1991) and HGM (2002)
Summary of findings	**Vegetation:** Spearwood Dune System Upland: Tuart (*Eucalyptus gomphocephala*) and Peppermint (*Agonis flexuosa* var. *flexuosa*) Open Forest to Woodland with associated scattered to Open woodland of Jarrah (*E. marginata*) and Candlestick Banksia (*Banksia attenuata*) sub-dominant Wetland: (dampland): *Melaleuca rhaphiophylla* Open Woodland over pasture **Area native remnant vegetation/Vegetation Condition:** <40% Very Good, >60% Completely Degraded, with areas of severe localised disturbance (HGM 2002) **Total Flora:** 44 native taxa, 24 weed taxa (estimated >70% expected flora, HGM 2002) **Significant Flora**: none recorded
Vegetation & Flora Survey Limitations	Limited survey to this date. Future survey limited as much of the native vegetation in the area has been removed
Regional	

Vegetation Complex	**Spearwood Dunes** Karrakatta Complex – Central and South
Vegetation types (Beard/Smith/Hopkins)	-
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *11 Wet forests and woodlands **Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes** *25 Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands
National/International Significance	None recorded
Fauna	
Area Specific	
Fauna Survey	DEP (2002): reconnaissance visit 1-3 October 2002 HGM (2002): opportunistic bird survey undertaken during 6 days in September 2002
Summary of findings	18 bird, 1 reptile, 1 mammal species. Schedule 1 species Baudin's Cockatoo. Conservation significant species listed as coastal plain declining species in *Bush Forever* (Government of WA 2000) include Splendid Fairy-wren, Yellow-rumped Thornbill, Scarlet Robin Tuart and Peppermint Open Forest to Woodland with associated scattered to Open woodland of Jarrah provides significant breeding habitat for bird species utilizing tall trees or hollows and species of wetland birds that feed in adjacent wetlands. Likely to have significant habitat value for arboreal mammals including bats
Fauna Survey Limitations	Surveys are opportunistic in spring only. Intensive surveys would add additional species. Many of the vertebrate species recorded in nearby Tuart woodlands by Alan Tingay and Associates (1998) are likely to occur here
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Baudin's Cockatoo
Linkage Values	
Adjacent bushland to the north (subdivision approval), west and east. Contiguous with bushland to west and east: • to west is the northern portion of the Dalyellup/Minninup Swamp Natural Area which is the proposed Dalyellup ROS and • to east is ROS in the System 6 area C71 (Dalyellup Reserves). Only undeveloped part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage between Dalyellup/Minninup Swamp Natural Area to the west and Tuart/Marri/Banksia woodlands to the east in C71	
Wetlands, Creeklines, Rivers, Estuaries	
Type	dampland
Management Category	Multiple Use
Suite	**Quindalup Dunes** Big Swamp (Qu.?4)
Conclusions from survey	Consistent with database (WRC 2003)
Other Attributes	
Provides bushland corridor between the coast and the Dalyellup Reserves (C71) (Peter Hanley, pers. comm. in HGM 2002)	
Further field survey	
Limited survey to this date. Future survey limited as much of the native vegetation in the area has been removed	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Karrakatta Complex Central and South (30% remaining on the SCP, 9% of this in secure tenure)
Floristic Community types	Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (FCT 25) which is the only substantial representation of this FCT in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage (small area in C71)
Size and Shape A large area of native vegetation (57ha, >20ha) of compact shape, contiguous with other natural areas to east and west	
Vegetation Condition <40% Very Good, >60% Completely Degraded, with areas of severe localised disturbance	
Relationship/proximity to:	
Other regionally significant natural areas	Contiguous area of regionally significant bushland to west and east
Protected areas	To west is the northern extent area of the proposed Dalyellup ROS portion of the Dalyellup/Minninup Swamp Natural Area; adjacent bushland to east is ROS in the System 6 area C71 (Dalyellup Reserves).
Naturally vegetated areas	Adjacent naturally vegetated areas to the north (subdivision approval), west and east
Contains areas suitable for ecological restoration	Recent activity (removal of native vegetation for geological survey and other purposes) have altered natural vegetation in the area. Past aerial photography (1990) and Alan Tingay and Associates (1991) indicate that the area was equivalent to the vegetation north of Harewoods Road. The recent nature of the alteration in vegetation and the condition recorded by HGM (2002) indicate that if grazing and further vegetation removal ceased there would be regeneration of significant numbers of native species. The area retains a Woodland to Open woodland dominated by Tuart and Peppermint with elements of Jarrah and Banksia.
Comment: The Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation Complex. Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (FCT 25) which is the only representation of this FCT in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage: Large area of native vegetation (57ha) of compact shape is contiguous with other natural areas to east and west	
Diversity	**NOT KNOWN**
Landforms	vegetated Spearwood Dune
Vegetation Complexes	1
Floristic Community Types	2
Vegetation units	
Flora	
Fauna	Likely to have good assemblage of Tuart woodland birds
Comment: In sufficient data on fauna.	
Rarity	**NO**
Vegetation Complex <10% remaining	No further clearing
Threatened Ecological Communities	None identified
Flora	None identified
Fauna	Schedule 1 species Baudin's Cockatoo. Conservation significant species, listed as coastal plain declining species in *Bush Forever* (Government of WA 2000), include Splendid Fairy-wren, Yellow-

	rumped Thornbill, Scarlet Robin
Comment:	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regionally significant link	Only undeveloped part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage between Minninup Swamp to the west and Tuart, Marri and Banksia woodlands to the east in C71. Part of the Maidens/Muddy Lake/Ludlow Coastal Ecological Linkage
Creekline/River/Estuary	NA
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment: This area is critical in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage as it contains the only area of its type (FCT 25) in the linkage	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine fringing Vegetation and Coastal vegetation	**NO**
Comment: Wetland of a type and quality that does not meet the criterion for regional significance	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The South Dalyellup area is considered to be a regionally significant natural area meeting two criteria, being: *Representation of Ecological Communities* and *Maintaining Ecological Processes and Natural Systems*. The natural attributes that contribute to meeting these criteria are listed below:

- Substantial representative area of natural vegetation of Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation Complex (57ha mapped as native vegetation)
- Representative of the southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (floristic community type 25) which is the only substantive area of this floristic community type in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage
- Contained a core area of vegetation in Very Good condition until recent activity removed many of the low trees and understorey as well as some tall habitat trees
- Large area of native vegetation of compact shape contiguous with very significant natural areas to east and west and is part of the Maidens/Muddy Lake/Ludlow Coastal Ecological Linkage. To west is the northern extent area of the Dalyellup/Minninup Swamp Natural Area identified as the Dalyellup ROS portion in the GBRS, and to the east is ROS in the System 6 area C71 (Dalyellup Reserves)
- This area is critical in the Dalyellup/Gelorup/Crooked Brook Ecological Linkage containing the only area of its type in the linkage not already developed for housing or with subdivision approval. Decreasing the extent of the linkage would reduce the habitat function
- Contains Tuart and Peppermint Open Forest to Woodland which is significant breeding habitat for bird species utilizing tall trees or hollows and species of wetland birds that feed in adjacent wetlands and significant habitat for animals moving between the different habitats of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage

Summary Comment in Relation to the Proposal

As a consequence of the regional significance of the natural areas of the area it is proposed that a suitable area of South Dalyellup, Lots 315, 316 and 317, be identified for retention and protection for its natural values. This area has the following specific attributes.

- Contains the area of Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation Complex in best condition, predominantly Very Good (HGM 2002)
- Provides adequate linkage opportunity between proposed Dalyellup ROS portion of the Dalyellup/Minninup Swamp Natural Area and adjacent bushland to east is ROS in the System 6 area C71 (Dalyellup Reserves)
- Provides an adequate area of Tuart and Peppermint Open Forest to Woodland which is significant breeding habitat for bird species utilizing tall trees or hollows and species of wetland birds that feed in adjacent wetlands

The identification of this area is consistent with the recommendations in HGM (2002)

RESERVE 31012 HAREWOODS ROAD, DALYELLUP

INFORMATION	COMMENT
Background Information	
Area Name	Harewoods Rd, Dalyellup
Location	Reserve 31012 Rubbish Depot (from Usher, Gelorup & Dalyellup DSP), Dalyellup, Shire of Capel
Size (ha)	
Reason for assessment	To determine regional significance

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	-
Existing System 6 area	-
Adjacent System 6 Area	Adjacent (west) to C71 Reserves near Dalyellup
Submission System 6 Update (6)	No
Others	

Environmental Considerations - Natural Attributes	
Landforms	
Spearwood Dune System Sands derived from Tamala Limestone (Qts: S7) Vegetated Spearwood Dune	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	DEP (2002): transects of the native vegetation in the reserve Gibson *et al.* (1994): Four floristic plots were located in C71 two plots in bushland immediately adjacent to the east.
Summary of findings	**Vegetation:** Sands derived from Tamala Limestone (Qts: S7) *Eucalyptus calophylla* Woodland over *Agonis flexuosa*, *Banksia attenuata* and *B. ilicifolia* scattered to Low Woodland with scattered and patches of *Melaleuca preissiana.* Northwest corner dominated by *Eucalyptus rudis* Woodland over scattered *Banksia littoralis* (this unit of vegetation extends adjacent area of the Dalyellup Estate, contiguous area appears to be sumpland). **Area native remnant vegetation/Vegetation Condition:** Approximately 50% reserve is naturally vegetated being in Very Good condition, with severe localised disturbance associated with the building in the NW corner. Remainder of reserve has been cleared, excavated and filled. **Total Flora:** Within C71 124 native taxa, 16 weed taxa (from 4 plots located for Gibson *et al*. (1994) estimated >70% expected flora) **Significant Flora:** none observed Note: large canopy trees in reserve, uncommon in C71 due to selective deaths 15 - 20 years previously, *Eucalyptus rudis* not recorded in C71
Vegetation & Flora Survey Limitations	Limited survey of C71 and subject land. Survey aimed to establish condition and vegetation type, sufficient information to establish the naturally vegetated area is of a quality and type to be a good example of its type.

Regional	
Vegetation Complex	Karrakatta Complex Central and South
Vegetation types (Beard/Smith/Hopkins)	medium woodland; tuart
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *11 Wet forests and woodlands **Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes** *21a Central *Banksia attenuata - E. marginata* woodlands
National/International Significance	Not assessed
Fauna	
Area Specific	
Fauna Survey	Brief day transect survey and spotlighting DEP April 2003
Summary of findings	20 species of vertebrate fauna: 2 native mammals, 16 birds (7 significant species), 2 reptiles. There are a number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance. Seven species of conservation significance in the area include Yellow Robin, Scarlet Robin, Weebill, Broad-tailed Thornbill. One Schedule 1 species (Western Ringtail Possum) Note: Tree species including *Banksia littoralis, Melaleuca preissiana, Eucalyptus gomphocephala* and *E.calopylla* together with the understorey provide significant fauna habitat
Fauna Survey Limitations	Reconnaissance only. More comprehensive surveys would add additional species
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Linkage Values	
Contiguous (over the drain) with C71 bushland, small naturally vegetated area to west. C71 contiguous with Dalyellup/Minninup Swamp Natural Area through South Dalyellup area; being contiguous with C71 is part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage.	
Wetlands, Creeklines, Rivers, Estuaries	
Type	Reserve is low lying falling towards a sumpland to the west, dampland areas in NE area of C71, Reserve can be considered transitional, patches of dampland
Management Category	inferred Conservation for wetland areas
Suite	Big Swamp
Conclusions from survey	Not consistent with database (WRC 2003) none of the wetlands are mapped
Other Attributes	
Part of best quality vegetation in or adjacent to C71, this 'section' of C71 was considered as the best condition area being of 'natural condition' (Alan Tingay and Associates 1991)	
Further field survey	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Characteristic of damp Spearwood Dune flat vegetation of the Bunbury area Karrakatta Complex Central and South, an uncommon vegetation

	unit. Within the Constrained Area 53.2% Karrakatta Central and South Complex remains, 11.0% currently identified as proposed and existing ROS.
Floristic Community types	Intergrade between wetland and upland types
Uplands and Wetlands	see above
Size and Shape: naturally vegetated area of small size (<20ha) but contiguous with C71, consolidates northern section of the long narrow C71.	
Vegetation Condition: Similar condition to C71, Very Good	
Relationship/proximity to:	
Naturally vegetated areas	Contiguous (over the drain) with C71 bushland, small naturally vegetated area to west
Protected areas	Protected area C71 to east, there appears to be a protected area to west (wetland area) and as a reserve the site has some existing protection.
Other regionally significant naturally vegetated areas	Contiguous (over the drain) with C71 bushland and small naturally vegetated area to west. C71 contiguous with Dalyellup/Minninup Swamp Natural Area through South Dalyellup area; being contiguous with C71 is part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage.
Comment: The naturally vegetated area of the Reserve is of a quality and type that makes it a significant contribution to the C71 conservation area and to the broader Dalyellup/Gelorup/Crooked Brook Ecological Linkage.	
Diversity	**NOT KNOWN**
Landforms	
Vegetation Complexes	
Floristic Community Types	
Vegetation units	
Flora	
Fauna	
Comment:	
Rarity	**YES**
Vegetation Complex <10% remaining	
Threatened Ecological Communities	
Flora	
Fauna	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Comment:	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Part of the Dalyellup/Gelorup/Crooked Brook Ecological Linkage between Minninup Swamp to the west and Tuart, Marri and Banksia woodlands to the east in C71
Creekline/River/Estuary	
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**

Comment: The naturally vegetated area of the Reserve has wetland characteristics and is of a quality and type that designates the wetland areas as Conservation. Few wetland areas in C71 (one small area to east of this land, not mapped)

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The area meets 4 criteria, being: *Representation of Ecological Communities, Rarity, Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes of Reserve 31012 that contribute to meeting these criteria are listed below:

- Characteristic of damp Spearwood Dune flat vegetation of the Bunbury area Karrakatta Complex Central and South. Within the constrained area but this vegetation unit is uncommon;
- Contains populations of at least one species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Western Ringtail Possum);
- The naturally vegetated area of the Reserve is of a quality and type that makes it a significant contribution to the C71 conservation area and to the broader Dalyellup/Gelorup/Crooked Brook Ecological Linkage; and
- The naturally vegetated area of the Reserve has wetland characteristics and is of a quality and type that designates the wetland areas as Conservation category.

Summary Comment in relation to the proposal

The naturally vegetated area of the Reserve is of a quality and type that it makes a significant contribution to the C71 conservation area and to the broader Dalyellup/Gelorup/Crooked Brook Ecological Linkage.

Note: The area of bushland in C71 and immediately adjacent (eastern road reserve) has been systematically reduced, this addition compensates to some extent for these losses

- location for one rare species of fauna - Western Ringtail Possum. This species is recognised by the State and is subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*
- this ‘section’ of C71 was considered by Tingay (1991) as the best condition area being ‘natural condition’
- this area contains the only wetland area in C71, see Tingay (1991)-unit H and this report

Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1, 4, 66 and Part Lot 138 Timperley Road, Boyanup

INFORMATION	COMMENT
Background Information	
Area Name	Boyanup (east) urban deferred zone
Location	Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1, 4, 66 and Part Lot 138 Timperley Road, Boyanup
Size (ha)	total 233.9 ha (35.5 remnant native vegetation) (HGM 2002)
Reason for assessment	Determine regional significance of vegetation

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	No
Groundwater Source Protection Area	-
Existing System 6 area	No
Adjacent System 6 Area	No
Submission System 6 Update	
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Whicher Scarp Cartis (Cs) **Swan Coastal Plain – Fluviatile Deposits** Guildford Formation (Qpry)	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Hart, Simpson and Associates Pty Ltd (2001): adjacent area, Joshua Brook Subdivision Rare Flora. Report prepared for Iluka Resources. Survey undertaken 29/11/01, flora and vegetation examined during extensive foot traverses, vegetation type and flora recorded. Identified in accordance to Gibson *et al.* (1994). Vegetation condition scale after Keighery (1994). DEP (2002): edge inspection HGM (2002): Survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; four plots 10X10m (3. 1- 4) located in the area
Summary of findings	**Vegetation** Four remnants of bushland in the area. Upland: Remnant 1 (Part Lot 201. Kingia Vegetation Complex) *Eucalyptus marginata* subsp. *marginata* and *E. haematoxylon* Woodland over *Xanthorrhoea preissii* Open Shrubland Remnant 2 (Lots 1, 4, 66, 139 and Part Lots 97 and 138. Cartis Vegetation Complex): *Banksia attenuata, Eucalyptus marginata* subsp. *marginata* and *Xylomelum occidentale* Low Open Woodland over *Melaleuca thymoides, Kunzea glabrescens, Hypocalymma robustum* and *Adenanthos meisneri* Shrubland; *Eucalyptus marginata* subsp. *marginata* and *E. calophylla* Woodland over *Banksia grandis* Low Open

	Woodland Remnant 3 (Part Lot 4402. Guildford Vegetation Complex): *Eucalyptus marginata- E. calophylla* Woodland over *Banksia grandis* Low Woodland; *Banksia attenuata* Low Woodland with scattered *Eucalyptus marginata* (HGM 2002) *Eucalyptus marginata- E. calophylla* Woodland over *Banksia grandis* Low Woodland; *Banksia attenuata* Low Woodland with scattered *Eucalyptus marginata* (Hart 2001) Wetland: Remnant 4 (Part Location 4402. Swan Vegetation Complex): *Eucalyptus calophylla* Open Forest over *Agonis flexuosa* var. *flexuosa* Low Open Forest (HGM 2002*); Eucalyptus rudis* Open Woodland with scattered *Agonis flexuosa* (Hart 2001) **Area native remnant vegetation/Vegetation Condition:**: > 60% Very Good to Excellent, < 40% Degraded to Good (Hart 2001); 15% Good, 65% Completely Degraded, 20% rehabilitated (HGM 2002) **Total Flora:** 123 native taxa, 35 weed taxa (HGM 2002, estimated >70% expected flora) **Significant Flora:** *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Drosera marchantii* subsp. *marchantii* (P4), *Jacksonia sparsa* (P4); *Acacia pulchella* var. *goadbyi*, *A. urophylla*, *Johnsonia lupulina*, *Styphelia tenuiflora*, *Kennedia coccinea*, *Adiantum aethiopicum* only location of *Eucalyptus haematoxylon* within the present study areas.
Vegetation & Flora Survey Limitations	Limited survey but adequate for information for the assessment of regional significance of vegetation, however no vegetation condition mapping and only one visit in spring.
Regional	
Vegetation Complex	**Blackwood Plateau:** Kingia Complex **Whicher Scarp:** Cartis Complex **Pinjarra Plain:** Swan Complex, Guildford Complex
Vegetation types (Beard/Smith/Hopkins)	-
Floristic Community Types (FCT) *type inferred	**Supergroup1: Foothills/Pinjarra Plain** *1a *Eucalyptus haematoxylon – E. marginata* woodlands on Whicher foothills **Supergroup 2: Seasonal Wetlands** Type not inferred **Supergroup 3: Uplands centred on Bassendean Dunes** *21b Southern *Banksia attenuata* woodlands
National/International Significance	
Fauna	
Area Specific	
Fauna Survey	HGM (2002): opportunistic bird survey undertaken during 6 days in September 2002 Reconnaissance and edge inspection of part of the lots DEP March 2002, April 2003
Summary of findings	28 bird species. There are a number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance. Eight species of conservation significance in the area include Western Yellow Robin, Broad-tailed Thornbill, Western Thornbill, Yellow-rumped Thornbill, and Splendid Fairy Wren. Two Schedule 1 species (Baudin's Cockatoo, Western Ringtail Possum)

Fauna Survey Limitations	More comprehensive surveys would add additional species
Regional	
National/International Significance	Contains populations of at least two species listed under the EPBC Act 1999, Western Ringtail Possum and Baudin's Cockatoo
Linkage Values	
Contiguous with Joshua Creek bushland through to the Preston River to the south. Part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and part of the Capel/Boyanup Ecological Linkage Remnant 2 linkage to bushland south to Joshua Brook, then west (to Preston River) and east (to Plateau, discontinuous between Brook and native vegetation) along Joshua Brook	
Wetlands, Creeklines, Rivers, Estuaries	
Type	Creek (Remnant 4)
Management Category	Not applicable
Suite	Not applicable
Conclusions from survey	Database (WRC 2003) not applicable
Other Attributes	
-	
Further field survey	
Comprehensive fauna and flora survey required	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Guildford Complex; Cartis Complex
Floristic Community Types	2 (FCT's not established for creeklines)
Uplands and Wetlands	yes
Habitats	
Size and Shape: Remnant 1 is small and Remnants 3 and 4, while contiguous with each other through a regionally significant naturally vegetated area are also relatively small and of elongate shape. Remnant 2 is the largest and by itself the most suitable area for protection.	
Vegetation Condition: All Remnants in the study area are either small or edges of a large bushland area and have a level of disturbance related to this and are generally described as being in good condition.	
Relationship/proximity to:	
Naturally vegetated areas	Remnants 2, 3 and 4 are contiguous with bushland however this bushland is urban zoned
Protected areas	see above
Other regionally significant naturally vegetated areas	The urban zoned land contiguous with Remnants 2, 3 and 4 is regionally significant
Contains areas suitable for ecological restoration	Remnant 2 contains areas in need of restoration
Comment: All of native vegetation in the study area is significant, some remnants are small (Remnant 1) and Remnants 2, 3 and 4, while contiguous with each other through a regionally significant naturally vegetated area this area is urban zoned. Vegetated creeklines of this quality with contiguous upland area rare on the Swan Coastal Plain/Foothills/Plateau interface.	
Diversity	partial **YES**
Landforms	creekline, foothills, plateau and
Vegetation Complexes	4 in close proximity
Floristic Community Types	2 (fct's not established for creeklines)
Vegetation units	4
Flora	Diversity of significant flora: *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Drosera marchantii* subsp. *marchantii* (P4), *Jacksonia sparsa* (P3); *Acacia pulchella* var. *goadbyi*,

	A. urophylla, *Johnsonia lupulina*, *Styphelia tenuiflora*, *Kennedia coccinea*, *Adiantum aethiopicum* only location of *Eucalyptus haematoxylon* within the present study sites.
Habitats	
Fauna	
Comment:	
Rarity	**YES**
Vegetation Complex <10% remaining	Vegetated creeklines of this quality with contiguous upland areas rare on the Swan Coastal Plain/Plateau interface.
Threatened Ecological Communities	
Flora	large number of significant flora
Habitats	
Fauna	Contains populations of at least two species listed under the EPBC Act 1999, Western Ringtail Possum and Baudin's Cockatoo
Comment: The location of the bushland on the Plain/Foothills/ Plateau interface with a vegetated creekline at its core, large number of significant flora and rare fauna	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Joshua Brook forms one of the two linkage opportunities to the Plateau and is part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and part of the Capel/Boyanup Ecological Linkage
Creekline/River/Estuary	Joshua Brook flows into the Preston River, contributing to a Ecological Linkage between Creekline/River/Estuary
Contains areas suitable for ecological restoration	yes
Size and Shape, *Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**NO**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: Creekline conservation category on vegetation type and condition	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The Boyanup (east) bushland remnants are considered to be regionally significant natural areas meeting four criteria, being: *Representation of Ecological Communities*, *Rarity*, *Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*; and partially meets *Diversity*. The natural attributes that contribute to meeting these criteria are listed below.

- Contains areas of vegetation representative of Kingia, Swan, Guildford and Cartis Complexes
- All of native vegetation in the study area is significant, some remnants are small (Remnant 1) and Remnants 2, 3 and 4, are contiguous with each other through a regionally significant naturally vegetated area. Vegetated creeklines of this quality with contiguous upland area rare on the Swan Coastal Plain/Foothills/Plateau interface.
- Diversity of significant flora: *Acacia flagelliformis* (P4), *Acacia semitrullata* (P3), *Caladenia speciosa* (P4), *Drosera marchantii* subsp. *marchantii* (P4), *Jacksonia sparsa* (P3); *Acacia pulchella* var. *goadbyi*, *A. urophylla*, *Johnsonia lupulina*, *Styphelia tenuiflora*, *Kennedia coccinea*, *Adiantum aethiopicum.* Only location of *Eucalyptus haematoxylon* within the present study sites
- This area is significant in the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and Capel/Boyanup Ecological Linkage containing the only area of its type known to occur in the linkage not already developed for housing or with subdivision approval.
- Contains significant habitat for bird species which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance.
- Significant linkage value for species moving between the different habitats of the Capel/Boyanup Ecological Linkage and the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage.

Summary Comment in relation to the proposal

The Boyanup (east) bushland remnants are considered to be regionally significant natural areas and suitable for retention. HGM (2002) recommended that Remnants 2 and 4 be retained but report Remnants 1 and 3 could be developed. While Remanants 1 and 3 are small all such remnants are of value and both are contiguous with other bushland areas. The significance of Remanants 2, 3 and 4 would be much greater if the bushland area to the south/east of these remnants could be protected, particularly the vegetated creekline.

LOT 35 SPURR STREET, CAPEL

INFORMATION	COMMENT
Background Information	
Area Name	Spurr Street Bushland, Capel (west, urban deferred)
Location	Lot 35 (includes vegetated road reserve to south east)
Size (ha)	ca 4ha native remnant vegetation
Reason for assessment	To determine natural values of site

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	No
Groundwater Source Protection Area	-
Existing System 6 area	No
Adjacent System 6 Area	No
Submission System 6 Update	
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Bassendean Dunes/Pinjarra Plain Bassendean Sands over Guildford Formation (Qpb/Qpa: S10) **Pinjarra Plain** Guildford Formation (Qpa: Msg4 and M) Vegetated Bassendean Dunes and Pinjarra Plain upland and sumpland	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	DEP (2002): edge inspection September 2002
Summary of findings	**Vegetation:** Vegetation units are not distinguished on the landform/soil units. Uplands: *Banksia attenuata* and *B. ilicifolia* Low Open Forest over *Melaleuca thymoides* Shrubland; *Agonis flexuosa* Woodland over *Kunzea glabrescens* Tall shrubland over *Phlebocarya ciliata* Herbland; *Agonis flexuosa* Woodland over *Kunzea glabrescens* and *Melaleuca thymoides* Closed Heath. Wetlands: Scattered emergent *Melaleuca preissiana* and *Agonis flexuosa* over *Kunzea glabrescens* Tall Shrubland and *Aotus gracillima* Closed Heath; *Eucalyptus calophylla* and *Melaleuca preissiana* Woodland to Open Forest over *Hypocalymma angustifolium* and *H. ericifolium* Open Low Heath with patches of Sedgeland **Area native remnant vegetation/Vegetation Condition:** Very Good to excellent with small patches of severe localised disturbance **Total Flora:** expected flora approx. 150 taxa, similar to Capel Nature Reserve (Keighery *et al.* 1996) **Significant Flora:** *Jacksonia sparsa* (P3); *Hypocalymma ericifolium*, *Astartea* sp "Brixton"
Vegetation & Flora Survey Limitations	Adequate for information for the assessment of regional significance of vegetation, however only one inspection from the edge in spring with no plots, vegetation mapping or vegetation condition mapping.
Regional	

Vegetation Complex	Southern River Vegetation Complex
Vegetation types (Beard/Smith/Hopkins)	Medium Forest; Jarrah-Marri/Low woodland Banksia
Floristic Community Types (FCT) *type inferred (DEP 2002)	**Supergroup 2: Seasonal Wetlands** *4 *Melaleuca preissiana* damplands **Supergroup 3 - Uplands, centred on Bassendean Dunes** *21b Southern *Banksia attenuata* woodlands Possible small areas **Supergroup 1 - Foothills/Pinjarra Plain** *1b Southern *Eucalyptus calophylla* woodlands on heavy soils
National/International Significance	-
Fauna	
Area Specific	
Fauna Survey	Brief day transect survey DEP April 2003
Summary of findings	10 species of vertebrate fauna: 3 native mammals, 7 birds (2 significant species). There are a number of bird species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance, including Broad-tailed Thornbill. One Schedule 1 species (Western Ringtail Possum) One Conservation Dependent species (Quenda)
Fauna Survey Limitations	Reconnaissance only. More comprehensive surveys would add additional species
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Linkage Values	
It is a remnant within the Capel/Boyanup Ecological Linkage and the Capel River Ecological Linkage	
Wetlands, Creeklines, Rivers, Estuaries	
Type	sumpland
Management Category	Resource Enhancement > 50%
Suite	Jandakot (B.3)
Conclusions from survey	Not consistent with database (WRC 2003), the area of vegetated wetland in the study area is Conservation Category
Other Attributes	
-	
Further field survey	
Further work would add additional species	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Southern River Vegetation Complex
Floristic Community types	at least two, possibly three
Uplands and Wetlands	contiguous vegetated areas of wetland and upland
Size and Shape: a small remnant (<20ha) however it is of compact shape and is very intact for its size; is one of the few good remnants in the town of Capel, it is linked other natural areas and is part of the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage.	
Vegetation Condition: Very Good with patches of severe localised disturbance	
Relationship/proximity to:	
Naturally vegetated areas	bushland over the road to north and east
Protected areas	?protected (?local government reserve)

Other regionally significant naturally vegetated areas	bushland over the road to north and east predominantly wetland likely to contain TEC's as an area of clay soil wetland
Contains areas suitable for ecological restoration	bushland over the road to north and east
Comment: The Bassendean Dune/Pinjarra Plain interface vegetation is a very good representation of its type (Southern River Vegetation Complex) containing upland and wetland vegetation units typical of this vegetation complex and the study area is a natural area in the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage.	
Diversity	**NO**
Landforms	wetland and upland
Vegetation Complexes	
Floristic Community Types	
Vegetation units	
Flora	
Fauna	
Comment:	
Rarity	**YES**
Vegetation Complex <10% remaining	
Threatened Ecological Communities	-
Flora	The area supports three significant flora (*Jacksonia sparsa* (P3), *Hypocalymma ericifolium, Astartea* sp "Brixton")
Fauna	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Comment:	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	It is a remnant within the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage
Creekline/River/Estuary	
Contains areas suitable for ecological restoration	Adjacent cleared areas to the south-west and south located within the Capel/Boyanup Ecological Linkage connect the study area to the ROS
Size and Shape , Uplands and Wetlands & Vegetation Condition - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: The vegetated wetland in the study area is Conservation Category.	

SUMMARY NATURAL VALUES
Regional Significance - Assessment against the Criteria
The site meets 4 criteria, being: *Representation of Ecological Communities*, *Rarity*, *Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes that contribute to meeting these criteria are listed below: • Representative area of natural vegetation of the Southern River Vegetation Complex (on the Bassendean Dune/Pinjarra Plain interface) • Containing upland and wetland vegetation units, the wetland area being of a quality and type to be recognised as a Conservation Category wetland; • Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum • Contains populations of three significant flora (*Jacksonia sparsa* (P3), *Hypocalymma ericifolium*, *Astartea* sp "Brixton"); • A natural area in the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage.
Summary Comment in relation to the proposal
The Spurr Street Bushland, Capel is considered to be a regionally significant natural area and should be protected. As the site is part of the Capel/Boyanup Ecological Linkage and Capel River Ecological Linkage consideration should be given in any future subdivision design to enhance ecological linkage values.

RESERVE 670 NORTH BOYANUP ROAD, DAVENPORT

INFORMATION	COMMENT
Background Information	
Area Name	Davenport Industrial Area
Location	Part Lots 1 and 5, Location 267 and Reserve 670 North Boyanup Road, Davenport, City of Bunbury
Size (ha)	41.6 (27.9 ha native remnant vegetation) (HGM 2002)
Reason for assessment	Determine regional significance of vegetation

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	-
Existing System 6 area	-
Adjacent System 6 Area	-
Submission System 6 Update (6)	No
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Bassendean Dunes/Pinjarra Plain Bassendean Sands over Guildford Formation (Qpb/Qpa: S10) **Pinjarra Plain** Guildford Formation (Qpa: Msg4 and M) **Alluvial Deposits (Qhay:Sm1)** Vegetated Bassendean Dunes and Pinjarra Plain sumpland and palusplain	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	DEP (2002): edge inspection March and September 2002 HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; two plots 10X10m (4 1-6) located in the area
Summary of findings	**Vegetation:** Vegetation units are not distinguished on the landform/soil units. Wetlands: *Eucalyptus calophylla* and *Agonis flexuosa* var. *flexuosa* Open Forest (Lot 1); *Agonis flexuosa* var. *flexuosa* Closed Forest (Lot 1 and 5); *Melaleuca preissiana* and *Agonis flexuosa* var. *flexuosa* Low Open Forest (Lot 5 and Res 670); *Melaleuca rhaphiophylla* Low Open Forest (Res 670); *Eucalyptus calophylla* and *E. marginata* subsp. *marginata* Open Woodland over Tall Shrubland dominated by *Melaleuca preissiana, Banksia littoralis, Agonis flexuosa* var. *flexuosa* and *Kunzea glabrescens* and combinations of these (Res 670); *Eucalyptus rudis* subsp. *rudis* and *Agonis flexuosa* var. *flexuosa* Open Forest (Lot 1). **Area native remnant vegetation/Vegetation Condition:** 100% Degraded to Completely Degraded with areas of severe localised disturbance but good canopy especially along the river **Total Flora:** 33 native taxa, 60 weed taxa (HGM 2002, estimated >70% expected flora); 59 native taxa (Bischoff 1998) **Significant Flora:** *Jacksonia sparsa* (P4); *Acacia pulchella* var.

	goadbyi
Vegetation & Flora Survey Limitations	Limited survey but, sufficient survey to place regionally. No vegetation condition mapping.
Regional	
Vegetation Complex	**Combinations of Bassendean Dunes/Pinjarra Plain** Southern River Complex **Pinjarra Plain** Swan Complex
Vegetation types (Beard/Smith/Hopkins)	Mosaic; medium forest; jarrah- marri/low woodland; banksia
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *4 *Melaleuca preissiana* damplands Additional type not inferred
National/International Significance	
Fauna	
Area Specific	
Fauna Survey	HGM (2002): opportunistic bird survey undertaken during 6 days in September 2002 Reconnaissance from edge DEP March 2002 Brief transect survey DEP 2003
Summary of findings	Birds 28 species (HGM 2002), 8 species (DEP 2003), total 30 species. Native mammals 1 species, reptiles 1 species (DEP 2003). There are a number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance. Significant bird species: Inland Thornbill, Splendid Fairy-wren, Yellow-rumped Thornbill, Scarlet Robin and New Holland Honeyeater. The area provides good frog breeding habitat in winter
Fauna Survey Limitations	Surveys are opportunistic and limited in season. Intensive surveys would add additional species.
Regional	
National/International Significance	
Linkage Values	
Adjacent bushland to southwest and north; the southern and eastern portions of this site form part of the riparian corridor of Maidens/Preston River Ecological Linkage and McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage	
Wetlands, Creeklines, Rivers, Estuaries	
Type	sumpland, palusplain
Management Category	Conservation (11.6ha), Multiple Use
Suite	Bennet Brook (BP.4)
Conclusions from survey	Not consistent with database (WRC 2002)
Other Attributes	
Open water sumpland with *Eucalyptus rudis* subsp. *rudis* of excellent height and good condition adjacent to Preston River (Eleanor Bennett, pers. comm.)	
Further field survey	
Comprehensive fauna survey and vegetation condition mapping required	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES (not to a degree that it would be considered regionally significant on this criterion alone)**
Vegetation Complexes	Within the Constrained Area 32.3% Southern River Complex remains

	but less than 10% (currently 7.6%) currently identified as proposed and existing ROS
Floristic Community types	>2 (because impacted by disturbance they are not allocated to Floristic Community Types)
Uplands and Wetlands	Mostly wetlands, uplands are mainly cleared
Size and Shape: The partly fragmented area is an irregular shape but is the only vegetation remaining in the area	
Vegetation Condition Degraded, but this is not uncommon for this type of vegetation and size (i.e. riverine and narrow in Lots 1 and 5 and eastern side of the Plain wetland in Res 670). However in this location is the best of its type remaining and it provides significant fauna habitat	
Relationship/proximity to:	
Naturally vegetated areas	Manea Park/Airfield bushland to south of Location 267 and west of Lot 5 (over road) and bushland north of Reserve 670
Protected areas	Manea Park
Other regionally significant naturally vegetated areas	Located in the Maidens/Preston River Ecological Linkage (Res 670 and Lot 5) and McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup (Lots 1 and 5) Ecological Linkage
Contains areas suitable for ecological restoration	Yes, especially areas of severe localised disturbance, should be kept and restored so the entire site functions better as part of the Ecological Linkage
Comment: A degraded, but representative area ,of fringing river and eastern side of the Plain wetlands vegetation.	
Diversity	**NOT KNOWN**
Landforms	
Vegetation Complexes	
Floristic Community Types	
Vegetation units	Diversity of wetland types/vegetation units
Flora	
Fauna	30 bird species is diverse for this vegetation type and includes significant insectivorous bird assemblage
Comment:	
Rarity	**NOT KNOWN**
Vegetation Complex <10% remaining	
Threatened Ecological Communities	
Flora	
Fauna	
Comment:	

Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Part of the Maidens/Preston River Ecological Linkage and McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage
Creekline/River/Estuary	
Contains areas suitable for ecological restoration	see above
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: Conservation Category Wetland	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The site meets 3 criteria, being: *Representation of Ecological Communities*, *Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes that contribute to meeting these criteria are listed below:

- a representative but degraded area of fringing river and eastern side of the Plain wetlands vegetation from the Southern River Vegetation Complex;
- the native vegetation (in particular the intact canopy) and river provide significant fauna habiat;
- Contains wetland areas recognised as a Conservation Category wetland;
- Contains populations of two significant flora (*Jacksonia sparsa* (P3) and*Acacia pulchella* var. *goadbyi)*;
- the only natural area in this section of the Maidens/Preston River (Res 670 and Lot 5) and McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup (Lots 1 and 5) Ecological Linkages

Summary Comment in relation to the proposal

It is recommended that all the areas (Part lots 1, 5, and Reserve 670 North Boyanup Road, Davenport) identified in Appendix be protected as they form a regionally significant natural area primarily in related to sites value as fauna habitat and part in the Maidens/Preston River and McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkages. The area recognised for retention includes the areas identified by HGM (2002) as degraded to ensure the conservation values of the riverine portion of the linkage are protected. The northern portion of Part Reserve 670 together with the vegetated portions of Lot 3 South Western Highway (which is outside the current MRS amendment) provide an important additional link to the Preston River

LOT 15 NORTH BOYANUP ROAD

INFORMATION	COMMENT
Background Information	
Area Name	Lot 15 North Boyanup Road
Location	Lot 15 North Boyanup Road
Size (ha)	ca 14ha native remnant vegetation (total area 72ha)
Reason for assessment	To assess significance of remnant vegetation

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	NA
Groundwater Source Protection Area	NA
Existing System 6 area	NA
Adjacent System 6 Area	NA
Submission System 6 Update	
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Bassendean Sands - low rounded dunes Qpb (majority of site) **Guildford formation** - mainly alluvial sandy clay Qpa	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	DEP (2002): edge inspection GDH (2002): proposed road reserve
Summary of findings	**Vegetation:** Bassendean Sands, low rounded dunes (Qpb) Uplands: Low Open Forest to Woodland dominated by *Eucalyptus marginata, Banksia grandis, B.attenuata* and *Agonis flexuosa* with scattered *Persoonia longifolia* **Area native remnant vegetation/Vegetation Condition:** generally Good to Degraded condition, some Completely Degraded. Canopy layer intact and dense, the understorey is heavily grazed but some understorey shrubs present and regeneration was evident. **Total Flora:** not known **Significant Flora:** not known
Vegetation & Flora Survey Limitations	Limited habitat assessment only comprehensive survey required to determine flora present
Regional	
Vegetation Complex	Southern River Complex
Vegetation types (Beard/Smith/Hopkins)	
Floristic Community Types (FCT) *type inferred	not inferred
National/International Significance	Not known
Fauna	
Area Specific	
Fauna Survey	Edge survey for fauna habitat assessment DEP April 2003.
Summary of findings	5 bird species, 1 native mammal

	One Schedule 1 species (Western Ringtail Possum)
Fauna Survey Limitations	More comprehensive surveys would add additional species
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Linkage Values	
This site together with the adjacent bushland to the west forms part of the Maidens/Preston River Ecological Linkage. Also part of McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage	
Wetlands, Creeklines, Rivers, Estuaries: none identified	
Conclusions from survey	Consistent with database (WRC 2003)
Other Attributes	
This small naturally vegetated dune is a significant landscape feature at the south eastern entrance to Bunbury (Bischoff pers. comm.)	
Further field survey	
Comprehensive fauna and flora survey required	

Consideration Against Criteria		**Criterion Met**
Representation of Ecological Communities		**NOT KNOWN**
Regional vegetation representation		
Vegetation Complexes	Southern River	
Floristic Community types	Not known	
Uplands and Wetlands	upland	
Size and Shape: Compact shape less than 20 ha		
Vegetation Condition: intact tree canopy provides significant habitat for fauna		
Relationship/proximity to:		
Naturally vegetated areas	Bushland/Manea Park to west (over road)	
Protected areas	Manea Park	
Other regionally significant naturally vegetated areas	Located in the Maidens/Preston River Ecological Linkage and McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage	
Contains areas suitable for ecological restoration	Yes, should be kept and restored so the entire site functions better as part of the ecological linkage	
Comment: Currently this area is not of a suitable condition to meet this criterion. However the native vegetaion provides significant canopy.		
Diversity		**NOT KNOWN**
Landforms		
Vegetation Complexes		
Floristic Community Types		
Vegetation units		
Flora		
Fauna		
Comment:		
Rarity		**YES**
Vegetation Complex <10% remaining	Not applicable	
Threatened Ecological Communities	Not known	
Flora	Not known	
Fauna	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum	
Comment: Meets for fauna		
Maintaining Ecological Processes and Natural Systems		**YES**

Relationship/proximity to:	
Regional Ecological Link	Forms part of the Maidens/Preston River Ecological Linkage and part of McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage
Creekline/River/Estuary	
Contains areas suitable for ecological restoration	See above
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment: By providing significant habitat this area functions as part of the Ecological Linkage	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**NO**
Comment:	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The site meets 2 criteria, being: *Rarity* and *Maintaining Ecological Processes and Natural Systems*. The natural attributes of the site that contribute to meeting these criteria are listed below:

- Characteristic of upland vegetation of the Bunbury area Southern River vegetation complex in Good to Degraded condition providing significant fauna habitat;
- Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
- Contains populations of at least one species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (Western Ringtail Possum);
- Forms part of the Maidens/Preston River Ecological Linkage and part of McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage

Summary Comment in relation to the proposal

The area is identified as a significant part of the Maidens/Preston River Ecological Linkage and part of McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and supports a population of at least one species listed under the EPBC Act 1999, Western Ringtail Possum. It is recommended that the vegetated portion of Lot 15 be retained.

BOYANUP BYPASS ROAD

INFORMATION	COMMENT
Background Information	
Area Name	Boyanup Bypass Road
Location	Lot 100 South West Highway
Size (ha)	Approximately 3.5 ha native remnant vegetation
Reason for assessment	To determine significance of vegetation in location of proposed bypass road

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	
Existing System 6 area	No
Adjacent System 6 Area	
Submission System 6 Update	
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Cartis (Cs) Gently sloping fringe to Blackwood Plateau	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; one plot 10X10m (6.1) located in the area
Summary of findings	**Vegetation:** Cartis, grey or yellow sands with some gravels Uplands: *Eucalyptus marginata* subsp. *marginata* and *E. calophylla* over *Xanthorrhoea preissii*, *Acacia pulchella* and *Acacia flagelliformis* Open Shrubland **Area native remnant vegetation/Vegetation Condition:** Mostly Very good **Total Flora:** 72 native taxa, 3 weed taxa (HGM 2002, estimated >70% expected flora) **Significant Flora:** *Caladenia speciosa* (P4); *Acacia flagelliformis* (P4)
Vegetation & Flora Survey Limitations	Adequate for information for the assesment of regional significance of vegetation, however no vegetation condition mapping and only one visit in spring.
Regional	
Vegetation Complex	Cartis Complex
Vegetation types (Beard/Smith/Hopkins)	
Floristic Community Types (FCT) *type inferred	**Supergroup1: Foothills/Pinjarra Plain** *1a *Eucalyptus haemotoxylon – E. marginata* woodlands on Whicher foothills
National/International Significance	
Fauna	
Area Specific	

Fauna Survey	HGM (2002): opportunistic bird survey undertaken during 6 days in September 2002 Reconnaissance transect DEP April 2003
Summary of findings	17 bird species, 2 native mammal species, 1 reptile species. One Schedule 1 species (Western Ringtail Possum)
Fauna Survey Limitations	More comprehensive surveys would add additional species
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Linkage Values	
Part of the McLarty/Kemerton/Twin Rivers/Gwindinup Ecological Linkage. Provides a direct linkage between the Preston River and the Reserve to south and west. The bushland to the west is proposed to be used as an offset for a sand mining proposal	
Wetlands, Creeklines, Rivers, Estuaries: none identified	
Conclusions from survey	Consistent with database (WRC 2003)
Other Attributes	
-	
Further field survey	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Cartis Complex
Floristic Community types	1
Uplands and Wetlands	upland
*Size and Shape:*A small area (<20ha) but contiguous with a much larger area (>20ha)part of which is protected and part proposed to be protected. Protected area being managed by the local community. This larger area is part of the McLarty/Kemerton/Twin Rivers/Gwindinup Ecological Linkage.	
Vegetation Condition: The study area is in very good condition and is part of a larger area in Very Good to Excellent condition.	
Relationship/proximity to:	
Naturally vegetated areas	Bushland to the west and south
Protected areas	Protected bushland to the west
Other regionally significant naturally vegetated areas	Bushland to the west and south is regionally significant
Contains areas suitable for ecological restoration	not applicable
Comment: The Foothills vegetation is a very good representation of its type (Cartis Complex) and is contiguous with a signifcant area of vegetation of the Cartis Complex located in the McLarty/Kemerton/Twin Rivers/Gwindinup Ecological Linkage.	
Diversity	**NOT KNOWN**
Landforms	
Vegetation Complexes	
Floristic Community Types	
Vegetation units	
Flora	Diverse flora, 72 native taxa identified in the plot from a single visit.
Fauna	
Comment:	
Rarity	**YES**
Vegetation Complex <10% remaining	
Threatened Ecological	

Communities	
Flora	The area supports two significant flora *Caladenia speciosa* and *Acacia flagelliformis*, both Priority 4.
Fauna	Contains populations of at least one species listed under the EPBC Act 1999, Western Ringtail Possum
Comment:	
Maintaining Ecological Processes and Natural Systems **YES**	
Relationship/proximity to:	
Regional Ecological Link Creekline/River/Estuary	Part of the McLarty/Kemerton/Twin Rivers/Gwindinup Ecological Linkage
Contains areas suitable for ecological restoration	not applicable
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance **NOT KNOWN**	
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation **NO**	
Comment:	

SUMMARY NATURAL VALUES
Regional Significance - Assessment against the Criteria
The Lot 100 Boyanup Bypass Road bushland is considered to be a regionally significant natural area meeting three criteria, being: *Representation of Ecological Communities*, *Rarity* and *Maintaining Ecological Processes and Natural Systems*. The natural attributes that contribute to meeting these criteria are listed below: • A very good representation of Foothills vegetation of the Cartis Complex containing a diversity of species and two priority flora species (*Caladenia speciosa* and *Acacia flagelliformis)*; • Contiguous with a significant area of vegetation of the Cartis Complex, few such large area of Cartis Complex remaining on the Swan Coastal Plain; • Located in the McLarty/Kemerton/Twin Rivers/Gwindinup Ecological Linkage. There are few such large area of Cartis Complex remaining on the Swan Coastal Plain.
Summary Comment in relation to the proposal
Part of Lot 100 Boyanup Road bushland is considered to be a regionally significant natural area and suitable for retention as recommended in HGM (2002).

LOC 7 AND 14 BUFFALO ROAD, BINNINGUP

INFORMATION	COMMENT
Background Information	
Area Name	Loc 7 and 14 Buffalo Rd
Location	Loc 7 and 14 Buffalo Rd, Binningup, Shire of Harvey
Size (ha)	253 (82.5 remnant vegetation, HGM 2002) (note remnant vegetation mapping does not reflect HGM 2002 mapping)
Reason for assessment	To comment on the appropriateness of the ROS boundary

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	NA
Groundwater Source Protection Area	NA
Existing System 6 area	Northern portion of C66 Leschenault Inlet (entire area of Lot 7and 14 – spans area between coast and hwy)
Adjacent System 6 Area	NA
Submission System 6 Update	NA
Others	

Environmental Considerations - Natural Attributes	
Landforms	
Vasse Alluvium (Qha) **Yoongarillup** Lagoonal Deposits (Qg)	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	DEP (2002): edge survey March 2002 HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; three plots 10X10m (7B. 1, 2 &3) located in the area, permission to enter Lot 7 not given, information inferred
Summary of findings	**Vegetation:** mapping (HGM 2002) Wetlands (Vegetation units are not distinguished on the landform/soil units): *Melaleuca rhaphiophylla* and *Melaleuca viminea* subsp. *viminea* Low Open Forest; Closed Sedgeland dominated by *Juncus kraussii* subsp. *australiensis, Triglochin huegelii, Baumea juncea* and **Juncus oxycarpus* and combinations of these; *Halosarcia lepidosperma, Halosarcia indica* subsp. *bidens* and *Juncus kraussii* subsp. *australiensis* Open Low Heath and inferred from aerial photography *Agonis flexuosa* unit **Area native remnant vegetation/Vegetation Condition:** 10% Excellent, 90% Degraded to Completely but "southern two thirds of Lot 7 and 14 support stands of *Melaleuca*, inundated sedges and samphire…" (HGM 2002) **Total Flora:** 21 native taxa, 34 weed taxa (Appendix C, HGM 2002) (Estimated >70% expected flora) **Significant Flora:** none identified
Vegetation & Flora Survey Limitations	Limited survey - DEP 2002 (survey from edge); HGM 2002 (plots, flora list and vegetation map) Entire site not surveyed, or adjacent lands surveyed
Regional	

Vegetation Complex	Quindalup, Vasse and Yoongarillup, remaining native vegetation predominantly Vasse
Vegetation types	Shrublands; scrub heath
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *16 Highly saline seasonal wetlands *17 *Melaleuca rhaphiophylla – Gahnia trifida* seasonal wetlands
National/International Significance	
Fauna	
Area Specific	
Fauna Survey	HGM (2002): opportunistic bird and frog survey undertaken during 6 days in September 2002 Limited survey from edge DEP March 2002
Summary of findings	Bird 21 species, frog 3 species, mammal 1 species. Remnant trees are habitat for several bird species
Fauna Survey Limitations	Limited surveys, additional survey would record more species
Regional	
National/International Significance	
Linkage Values	
Adjacent bushland to south and west (C66); direct linkage to the Leschenault Peninsula Conservation Park (LPCP); forms part of the Leschenault Estuary System 6 area (C66) The Buffalo Road proposed ROS is part of the Yalgorup/Myalup/Leschenault Coastal Ecological Linkage and the Leschenault/Kemerton Ecological Linkage	
Wetlands, Creeklines, Rivers, Estuaries	
Type	Estuary (Boundary approx. follows proposed GBRS boundary of the ROS, HGM mapping indicates wetland goes beyond proposed ROS)
Management Category	Conservation Category
Suite	Leschenault Inlet
Conclusions from survey	Appears to be generally consistent with database (WRC 2003)
Other Attributes	
GBRS Subm.- Steep unstable primary dune incorporating good quality Tuart woodland (outside current proposed ROS) HGM (2002) - The samphire associations at the southern portion are uncommon in the South West Botanical District (Trudgen 1984). - This site is part of the Leschenault Estuary System 6 area (C66) - The samphire flats area north of Buffalo Road is recognised as an important waterbird habitat (WRC and LIMA 1997, WAPC 2000) and a buffer against lateral movement of nutrients from intensive horticultural areas in to the Parkfield Drain that feeds into the Leschenault Estuary (WAPC 2000)	
Further field survey	
Sufficient survey to address vegetation issues on the area of proposed ROS but not adequate to address regional significance of the remainder of the Leschenault Estuary System 6 area (C66) and boundaries of the wetland unclear	

Consideration Against Criteria	
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Quindalup, Vasse and Yoongarillup, remaining native vegetation predominantly Vasse
Floristic Community types	2
Uplands and Wetlands	Area as identified is virtually all wetland The *Halosarcia lepidosperma, Halosarcia indica* subsp. *bidens* and *Juncus kraussii* subsp. *australiensis* Open Low Heath (unit 7B.3) on

	wetlands of the Vasse/Yoongarillup Complexes on the northern flats of the Leschenault Estuary constitutes approximately 60ha. Approximately 85 ha of this unit (DEP figures from mapping after Trudgen 1984) is in LPCP. The addition of 60ha is significant as this vegetation type is becoming increasingly restricted and is important habitat for birds. The significance of these flats was also highlighted by Trudgen (1984) and Pen (1992) Wetland Buffers: These have not been addressed in HGM conclusion
Size and Shape: It is a large compact remnant which is >20ha. The area is linked to adjacent bushland to south and west	
Vegetation Condition: 10% Excellent, 90% Degraded to Completely Degraded (HGM 2002)	
Relationship/proximity to:	
Naturally vegetated areas	To south and west
Protected areas	Adjacent bushland to south and west (C66); direct linkage to the Leschenault Peninsula Conservation Park (LPCP); forms part of the Leschenault Estuary System 6 area (C66)
Other regionally significant naturally vegetated areas	
Contains areas suitable for ecological restoration	Yes, changes to surface water flow by road to south has impacted on health of samphire vegetation resulting in considerable weed invasion. Restoring tidal water flow would reduce weed invasion
Comment: Vasse Complex is majority of estuarine area, important habitat areas. Vasse unit contains estuarine to freshwater areas, e.g. Peel-Harvey reserves are predominantly fresh except for margins, see comment above	
Diversity	**NOT KNOWN**
Landforms	
Vegetation Complexes	
Floristic Community Types	
Vegetation units	
Flora	
Fauna	
Comment:	
Rarity	**NOT KNOWN**
Vegetation Complex <10% remaining	
Threatened Ecological Communities	
Flora	Not known
Fauna	Not known
Comment:	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Buffalo Road is part of the Yalgorup/Myalup/Leschenault Coastal Ecological Linkage and the Leschenault/Kemerton Ecological Linkage. Adjacent bushland to south and west (C66); direct linkage to the Leschenault Peninsula Conservation Park (LPCP); forms part of the Leschenault Estuary System 6 area (C66)
Creekline/River/Estuary	Forms part of the Leschenault Estuary System 6 area
Contains areas suitable for ecological restoration	Yes, changes to surface water flow by road to south has impacted on health of samphire vegetation resulting in considerable weed invasion. Restoring tidal water flow would reduce weed invasion
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	

Scientific or Evolutionary Importance	**YES**
Comment: Met: with respect to relatively intact part of Leschenault Estuary	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: All Conservation Category wetland and is predominantly naturally vegetated	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

Buffalo Road is considered to be a regionally significant natural area meeting four criteria, being: *Representation of Ecological Communities, Maintaining Ecological Processes and Natural Systems, Scientific or Evolutionary Importance* and *General Criteria for the Protection of Wetland, Streamline and Estuarine fringing Vegetation and Coastal vegetation*. The natural attributes that contribute to meeting these criteria are listed below:

- contains areas of vegetation representative of the Vasse Complex
- is part of the Leschenault Estuary System 6 area (C66)
- the 60ha area of samphire flats (*Halosarcia lepidosperma, Halosarcia indica* subsp. *bidens* and *Juncus kraussii* subsp. *australiensis* Open Low Heath)
    - is a vegetation type that is becoming increasingly restricted on the Swan Coastal Plain;
    - are recognised as an important waterbird habitat
    - makes a significant addition to the habitat area in the Leschenault Peninsula Conservation Park and
    - forms a buffer against lateral movement of nutrients from intensive horticultural areas in to the Parkfield Drain that feeds into the Leschenault Estuary (WAPC 2000)

  (The values of these samphire flats have been highlighted in a series of reports including Trudgen 1984, Pen 1992, WRC and LIMA 1997, WAPC 2000 and HGM 2002)
- a large compact remnant linked to adjacent bushland to south and west
- contiguous with the Leschenault Peninsula Conservation Park
- forms part of the Leschenault Estuary System 6 area (C66)
- is part of the Yalgorup/Myalup/Leschenault Coastal and the Leschenault/Kemerton Ecological Linkages
- predominantly naturally vegetated Conservation Category wetland.

Summary Comment in relation to the Proposal

The area of proposed ROS appears to reflect the boundaries of the mapped Conservation Category wetland within the System 6 area C66 north of Buffalo Road. Ground truthing of this boundary is incomplete as HGM (2002) mapping surveyed within the proposed ROS boundary within Lot 14. This broad area meets sufficient criteria for identification as regionally significant natural area. However, it appears that within Lot 14 the boundary as mapped does NOT buffer the entire wetland areas, it is assumed that western boundary reflects wetland

Issues that need to be noted, but possible to defer

- agreed boundaries of wetland north of Buffalo Road within C66
- adequate buffers wetland
- area of Leschenault Estuary outside the proposed ROS mapped as Conservation Category wetland extends north of the proposed northern boundary of the ROS
- values of the area of C66 outside proposed ROS, especially the western Quindalup Dune area (these are retained as rural at present) and Yalgorup/Myalup/Leschenault Coastal and Leschenault/Kemerton Ecological Linkages.

The two areas on the eastern boundary of the ROS (unit X HGM 2002) proposed to be changed to rural appear to have low environmental value in their own right but are a buffer to the wetland. This function needs to be recognised in any future planning

TWIN RIVERS – PT LOT 211 BARNES AVENUE, AUSTRALIND

INFORMATION	COMMENT
Background Information	
Area Name	Twin Rivers Bushland
Location	Pt Lot 211 Barnes Avenue Australind
Size (ha)	42.2 approximately 37 native remnant vegetation (HGM 2002))
Reason for assessment - area being assessed	To determine appropriate ROS boundary within the bushland area

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	-
Existing System 6 area	-
Adjacent System 6 Area	Adjacent to C67 Brunswick, Collie and Wellesley Rivers
Submission System 6 Update (6)	No
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Spearwood Dune System (Sands derived from Tamala Limestone - Qts: S7) **Pinjarra Plain** (Alluvial Deposits - Qhao: Sm1) Open water, vegetated wetland, vegetated riverside sand cliff, vegetated upland	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	ATA Environmental (2001): Survey undertaken 8 January 2001, foot and vehicle traverses of the site. Search of CALM's DRF and Priority list. An additional spring survey was undertaken by ATA (11 October 2001) at DEP request. No detail on methods DEP (2000): brief transect survey March 2002 HGM (2002): survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; four plots 10X10m (8.1, 8.2, 8.3, 8.4) located in the area Vegetation mapping for the area is known from two studies: ATA Environmental (2001) and HGM (2002)
Summary of findings	**Vegetation:** Spearwood Dune System: Upland: *Eucalyptus calophylla* and *E. marginata* Open Woodland over *Agonis flexuosa* and *Banksia attenuata* or *Banksia grandis* Low Open Woodland; *A. flexuosa* and *B. attenuata* Low Open Woodland. *E. calophylla* and *E. marginata* Open Woodland over *A. flexuosa* and *Jacksonia furcellata* Low Open Woodland Pinjarra Plain: Wetland (floodplain): *Eucalyptus calophylla* and *E. rudis* Forest; *E. rudis* and *Melaleuca rhaphiophylla* Open Woodland; *Eucalyptus rudis* subsp. *rudis* and *Melaleuca rhaphiophylla* Open Forest over *Melaleuca incana* subsp. *incana* Tall Open Scrub *M. rhaphiophylla* and *M. viminea* Scrub; *Casuarina obesa, E. rudis* and *M. rhaphiophylla* Low Forest; *E. rudis, M. rhaphiophylla, C. obesa* and *Kunzea glabrescens* Low Forest. **Area native remnant vegetation/Vegetation Condition:**

	ATA Environmental (2001): Western section in better condition than eastern section, but no clear indication in the text of condition rating. No vegetation condition map HGM (2002): 85% Very Good to Good, 5% Degraded, 10% Completely Degraded **Total Flora:** 136 native taxa, 53 weed taxa (HGM 2002, ATA Environmental 2001a, van der Moezel 2001b) (HGM 2002 estimated >80% expected flora) **Significant Flora:** *Diuris drummondii* (R); *Lasiopetalum membranaceum* (3); *Caladenia speciosa* (4); diversity of tree/shrub species in floodplain vegetation, unusual adjacent to Spearwood Dunes, *including: M. rhaphiophylla, M. viminea, M. incana* subsp. *incana*, *Astartea* aff. *fascicularis* and *Viminaria juncea* indicating unusual representation of intact floodplain vegetation
Vegetation & Flora Survey Limitations	Additional surveys would record more species. No vegetation condition mapping undertaken
Regional	
Vegetation Complex	**Spearwood Dunes -** Karrakatta Complex **Pinjarra Plain -** Swan Complex
Vegetation types (Beard/Smith/Hopkins)	Medium woodland; tuart
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *11 Wet forests and woodlands **Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes** *21a Central *Banksia attenuata – Eucalyptus marginata* woodlands
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999, *Diuris drummondii*
Fauna	
Area Specific	
Fauna Survey	ATA Environmental (2001): Survey undertaken, 14 January 2001, inspection of habitats and several hours of spotlighting with Paul de Tores from CALM. Search of CALM's Threatened Fauna database. Ecologia (2001): Survey undertaken 24-29 November and 7 December 2001. Trapping grid, (pit trap, Elliot box traps and cage traps). 'Set time period census' search for bird species. Microhabitat searching, spotlighting (2 hrs), Bat censuring with an ANABAT detector (2.5 hrs). Opportunistic sightings and secondary evidence such as tracks, diggings and burrows were recorded. Brief transect survey DEP March 2002 HGM (2002): opportunistic survey including point method bird census and ground fauna microhabitat searching during 6 days in September 2002 Local observations (2002): local resident recorded Western Ringtail Possum
Summary of findings	53 species of vertebrate fauna: 4 native mammals, 32 birds (6 significant species), 10 reptiles and four amphibians. Two Schedule 1 species (Western Ringtail Possum, Baudin's Black Cockatoo), two species protected under JAMBA/CAMBA treaties (Common Greenshank, Great Egret), one Priority 4 species (Quenda) recorded. Of the fauna known to be present in the region, 9 other priority species utilise habitats similar to those present in the study area.
Fauna Survey Limitations	It would be expected that more vertebrate species would be present in the study area with greater survey intensity and different sampling

	periods.
Regional	
National/International Significance	Contains populations of at least two species listed under the EPBC Act 1999, Western Ringtail Possum, Baudin's Black Cockatoo and two species protected under JAMBA/CAMBA treaties, Common Greenshank, Great Egret
Linkage Values	
Contiguous bushland to south and north is ROS. Twin Rivers is part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River and Collie River Ecological Linkages. This is the largest consolidated riverine remnant in these Linkages. The Collie, Brunswick and Wellesley Rivers are a System 6 area C67. Links to the Leschenault Estuary to west via adjacent bushland of the Australind Primary School.	
Wetlands, Creeklines, Rivers, Estuaries	
Type	Floodplain (adjacent to river)
Management Category	Conservation (0.8ha), Multiple Use (WRC GIS 2002) considered Conservation category by ATA Environmental (2001).
Suite	Brunswick
Other Attributes	
Further field survey	
Vegetation condition mapping not done, comprehensive faunal survey not done	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES (not to a degree that it would be considered regionally significant on this criterion alone)**
Regional vegetation representation	
Vegetation Complexes	Within the Constrained Area 21.4% Swan Vegetation Complex remains, 12.6% currently identified as proposed and existing ROS. 53.2% Karrakatta Central and South Complex remains, 11.0% currently identified as proposed and existing ROS.
Floristic Community types	2
Uplands and Wetlands	
Size and Shape A relatively large area (37ha, >20ha) of compact shape, close to other natural areas and adjacent to river. Forms part of a riverine corridor for fauna and contiguous habitat types for seasonal faunal movement.	
Vegetation Condition Over 80% upland Very Good to Good, areas of wetland in Excellent to Very Good condition (with patches of severe localised disturbance)	
Relationship/proximity to:	
Naturally vegetated areas	Contiguous naturally vegetated areas to north and south (then link to west)
Protected areas	Contiguous foreshore reserve (ROS) to north and south.
Comment: Representative of Swan Complex and Karrakatta Complex Central and South Vegetation Complexes, most of the remaining Swan is thin strip along rivers and significantly altered, this area with adjacent uplands and wetlands is one of the best remaining remnants. Riverine corridor and contiguous upland habitat types provides ecological linkages for fauna.	
Diversity	**YES**
Landforms	diversity of form - river flats to river sand cliffs, undulating vegetated upland
Vegetation Complexes	2
Floristic Community Types	2
Vegetation units	10 vegetation units (ATA Environmental 2001), 3 vegetation units (HGM 2002)
Flora	136 native taxa, diverse for vegetation types
Fauna	53 species of vertebrate fauna.
Comment: Relatively diverse for its type in respect to landforms, flora and fauna.	
Rarity	**YES**
Vegetation Complex <10% remaining	No further clearing
Threatened Ecological Communities	Not known
Flora	*Diuris drummondii* (R), *Lasiopetalum membranaceum* (3); *Caladenia speciosa* (4) (ATA Environmental 2002)
Fauna	High vertebrate diversity. Two Schedule 1 species (Western Ringtail Possum, Baudin's Black Cockatoo), two species protected under JAMBA/CAMBA treaties (Common Greenshank, Great Egret), one Priority 4 species (Quenda) recorded. Of the fauna known to be present in the region, 9 other priority species utilise habitats similar to those present in the study area (Ecologia 2001). Likely presence of Water Rat (*Hydromys chrysogaster*) (Priority 4) (CALM 2001 letter to MfP (CALM ref 922.4))
Comment: Subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* for fauna (Western Ringtail Possum, Baudin's Black Cockatoo) and flora (*Diuris drummondii)*	

Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River and Collie River Ecological Linkages.
Creekline/River/Estuary	Largest consolidated naturally vegetated remnant on the Collie and Brunswick Rivers
Contains areas suitable for ecological restoration	While apparently cleared for a considerable period of time the cleared portions of the area are surrounded by bushland. This area has potential for significant recreational use (used currently but is private land) and these areas would be best left for intense human use and not revegetated
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**NOT KNOWN**
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine fringing Vegetation and Coastal vegetation	**YES**
Comment: Contains Conservation Category wetland, diversity of tree/shrub species in floodplain vegetation, unusual adjacent to Spearwood Dunes, including*: M. rhaphiophylla, M. viminea, M. incana* subsp. *incana, Astartea* aff. *fascicularis* and *Viminaria juncea* indicating unusual representation of intact floodplain vegetation	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against the Criteria

The Twin Rivers area meets five criteria, being: *Representation of Ecological Communities*, *Diversity*, *Rarity*, *Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine fringing Vegetation and Coastal vegetation*. The natural attributes that contribute to meeting these criteria are listed below.

- Substantial representative vegetation of Swan and Karrakatta Complex Central and South Vegetation Complexes. This criterion is met to a limited extent, as area is located within the 'Constrained' area of the GBRS, where the criterion *Representation of Ecological Communities* is modified to reflect a >10% threshold for retention. The Karrakatta Complex Central and South Vegetation Complex does not meet this criterion. However it is considered that this criterion is met for the Swan Vegetation Complex as the remaining areas of this Complex closer to the 10% threshold and this vegetation is generally significantly altered from its natural condition. The area of Swan Complex in the area is one of the best examples of its type.
- Contains Conservation Category wetland with intact floodplain vegetation.
- In combination the area is diverse for its type in respect to landforms, flora and fauna.
- Largest consolidated naturally vegetated remnant on the Collie and Brunswick Rivers.
- Part of the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage and the Brunswick River and Collie River Ecological Linkages.
- Location for three rare species, Western Ringtail Possum, Baudin's Black Cockatoo and *Diuris drummondii*. These species are recognised by the State and are subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999.*
- Location for other significant flora and fauna being:
  - Flora - *Lasiopetalum membranaceum* (Priority 3); *Caladenia speciosa* (Priority 4)
  - Fauna - two species protected under JAMBA/CAMBA treaties (Common Greenshank, Great Egret), one Priority 4 species (Quenda) recorded. Of the fauna known to be present in the region, 9 other priority species utilise habitats similar to those present in the study area.

Summary Comment in Relation to the Proposal
The Twin River area is a regionally significant natural area of high value. The entire site can be considered regionally significant. The values of the site are: • to include a significant area of upland; • retention of all vegetated wetland units; • configuration that allows for a width of at least 300m of upland vegetation adjacent to wetland (this is of particular significance adjacent to the river sand cliff); • provides sufficient habitat for the rare and significant flora and fauna; and • area of not less than 20ha

COLLEGE GROVE - LOT 1000 BUSSELL HIGHWAY

INFORMATION	COMMENT
Background Information	
Area Name	College Grove
Location	Pt Lot 1000, Cnr Somerville Drive and Bussell Highway, Bunbury, City of Bunbury
Size (ha)	136 ha
Reason for assessment	Determine appropriate area of ROS

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	-
Existing System 6 area (inc. comparison with proposed ROS boundary)	no
Adjacent System 6 Area	C70 South Bunbury Coastal Land to the west, adjacent to System 6 Update area Manea Park (which is also recognised by the EPA as an area of "Threatened and Poorly reserved plant community in need of Interim protection"
Submission System 6 Update	No
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Spearwood Dune System Sands derived from Tamala Limestone (Qts: S7) Vegetated Spearwood Dune and vegetated wetland	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Weston (2001): attached as an Appendix to BBG (2001), November 2000/Jan2001, 3 days in field, traverses driven and walked through area, observations recorded Bischoff (1999): consolidated vascular plant species list includes reference to work by 11 studies between 1990 - 1999 DEP (1996): foot traverse of southern section, one plot located
Summary of findings	**Vegetation**: Spearwood Dune System (Sands derived from Tamala Limestone - Qts: S7) Upland: *E. gomphocephala* Woodland; *Eucalyptus calophylla* /*E. marginata*/*Banksia attenuata* Open Forest; *B. attenuata*/ *E. marginata* Low Woodland to Open Forest; *B. attenuata*/ *Agonis flexuosa*/*E. gomphocephala* Open Forest to Low Open Forest Wetland: *Pericalymma ellipticum* Closed Heath **Area native remnant vegetation/Vegetation Condition:** > 80% Good to Excellent, < Good to Completely Degraded with areas of severe localised disturbance (Weston 2001) **Total Flora:** approx 140 native taxa (Bischoff 1999) **Significant Flora:** *Lasiopetalum membranaceum* (P2), *Jacksonia sparsa* (P4)
Vegetation & Flora Survey Limitations	Survey time was limited. Describes communities but does not include a species list.
Regional	

Vegetation Complex	Karrakatta Central and South and Yoongarillup indicated, no significant areas of Yoongarillup but area of Bassendean phase of the Southern River (not mapped)
Vegetation types (Beard/Smith/Hopkins)	medium woodland; tuart
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** type not inferred **Supergroup 3: Uplands centred on Bassendean Dunes** *21a – Central *Banksia attenuata – Eucalyptus marginata* Woodlands or, *21b – Southern *Banksia attenuata* Woodlands (or both) **Supergroup 4: Uplands centred on Spearwood and Quindalup Dunes** 25 – *E. gomphocephala – Agonis flexuosa* Woodlands
National/International Significance	-
Fauna	
Area Specific	
Fauna Survey	Fauna section in (BBG 2001). No comprehensive survey, description of fauna habitat and a search of the CALM Threatened Fauna database. A search for Western Ringtail Possums in Jan/Feb 2001 (Jones 2001). Brief reconnaissance survey DEP May 2003, 1 day bird transect DEP June 2003
Summary of findings	25 birds species, 2 reptile, 3 mammal species (DEP 2003). There are a number of bird species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance. Nine species of conservation significance in the area include Yellow Robin, Scarlet Robin, Weebill, Grey Shrike Thrush, Splendid Fairy Wren, Broad-tailed Thornbill and Western White-naped Honeyeater. Jones (2001) estimated less than 20 individuals of Western Ringtail Possum and about 120 Brushtail Possums. Population estimates were mainly based on collection of faecal pellets. Western Ringtail Possums mostly in western part of ridgetop (Banksia/ Peppermint/Tuart forest) and a few in north eastern corner BBG (2001) suggest that 3 Schedule 1 species one Schedule 4 species and three Priority fauna species are likely to occur within the area The tall woodland provides significant breeding habitat for bird species utilizing tall trees or hollows including those that feed in adjacent areas. Has significant habitat value for arboreal mammals including bats
Fauna Survey Limitations	Reconnaissance only. More comprehensive surveys would add more species
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999
Linkage Values	
The College Grove Bushland is part of the Maidens/ Preston River Ecological Linkage[1]. College Grove Bushland is particularly significant in this ecological linkage as it contains the tallest area of Spearwood Dune (natural landscape feature), a variety of Spearwood Dune vegetation structural units and the vegetated interface between Bassendean and Spearwood Dune systems	

[1] The Maidens/Preston River Ecological Linkage has also been referred to as South Bunbury Bushland Corridor and Bunbury Ocean to Preston River Regional Park. This Ecological Linkage contains a contiguous sequence of vegetated landform elements - Quindalup/Spearwood/Marine deposits

Wetlands, Creeklines, Rivers, Estuaries	
Type	Dampland, ?paluslope
Management Category	Inferred Conservation from quality and type of vegetation
Suite	Bennett Brook (B/P.4)
Conclusions from survey	Not consistent with database (WRC 2003), wetland are not mapped
Other Attributes -	
Further field survey -	
Further vegetation surveys at appropriate seasons required to document entire plant species list and other significant plant species (Weston 2001), comprehensive vegetation condition mapping required, comprehensive faunal survey required	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Within the Constrained Area 53.2% Karrakatta Central and South Complex remains, 11.0% currently identified as proposed and existing ROS.
Floristic Community types	3 or 4
Uplands and Wetlands	mostly upland, small area wetland
Size and Shape A large area of native vegetation (>20ha) of compact shape, contiguous with other natural areas to east and west	
Vegetation Condition Over 80% in good condition	
Relationship/proximity to:	
Naturally vegetated areas	to south, east, west and north west
Protected areas	Manea Park to the east and the bushland to north centenary Road to west. Manea Park has also been recognised by the EPA as an area of "Threatened and Poorly reserved plant community" and contains areas of threatened ecological community
Other regionally significant naturally vegetated areas	Maidens/ Preston River Ecological Linkage links north to Hay Park
Contains areas suitable for ecological restoration	Cleared area in bushland, previously landfill area, possible contamination, possible revegetation area
Comment: Predominantly Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation Complex with a smaller area of Bassendean Dune vegetation and the interface between these two. Southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (FCT 25) which is a significant representation of this FCT in the Maidens/ Preston River Ecological Linkage being on the only prominent Spearwood Dune in the ecological linkage. Interface between Bassendean and Spearwood Dune systems. Area of native vegetation (>20ha) is of compact shape and is contiguous with other natural areas to east and west	
Diversity	partial **YES**
Landforms	Single landform, but as part of Maidens/ Preston River Ecological Linkage only area of this landform in linkage

/Spearwood/Bassendean Dunes - Pinjarra Plain/River. This is a sequence is unusual on the Plain and does not appear to occur elsewhere. The area of Spearwood Dunes in the transect is also unusual on the Plain, being predominantly composed of deep sands of the Spearwood Dunes (ie no obvious Tamala Limestone) with these being divided into two principle components, the undulating flats of the Usher area and the 'College Grove dune'. Tuart is a dominant species in sections of both of these areas. While the 'College Grove dune' extends further south (to Gelorup area) the percentage of Tuart dominated vegetation gradually declines, the area in the 'College Grove dune' is the last undeveloped portion of this vegetation.

Vegetation Complexes	diversity of complexes
Floristic Community Types	diversity of Community Types
Vegetation units	-
Flora	Not adequate data however appears to have typical diversity
Fauna	Not adequate information
Comment: The location of the area at the interface of two major landform elements and the vegetated ridge in the ecological linkage are significant	
Rarity	**YES**
Vegetation Complex <10% remaining	not applicable
Threatened Ecological Communities	not determined
Flora	
Fauna	includes fauna listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments
Comment: The Maidens/Usher/College Grove/Manea Park/Airport/Preston River Primary Ecological Linkage is the only known sequence of this type on the Plain	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Part of the Maidens/ Preston River Ecological Linkage
Creekline/River/Estuary	Through Maidens/ Preston River Ecological Linkage
Contains areas suitable for ecological restoration	
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment: Only area of its type in the Maidens/ Preston River Ecological Linkage	
Scientific or Evolutionary Importance	
Comment: Not assessed	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation	**YES**
Comment: Small area of Conservation category equivalent wetland	

SUMMARY NATURAL VALUES
Regional Significance - Assessment against the Criteria
The area meets 4 criteria, being: *Representation of Ecological Communities*, *Rarity*, *Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. In addition it probably meets the *Diversity* criteria (more information required). The natural attributes that contribute to meeting these criteria being met are listed below: • Substantial representative area of bushland of Spearwood Dune vegetation of Karrakatta Complex Central and South Vegetation • Representative of the southern *Eucalyptus gomphocephala – Agonis flexuosa* woodlands (floristic community type 25 which is a significant representation of this FCT in the Maidens/ Preston River Ecological Linkage being on the only prominent Spearwood Dune in the ecological linkage • Contains bushland at the interface between Bassendean and Spearwood Dune systems • Contains vegetation in Good to Very Good condition with significant tall habitat trees (Tuart) • Includes fauna listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments • Contains 9 bird species listed as declining on the Swan Coastal Plain (Government of Western Australia 2000b) • Area of native vegetation (>20ha) is of compact shape and is contiguous with other natural areas to west (Centenary Road North bushland) and east (Manea Park) in the Maidens/ Preston River Ecological Linkage. Both bushland areas have some protection • The Maidens/ Preston River Ecological Linkage is the only known sequence of this type on the Plain • This area is critical in the Maidens/ Preston River Ecological Linkage containing the only area of its type in the linkage not already developed for housing • Small area of Conservation category equivalent wetland

MUDDY LAKES –MINNINUP ROAD, CAPEL

INFORMATION	COMMENT
Background Information	
Area Name	Muddy Lakes ROS (proposed)
Location	Lot 1 and Part Lot 394 Rich Rd, Minninup Beach, Lot 5, 6, 7 Minninup Rd, Stratham City of Bunbury
Size (ha)	191.9 (90.3 remnant vegetation) (after HGM 2002)
Reason for assessment	Comment on appropriate ROS boundary

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	EPP Lake (82.3ha after HGM 2002)
Groundwater Source Protection Area	-
Existing System 6 area (inc. comparison with proposed ROS boundary)	No
Adjacent System 6 Area	No
Submission System 6 Update (6)	Yes
Others	

Environmental Considerations - Natural Attributes	
Landforms	
Quindalup Dunes (Qhs) **Marine Deposits** Vasse (Qhw [interface between Quindalup and Spearwood Dunes – Qts]) Sandy coastline, Holocene vegetated coastal and parabolic dunes, vegetated wetland, open water	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	Alan Tingay and Associates (1991): Vegetation map prepared from 1:10000 aerial photography and ground survey of different vegetation types during June 1991. No details on how the ground survey was undertaken DEP (2002): Edge inspection March 2002, foot traverses over 1 day, June 2002 HGM (2002): Survey undertaken during 6 days in September allocated to 12 areas in GBR, foot and vehicle traverses of the area; four plots 10X10m (Map 9B: 9.4, 9.5, 9.6, 9.7 [shown as 9.8 on maps]) located in the area Vegetation mapping for the area is known from three studies: Alan Tingay and Associates (1991), Keighery *et al.* (2002) and HGM (2002). The first two studies map the full extent of the wetland system known as Minninup Swamp (see Map). The proposed Muddy Lake ROS encompasses approximately the southern half of the Swamp.
Summary of findings	**Vegetation:** Quindalup Dunes Uplands: *Agonis flexuosa* Low Forest to Open Forest, Low Woodland and Mallee; Open Low Heath dominated by *Scaevola crassifolia, *Pelargonium capitatum* and *Olearia axillaris*; Open Low Heath dominated by *Acanthocarpus preissii, Phyllanthus calycinus, Acacia cochlearis* and *Lepidosperma gracile* with emergent *Agonis flexuosa* var. *flexuosa*; *Acacia cochlearis* and /*Jacksonia furcellata* Heath Strand: Open Low Heath dominated by *Scaevola crassifolia,*

	Pelargonium capitatum* and *Olearia axillaris* Wetlands (damplands): *Agonis flexuosa* var. *flexuosa* Low Open Forest*; Banksia littoralis* Low Woodland over Tall Open Scrub dominated by *Xanthorrhoea preissii, Anthocercis littorea* and *Acacia saligna* Interface Quindalup and Spearwood Dunes: Wetlands (sumpland and lake - part Minninup Swamp): Closed Sedgelands dominated by *Lepidosperma* ?*effusum, L. gladiatum, Carex appressa, C. fasciculata, C. tereticaulis, Schoenoplectus pungens, Schoenoplectus validus* and/or **Typha orientalis* combinations of these with emergent *Acacia saligna, Banksia littoralis, Agonis flexuosa* var. *flexuosa* and *Melaleuca rhaphiophylla* dominated patches **Area natural vegetation/Vegetation Condition: The remnant vegetation mapping shows approx. half of the proposed ROS as remnant native vegetation. The area of sedgeland is not accurately mapped and is probably more extensive, however there are substantial degraded to completely degraded areas in the proposed ROS. These areas are either part of the sumpland or a buffer area to the west 100% Excellent to Good with occasional open areas; Natural Condition (trees and understorey largely intact) to Understorey Grazed (Alan Tingay and Associates 1991) **Total Flora:** 58 native taxa, 74 weed taxa (estimated >70% expected flora, HGM 2002) **Significant Flora:** *Calycopeplus oligandrus* (HGM 2002, Keighery *et al.* 2002), *Bromus arenarius*, *Bolboschoenus medianis* (listed in HGM, considered significant), *Jacksonia furcellata, Xanthorrhoea preissii, Lepidosperma* ?*effusum* (GJK & BJK 136) and *Lepidosperma* aff. *squamatum* (GJK & BJK 143) (Keighery *et al.* 2002)
Vegetation & Flora Survey Limitations	Alan Tingay and Associates (1991) study appeared to rely on mainly aerial photo interpretation. The area has a much more complex vegetation and wetland mosaic than shown in Tingay vegetation map (HGM 2002, Keighery *et al.* 2002). Tingay vegetation condition mapping scale not adequately explained. HGM (2002) and Keighery *et al.* (2002) limited duration, not sufficient field work to accurately map sumpland mosaic or vegetation condition
Regional	
Vegetation Complex	**Quindalup Dunes** - Quindalup Complex; **Marine Deposits** Vasse Complex; **Spearwood Dunes** - Karrakatta Complex (area not significant)
Vegetation types (Beard/Smith/Hopkins)	Shrublands; peppermint
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *17 *Melaleuca rhaphiophylla – Gahnia trifida* seasonal wetlands *19 Sedgelands in Holocene dune swales (see comment below) **Supergroup 4: Uplands centred on Quindalup Dunes** *29a Coastal shrublands on shallow sands *29b *Acacia* shrublands on taller dunes *30b Quindalup *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands
Threatened Ecological Communities	Keighery *et al.* (2002) and HGM (2002) consider that the communities of the Quindalup Dune damplands (see below), in particular the *Banksia littoralis* Low Woodland over Tall Open Scrub dominated by *Xanthorrhoea preissii, Anthocercis littorea* and *Acacia saligna*, is either FCT 19 or a rarer closely related ecological community. These dampland plant communities (extending north to Dalyellup and the

	Maidens) form a suite of wetland communities not known elsewhere on the Swan Coastal Plain (Keighery *et al.* 2002)
National/International Significance	Contains at least one Threatened Ecological Community listed under the EPBC Act 1999, FCT 19
Fauna	
Area Specific	
Fauna Survey	Alan Tingay and Associates (1991): Limited survey. Discusses previously compiled information, no on-ground survey. Provisional list of native animals compiled from general texts and anecdotal records from local people. HGM (2002): Survey undertaken during 25 - 30 September 2002 foot and vehicle traverses of the area; five trapping sites with pit traps, Elliott traps and cage traps for terrestrial vertebrates. Supplemented by opportunistic avifauna transects and microhabitat searching including spot lighting. Dell and Hyder-Griffiths (2002): 1-3 October 2002 a series of transects were walked and driven to assess habitat values and record all vertebrate fauna observed within the different plant communities, including spot lighting, dip netting for tadpoles and recording of frog calls. Seven broad vertebrate habitats were recognized as components of the damplands, sumplands, lakes and Quindalup Dunes as described by Keighery *et al.* (2002)
Summary of findings	Six frog species recorded and three other species likely to occur Thirteen species of reptile recorded 75 bird species recorded Six native mammal species recorded The area has a rich and diverse bird assemblage. This distinctiveness is further emphasised by the number of species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury, and the number of species that are of regional conservation significance. Species of conservation significance in the area include Splendid Fairy-wren, Southern Emu-wren, White-browed Scrubwren, Weebill, Broad-tailed Thornbill, Yellow-rumped Thornbill. The area also provides habitat for a large number of waterbirds. Three Schedule 1 species (Western Ringtail Possum, Quokka, Baudin's Black Cockatoo), two species protected under JAMBA/CAMBA treaties (Great Egret, White Ibis), two Priority 4 species (Water-rat, Quenda) recorded
Fauna Survey Limitations	All surveys are spring only and a single year. Surveys at other times would add additional species
Regional	
National/International Significance	Contains populations of at least three species listed under the EPBC Act 1999, Western Ringtail Possum, Quokka, Baudin's Black Cockatoo and two species protected under JAMBA/CAMBA treaties, Great Egret, White Ibis
Linkage Values	
Important part of the Wonnerup Estuary system. Part of Dalyellup/Gelorup/Crooked Brook and Maidens/Muddy Lakes/Ludlow/Coastal Ecological Linkages	
Wetlands, Creeklines, Rivers, Estuaries	
Wetland survey	Semeniuk (1998): Mapped wetland type, management category and suite for the area of the Swan Coastal Plain south of Mandurah
Type	Sumpland, Lake (WRC GIS 2002), survey identified substantial

	additional areas of dampland (Keighery *et al.* 2002, HGM 2002)
Management Category	All mapped wetland dampland areas from Keighery *et al.* (2002) and the contiguous sumpland/lake from WRC GIS (2002) are considered to be Conservation Category (Note: WRC GIS (2002) maps areas of Conservation (66.9ha HGM 2002) and Multiple Use). Over 82ha of the sumpland is recognised in an EPP lake. Areas of the sumpland are not currently naturally vegetated but as part of the wetland system are also considered to be Conservation Category and should be maintained and recognised as part of the whole wetland system
Suite	Big Swamp Minninup
Other Attributes	
Semeniuk (1998): The area of the proposed Muddy Lake ROS encompases the southern half of Minninup Swamp, which is the only wetland in the Minninup Consanguineous Suite. This Suite is recognised as a wetland of regional significance due to the following attributes: - Only wetland in the suite - Wetland processes representative of patterns within the suite - Coastal evolution - Avifauna use Alan Tingay and Associates (1991): Wetlands of the Upper-Stratham area have relatively high conservation value and should be conserved; Muddy Lakes should be incorporated into open space The remnant vegetation of the Vasse Complex has relatively high conservation value to water dependent fauna	
Further field survey	
Further detail is required on faunal assemblage and the extent of naturally vegetated sumpland and lake, detail of vegetation units in sumpland, information quality and type to identify floristic community types associated dampland area and location of any additional damplands in Quindalup Dunes	

Consideration Against Criteria	**Criterion Met**
Representation of Ecological Communities	**YES**
Regional vegetation representation	
Vegetation Complexes	Quindalup Complex; Vasse Complex
Floristic Community types	considered to be representative of vegetation complexes
Uplands and Wetlands	
Size and Shape: Much greater than 20ha (90.3ha). While not entirely naturally vegetated the non-vegetated areas are either part of the sumpland or the fringing dunes to the west to give a regular boundary to the west. Most of the eastern side of the sumpland is not buffered and small portions of the sumpland are not included in the proposed ROS. While elongate in shape, the size and width (mostly >300m) compensate for this. A range of upland and wetland communities/habitats is found in the area. Forms part of a wetland corridor for fauna and contiguous upland habitat types for seasonal faunal movement	
Vegetation Condition: Naturally vegetated areas are in Excellent to Good condition	
Comment: The largest most southern area of vegetated parabolic Quindalup Dunes on the Swan Coastal Plain. While >30% remains, areas proposed to be cleared reduce area remaining to approx. 30%. Upland vegetation of a quality and type to be considered typical of these Dunes in this location. Wetlands apparently unique. Vegetation of the Vasse Complex is highly variable, few sumplands of this type known elsewhere, <30% remaining vegetated. Wetlands and contiguous upland habitat types provides ecological linkages for fauna	
Diversity	**YES**
Landforms	diversity of form - vegetated coastline, coastal parabolic dunes, vegetated wetland swale damplands, sumplands
Vegetation Complexes	2
Floristic Community Types	5
Vegetation units	High diversity for vegetation units, related to complex of wetlands and

	uplands
Flora	Upland diversity typical, wetlands have an unusual diversity of sedges and shrubs/trees for Quindalup Dunes
Fauna	High diversity with 100 vertebrate species recorded
Comment: High diversity of Quindalup landform units and associated vegetation, diverse and wetland vegetation units. High vertebrate diversity is unique (100 vertebrate species recorded) on the southern Swan Coastal Plain	

Rarity	**YES**
Vegetation Complex <10% remaining	No complex at <10% remaining but note variability in Vasse
Threatened Ecological Communities	YES plant communities of Quindalup Dune damplands is either FCT 19 or a rarer closely related ecological community. These dampland plant communities (extending north to Dalyellup and the Maidens) form a suite of wetland communities not known elsewhere on the Swan Coastal Plain (Keighery *et al.* 2002)
Flora	7 significant taxa
Fauna	High vertebrate diversity. High number of conservation significant vertebrate species: three Schedule 1 species (Western Ringtail Possum, Quokka, and Baudin's Black Cockatoo), two species protected under JAMBA/CAMBA treaties (Great Egret, White Ibis), two Priority 4 species (Quenda and Water-rat) recorded. 17 conservation significant species listed as coastal plain declining species in *Bush Forever* (Government of WA 2000). Of the fauna known to be present in the region, other priority species utilise habitats similar to those present in the study area
Comment: Combination of vegetation units unique (together with northern area and Dalyellup proposed ROS), as well as associated habitats. 7 significant plant species. High vertebrate diversity is unique on the southern Swan Coastal Plain	
Maintaining Ecological Processes and Natural Systems	**YES**
Relationship/proximity to:	
Regional Ecological Link	Part of two ecological linkages: Dalyellup/Gelorup/Crooked Brook and Maidens/Muddy Lakes/Ludlow Ecological Linkages
Protected areas	Area proposed for protection since early 1990's
Naturally vegetated areas	Contiguous native vegetation to north and east
Creekline/River/Estuary	NA
Contains areas suitable for ecological restoration	Areas of the sumpland suitable, currently sedge growth controlled by burning and grazing, invasion by natives. Uplands restoration possible, *Agonis* readily colonises
Size and Shape, *Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance	**YES**
Comment: Only known combination of vertebrate assemblage currently existing on the Swan Coastal Plain. The only remaining Quokka population on the Swan Coastal Plain.	
General Criteria for the Protection of Wetland, Streamline and Estuarine fringing Vegetation and Coastal vegetation	**YES**
Comment: Quality and type of vegetation of the damplands, sumplands and lake areas, and the habitat these provide for, places these as Conservation Category of regional significance. Coastal vegetation	

SUMMARY NATURAL VALUES

Regional Significance - Assessment against Criteria

The Muddy Lakes ROS is part of a larger natural area of outstanding regional significance, the Dalyellup/Minninup Swamp Natural Area. This area contains a very large consolidated vegetated area of Quindalup Dunes uplands and wetlands and the eastern predominantly vegetated sumplands and lake of the Minninup Swamp. Two areas of of proposed ROS are located in the Dalyellup/Minninup Swamp Natural Area, Muddy Lakes ROS and the Dalyellup ROS. These areas of proposed ROS are centred on two EPP Lakes - Dalyellup and Muddy Lakes. The central area of Dalyellup/Minninup Swamp Natural Area is not included in ROS (Appendix 9).The central area of Dalyellup/Minninup Swamp Natural Area is not identified in the ROS

The Muddy Lakes ROS is considered to be a regionally significant natural area meeting all six criteria, being: *Representation of Ecological Communities*, *Diversity*, *Rarity*, *Maintaining Ecological Processes and Natural Systems*, *Scientific or Evolutionary Importance and General Criteria for the Protection of Wetland* and *Streamline and Estuarine fringing Vegetation and Coastal vegetation*. The natural attributes of the Muddy Lakes ROS that contribute to meeting these criteria are listed below. Some of these natural attributes are shared with the Dalyellup/Minninup Swamp Natural Area

- The largest most southern area of vegetated parabolic Quindalup Dunes remaining on the Swan Coastal Plain
- One of the few areas of Quindalup Dunes on the Plain with substantial wetland and upland area
- Substantial representative area of natural vegetation in Excellent to Good condition of the Quindalup and Vasse Vegetation Complexes
- The wetlands of the Vasse Vegetation Complex are highly variable, the sumplands of the Muddy Lake area (part of Minninup Swamp) are one of the few examples of its type, the most similar known being the sumpland/lakes of Yanchep National Park
- A highly diverse area with respect to diversity of Quindalup Dunes, wetlands, upland and wetland vegetation units, habitat and vertebrate diversity (100 vertebrate species recorded). The wetland and vertebrate diversity of the Dalyellup/Minninup Swamp Natural Area are considered unique on the southern Swan Coastal Plain
- The communities of the Quindalup Dune damplands are considered to be either a Threatened Ecological Community (floristic community type 19) or a rarer closely related ecological community. Floristic community type 19 is recognised by the State and is subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*
- Location for three rare species of fauna - Western Ringtail Possum, Quokka and Baudin's Black Cockatoo. These species are recognised by the State and are subject to protection under the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999*
- Only remaining Quokka population on the Plain
- High number of other significant vertebrate species: two species protected under JAMBA/CAMBA treaties (Great Egret, White Ibis), two Priority 4 species (Quenda and Water-rat) recorded. 17 conservation significant species recognised as declining on the Swan Coastal Plain
- Contains wetlands, Conservation category damplands, sumplands and lake areas of regional significance
- Contains the area of the EPP Lake - Muddy Lake
- Part of two ecological linkages: Dalyellup/Gelorup/Crooked Brook and Maidens/Muddy Lakes/Ludlow Ecological Linkages

Summary Comment in Relation to the Proposal

The Muddy Lakes ROS is part of the Dalyellup/Minninup Swamp Natural Area regionally significant natural area of outstanding value. The Muddy Lakes ROS encompasses much of the southern portion of this area. The current configuration of the ROS is considered suitable to protect these values as it addresses the following issues:

- contains substantial areas of naturally vegetated upland and wetland from the Quindalup and Vasse Vegetation Complexes;
- encompases the vegetated wetland units, including the area of actual or potential threatened ecological community; and
- contains habitat for the rare and significant flora and fauna

Areas of degraded and completely degraded wetland vegetation are included in the boundary as they are an integral part of the Muddy Lake portion of the larger Minninup Swamp sumpland and lake natural wetland suite

The identification of this area is consistent with the recommendations in HGM (2002) and advice from the Water and Rivers Commission.

The following issues need to be noted, as they have not been addressed within current boundary ROS:

- areas of sumpland on eastern side of Muddy Lake are outside ROS;
- no wetland buffer is accounted for on eastern side wetland; and
- the contiguous regionally significant natural areas to the north of the proposed Muddy Lakes ROS (south and contiguous with the proposed Dalyellup ROS) is outside the ROS boundaries.

PORT ACCESS ROAD (PAR) AREAS 9, 10 AND 11 AND ADJACENT/LINKING AREAS

INFORMATION	COMMENT
Background Information	
Area Name	Ferguson River South Natural Area , Davenport, City of Bunbury
Location	Area 9: Part Lot/Location 5545, Lots 5 and 10 Key to parts of site distinguished in Area 9 WT = 'western triangle' part Location 5545 ET = 'eastern triangle' part Lot 10 WR = west proposed PAR Res Lot 5 ER = east proposed PAR Res Lot 5 EER = east proposed PAR Res Lot 5 and east of the sand dune: Area 10: Reserve 40522, Part Location 5545 Area 11: Ferguson River
Size (ha)	Approx 90 ha native remnant vegetation
Reason for assessment	Determine regional significance of vegetation

Environmental Considerations	
General Policy	
Environmental Protection Policies (eg. SCP Lakes)	-
Groundwater Source Protection Area	-
Existing System 6 area	-
Adjacent System 6 Area	-
Submission System 6 Update (6)	No
Others	-

Environmental Considerations - Natural Attributes	
Landforms	
Bassendean Dunes/Pinjarra Plain Bassendean Sands over Guildford Formation (Qpb/Qpa: S10) **Pinjarra Plain** **Guildford Formation (Qpa: Msg4 and M)**	
Vegetation & Flora	
Area Specific	
Vegetation & Flora Survey	HGM (2002a and 2002b): Broad mapping and description of remnants, no specific detail on individual remnants or apparent ground truthing of boundaries of the remnants GDH (2002): DEP (2002): Selected remnants were surveyed over one day in September 2002 to consider the adequacy of the description of the natural values in Halpern Glick Maunsell (2002a and 2002b) in relation to EPA's strategy for identifying regionally significant natural areas in it consideration of the GBRS. GHD (2002): Selected remnants were surveyed over 2 days in October 2002 to 'confirm vegetation type, assess their local and regional significance and search for Declared Rare Flora or Priority flora.' (page 2, GDH 2002). Bennett (2003a&b): Area 10 & part 9 (WT) surveyed over 1 day in May and Areas 11 and majority 9 and adjacent areas over 2 days in June,

	transects of areas, described each unit, particular attention to wetlands.
Summary of findings	**Vegetation:** mapping HGM (2002), Bennett (2003a&b) Uplands Area 9 - *Eucalyptus calophylla* Open Forest (9:WT); *Eucalyptus calophylla, E. marginata* and *Banksia attenuata* Open Forest over *Kunzea glabrescens* Tall Open Scrub (9:WT); *Banksia attenuata, B. ilicifolia* and *Eucalyptus marginata* Woodland over patches of *Kunzea glabrescens* Tall Shrubland or scattered *Agonis flexuosa* and/or *Kunzea glabrescens* (9:ET, 9:WR (small area), 9: ER) Area 10 - *Eucalyptus marginata* and *Banksia attenuata* Low Open Forest to Woodland Area 11 - *Eucalyptus calophylla* Open Forest to Woodland over *Agonis flexuosa, Banksia attenuata* and *Kunzea glabrescnes* Low Woodland Wetlands (generally on clay soils, more typical Pinjarra Plain) Area 9 - *Melaleuca rhaphiophylla, M. preissiana* and *Banksis littoralis* Low Closed Forest (9:WT); *Melaleuca rhaphiophylla* Low Open Woodland over *Melaleuca teretifolia* and *M. viminea* Closed Tall Scrub (9: WR, Bennett 3.1); *Melaleuca preissiana* Low Woodland (9: WR, Bennett 4.3); *Melaleuca rhaphiophylla, M. preissiana* and *M. viminea* Low Closed Forest (9: ER/WR, Bennett 3.2) *Melaleuca rhaphiophylla* and *M. preissiana* Low Open Woodland (9: WR (majority)/ER , Bennett 3.3); *Melaleuca preissiana* Low Woodland over *Astartea* aff. *fascicularis* Closed Heath (9: ER, Bennett 4.1); *Melaleuca preissiana* and *Agonis flexuosa* Low Open Forest over *Astartea* aff. *fascicularis* Open Heath (9: EER, Bennett 4.2); *Astartea* aff. *fascicularis* Closed Tall Scrubwith emergent *Melaleuca preissiana* and *Eucalyptus calophylla.* (9: ER, Bennett 5.3); *Melaleuca preissiana* and *M. rhaphiophylla* Low Open Woodland (9: EER, Bennett 6); *Eucalyptus calophylla* Open Forest over *Agonis flexuosa* Low Open Woodland (9: WR) Area 10 - *Melaleuca preissiana* Low Open Woodland over a mosaic of shrub, sedge and herb dominated units; *Pericalymma ellipticum* and *Hakea varia* Closed Heath**;** *Eucalyptus calophylla* Low Open Forest occurs on the damp margin of the wetland. Area 11 - *Eucalyptus calophylla, E. rudis* and *Melaleuca rhaphiophylla* Forest (river bed) **Area native remnant vegetation/Vegetation Condition:** Area 9: Uplands: 85% Good to Degraded with patches in Very Good and Completely Degraded Condition; 15% Excellent to Very Good . Wetlands: variable, 80% Degraded to Completely Degraded, 20% Good to Very Good, occasional Area 10: Upland: Very Good to Good,; wetland Excellent to Very Good Area 11 - 100% Degraded to Completely Degraded but very good canopy **Total Flora:** Area 9: 105 native taxa (50 from WT) (GDH 2002, DEP 2002, Bennett 2003) Area 10: 86 native taxa (GDH 2002, DEP 2002, Bennett 2003) Area 11: 39 native taxa (DEP 2002, Bennett 2003) **Significant Flora:** Area 9: *Jacksonia sparsa* (P4) and *Acacia flagelliformis* (Bennett 2003a&b) Area 10: *Jacksonia sparsa* (P4) and *Verticordia attenuata,* (Bennett 2003a&b), *Caladenia speciosa* (GDH 2002), *Schoenus brevisetis* (DEP 2003) and *Acacia flagelliformis* (GDH 2002, DEP 2002) Area 11: *Darwinia citriodora, Trymalium floribundum* and *Acacia*

	urophylla (DEP 2002)
Vegetation & Flora Survey Limitations	Limited survey but, sufficient survey to place regionally. No vegetation condition mapping.
Regional	
Vegetation Complex	**Combinations of Bassendean Dunes/Pinjarra Plain** Southern River Complex (Area 9 (western)&10) **Pinjarra Plain (not mapped, inferred)** Guildford Complex (Area 9 (eastern) Swan Complex (Area 11)
Vegetation types (Beard/Smith/Hopkins)	Mosaic; medium forest; jarrah- marri/low woodland; banksia
Floristic Community Types (FCT) *type inferred	**Supergroup 2: Seasonal Wetlands** *4 *Melaleuca preissiana* damplands *?7 Herb rich saline shrublands in clay pans * ?12 *Melaleuca teretifolia* and/or *Astartea* aff. *fascicularis* shrublands **Supergroup 3: Uplands centred on Bassendean Dunes** *21a Central *Banksia attenuata – Eucalyptus marginata* woodlands *21c Low lying *Banksia attenuata* woodlands or shrublands
National/International Significance	
Fauna	
Area Specific	
Fauna Survey	No comprehensive fauna survey has been conducted. 1/2 day habitat assessment and possum and bird survey by DEP July 2003
Summary of findings	22 bird species, 3 amphibian species, 4 native mammal species (DEP 2003). Western Ringtail Possum (listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments) and Brushtail Possums were recorded in Areas 9, 10 and 11 and the Quenda (on CALM Priority fauna list) was recorded in Area 11. There are a number of bird species present which have declined elsewhere on the Swan Coastal Plain between Perth and Bunbury and are of regional conservation significance. Seven bird species of conservation significance in the area include Yellow Robin, Golden Whistler, Splendid Fairy Wren, Broad-tailed Thornbill, Yellow-rumped Thornbill, White-browed Scrubwren, and New Holland Honeyeater.
Fauna Survey Limitations	Surveys at appropriate seasons are required to document the fauna of the areas.
Regional	
National/International Significance	Contains populations of at least one species listed under the EPBC Act 1999
Linkage Values	
Adjacent native vegetation to west, southwest and east; this site forms a significant block in McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage	
Wetlands, Creeklines, Rivers, Estuaries	
Type	Dampland, sumpland, palusplain
Management Category	Conservation/Resource Enhancement (determined from vegetation survey), Multiple Use
Suite	Bennet Brook (BP.4)
Conclusions from survey	Not consistent with database (WRC 2002), areas of wetland with vegetation in good or better condition should be classed as Conservation and those with significant native vegetation cover, especially on clay based wetlands contiguous with areas in better condition and uplands should be Conservation and/or Resource Enhancement
Other Attributes	

Further field survey
Comprehensive fauna survey of these areas and more detailed condition mapping of upland vegetation of Area 9 is required.

Consideration Against Criteria **This is combined for Areas 9, 10 and 11**	**Criterion Met**
Representation of Ecological Communities	**YES**
Vegetation Complexes (constrained area retention level 10%)	Within the Constrained Area, 32.3% Southern River Complex remains but less than 10% (currently 7.6%) currently identified as proposed and existing ROS. 13.2% Guildford Complex remains, 0.4% currently identified as proposed and existing ROS. However as only 5% of the Guildford Complex remains on the whole of the southern Swan Coastal Plain it is essential to retain all existing Guildford Vegetation Complex.
Floristic Community types	5, however two types, 7and 12 are significantly impacted by disturbance they are provisionally allocated to these Floristic Community Types
Uplands and Wetlands	Variety of wetland units, all contiguous with substantial upland areas, especially in Area 9
Size and Shape: Areas 9 and 10 are contiguous forming a large(>20ha) unit of both wetland and upland	
Vegetation Condition: Condition is very variable, northern sections (WT&ET) are both relatively intact however remaining sections of Area 9 are significantly impacted by grazing. Area 11 is Completely Degraded, but this is not uncommon for this type of vegetation and size (i.e. riverine and narrow). It is the best known areas of its type remaining on the Ferguson River and it provides significant fauna habitat for tree-frequenting species.	
Relationship/proximity to:	
Naturally vegetated areas Protected areas Other regionally significant naturally vegetated areas	Area 9, together with Area 10, forms a consolidated bushland area Area 10 and part Area 9 are part of a CALM Miscellaneous Reserve, Area 11 connects to Area 10 through the Ferguson River ROS/proposed ROS
Contains areas suitable for ecological restoration	Yes, especially areas of severe localised disturbance, should be kept and restored so the entire site functions better as part of the ecological linkage. Removal of grazing over much of Area 9 should lead to improvement in condition.
Comment: A representative area of very significant size and diversity of contiguous upland and wetland units but variable condition.	
Diversity	**NOT KNOWN**
Landforms	
Vegetation Complexes	
Floristic Community Types	
Vegetation units	Diversity of wetland vegetation units
Flora	Area 11 is diverse for its type
Fauna	
Comment:	
Rarity **that it would be considered regionally significant on this criterion alone)**	**YES (not to a degree**
Vegetation Complex	Intact wetlands in Area 9 and 10 are most like wetlands on heavier soils of Pinjarra Plain and Area 11 is one of few remnants associated with Rivers in the GBR with some diversity of species
Threatened Ecological Communities	Condition of these units is such that they not considered good examples of their type.
Flora	Area 9: *Jacksonia sparsa* (P4) and *Acacia flagelliformis* (Bennett 2003a&b) Area 10: *Jacksonia sparsa* (P4) and *Verticordia attenuata,* (Bennett

	2003a&b), *Caladenia speciosa* (GDH 2002), *Schoenus brevisetis* (DEP 2003) and *Acacia flagelliformis* (GDH 2002, DEP 2002) Area 11: *Darwinia citriodora, Trymalium floribundum* and *Acacia urophylla* (DEP 2002)
Fauna	
Comment: while	
Maintaining Ecological Processes and Natural Systems **YES**	
Relationship/proximity to:	
Regional Ecological Link	McLarty/Kemerton/Twin Rivers/Preston River/Gwindinup Ecological Linkage
Creekline/River/Estuary	Ferguson River
Contains areas suitable for ecological restoration	see above
***Size and Shape**, Uplands and Wetlands & Vegetation Condition* - see Representation of Ecological Communities	
Comment:	
Scientific or Evolutionary Importance **NOT KNOWN**	
Comment:	
General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation **YES**	
Comment: Wetlands in Area 10, Area 9/WT and Conservation Category Wetland	

SUMMARY NATURAL VALUES

Regional Significance - Assessment area against the Criteria

Area 9 as part of this consolidated site is considered to be a regionally significant natural area as it meets three criteria, being: *Representation of Ecological Communities*, *Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes that contribute to meeting these criteria are listed below:

- Contains a series of upland and wetland vegetation units typical of vegetation of the Southern River vegetation complex in predominantly Good to Degraded condition with patches in Very Good to Excellent
- Contains a wetland area which supports a mosaic of vegetation units allied with Pinjarra Plain vegetation
- Contains a palusplain wetland area supporting patches of vegetation of a quality and type deserving of designation as a Conservation category wetland and a population of the priority species *Acacia flagelliformis*
- Is one of only two large remnants within the Constrained portion of the GBR in the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup Ecological Linkage (the other remnant is contiguous with Area 7 on the Bunbury Outer Ring Road reserve)
- Together with Area 10 forms a consolidated bushland area with a diversity of vegetation units and flora which provides a variety of habitats for fauna
- Includes fauna listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments;
- Contains 7 bird species listed as declining on the Swan Coastal Plain (Government of Western Australia 2000b) and
- The upland and wetland habitats are likely to maintain a diverse bird assemblage with significant feeding and breeding areas

- canopy but in a generally Degraded condition
- Contains nearly 40 native species, a high diversity of plant species for its type
- Is the location of a series of significant species associated with riverine remnants on the SCP including, *Darwinia citriodora, Trymalium floribundum* and *Acacia urophylla*
- Includes fauna listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments (Western Ringtail Possum);
- Contains 2 bird species listed as declining on the Swan Coastal Plain (Government of Western Australia 2000b);
- Is located in the Preston/Ferguson River Ecological Linkage

the area has some level of protection, being a reserve for Park, Recreation and Drainage

Area 10 is considered to be a regionally significant natural area as it meets four criteria, being: *Representation of Ecological Communities, Rarity, Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes that contribute to meeting these criteria are listed below:

- Contains a series of upland and wetland vegetation units typical of vegetation of the Southern River vegetation complex in predominantly Excellent to Good conditio;
- Contains a wetland area which supports a mosaic of vegetation units allied with Pinjarra Plain vegetation
- Contains a wetland area supporting vegetation of a quality and type deserving of designation as a Conservation category wetland
- Is the location of a series of significant species associated with wetlands of the Pinjarra Plain including, *Schoenus brevisetis* and *Acacia flagelliformis* which are both priority species;
- Is the location of *Caladenia speciosa* (GDH 2002) and *Verticordia attenuata*, a priority species
- Includes fauna listed under the EPBC Act (1999) and WA Wildlife Conservation Act 1950 and subsequent amendments
- Contains 2 bird species listed as declining on the Swan Coastal Plain (Government of Western Australia 2000b)
- Is located in the south McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup Ecological Linkage
- The area has some level of protection, being a CALM miscellaneous reserve

Area 11 is considered to be a regionally significant natural area as it meets five criteria, being: *Representation of Ecological Communities, Diversity, Rarity, Maintaining Ecological Processes and Natural Systems* and *General Criteria for the Protection of Wetland, Streamline and Estuarine Fringing Vegetation and Coastal Vegetation*. The natural attributes that contribute to meeting these criteria are listed below:

Contains several vegetation units typical of vegetation of the Swan vegetation complex with intact

Summary Comment in relation to the proposal

The three areas are considered to be regionally significant individually and as a whole, forming a north south sequence of wetland and upland naturally vegetated units within the McLarty/Kemerton/Twin Rivers/Preston River/Gwindinnup Ecological Linkage. The proposed PAR Reserve would impact significantly on Areas 10 and 11 and would separate the western wetland area form the eastern upland in Area 9. As one of the largest natural areas in this Ecological Linkage it is considered advisable to locate the proposed PAR Reserve between the Ferguson River and X Road so that impact on Areas 9, 10 and 11 is avoided. Both GDH (2002) and Bennett (2003) considered Area 10 to be regionally significant and Bennett (2003) also identified Area 11 as being regionally significant (GDH did not consider Area 11). Avoiding impact on Area 10 and 11 would also limit impact on Area 9 allowing for the retention of a large natural area with contiguous wetland and upland areas. The conservation of suitable potions of Area 8, 9 and 10 needs to be addressed in the proposed 'Country Bush Forever'.

Additional references

Bennett Environmental Consulting Pty Ltd 2003a Vegetation and Flora Port Access Road Route off Boyanup – Picton Road. Reserve 40552, Location 5545. An unpublished report for Main Roads WA Bunbury

Bennett Environmental Consulting Pty Ltd 2003b Vegetation and Flora of Selected Sites Bunbury Outer Ring Road and Port Access Road. An unpublished report for Main Roads WA Bunbury.

Background

A summary assessment sheet is used to consider the natural values of sites in the Greater Bunbury Region Scheme against the criteria to identify regionally significant natural areas in the EPA's Natural Area Strategy (Appendix 3). This sheet was developed from a sheet used to consider natural areas in the Perth Metropolitan Region against the *Bush Forever* criteria.

The assessment process considered all known available information relevant to the application of the criteria. Information came from both regional datasets in the table below and area specific survey. The regional datasets are not referenced in each sheet. These references are listed in the Bulletin reference list (Appendix 16) and the Natural Area Strategy (Appendix 3). The sources of specific area information are referenced in the Assessment sheets. However unless a source is specifically quoted the information is summarised from several sources. These references are listed in the Bulletin reference list.

National and Regional Information Sets for the Swan Coastal Plain (after table prepared by DEP Conservation Branch in 1997).

LANDFORM AND SOIL

(various sources)

VEGETATION AND FLORA

Vegetation Types (Beard 1979a, b&c, Beard 1981; Smith 1973 & 1974 and Hopkins *et al.* 1996)*
Vegetation Complex (Heddle *et al.* 1980 and CALM)
Floristic Community Types (Gibson *et al.* 1994, DEP 1996)

WETLANDS

Wetland Types (Hill *et al.* 1996a&b and as updated periodically by WRC)
Consanguineous suite (Hill *et al.* 1996a&b)
Wetland Management Objective (after Hill *et al.* 1996a&b, Semeniuk 1998 and as updated periodically by WRC)
Lake's EPP (Government of WA 1992)

THREATENED ECOLOGICAL COMMUNITIES

after English and Blyth 1997 and as updated periodically by CALM

THREATENED SPECIES

CALM current Declared Rare and Priority Flora and Fauna Lists, reports, specific area survey

INTERNATIONAL AND NATIONAL SIGNIFICANCE

Reference to international treaties, Commonwealth Environment Protection and Biodiversity Act 1999, listing on the register of the National Estate etc.

*Not applied in Government of WA (2000a&b), see Appendix 2 for description of the dataset.

Sheet Numbers	ASSESSEMENT SHEETS FOR NEW ZONES AND RESERVES
Urban and Urban Deferred	
1.	Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant (Urban Deferred), Lots 27, 150, 151, 1 and 21 Paris Road (north), Australind (Urban Deferred) and Lot 3 Paris Road (south), Australind
2.	Part Lot 1 Washington Ave, part lots 3, 4 and 8 Bussell Hwy, Loc 632 Parade Road, and part lots 302 and 303, South Bunbury, City of Bunbury
3.	Dalyellup Beach Estate
4.	Lots 313-317 south of Harewoods Rd, South Dalyellup
5.	Reserve 31012 Harewoods Road, Dalyellup (Urban Deferred zone)
6.	Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup
7.	Lot 35 Spurr Street, Capel (west)
Industrial	
8.	Reserve 670, Lots 1 and Pt Lot 5 North Boyanup Road, Davenport
9.	Lot 15 North Boyanup Road
Primary Regional Road and Rail Reserves	
10.	Boyanup Bypass Road
Regional Open Space Reserve	
11.	Locations 7 and 14 Buffalo Rd, Binningup
12.	Twin Rivers - Pt Lot 211 Barnes Avenue, Australind
13.	College Grove - Lot 1000 Bussell Highway
14.	Muddy Lakes-Minninup Rd, Capel
15.	Port Access Road (PAR) Areas 9, 10 and 11 and adjacent linking areas

Appendix 6

List of submitters

NAME	ADDRESS	ADDRESS	ADDRESS	ADDRESS	ATT
General Manager	Bunbury Port Authority	PO Box 4	BUNBURY WA 6231		
Trevor Prowse	7 Holtzman Place	BUNBURY WA 6231			
Brian & Lynnette Hastie	RMB 348	STRATHAM WA 6237			
Lee-Anne Abdo	3/238 Spencer Street	BUNBURY WA 6230			
Edward Byrne	C/- RMB 267 Minninup Road	STRATHAM WA 6237			
John & Pam Colum	42 Mardo Avenue	AUSTRALIND WA 6233			
Judy Jarvis	16 Barnes Avenue	AUSTRALIND WA 6233			
N & J Purchon	16A Laura Avenue	AUSTRALIND WA 6233			
John & Judy Baker	50 Carpenter Terrace	AUSTRALIND WA 6233			
Chris M Bishop	83 Lucy Victoria Avenue	CLIFTON PARK WA 6233			
Jeffrey Hardwick & Marjan Lefaucheur	PO Box 17	CAPEL WA 6271			
Mario Giacci	Giacci Bros Pty Ltd	South Western Highway	PICTON WA 6229		
Margaret J Forbes	PO Box 476	HARVEY WA 6220			
Tony & Linda Barker-Jones	26 Westwood Street	BUNBURY WA 6230			
Janet Bartlett	175 Barnes Avenue	AUSTRALIND WA 6233			
Natalie L Harwood	12 Hudson Road	BUNBURY WA 6230			
Philip & Arlene Jane	c/- PO Box A 251	AUSTRALIND WA 6233			
Nicholas D'Rosario & Emily K Bailey	6 Cruise Road	SAFETY BAY WA 6169			
Astrid Doig	124 Paris Road	AUSTRALIND WA 6233			
Isobel & Laurence Bryant	15 Clarke Street	BUNBURY WA 6230			
Paul Taylor & Caroline Gibbney	197 Rothesay Crescent	AUSTRALIND WA 6233			

Ivan D'Rosario & Kerry A D'Rosario	13 Barnes Avenue	AUSTRALIND WA 6233			
Elaine M Page	51 Pearce Road	AUSTRALIND WA 6233			
Mary Ward	164 Lucy Victoria Ave	CLIFTON PARK WA 6233			
Jill P Mazza	12 Brookview Avenue	GELORUP WA 6230			
Philip Cox	Bunyarra Farm Pty Ltd	C/- PO Box 380	HARVEY WA 6220		
Mervyn W Catchpole	10 Laura Avenue	AUSTRALIND WA 6233			
Norman & Margaret Jackson	2A Cecil Street	AUSTRALIND WA 6233			
John Ferguson	PO Box 73	DARDANUP WA 6236			
H, O & D May	Lot 10 Picton-Boyanup Road	PICTON WA 6229			
William C Scott	171 Kent Street	BUSSELTON WA 6280			
Ray and Carol Valli	C/O Thompson Consulting Surveyors	PO Box 1719	BUNBURY WA 6231		
R & L Kelly	27 Valentine Way	AUSTRALIND WA 6233			
The Secretary	Preston Environment Group	RMB 652	DONNYBROOK WA 6239		
Bradley Williams & Julie Egan	PO Box 758	BUNBURY WA 6230			
Larry & Jenny McLain	3 Champion Street	BUNBURY WA 6230			
Philip E J & Lynden C Howe	6 Eastwell Road	AUSTRALIND WA 6233			
Grahame & Margaret Tidy	25 Barnes Avenue	AUSTRALIND WA 6233			
Joe Miller & Alice Douglass	Lot 4208 Harris Road	PICTON WA 6229			
Manager	Department of Agriculture	PO Box 507	HARVEY WA 6220		NEIL GUISE
Peter Gervassi	63 Hayward Street	HARVEY WA 6220			
Rob & Heather Coleman	30 Eastwell Road	AUSTRALIND WA 6233			
Alison Ager	38 Risby Street	GOSNELLS WA 6110			
Malcolm, Jean & Stanley Hayes	C.M.B Cookernup	VIA HARVEY WA 6220			
Clive & Tess Reid	PO Box 30	BOYANUP WA 6237			
Caribbean Investments Pty Ltd	C/O John Taylor	Thompson Consulting Surveyors	PO Box 1719	BUNBURY WA 6231	
Lynette R Clarke	57 Vickery Crescent	BUNBURY WA 6230			

Keith & Tanuja Sanders	Lot 124 Old Coast Road	AUSTRALIND WA 6233			
David Addy	7 Benson Court	BUNBURY WA 6230			
Chief Executive Officer	Shire of Capel	PO Box 369	CAPEL WA 6271		
Thomas F Hutton	PO Box 28	CAPEL WA 6271			
C Thornstensen	GeoCatch	PO Box 269	BUSSELTON WA 6280		
Director General	Department of Industry & Resources	PO Box 7606	CLOISTERS SQUARE WA 6850		S WEBSTER
Steven Mewett	21 Watermass Place	AUSTRALIND WA 6233			
K V & G K Caratti	19 Jamieson Road	CAPEL WA 6271			
David S & Joanne E Callis	31 Dawe Street	AUSTRALIND WA 6233			
Manager	Main Roads Western Australia	PO Box 5010	BUNBURY WA 6231		ROB GILLESPIE
Bradley M & Kimberley C Piacentini	PO Box 308	BUNBURY WA 6231			
Chief Executive Officer	City of Bunbury	PO Box 21	BUNBURY WA 6231		PAUL DAVIES
Sue Merritt	Lot 25 South Western Highway	GWINDINUP WA 6237			
Michael Tichbon	Land Conservation District Committee	PO BOX 82	CAPEL WA 6271		
Ernest C Manea	36 Mangles Street	BUNBURY WA 6230			
Sandra & Terry Wooltorton	RMB 258	BOYANUP WA 6237			
Robert B & Muriel F Norris	Lot 4 Jeffrey Road	GLEN IRIS WA 6230			
James Forrest	C/O D Brennan	PO Box 400	BUSSELTON WA 6280		
Antonio Carbone	PO Box 118	BRUNSWICK WA 6224			
Manager	Carbone Bros. Pty Ltd	PO Box 61	BRUNSWICK WA 6224		
R & J Ranson & B & R Harris	C/- Elizabeth Crescent	BUNBURY WA 6230			
V & V Walsh	C/O Rizzo Associates	Level 4, 731 Hay Street	PERTH WA 6000		
Debbie Payne	2 Hockins Place	AUSTRALIND WA 6233			
Bernard W Ridley	PO Box 35	BRUNSWICK WA 6224			
Rodney & Fiona Bywaters	6 Riverview Place	CAPEL WA 6271			
K J Potter	PO Box 440	COTTESLOE WA 6911			

Ardross Estates (SA) Pty Ltd	C/O Mitchell Goff & Associates	PO Box 104	WEST PERTH WA 6872		
Harvey Beach Estate Syndicate	C/O Mitchell Goff & Associates	PO Box 104	WEST PERTH WA 6872		
Prindiville Investments Pty Ltd	C/O Mitchell Goff & Associates	PO Box 104	WEST PERTH WA 6872		
The Secretary	Australind Bushland Council	C/- PO Box A156	AUSTRALIND WA 6233		
Lionel K Craigie	PO Box 167	HARVEY WA 6220			
C Sharp	Brockman Street	BALINGUP WA 6253			
The Secretary	Bunbury Naturalists Group Inc.	5 Egret Court	AUSTRALIND WA 6233		
Rita Watkins	5 Gulf Way	AUSTRALIND WA 6233			
BGC	C/O 'Greg Rowe & Associates	24-26 Wickham Street	EAST PERTH WA 6004		
Peter Campagnolo	15 McTaggart Road	CAPEL WA 6271			
Kevin Campedelli & Lois Wood	Lot 1 Honeymoon Road	HARVEY WA 6220			
M G, P M G & J C Smith	Parkfield Old Coast Road	PARKFIELD WA 6233			
Lorraine & Steve Dimor	19A Stanton Street	EATON WA 6232			
Henry C Cooke	38 Loretta Avenue	GELORUP WA 6230			
The Secretary	Myalup Community Association Inc.	24 Manning Street	MYALUP WA 6220		
A J Higgens	12 Scott Road	CAPEL WA 6271			
Jane C Morrow	Punchbowl Caravan Park	Holywell Street	BUNBURY WA 6230		
Roger Kay	Capel Dairy Company	PO Box 57	CAPEL WA 6271		
John Vukovic	21 Whitley Place	BUNBURY WA 6230			
G & S Bryce , & G Rosenthal	22 Boyalla Street	BUNBURY WA 6230			
Wesfi Ltd and Wespine Ltd	C/O Tony Lambert	Chappell & Lambert Pty Ltd	PO Box 796	SUBIACO WA 6904	
Lycaste-Jefferies Trust	RMB 187 Minninup Road	STRATHAM WA 6237			
Roger & Lyndon Edwards	Wellesley Road	WELLESLEY WA 6233			
Australian Vanguard Ltd	C/O Jenny Smithson	BSD Consultants	PO Box 155	SUBIACO WA 6904	
Trevor & Bev Fortescue	35 Eulalia Street	BUNBURY WA 6230			

Edward Turner	Coonawarra Nominees Pty Ltd	Turner Master Planners Australia	PO Box 430	VICTORIA PARK WA 6979	
Sherrilee Thomas	20 Wellington Street	BUNBURY WA 6230			
L J Whitton	8 Fairbridge Road	HALLS HEAD WA 6210			
Ian J & Joanne M Newman	3 Eades Street	BUNBURY WA 6230			
Jillian Anne Clarke	67 Cutler Road	CLONTARF NSW 2093			
Michael & Merryilyn J Gollan	PO Box 40	BUNBURY WA 6231			
Malcolm Forrest	4 Acacia Street	BUNBURY WA 6230			
Howard Ware & Leslie Nicholson	23 Park Road	MT LAWLEY WA 6050			
Frank & Jean Brockman & Family	Minninup, Mangles Road	CAPEL WA 6271			
Gemma Basley		Thompson McRobert Edgeloe	PO Box 733	BUNBURY WA 6231	Ref: 00090 D Scott
Ray Anderson	PO Box 272	COLLIE WA 6225			
T W Tyson	Cable Sands (WA) Pty Ltd	Koombana Drive	BUNBURY WA 6230		
David F James	284 Commercial Road	FORRESTDALE WA 6112			
Geoff Tothill	1 Wellesley Road	BINNINGUP WA 6233			
George Bell	38 Hawkins Drive	GELORUP WA 6230			
Brendan Kelly	10 Turner Street	BUNBURY WA 6230			
Bevan & Kathryn Jilley	Lot 7 Minninup Road	STRATHAM WA 6237			
Gordon L Roberts	3 Buchanan Road	CAPEL WA 6271			
Bernard K Masters	PO Box 516	BUSSELTON WA 6280			
Peter & Faye Giadresco	Lot 1 Calinup Road	GELORUP WA 6230			
Chief Executive Officer	Shire of Harvey	PO Box 500	HARVEY WA 6220		
The Secretary	Bunbury-Wellington Economic Alliance	3 Little Street	DARDANUP WA 6236		
Conservation Secretary	Wildflower Society of WA	PO Box 64	NEDLANDS WA 6909		
L R Cambrey	Marist Brothers Province Centre	7 Tuscany Rise	TEMPLESTOWE VIC 3106		
Marist Brothers Community Inc.	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		

Vukelic Holdings Pty Ltd	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		Ref: 99057
Andrew G Thomson	28 Tralee Way	WATERFORD WA 6152			
Secretary	South West Environment Centre	PO Box 693	BUNBURY WA 6231		
Barrie J & Margaret Gelmi	Harris Road	WATERLOO WA 6228			
Managing Director	Water Corporation	PO Box 100	LEEDERVILLE WA 6902		Ref: 'JT1 2000 06657 VO.1 Brendan Toohey
Bernhard Bischoff	15 Forster Street	BUNBURY WA 6230			
Warwick Hemsley	Peet & Company Ltd	Level 7, 200 St George's Terrace	PERTH WA 6000		
Ross W Price	PO Box 22	CAPEL WA 6271			
Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231			Ref: 00244, F E Brockman
Planning Solutions (Aust) Pty Ltd	Bunbury Industrial Park	PO Box 1138	EAST VICTORIA PARK WA 6981		
Filip Guglielmana	5 Jamieson Road	CAPEL WA 6271			
Manager	Department of Conservation and Land Management	PO Box 1693	BUNBURY WA 6231		Ref: 922.4 P Hanly
Philip J Smith	23 Dunstan Street	BUNBURY WA 6230			
Albert J & Angela F Milne	123 Old Coast Road	BINNINGUP WA 6233			
The Minninup Road Landholders	C/O B & K Jilley	7 Minninup Road	STRATHAM WA 6237		
Ronald E Roberts	"Rosemore" RSM 118	STRATHAM WA 6237			
Manager	Water And Rivers Commission	PO Box 261	BUNBURY WA 6231		Ref: SW9444, Damon Carter
Robert A & Jo-Anne M Selkirk	PO Box 120	BOYANUP WA 6237			
Scott & Lynden Carruthers	282 Ocean Drive	BUNBURY WA 6230			
Patricia Beauglehole	Lot 15 Australind By-Pass Road	GLEN IRIS WA 6230			
Chief Executive Officer	Shire of Dardanup	1 Council Drive	EATON WA 6232		Ref: T227, Mark Jones
Brook Village, Ministry for Housing	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		

Shearwater, Ministry for Housing	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		
Dalyellup Beach Estate Pty Ltd	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		
00310 Vittoria Heights Estate	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		
Dardanup Butchering Company, 6 Wimbridge Road	C/O Thompson McRobert Edgeloe Pty Ltd	PO Box 733	BUNBURY WA 6231		
Lyndon G Rowe	Chamber of Commerce and Industry Western Australia	PO Box 6209	EAST PERTH WA 6892		
Jeremy Bolwell	Allwest First National Real Estate	PO Box A111	AUSTRALIND WA 6233		
Bowman Bishaw Gorham	PO Box 465	SUBIACO WA 6904			

Appendix 7

Summary of submissions and the Environmental Protection Authority and the Western Australian Planning Commission response to the environmental submissions

REGIONAL OPEN SPACE						
No.	Points Raised	Submissions Raising Points	Total	WAPC Comment	WAPC Response	EPA Recommendation
Areas the subject of varying points of view						
1	Twin Rivers					
	a) Support inclusion of all of Lot 211 Barnes Ave in ROS because it provides a valuable range of vegetation types and habitats that are now limited in the area, it provides a passive recreation and education resource, it contains threatened species such as the Southern Brown Bandicoot and possibly the Quenda, and it is recognised in LIMA's Waterways Protection Precinct and EPA's System 6 Report.	24, 25, 27, 29, 35, 36, 38, 42, 44, 45, 49, 51, 52, 54, 55, 58, 59, 62 - 65, 69, 79, 88, 89, 99, 100, 110, 126, 149, ABC, 165, 177, 184, 218, SWEC, WRC	37	Lot 211 is zoned Residential under the Shire of Harvey TPS No.1 and has been recognised as suitable for residential development in regional and local planning strategies over many years. Historically, the need for a foreshore reserve along sections of the Collie and Brunswick Rivers adjoining Lot 211 has also been acknowledged. The foreshore reserve shown in Shire of Harvey's current TPS No.1 was originally approved in 1993. More recently, the significance of the foreshore reserve as a wildlife corridor, the conservation value of other remnant vegetation on Lot 211 and the strategic importance of this site for recreation have been highlighted. Accordingly, the WAPC reviewed the foreshore reserve shown in Shire of Harvey TPS No.1 and found it should be increased to protect regional conservation and recreation values associated with the site, but that these values do not justify reservation of the entire site. The Regional Open Space (ROS) reserve proposed by the advertised GBRS, which will more than double the size of the existing reserve, was delineated based on a technical assessment of conservation and recreation values and in recognition of the current Residential zoning. The WAPC commissioned an independent environmental study to review the adequacy of the proposed ROS. While the study concludes that the entire site has conservation value, it recommends that the enlarged reserve proposed by the GBRS is acceptable in the circumstances subject to minor modification of the proposed boundary alignment to better protect regionally significant natural values and a practical boundary with the Urban land.	Note. However, the proposed ROS boundary shall be modified as depicted on Map 1 Appendix 8). Should it be decided that virtually the whole of the site is to be reserved, it is recommended that the subdivision boundary (blue line) as shown Map 1 be permitted. This boundary allows a practical rounding off of development at a road separating residential use from ROS which is consistent with WAPC policy.	Refer to Section 9.3 for details of the EPA's assessment and recommendations.
	b) ROS over Lot 211 Barnes Ave should be reduced to reflect the Greater Bunbury Structure Plan, local TPS and approved local structure plan.	231, 232, 240, 269	4	The portion of Lot 211 shown on the *Greater Bunbury Structure Plan (1995)* as Parks, Recreation and Drainage is greater than the area reserved Recreation by the Shire of Harvey TPS No.1. Whilst the ROS boundary proposed by the GBRS is not consistent with the boundary indicated on the *Greater Bunbury Structure Plan*, the purpose of the latter was not to define the actual reserve boundary but to	Dismiss. Subject to the modification of the boundary alignment referred to in 1(a) above, the proposed additional area of ROS has regionally	Refer to Section 9.3 for details of the EPA's assessment and recommendations.

				indicate the general need for a reservation. The GBRS will define the reservation over Lot 211 required to adequately protect regional conservation and recreation values. The investigations undertaken on behalf of the WAPC indicate that subject to modification of the boundary alignment, the proposed additional area of ROS has regionally significant conservation values that should be protected.	significant conservation values that should be protected.	
	c) No environmental justification for ROS boundary over Lot 211 Barnes Ave.	232, 240	2	The boundary recommended by the WAPC's independent environmental study is based on environmental considerations including vegetation, wetlands and flooding.	Dismiss.	Agree with WAPC response. For further details of the EPA's assessment and recommendations also refer to Section 9.3.
2	Ocean to Preston River Regional Park.					
	(a) Through detailed vegetation survey, further consideration should be given to including additional areas of remnant bushland in the Park around the Maidens and the Tuart Forest and between Usher and Hay Park, the Bussell Highway and Manea Park (north and south of College Grove) and Manea Park and the Preston River.	110, 120, C/B, 194, 218, SWEC, 239, 248	8	Generally, the ability to include additional areas in the Park at this stage is limited because such modifications would constitute substantial variations to the advertised GBRS. However, amendments to the Scheme Map can be made once the GBRS is operational. A future Park enhancement study shall be undertaken by the WAPC to identify additional areas suitable for inclusion in the Park and to determine management priorities and processes for the Park. Notwithstanding this, some additional areas can be included in ROS because of their particular circumstances. For example, the WAPC's independent environmental study concludes that the undeveloped portion of Pt Loc 302 and 303 south of Mosedale Road, Usher, which is Crown land proposed to be zoned Urban by the GBRS, has regionally significant conservation value. As this is Crown land and because of its conservation value, the GBRS should be amended to reserve this land ROS. The WAPC's environmental study recommends a small corner of Pt Loc 632 east of Parade Road be added to the regional park. A submission on behalf of the main landowner in this area supports this modification. The EPA's Service Unit has indicated to the College Grove developer an appropriate width for the east-west open space link to the south of College Grove and the GBRS should be modified to accord with this advice. The WAPC's environmental study concludes that the portion of Pt Loc 632 west of Parade Road, two areas adjacent to the proposed north-south ROS corridor between Usher and Hay Park, and the proposed Industrial	Uphold in part. The GBRS shall be modified to reserve for ROS the undeveloped portions of Pt Loc 302 and 303 south of Mosedale Road, Usher, the small corner of Pt Loc 632 east of Parade Road. Given the previous environmental studies in this area, and Council and the community's involvement in the management of this land, it should be reserved in ROS. The proposed ROS over section of the Preston River should be reduced, as shown on Map 3 (Appendix 8). College Grove- The 200m ROS boundary line is supported but should additional ROS be included it is recommended that flexibility be allowed in determining the final alignment of the northern ROS boundary to facilitate a	Note WAPC comment and response. The EPA recommends that: a)all of the remnant vegetation on Pt Loc 632 is regionally significant, as shown in Map 11 (Appendix 9) , and should be reserved and appropriately managed; b) a corridor between 300 and 500m on Lot 1000 Bussell Hwy, as indicated in Map 9 (Appendix 9), be reserved in the GBRS and appropriately managed c) All of the remnant vegetation on Reserve 670 should be reserved and appropriately managed because of its regional significance, faunal habitat values and ecological linkage importance; d)A portion of the remnant vegetation to the north of Reserve 670 should be conserved to provide a consolidated ecological linkage between Reserve 670

				zone over Reserve 670 east of North Boyanup Rd have regionally significant conservation value. With respect to the portion of Loc 632 west of Parade Road, it would be misleading to leave this land zoned Urban in the knowledge that it has regionally significant conservation values requiring protection. This land should be zoned Urban Deferred, with the lifting of Urban Deferred to be conditional upon regional conservation values being protected. The two areas between Usher and Hay Park may be able to be protected within local open space as part of structure planning. The proposed Industrial zone over Reserve 670 east of North Boyanup Road is consistent with the zoning under City of Bunbury TPS No.7. The WAPC will consider inclusion of these areas in the Park as part of its future Park enhancement study. The WAPC's environmental study identifies two cleared portions of the proposed ROS between Usher and Hay Park that could be excluded. These areas form part of a narrow north-south regional conservation/recreation corridor and removing either from ROS could compromise the functions of the corridor. It is recommended that these areas be retained as ROS and rehabilitated. The study also recommends the reserve width along sections of the Preston River be reduced. While on conservation grounds there may be justification for the reduction, the ROS corridor width should not be reduced below the 1 in 100 year flood line to ensure the recreation values of the river foreshore are not compromised.	modification to the structure plan which is now with the WAPC for assessment. DEP should liaise with the proponent and DPI to discuss the final alignment. See Map 2 (Appendix 8). It is recommended that the southern portion of Lot 670 be reserved as ROS. The northern environmental values in the portion of the land is questioned, particularly the cleared area and as such further assessment should be undertaken at the structure planning, subdivision or development stage. In relation to the land to the north and east of the Lot 670 it is recognised that the natural qualities of the sites are significant. Further assessment should be undertaken at the structure planning, subdivision or development stage, or through provisions should an amendment to the town planning scheme be submitted. See Map 3 (Appendix 8). Once the GBRS is operational, the WAPC will undertake a study to identify other areas for protection and/or inclusion in the Park. The WAPC will also consider whether the Park can be enhanced by local open space through the consideration of adjoining	and the Preston River; and

					structure plans.	
	(b) There are opportunities for extensions to the Park from Preston River through Glen Iris to the Collie River, Kemerton and the coast and Bunbury Regional Park and the Dardanup/Boyanup area.	SWEC, 239, 248	3	Some of these links are provided for through the GBRS ROS network, in combination with planning for undeveloped areas. Further regional-level studies should be undertaken when the GBRS is operational to identify additional regionally significant vegetation links and to determine appropriate protection measures. In the interim, EMM 4 provides for protection of regionally significant vegetation as part of any future GBRS rezoning proposal.	Note. The WAPC will undertake further regional-level studies when the GBRS is operational.	Agree with the WAPC comment and response. Refer to the EPA's recommendations to 2(a) above.
	(c) ROS over Location 267 North Boyanup Rd, apart from portions reserved in local TPS, should be replaced by Industrial zone because it is not consistent with the Greater Bunbury Structure Plan, the site does not have regional conservation value and ROS would not provide road interface between the Park and industrial development.	205	1	The *Greater Bunbury Structure Plan (1995)* recognises the conservation value of remnant vegetation in this area and the need for a conservation/recreation link between the coast and the Preston River. The proposed ROS would form part of the Ocean to Preston River Regional Park. The WAPC's independent environmental study recommends the proposed ROS over Location 267 be retained despite vegetation condition to enhance the conservation link provided by the Park.	Dismiss.	Agree with the WAPC comment and determination.
	(d) The ROS link between Preston River and Manea Park should be north of the Bunbury airport.	245	1	ROS link proposed by GBRS between Preston River and Manea Park is north of Bunbury Airport.	Note.	Refer to the EPA's recommendations to 2(a) above.
3	Muddy Lakes					
	(a) Objects to ROS over area set aside to protect Muddy Lakes wetlands because it will affect the agricultural productivity of existing businesses.	23, 75, 139, 187, 219, 223, 224, 250	8	The ROS proposed for the Muddy Lakes wetlands is based on the boundaries defined in the Lakes EPP. The WAPC's independent environmental study concludes that on their own these lakes have regionally significant natural values but that they also form part of a larger conservation area that supports natural values of outstanding regional significance that should be protected. On this basis, the ROS should remain. It has been confirmed through further site surveys with the WRC and DEP that the proposed ROS boundaries are required to protect these values. There is no doubt that preventing stock access to the ROS, some of which is used for summer pasture, would have a significant impact on the agricultural productivity of some affected properties. However, stock would not be prevented over this area by the GBRS until it is in Crown ownership. Even then there may be an option to lease some of the land back for	Dismiss objection to ROS. Note the landowners concerns regarding the effect of preventing access to the ROS on the agricultural productivity of some properties. Once the GBRS is operational the WAPC will coordinate preparation of a structure plan for this general area. Any change to the ROS boundary would require an Amendment to the GBRS.	Noted and agree with the WAPC determination. The EPA recommends that: a)the alignment of the ROS reserve boundary around Muddy Lakes should remain as shown in the advertised GBRS; and b)the alignment of the ROS reserve boundary should be amendment to include other areas of environmental significance pending the outcome the management plan to be prepared for the area;

				grazing until restoration works commence. Notwithstanding these considerations, at some point in the future the GBRS will impact on the suitability of some properties for grazing. It is also likely that this area will be subject to pressure for closer subdivision in the future. For these reasons, a structure plan should be prepared to determine appropriate land use and management guidelines for the protection and enhancement of coastal and wetland resources in this general area. This could be undertaken in the context of the coastal management plan recommended in 6(c) below.		For further details of the EPA's assessment and recommendations refer to Section 9.3.
	(b) WRC should conduct a hydrological study of the Muddy Lakes area to determine the level of saline incursion, whether wetlands can be reinstated by drain modifications and establish the need for and extent of ROS.	223	1	WRC advises that Muddy Lakes are an expression of the local aquifer system and that groundwater management contributes to maintaining water quality in the lake. WRC also advises that annual flushing of the lake system with surface drainage assists in maintaining salinity levels. WRC indicates that there is currently insufficient evidence to demonstrate that drain modifications are required to maintain ecological function and that if drain modifications were determined necessary then further hydrological understanding would be required to assess the impacts of modifications on the lake. The WAPC's independent environmental study confirms that the Muddy Lakes area in its current state has regionally significant conservation values. However, there will be a need for a hydrological study in the future to gain a better understanding of the hydrological system and determine appropriate remedial actions to restore conservation values of the wetland system.	Note. There will be a need for a hydrological study in the future to gain a better understanding of the hydrological system and determine appropriate remedial actions to restore conservation values of the wetland system.	Noted. Agree with the WAPC comment.
	(c) Only areas within Loc 492 and 41 Minninup Rd Stratham proven to have high conservation value should be included in ROS.	251	1	The WAPC's independent environmental study concludes that the majority of the area proposed to be included in ROS has natural values of outstanding regional significance. It recommends that the few small portions that on their own do not have regionally significant conservation value, form part of the consolidated area and that excluding these areas from ROS may compromise its regionally significant values.	Uphold. The area proposed to be reserved ROS has natural values of outstanding regional significance and the proposed boundaries are required to protect these values.	Agree with the WAPC comment and determination.
	(d) The proposed ROS over Lot 1 and Pt Lot 394 Rich Road, Stratham should be reviewed.	208	1	Refer to WAPC Comments for 3(c) above.	Refer to WAPC response for 3(c) above.	Refer to EPA recommendation to 3(a).
4	Land north of Leschenault Estuary					
	(a) Support for Rural zoning of Loc 7 Buffalo Road.	S/H	1	Apart from along the eastern boundary, Loc 7 Buffalo Road is proposed to be zoned Rural pending further	Note.	Noted

				environmental and planning investigations.		
	(b) Most of Loc 7 Buffalo Rd should be reserved for ROS.	30	1	This land is identified for future urban development in the *Greater Bunbury Structure Plan (1995)* and *Coastal and Lakelands Planning Strategy (1999)* subject to environmental assessment. This environmental assessment will determine the existence and extent of natural areas within the property outside the proposed ROS requiring protection.	Dismiss.	Agree with the WAPC comment and determination. There will also be further regional level studies of regionally significant natural areas.
	(c) ROS boundaries over Loc 7 and 14 Buffalo Rd should be reviewed.	S/H	1	The WAPC's independent environmental study concludes that while the northern portions of Loc 7 and 14 proposed to be reserved ROS are degraded, they are part of System 6 area C66 and represent the previous extent of the Leschenault Estuary. For these reasons, the proposed ROS over the northern portions should remain. The study also identifies two areas along the eastern boundary that could be excluded from ROS. WRC have no objection to the eastern ROS boundary being modified.	Uphold. The proposed ROS boundary shall be modified in accordance with Map 8 (Appendix 8).	The EPA recommends that: a)the proposed modification to the alignment of the ROS reserve boundary alignment on Location 14 is acceptable; and b)the alignment of the ROS reserve boundary on Location 7 should be reviewed prior to any future zoning or subdivision on the subject land, whichever comes first, and amended where necessary.
	(d) ROS should be reduced over Loc 14 Buffalo Rd to cover only the area of the remaining wetland on the western central boundary.	176	1	Refer to WAPC Comment for 4(c) above.	Uphold in part. Refer to WAPC Response for 4(c) above.	The EPA recommends that: a)the proposed modification to the alignment of the ROS reserve boundary alignment on Location 14 is acceptable.
	(e) ROS over Loc 7 Buffalo Rd includes a dwelling, sheds and cattle yards and should be removed pending a proposal to rezone the land for closer development.	193	1	No evidence has been submitted to demonstrate that the proposed ROS over Loc 7 is inappropriate. The WAPC's independent environmental study does not recommend removal of or modification to the proposed ROS boundary over Loc 7.	Dismiss.	The EPA recommends that the alignment of the ROS reserve boundary on Location 7 should be reviewed prior to any future zoning or subdivision on the subject land, whichever comes first, and amended where necessary.
	(f) ROS at the northern end of Leschenault Estuary is supported and should be extended.	WRC	1	Refer to WAPC Comments for 4(c) above. The study notes that land north of Buffalo Rd is classified as a Conservation category wetland. This does not justify inclusion in ROS but does afford some protection. Further regional-level studies should be undertaken when the	Note. The WAPC will undertake further regional-level studies when the GBRS is	Noted

				GBRS is operational to identify regionally significant natural areas and determine appropriate protection mechanisms.	operational.	
	(g) Port of Bunbury should be relocated to coastal site south of Binningup.	213	1	*Industry 2030 (WAPC, 2000)* does not recommend a future Kemerton Port, but rather improved road and rail access to the existing Port of Bunbury. Land to the south of Binningup has been identified in the *Greater Bunbury Structure Plan (1995)* and *Coastal and Lakelands Planning Strategy (1999)* for future urban development subject to environmental assessment.	Dismiss.	Noted.
	(h) GBRS should allow for future development of Kemerton Port.	268	1	Refer to WAPC comments for 4(g) above.	Dismiss.	Noted.
	(i) Port for Kemerton should not be allowed on land south of Binningup.	SWEC	1	Refer to WAPC comments for 4(g) above.	Note.	Noted.
5	ROS around Bunbury Port					
	(a) Proposed ROS between Turkey Point and Preston River is excessive and restricts access for future port operations and block of ROS between the Preston River and Newton Dve was acquired by the Port Authority for expansion of the inner harbour and should be available for that purpose in the future.	BPA, 228	2	WRC agrees that the block of ROS for the Preston River Oxbow can be reduced where the proposed ROS buffer exceeds 50m width. The Bunbury Port Authority, WRC and City of Bunbury also agree that there are high conservation values at the Preston River delta that need to be protected and that public access to and along the Leschenault Estuary foreshore needs to be accommodated, but that the ROS proposed by the GBRS is excessive between the western end of the waterbird habitat area and the man-made cove. It has been indicated that there is an intention to construct a road between port industry and the estuary foreshore but the location and alignment of such a road has not been set. For these reasons, the proposed ROS between the western end of the waterbird habitat area and the south-west corner of the proposed ROS around the man-made cove should be modified to be at least 50m from the high water mark. Further revisions to proposed ROS boundaries can be considered when more detailed planning for the port area is finalised.	Uphold in part. The ROS boundaries proposed for the Preston River Oxbow and the Leschenault Estuary foreshore between Turkey Point and Preston River shall be modified in accordance with Map 9 (Appendix 8).	The EPA agrees with the proposed modifications. Refer to Section 6 for further details of the EPA's assessment.
	(b) ROS between Turkey Point and Preston River should extend to the existing road.	WRC	1	Refer to WAPC comments for 5(a) above.	Dismiss.	Agree with WAPC response.
Objection to, or request for review of specific ROS proposals						
6	Capel Coastal					
	(a) Land proposed to be included in ROS is being effectively managed by existing landowners and the proposed ROS will result in a loss of grazing land	101, S/C, 119, 138, 146, 204, 208, 220,	13	Generally, the coastal foreshore over rural properties in the Shire of Capel is being effectively managed by existing landowners. In the absence of a change in use or management of the affected properties, it is likely that the	Uphold in part. The proposed ROS boundary shall be modified in	Agree with the WAPC comment and response. No further evaluation

	and uncontrolled public access to a fragile coastal environment.	223, 228, 242, 244, 250		coastal strip will remain on the existing titles under existing management arrangements for some time. However, reserving this foreshore as ROS under the GBRS provides the Government with a mechanism to conserve the coastal environment if threatened, control future coastal development and provide for future public access and coordinated management in accordance with coastal planning principles and policies being implemented across Western Australia. The proposed ROS has been technically reviewed against provisions of the draft State Coastal Planning SPP to determine whether the proposed reserve width is acceptable. The review concludes that modifications should only be made where the proposed ROS width is greater than the development setback recommended by the policy. There are sections where modifications should be made.	accordance with Modification Plan 10 & 11 (Appendix 8).	required.
	(b) Recommended alternative coastal ROS boundary over rural property.	101, 242	2	Some sections where boundary modifications are recommended coincide with alternative boundaries recommended by landowners.	Refer to WAPC Response for 6(a) above.	Agree with the WAPC comment and response. No further evaluation required.
	(c) Coastal management plans required to determine appropriate coastal use, development, protection and management.	244, 250	2	A coastal management plan will be prepared for this section of coastline to provide land use and management guidelines specific to particular sections. This plan may result in some refinements to the coastal foreshore ROS reserve.	Note. The WAPC will prepare a management plan for this section of coastline.	Agree with the WAPC comment and response.
	(d) ROS should be replaced by zoning and management agreements should be put in place.	223	1	Investigations into alternatives to ROS reservation have concluded that while many, including Conservation zones, would protect the foreshore from inappropriate development, none would provide for future public access. The proposed ROS reserve will not affect the current responsible use and management of this foreshore by existing landowners and will protect against inappropriate development, but would also provide for public access in the future. For these reasons the proposed ROS should be retained.	Dismiss.	Noted.
7	Capel River					
	(a) Objects to ROS over properties along the Capel River within the townsite because it affects existing agricultural uses, is not required for floodplain management, is excessive for public access requirements, that can be accommodated when future subdivision	S/C, 119, 125, 154, 170, 180, 182, 223, 246	9	A revised ROS boundary for the section of the Capel River through the Capel townsite has been prepared in consultation with the WRC, DEP, Shire of Capel and affected landowners and through further site surveys. The boundaries have been revised based on more detailed consideration of floodplain management, vegetation protection and public access requirements, as well as the	Uphold in part. The proposed ROS boundary shall be modified in accordance with Map 12 (Appendix 8).	Agree with the WAPC comment and response. The proposed modifications to the ROS reserve alignment are within the area of the Capel River

	occurs, and encourages uncontrolled public access that will affect privacy.			need to recognise existing development. The proposed ROS boundary should be modified in accordance with the revised boundary.		Ecological Linkage and the McLarty/Kemerton/Twin Rivers/Gwindinup Ecological Linkage. These areas should be managed to protect the values of these linkages and the vegetation (in particular the northern part of Lot 21 which supports *Eucalyptus calophylla*) should be conserved. Consideration should be given to restoration with local native species as part of any future development to protect the value of the adjacent riverine vegetation in the ROS. No further evaluation required.
	(b) Recommended alternative ROS boundary for Capel River through the townsite.	154, 182	2	The alternative ROS boundary alignments suggested by affected landowners were considered as part of the review of the proposed ROS reserve for the Capel River and were found to be acceptable modifications.	Uphold. Refer to WAPC Response for 7(a) above.	Agree with the WAPC comment and response. Refer to EPA response to 7(a) above. No further evaluation required.
	(c) ROS should be replaced by zoning and management agreements should be put in place.	223	1	Refer to WAPC Comments for 6(d) above.	Dismiss.	Noted
8	Other					
	(a) Proposed ROS for Ferguson River in Picton includes an existing residence and substantial property, including part of a nursery, and it should be reduced.	73, 91	2	The proposed ROS for Ferguson River in Picton does not include an existing residence but it has been reviewed in consultation with the WRC and some modifications have been recommended as acceptable.	Uphold in part. The proposed ROS boundary shall be modified in accordance with Map 13 (Appendix 8).	Land shall be reserved for conservation purposes to provide an appropriate buffer to the Ferguson River on Lot 42080, Picton to the requirements of the WAPC on advice of the DEP and shall only be used for conservation and complementary

						purposes. Refer to Assessment Sheet 15 (Appendix 5).
	(b) ROS over western portion of Lot 6 Old Coast Rd, Australind and adjoining Lot 46 should be reduced.	150, S/H	2	The proposed ROS provides for a contiguous foreshore reserve along this section of the Leschenault Estuary eastern bank. While there is an existing retaining wall and fill within the proposed ROS over Lot 6, the WAPC considers the existing and potential conservation and recreation values of this foreshore would be compromised by a reduced reserve width for these lots. The proposed ROS over Lots 6 and 46 should not be reduced.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(c) Objects to ROS over southern foreshore of Brunswick River east of Australind Bypass.	152, 153	2	This area has been identified as under consideration for conservation, protection and reservation in the *Greater Bunbury Structure Plan (WAPC, 1995)*. However, the WAPC's independent environmental study concludes that apart from Lot 61, only the riparian corridor should be retained in ROS. A revised ROS boundary has been surveyed in consultation with the WRC, DEP and the landowner. Vegetation along the southern boundary of the proposed ROS has been identified in the WAPC's environmental study as having conservation value, and Eucalyptus woodlands further south as providing a conservation linkage. EMM4 provides for preparation of an EMP as part of any future GBRS rezoning proposal for these lots. Otherwise, these values can be considered as part of future planning for this area.	Uphold in part. The WAPC supports the amended ROS boundary as shown on EPA's Map 6 (Appendix 8).	Agree in part with the WAPC comment and determination Further EPA evaluation required (Section 9.1).
	(d) Objects to ROS over Lots 5 & 6 Estuary Drive, Pelican Point and recommends alternative ROS boundary.	197, 198	2	The WAPC's independent environmental study concludes that the portion of the lots proposed to be reserved ROS as part of the Leschenault Estuary foreshore is of regionally significant conservation value. Accordingly, the proposed ROS should remain.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(e1) Objects to proposed ROS landscape buffer over industrial land adjacent to proposed Port Access Road reserve in Picton.	MRWA, 267	2	*Industry 2030 (WAPC, 2000)* recommends a buffer on both sides of the Glen Iris Service Corridor. The GBRS proposes to include all but the southern portion of the recommended buffer on the western side of the Service Corridor in ROS. The buffer on the eastern side is proposed to be zoned Industrial. While there are existing industrial uses on the western side of the Service Corridor that do not require separation, the long-term planning objective for this area is to make the land available for uses compatible with an Urban zone. Some uses permitted in the Urban zone such as residential development would require separation from the Service Corridor but others	Uphold. The GBRS should be modified in accordance with Map 10 (Appendix 8).	Agree with the WAPC comment and determination. Further EPA evaluation required (Section 9.1).

				may not. Reserving the buffer as ROS would effectively sterilise that land. A SCA, as an alternative, would provide the necessary control to protect the Service Corridor and the flexibility to allow for appropriate uses to be permitted within the buffer. The buffer on both sides of the Glen Iris Service Corridor should be included in a SCA.		
	(e2) ROS reservation over wetland on Lot 6 Wimbridge St, Picton is not justified.	267	1	The ROS over Lot 6 between the Wimbridge Road reserve and the Glen Iris Service Corridor buffer covers an area in excess of 4ha that does not have regionally significant environmental value. Given its proximity to a future regional park, this area would be suitable for future urban development. This land should be zoned Urban.	Refer to WAPC Response for 8(e1) above.	Further EPA evaluation required. (Section 10.5)
	(e3) ROS boundaries at Picton Waters should be modified.	270	1	Agreed. In July 2002 the EPA's Service Unit advised the landowner of a revised wetland buffer alignment that it supports. The proposed ROS boundary should be modified to accord with the revised wetland buffer alignment. Substantial rehabilitation of this wetland is required to restore its regional conservation value. While the WAPC is prepared to contribute to the rehabilitation project, other stakeholders that will benefit from the allocation of ROS in this area and/or the improvements that will result from the rehabilitation project should also contribute. ROS should not be used for local drainage purposes.	Refer to WAPC Response for 8(e1) above. Note that all stakeholders that will benefit from the allocation of ROS in this area and/or the improvements that will result from rehabilitation should contribute to rehabilitation and that ROS should not be used for local drainage purposes.	Further EPA evaluation required. (Section 9.4)
	(f) Objects to ROS over south east corner of Lot 10 Paris Road because it has no environmental value.	43	1	The proposed ROS provides a buffer between an EPP wetland and land zoned for medium density residential development in Shire of Harvey TPS No.1. Accordingly, the ROS should remain to protect the wetland from the pressures of future development.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(g) Proposed ROS within Kemerton be removed and land be included in rural buffer subject to SCA No.2.	DRD	1	The areas within Kemerton proposed as ROS contain EPP wetlands. Whilst it may be acceptable to manage these wetlands in a rural environment under normal circumstances, the fact that they are within the defined boundaries of the Kemerton Industrial estate justifies their inclusion in ROS. Landcorp, in consultation with DMPR, supports the request for the proposed ROS reserves to be included in SCA No.2. However, there will be sufficient controls on the use of these areas under the GBRS if they are reserved as ROS.	Dismiss.	Agree with the WAPC comment and determination.
	(h) ROS over southern portions of Lot 5 and Pt Lot 1 North Boyanup Rd, Davenport will have a detrimental	151	1	The WAPC's independent environmental study concludes that the proposed ROS over the southern portion of Lot 5 should be retained because it contains a Priority flora	Uphold in part. Further assessment should	The EPA recommends that the remnant vegetation on Lot 1, shown in Map 12

	impact on an area used for irrigated pasture as part of the existing abattoir operation and should be deleted.			species and forms an integral part of the Ocean to Preston River Regional Park. The study does, however, recommend that the proposed Preston River foreshore ROS over Pt Lot 1 can be reduced. While there is justification for the reduction, the ROS corridor width should not be reduced below the 1 in 100 year flood line to ensure the recreation values of the river foreshore are not compromised.	be undertaken at the structure planning, subdivision or development stage, or through provisions should an amendment to the town planning scheme be submitted. The land is not located in the Preston River Floodway and therefore, it is recommended that that it should be retained as Industrial pending further assessment. The proposed ROS over Pt Lot 1 along the Preston River foreshore shall be modified in accordance with Map 3 (Appendix 8)	(Appendix 9) , be reserved and appropriately managed as part of any future zoning, subdivision and/or development on the site.to consolidate the size and shape of the foreshore reserve. Refer to Section 10.8 for further details of the EPA's assessment and recommendations. Refer to Assessment Sheet No. (Appendix 8)
	(i) Recommends alternatives to ROS boundary along southern side of Harvey River Diversion.	161	1	The WAPC's independent environmental study concludes that the area proposed to be reserved ROS is a priority for protection and that the proposed ROS better protects regionally significant environmental value than the alternative suggested.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(j) Objects to ROS over Forrest Homestead property on Preston River, particularly near the heritage homestead itself.	201	1	The proposed ROS boundary is consistent with the reserve boundary shown on the City of Bunbury TPS No.7 and recommendations of the *Greater Bunbury Structure Plan (WAPC, 1995)* and *Industry 2030 (WAPC, 2000)*. It forms part of the ROS corridor along the Preston River.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(k) ROS over Pt Lot 1 and Pt Lot 22 Cathedral Ave, Australind should be reviewed.	S/H	1	The proposed ROS boundary over these lots generally follows the boundary between the riparian zone of the Leschenault Estuary and the Yoongarillup landform, which is a desirable foreshore reserve boundary alignment.	Note.	Noted.
	(m) Sections of Lake Preston Rd should not be included in ROS but zoned Rural.	S/H	1	The Lake Preston Road reserve is Crown land immediately adjacent to Lake Preston. Only this Crown land is proposed as ROS by the GBRS. Whilst the adequacy of this reserve as a foreshore reserve for Lake Preston will be reviewed as part of any future rezoning, subdivision or development proposal for adjacent properties, it would be unlikely that a reduced ROS width for the lake foreshore would be considered environmentally acceptable.	Dismiss. This reserve is required as a minimum foreshore reserve for the lake.	Agree with the WAPC comment and determination. No further evaluation required.
	(n) Harvey Tourism Precinct should be	S/H	1	The Harvey Tourism Precinct to the west of South	Dismiss.	Agree with the WAPC

	zoned Urban rather than ROS because it supports uses that may not be compatible with an ROS reservation.			Western Highway and north of town on the Harvey River foreshore is on Crown land and is a tourist attraction of regional significance. Reserving the precinct ROS is recognition of this. The existing cafe/restaurant and tourist bureau on this land are uses compatible with the ROS reservation.		comment and determination. No further evaluation required.
	(o) Objects to ROS over Lots 5 & 6 Old Coast Rd, Australind outside existing foreshore reserve as shown in Shire of Harvey TPS No.1 and approved through subdivision.	233	1	Apart from a section of foreshore on the property adjacent to a bend in the Brunswick River, the ROS proposed by the GBRS is consistent with the reserve shown by Shire of Harvey TPS No.1. There is no current subdivision approval over this land. At the bend, neither the reserve shown by TPS No.1 nor the proposed ROS follow the floodway line. As no development is permitted within the floodway the ROS boundary should be modified at the bend to follow the floodway line.	Dismiss. The proposed ROS boundary shall be modified in accordance with Modification Plan 12.	Agree with the WAPC comment and determination. No further evaluation required.
	(p) Loc 5221 Parade Rd and Lot 50 Tuart St Bunbury should be reserved Public Purpose not ROS.	WC	1	These two lots, the first being about 225m2 and the second being about 7500m2, contain existing sewer pump stations. These utilities are not regionally significant in a planning context. The proposal to include these facilities in ROS reserves will not affect their operation.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(q) Objects to ROS over Loc 492 and 41 Minninup Road, Stratham because: (i) the land is ideally situated for residential, special rural or intensive agricultural use, its conservation value has not been recognised in environmental policy or assessed in detail, and the environmental attributes of the property are adequately represented in reserves elsewhere in the area; and (ii) Access to Location 492 Minninup Rd Stratham is affected by the proposed ROS reservation.	251	1	(i) The *Greater Bunbury Structure Plan (1995)* identifies this area as under consideration for conservation, scenic protection and reservation. The WAPC's independent environmental study concludes that this area has natural values of outstanding regional significance that should be protected. Accordingly, the proposed ROS should be retained. (ii) The portion of Location 492 proposed to be included in ROS will remain on the existing title until the ROS is acquired by the WAPC. Arrangements can be made at the time of acquisition and transfer to ensure access to balance portions of properties is provided.	(i) Dismiss. (ii) Note.	Agree with the WAPC comment and determination. Refer to Section 9.6 for further details of the EPA's assessment and recommendations
	(r) Two portions of Pt Lot 1 Parade Rd, Brook Village should be zoned Urban instead of ROS because they are suitable for inclusion in a neighbourhood centre site and area of POS respectively and there is no environmental justification for their ROS reservation.	262	1	The WAPC's independent environmental study concludes that the area proposed for inclusion in a neighbourhood centre has regionally significant natural values. The proposed ROS reserve over this area should remain. The study identifies the portion proposed for POS as an area not supporting regionally significant natural values that could be removed from ROS. However, the north-south regional conservation/recreation corridor it is part of is already narrow. Removing this area from ROS would reduce the width of the corridor to about 50m. To	Dismiss.	Agree with the WAPC comment and determination.

				maximise the opportunities to create the corridor, it is recommended that this area be retained as ROS and rehabilitated.		
	(s) Proposed western and northern ROS boundaries for Dalyellup Beach Estate should reflect approved structure plan.	264	1	Agree in part.	Uphold. The zoning for the Tourist Precinct should remain as advertised (Map 6 – Appendix 8).	Further EPA assessment required. Refer to Section 10.9 for further details of the EPA's assessment and recommendations
	(t) Centenary Rd, Dalyellup should not be included in ROS.	S/C	1	Centenary Road is proposed to be included in ROS to increase the width of the open space link between the Tuart Forest and Bussell Highway, as part of the proposed Ocean to Preston River Regional Park. Main Roads' draft regional road access plans for this area do not indicate the need for Centenary Road to remain open. The City of Bunbury's draft Tuart Brook Structure Plan also indicates that Centenary Road should be closed. The DPI has given in-principle support for the closure of Centenary Road.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
	(u) ROS over southern portion of Garden of Eaton estate adjacent to Millars Creek should be adjusted to reflect approved Structure Plan.	159, S/D	1	Agree.	Uphold. The proposed ROS boundary shall be modified in accordance with Map 8 (Appendix 8).	Agree with the WAPC comment and determination. No further evaluation required.
	(v) Delete 17m2 of ROS from north east corner of Lot 100 Eades St, Glen Iris.	196	1	The subject portion of land forms part of a residential property and has no environmental or recreational value so it should be zoned Urban.	Uphold. The proposed ROS boundary shall be modified in accordance with Modification Plan 19 (Appendix 8).	Agree with the WAPC comment and determination. No further evaluation required.
	(w) ROS proposed over Ridley Place, Australind should be removed.	S/H	1	Ridley Place provides access to a Leschenault Estuary foreshore car park, picnic area and boat ramp. Including such an access road in ROS is appropriate.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
Recommended additional ROS						
9	Point Douro					
	Lot 5 Old Coast Rd, Australind should be protected for recreation and waterbird habitat conservation.	110, 121, 165, BNG, 168, SWEC, WRC, 257	8	The proposed amendment to Shire of Harvey TPS No.1 for this site is subject to a separate environmental assessment. The amendment proposes to modify the Urban/ROS boundary shown on the GBRS. If a modification to the proposed GBRS boundary is required as a result of a determination on the related local TPS	Dismiss.	Amendment 13 to the Shire of Harvey TPS No 1 (Pt Douro) is being formally assessed by the EPA pursuant to Division 3 of Part IV of the *Environmental*

				amendment, then the GBRS can be amended at that time.		*Protection Act 1986.* The scheme amendment proposes to change the alignment of the ROS reserve boundary. The boundary changes proposed in the Amendment 13 are not included in the GBRS. The ROS reserve boundary alignment in the GBRS is consistent with the alignment currently shown in the Shire of Harvey TPS. If the amendment is approved, the GBRS will need to be amended.
10	Major Rivers					
	(a) Concerned that ROS along major rivers does not extend into rural areas.	87, ABC, WRC, 258	4	ROS is not generally proposed for river foreshores in rural areas because these section of foreshore are not subject to the same pressures and demands associated with adjacent urban development. EMM 4 provides for protection of riparian vegetation as part of any future GBRS rezoning proposal and the need for a foreshore reserve would be considered as part of any local rezoning or subdivision. Further regional-level studies should be undertaken when the GBRS is operational to identify other sections of river foreshore in the Rural zone that should be protected and to determine the appropriate protection mechanism.	Note. There are adequate measures in place to ensure protection of river foreshores is considered as part of planning proposals. However, the WAPC will undertake further regional-level studies when the GBRS is operational.	Noted.
	(b) ROS along the Brunswick River foreshore north of the Millenium Industrial site should be increased to maximise protection of the conservation values of this corridor.	ABC	1	The ROS proposed by the GBRS generally reflects approved foreshore reserves shown on local Town Planning Schemes and structure plans. In many cases, adjacent areas have already been developed. Additional ROS is proposed adjacent to the Twin Rivers subdivision in recognition of the particular recreation and conservation significance of this area. All foreshore reserve boundaries proposed by the GBRS have been determined based on technical assessments and provide for a continuous foreshore reserve along the Brunswick River from the Millenium Industrial site through to the Australind Bypass.	Note. The ROS along the Brunswick River from the Millenium Industrial site through to the Australind Bypass is continuous and substantially increases the area to be protected over Lot 211 Barnes Avenue (Twin Rivers).	Noted. Refer to Section 9.3 (Twin Rivers) for further details of the EPA's assessment and recommendations
11	Waste Water Treatment Plant on Paris Road, Australind.					
	a) Northern portion of WWTP on Paris Rd, Australind be included in ROS	ABC, 256	2	The WAPC's independent environmental study concludes that the northern and western portions of this Crown	It is recommended that the Urban Deferred zoning is	Agree with the WAPC comment and determination.

	rather than Urban Deferred.			reserve contain vegetation of regional conservation value, particularly in terms of providing for an extension to the adjacent Wardandi Reserve, but that the balance either supports wastewater treatment infrastructure or is degraded. Based on this information, the northern and western portions of this site should be included in an ROS reserve.	retained except for the area of ROS delineated on Reserve 35061.	Refer to Section 4.1 for further details of the EPA's assessment and recommendations.
	b) Water Corp land abutting the Wardandi Reserve should be included in ROS.	SWEC	1	Refer to WAPC comment for 11(a) above.	Refer to WAPC response for 11(a) above.	Agree with the WAPC comment and determination. Refer to Section 4.1 for further details of the EPA's assessment and recommendations
12	Land north of Myalup					
	(a) Lack of conservation connection between Lake Preston and the ocean and delineation of northern development boundary for Myalup is likely to isolate Lake Preston and reduce conservation significance.	30	1	The *Coastal and Lakelands Planning Strategy (WAPC, 1999)* only permits a dwelling density of one dwelling per 5ha north of Myalup subject to environmental criteria. Development at this density would not prevent conservation connections between Lake Preston and the ocean. There is an opportunity to create a reserve connection between the lake and the ocean through a future amendment to the GBRS if that is considered necessary.	Dismiss.	Noted. The EPA supports the completion of the System 6 and System 1 update on the Swan Coastal Plain and adjacent Scarps as a 'whole of government' program through a similar co-ordinated approach, as used for Bush Forever. Areas such as this maybe identified as part of this process.
	(b) Land on northern boundary of Myalup is in pristine condition and represents an important conservation and recreation corridor. It is owned by Council and managed by the local community.	MCA	1	The GBRS does not propose any additional development pressure on this area. The conservation value of this land would be considered as part of any future rezoning, subdivision or development proposal.	Note.	Noted. Refer to 12(a) above.
	(c) Western portion of Lot 200 to the north of Myalup should be ROS.	S/H	1	The proposed Urban zoning for the western portion of Lot 200 in the GBRS is consistent with the Tourist zone in Shire of Harvey TPS No.1. Including the additional land in ROS would represent a substantial variation to the advertised GBRS. EMM 1 provides for the responsible authority to require an EMP for any rezoning, subdivision or development proposal over this land. The need for additional coastal foreshore reserve should be considered	Dismiss. To be considered as part of any future rezoning, subdivision or development proposal.	Agree with the WAPC comment and determination. No further evaluation required.

				as part of such proposals.		
13	Other					
	(a) Cokelup Swamp should be reserved in ROS.	30, 209	2	This wetland is protected by the Lakes EPP. The GBRS proposes to include it in the Rural zone, so does not increase the potential for degradation. EMM 1 and 2 provide for protection of EPP wetlands as part of any future rezoning, subdivision or development proposal.	Dismiss.	Noted Refer to 12(a) above.
	(b) Queries why ROS for Collie River adjacent to Treendale subdivision is not continuous.	30, 258	2	The proposed ROS for the Collie River adjacent to the Urban zone east of Australind Bypass is consistent with the foreshore reserve alignment shown on the approved Treendale Farm Structure Plan and the plans of subdivision granted preliminary approval by the WAPC. The WRC has been involved in determining this foreshore reserve boundary alignment. The ROS does not extend to the southern foreshore of the Collie River because it is proposed to be zoned Rural and will therefore not be exposed to the same pressures and demands as the northern foreshore.	Dismiss	Agree with the WAPC comment and determination. No further evaluation required.
	(c) Proposed new Urban zone at Harvey should be included in ROS.	165, WSWA	2	The proposed new Urban zone in Harvey contains existing pockets of CALM housing in a bushland setting. Only the pockets of housing are zoned residential in Shire of Harvey TPS No.1. Any future rezoning, subdivision or development proposal would be subject to separate assessment.	It is recognised that the qualities of the site are significant and that further assessment should be undertaken at the subdivision or development stage, or should an amendment to the town planning scheme be submitted. The implementation of the Peel-Bunbury Bushplan will provide a further mechanism for the protection of areas of regional environmental significance.	Further EPA assessment required. Refer to Section 4.6 for further details of the EPA's assessment and recommendations
	(d) More land on eastern side of Leschenault Estuary should be ROS.	WRC, 256	2	Constructed roads are in place along most of the eastern foreshore of the Leschenault Estuary. Generally, residential and rural residential lots front these roads to the east and the natural conditions have been substantially modified. These roads represent a physical boundary between the Estuary foreshore and development and are the basis for the proposed ROS boundary alignment. At the very north, where a road reserve is not in place, the proposed boundary generally follows the boundary between the riparian zone of the Leschenault Estuary and the Yoongarillup landform, which is a desirable foreshore	Dismiss.	Noted. Refer to 12(a) above.

				reserve boundary alignment.		
	(e) McCarley's Swamp, south west of Capel townsite, should be included in a Conservation reserve.	209	1	Refer to WAPC's comment for 13(a) above.	Refer to WAPC's response to 13(a) above.	Noted Refer to 12(a) above.
	(f) Eastern portion of Lot 37 Harris Rd Picton be reserved as ROS.	130	1	An EPP wetland is located over this portion of Lot 37 and the adjoining lot to the east. *Industry 2030 (WAPC, 2000)* recommends further structure planning for this area, including vegetation and wetland surveys, prior to subdivision and development. Protection of the wetland should be addressed as part of the future structure planning.	Dismiss.	Noted Refer to 12(a) above.
	(g) Boyanup Locations AA 396 and AA 107 should be included in ROS to be managed with adjoining reserves.	138	1	The GBRS proposes to include each lot in the Rural zone and EMM 4 provides for protection of regionally significant vegetation as part of any future GBRS rezoning proposals. The impact of any local rezoning or subdivision proposal Notwithstanding this, regional-level studies should be undertaken when the GBRS is operational to identify additional regionally significant remnant vegetation that should be protected and to determine the appropriate protection mechanism.	Dismiss. There are adequate measures in place to ensure protection of natural values is considered as part of planning proposals. However, the WAPC will undertake further regional-level studies when the GBRS is operational.	Noted Refer to 12(a) above.
	(h) Area in south-east of Basalt buffer contains a wetland and Priority listed plant species and should be included in ROS.	138	1	This wetland is protected by the Lakes EPP. The GBRS proposes to include the area referred to in the Rural zone, so does not increase the potential for degradation. EMM 1 and 2 provide for protection of regionally significant wetlands and EMM 4 provides for protection of regionally significant vegetation as part of any future GBRS rezoning proposal. Refer to WAPC Comments for 12(g) above regarding recommendations for future studies.	Refer to WAPC Response for 12(g) above.	Noted Refer to 12(a) above.
	(i) Stand of trees along eastern boundary of Pt Lot 41 Minninup Rd, Stratham should be included in ROS.	139	1	Refer to WAPC Comments for 12(g) above.	Refer to WAPC Response for 12(g) above.	The stands of trees can be conserved and managed as part of future zoning or development proposals.
	(j) Original buffer for Kemerton be included in ROS.	ABC	1	The area covered by SCA No.2 represents the buffer requirements for the proposed Kemerton Industrial zone, as recommended in the *Kemerton Expansion Study Final Concept Plan (WAPC, 2000b)*. Landcorp intends to acquire some additional properties affected by SCA No.2 and has already acquired others. The primary purpose of SCA No.2 is to provide a buffer for industry at Kemerton, not for conservation or recreation. Including the buffer in	Dismiss.	It is the EPA's opinion that: 1) areas of regionally significant bushland within SCA No. 2 should be reserved as ROS as a future amendment to the GBRS; and

				ROS would therefore not reflect the primary purpose of the area.		2) Special Control Area No. 2 provides adequate separation between proposed industrial development and surrounding landuses to accommodate the impacts of noise, air quality and risk in accordance with the EPA's environmental objectives and criteria for these environmental factors.
	(k) East-west vegetation link should be provided between Kemerton and Leschenault Peninsula.	SWEC	1	Refer to WAPC Comments for 12(g) above.	Note. Refer to WAPC Response for 12(g) above.	The EPA identified a series of regionally important ecological linkages (Appendix 4) which could be achieved through the update of the remainder of the System 6 and part System 1 area in a similar co-ordinated program to *Bush Forever*
	(l) Portion of Urban zone south of Dalyellup Beach Rd/Minninup Rd intersection should be ROS.	CALM	1	Agreed. Subject land is shown on approved Dalyellup Beach Estate Structure Plan as Regional Conservation.	Uphold. GBRS should be modified in accordance with Modification Plan 13.	The EPA recommends that the ROS boundary be realigned as shown in Appendix 16 . For further details of the EPA's assessment and recommendations also refer to Section 10.9.
	(m) Some existing reserves are not included in ROS.	WRC	1	No further information has been provided to identify reserves not included in ROS and none have been found.	Dismiss.	Noted
	(n) Portions of Lot 21 Cathedral Ave, reserved for recreation by the Shire of Harvey TPS No.1 Amendment 17 should be included in ROS.	WRC	1	The area referred to is local public open space and is sufficiently protected under the Shire of Harvey TPS No.1.	Dismiss.	Agree with the WAPC comment and determination.
	(o) North west corner of Pt Lot 632 east of Parade Rd, Brook Village should be included in ROS.	262	1	The WAPC's independent environmental study recommends that this corner should form part of the regional corridor (Map 5 – Appendix 8). The main landowner in this area supports the modification. The north-west corner of Pt Lot 632 should be reserved as	Uphold.	The EPA recommends that the ROS boundary be realigned as shown in Map 11 (Appendix 9). For further details of the EPA's

				ROS.		assessment and recommendations also refer to Section 10.1.
	(p) Land fronting Australind Bypass between Johnson Rd realignment and proposed Port Access Road should be reserved as ROS.	218	1	This land has been identified as a possible alignment for the Preston River Diversion Channel. Whilst ROS is likely to be an appropriate reservation for the diversion channel, matters such as the timing and detailed design of the channel are subject to further investigation. In the absence of this information or any information regarding the recreation or conservation significance of this land currently, the proposed Rural zoning is appropriate.	Dismiss.	Agree with the WAPC comment and determination.
Support for specific proposals						
14	Proposed ROS for the Collie River flood plain within Glen Huon, Eaton.	30	1	Proposed ROS reflects the floodway for the Collie River.	Note.	Noted
15	Proposed ROS on northern side of the Capel River mouth.	119	1	The proposed ROS over this area supports plans of the local Land Conservation District Council to control access to and rehabilitate land around the river mouth.	Note.	Noted
16	ROS around Millennium Industrial site in Australind.	S/H	1	This area serves the dual purpose of providing an industrial buffer and a conservation and recreation resource.	Note.	Noted
General						
17	Lack of justification for ROS areas and boundary alignments.	228	1	Many of the proposed ROS reserves reflect existing regional conservation and recreation reserves. Both the WAPC and the EPA are reviewing the new ROS reserves to ensure they reflect regional recreation and conservation values and modifications to the GBRS will be carried out accordingly.	Dismiss.	Noted. In addition to the Environmental Review the EPA has undertaken additional biological surveys and mapping (Appendix 5) and has also prepared a strategy to identify regionally significant natural areas in its consideration of the GBRS.
18	Additional ROS should be provided to protect more poorly represented vegetation complexes.	WSWA	1	The EPA has developed criteria that it will use to assess proposed new zones and reserves under the GBRS in terms of their impact on remnant vegetation. These criteria include giving priority to protection of poorly represented vegetation complexes. The WAPC's independent environmental study has technically reviewed new zones and reserves against the EPA's criteria for assessing their impact on remnant vegetation and where necessary, has recommended modifications. EMM 4 provides for protection of regionally significant vegetation as part of any future GBRS rezoning proposals. Notwithstanding this, regional-level studies should be	Dismiss. The WAPC has technically reviewed new zones and reserves against the EPA's criteria and where necessary, has recommended modifications. There are adequate measures in place to ensure protection of natural values are considered as part of planning proposals.	Agree with the WAPC comment and determination. Refer to 12(a) above.

				undertaken when the GBRS is operational to identify additional regionally significant remnant vegetation that should be protected and to determine the appropriate protection mechanism.	However, the WAPC will undertake further regional-level studies when the GBRS is operational.	
19	All threatened flora communities should be included in ROS.	WSWA	1	Of the known areas supporting threatened floristic communities in the GBR, over half are within existing reserves and the remaining areas are proposed to be zoned Rural. Threatened flora is protected by provisions of the *Wildlife Conservation Act 1950*. Also refer to WAPC comments for 18 above.	Refer to WAPC response to 18 above.	Agree with the WAPC comment and determination. Refer to 12(a) above.

ZONES						
No.	Points Raised	Submissions Raising Points	Total	WAPC Comment	WAPC Response	EPA Recommendation
Kemerton Industrial Zone						
20	Objection to the expansion of Kemerton due to impacts on air quality, waste disposal, water quality, wetlands, bushland, Declared Rare Flora and visual amenity.	37, 56, 85, 124, ABC, 165, BNG, 168, 210, WSWA, SWEC	11	The *State Planning Strategy (WAPC, 1997)* identifies Kemerton as a strategic industrial site. The proposed expanded industrial area is generally consistent with recommendations of *Industry 2030 (WAPC, 2000)*. The recommended buffer for Kemerton indicated in the *Kemerton Expansion Study Final Concept Plan (WAPC, 2000b)* has been supported by the EPA in terms of providing an adequate separation distance for surrounding sensitive uses. SCA No.2 generally includes all properties affected by the recommended buffer and these properties are being acquired by Landcorp. EMM 5 requires preparation of an EMP prior to any subdivision or development in the Kemerton Industrial zone to ensure the protection of wetlands, remnant vegetation and DRF is taken into account. The *Kemerton Expansion Study Final Concept Plan* designates the ridgeline as a Ridge Development Control Area where development will be subject to special planning controls to ensure visual impacts are minimised. These special planning controls should be included in EMM 5.	Note. Refer to WAPC Response for 23 below.	Agree with the WAPC comment and determination. The EPA is recommending that a condition is imposed on the GBRS requiring that prior to subdivision or development, whichever is first, being approved within the Kemerton Industrial Area or the Special Control Area No. 2 an Environmental Management Plan is to be prepared and implemented to manage the potential impacts of the subdivision or development on remnant vegetation, wetlands, watercourses and visual amenity.. Refer to Section 5 for further details of the EPA's assessment and recommendations. Subsequent proposals within the Industrial zone may also require referral to the EPA for detailed assessment in relation to air quality, noise

						and risk..
21	Lot 6 Wellesley Rd should not form part of the Kemerton expansion area because it contains diverse plant species, Declared Rare Flora and Priority species, fauna habitats and lacks management commitments.	53, 110, ABC, 165, BNG	5	The *Kemerton Expansion Study Final Concept Plan (WAPC, 2000b)* includes the southern portion of Lot 6 in a Vegetation Management Area. Only the portion of the property outside the area subject to a conservation covenant will be available for industrial development.	Dismiss	Agree with the WAPC comment and determination. No further evaluation required.
22	Proposed northern boundary of Kemerton expansion area doesn't reflect the boundary recommended in *Industry 2030* Report.	DRD	1	The northern boundary of the proposed Industrial zone at Kemerton should be modified to be consistent with the boundary recommended by *Industry 2030 (WAPC, 2000)*.	Uphold The northern boundary of the Kemerton Industrial zone shall be modified in accordance with Modification Plan 11.	Agree with the WAPC comment and determination. No further evaluation required.
23	Ridgeline and vegetation management guidelines for the western and northern expansion areas of Kemerton need to be provided in the GBRS to address issues raised in *Industry 2030*.	189	1	Refer to WAPC comment for 21 above. Also the *Kemerton Expansion Study Final Concept Plan (WAPC, 2000b)* includes the western and northern portions of the Kemerton Industrial zone in a Vegetation Management Area. EMM 5 should refer to visual amenity to ensure recommendations regarding development control along the ridgeline are implemented through future subdivision and development proposals.	Uphold in part. EMM 5 will refer to visual amenity.	Agree with the WAPC comment and determination. The EPA is recommending that a condition is imposed on the GBRS requiring that prior to subdivision or development, whichever is first, being approved within the Kemerton Industrial Area or the Special Control Area No. 2 an Environmental Management Plan is to be prepared and implemented to manage the potential impacts of the subdivision or development on remnant vegetation, wetlands, watercourses and visual amenity.. Refer to Section 5 for further details of the EPA's assessment and recommendations
24	Kemerton Industrial zone should be replaced by single-industry sites dispersed across the Bunbury-	203	1	There are significant advantages in planning for large-scale strategic industrial estates both in terms of efficiently providing for the special servicing	Dismiss.	Noted

	Wellington region.			requirements of those industries and in controlling the impacts of pollution and risk associated with those industries.		
Other Industrial Zones						
25	Lot 15 Bunbury Industrial Park					
	(a) Lot 15 should be included in Ocean to Preston River Regional Park.	239	1	The Industrial zoning proposed for Lot 15 by the GBRS is consistent with the City of Bunbury TPS No.7 and there is an approved structure plan for the area.	Dismiss. This area has been significantly grazed and there is no evidence of any regional natural significance on the site. The site is the subject of an approved structure plan which identifies some vegetation in the south west corner. Further assessment should be undertaken at the subdivision or development stage, or should an amendment to the town planning scheme be submitted. The implementation of the Peel-Bunbury Bushplan will provide a further mechanism for the protection of areas of regional environmental significance.	It is the EPA's opinion that the remnant vegetation on Lot 15 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site. For further details of the EPA's assessment and recommendations also refer to Section 10.3.
	(b) Lot 15 should not require detailed vegetation survey as it is subject to an approved structure plan.	245	1	Given that the land is already zoned for industrial development in the local TPS, any vegetation survey of this area should be undertaken at the subdivision stage.	Dismiss. A vegetation survey of this land may be required at the subdivision stage.	Dismiss.
26	North Capel					
	(a) Area of Industrial zone should be reduced through the operator adopting better practices.	141	1	The effect of noise is likely to extend beyond property boundaries regardless of operating practices. Proposed SCA No.3 will provide an adequate separation between the industry and incompatible land uses to ensure noise does not exceed acceptable levels.	Dismiss.	The boundary of SCA No. 3 has been calculated based on noise emissions modelling for current and future industrial activities. Reducing the width of the buffer may expose sensitive

						land uses to unacceptable noise levels.
	(b) Object to impact of proposed new Industrial zone on remnant vegetation.	WSWA	1	The Industrial zone at North Capel, including the proposed new Industrial zone in the north east of the precinct, has been cleared and supports existing development.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
27	Object to proposed new Industrial zone in Davenport due to impact on remnant vegetation.	WSWA	1	This site extends to the north of the proposed Ocean to Preston River Regional Park east of North Boyanup Road. The WAPC's independent environmental study concludes that this site is part of a regionally significant vegetation corridor extending to the north to the Preston River and recommends that it should be protected. The proposed Industrial zoning, however, is consistent with zoning in City of Bunbury TPS No.7. The WAPC will consider inclusion of this area in the Park as part of its future Park enhancement study.	Note. Once the GBRS is operational, the WAPC will undertake a study to identify additional areas for protection and/or inclusion in the Ocean to Preston River Regional Park.	All of the remnant vegetation on Reserve 670 should be reserved and appropriately managed because of its regional significance, faunal habitat values and ecological linkage importance. For further details of the EPA's assessment and recommendations also refer to Section 10.2.
28	SCA should be provided for Preston Industrial Park buffer.	186	1	*Industry 2030 (WAPC, 2000)* recommends preparation of a number of studies, including noise, air quality and risk modelling, as part of a structure plan for the area. This modelling will identify whether a buffer is required. The structure plan will recommend how the buffer should be implemented.	Dismiss.	Noted
29	Integrated drainage system should be developed for existing and proposed industrial areas in Picton and Preston.	WRC	1	*Industry 2030 (WAPC, 2000)* recommends preparation of a number of studies, including a comprehensive water and drainage management strategy, as part of a structure plan for the area.	Uphold. To be undertaken as part of structure planning for the area.	Noted
Urban and Urban Deferred Zones						
30	Object to South Dalyellup Urban Deferred because it will result in clearing of Tuart woodland, destruction of habitat and an EPP wetland, impact on adjacent conservation reserves and remove an important conservation link between System 6 area C71 and the coastal ROS south of Dalyellup.	120, 138, 141, 165, WSWA, CALM	6	The WAPC's independent environmental study concludes that the southern three lots proposed to be zoned Urban Deferred (Lots 315, 316 and 317) have regionally significant conservation value due to the east-west link they provide between two conservation areas and the vegetation condition. The study notes that current activity on the property is degrading conservation values. Given the conservation values of the southern three lots, it would be inappropriate to indicate their suitability for future urban development. However, these values may be retained with an appropriate rural use over the land. Accordingly, the southern three lots should be zoned Rural and the EPA should note observations from the WAPC's independent environmental study.	Uphold in part. GBRS shall be modified in accordance with Modification Plan 17. *In the interim it is recommended that the land be included in a Regional Interim Development Order to conserve natural values.*	Rremnant vegetation on Lots 315, 316 and 317 should be conserved and appropriately managed either as a ROS reserve in the GBRS or as part of future zoning, subdivision and/or development on the lots Refer to Section 4.2 for further details of the EPA's assessment and recommendations

31	Urban zoning over Pt Lot 302 & 303 Ocean Pde and Pt Lot 1 Parade Rd, Shearwater should not be reduced further because it has already been significantly reduced from the area zoned by City of Bunbury TPS No.6, it is ideal for residential development, such a decision would bring about the need for further structure planning and the additional ROS will place a burden on management authorities.	263	1	Refer to WAPC comments for 2(a) above.	Dismiss. Refer to WAPC response for 2(a) above.	Agree with the WAPC comment and determination.
32	Object to proposed Urban zone over existing industrial uses at Picton because some of these uses have off-site impacts and zoning the land Urban will encourage residential development, which will result in land use conflict.	32	1	The proposed Urban zoning over existing industries will permit existing industrial uses to continue to operate, with buffers being provided where required as part of planning for adjoining land, in accordance with *SPP No.4 – State Industrial Buffer Policy (WAPC, 1997)*. This land forms part of a consolidated area that has been identified for future urban development in the *Greater Bunbury Region Structure Plan (WAPC, 1995)*. Zoning the land Urban in the GBRS allows for a broad range of uses and would prevent the introduction or expansion of uses that could compromise long-term planning objectives. City of Bunbury TPS No.7 will define uses permitted in regional Urban zones.	Dismiss.	Noted.
33	Land south of Dalyellup Beach Road at Western end.					
	(a) The proposed Urban zoning for this land should be ROS.	CALM	1	The inclusion of this land in the Urban zone under the GBRS reflects the approved Dalyellup Beach Estate Structure Plan, which identifies this area for a Tourist precinct. However, the area of the Tourist precinct on the approved structure plan is larger.	Dismiss. *It is recommended that the portion of the site, as originally advertised, be retained for future development for Urban (Tourism).* *Further assessment should be undertaken at the structure planning, subdivision or development stage, or through provisions should an amendment to the town planning scheme be submitted.* *The area of land between the 'Red' line and the Urban*	The remnant vegetation within the tourist precinct site on Pt Loc 497, south of Dalyellup Road Road, is part of regionally significant bushland and ecological linkage and should be reserved and appropriately managed.

					zone has significant natural values and should be reserved. Therefore the WAPC recommends that only the land shown as Urban be retained and not expanded to the 'Red' line. See Map 8 (Appendix 8).	
	(b) The proposed Urban zoning on the coastal boundary of the Tourist Precinct (as defined on the approved Dalyellup Beach Structure Plan) should remain.	264	1	Agreed.	Uphold.	Refer to 33(a) above
34	Object to Boyanup Urban Deferred due to impact on a poorly represented vegetation complex and the adjacent State Forest.	WSWA	1	The WAPC's independent environmental study concludes that remnant vegetation on Lots 1a, 4a, 66, 97, 138 and 139 and along the southern boundary of Loc 4402 is of regionally significant conservation value and that this vegetation should be protected. The approved structure plan for this area includes the vegetation on Loc 4402 in a foreshore reserve but identifies the remainder for residential development. As this area is currently zoned Special Rural in Shire of Capel TPS No.7, protection of the remnant vegetation can be considered as part of future rezoning and/or subdivision proposals or as part of a structure plan review.	Dismiss. The land has been identified in a study commissioned by the WAPC as having regionally significant natural values. The remnant vegetation either is protected by the approved structure plan or can be protected as part of future planning proposals, or through planning provisions should an amendment to the town planning scheme be submitted.	There is regionally significant remnant vegetation on the land proposed to be zoned Urban Deferred which should be conserved and appropriately managed as part of any future zoning, subdivision and/or development on the site.
35	The Capel Urban Deferred zone will impact on remnant vegetation of the Southern River Complex, an EPP wetland and possibly DRF and Priority Flora. The remaining remnant vegetation should be protected.	WSWA	1	The portion of the proposed Urban Deferred zone referred to covered by remnant vegetation represents 16.8% of the total site area. More detailed site investigations could be required at the local rezoning stage to determine the amount of this remnant vegetation that should be retained in a local recreation reserve.	Note. The WAPC advises that there is no evidence of the regional significance of this vegetation. If the site did possess significant natural qualities it is isolated and of such small size that it is doubtful that it would be environmentally sustainable. Further assessment should be undertaken at the subdivision or development	The remnant vegetation on Lot 35 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site Refer to Section 10.6 for further details on the EPA's assessment.

					stage, or should an amendment to the town planning scheme be submitted. The implementation of the Peel-Bunbury Bushplan will provide a further mechanism for the protection of areas of regional environmental significance.	
Land suggested for inclusion in an Urban or Urban Deferred Zone						
36	Land between Binningup and Myalup should be zoned Urban or Urban Deferred.	160, 161	2	The inclusion of this land in an Urban or Urban Deferred zone would be a substantial variation to the advertised version of the GBRS and would require a separate environmental assessment and advertising exercise. There has been no evidence submitted to demonstrate that there is a need to rezone this land to Urban or Urban Deferred.	Dismiss.	Noted. No further evaluation required.
37	Land south of proposed Binningup Urban zone should be zoned Urban Deferred even in the absence of environmental assessment because this zoning would be consistent with recommendations of the *Greater Bunbury Structure Plan* and *Coastal and Lakelands Planning Strategy* and lifting the Urban Deferred could be conditional upon environmental assessment.	193	1	This land is part of the System 6 C66 area and the *Coastal and Lakelands Planning Strategy (1999)* identifies it as having particular environmental sensitivity or high conservation value. Given that this area has recognised regional conservation value, an environmental assessment should form the basis for determining the acceptability of areas being zoned for future urban development. Also refer to WAPC comments for 36 above.	Dismiss.	Agree with the WAPC comment and determination. No further evaluation required.
38	Land proposed to be zoned Residential by Shire of Capel TPS No.7 Amendment No.3 should be zoned Urban Deferred rather than Urban due to concerns regarding drainage.	S/C	1	The EPA has determined that Amendment No.3 is environmentally acceptable. Both the Shire of Capel and the WAPC have adopted Amendment No.3 for final approval and the amendment has been forwarded to the Minister for Planning and Infrastructure for consideration. The amendment, as adopted by the WAPC, will insert into the Scheme a requirement for the subdivider to prepare a drainage management strategy as a condition of subdivision.	Dismiss. Drainage issues will be addressed at the subdivision stage.	Noted
39	Lot 300 Goodwood Rd, Capel should be zoned Urban Deferred.	109	1	Refer to WAPC's comments for 36 above. A structure plan for the Capel Townsite was included in previous Shire of Capel TPS No.5 and this plan identified Lot 300 for future urban development. Current TPS No.7 refers to the need to review this structure plan. Lot 300 should not be zoned Urban Deferred until the structure plan review is complete.	Dismiss.	Noted.
40	Boyanup Lot 155 Gelorup west of	77	1	Refer to WAPC comments for 36 above.	Dismiss.	Noted.

	Bunbury Outer Ring Road and at the south-east corner of the proposed Urban zone at Gelorup should be zoned Urban.					
41	The majority of Lot 1 and Pt Lot 394 Rich Road, Stratham should be zoned Urban Deferred in order to realise the development potential indicated in the Shire of Capel Rural Strategy.	208	1	The Shire of Capel Local Rural Strategy identifies this area as having potential for low-key tourism, which does not require Urban Deferred zoning in the GBRS. Also refer to comments for 36 above.	Dismiss.	Noted.
42	Pt Lot 2 Old Coast Road adjacent to Bunbury Golf Club should be zoned Urban Deferred.	S/H	1	Proposed Rural zoning reflects zoning in Shire of Harvey TPS No.1. Also refer to comments for 36 above.	Dismiss.	Noted.
43	Land immediately surrounding Dardanup townsite identified in the Dardanup Expansion Strategy should be zoned Urban Deferred.	S/D	1	Refer to comments for 36 above. The Commission still has concerns regarding the Dardanup Expansion Strategy and until these concerns are addressed the Strategy should not be used as a guide to future development.	Dismiss.	Noted.

NON-ROS RESERVES						
No.	Points Raised	Submissions Raising Points	Total	WAPC Comment	WAPC Response	EPA Recommendation
Port Installations						
44	Proposed reserve boundaries need to be reviewed.	BPA, 169	2	Refer to WAPC Comments for 5(a) above.	Refer to WAPC Response for 5(a) above.	Agree with the WAPC comment and determination.
45	Object to impact of proposed reserve on remnant vegetation.	WSWA	1	The portion of proposed Port Installations reserve to the south-east of the Preston River delta contains remnant vegetation associated with the Leschenault Estuary foreshore. The Port Installations reserve boundary in this area should be modified to exclude the foreshore vegetation. Otherwise there is little remnant vegetation in the proposed port expansion area and its retention should be considered as part of future port expansion proposals.	Uphold in part. The Port Installations reserve boundary shall be modified in accordance with Map 5 (Appendix 8)	Further EPA assessment required. Refer to Section 6.
46	Object to extent of proposed reserve due to potential impacts on amenity, drainage and groundwater supply.	259	1	The extent of the proposed reserve will not itself impact on amenity, drainage and/or groundwater supply. Future port expansion proposals may have a potential impact on these environmental values and these impacts will be considered through the assessment of individual proposals.	Dismiss.	Further EPA assessment required.
47	Swampy area on Lot 8 Newton Rd, Glen Iris is used by swans and other waterbirds.	260	1	This wetland is classified as a Multiple Use wetland and has therefore been substantially modified and retains little of its original conservation value.	Note.	Refer to 12(a) above.
Glen Iris Service Corridor and Port Access Road						
48	Object to the impact of proposed reserve corridor on remnant vegetation.	WSWA	1	There is little remnant vegetation within the proposed Glen Iris Service Corridor/Port Access Road reserve. Main Roads has prepared an Environmental Assessment and Management Plan for the remaining section of the Port Access Road to the south and is in the process of confirming the environmental acceptability of particular sections with the DEP. Any minor modifications to the reserve alignment required as a result of these investigations can be incorporated into the GBRS prior to finalisation.	Dismiss. This portion of the port Access Road between the Outer Ring Road and the Boyanup Picton Road is currently under review and subject to further assessment. The review of the road can be included in the Preston Industrial Area Structure Plan. The Scheme can be amended to reflect any new findings that may arise. It is recommended that the current alignment be	a) The PAR Primary Regional Road Reserve should be realigned to avoid impacting on: • Area 9: Barbetti's/CSBP Lot 5; • Area 10: Bushland between Boyanup/Picton road and railway; and • Area 11: Ferguson River. Refer to Section 7.3 for further details of the EPA's assessment and recommendations.

					retained until all other alternative alignments have been investigated.	
49	Corridor should have a maximum width of 135m along eastern portion of Pt Lot 52.	266	1	The WAPC has approved subdivision to create road reserves over portion of the land proposed to be reserved ROS. The DEP has advised that the approved subdivision provides an adequate separation between residential lots and the Port Access Rail/Road Corridor. The proposed ROS boundary should be modified to reflect the approved subdivision.	Uphold. The proposed ROS boundary shall be modified in accordance with Modification Plan 10.	Agree with the WAPC comment and determination. Refer to Section 10.5 for further details of the EPA's assessment and recommendations
Widening of South Western Highway						
50	Objection to proposed widening based on impacts on remnant vegetation.	33, 95, 134, WSWA	4	Many sections of the proposed South Western Highway widening are over cleared farming land. For those sections containing remnant vegetation, Main Roads seeks to retain as much remnant vegetation as possible as part of its road designs. In this regard, the proposed reserve width for South Western Highway is 90m. Only 30m of this is required for the actual road pavement, 15m of which is already existing. The remaining 60m can be used to protect significant remnant vegetation as part of the road design. Main Roads also actively revegetates road verges and medians to extend or link sections of bushland adjacent to roads.	Dismiss. There are few sections of the proposed South Western Highway widening that affect remnant vegetation and for those that do there is flexibility to avoid significant stands as part of the road design.	The alignments of the South Wester Highway meets the EPA's environmental objectives provided Environmental and Noise/Vibration Management Plans and Vegetation and Waterway Mitigation Strategies are prepared and implemented, when appropriate, to the satisfaction of the EPA. Refer to Section 7.2 for further details of the EPA's assessment and recommendations.
51	Objection to proposed widening based on the noise and vibration impacts on nearby residents.	33, 134	2	Main Roads must ensure road projects meet base noise level objectives either through separation or incorporating noise control measures. Potential noise and vibration impacts will be assessed at the design and construction stages.	Dismiss. To be addressed by Main Roads during design and construction stages.	Refer to 50 above.
52	Proposed widening has not been subject to environmental assessment.	60	1	The proposed South Western Highway widening alignment has largely been determined by the alignment of the existing Highway. As part of defining the road widening corridor, Main Roads prepared an Environmental Status Report, which considers the extent and condition of remnant vegetation on either side of the existing road reserve. There will be sufficient flexibility within the proposed reservation width to allow the new carriageway to be designed to avoid significant remnant	Dismiss. Protection of remnant vegetation can be addressed as part of the road design.	Refer to 50 above.

				vegetation. The design stage of the project may be subject to a separate environmental assessment.		
53	Objection to proposed widening based on impacts on Weeks Brook and an historic Gum Tree.	164	1	Main Roads will consider drainage as part of the road design stage, including minimising the impact on natural drainage systems. Potential erosion can be managed by either engineering or vegetation solutions. If the Gum tree is demonstrated to have cultural or ecological significance, Main Roads may include its protection in the design.	Dismiss. To be addressed by Main Roads during design and construction stages.	Refer to 50 above.
Widening of Bussell Highway						
54	Object to proposed widening due to impact on remnant vegetation.	WSWA	1	Most of the proposed widening for Bussell Highway already contains the existing constructed dual carriageway. There will be sufficient flexibility within the proposed reserve width to allow the remaining sections of new carriageway to be designed to avoid significant remnant vegetation. The design stage for these sections may be subject to a separate environmental assessment. The proposed widening adjacent to the future Bunbury Outer Ring Road intersection is required to provide for a grade-separated interchange. Removing this proposed widening would necessitate a redesign of the interchange and a further widening of the reservation over freehold land to the east of the intersection. As the proposed widening would not substantially reduce the conservation values of the adjoining conservation reserve or the amenity of adjoining residents, it should be retained.	Dismiss. The proposed widening will not reduce the conservation values of adjoining reserves and in many cases, the protection of remnant vegetation can be considered further at the design stage.	The Primary Regional Road reserve for Bussell Highway, has been widened to facilitate the upgrading of the highway. The dual carriageway has been constructed for the full length of the highway within the GBRS area.
55	Object to the noise impact of the proposed widening on residents of existing dwelling on Lot 50 Bussell Highway, Stratham.	18	1	Bussell Highway is already constructed to dual carriageway along this section. The proposed widening will increase the verge width and will not result in traffic passing closer to the existing dwelling.	Dismiss.	Refer to 54 above.
56	Object to proposed widening because it will include 100 trees planted on Lot 37 Bussell Highway by the owners as a buffer in the road reserve.	191	1	As the proposed road widening is only required to increase the width of the road verge in this locality, the landscape buffer planted by the landowners will not be physically affected.	Dismiss.	Refer to 54 above
Bunbury Outer Ring Road						
57	More investigations required to determine alignment.	213, WSWA	2	Main Roads has prepared an Environmental Assessment and Management Plan for the Bunbury Outer Ring Road and is in the process of confirming the environmental acceptability of particular sections with the DEP. Any minor modifications to the reserve alignment required as a result of these investigations can be incorporated into the GBRS prior to finalisation.	Dismiss. *It is recommended that the current alignment be retained until all other alternative alignments have been investigated. Where necessary, wetland*	Further was undertaken by the EPA and Main Roads. The EPA recommends that the BORR Primary Regional Road Reserve should be realigned to avoid impacting on: -Area 1:Dalyellup Reserve (System 6 -Area C71);

					relocation options should also be considered. Changes to the alignment of the road will be included as a future amendment to the Region Scheme.	-Area 3B: Wetland north of Lilydale Road; -Area 4: Lot 2 Miles Property; -Area 7: Hines Road/Australind Bypass. Refer to Section 10.4 for further details of the EPA's assessment and recommendations
Boyanup Bypass						
58	Proposed alignment cuts through north-western corner of Boyanup Billabong wetlands area.	107	1	The WAPC's independent environmental study concludes that Boyanup Billabong is not regionally significant. Accordingly, the proposed alignment does not need to be modified at this point. However, the study recommends the southern extremity of the proposed alignment be modified to avoid regionally significant remnant vegetation. The DPI and Main Roads should investigate the possibility of modifying this section of the proposed reserve prior to finalisation of the GBRS.	Note. The DPI and Main Roads will investigate the possibility of modifying the southern extremity of the proposed Boyanup Bypass reserve prior to finalisation of the GBRS.	The EPA recommends that the road be designed and constructed to minimise impact on bushland and avoid any direct or indirect impacts on the Boyanup Billabong. Refer to Section 7 for further details of the EPA's assessment and recommendations.
59	Proposed alignment will eliminate the drainage and biological filter designed to trap and store nutrient runoff from the orchard on Loc 22 Junction Street, Boyanup.	255	1	Main Roads considers existing infrastructure in road designs. If the nutrient trap is demonstrated to be significant and the proposed road alignment is likely to affect it, Main Roads may include its relocation/replace as a design consideration. Environmental impacts and management plans can be assessed by the EPA at the design or construction stages.	Note. To be considered by Main Roads at the road design stage.	Noted. Agree with the WAPC comment.
General Comments regarding Proposed Regional Roads Reserves						
60	Objection to proposed new arterial road corridors.	SWEC	1	The Primary Regional Roads proposals of the GBRS are identified in *Roads 2020: Regional Roads Development Strategy - South West and Peel (Main Roads, 1997).* These roads are required to provide for the effective operation of the regional road network into the future. The environmental impacts of each proposed Primary Regional Roads reserve have been considered and each will require environmental approval.	Dismiss.	Noted.
61	Care should be taken in determining road alignments and road design to protect remnant bushland.	ABC	1	All proposed new regional roads and regional road widenings have been reviewed based on their impact on remnant vegetation. Generally it has been determined that sufficient protection of remnant bushland within the	Note.	Noted. The EPA will require the preparation of Environmental Management

				proposed road reserves can be achieved by sensitively designing the road to avoid remnant vegetation where possible.		Plans and Vegetation Mitigation Strategies prior to the construction of the regional roads in the GBRS.
62	River foreshores disturbed through the construction of bridges for Primary Regional Roads reserves should be restored through revegetation.	WRC	1	These concerns can be addressed by Main Roads as part of the management planning for Primary Regional Roads river crossings.	Note.	Noted. Refer to 61 above.

SPECIAL CONTROL AREAS						
No.	Points Raised	Submissions Raising Points	Total	WAPC Comment	WAPC Response	EPA Recommendation
SCA No.1.						
63	Unsustainable logging needs to be addressed.	PEG, 165, 183, 206, SWEC	5	Decisions regarding the use and management of State Forest are not made under planning legislation. Any logging proposal for areas within public water supply catchments needs to be accompanied by a management plan, the principal purpose of which is to demonstrate water quality will not be adversely affected. Both the EPA and WRC assess management plans to ensure biodiversity and water quality are maintained.	Dismiss.	Agree with WAPC comment and determination. No further evaluation required.
64	Objection to restrictions being imposed upon existing and future land use and development in SCA No.1.	147, 148, 157	3	These properties are located in declared Priority 2 water source protection areas. Existing approved uses and development in these areas would not be affected by SCA No.1. Restrictions would only apply to new land use and development proposals whether an SCA is created or not. The restrictions do not necessarily prevent use and development of the land. In many cases, land use and development typical of rural areas would be permitted subject to suitable controls and conditions to prevent pollution of public drinking water source areas. WRC will provide advice on these matters in considering future rezoning, subdivision and development proposals.	Dismiss. There is a need to ensure land use and development in public drinking water supply catchments do not pollute the water resource.	Agree with WAPC comment and determination. No further evaluation required.
65	Lot 1 Honeymoon Rd, Harvey should not be included in SCA No.1 as it is not thought to be in the Harvey Dam catchment.	172	1	The WRC agrees that Lot 1 should not be included in SCA No.1.	Uphold. The boundary of SCA No.1 will be modified to exclude this land.	Agree with WAPC comment and determination. No further evaluation required. .
SCA No.2						
66	Proposed boundary should be modified to reflect modelled buffer requirements rather than convenient physical or administrative boundaries.	112, DRD, ABC, S/H, 236, 249, 251	7	The *Kemerton Expansion Study -Final Draft Report (BSD Consultants 1997)* determined buffer requirements of the GBRS based on risk, noise and air quality impact models. SCA No.2 includes all properties potentially affected by risk, noise or air quality impacts associated with any additional industries in the expanded Kemerton Industrial zone. It also includes land south of the modelled buffer requirements around the regional landfill facility. Landcorp is acquiring all properties in SCA No.2 containing incompatible land uses (ie. residential	Dismiss. As the buffer requirements recommended by the *Kemerton Expansion Study - Final Draft Report* are based on modelling, a cautious approach to defining the buffer is required.	Refer to Sections 5 & 11.2 for further details of the EPA's assessment and recommendations. The EPA is satisified the buffer has bee appropriately modelled and reflects the buffer requirements of current and future industrial

				dwellings) and affected or likely to be affected in the short term by unacceptable industry impacts.	It is recognised that the qualities of the site are significant and that further assessment should be undertaken at the subdivision or development stage. The requirement for the preparation of an Environmental Management Plan, as part of any application for subdivision or development in this area, could be included in the GBRS (Refer to section 5.3.2.2 of the Scheme text).	activities.
67	Recreation should be permitted.	ABC, S/H, S/D	3	There should be a presumption against recreational activities that inevitably lead to people being exposed to unacceptable levels of risk. However, there may be recreational uses that, because of their operations, would be compatible and have an acceptable level of risk at certain locations within SCA No.2. Further consultation with DMPR, Shire of Harvey and Landcorp should be undertaken to introduce a provision into the GBRS that would provide for such uses without permitting inappropriate recreation activities.	Note. Further consultation with DMPR, the Shire of Harvey and Landcorp required.	Noted. Agree with the WAPC comment.
68	Land proposed as ROS in Kemerton be included in Rural buffer subject to SCA No.2.	DRD	1	Refer to WAPC Comments for 8(g) above.	Refer to WAPC response for 8(g) above.	Agree with the WAPC comment and determination.
SCA No.3						
69	Area should be reduced based on operator adopting better practices.	141	1	The boundary of SCA No.3 reflects the projected 35 dB(A) noise level contour identified in modelling conducted on behalf of the operator for existing and ultimate industrial activity. SCA No.3 will ensure no residents are exposed to unacceptable noise levels and the operator is negotiating with affected landowners regarding compensation for loss of development rights. These initiatives represent best operating practices.	Dismiss.	The boundary of SCA No. 3 has been calculated based on noise emissions modelling for current and future industrial activities. Reducing the width of the buffer may expose sensitive land uses to unacceptable noise levels.
70	Recreation should be permitted.	S/D	1	The proponent of the North Capel Industrial Complex has advised that some recreation uses may be acceptable in SCA No.3. On this basis, a suitable provision will be prepared for the GBRS in consultation with DMPR, the Shire of Capel and the proponent to ensure the	Note. Further consultation with DMPR, the Shire of Capel and the proponent required.	Noted. Agree with the WAPC comment.

				proponent's interests are adequately represented in the consideration of recreation proposals within SCA No.3.		
71	Support for SCA.	268	1	SCA No.3 will prevent the siting of incompatible land uses in areas where they could potentially conflict with industrial operations in the North Capel Industrial zone.	Note.	Noted.

SUPPORTING DOCUMENTS						
No.	Points Raised	Submissions Raising Points	Total	WAPC Comment	WAPC Response	EPA Recommendation
Environmental Review						
72	The Environmental Review should not pre-empt provisions of the Coastal Zone Management Policy with respect to coastal management recommendations.	213	1	The only new proposals of the GBRS along the coast are additional areas identified for future foreshore reserve. These proposals are consistent with the intent of the Coastal Zone Management Policy's stated coastal zone management, environmental and community principles and objectives to protect the conservation values and provide for public access to the coast. EMM 1 allows the decision-making authority to require an environmental management plan for any future coastal rezoning, subdivision or development proposal adjacent to coastal ROS. Such proposals will be assessed against relevant coastal policy such as the Coastal Zone Management Policy.	Note. The GBRS will implement recommendations of the Coastal Zone Management Policy.	Noted.
73	The absence of any Site Specific Factors under the Coastal Areas and Urban Bushland categories in the Summary Table is astonishing. More detailed analysis is required.	213	1	For Coastal Areas, the GBRS does not propose any additional impacts on particular coastal sites. In accordance with requirements of EMM 1, more detailed analysis will be undertaken as part of any future coastal rezoning, subdivision or development proposals. For Urban Bushland, the WAPC's independent environmental study has contributed to ensuring GBRS proposals do not impact on regionally significant remnant vegetation, where possible. EMM 4 provides for a vegetation survey as part of any future GBRS rezoning proposal potentially affecting remnant vegetation.	Note. More detailed analysis has been undertaken for sites affected by GBRS proposals. Detailed analysis of the impacts of future proposals on remnant vegetation will be undertaken as part of their assessment.	Noted. In addition to the Environmental Review the EPA has undertaken additional biological surveys and mapping (Appendix 5) and has also prepared a strategy to identify regionally significant natural areas in its consideration of the GBRS.
74	Objection to Section 3.7.3 because it states that industries with limited potential for groundwater contamination will be permitted in the Preston Industrial Park. This decision should be made by the EPA.	DRD	1	This section of the Environmental Review will have no bearing on the permissibility of uses in the Preston Industrial Park. A comprehensive drainage and water management strategy is required as part of structure planning for the area and provisions of local Town Planning Schemes and conditions of subdivision and development approval will determine permissibility of uses and drainage management conditions.	Dismiss.	Agree with the WAPC comment. No further evaluation required.

75	Section 5.2 should only require vegetation management plans for areas within Kemerton identified in *Industry 2030 (WAPC, 2000)* and not the industry core generally. The existing heavy industry core and proposed expansion area exclude wetlands of high conservation value, which are protected by the Lakes EPP.	DRD	1	The WAPC recognises the importance of maximising the opportunities for industrial development in the Kemerton Industrial zone but considers that environmental values of the area should also be protected where possible. For this reason, EMM 5 requires preparation of EMPs prior to subdivision or development.	Dismiss. Environmental values of the Kemerton Industrial zone should be protected where possible.	Agree with WAPC comment and determination.
76	Commitment to Preston River Diversion under Section 5.11.2 should be subject to environmental approval.	SWEC	1	The Preston River Diversion is not proposed by the GBRS. In the Environmental Review, the second paragraph under the heading "Regionally Significant Wetlands" states that the EPA has requested formal environmental assessment of the Preston River Diversion proposal.	Note.	Agree with the WAPC comment.
77	Water Management Strategy for Kemerton					
	(a) Comprehensive strategy should be developed prior to water management conditions being considered for specific developments.	DRD	1	According to WRC, a comprehensive groundwater management plan is currently being prepared for Kemerton to address groundwater allocation and protection (including wetland water levels) issues. Drainage and nutrient management plans are required as part of each subdivision or development proposal in Kemerton.	Note.	Agree with the WAPC comment.
	(b) Strategy should have been released with GBRS for public comment.	165	1	WRC advises that public consultation will be incorporated into the approval process for the comprehensive groundwater management plan referred to in WAPC comments for 77(a) above.	Dismiss.	Noted.
78	Conservation value of Conservation and Resource Enhancement category wetlands should be considered.	WRC	1	EMM 1 provides for an EMP for rezoning, subdivision or development proposals impacting on wetlands identified in an approved Government policy for conservation. Conservation and Resource Enhancement category wetlands are not identified in an approved Government policy. It is understood that WRC and EPA are working towards addressing this issue. Notwithstanding the status of these wetlands, the absence of reference to Conservation and Resource Enhancement category wetlands in EMM 1 does not prevent the protection of environmental values associated with those wetlands from being considered as part of future rezoning, subdivision and development proposals.	Note. The GBRS does not prevent the conservation value of these wetlands from being considered as part of future rezoning, subdivision and development proposals.	The EPA will have the opportunity to assess the potential impact of schemes and proposals on wetlands within Rural zones and other areas where it listed as a deferred factor in Section 15.
79	Conservation category wetland classification over portion of the Kingston Estate should be deleted from	190	1	The Environmental Review reflects the management category assigned to the wetland following a comprehensive assessment of wetlands on the Swan	Dismiss. The Conservation	Agree with WAPC comment and determination.

	Figure 8.			Coastal Plain. As there is no technical evidence to suggest that this classification is incorrect, there is no reason to delete the classification from the Environmental Review. Appropriate environmental management measures have been incorporated into plans for this area to protect conservation values of the wetland.	classification of the wetland is appropriate. The DEP has had input into plans for the area to ensure conservation values of the wetland are protected.	
80	Unclear whether Conservation category wetland on southern boundary of Dalyellup Beach Estate is regionally significant.	264	1	The subject wetland is proposed to be included in ROS.	Dismiss.	Noted.
81	Reference to "water sensitive design in new developments" on Page x of Executive Summary should specify urban, industrial, commercial, roads, railways, agriculture, horticulture and other rural pursuits.	WRC	1	The general reference to "new developments" in the Proposed Management Strategy on Page x allows water sensitive design to be required of all new development proposals, whether urban or rural. As the Proposed Management Strategy relates to all new development there is no need to specify particular types of development to which it applies.	Dismiss.	Noted.
82	EMM 1 should be required for proposals adjoining watercourses or significant (including Conservation category) wetlands.	WRC	1	EMM 2 provides for preparation of a DNMP as part of any subdivision or development proposal where drainage may lead to degradation of a wetland or watercourse. EMM 4 provides for a vegetation survey as part of any GBRS rezoning that potentially affects riparian vegetation. EMM 1 provides for an EMP for rezoning, subdivision and development proposals affecting wetlands identified in an approved Government policy for conservation. While Conservation category wetlands are currently not included, it is understood that WRC and EPA are working towards addressing this issue. Also, the protection of environmental values associated with these wetlands can be considered as part of future rezoning, subdivision and development proposals. These mechanisms will ensure impacts of future proposals on watercourses and wetlands are addressed as part of the assessment of future proposals.	Dismiss. The expansion of EMM 1 to include watercourses and Conservation category wetlands is not required to protect their environmental values. There will be adequate mechanisms available to ensure these environmental values are protected as part of future proposals.	Agree
83	EMM 4 should be made compulsory for all rezonings.	165	1	Vegetation surveys should not be required for rezoning proposals that do not impact on remnant vegetation. The need for a vegetation survey should be determined by the responsible authority, which includes the EPA, when rezoning proposals are submitted for consideration.	Dismiss. The need for a vegetation survey can be considered as part of rezoning proposals.	Noted
84	EMM 5 should ensure wastewater re-use for irrigation within Leschenault Estuary catchment does not impact on waterways.	WRC	1	Wastewater disposal from industrial developments in Kemerton will be one of the most important issues to be addressed by the Environmental Management Plan required under EMM 5. If wastewater is proposed to be used for irrigation, the Environmental Management Plan	Note. EMM 5 will require wastewater disposal, including disposal for off-site	Noted

				would need to provide details of the environmental acceptability of this method of disposal.	irrigation, to be addressed.	
85	Concerns about risk associated with Kemerton-Bunbury rail link shown on Figure 4.	SWEC	1	Figure 4 shows recommendations of *Industry 2030 (WAPC, 2000)*. The Kemerton-Bunbury rail link is not a proposal of the GBRS and any amendment to reserve the rail link in the GBRS would require separate public consultation and environmental approval.	Dismiss.	Noted
Strategic Minerals and Basic Raw Materials Resource Policy						
86	Basalt Extraction Referral Area					
	(a) Policy should not be finalised until the report on the Gelorup basalt quarries buffer requirements is finalised.	S/C, 178	2	"A Technical Assessment of the Effects of Blasting at the Gelorup Basalt Quarries" is currently available for public comment. This study will be used to determine appropriate planning controls around the quarry. Any changes to the referral area required as a result of the study can be made to the policy once the study is finalised.	Dismiss.	Noted.
	(b) Buffer should be removed and memorials placed on new titles.	178	1	The importance of the basalt resource in this location and the relatively significant impacts that could be experienced by a sensitive land use located within the area of blasting effect warrants the establishment of an appropriate buffer. The implementation mechanism is yet to be determined.	Dismiss.	Noted.
	(c) Area should be 500m radius excluding existing residential areas.	213	1	While the Basalt Extraction Referral Area will be reviewed following finalisation of the related study. It is premature to adopt a reduced buffer.	Dismiss.	Noted.
	(d) Basalt Quarry operation should be subject to controls.	213	1	The basalt quarry operation is subject to controls but still requires the Basalt Extraction Referral Area to ensure access to the basalt resource is not compromised by an increase in incompatible land uses in the area of blasting effect.	Dismiss.	Agree with WAPC comment.
87	Environmental value of area south of Capel shown as a SM&BRMR Policy area should be protected.	31, 165, 209	3	The policy only defines general areas identified as containing mineral or basic raw material deposits. Any proposal to mine these deposits would be subject to a separate approval, which may include environmental assessment. Such an approval would specify the areas from which, and the conditions under which minerals and basic raw materials can be extracted.	Note. More detailed environmental assessment will be undertaken for any future extraction proposals.	The EPA recommends that the text of the policy be modified as outlined in Section 12.4.
88	More detailed environmental assessment required to define areas from which minerals and basic raw materials can be extracted.	WSWA	1	Refer to comments for 87 above.		The EPA recommends that the text of the policy be modified as outlined in Section 12.4.
89	Section 3.1 (ii) relating to buffers should be deleted.	S/D	1	Section 3.1(ii) states that the Policy applies to planning applications within 500m of SM&BRMR Policy areas. This referral allows DMPR to consider the effect of	Dismiss.	Noted.

				planning proposals on the ability to access mineral and basic raw material resources and to ensure access to those resources is maintained.		
Public Water Supply Catchment Policy						
90	Insufficient logging controls.	PEG, 165, 183, 206, SWEC	5	Refer to WAPC comments for 63 above.	Dismiss.	Agree with WAPC comment and response. No further evaluation required.
91	The land use permissibility table should be deleted.	S/D	1	Land use permissibility in Public Water Supply Catchments is determined based on WRC guidelines. These guidelines should be referred to in the GBRS policy to ensure consistency and avoid the need for future amendments to the GBRS policy.	Uphold. The land use permissibility table in the PWSC Policy should be deleted.	Agree with WAPC comment and response.
92	Wellington Dam catchment area should be Priority Area 1.	SWEC	1	PWSC Policy areas have been defined based on management requirements for each catchment. Stakeholders are currently considering the most appropriate uses for the Wellington Dam water supply. The results of this process will determine whether the proposed PWSC Policy areas for the Wellington Dam catchment need to be revised.	Dismiss.	Noted
93	Water catchment areas extending beyond the GBRS boundary need to be protected.	SWEC	1	All Public Water Supply Catchments extending outside the GBR are protected by provisions of the *Country Areas Water Supply Act 1947* and these provisions apply whether the catchment is covered by a regional town planning scheme or not.	Note.	Noted
Strategic Agricultural Resources Policy						
94	Areas covered by remnant vegetation should not be included.	WSWA	1	The inclusion of areas containing remnant vegetation within SAR Policy areas does not commit them to agriculture. It only requires the responsible authority to have regard to potential for agriculture in determining land use and development proposals. Regional-level studies should be undertaken when the GBRS is operational to identify regionally significant remnant vegetation that should be protected.	Dismiss. The WAPC will undertake further regional-level studies when the GBRS is operational to identify regionally significant vegetation.	The EPA recommends that the text of the policy be modified as outlined in Section 12.3.
95	State Forest north of Myalup east of the Perth-Bunbury Highway should be included.	93	1	CALM will determine the future use of this portion of the State Forest following harvesting of the existing pine plantation. Any proposal to include additional land within SAR Policy areas can be considered as an amendment to the policy.	Dismiss.	Agree with WAPC comment and response. No further evaluation required.
96	Land north of Leschenault Estuary should not be included.	WRC	1	The portion of Loc.14 north of Leschenault Estuary to be included in ROS should not be included in a SAR Policy area. Whilst western portions of other lots north of the Estuary included in SAR Policy areas have been mapped	Uphold in part. The portion of Loc.14 north of Leschenault Estuary to be	Agree with WAPC comment and response. No further evaluation required.

				as containing Vasse soils, which do not justify the same level of protection for agriculture as the Spearwood soils to the east, the SAR Policy area boundary is consistent with lot boundaries rather than soil type boundaries. The fact that a large proportion of these lots are highly suitable for intensive agriculture justifies their inclusion in the SAR Policy areas. More detailed analysis of land capability will be considered as part of any intensive agriculture proposal.	included in ROS will be excluded from the SAR Policy area.	
97	Planning proposals within 500m of a SAR Policy area should not require referral to DEP and Department of Agriculture.	S/D	1	Planning applications within 500m of SAR Policy areas need to be referred to DEP and Department of Agriculture to ensure existing agricultural operations or the potential to use these areas for agriculture are not compromised by incompatible land uses.	Dismiss.	Agree with WAPC comment and response. No further evaluation required.
Floodplain Management Policy						
98	Policy should recognise that global warming will cause sea levels to rise and must ensure no housing development or filling occurs on floodplains.	143	1	The policy has been formulated in consultation with WRC and prohibits development or inappropriate land uses in floodways and requires suitable site preparation in flood fringes. The policy will be subject to review and any changes in floodplain management requirements can be introduced as part of future review.	Dismiss.	Noted.

GENERAL						
No.	Points Raised	Submissions Raising Points	Total	WAPC Comment	WAPC Response	EPA Recommendation
Preserving remnant vegetation						
99	Need for planning to preserve more remnant vegetation.	34, 82, 86, 110, 141, ABC, 165, 209, 218, WSWA, 234, SWEC, CALM, 248	14	The GBRS proposes to include over 10 000ha of additional land in ROS reserves. The WAPC's independent environmental study has reviewed all new zones and reserves proposed by the GBRS that have been identified through submissions as impacting on remnant vegetation. Modifications have been recommended where required to protect regionally significant vegetation. In addition, EMM 1 and 4 provide for protection of regionally significant vegetation as part of any future GBRS rezoning proposal. The GBRS also provides a mechanism to include in ROS additional regionally significant natural areas if determined appropriate. Any proposal to clear over 1ha of remnant vegetation requires a separate approval. Notwithstanding these measures, further regional-level studies should be undertaken when the GBRS is operational to identify regionally significant remnant vegetation that should be protected and to determine an appropriate protection mechanism.	Note. The GBRS will provide a valuable contribution to preserving remnant vegetation in the region. However, the WAPC will undertake further regional-level studies when the GBRS is operational.	The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.
100	Process for protecting all significant remnant vegetation from inappropriate development needs to be incorporated.	120, 141, 218, WSWA, SWEC, CALM, 248	7	Refer to WAPC's Comments for 99 above.	Refer to WAPC's Response for 99 above.	Refer to 99 above
101	Lack of detailed vegetation mapping as part of GBRS preparation.	165, 213, WSWA, 239	4	Refer to WAPC Comments for 99 above.	Dismiss. Refer to WAPC Response for 99 above.	Noted. The EPA has undertaken additional biological surveys and mapping (Appendix 5) and has also prepared a strategy to identify regionally significant natural areas in its consideration of the GBRS.
102	Regional review of remnant vegetation is required.	DRD, 218, CALM, 248	4	Refer to WAPC's Comments for 99 above.	Refer to WAPC's Response for 99 above.	Noted. The EPA has undertaken additional biological surveys and mapping (Appendix 5) and has also prepared a strategy to identify regionally significant natural

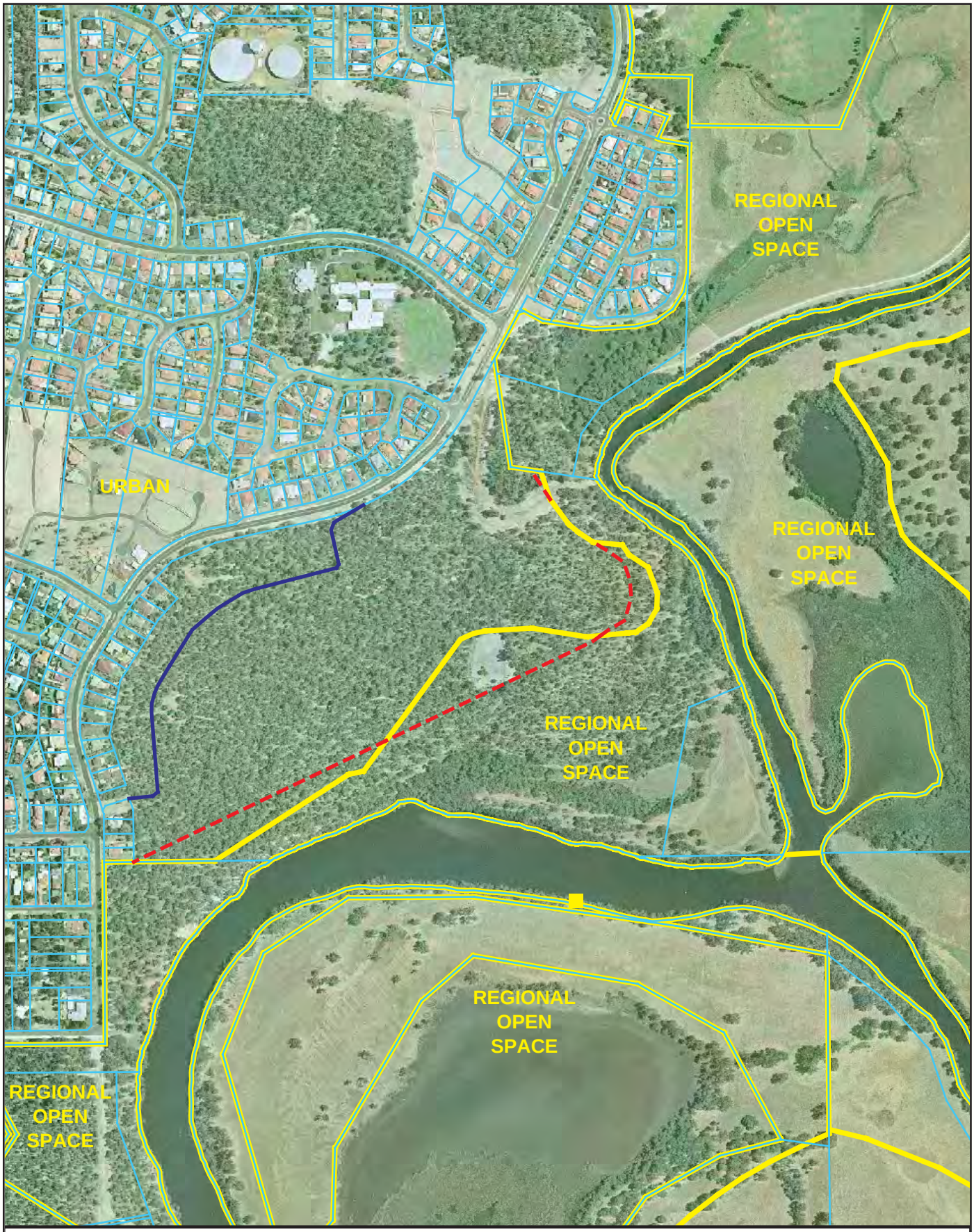
						areas in its consideration of the GBRS.
103	Should be a moratorium on land clearing until System 6 Update is completed.	141, 165, 234, SWEC	4	Refer to WAPC Comments for 99 above.	Refer to WAPC's Response for 99 above.	Refer to 99 above
104	Objection to any further new development in areas containing remnant vegetation.	17, 20	2	Refer to WAPC Comments for 99 above.	Dismiss. Refer to WAPC's Response for 99 above.	Refer to 99 above
105	Areas of remnant vegetation extending beyond GBRS boundary need to be protected.	SWEC	1	This is obviously outside the jurisdiction of the GBRS. However, there are various other mechanisms available, both within and outside the planning system, for the protection of significant vegetation. To provide consistency, certainty and efficiency in decision-making further studies should be undertaken when the GBRS is operational to identify regionally significant remnant vegetation that should be protected and to determine appropriate protection mechanisms.	Refer to WAPC's Response for 99 above.	Refer to 99 above
Preserving wetlands						
106	All EPP wetlands should be protected through inclusion in ROS or other planning mechanisms.	S/H, 234	2	While some EPP wetlands have been included in ROS based on surrounding pressures or recommendations of environmental studies, most are proposed to be retained in Rural or other zones because they are already protected by provisions of the Lakes EPP and because the GBRS does not increase the potential for their environmental values to be degraded. EMM 1 provides for EMPs as part of future rezoning, subdivision and development proposals including or adjacent to EPP wetlands.	Dismiss.	Noted.
107	Should be a policy requiring 50 m buffers around Conservation category wetlands and site specific buffers around Resource Enhancement category wetlands.	WRC	1	Refer to WAPC Comments for 78 above.	Refer to WAPC Response for 78 above.	Noted.
108	Wetlands in Preston Industrial Park should be protected.	SWEC	1	*Industry 2030 (WAPC, 2000)* recommends a detailed survey of wetlands as part of the structure planning for the Preston Industrial Park. Any significant wetlands will be protected through this process. Future amendment of the GBRS will be required, but the proposed zonings are appropriate pending structure planning.	Note. Structure planning for this area will identify and protect significant wetlands.	Noted.
Management of Natural Areas						
109	Need for management programs for regionally significant natural areas.	113, S/H, 234	3	The management of regionally significant natural areas on private land is the responsibility of the landowner. However, development in or adjacent to ROS reserves	Note. The GBRS will place	Noted.

				will be determined by the WAPC. The WAPC will prepare or encourage and assist with the preparation of management plans for ROS reserves in Crown ownership as a guide to future development of those areas. Management programs for all ROS reserves over Crown land will be coordinated between the WAPC and other land management agencies. The GBRS, through implementation of its EMMs, also provides a mechanism to protect regionally significant natural areas from the impacts of future rezoning, subdivision and development proposals.	controls on development within or adjacent to ROS reserves and the WAPC will prepare management plans for ROS once acquired. The GBRS will also protect regionally significant natural areas affected by future planning proposals.	
110	Study required to measure nutrient inputs into the Leschenault Estuary and set management guidelines for the catchment.	213, SWEC	2	The EPA has water quality guidelines for the protection of aquatic ecosystems and WRC has guidelines for best drainage and nutrient management practice, which are applied to rezoning, subdivision and development proposals. EMM 2 provides for DNMPs as part of future rezoning, subdivision and development proposals with the potential to degrade waterways and these would ensure water quality guidelines are met. It is noted that a "No Nett Nutrient Increase" policy is applied to the Leschenault Estuary catchment.	Note.	Noted. Agree with the WAPC comment.
111	Concern regarding illegal felling of Jarrah and dumping of rubbish in Dardanup Forest Block	66	1	These issues are dealt with by CALM as part of its management responsibilities under the *Conservation and Land Management Act 1984*.	Note.	Noted. Agree with the WAPC comment.
112	Provision be made to develop guidelines for management of private land adjoining ROS.	ABC	1	EMM 1 provides for EMPs to be prepared for subdivision or development proposals adjoining ROS. In the absence of more intensive land use or development, management for areas of ROS in Crown ownership would incorporate measures to minimise impacts from surrounding land uses.	Note.	Noted.
113	Management plan required for Ludlow Tuart Forest.	SWEC	1	Management plans are prepared by CALM on a priority basis and as resources permit and the Ludlow Tuart Forest is on their management plan priority list.	Note.	Noted. Agree with the WAPC comment.
114	Need for better management of rivers and wetlands.	234	1	The GBRS generally includes in ROS those river foreshores and wetlands considered to be exposed to high levels of activity or disturbance due to adjacent development. These areas are either already in public ownership or can be acquired by the WAPC and managed appropriately. Through the application of EMMs, the GBRS will ensure other significant wetlands and river foreshores are protected where there is potential for future rezoning, subdivision or development proposals to affect	Note. The GBRS introduces planning mechanisms that will ensure protection and appropriate management of river foreshores and wetlands.	Noted.

				their environmental value.		
115	Environmental management plan should be prepared for land surrounding Lake Preston.	SWEC	1	The WAPC's *Coastal and Lakelands Planning Strategy (1999)* provides environmentally sensitive planning and land management guidelines for land use and development adjacent to Lake Preston that can be implemented through the assessment of rezoning, subdivision and development proposals.	Note.	Noted.
General Suggestions on Environmental Improvements						
116	GBRS should focus more on protecting the environment and encouraging sustainable development than simply planning for economic growth.	183, WSWA, 234	3	The GBRS will contribute substantially to environmental protection. It will include many recognised regionally significant natural areas in ROS to secure protection of their environmental values and introduce EMMs that will protect regionally significant natural areas from potential impacts of future rezoning, subdivision and development proposals. However, the concept of sustainable development has broader application than environmental sustainability. Through the implementation of principles in the *State Planning Strategy (1997)* and the close involvement of the EPA and other environmental representatives in the planning process, the WAPC will ensure high regard is given to planning for environmentally sustainable development in the context of the broader concept when assessing future planning proposals.	Dismiss. The GBRS contributes substantially to environmental protection and the WAPC will give due regard to planning for environmentally sustainable development when assessing future planning proposals.	Noted.
117	Planning for GBRS should be based on characteristics of, and objectives for each bioregion.	181	1	The *Greater Bunbury Structure Plan (1995)*, which provides the strategic foundation for many of the proposals of the GBRS, defined precincts for the GBR based on major surface water catchments and functional geographic boundaries, as well as existing and potential land use patterns. The structure plan includes recommendations to address issues relating to the protection of environmental values specific to each planning unit.	Note. The GBRS is founded on planning for bio-physical planning units as described in the *Greater Bunbury Structure Plan*.	Noted.
118	Support for a larger Wellington National Park	194	1	The declaration of National Parks is not a function of the planning process.	Note. The WAPC will undertake further regional studies when the GBRS is operational.	Noted
119	The State Forest portion of the Ludlow Tuart Forest should be included in National Park in the GBRS.	218	1	Portion of the Ludlow Tuart Forest is already included in National Park. Consideration of additions to the National Park should be addressed through the *Conservation and Land Management Act 1984* planning process, particularly through revision of the Forest Management Plan.	Dismiss.	Noted.

120	ROS with highest conservation value should be purchased as a priority.	ABC	1	The WAPC will consider conservation values when determining acquisition priorities.	Note.	Noted.
121	ROS areas around Leschenault Estuary should be acquired as a priority.	WRC	1	Refer to WAPC Comments for 120 above. The majority of ROS around the Estuary is already in Crown ownership.	Note.	Noted.
General comments regarding future planning						
122	Diversion of the Preston River should not result in the loss of ROS along the river foreshore.	WRC	1	The GBRS does not propose diversion of the Preston River. The need for ROS will be considered as part of any future proposal to amend the GBRS to provide a reservation for the Preston River Diversion Channel.	Note.	Noted.
123	Strategic drainage plans should be required prior to rezonings under GBRS and urban water management plans should be required for structure plans.	WRC	1	Drainage will be considered for any GBRS rezoning proposal. Stormwater management is addressed at the structure planning stage of the planning process. EMM 2 provides for preparation of a DNMP for any subdivision or development where drainage has the potential to impact on a watercourse or wetland.	Note.	Noted.
Land use conflict						
124	Planning must control polluting development so residents are not affected.	142	1	The WAPC's *SPP No.4 – State Industrial Buffers Policy* requires industrial buffer requirements to be considered in the assessment of planning proposals. The *Environmental Protection Act 1986* empowers the EPA to assess the potential impact of any proposal for polluting development on surrounding or nearby residential development.	Note.	Noted.
125	GBRS should provide a buffer for DBC abattoir on Lot 6 Wimbridge St, Picton.	267	1	The proposed ROS over the adjoining EPP wetland provides a buffer to the north and north west. For other surrounding areas, the WAPC's *SPP No.4 – State Industrial Buffer Policy* requires industrial buffer requirements to be considered in the assessment of planning proposals. The buffer requirements for the abattoir would therefore be considered as part of any surrounding rezoning, subdivision or development proposal.	Dismiss. The buffer requirements for the abattoir will be considered as part of any surrounding rezoning, subdivision or development proposal.	Agree with WAPC comment and determination.
Environmental Assessment Process						
126	Environmental conditions to be included in Schedule 6 of the GBRS should be provided to all decision making authorities prior to being finalised.	DRD	1	There will be an opportunity for any persons and bodies to comment on recommended environmental conditions during the appeal period for the EPA's bulletin on the GBRS.	Dismiss. There is an opportunity for comment on the EPA's recommended environmental conditions within the environmental assessment process.	Agree.
Coastal Planning						
127	Object to further coastal residential	234	1	The GBRS does not propose any new coastal Urban	Dismiss.	Noted.

	development			zones. Any future proposal to zone additional coastal land Urban or Urban Deferred in the GBRS would be considered against relevant WAPC strategic and statutory coastal planning policies and would be subject to separate public consultation and environmental assessment.		
Groundwater protection						
128	Protection areas should be declared around possible public water supply bores, such as the bores proposed for public water supply in Preston.	SWEC	1	Wellhead protection zones are declared around proclaimed public drinking water source bores. Protection zones are not enforceable for wellheads in proposed public water source areas and would be more likely implemented through a structure plan or local TPS than by the GBRS. In this regard, further structure planning is required for the Preston Industrial Park. The need for protection of bores in this area may be considered as part of the structure plan preparation.	Dismiss.	Noted.



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA DRAFT BULLETIN - TWIN RIVERS

MAP 1

Department for Planning and Infrastructure

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

Filename: ...\EPA_BULLETIN\TWINRIVERS.DGN
Amended: 30 July 2003

Produced By Cartographic Section
Bunbury Office, DPI

Photography: December 2000
Positional Accuracy ±10 metres

LEGEND

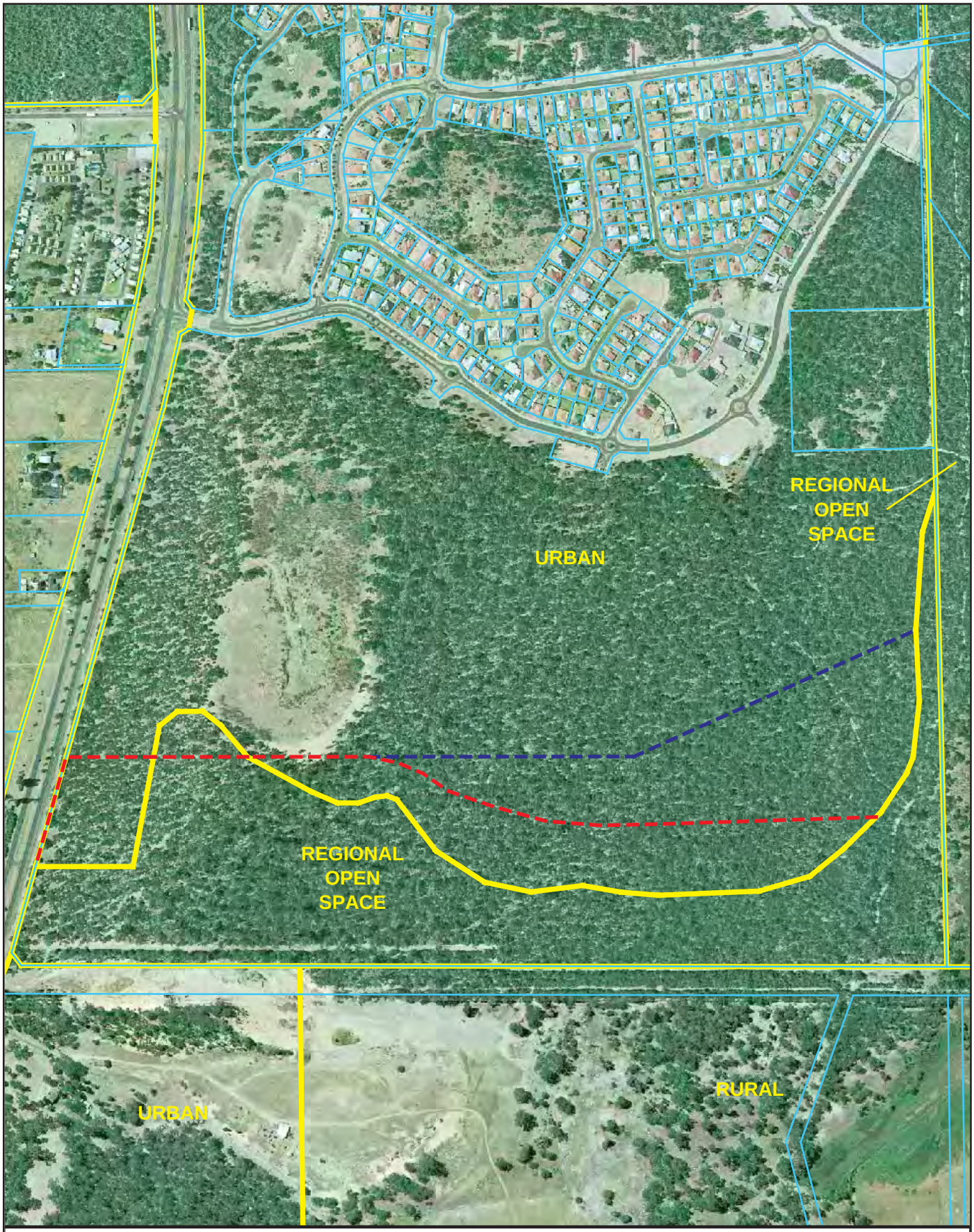
- CADASTRE
- DRAFT GBRS BOUNDARY
- RECOMMENDED ROS BOUNDARY (WAPC FEB. 2003)
- RECOMMENDED BOUNDARY IN EVENT MAJORITY OF SITE INCLUDED IN ROS

N

1:7500 at A4

0 150

Metres



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA DRAFT BULLETIN - COLLEGE GROVE BUSHLAND

MAP 2

Department for Planning and Infrastructure

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

Filename: ...\EPA_BULLETIN\COLLEGEGROVE.DGN
Created: 28 July 2003

Produced By Cartographic Section
Bunbury Office, DPI

Photography: December 2000
Positional Accuracy ±10 metres

LEGEND

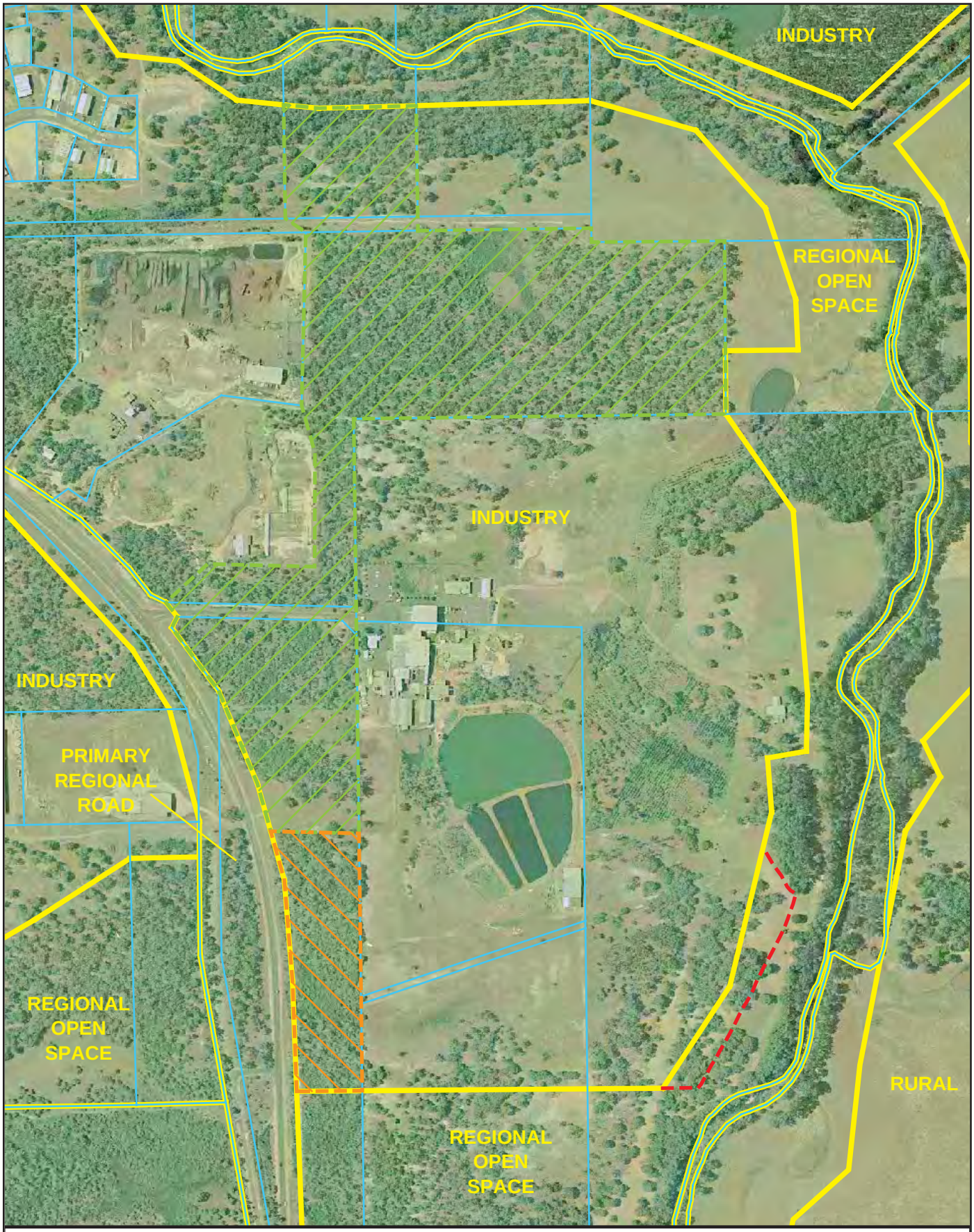
- CADASTRE
- DRAFT GBRS BOUNDARY
- EPA BULLETIN ALIGNMENT (SUBJECT TO STRUCTURE PLANNING)
- RECOMMENDED ALIGNMENT (WAPC FEB. 2003)

N

1:7500 at A4

0 150

Metres



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA DRAFT BULLETIN - DAVENPORT INDUSTRIAL REA

MAP 3

Department for Planning and Infrastructure

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

Filename: ...\EPA_BULLETINDAVENPORT.DGN
Amended: 5 August 2003

Produced By Cartographic Section
Bunbury Office, DPI

Photography: December 2000
Positional Accuracy ±10 metres

LEGEND

- CADASTRE
- DRAFT GBRS BOUNDARY
- RECOMMENDED ALIGNMENT (WAPC FEB. 2003)
- REGIONAL OPEN SPACE (ADDITIONAL TO WAPC RECOMMENDATIONS)
- SIGNIFICANT NATURAL AREA (To be addressed at subdivision, structure planning or development stage)

N

1:7500 at A4

0 150

Metres



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA DRAFT BULLETIN - HAREWOOD ROAD BUSHLAND

MAP 4

Department for Planning and Infrastructure

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

Filename: ...\EPA_BULLETIN\HAREWOODROAD.DGN
Created: 28 July 2003

Produced By Cartographic Section
Bunbury Office, DPI

Photography: December 2000
Positional Accuracy ±10 metres

LEGEND

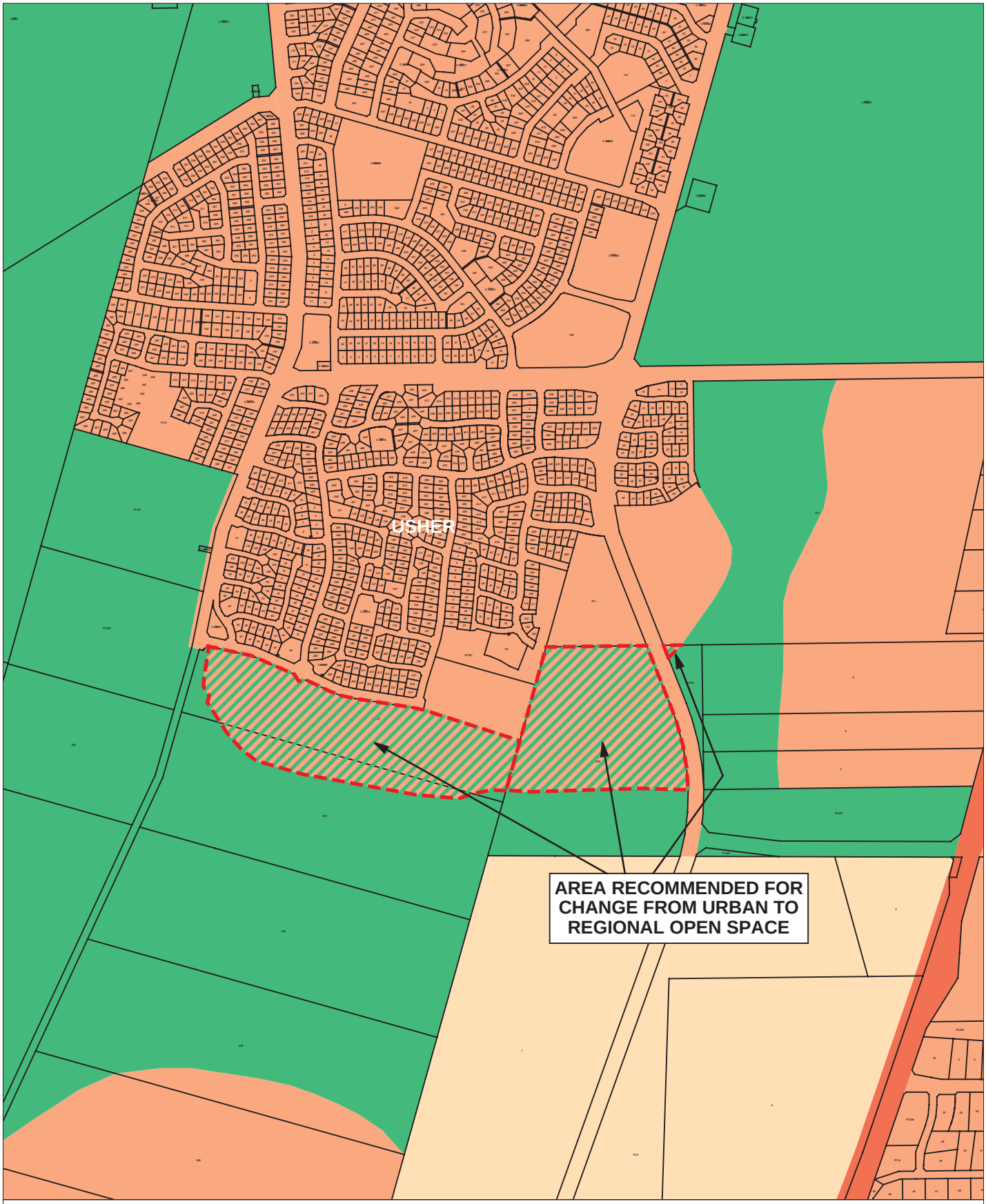
- CADASTRE
- DRAFT GBRS BOUNDARY
- REGIONAL OPEN SPACE (ADDITIONAL TO WAPC RECOMMENDATIONS)

N

1:7500 at A4

0 150

Metres



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA BULLETIN - PARADE ROAD, GLEN PADDEN

MAP 5

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA

AREA OF RECOMMENDED MODIFICATION

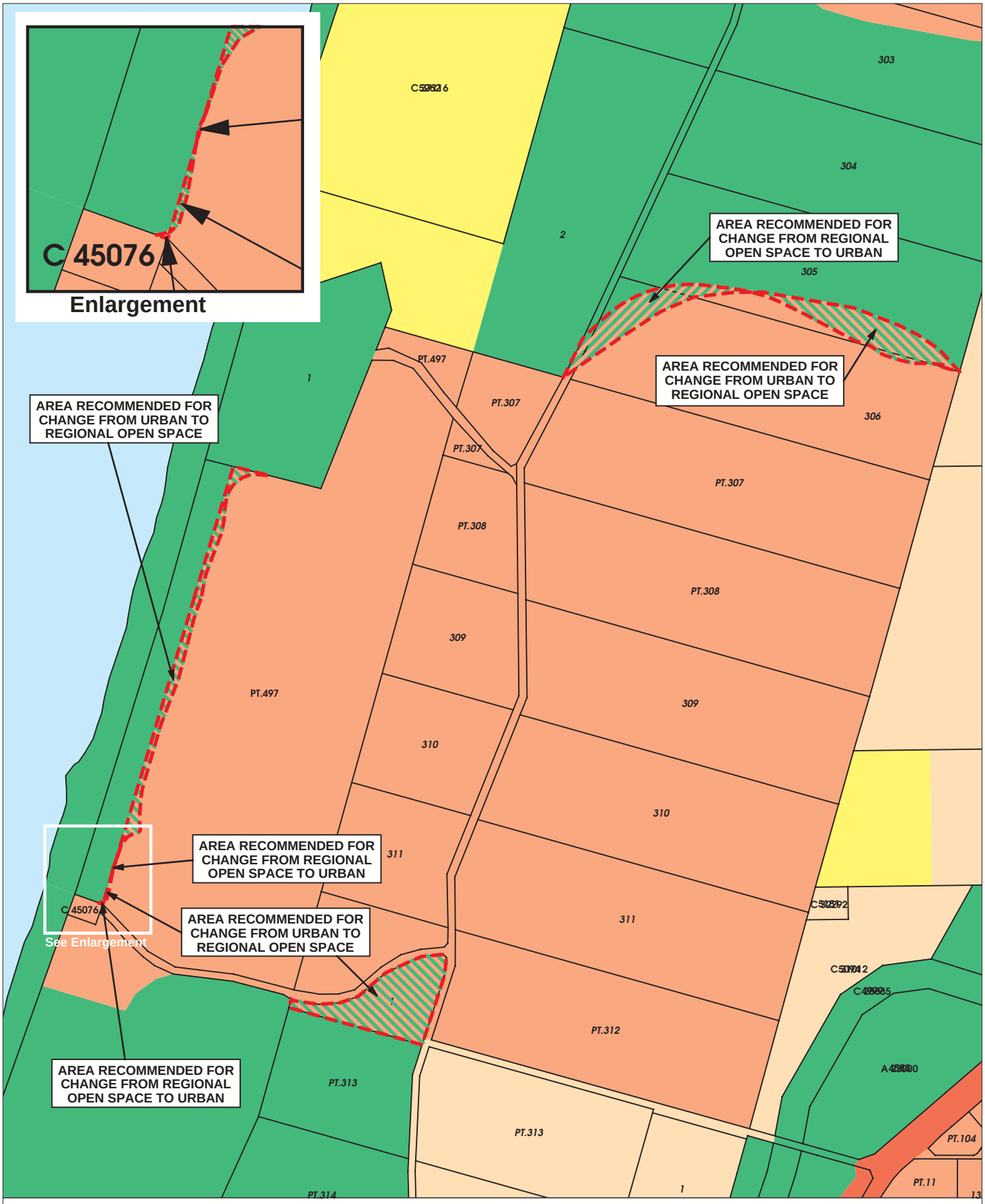
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0 200

Metres

Filename: ....\EPA_BULLETIN\SHEARWATER.DGN
Created: 25 August 2003

Produced By Cartographic Section
Bunbury Office, DPI



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA BULLETIN - DALYELLUP BEACH

MAP 6

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

Filename: ...\EPA_BULLETIN\DALYELLUP_COASTAL.DGN
Amended: 27 July 2003

Produced By Cartographic Section
Bunbury Office, DPI

LEGEND

RESERVED LANDS
- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :
- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES
- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

- SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :
  - SCA NO.1 WATER CATCHMENTS
  - SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
  - SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- AREA OF RECOMMENDED MODIFICATION

N

0 200

Metres



DRAFT GREATER BUNBURY REGION SCHEME
RESPONSE TO EPA DRAFT BULLETIN - AUSTRALIND WWTP

MAP 7

Department for Planning and Infrastructure

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

Filename: ...\EPA_BULLETIN\AUSTRALINDWWTP.DGN
Amended: 5 August 2003

Produced By Cartographic Section
Bunbury Office, DPI

Photography: December 2000
Positional Accuracy ±10 metres

LEGEND

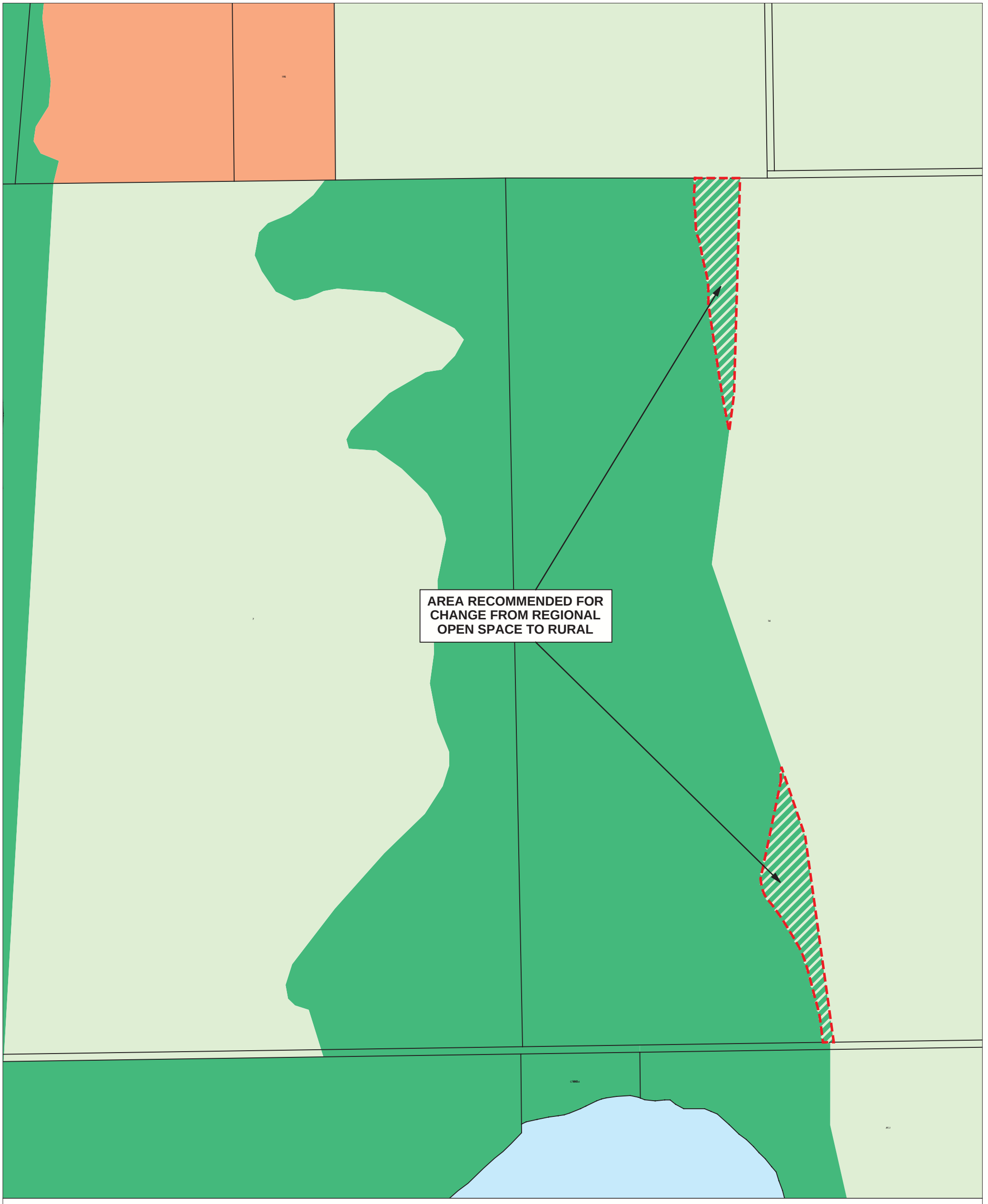
- CADASTRE
- DRAFT GBRS BOUNDARY
- RECOMMENDED ALIGNMENT (WAPC FEB. 2003)
- SIGNIFICANT NATURAL AREA
  (To be addressed at subdivision, structure planning or development stage)

N

1:7500 at A4

0 150

Metres



RECOMMENDED MODIFICATION

PROPOSED R.O.S. NORTH OF LESCHENAULT ESTUARY (LOC. 14)

MAP 8

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite4.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

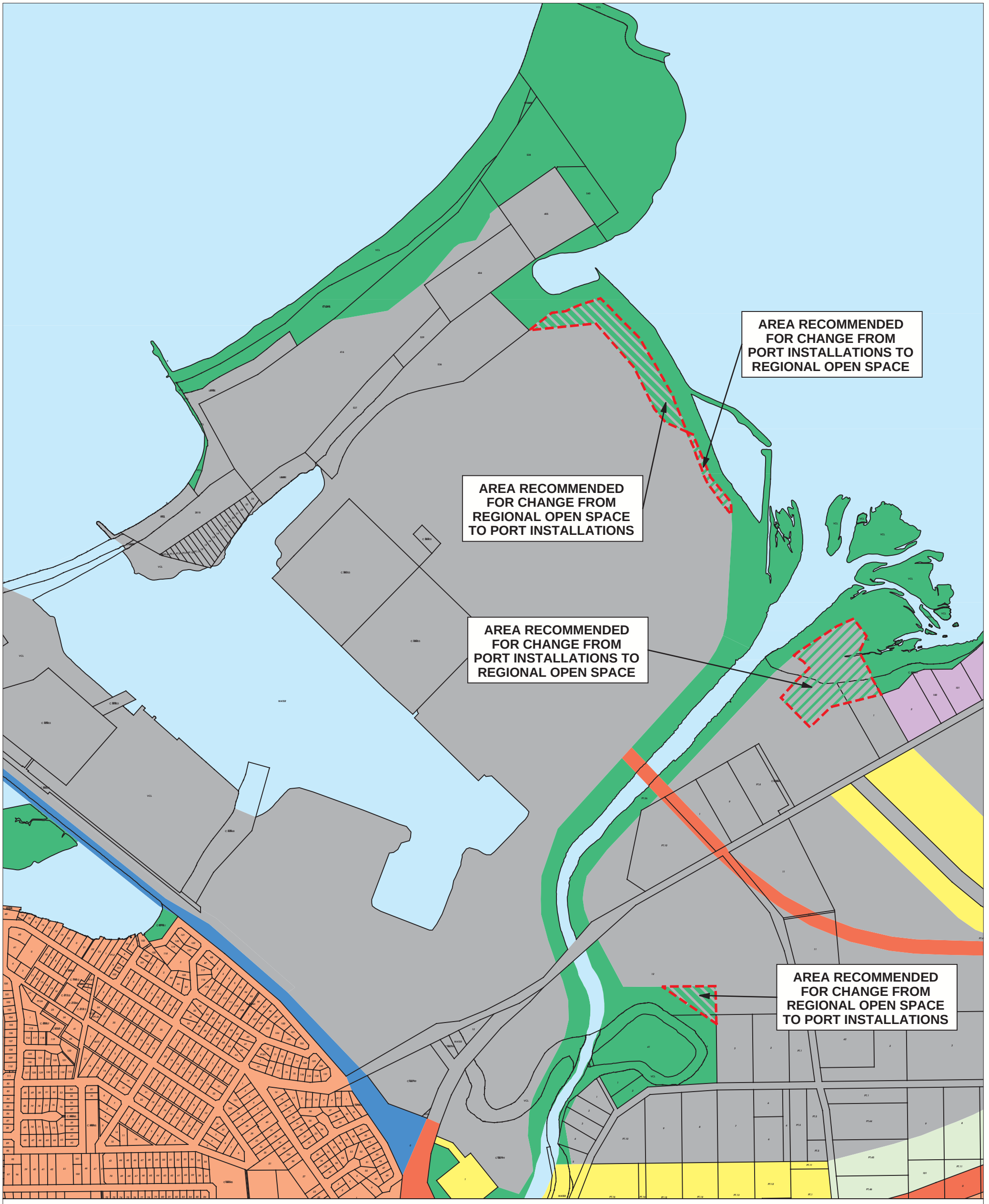
- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:10000

0 200

Metres



RECOMMENDED MODIFICATION

PORT INSTALLATIONS

MAP 9

WESTERN AUSTRALIAN PLANNING COMMISSION

ModSite5.dgn
Amended 20 January 2003
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LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

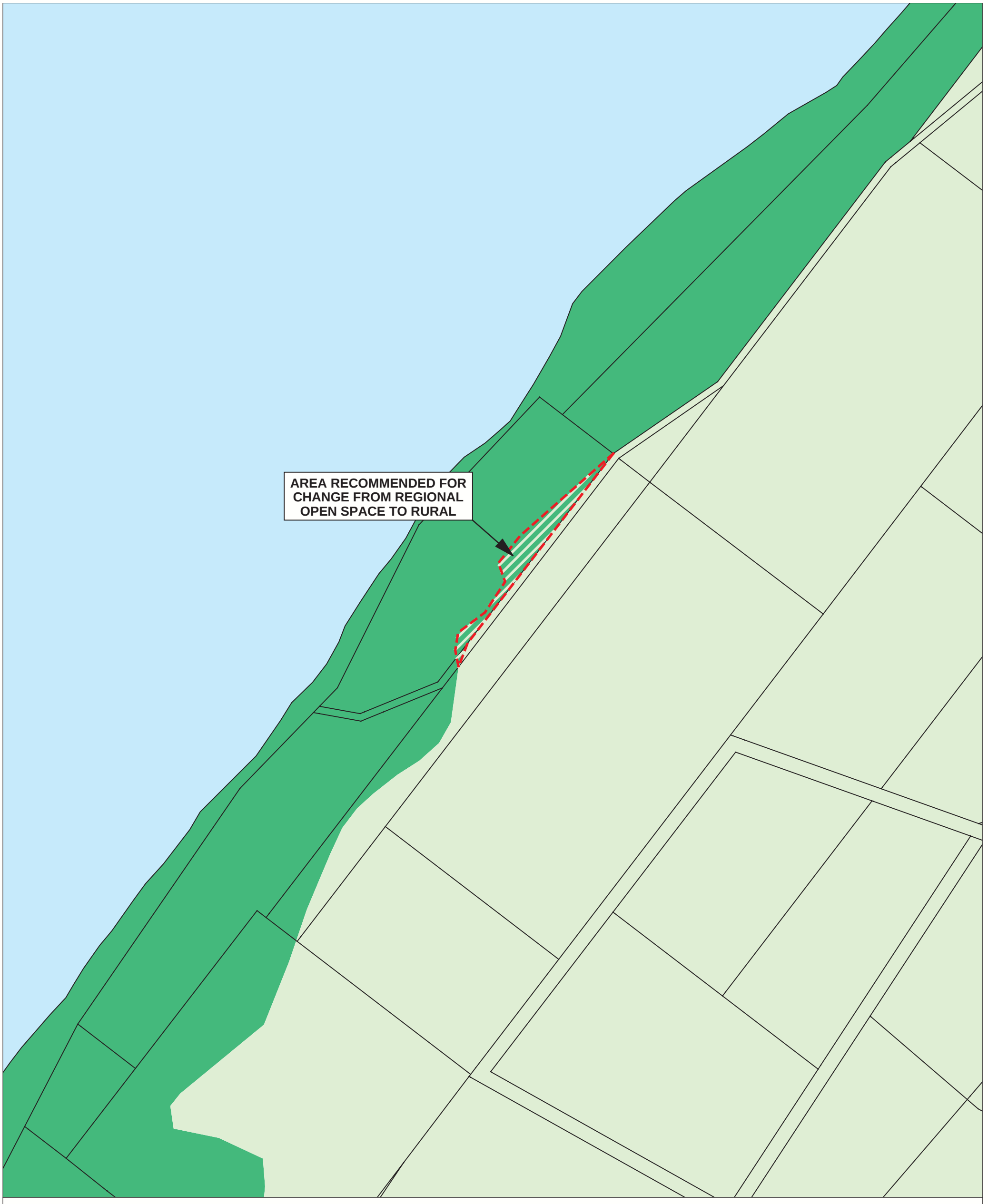
- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- AREA OF RECOMMENDED MODIFICATION

N

SCALE 1:10000

0 200

Metres



RECOMMENDED MODIFICATION

CAPEL COASTAL FORESHORE

MAP 10

WESTERN AUSTRALIAN PLANNING COMMISSION

ModSite6A.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

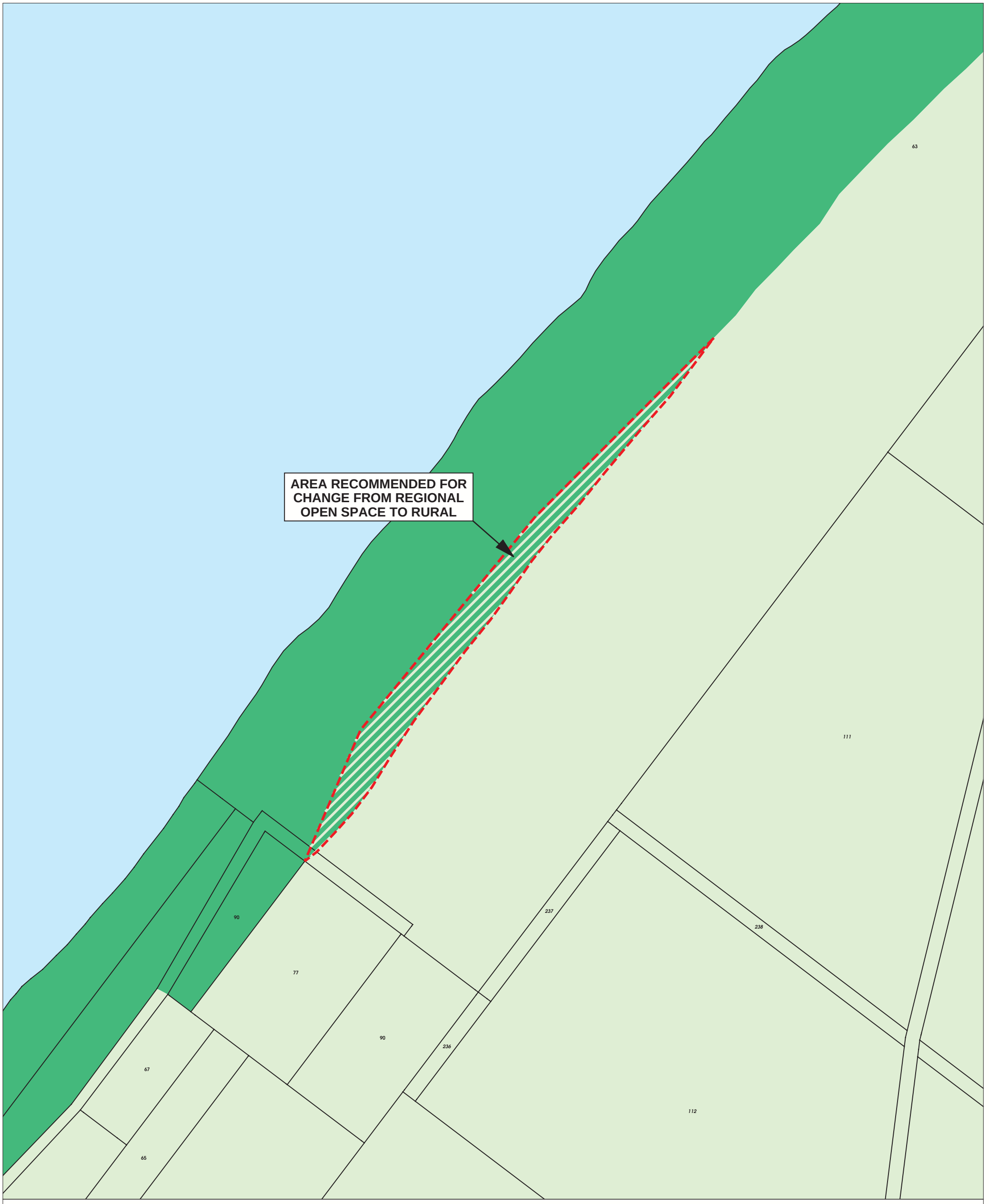
- **SPECIAL CONTROL AREAS** DENOTED AS FOLLOWS :
  - SCA NO.1 WATER CATCHMENTS
  - SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
  - SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:5000

0 100

Metres



RECOMMENDED MODIFICATION

CAPEL COASTAL FORESHORE

MAP 11

WESTERN AUSTRALIAN PLANNING COMMISSION

ModSite6B.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:5000

0 100

Metres

AREA RECOMMENDED FOR CHANGE FROM REGIONAL OPEN SPACE TO URBAN

AREA RECOMMENDED FOR CHANGE FROM REGIONAL OPEN SPACE TO URBAN

AREA RECOMMENDED FOR CHANGE FROM URBAN TO REGIONALOPEN SPACE

RECOMMENDED MODIFICATION

CAPEL RIVER FORESHORE

MAP 12

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite7.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

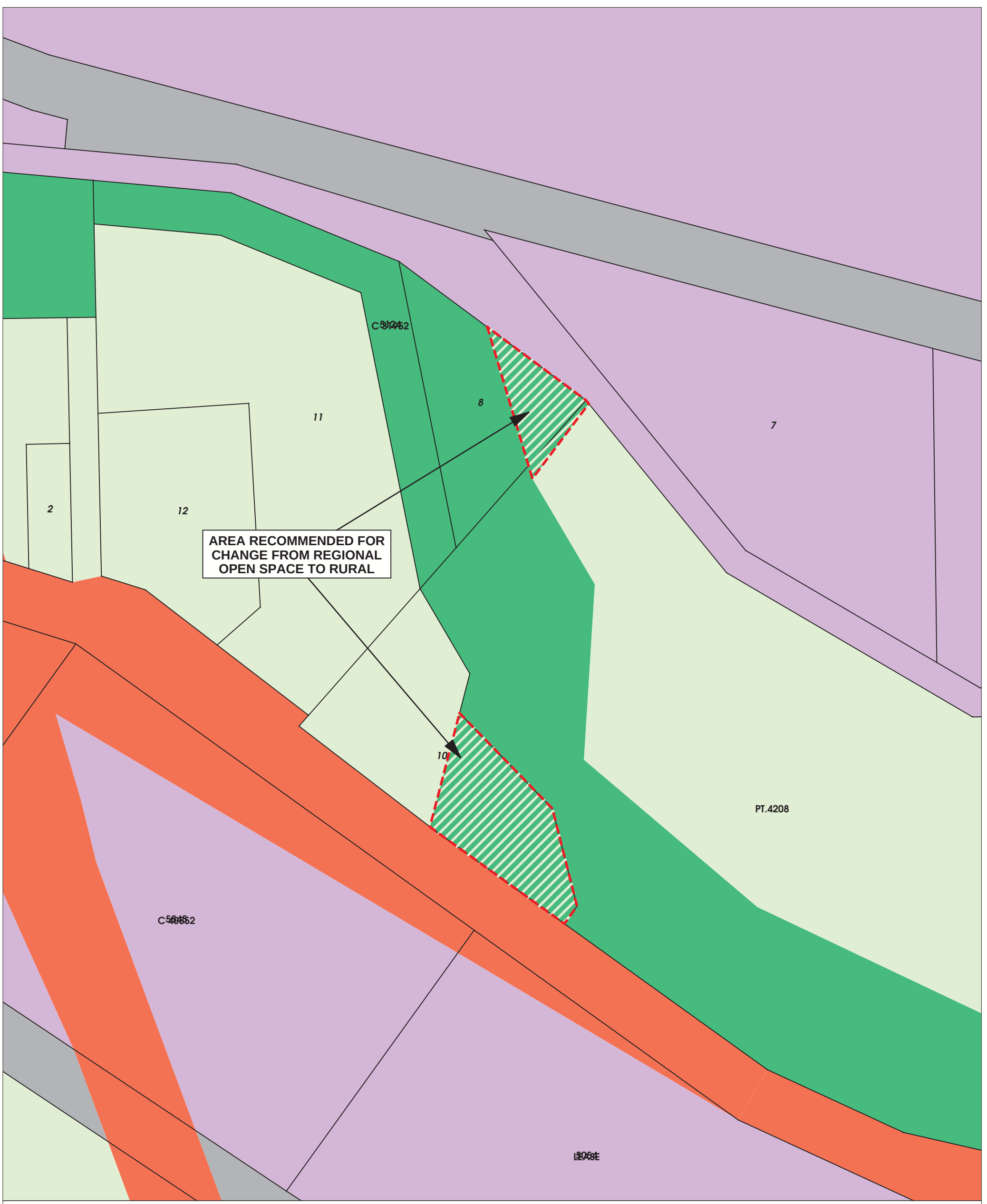
- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:5000

0 100

Metres



RECOMMENDED MODIFICATION

FERGUSON RIVER FORESHORE

MAP 13

WESTERN AUSTRALIAN PLANNING COMMISSION

ModSite8.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS
- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :
- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
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  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES
- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :
- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- AREA OF RECOMMENDED MODIFICATION

N

SCALE 1:2500

0 50

Metres

AREA RECOMMENDED FOR CHANGE FROM REGIONAL OPEN SPACE TO RURAL

RECOMMENDED MODIFICATION

BRUNSWICK RIVER EAST OF AUSTRALIND BYPASS

MAP 14

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite9.dgn
Created 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
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  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

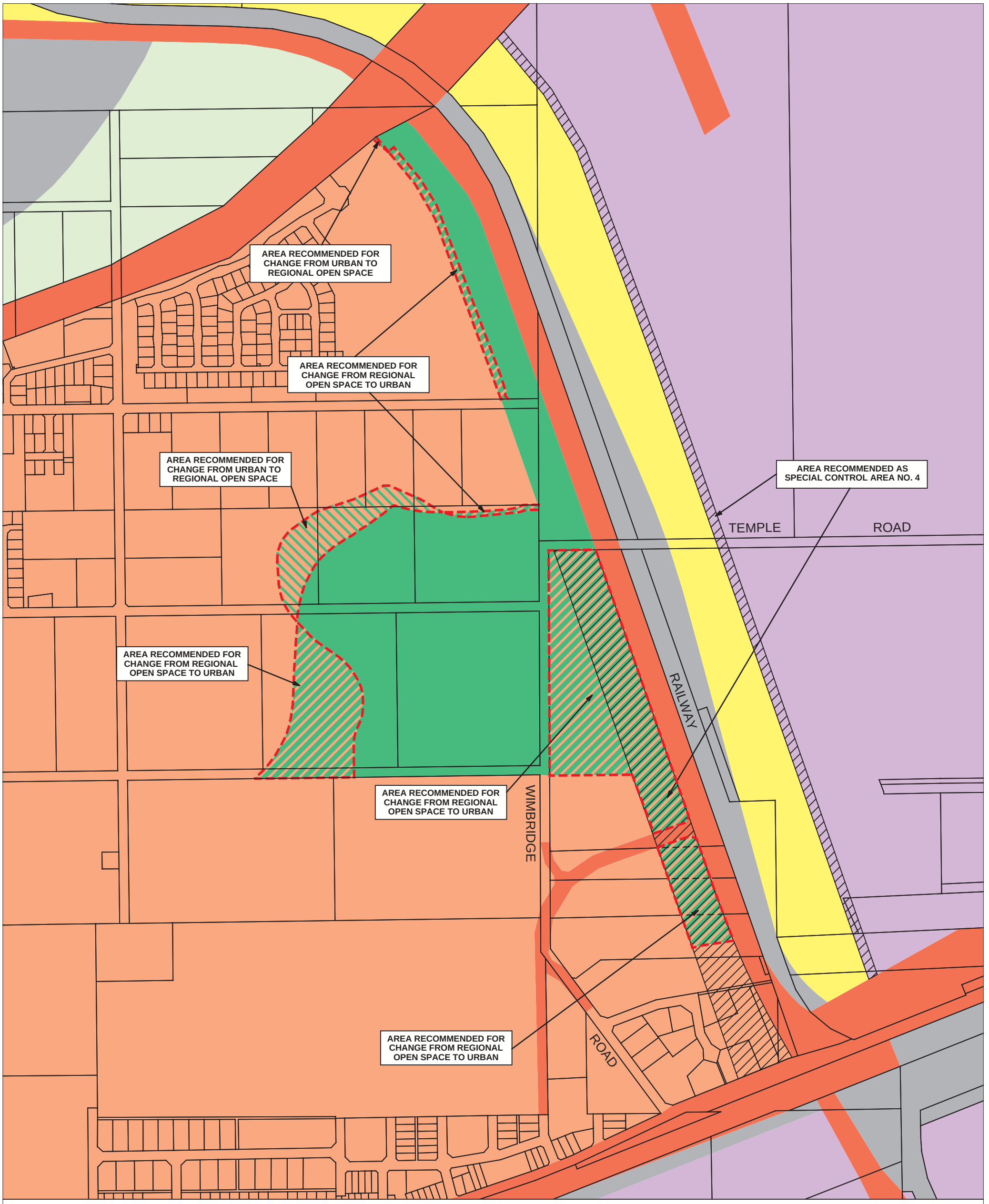
- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:7500

0 150

Metres



RECOMMENDED MODIFICATION

WIMBRIDGE ROAD INDUSTRIAL AREA, GLEN IRIS SERVICE CORRIDOR & PICTON WATERS R.O.S.

MAP 15

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite10.dgn
Amended 7 February 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
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  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:7500

0 150

Metres

7

PT.4

CLOSED RD

50

AREA RECOMMENDED FOR CHANGE FROM RURAL IN SCA No. 2 TO INDUSTRY

PT.5

WELLESLEY ROAD

500

PT.6

CLOSED RD

43

29 28 26 24 54 20

30 27 25 52 19

31 32 53 51 18

33 48 50

49

PT.7

C 3956 3

RECOMMENDED MODIFICATION

KEMERTON INDUSTRIAL ZONE

MAP 16

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite11.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
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  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

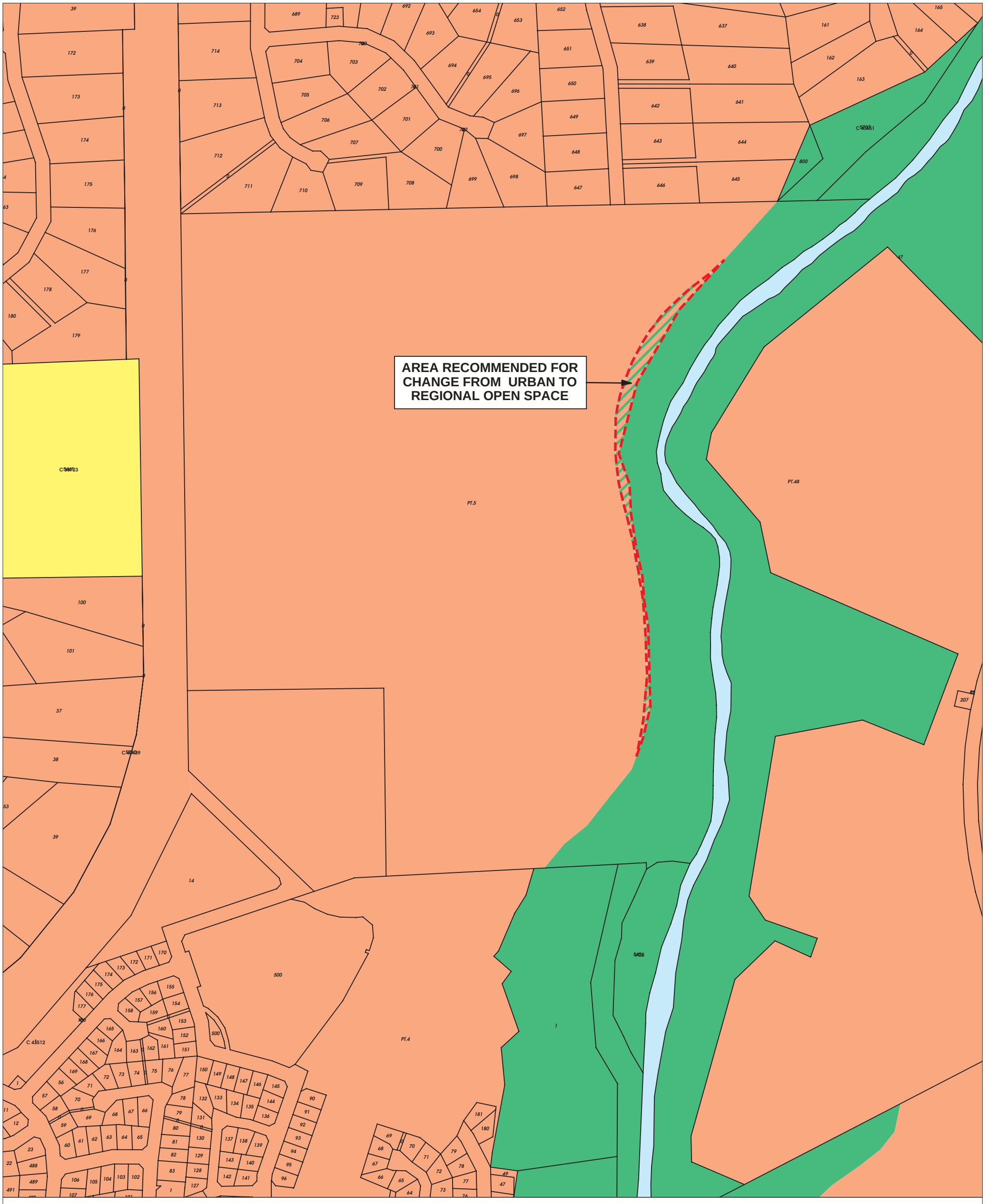
- **SPECIAL CONTROL AREAS** DENOTED AS FOLLOWS :
  - SCA NO.1 WATER CATCHMENTS
  - SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
  - SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:10000

0 200

Metres



RECOMMENDED MODIFICATION

Pt LOT 5 OLD COAST ROAD, AUSTRALIND (BRUNSWICK RIVER)

MAP 17

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite12.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
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  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

- **SPECIAL CONTROL AREAS** DENOTED AS FOLLOWS :
  - SCA NO.1 WATER CATCHMENTS
  - SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
  - SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:5000

0 100

Metres

AREA RECOMMENDED FOR CHANGE FROM REGIONAL OPEN SPACE TO URBAN

AREA RECOMMENDED FOR CHANGE FROM URBAN TO REGIONAL OPEN SPACE

RECOMMENDED MODIFICATION

GARDEN OF EATON

MAP 18

WESTERN AUSTRALIAN PLANNING COMMISSION

ModSite14.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :

- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

SCALE 1:2000

0 40

Metres

SOUTH WESTERN HIGHWAY

MORRISSEY STREET

WALLRODT CRESCENT

EADES STREET

DODSON STREET

RAILWAY

126 127 128 125 123 121 122 132 133 0 21 20 100 PT.65 1 2 3 4 5 6 7 114 113 12 13 11 14 15 10 16 9 19

AREA RECOMMENDED FOR CHANGE FROM REGIONAL OPEN SPACE TO URBAN

RECOMMENDED MODIFICATION

LOT 100 EADES STREET, PICTON

MAP 19

WESTERN AUSTRALIAN PLANNING COMMISSION

ModSite15.dgn
Amended 20 January 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS
- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :
- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
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  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES
- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

SPECIAL CONTROL AREAS DENOTED AS FOLLOWS :
- SCA NO.1 WATER CATCHMENTS
- SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
- SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- AREA OF RECOMMENDED MODIFICATION

N

SCALE 1:1000

0 20

Metres

AREA RECOMMENDED FOR CHANGE FROM URBAN DEFERRED TO RURAL

RECOMMENDED MODIFICATION

SOUTH DALYELLUP URBAN DEFERRED

MAP 20

WESTERN AUSTRALIAN PLANNING COMMISSION

GDA

ModSite17.dgn
Created 26 February 2003
PRODUCED BY CARTOGRAPHIC SECTION, BUNBURY OFFICE

LEGEND

RESERVED LANDS

- REGIONAL OPEN SPACE
- RAILWAYS
- STATE FORESTS
- WATERWAYS
- PORT INSTALLATIONS

ROADS :

- PRIMARY REGIONAL ROADS
- OTHER REGIONAL ROADS

- PUBLIC PURPOSES - DENOTED AS FOLLOWS :
  - A AIRPORT
  - H HOSPITAL
  - HS HIGH SCHOOL
  - P PRISON
  - PU PUBLIC UTILITIES
  - SU SPECIAL USES
  - TS TECHNICAL SCHOOL
  - U UNIVERSITY

ZONES

- URBAN
- URBAN DEFERRED
- REGIONAL CENTRE
- INDUSTRIAL
- RURAL
- PRIVATE RECREATION

- **SPECIAL CONTROL AREAS** DENOTED AS FOLLOWS :
  - SCA NO.1 WATER CATCHMENTS
  - SCA NO.2 KEMERTON INDUSTRIAL ZONE BUFFER AREA
  - SCA NO.3 NORTH CAPEL INDUSTRIAL ZONE BUFFER AREA
- SCHEME BOUNDARY
- **AREA OF RECOMMENDED MODIFICATION**

N

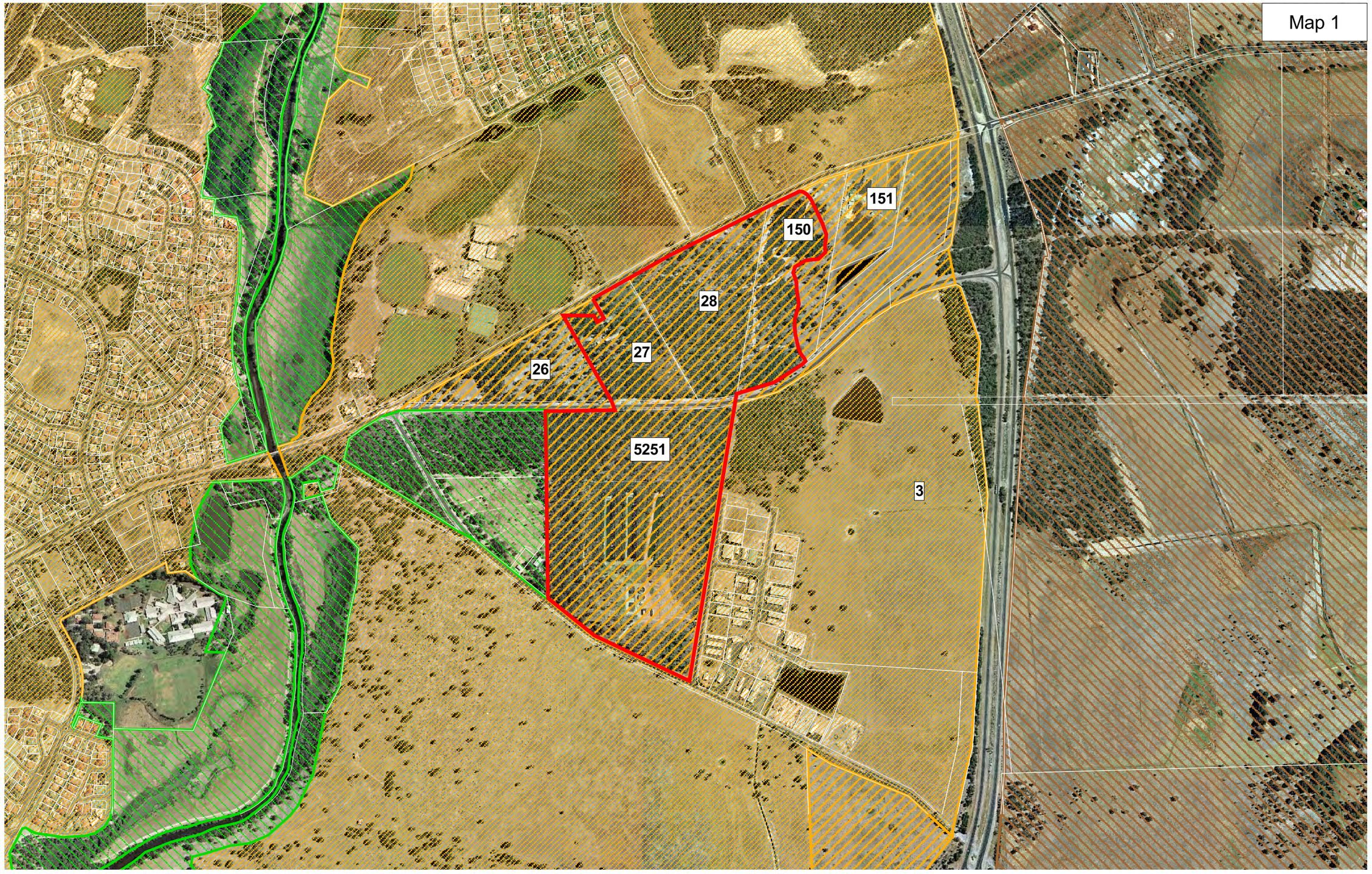
SCALE 1:7500

0 150

Metres

	Maps of the proposed modifications to the GBRS recommended in the WAPC's response to the environmental submissions
1	Twin Rivers
2	College Grove
3	Davenport Industrial Area (Reserve 670, Lot 1 and Pt Lot 5 North Boyanup Road, Davenport)
4	Harewood Road Bushland (Reserve 31012 Harewoods Roads, Dalyellup)
5	Parade Road, Glen Padden (Loc 632)
6	Dalyellup Tourist Site
7	Australind Waste Water Treatment Plant – Paris Road, Australind
8	Proposed ROS north of Leschenault Estuary (Loc 14)
9	Port Installations
10	Capel Coast Foreshore
11	Capel Coast Foreshore
12	Capel River Foreshore
13	Ferguson River Foreshore
14	Lots 0, 7 and 9 Brunswick River east of Australind Bypass
15	Wimbridge Road Industrial Area, Glen Iris Service Corridor & Picton Waters ROS
16	Kemerton Industrial zone
17	Pt Lot 5 Old Coast Road, Australind
18	Garden of Eaton
19	Lot 100 Eades Street, Picton
20	South Dalyellup Urban Deferred

Map 1



Advertised Greater Bunbury Region Scheme

- Rural
- Urban
- Urban Deferred
- Regional Open Space
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected

Reserve 35061 Paris Rd, Australind - Decommissioned Wate Water Treatment Plant. Lot 27, 150, 151, 1 and 21 Paris Rd (north) Australind (Urban Deferred) and Lot 3 Paris Rd (south) Australind (Urban zone).

0 1 km

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 2



Advertised Greater Bunbury Region Scheme

- Rural
- Urban Deferred
- Urban
- Regional Open Space
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected

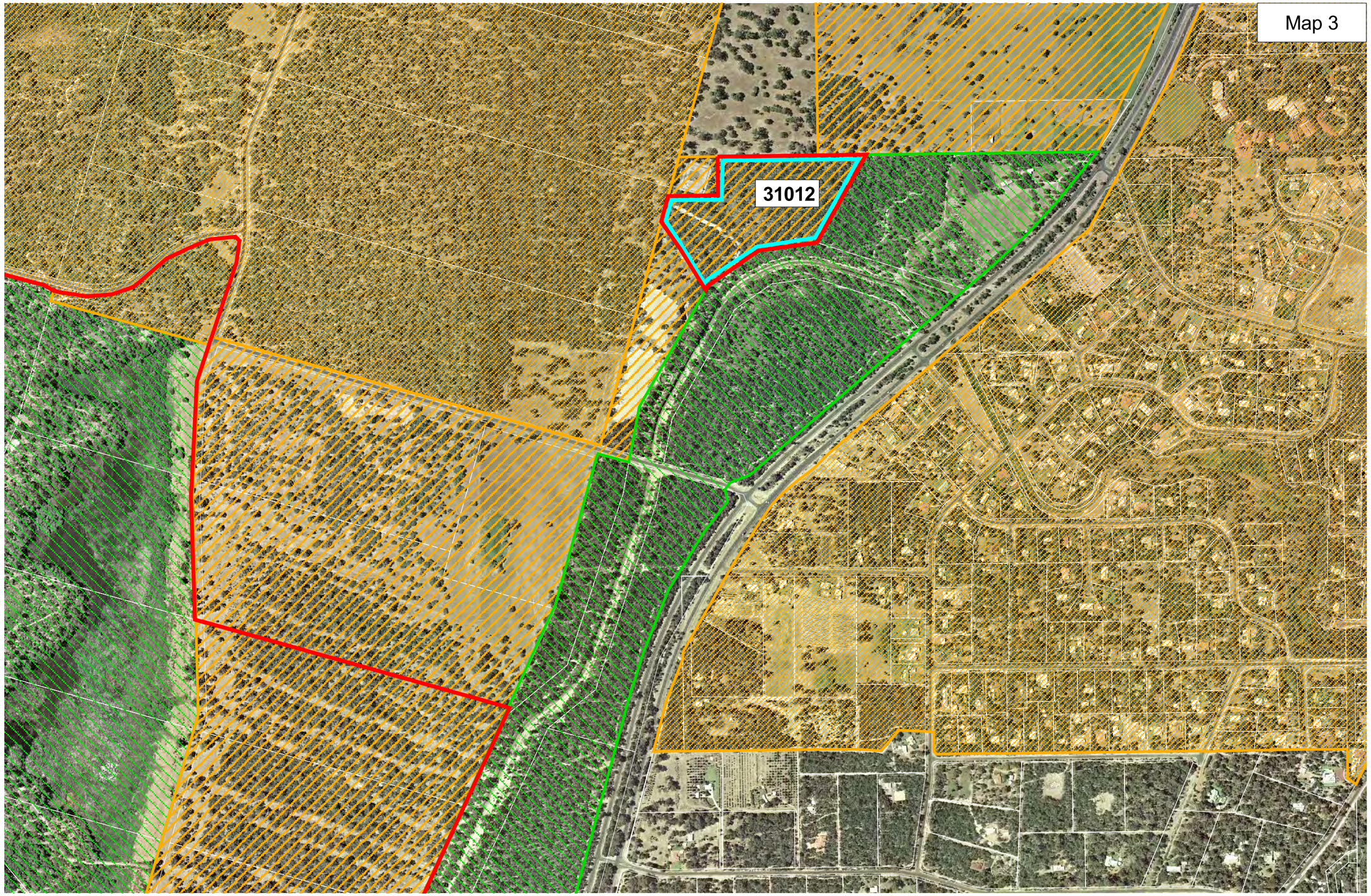
Lots 313 - 317 South of Harewoods Road, South Dalyellup.

0 1 km

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 3



Advertised Greater Bunbury Region Scheme
- Urban Deferred
- Urban
- Regional Open Space
- Cadastral boundaries

EPA Recommendations
- Regionally significant natural area - Should be protected
- Reserve

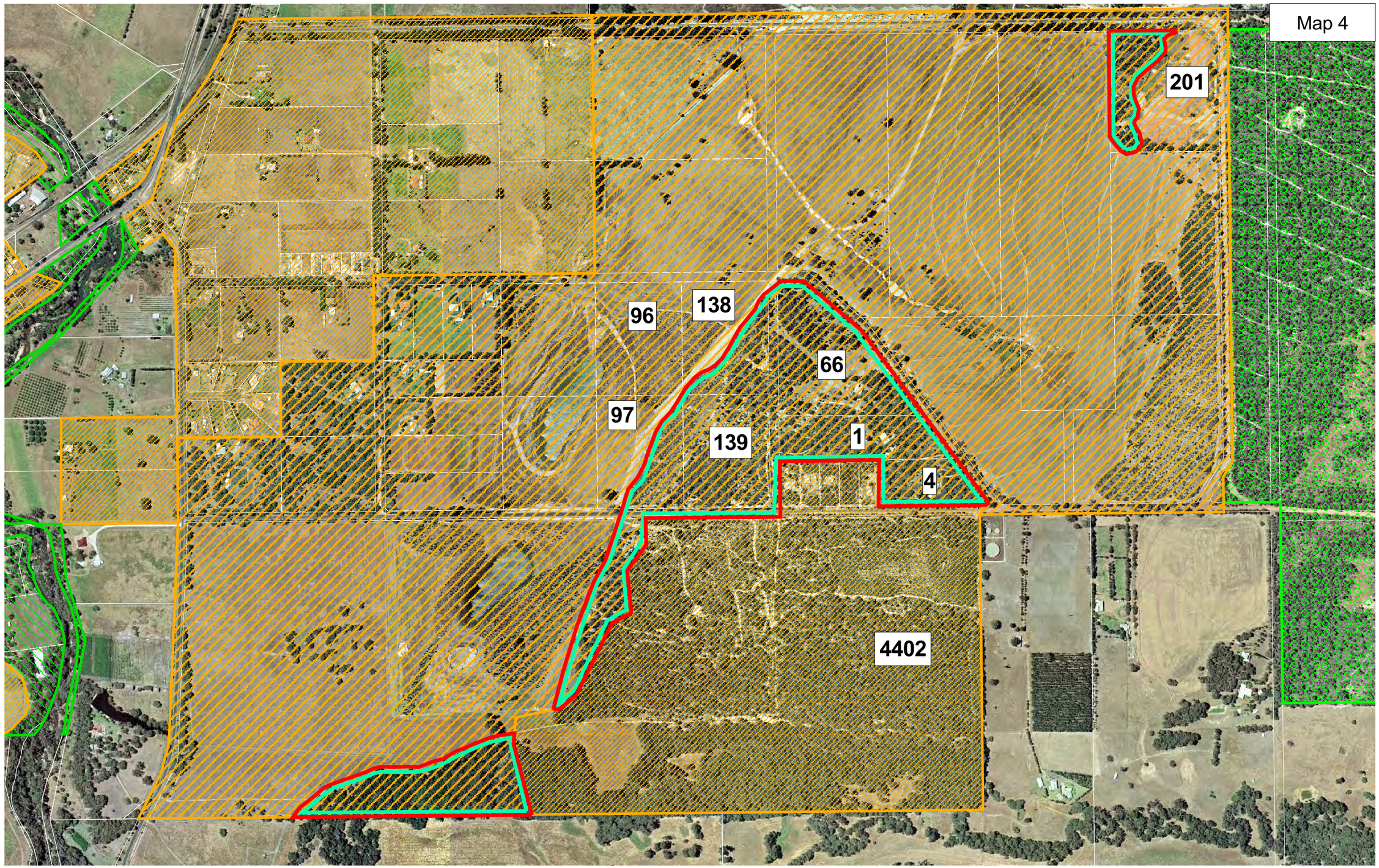
0 500m

Reserve 31012 Harewoods Road, Dalyellup

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 4



Advertised Greater Bunbury Region Scheme

- Urban Deferred
- Urban
- Regional Open Space
- State Forest
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected
- Conserve

0 500m

Part Lot 201 Gray Rd, Part Lot 4402, Part Lot 97, Lot 139 Armstrong St, Lot 1a, 4a, 66 and Part Lot 138 Timperley Rd, Boyanup

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.



Advertised Greater Bunbury Region Scheme

- Regional Open Space
- Primary Regional Road
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected

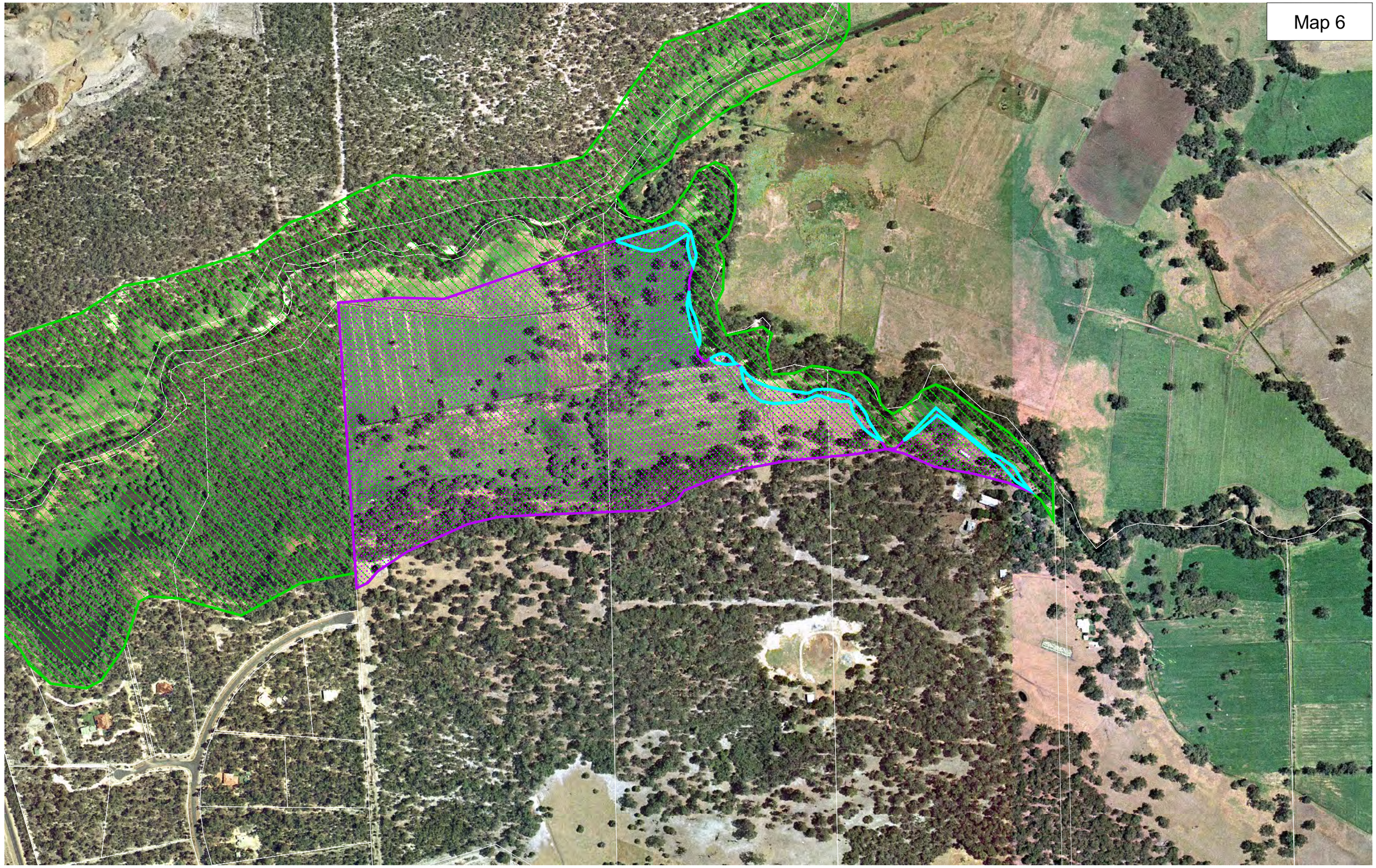
0 500m

Boyanup Bypass Road

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 6



Advertised Greater Bunbury Region Scheme

Regional Open Space

Cadastral boundaries

WAPC Recommendations

Recommended modification from Regional open space to Rural

EPA Recommendations

Reserve

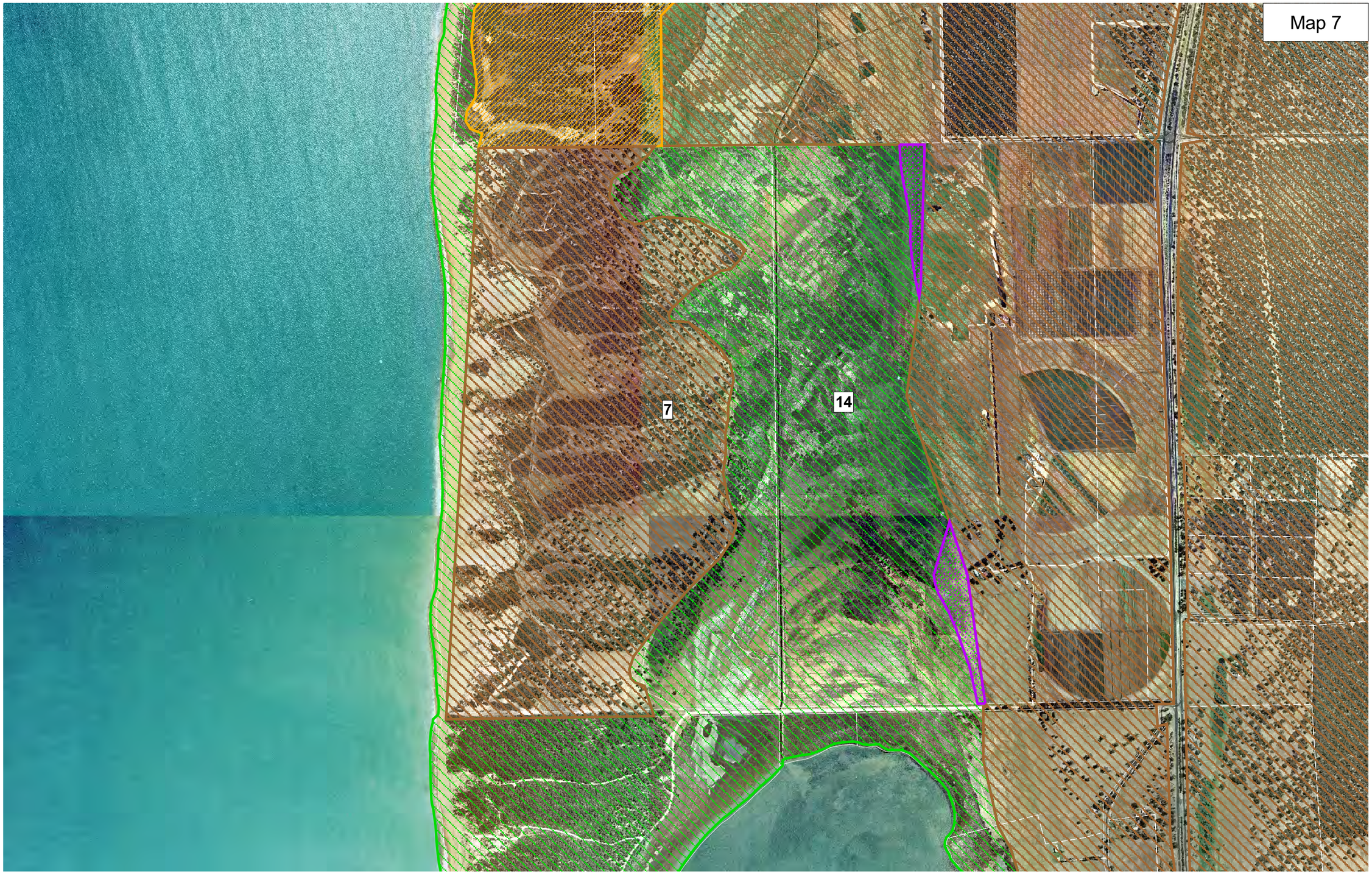
0 500m

Brunswick River East of Australind Bypass

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 7



Advertised Greater Bunbury Region Scheme

- Rural
- Urban
- Regional Open Space
- Cadastral boundaries

WAPC Recommendations

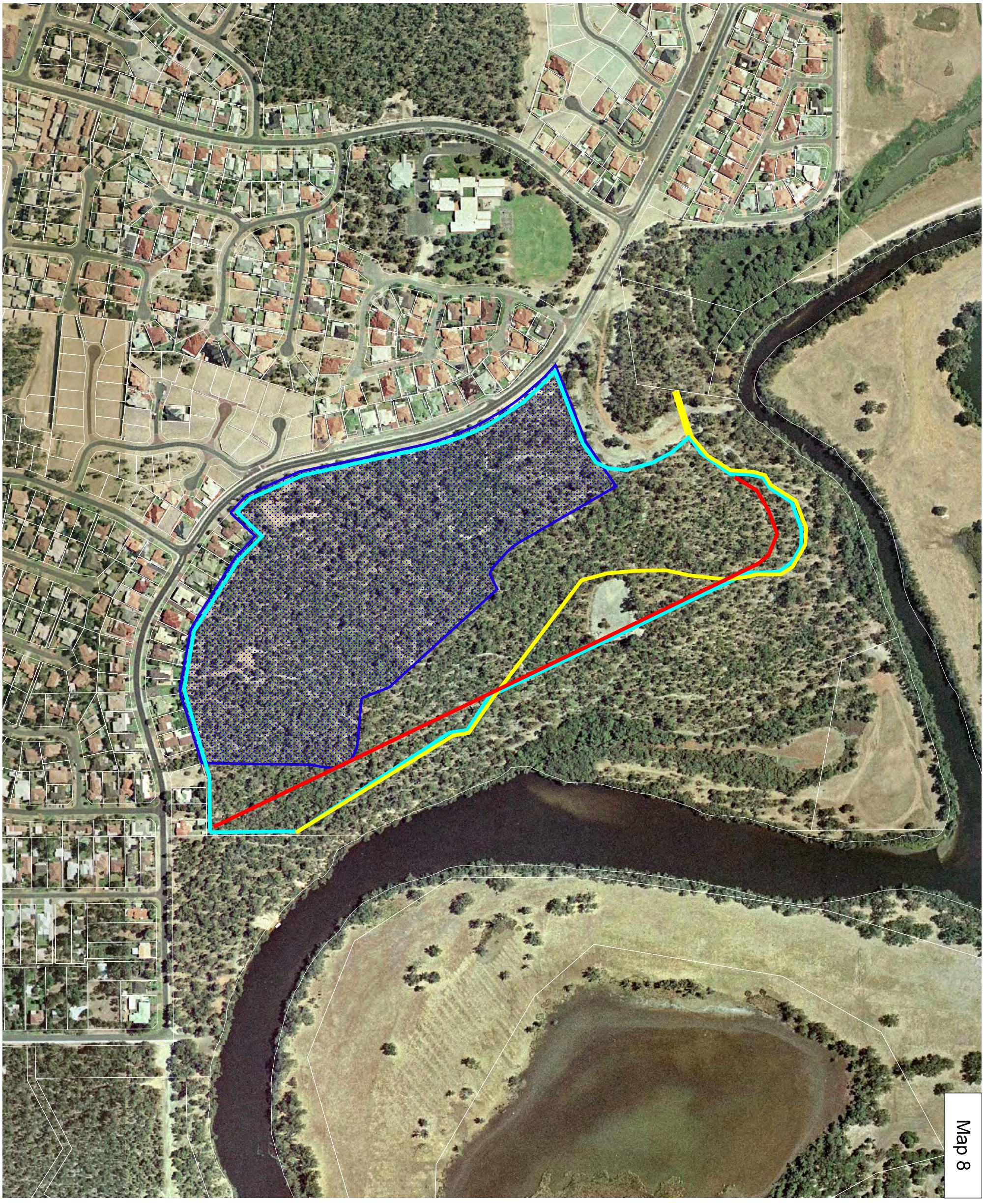
- Recommended modification from Regional open space to Rural

0 1 km

Lot 7 & 14 Buffalo Road, Binningup

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.



Advertised Greater Bunbury Region Scheme

Regional Open Space

WAPC Recommendations

WAPC recommended ROS alignment

Subdivision Plan

Cadastral boundaries

EPA Recommendations

Reserve

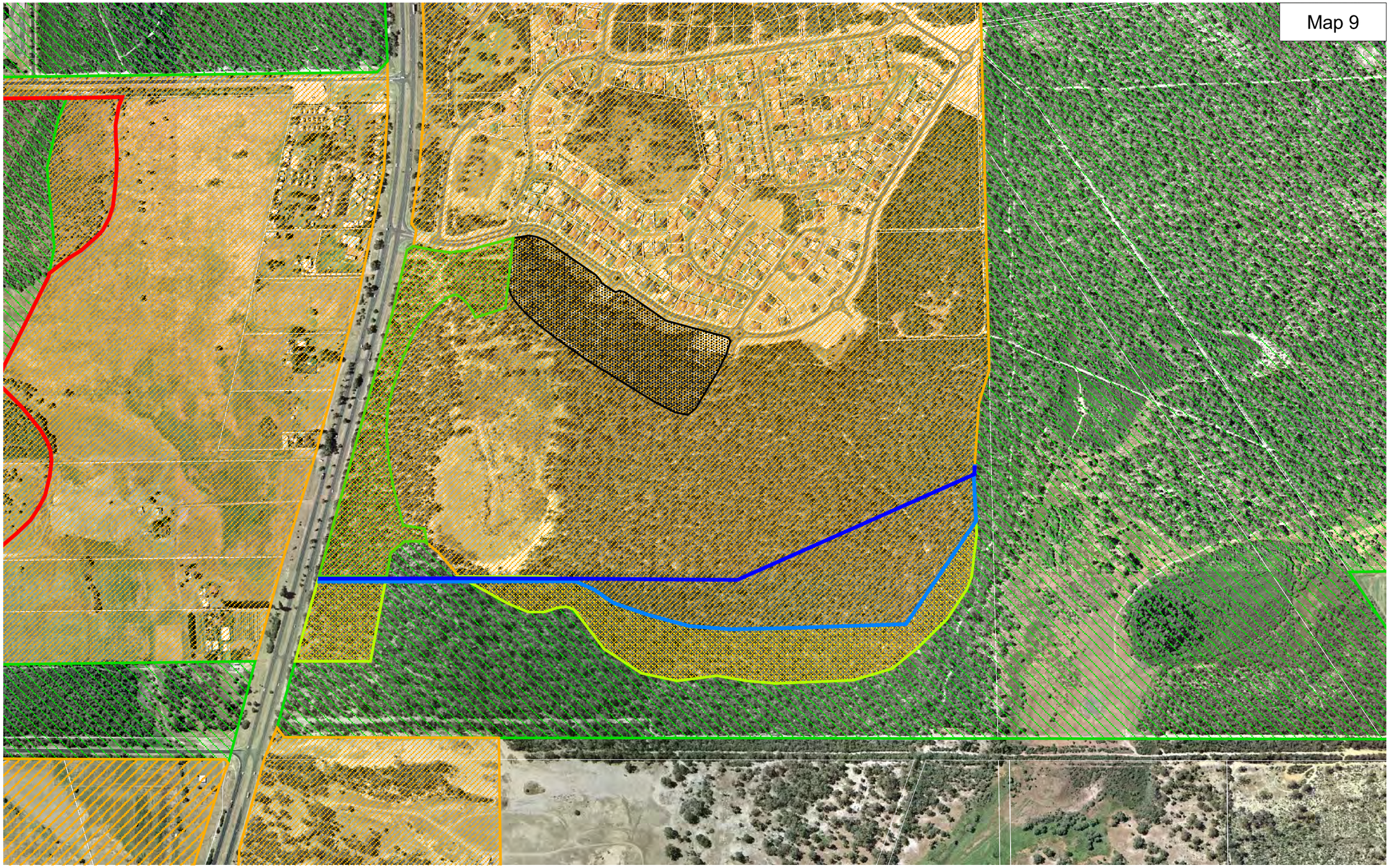
Twin Rivers - Part Lot 211
Barnes Ave, Australind

0 500m

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 9



Advertised Greater Bunbury Region Scheme
- Urban Deferred
- Urban (as advertised)
- Regional Open Space (as advertised)
- Cadastral boundaries

WAPC Recommendations
- Recommended modification from Urban to Regional open space

- EPA recommended ROS alignment
- WAPC recommended ROS alignment

EPA Recommendations
- Regionally significant natural area - Should be protected
- Reserve

- Non-Development area
- Developed

College Grove - Lot 1000 Bussell Highway

0 500m

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Government of Western Australia

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Map 10

Muddy Lakes - Minninup Road, Capel

Advertised Greater Bunbury Region Scheme

- Rural
- Regional Open Space
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected

0 500m

Department of Environment
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Map 11

632

Advertised Greater Bunbury Region Scheme

- Urban Deferred
- Urban
- Regional Open Space
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected
- Reserve
- Conserve

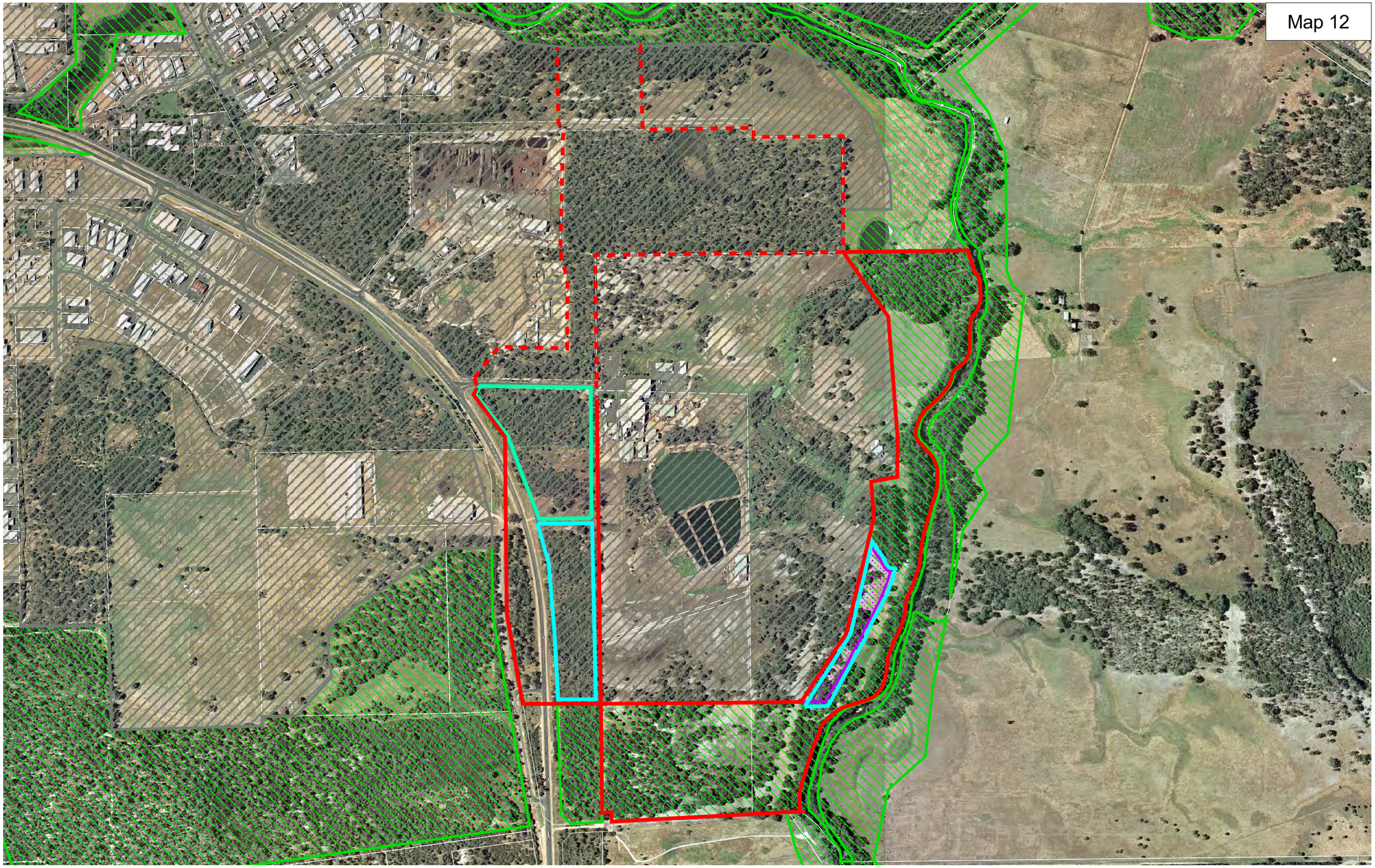
Part Lot 632 Parade Rd, Glen Padden

0 500m

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map 12



Advertised Greater Bunbury Region Scheme

- Industrial
- Regional Open Space
- Cadastral boundaries

WAPC Recommendations

- Recommended modification from Regional open space to Industrial

EPA Recommendations

- Regionally significant natural area - Should be protected
- Provide vegetated link to Preston River
- Conserve
- Reserve

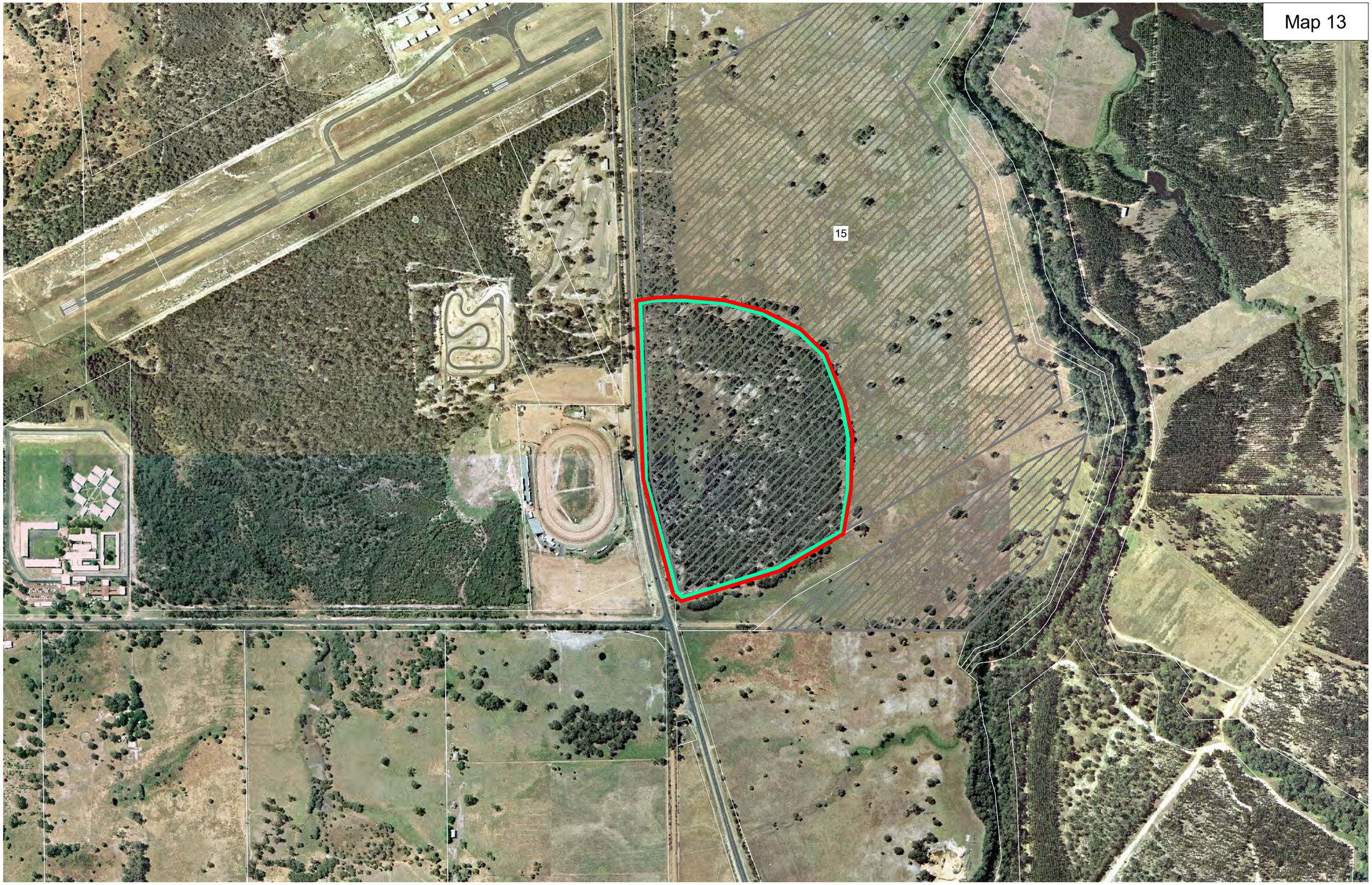
0 500m

Reserve 670 North Boyanup Road, Davenport

Department of Environment
Government of Western Australia

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Map 13



Advertised Greater Bunbury Region Scheme

- Industrial
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected
- Conserve

0 500m

Lot 15 North Boyanup Road

Department of Environment
Government of Western Australia

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Map 14



Advertised Greater Bunbury Region Scheme

- Urban Deferred
- Urban
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected
- Conserve

0 500m

Lot 35 Spurr St, Capel

Department of Environment
Government of Western Australia

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Map 15



Advertised Greater Bunbury Region Scheme
- Rural
- Regional Open Space
- Cadastral boundaries

EPA Recommendations
- Reserve

WAPC Recommendations
- Recommended modification from Regional open space to Rural

0 200m

Lots 8 and 42080
Ferguson River Foreshore, Picton

Department of Environment
Government of Western Australia

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Map 16

497

Advertised Greater Bunbury Region Scheme

- Urban Deferred
- Urban
- Regional Open Space
- Cadastral boundaries

EPA Recommendations

- Regionally significant natural area - Should be protected
- Reserve

WAPC Recommendations

- Recommended modification from Regional open space to Urban
- Recommended modification from Urban to Regional open space

Dalyellup Beach Estate Tourist Precinct

0 1 km

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Map Numbers	Plans of the EPA's recommendations
1.	Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant (Urban Deferred), Lots 27, 150, 151, 1 and 21 Paris Road (north), Australind (Urban Deferred) and Lot 3 Paris Road (south), Australind (Urban zone)
2.	Lots 313-317 south of Harewoods Road, South Dalyellup (Urban Deferred)
3.	Reserve 31012 Harewoods Road, Dalyellup (Urban Deferred zone)
4.	Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup (Urban Deferred zone)
5.	Boyanup Bypass Road
6.	Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)
7.	Locations 7 and 14 Buffalo Road, Binningup
8.	Twin Rivers - Pt Lot 211 Barnes Avenue, Australind
9.	College Grove - Lot 1000 Bussell Highway
10.	Muddy Lakes – Minninup Road, Capel
11.	Pt Loc 632 Parade Road, Glen Padden
12.	Reserve 670, Lots 1 and Pt Lot 5 North Boyanup Road, Davenport
13.	Lot 15 North Boyanup Road
14.	Lot 35 Spurr Street, Capel (Urban Deferred)
15.	Lots 8 and 10 Ferguson River Foreshore, Picton
16.	Dalyellup Beach Estate Tourist Precinct

Appendix 10

Kemerton Industrial Expansion Project – Vegetation Significance

Environmental Protection Authority

Mr Simon Holthouse
Chairman
Western Australian Planning Commission
Albert Facey House
Wellington Street
PERTH WA 6000

Dear Simon

EPA ADVICE KEMERTON INDUSTRIAL AREA EXPANSION - VEGETATION SIGNIFICANCE

In August 1998 the EPA advised that the Draft Kemerton Structure plan should not be finalised until the remnant vegetation had been surveyed and assessed in terms of its regional significance (EPA Bulletin 902, Industry 2030 - Greater Bunbury Industrial Land and Port Access Planning, August 1998). The EPA further advised that the Draft Kemerton Structure Plan may require modification to protect vegetation of regional significance pending the outcome of a vegetation survey.

I am aware that to facilitate this request the Commission had to delay progress in finalising both the Industry 2030 strategy and the Greater Bunbury Region Scheme (GBRS). The EPA is appreciative of the opportunity to provide this additional advice and regrets the delays caused.

A vegetation survey of the Kemerton area has been completed and the EPA visited the area recently to view the remnant vegetation first hand. The EPA used information collected during the site visit, results from the vegetation survey and advice from the Department of Resources Development (DRD) and Department of Environmental Protection (DEP) to finalise its advice regarding the significance of the vegetation in the Kemerton area.

I have enclosed two attachments which should be used in relation to the advice provided below. Attachment 1 shows areas of significant remnant vegetation requiring "conservation" (dark green) and areas where conservation values will not constrain "industrial expansion" (blue). Attachment 2 is the same map as Attachment 1 with information showing cleared land within the conservation areas. These cleared areas may be suitable for some development, however, some of these cleared areas contain wetlands of regional significance and will require protection.

Westralia Square, 141 St Georges Terrace, Perth, Western Australia 6000. Telephone: (08) 9222 7000. Facsimile: (08) 9222 7155.
Postal Address: PO Box K822, Perth, Western Australia 6842.

On the 28 July 1999 the EPA resolved that:

1. The areas shown in blue in Attachment 1 have been identified as being suitable for industrial development, but the blue areas shown with a stipple overlay have significant vegetation or wetland values and will need to be managed to ensure that these areas are retained and protected within the industrial estate.

2. The areas shown in dark green are areas of significant remnant vegetation identified by either the EPA or the vegetation survey prepared on behalf of the DRD.

   The EPA is of the view that the areas of significant remnant vegetation identified in Attachment 1 (dark green) should, in the long term, be provided with a high level of protection through the planning system. There are two parts to the protection of the significant remnant vegetation (dark green): the area within the new industrial buffer area and the area outside the buffer. One option would be to reserve the significant vegetation included within the final Kemerton buffer area for Parks and Recreation in the GBRS, either as part of the initial GBRS or as a later amendment to the GBRS. However, the EPA also recognises that other options exist which could provide the same level of protection. Alternatively, options for protection of the significant vegetation inside and outside the final Kemerton buffer area could be developed as part of the System Six review in the Greater Bunbury Region.

3. Further investigation for the location of future wastewater treatment plants be restricted to the area shown in dark green with yellow hatching.

   From an ecological perspective the EPA's preference is for the wastewater treatment plants to be located in the blue area directly north of Marriott Road, i.e. immediately north of the yellow hatched area, or immediately south of Marriott Road and west of the existing Kemerton industrial area, i.e. in the northern part of the yellow hatched area.

4. The DEP liaises with DRD on the revised Kemerton buffer to ensure that the revised buffer boundary is appropriate for noise requirements.

5. Environmental management plans be developed for the Kemerton area to ensure the on-going protection of significant areas of remnant vegetation and wetlands. It may be appropriate that this become a requirement of the GBRS and will be considered by the EPA as part of its assessment of that Scheme. Further biological surveys of Declared Rare Flora, priority species and fauna will be required as part of that management plan.

Yours sincerely

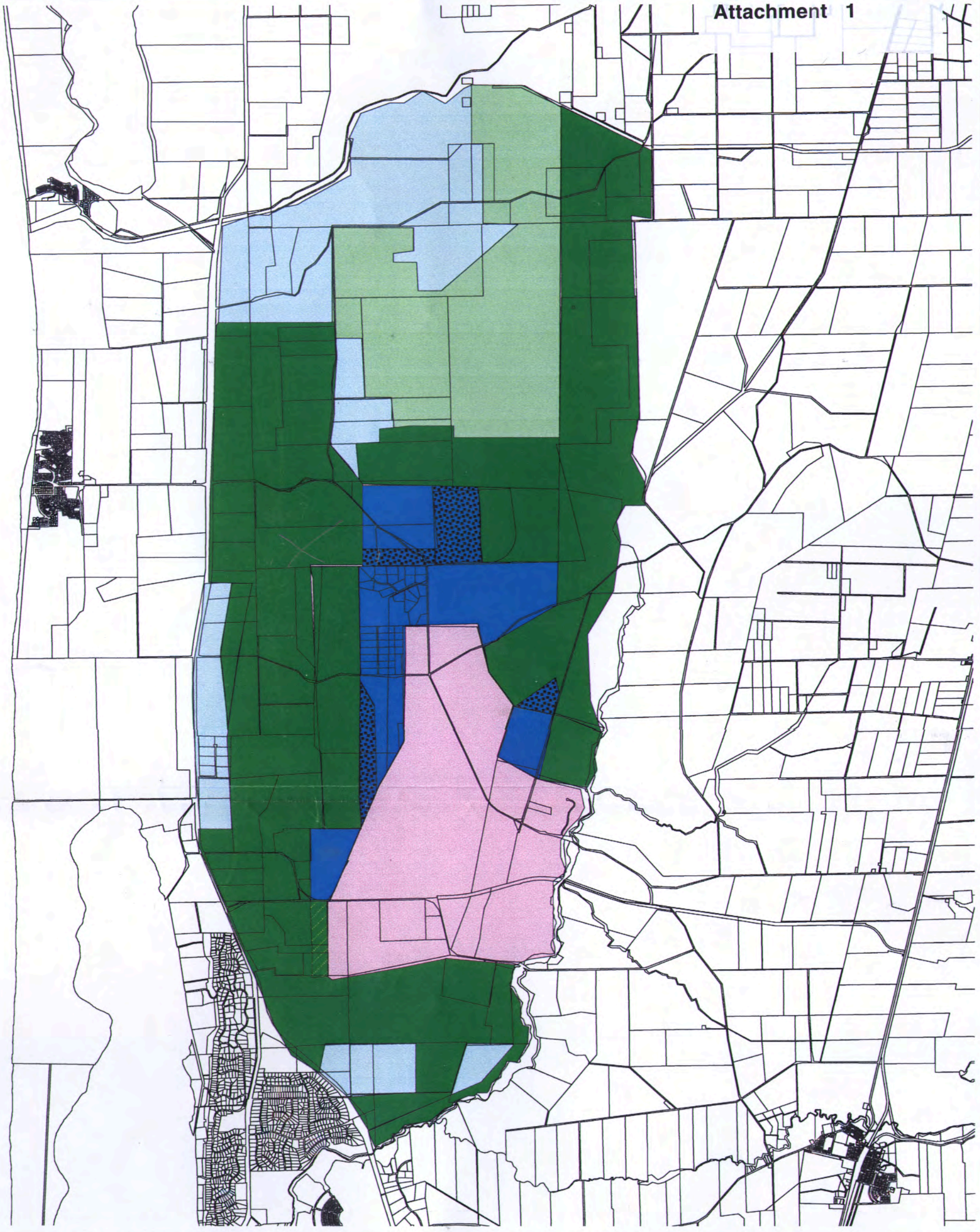
Bernard

Bernard Bowen
CHAIRMAN

31 August 1999

Enc

Attachment 1



KEMERTON INDUSTRIAL EXPANSION PROJECT

N

0 1 2 3 4 5 Kilometers

1:70000

Projection: Australian Map Grid

- DOLA Cadastre
- Conservation
- Conservation value (further investigation)
- Investigation area for alternative location for wwtp
- Industrial (existing)
- Industrial expansion
- Vegetation buffer
- Development (other)

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

KEMERTON INDUSTRIAL EXPANSION PROJECT

N

0 1 2 3 4 5 Kilometers

1:70000

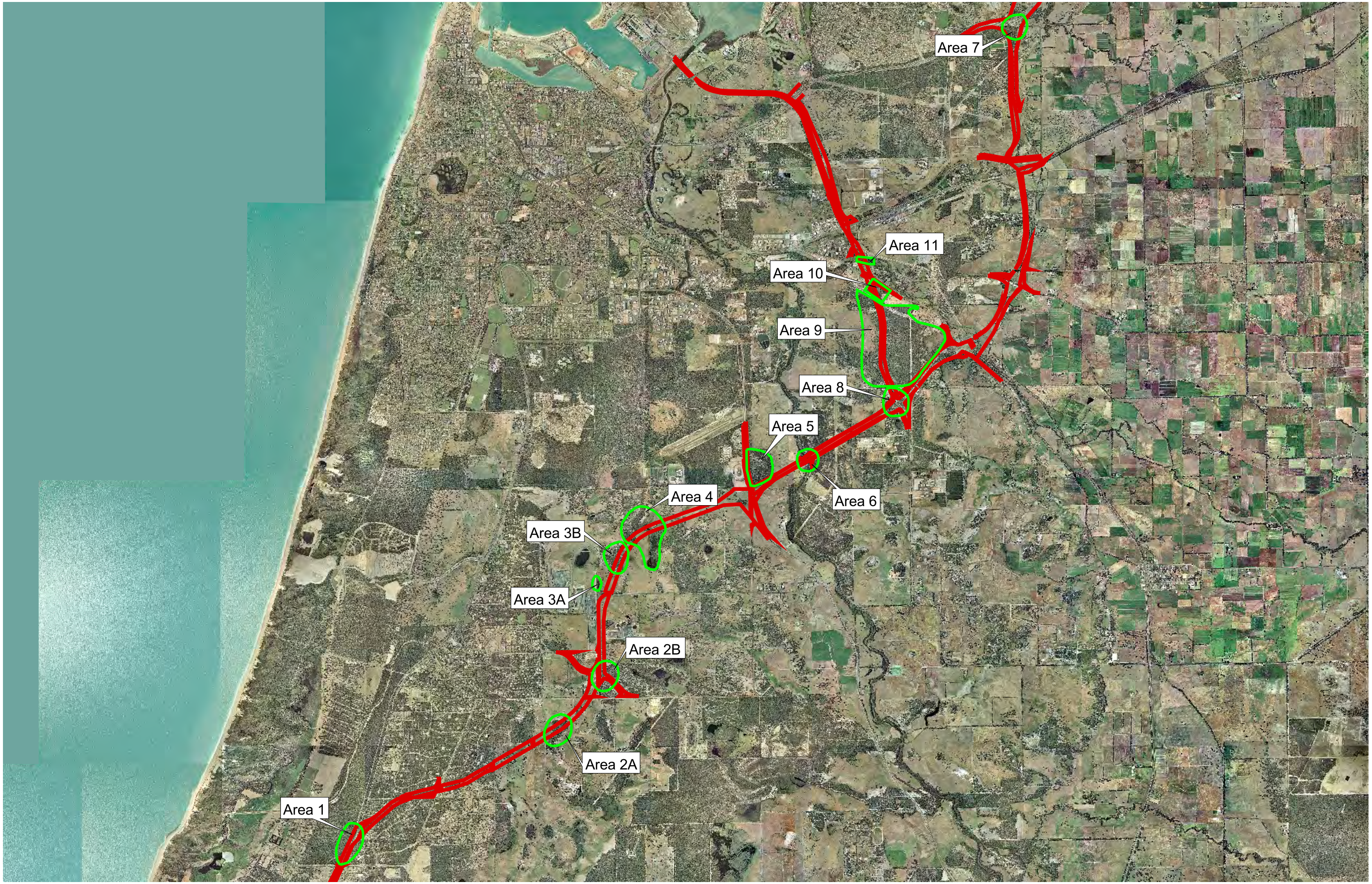
Projection: Australian Map Grid

- DOLA Cadastre
- Conservation
- Conservation value (further investigation)
- Investigation area for alternative location for wwtp
- Cleared Land
- Industrial (existing)
- Industrial expansion
- Vegetation buffer
- Development (other)

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Appendix 11

Areas of potential environmental impact within the Bunbury Outer Ring Road and Port Access Road Primary Regional Road Reserve alignment



Bunbury outer ring road and port access road proposal

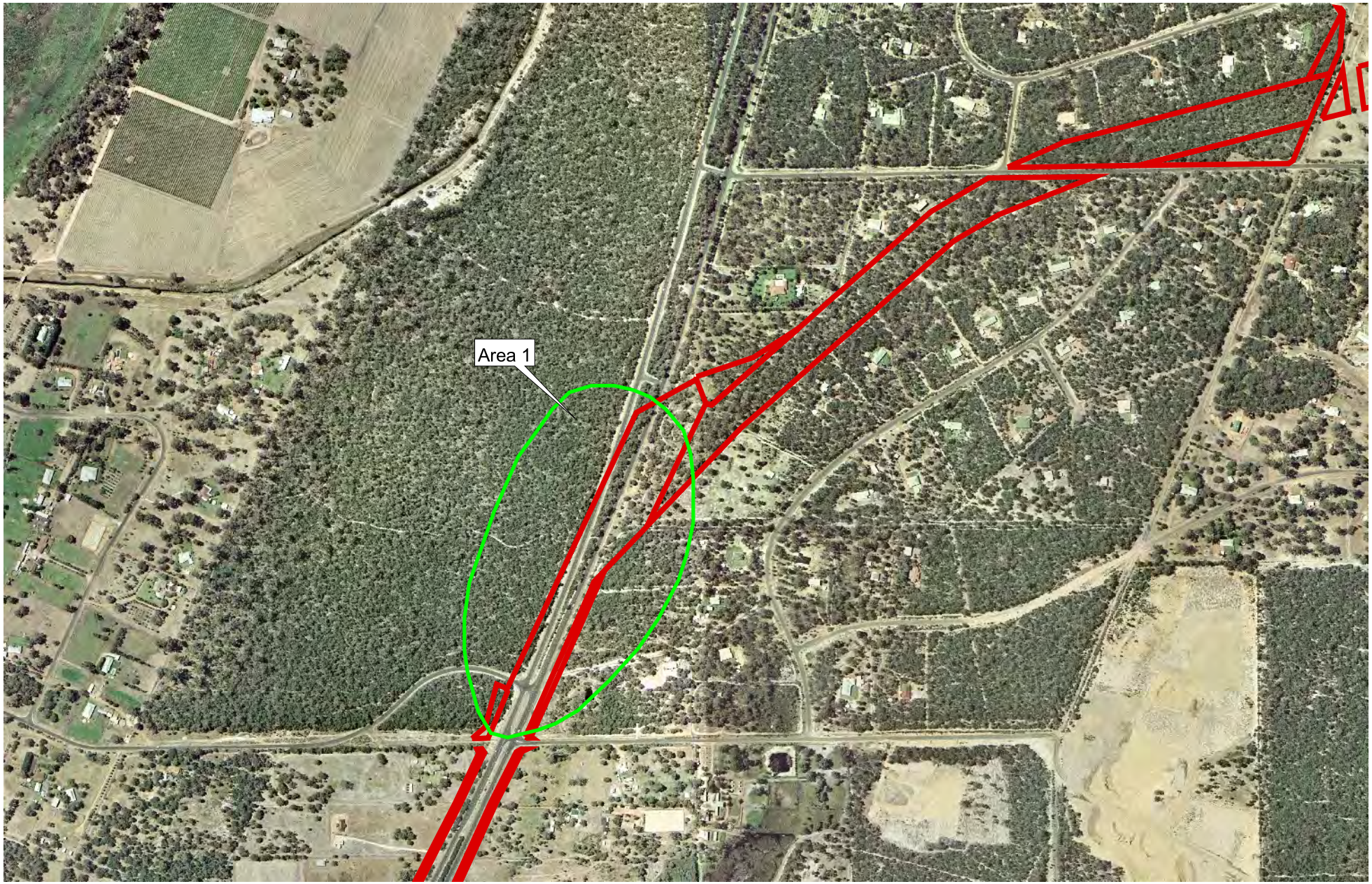
Vegetation impacted by proposed roads

0 5

Bunbury Outer Ring Road and Port Access Road

Department of Environment
Government of Western Australia

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Bunbury outer ring road and port access road proposal

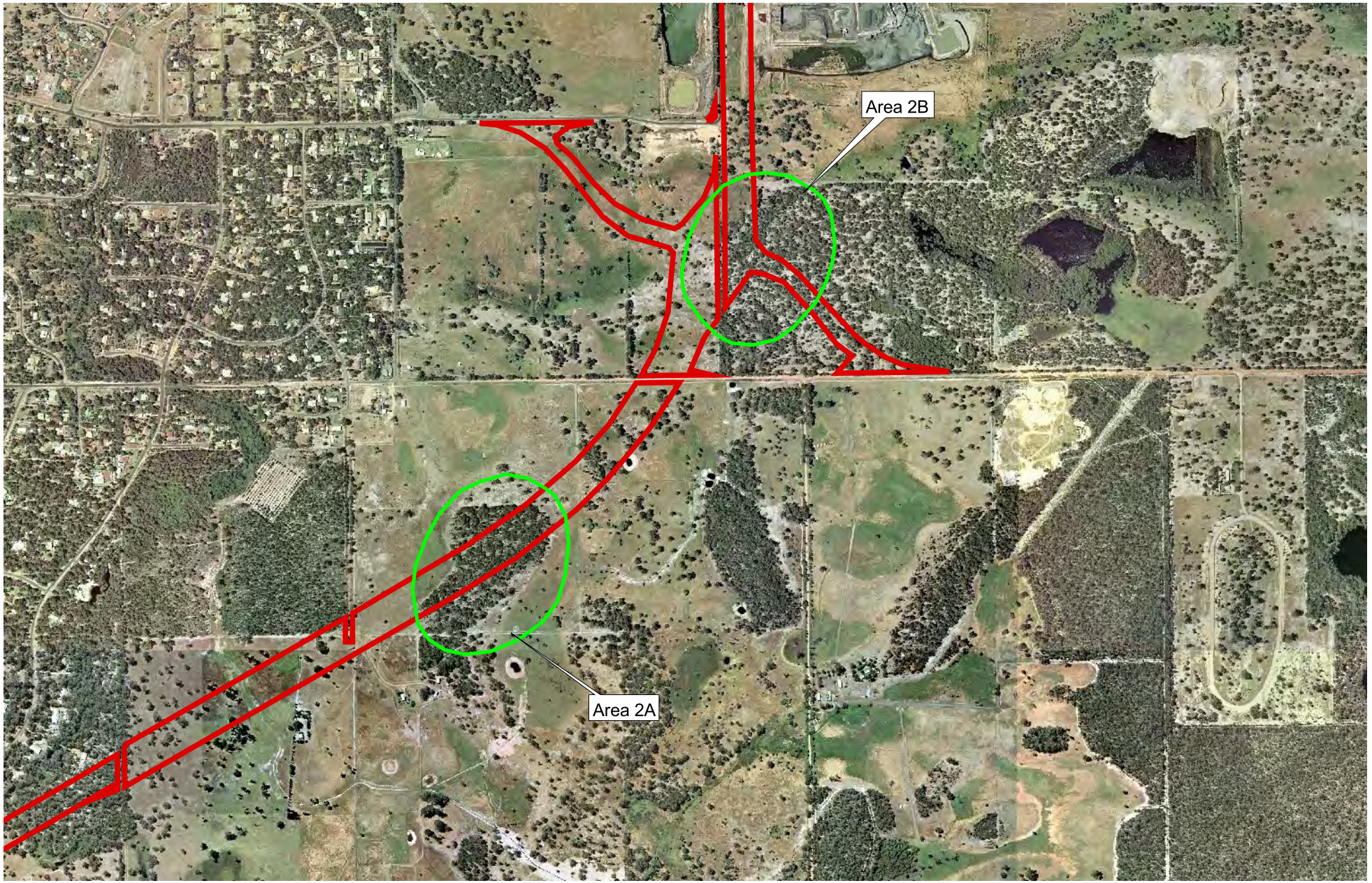
Vegetation impacted by proposed roads

Bunbury Outer Ring Road
Area 1

0 500m

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Department of Environment
Government of Western Australia



Bunbury outer ring road and port access road proposal

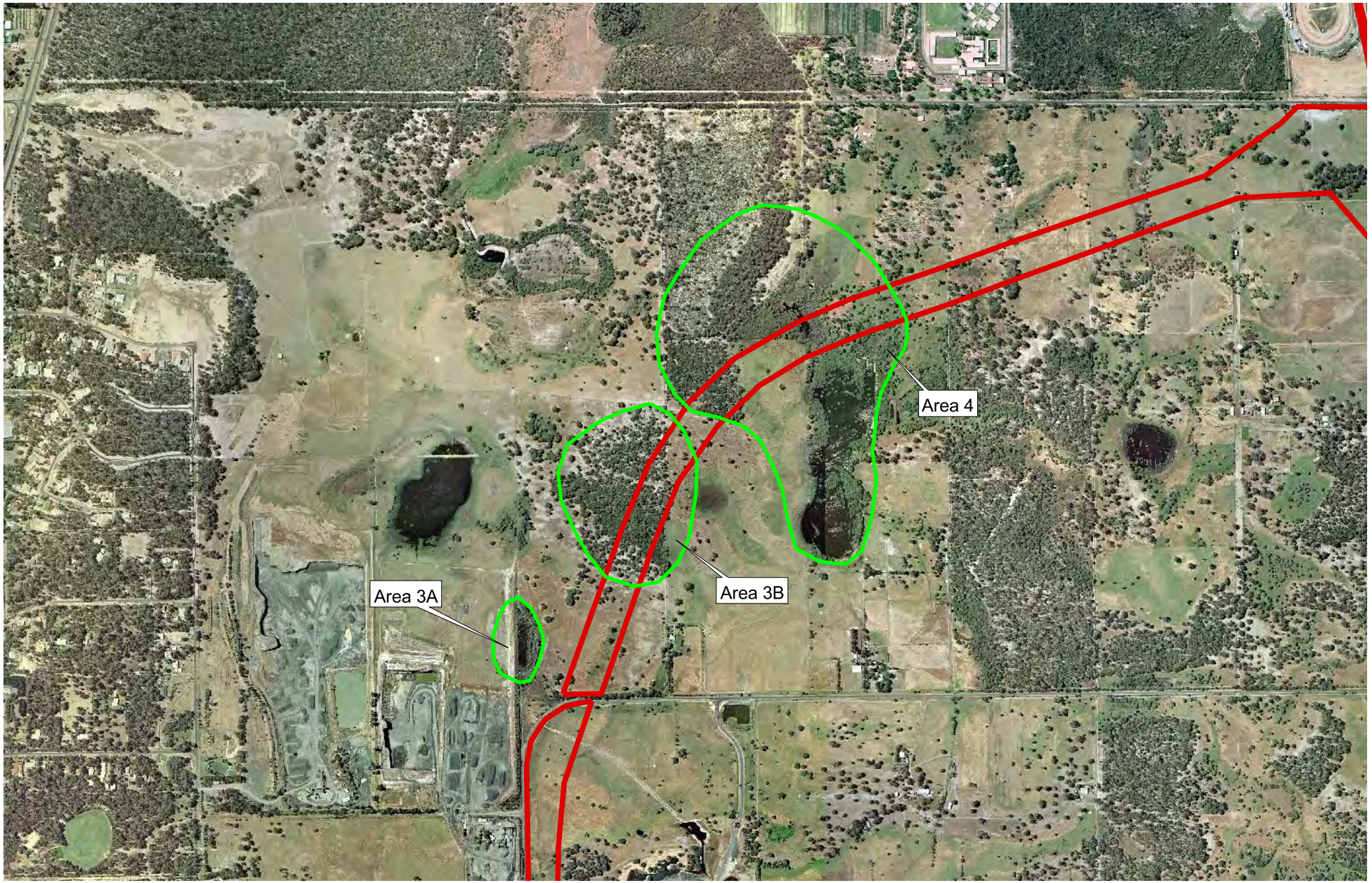
Vegetation impacted by proposed roads

Bunbury Outer Ring Road Areas 2A and 2B

0 1 km

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.



Bunbury outer ring road and port access road proposal

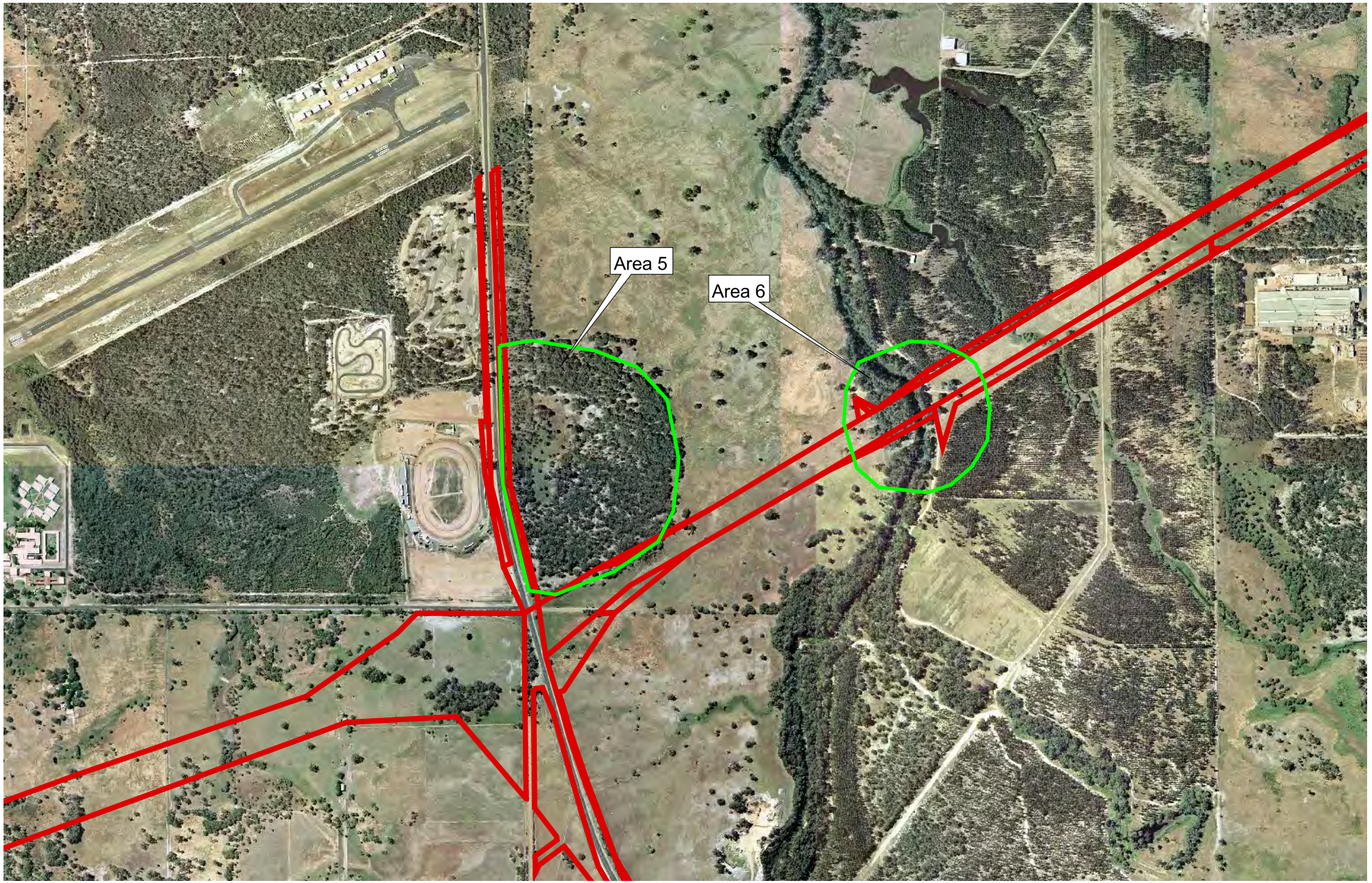
Vegetation impacted by proposed roads

Bunbury Outer Ring Road
Areas 3A, 3B and 4

0 1 km

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.



Bunbury outer ring road and port access road proposal

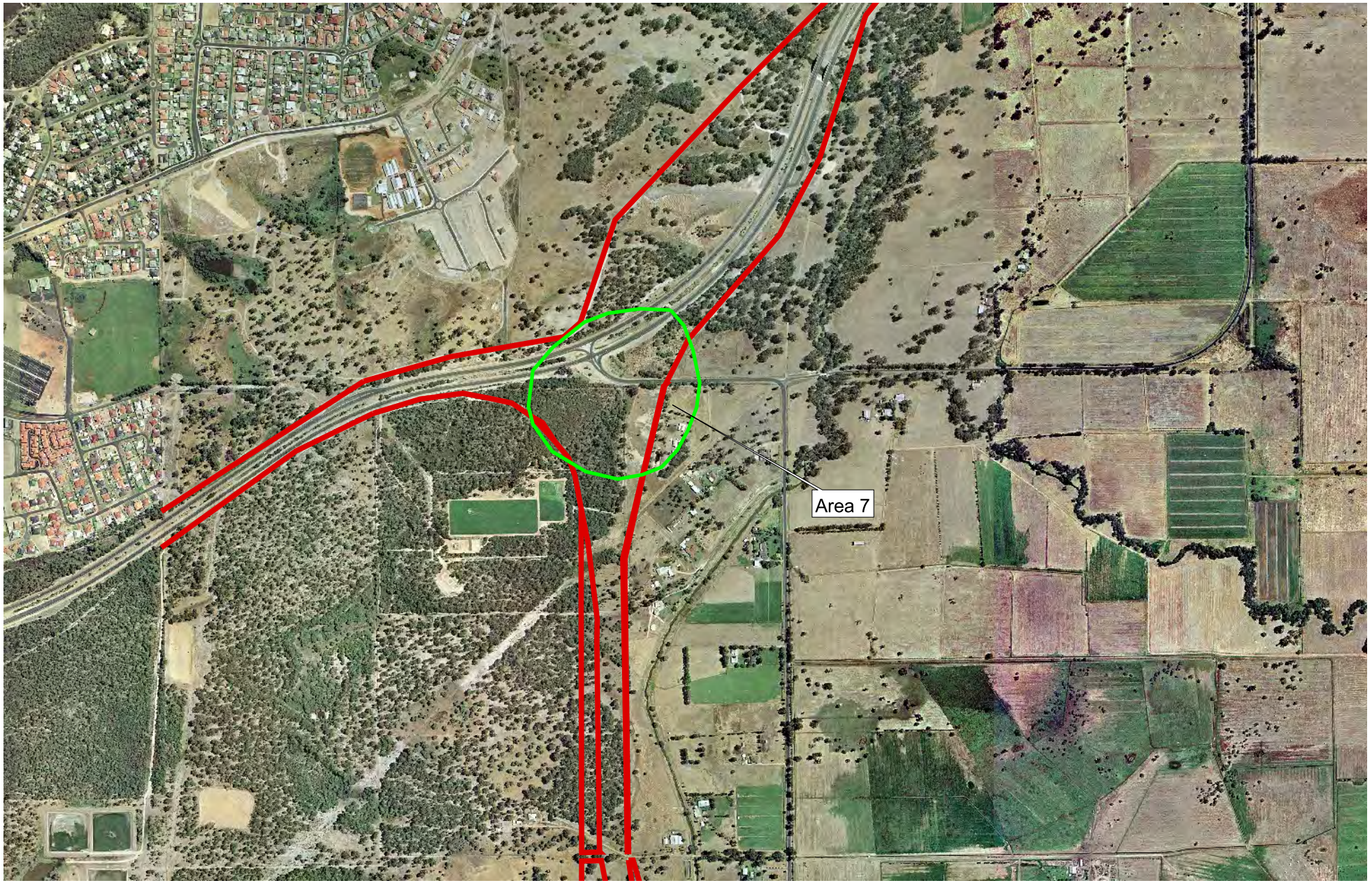
Vegetation impacted by proposed roads

Bunbury Outer Ring Road
Areas 5 and 6

0 500m

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.



Bunbury outer ring road and port access road proposal

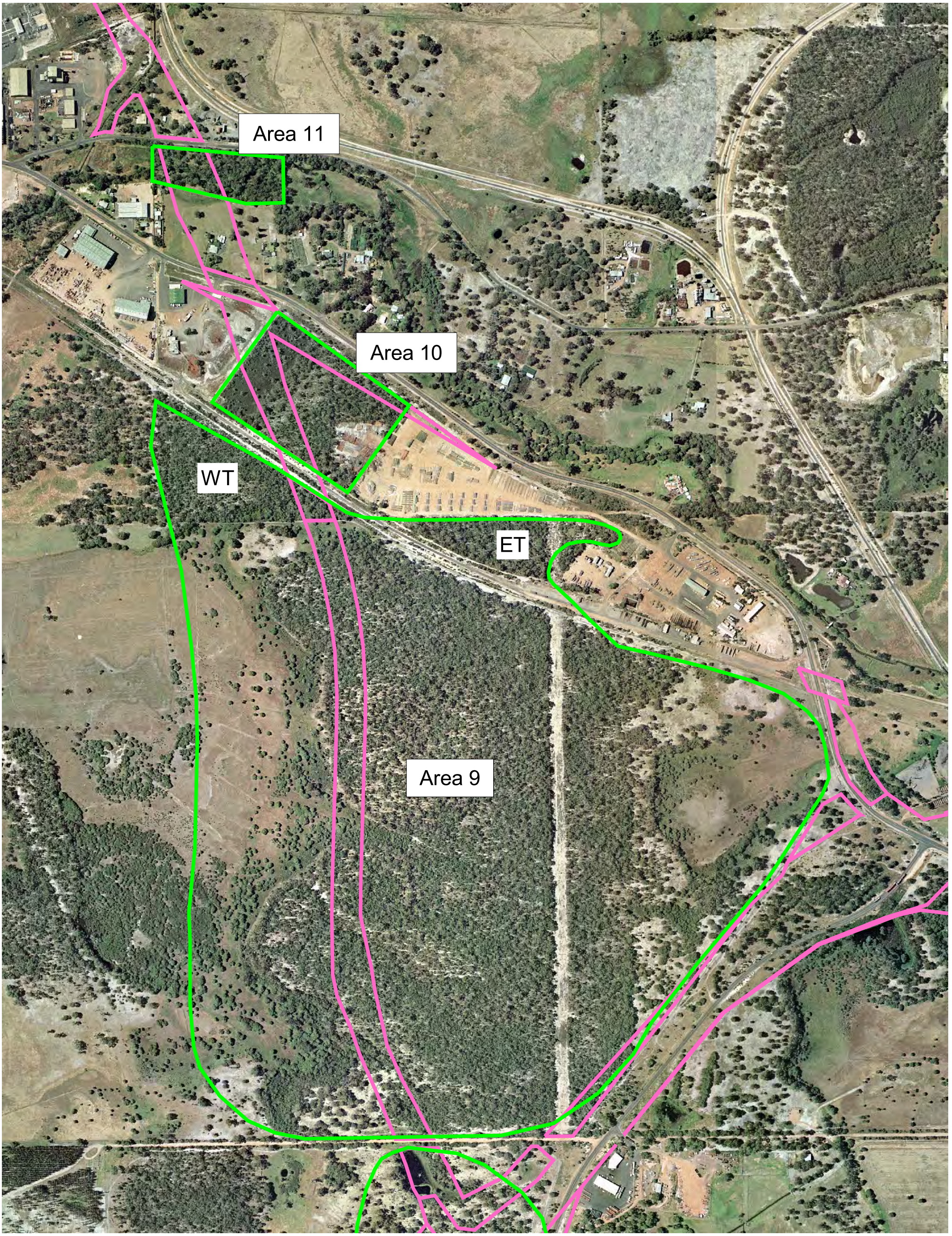
Vegetation impacted by proposed roads

Bunbury Outer Ring Road
Area 7

0 500m

Department of Environment
Government of Western Australia

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Advertised Greater Bunbury Region Scheme

- Bunbury Port access road proposal
- Vegetation impacted by proposed roads
- Cadastral boundaries

0 500m

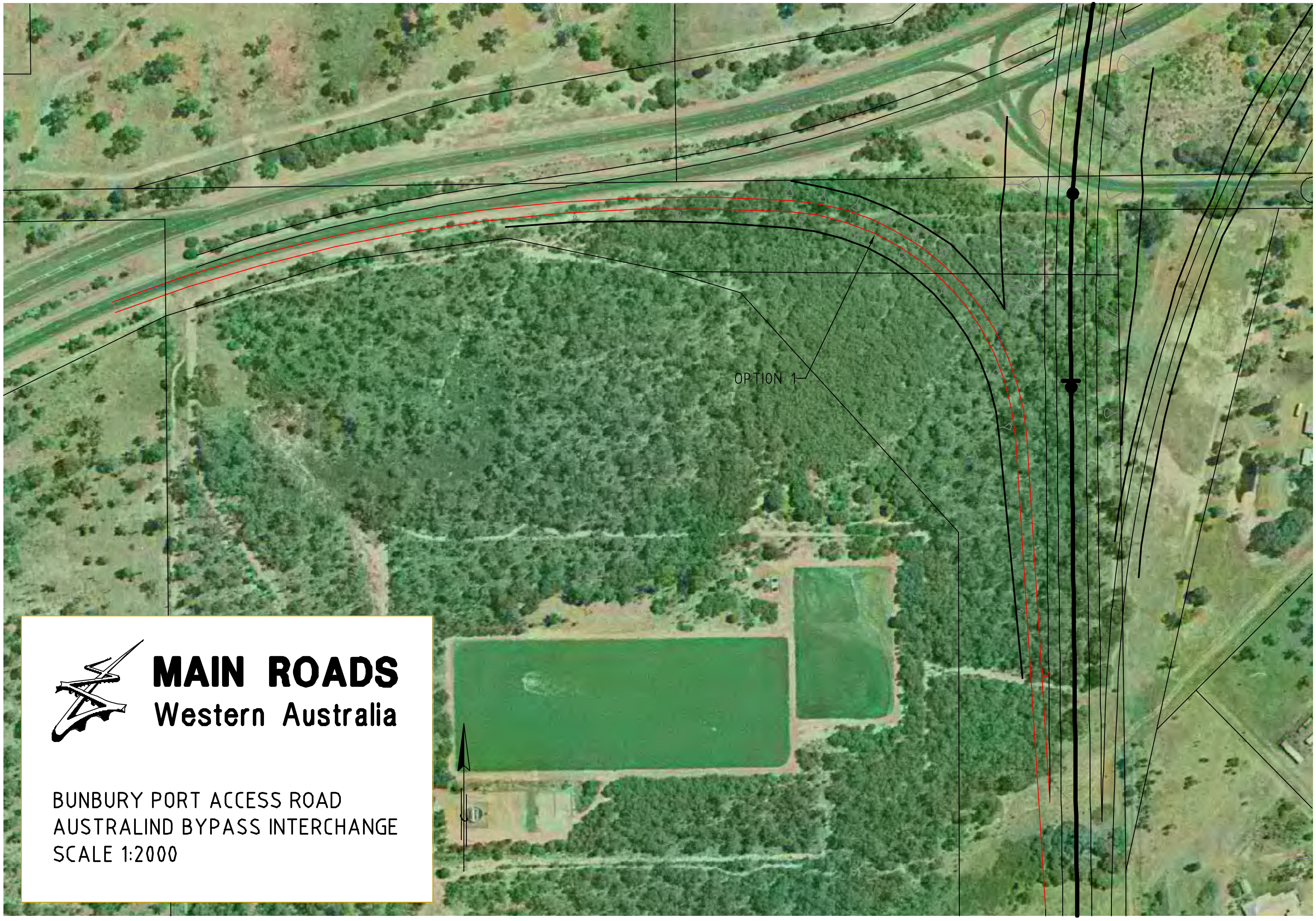
Bunbury Port Access Road
Areas 9, 10 and 11

Department of Environment
Government of Western Australia

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Appendix 12

Recommended realignment of portions of the Bunbury Outer Ring Road and Port Access Road Regional Road reserves in the Greater Bunbury Region Scheme



MAIN ROADS
Western Australia

BUNBURY PORT ACCESS ROAD
AUSTRALIND BYPASS INTERCHANGE
SCALE 1:2000

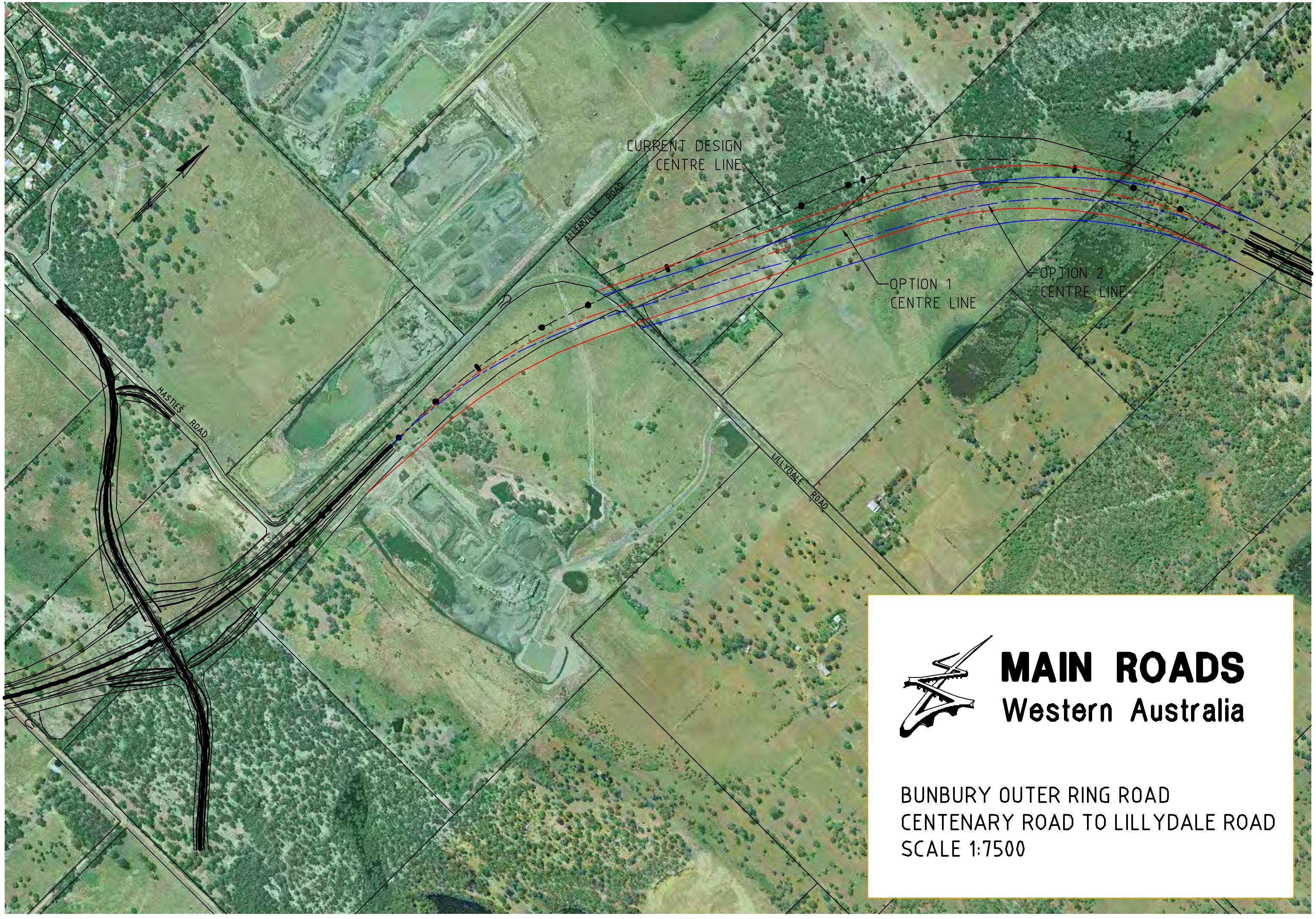
OPTION 2
CENTRE LINE

OPTION 1
CENTRE LINE

CURRENT DESIGN
CENTRE LINE

MAIN ROADS
Western Australia

BUNBURY PORT ACCESS ROAD
REALIGNMENT OPTIONS
HARRIS ROAD TO MOORE ROAD
SCALE 1:7500



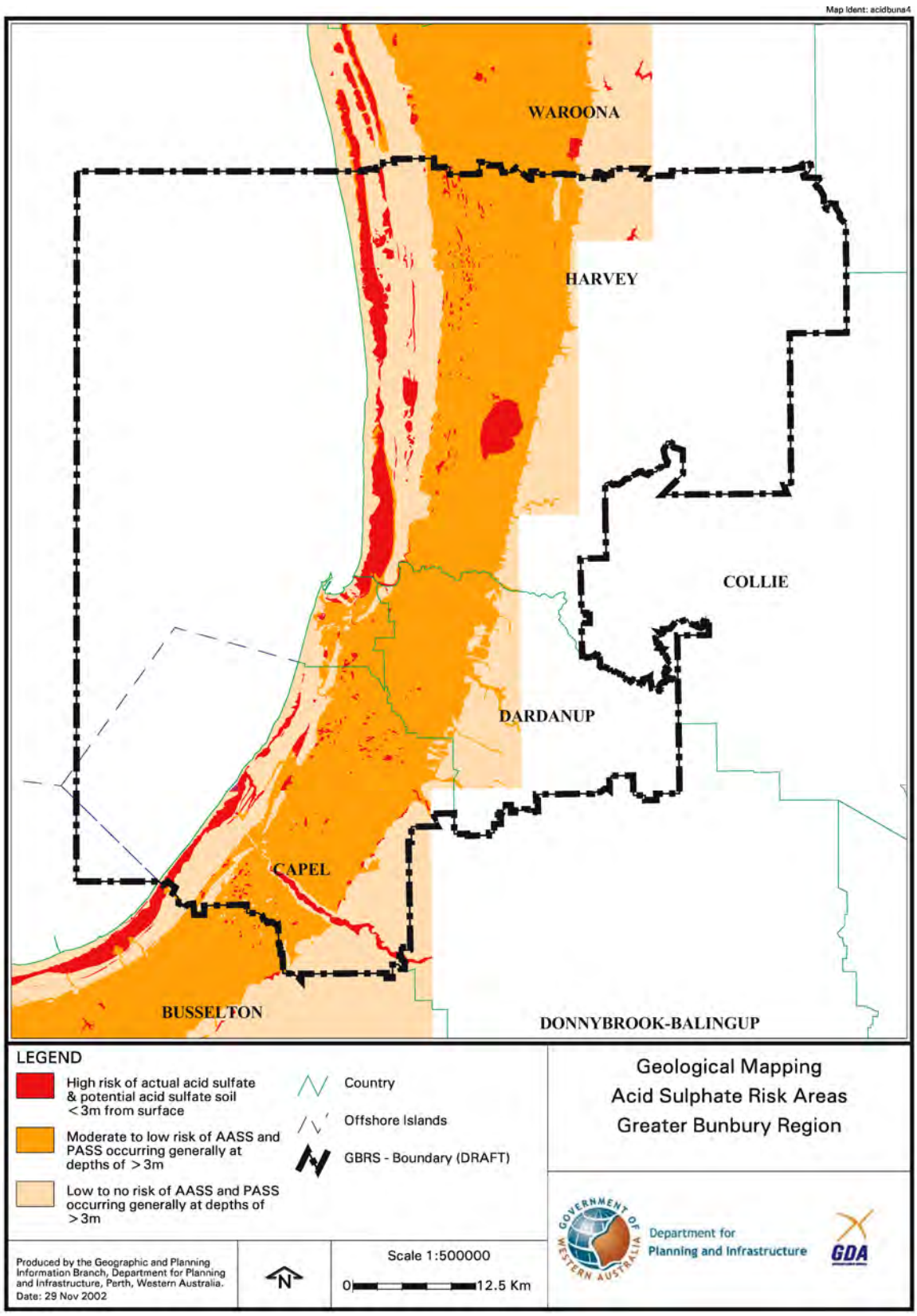
MAIN ROADS
Western Australia

BUNBURY OUTER RING ROAD
CENTENARY ROAD TO LILLYDALE ROAD
SCALE 1:7500

Appendix 13

Greater Bunbury Region

Map of Acid Sulphate Risk Areas


Map Ident: acidbuna4
WAROONA
HARVEY
COLLIE
DARDANUP
CAPEL
BUSSELTON
DONNYBROOK-BALINGUP
LEGEND
High risk of actual acid sulfate & potential acid sulfate soil <3m from surface
Moderate to low risk of AASS and PASS occurring generally at depths of >3m
Low to no risk of AASS and PASS occurring generally at depths of >3m
Country
Offshore Islands
GBRS - Boundary (DRAFT)
Geological Mapping
Acid Sulphate Risk Areas
Greater Bunbury Region
Produced by the Geographic and Planning Information Branch, Department for Planning and Infrastructure, Perth, Western Australia.
Date: 29 Nov 2002
N
Scale 1:500000
0
12.5 Km
Department for Planning and Infrastructure
GDA

Appendix 14

Recommended Environmental Conditions

CONDITIONS TO BE INCORPORATED INTO THE SCHEME BY INSERTION OF PROVISIONS IN SCHEME TEXT

1 Management Plans

1-1 The following Environmental Management Plans may be required in accordance with the specifications set out in Attachment 1 in the Minister for the Environment's "Statement that a Scheme may be Implemeted" No. (insert relevant statement number) published on (insert date), and shall be subsequently implemented in accordance with the provisions of the Management Plans, to the satisfaction of the Western Australian Planning Commission:

1) Environmental Management Plans for schemes, subdivisions and developments;
2) Environmental Management Plans for industrial development with the Kemerton Industrial Area and Special Control Area No. 2;
3) Drainage, Nutrient and Water Management Plan; and
4) Acid Sulfate Soil Management Plan.

2 Biological Survey

2-1 As part of a scheme amendment or application to subdivide or develop land which has the potential to impact on regionally significant native remnant vegetation or native fauna, the Responsible Authority may require a biological survey, including a search for Declared Rare Flora and Fauna, Priority Flora, Threatened Flora Communities and Threatened Fauna, to be undertaken.

The biological survey shall be prepared to the satisfaction of the Responsible Authority having due regard for advice from relevant government agencies, and shall be taken into account when considering the rezoning and subsequent subdivision and development applications.

3 Connection to Reticulated Sewerage

3-1 As part of an amendment to a local town planning scheme or application to subdivide or develop land for residential, special residential, commercial, industrial and tourist purposes, the Western Australian Planning Commission or local authority may require connection of the land to reticulated sewerage where:

1) the Average Annual Maximum Groundwater Level is less than 1.2 metres below the natural ground surface; or

2) subsoil drainage is proposed or will be required as a part of development, unless the responsible authority and the Environmental Protection Authority agree that there are special circumstances applying to a particular subdivision or development.

4 Land to be reserved

4-1 All or portions of the following sites shall be reserved for conservation, in accordance with the requirements set out in Attachment 1 of the Minister for the Environment's "Statement that a Scheme may be Implemented" No. (insert number) published on (date):

1) Reserve 35061 Paris Road, Australind - Decommissioned Wastewater Treatment Plant
2) Reserve 31012 Harewoods Road, Dalyellup
3) Port Installation Reserve
4) Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)
5) Twin Rivers - Pt Lot 211 Barnes Avenue, Australind
6) College Grove - Lot 1000 Bussell Highway
7) Pt Loc 632 Parade Road, Glen Padden
8) Reserve 670 North Boyanup Road, Davenport
9) Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
10) Lot 10 Ferguson River foreshore, Picton
11) Pt Lot 1 North Boyanup Road, Davenport

5 Realignment of Primary Regional Road Reserves

5-1 Portions of the following Primary Regional Road Reserves shall be realigned, in accordance with the requirements set out in Attachment 1 of the Minister for the Environment's "Statement that a Scheme may be Implemented" No (insert number) published on (date):

1) Port Access Road
2) Bunbury Outer Ring Road

Attachment 1 – STATEMENT THAT A SCHEME MAY BE IMPLEMENTED – GREATER BUNBURY REGION SCHEME

SPECIFICATIONS FOR ENVIRONMENTAL MANAGEMENT PLANS

1. Environmental Management Plans for schemes, subdivisions and developments

1-1 Prior to amending local town planning schemes, or finally approving subdivisions or developments (whichever is sooner), the Western Australian Planning Commission or local government may require an Environmental Management Plan to be prepared and implemented to achieve the objective of managing the potential impacts of the proposed subdivision or development on the following:

1) land which is reserved as Regional Open Space in the Scheme;

2) a Crown conservation or nature reserve;

3) a National Park; or

4) bushland, waterway, wetland or land that may be part of an ecological linkage.

The Environmental Management Plan shall include:

1) a description of existing environmental values, and the identification of the environmental outcome to be achieved through the implementation of this plan;

2) clear delineation of boundaries or significant areas to be protected;

3) fire management;

4) drainage and nutrient management;

5) management of access and rehabilitation;

6) vegetation and/or wetland mitigation strategies

7) allocation of responsibilities and identification of timing and duration of implementation;

8) provision for routine monitoring of environmental values; and

9) provision of details of contingency plans in the event that the monitoring surveys indicate that the development is having or has had an adverse impact upon environmental values.

1-2 An Environmental Management Plan required by condition 1-1 shall be prepared to the satisfaction of the Responsible Authority having due regard for advice from relevant government agencies and shall be implemented in accordance with a program defined in the Environmental Management Plan.

1-3 An Environmental Management Plan shall also include a Vegetation Compensation Package to off-set the impacts on particular vegetation complexes.

The Vegetation Compensation Package shall consider:

1) the biological and environmental values of any vegetation to be impacted by the proposed alignment and design of the road;
2) a review of the alignment of the route or design of the road, to avoid or minimize impacts on the vegetation; and
3) measures, including the possible acquisition of other vegetated land, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

2. Environmental Management Plans for industrial development with the Kemerton Industrial Area and Special Control Area No. 2

2-1 Prior to approving subdivision or development within the Kemerton Industrial Area and the Special Control Area No. 2, the Western Australian Planning Commission or local government may require an Environmental Management Plan to be prepared and implemented to achieve the objective of managing the potential impacts of the proposed development.

An Environmental Management Plan shall include:

1) a description of existing environmental values (including vegetation, fauna and wetlands) and the identification of the environmental outcome to be achieved through the implementation of this plan;
2) management of potential impacts on visual amenity;
3) clear delineation of significant areas to be protected;
4) allocation of responsibilities and identification of timing and duration of implementation;
5) provision for routine monitoring of environmental values; and
6) provision of details of contingency plans in the event that the monitoring surveys indicate that the subdivision or development is having or has had an adverse impact upon environmental values.

2-2 An Environmental Management Plan required by condition 2-1 shall be prepared to the satisfaction of the responsible authority having due regard for advice from relevant government agencies and shall be implemented in accordance with a program defined in the Environmental Management Plan.

3. Drainage, Nutrient and Water Management Plan

3-1 Prior to amending local town planning schemes, or finally approving subdivisions or developments (including those for intensive horticulture), whichever is sooner, in areas where the Average Maximum Groundwater Level is less than 1.2 metres below the natural ground surface, or where any proposed off-site drainage could lead to degradation of wetlands or waterways, the Responsible Authority or local authority may require a Drainage, Nutrient and Water Management Plan to be prepared and implemented.

3-2 A Drainage, Nutrient and Water Management Plan, if required, shall ensure that there is no net increase in nitrogen export to the Leschenault Inlet as a result of development within the Greater Bunbury Region.

3-3 The Drainage, Nutrient and Water Management Plan shall be prepared to the satisfaction of the Western Australian Planning Commission or local authority having due regard for advice from relevant government agencies, and shall be implemented in accordance with a program defined in the Drainage, Nutrient and Water Management Plan.

An Environmental Management Plan shall also include:

1) a description of existing environmental values, and the identification of the environmental outcome to be achieved through the implementation of this plan;
2) clear delineation of significant areas to be protected;
3) allocation of responsibilities and identification of timing and duration of implementation;
4) provision for routine monitoring of environmental values; and
5) provision of details of contingency plans in the event that the monitoring surveys indicate that the road is having or has had an adverse impact upon environmental values.

4. Acid Sulfate Soils Management Plan

4-1 Prior to amending local town planning schemes, or finally approving subdivisions or developments, the Western Australian Planning Commission may require:

1) A Preliminary Acid Sulfate Soils assessment to be prepared where there is likely to be a significant risk of disturbing acid sulfate soils; or

2) An Acid Sulfate Soil Management Plan to be prepared and implemented where the presence of acid sulfate soils has been confirmed.

5. Biological Surveys

5-1 Prior to rezoning land in the scheme which has the potential to impact on regionally significant remnant vegetation or native fauna, the responsible Authority may require a biological survey.

5-2 A biological survey shall be prepared to the satisfaction of the Western Australian Planning Commission having due regard for advice from relevant government agencies, and shall be taken into account when considering the rezoning and subsequent subdivision and development applications.

6. Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant

6-1 Land shall be reserved for conservation purposes to protect the integrity, function and environmental, value of the bushland on the northern and western portions of Reserve 35061 Paris Road, Australind, to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

7. Reserve 31012 Harewoods Road, Dalyellup

7-1 Land shall be reserved for conservation purposes to protect the integrity, function and environmental value of the bushland on the northern portion of Reserve 31012 Harewoods Road, Dalyellup to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection and shall only be used for conservation and complementary purposes.

8. Port Installation Reserve

8-1 Land shall be reserved for conservation purposes to protect the integrity, function and environmental value of the foreshore adjacent to the Port Installation, zone to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection and shall only be used for conservation and complementary purposes.

9. Port Access Road

9-1 The Port Access Road Primary Regional Road reserve shall be realigned to protect the integrity, function and environmental value of bushland, wetlands, and watercourses, to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection.

10. Lots 0, 7 and 9 Brunswick River (east of Australind Bypass)

10-1 Land shall be reserved for conservation purposes to provide an appropriate buffer to the Brunswick River on Lots 0, 7 and 9 (east of Australind Bypass), to the requirements of the Western Australian Planning

Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

11. Twin Rivers - Pt Lot 211 Barnes Avenue, Australind

11-1 All of Pt Lot 211 shall be reserved for conservation purposes to protect the integrity, function and environmental value of the bushland, wetland and river foreshores on Pt Lot 211 Barnes Avenue, Australind, to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

12. Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton

12-1 Land shall be reserved for conservation purposes to protect the integrity, function and environmental value of the wetland on Lots 40-44 Jeffery Road, Picton, to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes. The land requirements shall include an appropriate buffer to protect the core wetland.

13. College Grove - Lot 1000 Bussell Highway

13-1 A corridor between 300 metre and 500 metre shall be reserved for conservation purposes on Lot 1000 Bussell Highway, to protect the integrity, function and environmental value of the bushland on Lots 1000 Bussell Highway to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

14. Pt Loc 632 Parade Road, Glen Padden

14-1 Land shall be reserved for conservation purposes to protect the integrity, function and environmental value of the bushland on Pt Loc 632 Parade Road, Glen Padden, to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

15. Reserve 670 North Boyanup Road, Davenport

15-1 Land shall be reserved for conservation purposes to protect the integrity, function and environmental value of the bushland on Reserve 670 North Boyanup Road, Davenport to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

16. Bunbury Outer Ring Road

16-1 The Bunbury Outer Ring Road Primary Regional Road Reserve shall be realigned to protect the integrity, function and environmental value of bushland, wetlands, and watercourses, to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection.

17. Lot 10 Ferguson River foreshore, Picton

17-1 Land shall be reserved for conservation purposes to provide an appropriate buffer to the Ferguson River on Lot 10, Picton to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

18. Pt Lot 1 North Boyanup Road, Davenport

18-1 Land shall be reserved for conservation purposes to provide an appropriate buffer to the Preston River on Pt Lot 1, Picton to the requirements of the Western Australian Planning Commission on advice of the Department of Environmental Protection, and shall only be used for conservation and complementary purposes.

Appendix 15

Environmental Protection Authority

Environmental Advice

ENVIRONMENTAL PROTECTION AUTHORITY ADVICE
In addition to the environmental conditions the Environment Protection Authority wishes to provide the following advice in relation to the GBRS:

1 Deferred factors

1-1 A number of environmental factors have not been included in the EPA's assessment due to the broad scale of the assessment or because insufficient information is available at this stage of the planning process. The EPA has decided that these factors should be "deferred" to ensure that the EPA has the opportunity to assess future local government scheme amendments, subdivisions or development proposals, whichever comes first, so that a more detailed consideration of the potential environmental impacts can be undertaken by the EPA pursuant to Part IV of the *Environmental Protection Act 1986.*

The deferred factors are:

1) All Rural zoned land in the GBRS
Deferred factors – remnant vegetation and wetlands

2) All land in the Greater Bunbury Region Scheme
Deferred factor – site contamination

3) Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant
Deferred factors – remnant vegetation, fauna and ecological linkage

4) Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind
Deferred factors— remnant vegetation, fauna and ecological linkage

5) Lots 313-317 south of Harewoods Road, South Dalyellup
Deferred factors — remnant vegetation, fauna and ecological linkage

6) Reserve 31012 Harewoods Road, Dalyellup
Deferred factors — contamination.

7) Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup
Deferred factor — remnant vegetation

8) Lot 871 Prowse Road, Capel (south)
Deferred factors — remnant vegetation, fauna and ecological linkage

9) Lot 2 Harvey (Urban zone)
Deferred factors — remnant vegetation, fauna and ecological linkage

10) Kemerton Industrial Expansion Area
Deferred factors — noise, air quality, remnant vegetation, groundwater quality, surface water quality and solid/liquid waste disposal

11) Port Installation reserve
Deferred factors — noise, air quality and marine water quality

12) Raymond Road
Deferred factors — wetlands, remnant vegetation and the impacts from road users on surrounding noise sensitive landuses

13) South Western Highway (northern section between the northern boundary of the GBRS and the Preston River)
Deferred factors — remnant vegetation, watercourses and the impacts from road users on surrounding noise sensitive landuses

14) Port Access Road
Deferred factors - the remnant vegetation, wetland, watercourses, fauna and noise.

15) Boyanup Bypass
Deferred factors — remnant vegetation, wetlands and the impacts from road users on surrounding noise sensitive landuses

16) Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton
Deferred factors — remnant vegetation, fauna and odour emissions

17) Picton Waters - EPP Lake on portion of Lots 40-44 Jeffery Road, Picton
Deferred factors — remnant vegetation, wetlands and fauna

18) Muddy Lakes – Minninup Road, Capel
Deferred factors — remnant vegetation, wetlands and fauna

19) Reserve 670 North Boyanup Road, Davenport
Deferred factors — remnant vegetation, fauna and ecological linkage

20) Lot 15 North Boyanup Road
Deferred factors — remnant vegetation and fauna

21) Bunbury Outer Ring Road
Deferred factors - the remnant vegetation, wetland, watercourses, fauna and noise.

22) Glen Iris Service Corridor
Deferred factors— noise, vibration, remnant vegetation and wetlands

23) Lot 35 Spurr Street, Capel

Deferred factors — remnant vegetation, wetlands and fauna

1 Primary Regional Road Reserves

2-1 The alignments of the following Primary Regional Road reserves in the GBRS meet the EPA's environmental objectives provided Environmental and Noise/Vibration Management Plans and Vegetation and Waterway Mitigation Strategies are prepared and implemented, when appropriate, to the satisfaction of the EPA:

1) South Western Highway;
2) Raymond Road;
3) Boyanup Bypass Road;
4) Bussell Highway;

2-2 Proposals to construct these roads should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986* to ensure that the management plans are prepared to the satisfaction of the EPA.

2-3 The Environmental Management Plans should include:

1) mapping of vegetation units and the condition of the vegetation units;
2) plot based descriptions and flora lists for each of the mapped vegetation units;
3) mapping of populations of priority species; and
4) the identification of fauna values of the remnants.
5) a description of existing environmental values, and the identification of the environmental outcome to be achieved through the implementation of this plan;
6) clear delineation of significant areas to be protected;
7) vegetation and/or wetland mitigation strategies
8) allocation of responsibilities and identification of timing and duration of implementation;
9) provision for routine monitoring of environmental values; and
10) provision of details of contingency plans in the event that the monitoring surveys indicate that the road is having or has had an adverse impact upon environmental values.

2-4 The Noise Management Plan should include:

1) detailed noise modeling for the whole proposal taking into account topography, cadastral information, dwelling locations, road design (including elevation), road surfaces and traffic volumes;
2) acceptable noise and vibration levels, as agreed between the Main Roads Western Australia and the Department of Environmental Protection, to protect the amenity of adjacent residences; and
3) measures to manage the impact of traffic noise and vibration on adjacent residnces and residential areas.

2-5 The Vegetation Mitigation Strategy should off set the impacts on particular vegetation complexes and should include:

1) the biological and environmental values of any vegetation to be impacted by the design and construction of the road;
2) a review of the design of the road, to avoid or minimize impacts on the vegetation; and
3) measures including the possible acquisition of other vegetated land, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

2-6 In considering the suitability of other vegetated land to mitigate the loss of any biological and environmental values caused by the construction of the proposed road the following matters will be considered by the EPA:

1) specific vegetation communities affected by the proposal;
2) specific vegetation communities on land proposed for acquisition to mitigate the loss of biological and environmental values caused by the proposal;
3) vesting and proposed management of the vegetation proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and
4) values and roles of this vegetation in maintaining conservation in the Greater Bunbury Region.

2-7 A Vegetation Mitigation Strategy should off set the impacts on particular wetlands and should include:

1) the biological and environmental values of any wetlands to be impacted by the design and construction of the road;
2) a review of the design of the road, to avoid or minimise impacts on wetlands; and
3) measures including the possible acquisition of other or wetlands, to mitigate for the loss of any biological and environmental values caused by the construction of the road.

2-8 In considering the suitability of other vegetated land and wetlands to mitigate the loss of any biological and environmental values caused by the construction of the road the following matters will be considered by the EPA:

1) specific category, or categories, of wetlands to be affected by the road construction;
2) vesting and proposed management of wetland areas proposed for acquisition to mitigate against the loss of any biological and environmental values caused by the road construction; and
3) values and roles of the wetlands in maintaining conservation in the Greater Bunbury Region.

2 Reserve 35061 Paris Road, Australind - Decommissioned Waste Water Treatment Plant, Lots 27, 28, 150, 151, 1 and 21 Paris Road (north), Australind and Lot 3 Paris Road (south), Australind

3-1 It is the EPA's opinion that:

1) the remnant vegetation on the northern and western portions of Reserve 35061 should be reserved in the GBRS and appropriately managed;
2) the bushland on part Lots 27, 28 and 150 to the north of Paris Road should be conserved and managed as part of any future subdivision and development, whichever comes first; and

3 Lots 313-317 south of Harewoods Road, South Dalyellup

4-1 It is the EPA's opinion that:

1) remnant vegetation on Lots 315, 316 and 317 should be conserved and appropriately managed either as a ROS reserve in the GBRS or as part of future zoning, subdivision and/or development on the lots;
2) the extraction of sand and limestone from Lots 315, 316 and 317 is incompatible with the need to protect vegetation in this area;
3) immediate planning measures be implemented by the WAPC to manage and prevent any further development or change of land use on Lots 315, 316 and 317, until the GBRS has been proclaimed.

4 Reserve 31012 Harewoods Road, Dalyellup

5-1 It is the EPA's opinion that:

1) remnant vegetation on Reserve 31012 is regionally significant and should be reserved and appropriately managed;
2) appropriate landuses need to be determined for that portion of the site used a municipal waste disposal site;
3) a site investigation be undertaken prior to any ground disturbing activities, to determine the extent and severity of contamination on that part of Reserve 31012 used as a waste disposal site. If the site is found to be contaminated as a result of this investigation, then a Site Remediation and Validation Report should be produced to the satisfaction of the Department of Environmental Protection; and

5 Part Lot 201 Gray Road, Part Lot 4402, Part Lot 97, Lot 139 Armstrong Street, Lots 1a, 4a, 66 and Part Lot 138 Timperley Road, Boyanup

6-1 It is the EPA's opinion that there is regionally significant remnant vegetation on the land proposed to be zoned Urban Deferred which should be conserved and appropriately managed as part of any future zoning, subdivision and/or development on the site.

6 Lot 871 Prowse Road, Capel (south)

7-1 It is the EPA's opinion that the Urban zoning on Lot 871 is environmentally acceptable subject to the remnant vegetation being conserved and protected as part of any future subdivision or development on the land.

7 Lot 2 Harvey

8-1 It is the EPA's opinion that the Urban zoning on Lot 2 is environmentally acceptable subject to as much of the remnant vegetation being conserved and protected as possible (at least 60%), as part of any future subdivision or development on the land.

8 Kemerton Industrial Area Expansion and Special Control Area No. 2

9-1 It is the EPA's opinion that:

1) areas of regionally significant bushland within Special Control Area No. 2 should be reserved as ROS as a future amendment to the GBRS; and
2) Special Control Area No. 2 provides adequate separation between proposed industrial development and surrounding landuses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

9 Port Access Road

10-1 It is the EPA's opinion that it would be preferable for the Port Access Road to follow existing road alignments between Harris Road and Moore Road. Although a re-alignment to the west of the currently alignment shown in the GBRS, designed and constructed to minimise impact on bushland, would be environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

10 Boyanup Bypass Road

11-1 It is the EPA's opinion that subject to:

1) the road being designed and constructed to minimise impact on bushland and avoid any direct or indirect impacts on the Boyanup Billabong; and
2) Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared

the alignment of the Primary Regional Road reserve for the Boyanup Bypass is environmentally acceptable.

11 Public Purpose Reserve, Lot 310 and Part of lots 23, 35 and 205 Marriot Road, Kemerton

12-1 It is the EPA's opinion that:

1) the proposal to establish waste water treatment plants on the Public Purpose reserve is environmentally acceptable subject to further

investigation to select development sites with minimal potential environmental impacts on remnant vegetation and fauna; and

2) Special Control Area No. 2 provides adequate separation between the Public Purpose reserve and surrounding landuses to accommodate the impacts of odour emissions from waste water treatment plants in accordance with the EPA's environmental objectives and criteria for this environmental factor.

12 Locations 7 and 14 Buffalo Road, Binningup

13-1 It is the EPA's opinion that:

1) the proposed modification to the alignment of the ROS reserve boundary alignment on Location 14 is acceptable; and
2) the alignment of the ROS reserve boundary on Location 7 should be reviewed prior to any future zoning or subdivision on the subject land, whichever comes first, and amended where necessary.

13 Twin Rivers - Pt Lot 211 Barnes Avenue, Australind

14-1 It is the EPA's opinion that:

1) the current alignment of the ROS reserve does not adequately protect the regional natural values of the Pt Lot 211 Barnes Avenue;
2) in view of the regional natural values of Pt Lot 211 Barnes Avenue all of the site should be reserved;
3) if the Government decides not to preserve the whole of the area as a regional park, the EPA is of the view that the alignment ROS alignment identified by the WAPC on 31 July 2003 should be adopted; and
4) arrangements be included in the Greater Bunbury Region Scheme to ensure that adequate funds are available for the WAPC to purchase areas of regional conservation value.

14 College Grove – Lot 1000 Bussell Highway

15-1 It is the EPA's opinion that:

1) a corridor between 300 and 500m be reserved in the Greater Bunbury Region Scheme and appropriately managed; and
2) some degree of flexibility (20 metres) be allowed in determining the final alignment of the northern ROS boundary to facilitate the final structure plan with no nett loss of ROS.

15 Muddy Lakes – Minninup Road, Capel

15-1 It is the EPA's opinion that:

1) the alignment of the ROS reserve boundary around Muddy Lakes should remain as shown in the advertised GBRS;
2) the alignment of the ROS reserve boundary should be amended to include the full extent of the wetland at the earliest opportunity;

3) Priority be given to implementing management arrangements (ie Government acquisition) in the Dalyellup/Minninup Lake Natural Area to prevent further degradation by current land use activities;
4) Interim planning mechanisms be put in place to ensure that conservation values in the Dalyellup/Minninup Lake Natural Area are protected from any further development or change of land use until suitable protection measures under the Greater Bunbury Region Scheme are provided; and
5) Further biological and hydrological studies be undertaken to ensure that the Dalyellup/Minninup Lake Natural Area is appropriately managed.

16 Reserve 670 North Boyanup Road, Davenport

17-1 It is the EPA's opinion that:
1) the southern portion on Reserve 670 should be reserved and appropriately managed because of its regional significance;
2) the remnant vegetation on the northern portion of Reserve 670 should be conserved primarily because of its faunal habitat values and value as an additional ecological linkage to Preston River; and
3) a portion of the remnant vegetation to the north of Reserve 670 should be conserved to provide a consolidated ecological linkage between Reserve 670 and the Preston River.

17 Lot 15 North Boyanup Road

17-1 It is the EPA's opinion that the remnant vegetation on Lot 15 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site.

18 Bunbury Outer Ring Road

18-1 It is the EPA's opinion that subject to the Bunbury Outer Ring Road being realigned, designed and constructed to minimise impact on:
1) a wetland near the intersection with the Australind Bypass;
2) wetlands to the north of Lillydale Road;and
3) bushland at the intersection with Bussell Highway

the alignment would be environmentally acceptable subject to Environmental and Noise/Vibration Management Plans, and Vegetation and Wetland Mitigation Strategies being prepared.

19 Glen Iris Service Corridor

19-1 It is the EPA's opinion that:
1) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to adoption of a Special Control Area to prevent incompatible land uses being located in the buffer;

2) the alignment of the Glen Iris Service Corridor (Public Purpose Reserve, Rail Reserve and Regional Road Reserve) and the width of the Special Control Area are environmentally acceptable subject to Noise and Vibration Management Plans being prepared in accordance with the specifications in Section 2, above, prior to any additional infrastructure being constructed within the corridor;

3) the proposal to rezone a portion of the Glen Iris Service Corridor buffer to Urban is environmentally acceptable subject to the preparation and implementation of a drainage and nutrient management plan, wetland rehabilitation/management plan and fauna management plan; and

4) any proposal to construct infrastructure within the Glen Iris Service Corridor should be referred to the EPA pursuant to Part IV of the *Environmental Protection Act 1986*.

20 Lot 35 Spurr Street, Capel

20-1 It is the EPA's opinion that the remnant vegetation on Lot 35 is a significant fauna habitat and effort should be made to conserve a consolidated area of remnant vegetation and appropriately manage the remnant vegetation as part of any future zoning, subdivision and/or development on the site.

21 Special Control Area No. 2 - Kemerton Industrial Zone Buffer

21-1 It is the EPA's opinion that Special Control Area No. 2 provides adequate separation between the proposed industry and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

22 Special Control Area No. 3 - North Capel

22-1 It is the EPA's opinion that SCA No. 3 will provide adequate separation between current and future industrial operations and surrounding land uses to accommodate the impacts of noise and air quality in accordance with the EPA's environmental objectives and criteria for these environmental factors.

23 Public Water Supply Catchment Policy

23-1 The EPA supports the Public Water Supply Catchment Policy subject to the land use permissibility table being deleted and inclusion of reference to the WRC guidelines which determine land use permissibility

24 Floodplain Management Policy

24-1 The EPA supports the Floodplain Management Policy subject to the environmental values of floodplains being described in further detail consistent with the WRC's Western Australian Draft Floodplain Management Strategy.

25 Strategic Agricultural Resource Policy

25-1 The EPA recommends that the Strategic Agricultural Resource Policy should be modified to include the following statements:

1) There is a general presumption against clearing of native vegetation including within the Strategic Agricultural Resource Policy Areas where 30% or less of the Vegetation Complex remains;
2) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposed clearing will be assessed by the EPA in accordance with EPA's Guidance 10 (EPA, 2003); and
3) Native vegetation clearance is also proposed to be addressed through the *Environmental Protection Amendment Bill 2002* which is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

26 Strategic Minerals and Basic Raw Materials Resource Policy

26-1 The EPA recommends that the Strategic Minerals and Basic Raw Materials Resource Policy should be modified to include the following statements:

1) There is a general presumption against clearing of native vegetation including within the Strategic Minerals and Basic Raw Materials Resource Policy Areas where 30% or less of the Vegetation Complex remains;
2) Where native vegetation and/or habitat areas (natural areas) are present it should be assumed that the proposal will be assessed by the EPA in accordance with Guidance 10 (EPA, 2003);
3) After the resource has been recovered from a Strategic Minerals and Basic Raw Materials Resource Policy Area located within a cleared portion of an Ecological Linkage, the linkage should be restored using previously occurring native species of local provenance; and
4) Native vegetation clearance is also proposed to be addressed through the *Environmental Protection Amendment Bill 2002* which is currently before Parliament. This Bill contains new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process run by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit.

27 Strategy to conserve regionally significant natural areas on the Swan Coastal Plain

27-1 The EPA recognises the need to update the conservation recommendations on the Swan Coastal Plain portion of the GBRS as a priority. It considers that this work should be undertaken as part of a wider coordinated program to update conservation recommendations across the non-metropolitan portions of the southern Swan Coastal Plain, and the Darling and Whicher Scarps. The review

of conservation recommendations on the country portions of the Swan Coastal Plain is needed to complete an update of the EPA System 6 and System 1 recommendations that was initiated in 1995, but deferred pending completion of recommendations for the metropolitan area through Bush Forever.

The EPA supports the completion of the System 6 and System 1 update on the Swan Coastal Plain and adjacent Scarps as a 'whole of government' program through a similar co-ordinated approach, as used for Bush Forever. It considers that an adaptation of the criteria developed for the Natural Area Strategy would provide an appropriate basis for this review. Consideration of the ecological linkage requirements and mechanisms promoting re-establishment of ecological linkage, including hydrological and wetland function, should be an important component of the program.

28 Alcoa Wagerup

28-1 It is the EPA's view that measures be put in place by the Shires of Harvey and Waroona or the WAPC to provided an adequate buffer around the Alcoa refinery as a matter of priority.

29 Environmental Protection Amendment Bill 2002

29-1 The *Environmental Protection Amendment Bill 2002* is currently before Parliament. This Bill proposes new legislation to control clearing of native vegetation in Western Australia, through a coordinated assessment process administered by the Department of Environmental Protection. Under the proposed laws most instances of clearing will require a permit. Permit applications will be assessed against criteria designed to assess impacts on:

- representation of ecological communities;
- biodiversity;
- rare species and communities;
- watercourses and wetlands;
- salinisation of land and water;
- land degradation;
- surface and ground water quality, and
- potential for flooding.

Appendix 16

References

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(Note: Some references listed here are not referenced in this Bulletin. They are included in this list because they were used in compiling information for the assessment sheets for individual sites.
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