

# **Town Planning Scheme 2 Amendment 77 (Byford)**

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**Shire of Serpentine-Jarrahdale**

**Report and recommendations  
of the Environmental Protection Authority**

**Environmental Protection Authority  
Perth, Western Australia  
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## Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the proposal by the Shire of Serpentine-Jarrahdale to rezone Part Lots 521 and 523 South Western Highway, Byford from "Rural" to "Residential", "Commercial", "Public Open Space Reserve", "Public and Community Purpose Reserve", and "Mixed Use". The area is currently zoned "Urban" and "Urban Deferred" under the Metropolitan Region Scheme.

Amendment 77 was initiated by the Shire of Serpentine-Jarrahdale in response to a proposal by Bredwell Pty Ltd (Smith Corporation Pty Ltd) to develop the subject area for residential purposes.

### Relevant environmental factors

It is the EPA's opinion that the following are the environmental factors relevant to the scheme amendment which require detailed evaluation in the report:

- (a) Vegetation Communities - clearing and indirect impacts due to public access
- (b) Wetlands - maintenance of water flows
- (c) Surface Water Quality - excess nutrients entering the Peel-Harvey Estuary
- (d) Soil Contamination - clean-up of leakage from stored munitions and associated infrastructure
- (e) Gaseous Emissions - impacts on future residents due to adjacent Brickworks
- (f) Particulates/ Dust - impacts on future residents due to adjacent land uses
- (g) Noise - impacts on future residents due to adjacent land uses
- (h) Aboriginal Heritage - protection of identified archaeological sites
- (i) Public Health and Safety (Risk and Hazard) - survey for and removal of UXOs

### Conclusion

The EPA has considered the proposal by the Shire of Serpentine-Jarrahdale to rezone Part Lots 521 and 523 South Western Highway, Byford from "Rural" to "Residential", "Commercial", "Public Open Space Reserve", "Public and Community Purpose Reserve", and "Mixed Use". The EPA has concluded that the scheme amendment can be implemented to meet the EPA's objectives provided the conditions recommended in Section 4, and set out in Appendix 3, are imposed.

The key factors in this assessment are Surface Water Quality, Gaseous Emissions, Particulates/ Dust, Noise, Public Health and Safety (Risk and Hazard). The recommendations made by the EPA to ensure the its objectives for these factors can be achieved are:

- the preparation of a Drainage and Nutrient Management Plan to ensure the surface water quality flowing from the amendment area complies with the requirements of the Peel-Harvey EPP and Statement of Planning Policy No.2;
- provision of suitable buffers which limit development to ensure the welfare, amenity and health of land users within the amendment is not adversely affected by gaseous emissions, particulates, dust, or noise; and
- investigations to determine the presence of any Unexploded Ordinance (UXO) and implementation of appropriate remediation activities to render the site safe for the intended use.

## **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 scheme amendment and on the conditions to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

To ensure that the scheme provisions documented in the environmental review are incorporated into the Town Planning Scheme text, the EPA considers that it is necessary to impose a number of conditions to reflect the scheme provisions.

Accordingly, the EPA has developed a set of conditions which it recommends should be imposed if Amendment 77 to the Shire of Serpentine-Jarrahdale's Town Planning Scheme No. 2 is approved. These conditions are presented in Appendix 3 and are based on the EPA recommendations in Section 3.

## **Recommendations**

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

1. That the Minister considers the report on the relevant environmental factors of Vegetation Communities, Wetlands, Surface Water Quality, Soil Contamination, Gaseous Emissions, Particulates/ Dust, Noise, Aboriginal Heritage, and Public Health and Safety (Risk and Hazard);
2. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's objectives, and thus not impose an unacceptable impact on the environment; and
3. That the Minister imposes the conditions and procedures consistent with Section 4 and set out in formal detail in Appendix 3 of this report.

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## 1. Introduction and background

The Shire of Serpentine-Jarrahdale proposes to rezone Part Lots 521 and 523 South Western Highway, Byford from "Rural" to "Residential", "Commercial", "Public Open Space Reserve", "Public and Community Purpose Reserve", and "Mixed Use" (see Figure 1). The area is currently zoned "Urban" and "Urban Deferred" under the Metropolitan Region Scheme.

Amendment 77 was initiated by the Shire of Serpentine-Jarrahdale in response to a proposal by Bredwell Pty Ltd (Smith Corporation Pty Ltd) to develop the subject area for residential purposes.

Amendment 77 was referred to the EPA on 7 March 1997 and the level of assessment set at Environmental Review on 24 March 1997.

The six (6) week public submission period for the Environmental Review prepared for Amendment 77 commenced on 17 March 1998 and ended on 28 April 1998.

Further details of the proposal are presented in Section 2 of this Report. Section 3 discusses environmental factors relevant to the proposal. Conditions and procedures to which the proposal should be subject if the Minister determines that it may be implemented are set out in Section 4. Section 5 presents the EPA's conclusion and Section 6 the EPA's recommendations.

A list of people and organisations that made submissions is included in Appendix 1. References are listed in Appendix 2, and recommended conditions and procedures are provided in Appendix 3. Appendix 4 contains a summary of the relevant environmental factors.

The DEP's summary of submissions and the proponent's response to those submissions has been published separately and is available in conjunction with this report.

## 2. The scheme amendment

The area is currently zoned "Urban" and "Urban Deferred" under the Metropolitan Region Scheme and "Rural" by the Shire of Serpentine-Jarrahdale's Town Planning Scheme No. 2. In response to a proposal by Bredwell Pty Ltd to develop the land for residential purposes the Shire of Serpentine-Jarrahdale initiated Amendment 77 to the scheme to rezone Part Lots 521 and 523 South Western Highway, Byford from "Rural" to "Residential", "Commercial", "Public Open Space Reserve", "Public and Community Purpose Reserve", and "Mixed Use".

The amendment area was previously owned by the Commonwealth Government and much of the area was cleared to house a Royal Australian Navy Ammunition Depot for the storage and assembly of naval munitions. This depot was closed in 1979 and the site has subsequently been used for grazing cattle on an intermittent basis.

Surrounding land uses include (see Figure 2):

- a brickworks to the southeast;
- a Federal Government Quarantine Station to the northeast;
- rural land to the south, west and northeast;
- residential land to the northeast;
- Cardup Quarry (mainly used for the storage and mixing of clay and intermittent mining of Armadale Shale) to the east; and

Industrial zoned land that contains a Flour Mill, Salvage Yard, Wreckers Yard, Petrol Station, and light engineering firm to the northwest.

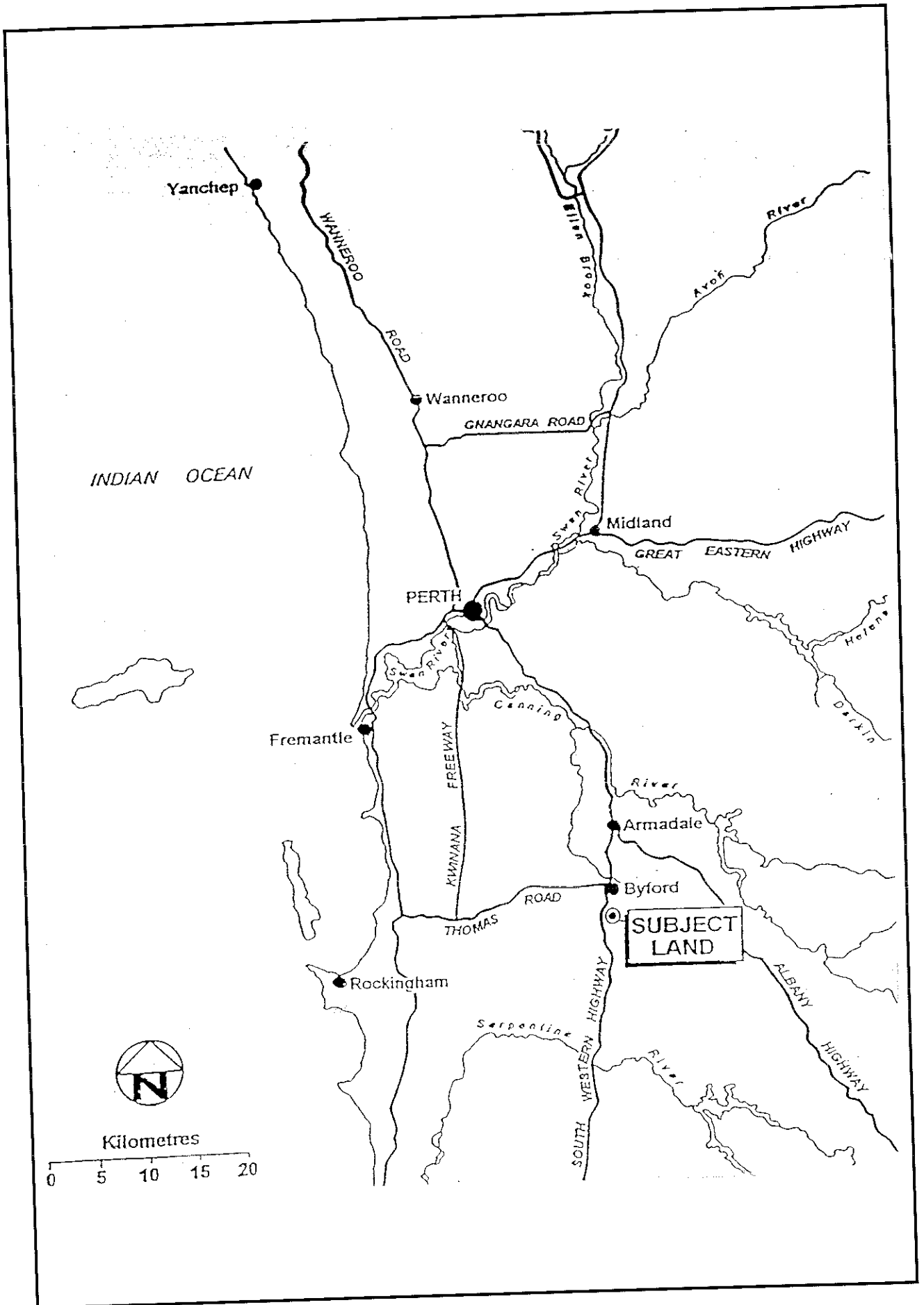
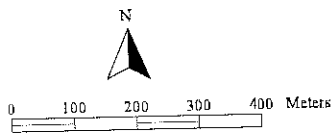
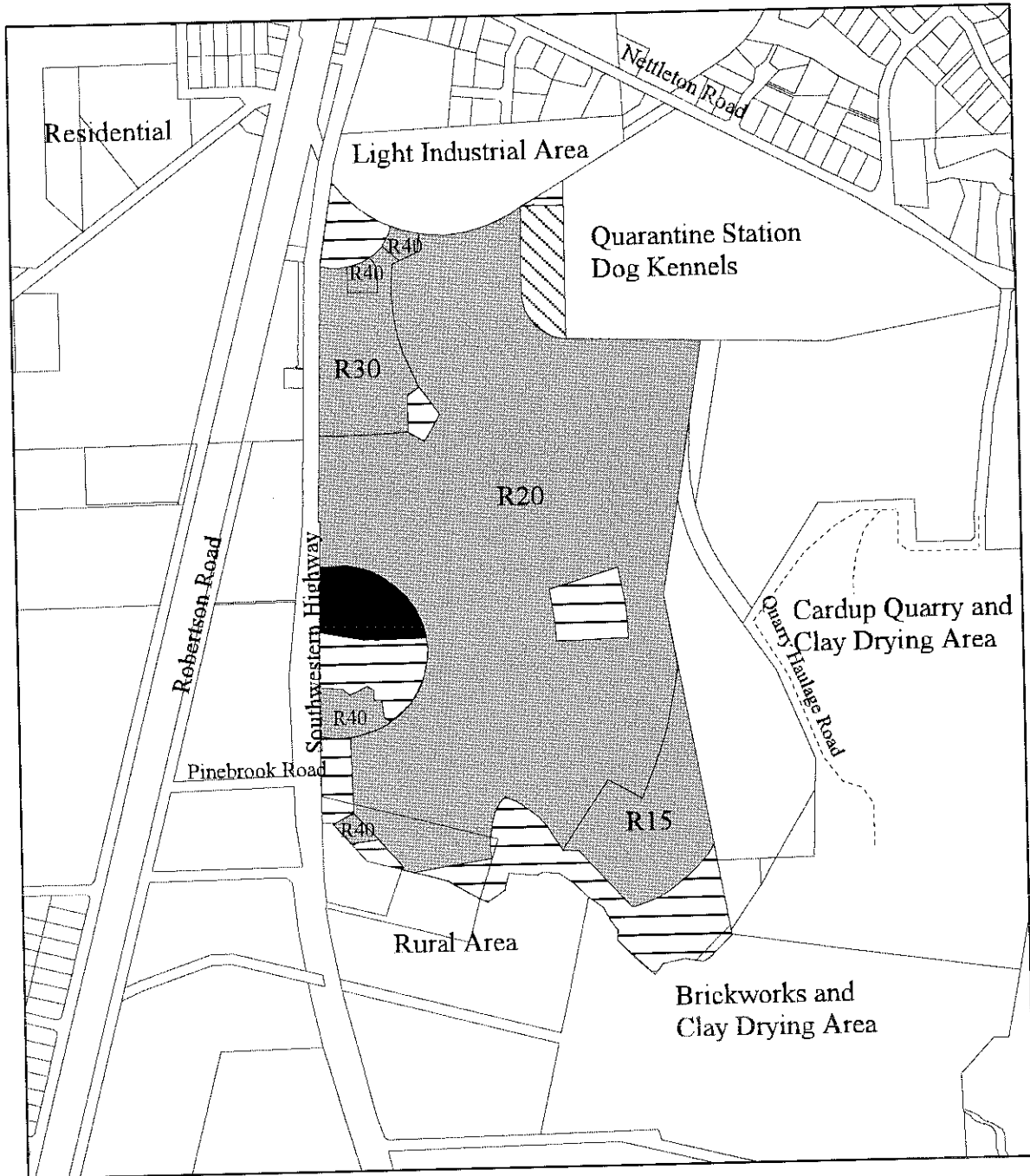


Figure 1. Location map.









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Projection: Australian Map Grid

~ Cadastral Boundaries

-  Commercial
-  Public Open Space
-  Public Purposes
-  Residential



Department of Environmental Protection, Western Australia

Figure 2. Surrounding landuses and proposed zoning changes.

Areas of significant remnant vegetation are present within, and adjacent to, the proposed amendment area. Vegetation within the amendment area is generally in poor condition while that along Cardup Brook to the south, and adjacent to the eastern margin is in better condition. The Department of Environmental Protection (DEP) has advised vegetation adjacent to the amendment area which is representative of the Guildford, Forrestfield, and Darling Scarp vegetation complexes is regionally significant.

Amendment 77 is also located within the Peel-Harvey surface water catchment, but is not within the area covered by the Peel-Harvey Environmental Protection Policy and Statement of Planning Policy Number 2. Notwithstanding this, development of the amendment area may cause changes in the surface water quality and quantity that may lead to erosion and or increase nutrient loads in the Peel-Harvey Estuary.

The main characteristics of the Amendment are summarised in Table 1 below.

**Table 1 - Summary of key characteristics of the Amendment**

Element	Description	
Existing zoning	MRS	'Urban' and 'Urban Deferred'
	TPS	'Rural'
Proposed zoning	TPS	'Residential', 'Commercial', 'Public Open Space Reserve', 'Public and Community Use' and 'Mixed Use'

It is the EPA's opinion that the following are the environmental factors relevant to the proposal, which require detailed evaluation in this report:

- (a) Vegetation Communities - clearing and indirect impacts due to public access
- (b) Wetlands - maintenance of water flows
- (c) Surface Water Quality - excess nutrients entering the Peel-Harvey Estuary
- (d) Soil Contamination - clean-up of leakage from stored munitions and associated infrastructure
- (e) Gaseous Emissions - impacts on future residents due to adjacent Brickworks
- (f) Particulates/ Dust - impacts on future residents due to adjacent land uses
- (g) Noise - impacts on future residents due to adjacent land uses
- (h) Aboriginal Heritage - protection of identified archaeological sites
- (i) Public Health and Safety (Risk and Hazard) - survey for and removal of Unexploded Ordinances (UXOs).

The above relevant factors were identified from the EPA's consideration and review of all environmental factors (preliminary factors) generated from the Environmental Review document and the submissions received, in conjunction with the proposal characteristics (including significance of the potential impacts), the adequacy of the Responsible Authority's response, the effectiveness of current management and alternative approval processes which ensure that the factors will be appropriately managed. The identification of relevant environmental factors is summarised in Table 2, and a summary of their assessment is set out in Table 3.

The relevant environmental factors are discussed in Sections 3.2 to 3.10 of this report.

### **3.2 Vegetation Communities - clearing and indirect impacts due to public access**

#### **Description**

The vegetation located adjacent to the eastern and northwestern boundaries of the amendment area is considered to be regionally significant. This vegetation has not been included in Amendment 77.

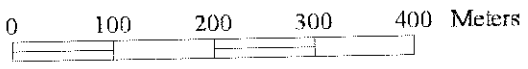
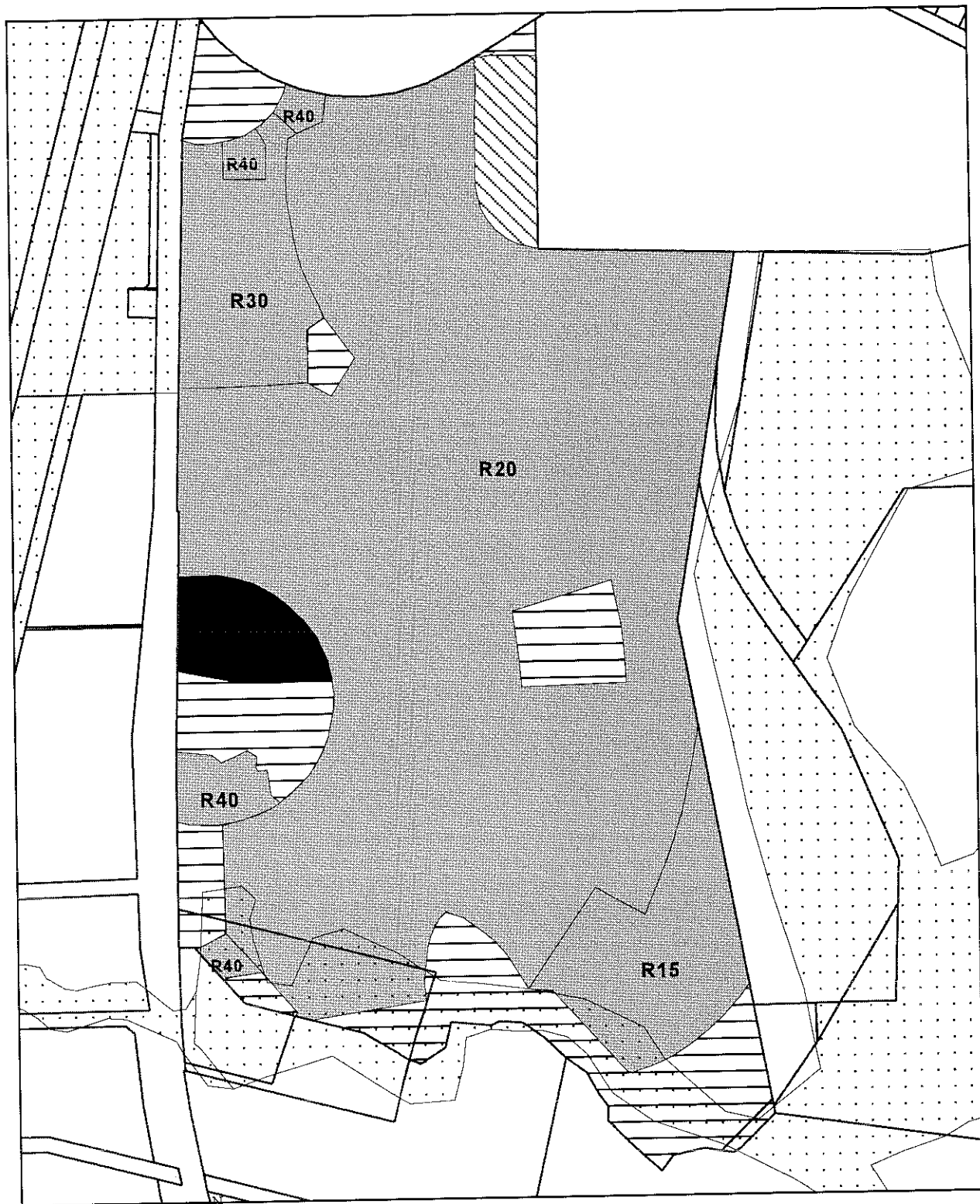
The vegetation adjacent to Cardup Brook within the amendment area is also considered to be regionally significant. The Shire of Serpentine-Jarrahdale proposes to protect the area of vegetation adjacent to Cardup Brook by providing 50m wide strip of Public Open Space along Cardup Brook measured from the centre line of the Brook.

The Shire of Serpentine-Jarrahdale has proposed the following Scheme Provision in Amendment 77 to maximise the viability of regionally significant vegetation within and adjacent to the amendment area.

*Any subdivision application will retain remnant native vegetation within and adjacent to the Amendment area, ensuring its long term viability and minimal human impact.*

*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until it has received written confirmation from the Department of Environmental Protection that is satisfied the remnant vegetation will be managed appropriately. A development plan will be submitted to the DEP.*

*Management will include retention of vegetated areas on the eastern part of assessment area and along Cardup Brook and retention of a walking trail to reduce disturbances and; clear delineation of vegetated areas through use of dual use paths, roads and the like.*



- Cadastral Boundaries
- Regionally Significant Vegetation
- Commercial
- Public Open Space
- Public Purposes
- Residential

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

Projection: Australian Map Grid



Department of Environmental Protection, Western Australia

Figure 3. Location of regionally significant vegetation.

The DEP has recommended that the 50m proposed buffer should be used as a minimum requirement and that regionally significant vegetation adjacent to, but beyond, the 50m line should also be incorporated into the buffer area along Cardup Brook.

## Assessment

The area considered for assessment of this factor is the Swan Coastal Plain.

The EPA's objective in regard to this environmental factor is to maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.

The implementation of the amendment has the potential to impact on regionally significant vegetation through direct impacts such as clearing adjacent to Cardup Brook, and indirectly via public access on the eastern boundary and along Cardup Brook. There is a proposed Scheme Provision in Amendment 77 to provide a mechanism to ensure development does not adversely impact on regionally significant vegetation through either direct or indirect impacts.

The 50m buffer measured from the centre line of Cardup Brook proposed in the Environmental Review does not take into account the fragility of breakaways associated with the break in slope leading to the Brook foreshore and hence does not allow for the presence of upland vegetation to stabilise this area. The proposed buffer does not incorporate all of the regionally significant vegetation associated with Cardup Brook.

The EPA recommends that an alternative buffer, as shown in Figure 4, is adopted to protect the regionally significant vegetation adjacent to Cardup Brook and the associated wetlands. This buffer approximately follows access tracks located along the break in slope that forms the boundary between upland vegetation and vegetation that may be described as being associated with Cardup Brook and associated wetlands. This buffer includes some allowance (~10-15m) for upland vegetation in the area where there are fragile breakaways. Although there are degraded patches the vegetation between the recommended buffer and Cardup Brook is generally in very good to good condition. Note that part of the recommended buffer is less than 50m from the centre line of Cardup Brook to the east and extends beyond 50m from Cardup Brook to the west.

The buffer in Figure 4 was negotiated and agreed with the Shire of Serpentine-Jarrahdale and the land owner. This buffer includes the vegetation along Cardup Brook considered to be regionally significant. It is the EPA's opinion that development should be limited to that area north of the buffer on Cardup Brook shown in Figure 4.

The EPA agrees that the intent of the Scheme Provision in Amendment 77 to protect regionally significant vegetation is an appropriate way to achieve the EPA's objective and has adopted the intent of the proposed scheme provision in its recommended scheme provisions contained in Appendix 3.

Having particular regard to the:

- a) Provision in the amendment to limit and manage impacts on Regionally Significant vegetation;
- b) the delineation of regionally significant vegetation on Cardup Brook; and
- c) the adoption of the buffer zone depicted in Figure 4;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

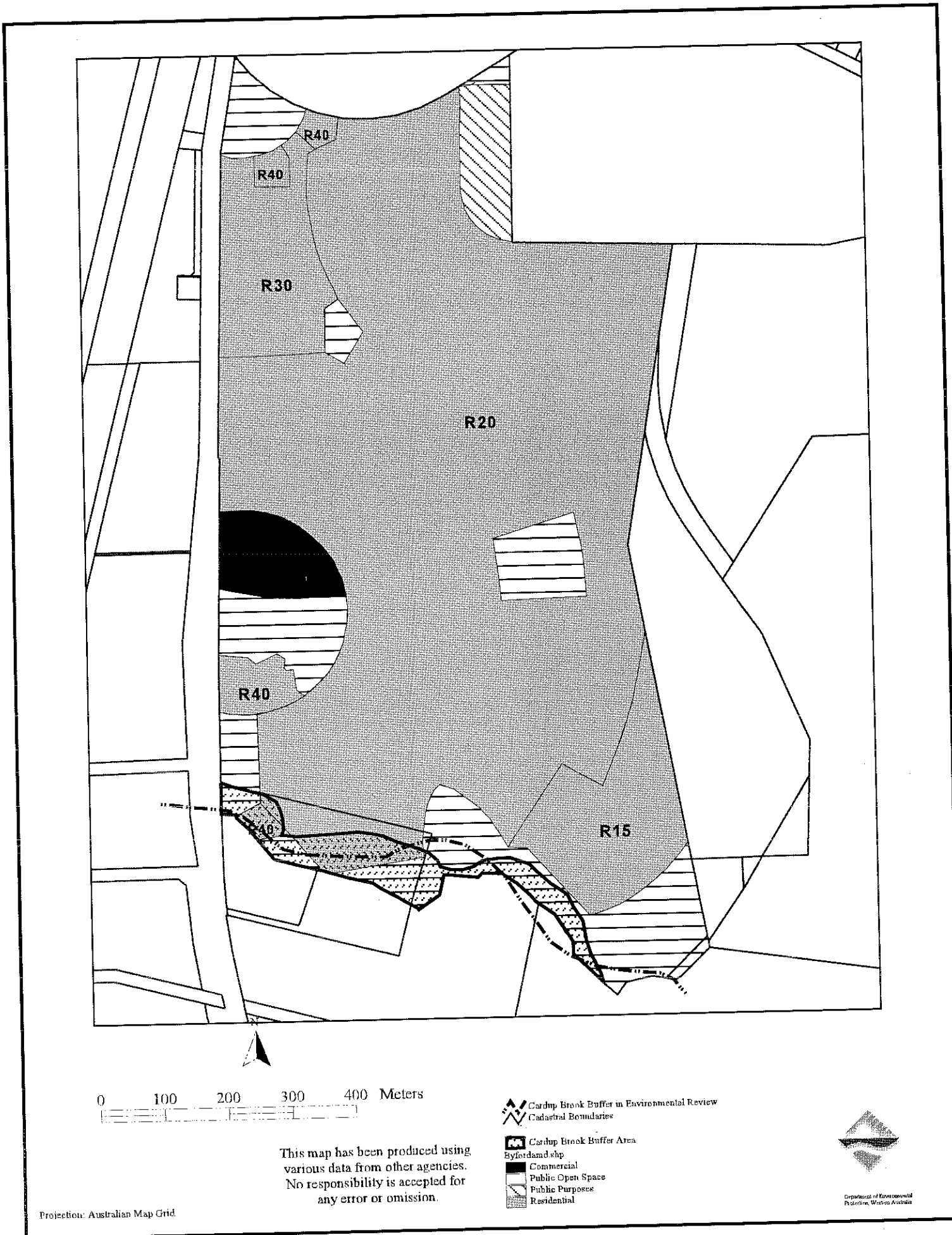


Figure 4. EPA recommended buffer for Cardup Brook.

### 3.3 Wetlands - maintenance of water flows

#### Description

Part of Cardup Brook, located on the southern boundary of the amendment area, forms part of a Conservation Category wetland that has been identified by the Water and Rivers Commission (Hill et al, 1996).

A scheme provision within Amendment 77 proposes to retain a vegetated buffer of 50m along Cardup Brook, and incorporate Water Sensitive Urban Design principles into the subdivision design to ensure the pattern of flow in Cardup Brook is unchanged from the pre-development situation.

The Shire of Serpentine-Jarrahdale has proposed the following scheme provision within Amendment 77 to protect the wetlands associated with Cardup Brook.

*Any subdivision application will incorporate a vegetated buffer around Cardup Brook and implement drainage measures which will ensure flows in Cardup Brook are maintained at pre-development levels and protect the long term health and viability of the brook.*

*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection it is satisfied the long term health and viability of Cardup Brook will be protected.*

*Implementation of protection measures will include:*

- *Provision of a vegetated buffer, including native trees and shrubs, 50m wide extending from the centre line of the water course to protect the brook ecosystem. This buffer area will incorporate existing wetland vegetation along Cardup Brook and is in accordance with advice from the Waters and Rivers Commission.*
- *Preparation of a site drainage plan incorporating best practice in Water Sensitive Urban Design which will maximise on site water infiltration, maintain the existing water quality within Cardup Brook by ensuring drainage emanating from the proposed development does not enter the Brook and ensure the pattern of flow from the property remains largely unchanged.*

*The drainage program will be monitored after development to ensure the pattern of flow is unchanged from predevelopment.*

#### Assessment

The area considered for assessment of this factor is the Swan Coastal Plain.

The EPA's objective in regard to this environmental factor is to maintain the integrity, functions and environmental values of wetlands.

The EPA has recommended a buffer adjacent to Cardup Brook (as discussed in Section 3.2 and shown in Figure 4) that is different to that proposed in the Environmental Review. The incorporation of this alternate buffer into the amendment will help to protect the vegetation along Cardup Brook stabilising the foreshore area and water flows in the Brook. It is also noted that there are a number of wetlands within the floodplain of Cardup Brook at the base of the breakaway areas. It appears that these wetlands are associated with seepage flows from the upland areas rather than from Cardup Brook. This emphasises the need to ensure adequate infiltration of runoff from any future development of the upland area is achieved rather than all of the runoff being channelled to nutrient stripping ponds elsewhere in the development.

The EPA has adopted the intent of the scheme provision proposed by the Shire of Serpentine-Jarrahdale and incorporated the modified buffer as shown in Figure 4 in its recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- (a) the listing of part of Cardup Brook as a Conservation Category wetland;
- (b) Provisions in the amendment to provide a vegetated buffer;
- (c) Provisions within the amendment to incorporate WSUD to maintain or improve water quality in the Brook;
- (d) Provisions in the amendment to ensure the pattern of flow in the Brook and seepage from upland areas remains largely unchanged; and
- (e) the adoption of the buffer zone depicted in Figure 4;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

### 3.4 Surface Water Quality - excess nutrients entering the Peel-Harvey Estuary

#### Description

A Conceptual Drainage Management Plan has been developed based on Water Sensitive Urban Design principles. This design comprises local small scale nutrient reduction measures such as on-lot infiltration wells, street swales/table drains and check drains. The principal pollution removal mechanisms employed by these facilities are infiltration and sedimentation. Runoff flowing through these structures and channelled to on-site detention basins and artificial wetlands is expected to carry an annual phosphorus load of 0.4 kg P/ha.

There is some debate as to whether the artificial wetlands should be constructed within the amendment area or at a site downstream to include a larger catchment area. However, the Water and Rivers Commission has advised that irrespective of the precise location of the artificial wetlands the phosphorus removal efficiency is expected to be at least 50%. The final location of the wetlands will have implications for the detailed design of the facilities but not on the expected performance. The Water and Rivers Commission has indicated they are satisfied that the artificial wetlands can be designed to achieve the expected performance and that a discharge of total phosphorus to the Serpentine River of 0.225kg P/ha/a or less is achievable.

The Shire of Serpentine-Jarrahdale has proposed the following scheme provision in Amendment 77 to manage the surface water quality discharging from the amendment area.

*Any subdivision application will prepare a nutrient and drainage management plan to ensure rate of storm water leaving the site is maintained at no greater than predevelopment levels and provide measures to facilitate the removal of pollutants and nutrients. The strategy will be prepared and lodged prior to issue of subdivision approval.*

*The nutrient and drainage management plan will incorporate best practice in Water Sensitive Design which will:*

- *maximise on-site water infiltration;*
- *ensure the quantity of surface water leaving the site will be largely unchanged;*
- *ensure the quality of water leaving the site meets DEP requirements;*
- *provide for contingency plans; and*
- *monitor water quality parameters and water quantities until such time as the DEP, Waters and Rivers Commission and Shire of Serpentine-Jarrahdale are satisfied that the objectives of the Nutrient and Drainage Management Plan have been achieved.*



*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until it has received written confirmation from the Department of Environmental Protection it is satisfied with the nutrient and drainage management plan.*

## **Assessment**

The area considered for assessment of this factor is the Peel-Harvey Catchment.

The EPA's objective in regard to this environmental factor is to maintain or improve the quality of surface water to ensure that existing and potential uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993) and Peel-Harvey Environmental Protection Policy requirements.

The amendment area is located within the Peel-Harvey catchment, although not within the area covered by the Peel-Harvey Environmental Protection Policy and Statement of Planning Policy No.2. The EPA is concerned that some constraints should be applied to the proposed development to prevent detrimental impacts on the Peel-Harvey Estuary. The most appropriate position is to apply the same load requirements as if the area was within the Policy areas.

Provisions in the amendment require the preparation of a nutrient and drainage management plan to achieve the requirements.

The EPA is satisfied that although the precise location and design of artificial wetlands for nutrient stripping as indicated in the concept drainage and nutrient management strategy outlined in the Environmental Review has not been determined the discharge of total phosphorus from the amendment area to the Serpentine River can be managed to achieve 0.225kg P/ha/a or less.

The EPA also agrees that the preparation of a Drainage and Nutrient Management Plan is an appropriate vehicle for the design and implementation of drainage and nutrient management facilities associated with surface water quality management for the amendment area to achieve surface water quality target. The Drainage and Nutrient Management Plan should include monitoring and contingency provisions in the event that the criteria for water quality and quantity are not achieved.

The EPA has adopted the intent of the scheme provision proposed by the Shire of Serpentine-Jarrahdale in its recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- a) the high nutrient status of the Peel-Harvey estuary;
- b) the demonstrated ability to limit nutrient export loads to the Peel-Harvey Environmental Protection Policy targets; and
- c) Provisions within the amendment to require the preparation and implementation of a nutrient and drainage management plan to achieve these loads;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.



0 200 400 600 800 Meters

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- Peel Harvey EEP and Statement of Planning Policy No.2
- Cadastral Boundaries
- Commercial
- Public Open Space
- Public Purposes
- Residential



Department of Environmental Protection, Western Australia

Projection: Australian Map Grid

**Figure 5. Location of Amendment 77 relative to the Peel-Harvey EPP and Statement of Planning Policy No.2.**

### **3.5 Soil Contamination - clean-up of leakage from stored munitions and associated infrastructure**

#### **Description**

A number of sites with soil contamination due to the storage and handling of naval munitions have been identified in the Environmental Review. Work is already underway to investigate the extent of contamination and to remediate contaminated areas. Based on the land use history and preliminary investigations during the environmental review there are no indications to suggest that the soils cannot be completely remediated (or removed) to achieve a standard suitable for residential purposes. Amendment 77 contains the following scheme provision to ensure all contaminated soils are identified and remediated to an appropriate standard prior to the issuing of subdivision approvals.

*Any subdivision application will undertake an appropriate investigation on the Amendment area to determine the nature and extent of any soil and groundwater contamination. If contamination is identified then a remediation program, and if necessary management program, will be developed and be implemented prior to the implementation of the scheme.*

*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection is satisfied any contaminants identified on the subject land have been remediated or will be managed in manner that is compatible with the intended land use and consistent with DEP approved criteria.*

#### **Assessment**

The area considered for assessment of this factor is the Amendment area.

The EPA's objective in regard to this environmental factor is to ensure the rehabilitation of the site to an acceptable standard that is compatible with the intended land use, consistent with appropriate criteria.

Preliminary work on the site has identified a number of areas where soil contamination is apparent due to the use of the area as a Naval Munitions depot. Determination of the precise nature and extent of soil contamination on the amendment area was not considered to be necessary as part of the environmental review. This is because the amendment area is considered to be a low risk site, based on the review of past land uses at the site and preliminary investigations into the nature and extent of soil contamination (see Tingay, 1998), and the fact that the presence of contamination is not disputed.

The EPA is of the view that scheme provisions as part of Amendment 77 are capable of ensuring that any soil or groundwater contamination will be adequately remediated prior to development and has adopted the intent of the proposed scheme provision in its recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- a) Provisions in the amendment that require the identification and remediation of contaminated soils prior to subdivision approval;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

### 3.6 Gaseous Emissions - impacts on future residents due to adjacent Brickworks

#### Description

Modelling work has been undertaken to quantify the extent of hydrogen fluoride emissions due to the brickworks on the southern boundary of the amendment area. As a result of this work the Shire of Serpentine-Jarrahdale has proposed a that buffer be incorporated into Amendment 77 (see Figure 6). This buffer excludes residential development from a small area adjacent to Cardup Brook to the southwest of the amendment area. This proposed buffer is within the 50m vegetation buffer proposed by the Shire of Serpentine-Jarrahdale adjacent to Cardup Brook as discussed in Section 3.3 (see Figure 6).

To ensure gaseous emissions do not adversely impact on development within the amendment area the Shire of Serpentine-Jarrahdale proposed the following scheme provision.

*Any subdivision application will undertake a modelling exercise to determine the impact of gaseous emissions emanating from the brickworks located at the southern boundary on the Amendment area. A buffer encompassing the Amendment areas in which gaseous emissions exceed relevant criteria will be incorporated into the subdivision plan.*

*Accordingly, the Shire of Serpentine - Jarrahdale shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection it is satisfied modelling of gaseous emissions from the brickworks has been undertaken and if required a buffer incorporated into the development plan to ensure future land users are not affected by those emissions.*

#### Assessment

The area considered for assessment of this factor is the land within and adjoining the Amendment area.

The EPA's objective in regard to this environmental factor is to ensure that gaseous emissions due to adjacent activities do not adversely affect the environment or health, welfare and amenity of land users by meeting the statutory requirements (including Section 51 of the Environmental Protection Act 1986) and acceptable standards.

An existing brickworks on the southern boundary of the amendment area is a potential source of gaseous emissions that may impact on the amendment area. Hydrogen fluoride is the primary emission of concern. Modelling work conducted as part of the Environmental Review shows impacts from gaseous emissions on the amendment area are unacceptable for residential development along the southern boundary.

A study of particulate and dust levels conducted by Sinclair Knight Merz (SKM, 1998) reported hydrogen fluoride odour 200m from the brickworks and recommended further studies be conducted to confirm the adequacy of the 200m buffer proposed in the Environmental Review.

The hydrogen fluoride modelling conducted in SKM (1998) was based on limited information on the emission rate from the brickworks. Following some concerns expressed by the EPA the landowner conducted further modelling of hydrogen fluoride impacts due to the brickworks using a more conservative approach. Due to the uncertainties in emission rates measures directly from the stacks an estimate of the emission rate was derived by calculating a weighted mean of hydrogen fluoride content in the clays used by the brickworks (314ppm), adding a standard deviation (162ppm), and converting this to an expected stack emission rate of 2.94g/s.

The gaseous emissions buffer shown in Figure 7 is based on the conservative approach outlined above. The EPA is satisfied that the buffer proposed in Figure 7 will ensure impacts on future residents in the amendment area are restricted to an acceptable level.

It is also noted that the landowner will commence negotiations with the brickworks to reduce the emission rate of hydrogen fluoride from this operation.

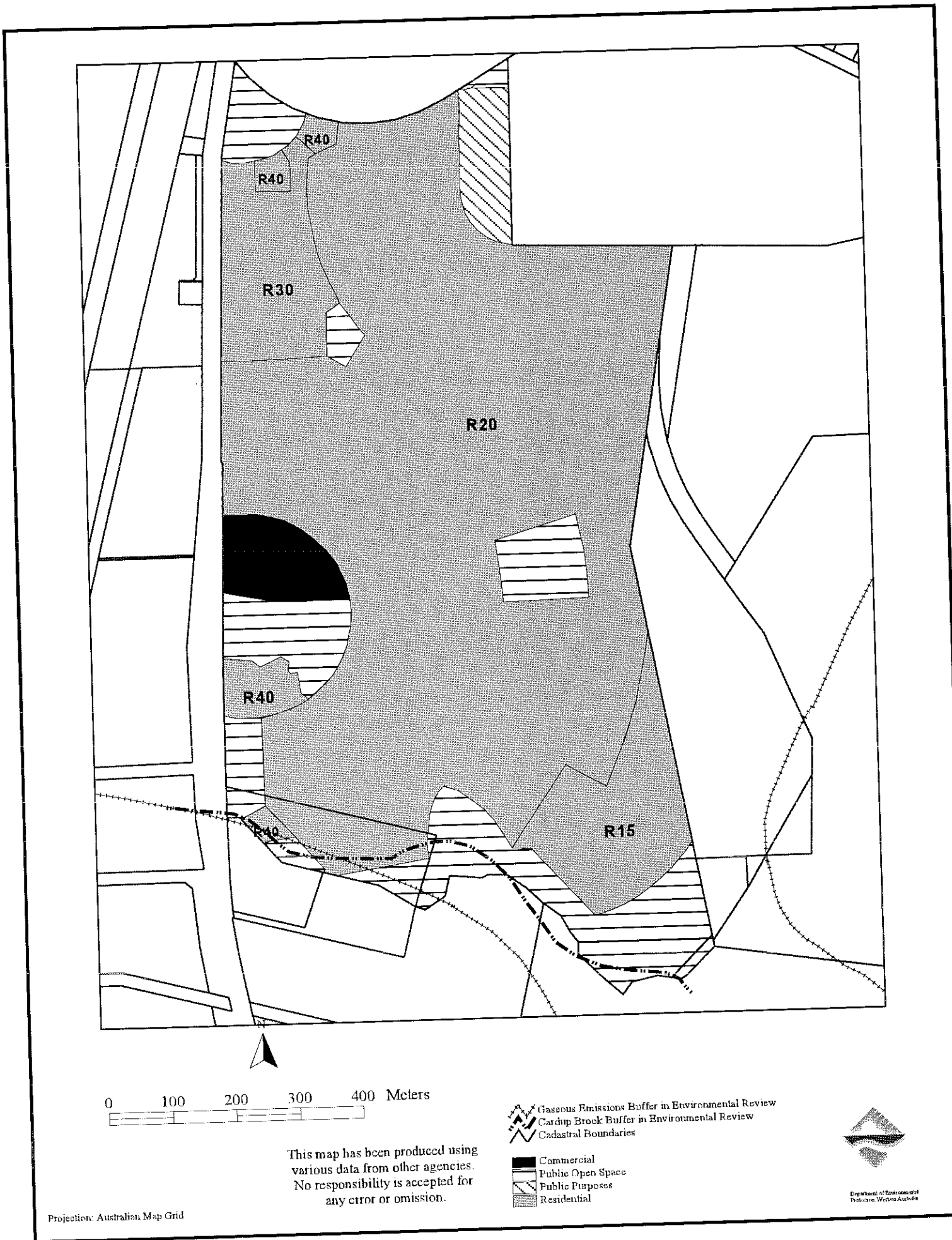
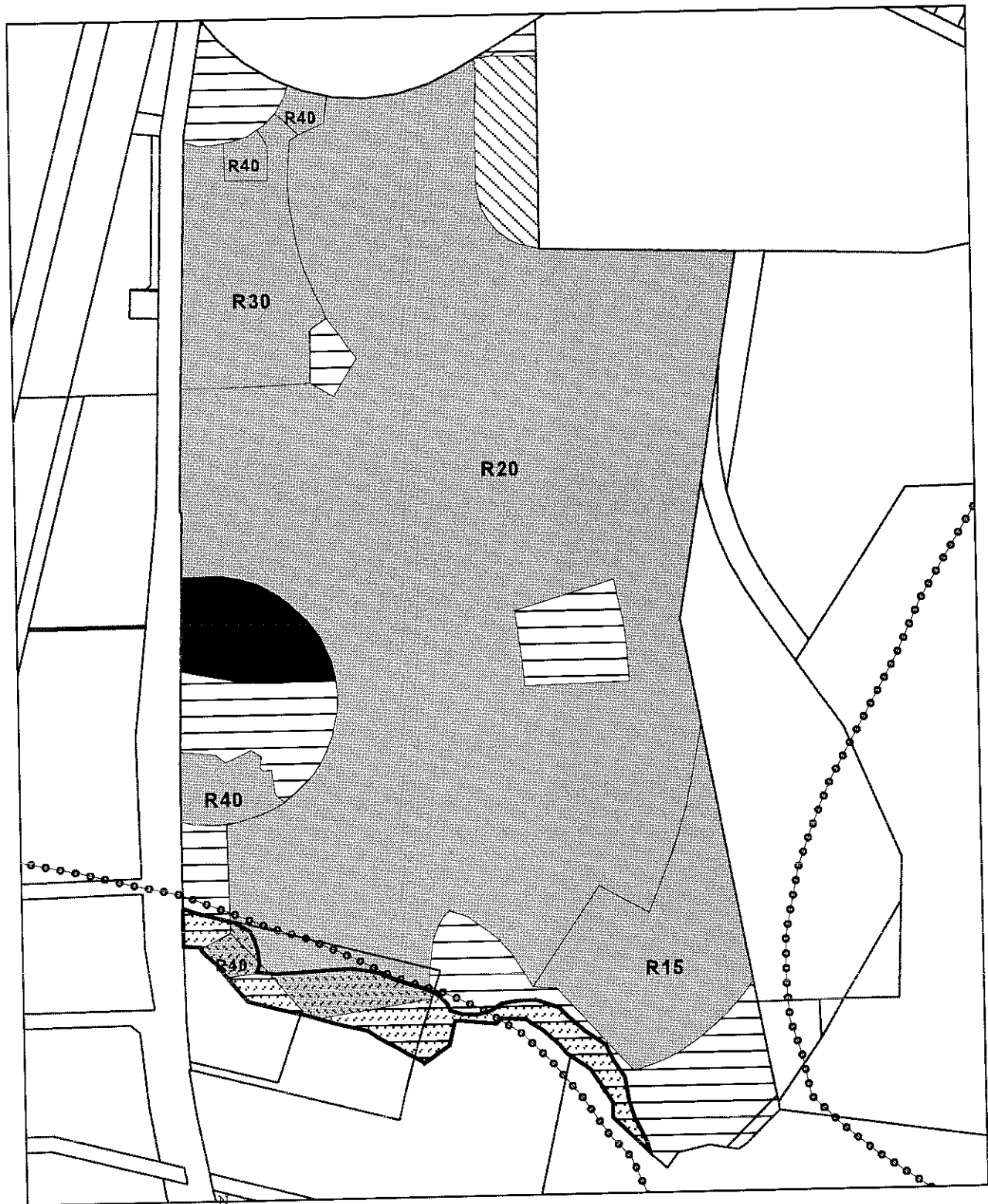


Figure 6. Gaseous emissions buffer proposed in the Environmental Review.



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This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

- Gaseous emissions buffer area
- Cadastral Boundaries
- Cardup Brook Buffer Area
- Commercial
- Public Open Space
- Public Purposes
- Residential



Department of Environmental Protection, Western Australia

Projection: Australian Map Grid

Figure 7. EPA recommended buffer for Gaseous Emissions.

The EPA has adopted the intent of this proposed scheme provision in its recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- a) studies conducted to identify likely impact areas as a result of gaseous emissions from the Brickworks on the southern boundary of the amendment area; and
- b) the incorporation of buffers to limit residential development in these areas;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

### **3.7 Particulates/ Dust - impacts on future residents due to adjacent land uses**

#### **Description**

The main sources of dust and particulates that have been considered include the quarry, brickworks, flour mill, and wrecker's yard. Development constraints in the form of 500m buffers around dust generating activities are proposed for the amendment area to exclude residential development from areas likely to suffer unacceptable impacts.

The Shire of Serpentine-Jarrahdale proposes the following provision within the amendment to ensure future residents are not adversely affected by dust or particulates.

*Any subdivision application will incorporate buffer(s) encompassing the Amendment areas where the impacts of particulates/dust exceed the guidelines (as defined by modelling) to ensure the welfare, amenity and health of future land users is not adversely impacted by the development.*

*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection is satisfied buffer(s) have been incorporated into the subdivision plan as appropriate.*

#### **Assessment**

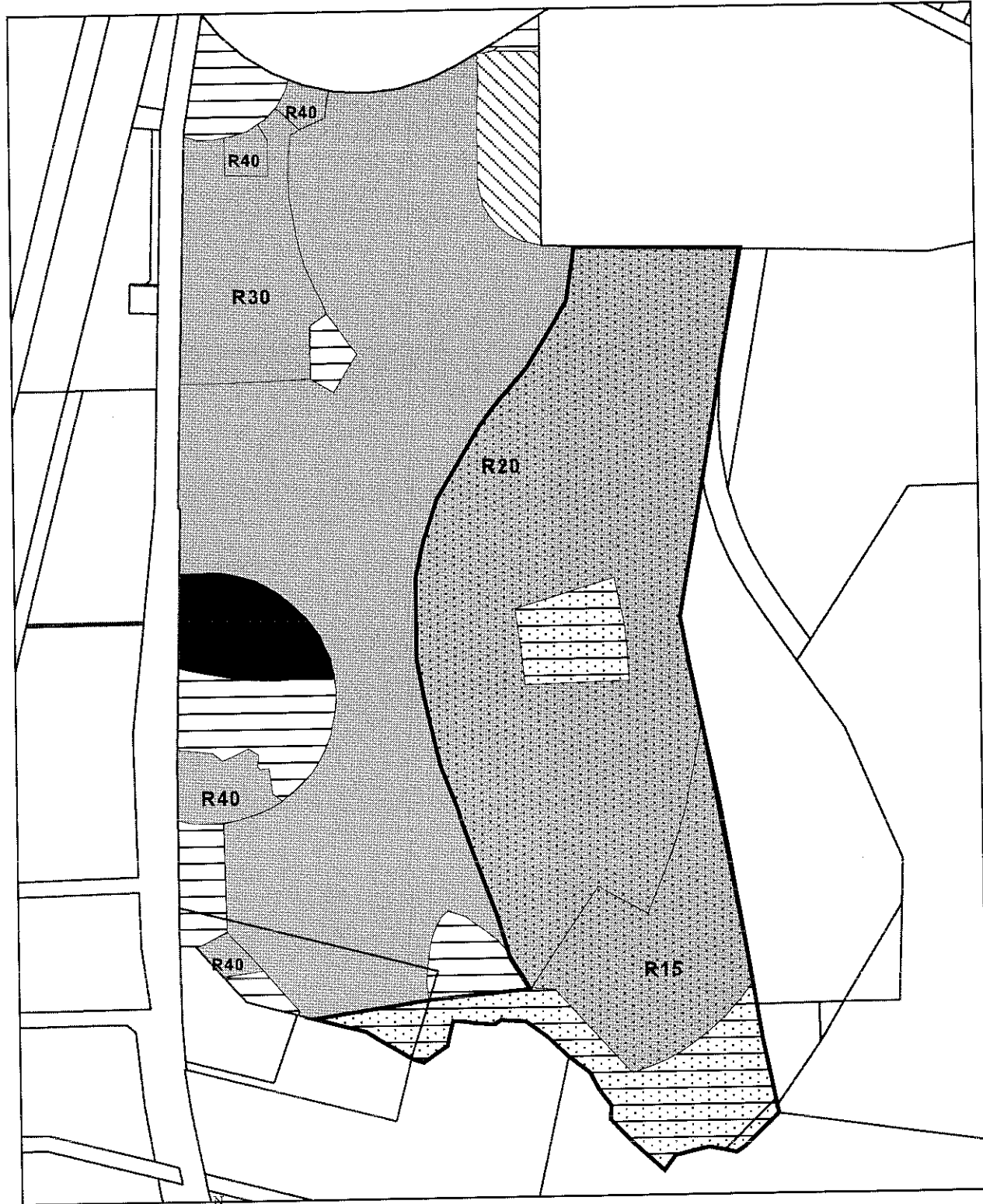
The area considered for assessment of this factor is the land within and adjoining the Amendment area.

The EPA's objective in regard to this environmental factor is to ensure that the dust levels generated by activities adjacent to the site do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.

A number of activities, including a brickworks, shale quarry, flour mill, and access roads (see Figure 2), adjacent to the Amendment area have the potential to generate levels of particulates and or dust that may have an adverse affect on the amendment area. It is noted that the Environmental Review was unable to recommend a buffer less than the generic 500m buffer due to inadequate data.

The relocation of dust generating activities adjacent to the amendment area may result in the commensurate adjustment of particulate and dust buffers. It may also be possible to reduce the dust buffers through appropriate studies to demonstrate a reduced buffer is appropriate. Figure 8 shows the generic dust buffer and associates dust producing activities in relation to the amendment.





0 100 200 300 400 Meters

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

~ Cadastral Boundaries

-  Dust Buffer Area
-  Commercial
-  Public Open Space
-  Public Purpose
-  Residential



Department of Environment and Planning, Western Australia

Projection: Australian Map Grid

Figure 8. EPA recommended buffer for Dust.



The EPA is satisfied that the adoption of a generic 500m buffer is appropriate and has adopted the intent of the scheme provision proposed by the Shire of Serpentine-Jarrahdale in the recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- a) the incorporation of buffers to limit residential development in the areas identified as being subject to dust impacts;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

### **3.8 Noise - impacts on future residents due to adjacent land uses**

#### **Description**

The main sources of noise likely to impact on the amendment area are the quarry to the east, the industrial area to the northwest, and dog kennels in the quarantine station to the north east (see Figure 2). The Shire of Serpentine-Jarrahdale has incorporated a 200m buffer around all of these operations in the Environmental Review to prevent residential development that may be adversely effected by noise (see Figure 9). The selection of this buffer distance is in keeping with the noise monitoring conducted at the site which showed only minimal noise impacts on the amendment area due to adjacent activities.

To ensure noise does not adversely impact on development within the amendment area the Shire of Serpentine-Jarrahdale proposed the following scheme provision.

*Any subdivision application will incorporate buffer/s encompassing the Amendment areas in which noise guidelines are exceeded to protect the amenity of future land users from noise impacts by ensuring that noise levels meet statutory requirements and acceptable standards.*

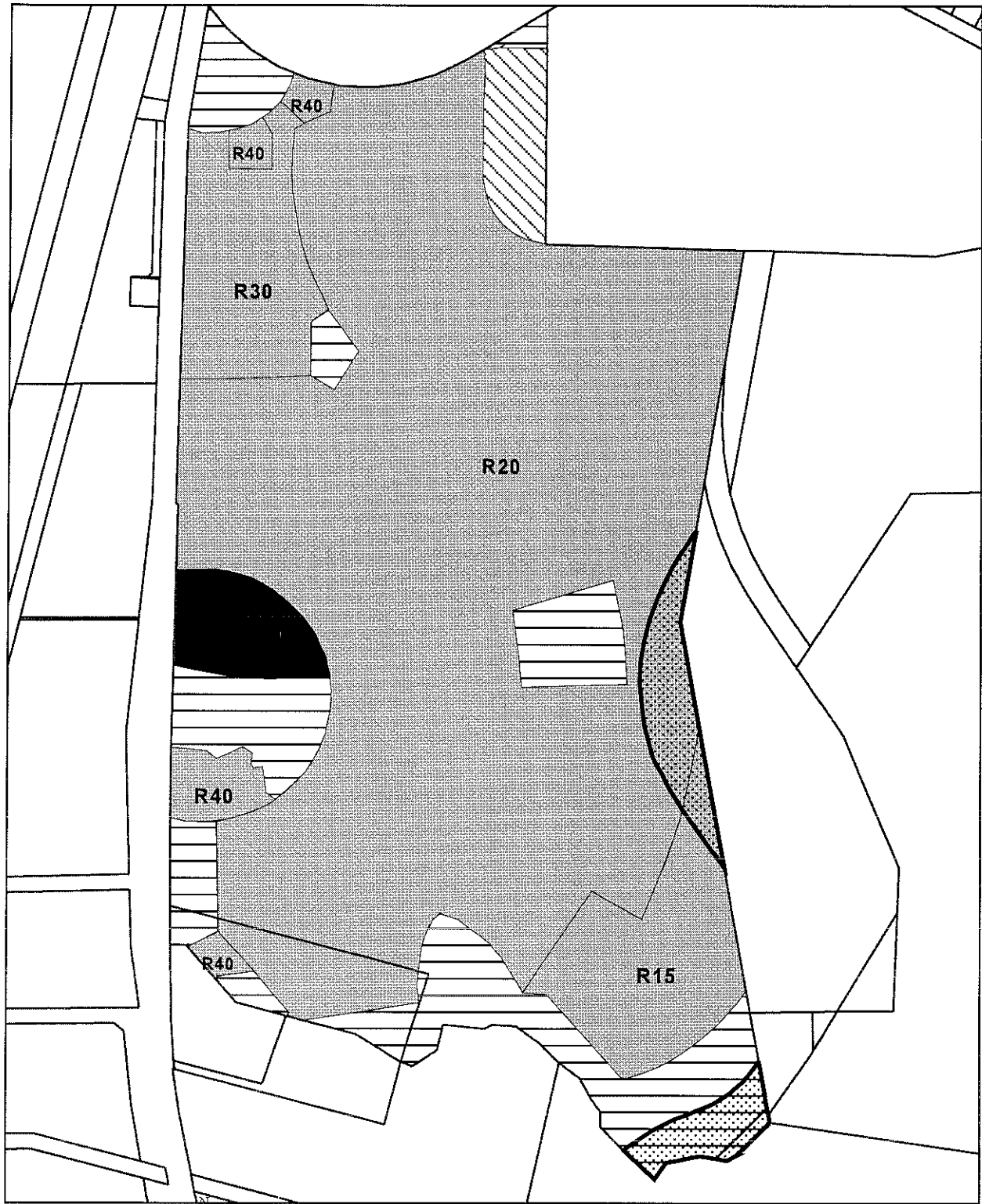
*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection it is satisfied buffer/s have been incorporated into the subdivision plan as appropriate.*

#### **Assessment**

The area considered for assessment of this factor is the land within and adjoining the Amendment area.


The EPA's objective in regard to this environmental factor is to protect the amenity of residents from noise impacts resulting from activities adjacent to the site by ensuring that noise levels meet statutory requirements and acceptable standards.


A number of activities, including a brickworks, shale quarry, industrial area, dog kennels, and access roads, adjacent to the Amendment area have the potential to generate levels of noise that may have an adverse affect on the Amendment area. The EPA accepts the proposed 200m buffer as appropriate, based on the noise monitoring study conducted as part of the Environmental Review. This buffer and the intent of the proposed scheme provision is incorporated in the EPA's recommended Scheme Provisions contained in Appendix 3.





0 100 200 300 400 Meters


This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

 Cadastral Boundaries

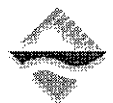
 Noise Buffer Area

 Commercial

 Public Open Space

 Public Purposes

 Residential



Department of Environmental Protection, Western Australia

Projection: Australian Map Grid

Figure 9. EPA recommended buffer for Noise.

Having particular regard to the:

- a) incorporation of buffers within the amendment to restrict residential development in the areas identified as being subject to noise impacts; and
- b) requirements of the Environmental Protection (Noise) Regulations;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

### **3.9 Aboriginal Heritage - protection of identified archaeological sites**

#### **Description**

Twenty-nine archaeological sites have been identified in the Amendment area. To ensure Aboriginal heritage is adequately managed within the amendment area the Shire of Serpentine-Jarrahdale proposed the following scheme provision.

*Any subdivision application will incorporate management strategies to comply with the requirements of the Aboriginal Heritage Act, 1972 and ensure that changes to the biological and physical environment resulting from the project do not affect cultural associations with the area.*

*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Aboriginal Affairs Department it is satisfied that management strategies have been implemented as appropriate.*

#### **Assessment**

The area considered for assessment of this factor is the land within the Amendment area.

The EPA's objective in regard to this environmental factor is to ensure that the proposal complies with the requirements of the Aboriginal Heritage Act 1972; and to ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.

Twenty-nine archaeological sites have been identified within the amendment area. The amendment incorporates provisions that require the preparation of management strategies to the satisfaction of the Aboriginal Affairs Department prior to subdivision approval.

The EPA agrees that provisions within Amendment 77 are an appropriate mechanism to manage impacts on Aboriginal sites and has adopted the intent of the proposed scheme provision in its recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- a) the presence of archaeological sites within the amendment area; and
- b) the incorporation of provisions within the amendment to manage these areas to the satisfaction of the Aboriginal Affairs Department;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are imposed.

### 3.10 Public health and safety (risk and hazard) - survey for and removal of UXOs

#### Description

Unexploded Ordnances (UXO) have been identified on every ammunition storage facility in WA so far investigated by the WA UXO Working Party. The Shire of Serpentine-Jarrahdale and the developers have already initiated contact with the UXO Unit (Police Response and Emergency) to address this factor. There is no indication to suggest that the area cannot be cleared and made safe for residential development.

To ensure public health and safety is not compromised within the Amendment area the Shire of Serpentine-Jarrahdale proposed the following scheme provision.

*Any subdivision application will conduct an appropriate investigation on the site to determine the presence of any unexploded ordnance (UXO) and/or explosive wastes; and develop and implement a remediation program as necessary. Implementation of the UXO survey and, if necessary, remediation programs will occur prior to the implementation of any other ground disturbing activity occurring within the Amendment area.*

*Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the West Australian Police Service (UXO Unit) that appropriate unexploded ordnance hazard reduction standards have been achieved; the Department of Environmental Protection that risk is managed to meet the Environmental Protection Authority's criteria for individual fatality risk offsite, and the Department of Minerals and Energy's requirements in respect to public safety are met.*

#### Assessment

The area considered for assessment of this factor is the land within the Amendment area.

The EPA's objective in regard to this environmental factor is to risk should be as low as reasonably achievable and comply with acceptable standards.

The proponent has assumed there are UXOs on-site. As a consequence there should be no further ground disturbing activities on the site or in the buffer zone immediately to the east of the subject lots by any party without prior consultation with the UXO Unit (Police Response and Emergency).

The EPA agrees that provisions within Amendment 77 can manage this factor satisfactorily and has adopted the intent of this proposed scheme provision in its recommended Scheme Provisions contained in Appendix 3.

Having particular regard to the:

- a) the likely presence of UXOs within the amendment area;
- b) the need to prevent any further ground disturbing activities until the site is pronounced clear of UXOs by the UXO Unit; and
- c) provisions in the amendment requiring investigation and remediation of the site prior to subdivision;

it is the EPA's opinion that the proposal can meet the EPA's objective. It is acknowledged that the environmental review has proposed a scheme provision which could, if implemented, manage the environmental impacts resulting from the proposed development. The EPA considers it necessary, however, to impose a number of conditions to ensure that appropriate planning mechanisms will be implemented into the scheme amendment prior to gazettal. It is recommended that the environmental provisions set out in Appendix 3 are incorporated into the Scheme Amendment.

## 4. 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 scheme amendment and on the conditions to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

To ensure that the scheme provisions documented in the environmental review are incorporated into the Town Planning Scheme text, the EPA considers that it is necessary to impose a number of conditions to reflect the scheme provisions.

Accordingly, the EPA has developed a set of conditions which they recommend should be imposed if Amendment 77 to the Shire of Serpentine-Jarrahdale's Town Planning Scheme No. 2 is approved. These conditions are presented in Appendix 3 and are based on the EPA recommendations in Section 3.

The key environmental factors in this assessment are Vegetation Communities, Surface Water Quality, Soil Contamination, Gaseous Emissions, Particulates/ Dust, Noise, Public Health and Safety (Risk and Hazard). The recommendations made by the EPA to ensure that its objectives for these factors can be achieved are:

- the preparation of a Vegetation Management Plan to ensure the long term viability of remnant vegetation within and adjacent to the amendment area;
- the preparation of a Drainage and Nutrient Management Plan to ensure the surface water quality flowing from the amendment area complies with the requirements of the Peel-Harvey EPP and Statement of Planning Policy No.2;
- investigations to identify areas of soil contamination and implementation of appropriate remediation strategies;
- provision of suitable buffers which limit development to ensure the welfare, amenity and health of land users within the amendment is not adversely affected by gaseous emissions, particulates, dust, or noise; and
- investigations to determine the presence of any UXOs implementation of appropriate remediation activities to render the site safe for the intended use.

## 5. Conclusions

The EPA has concluded that Amendment 77 to the Shire of Serpentine-Jarrahdale Town Planning Scheme 2 to rezone Part Lots 521 and 523 South Western Highway, Byford from "Rural" to "Residential", "Commercial", "Public Open Space Reserve", "Public and Community Purpose Reserve", and "Mixed Use" can be implemented to meet the EPA's objectives provided the conditions recommended in Section 4, and set out in Appendix 3, are imposed.

## 6. Recommendations

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

1. That the Minister considers the report on the relevant environmental factors of Vegetation Communities, Wetlands, Surface Water Quality, Soil Contamination, Gaseous Emissions, Particulates/ Dust, Noise, Aboriginal Heritage, and Public health and safety (risk and hazard);
2. That the Minister notes that the EPA has concluded that the proposal can be managed to meet the EPA's objectives, and thus not impose an unacceptable impact on the environment;
3. That the Minister imposes the conditions and procedures consistent with Section 4 and set out in formal detail in Appendix 3 of this report.

## **Appendix 1**

### **List of submitters**

**Organisations:**

- Mitchell Goff and Associates
- UXO Unit - Police Response and Emergency
- Water Corporation
- Water and Rivers Commission

## **Appendix 2**

### **References**



Alan Tingay and Associates (1998), '*Shire of Serpentine-Jarrahdale Town Planning Scheme No.2 Amendment 77, Pt Lots 521 and 523 South Western Highway, Byford Environmental Review*', Shire of Serpentine-Jarrahdale.

Environmental Protection Authority (1997), Environmental Protection (Noise) Regulations 1997.

Environmental Protection Authority (1992), Environmental Protection Policy (Peel Inlet-Harvey Estuary) Policy.

Hill, A.L., Semeniuk, C.A., Semeniuk, V. and Del Marco, A. (1996) *Wetlands of the Swan Coastal Plain - Wetland mapping, classification and evaluation*; Water and Rivers Commission, Perth.

Sinclair Knight Merz (1998a), '*Former RANAD Site - Dust Assessment*', Alan Tingay and Associates, May 1998.

Western Australian Planning Commission (1992), Statement of Planning Policy No.2, The Peel-Harvey Coastal Plain Catchment.

## **Appendix 3**

**List of recommended Ministerial Conditions to be incorporated into the  
Amendment**

**STATEMENT THAT A SCHEME MAY BE IMPLEMENTED  
(PURSUANT TO THE PROVISIONS OF DIVISION 3 OF PART IV OF THE  
ENVIRONMENTAL PROTECTION ACT 1986)**

**SHIRE OF SERPENTINE-JARRAHDAL TOWN PLANNING SCHEME NO. 2  
AMENDMENT NO. 77**

- Scheme Purpose:**
- (a) to rezone Part Lots 521 and 523 South Western Highway, Byford, from "Rural" to "Residential", "Commercial", "Public Open Space Reserve", "Public and Community Purpose Reserve" and "Mixed Use";
  - (b) to add new provisions to the Shire of Serpentine-Jarrahdale Town Planning Scheme No. 2 Scheme Text; and
  - (c) to amend the Shire of Serpentine-Jarrahdale Town Planning Scheme No. 2 Scheme Maps accordingly.

**Responsible Authority:** Shire of Serpentine-Jarrahdale

**Responsible Authority Address:** 6 Patterson Street, Mundijong WA 6202

**Assessment Number:** 1102

**Report of the Environmental Protection Authority:** Bulletin 900

On the available information and subject to the following conditions there is no identified environmental reason why the Town Planning Scheme amendment to which the above report of the Environmental Protection Authority relates should not be implemented. Subsequent proposals under the assessed Amendment are subject to Section 48 (I) of the Environmental Protection Act (1986).

**1 Conceptual Subdivision Plan**

1-1 Subject to these conditions, the subdivision and development of the amendment area shall generally conform with the indicative subdivision plan in Scheme Provision Figure 1 with appropriate modifications to incorporate buffer requirements.

**2 Vegetation**

2-1 A Vegetation Management Plan shall be prepared and implemented to ensure the long term viability of remnant vegetation within and adjacent to the amendment area.

- 2-2 Prior to finalisation of the subdivision design, the subdivider shall prepare a Vegetation Management Plan for remnant vegetation that may be affected directly or indirectly by the project, to the requirements of the Department of Environmental Protection and the Shire of Serpentine-Jarrahdale.

This Plan shall include:

- 1 retention of vegetated areas in the eastern part of the amendment area and along Cardup Brook;
- 2 provision for rehabilitation of degraded areas;
- 3 provision of walking trails to reduce disturbances of vegetation;
- 4 clear delineation of vegetated areas through use of dual use paths, roads and the like; and
- 5 allocation of responsibilities for the implementation of the Vegetation Management Plan.

### **3 Wetlands**

- 3-1 Vegetation and water flows in and around Cardup Brook shall be managed to protect the long term health and viability of the Brook and associated wetlands.
- 3-2 A vegetated buffer consisting of native trees and shrubs shall be provided adjacent to Cardup Brook consistent with the buffer shown in Scheme Provision Figure 2 attached.

### **4 Surface Water Quality**

- 4-1 A Drainage and Nutrient Management Plan shall be prepared and implemented to ensure that the rate, quantity and flow regime of surface water leaving the amendment area will be maintained at or below pre-development levels.
- 4-2 Prior to finalisation of subdivision design, the subdivider shall prepare a Drainage and Nutrient Management Plan for the whole of the amendment area, to the requirements of the Water and Rivers Commission, the Department of Environmental Protection and the Shire of Serpentine-Jarrahdale.

This Plan will:

- 1 provide measures to facilitate the removal of pollutants and nutrients;
- 2 incorporate best practice Water Sensitive Urban Design principles to maximise on-site water infiltration generally, and especially adjacent to Cardup Brook;
- 3 ensure adequate seepage is maintained from the Amendment area to maintain the viability of dependant wetlands within the Cardup Brook buffer;
- 4 ensure that the quantity of surface water leaving the site is largely unchanged from pre-development levels;
- 5 include measures to prevent excessive surface water runoff from entering Cardup Brook;
- 6 ensure that the quality of water leaving the site meets the criteria specified by the Environmental Protection (Peel Inlet-Harvey Estuary ) Policy (see note below);
- 7 include a monitoring program to measure the performance of the implemented Plan against performance criteria; and

8 include contingency plans in the event that the criteria are temporarily not achieved.

Note: The criteria referred to in item 6 above are deemed to be met for phosphorus if the discharge of total phosphorus from the amendment area does not exceed 0.225 kilograms of total phosphorus per hectare per year.

## **5 Soil Contamination**

- 5-1 Areas of soil contamination resulting from previous activities in the amendment area shall be identified and remediated to a standard that is suitable for the intended land uses.
- 5-2 Any subdivision application for land in the amendment area shall be accompanied by a report of an investigation of the amendment area to determine the nature and extent of any soil and groundwater contamination, to the requirements of the Department of Environmental Protection and the Shire of Serpentine-Jarrahdale.
- 5-3 If soil or groundwater contamination is present, a remediation program shall be prepared and implemented, and if necessary, a management plan shall be prepared, to the requirements of the Department of Environmental Protection and the Shire of Serpentine-Jarrahdale, prior to subdivision.
- 5-4 The management plan referred to in condition 5-3 shall be implemented.

## **6 Gaseous Emissions**

- 6-1 The welfare, amenity and health of land users within the amendment area should not be adversely affected by gaseous emissions from the brickworks located adjacent to the southern boundary of the amendment area.
- 6-2 Residential development is not permitted within the buffer area shown in Scheme Provision Figure 3 attached, unless the Shire of Serpentine-Jarrahdale and the Department of Environmental Protection agree in writing that subsequent modelling or monitoring of gaseous emissions from the brickworks has been undertaken and that a modified buffer is appropriate.

## **7 Particulates/Dust**

- 7-1 The welfare, amenity and health of land users within the amendment area should not be adversely affected by particulates or dust resulting from land uses adjacent to the amendment area.
- 7-2 Residential development is not permitted within the buffer area shown in Scheme Provision Figure 4 attached, unless the Shire of Serpentine-Jarrahdale and the Department of Environmental Protection agree in writing that subsequent modelling or monitoring of particulates and dust has been undertaken and that a modified buffer is appropriate.

## **8 Noise**

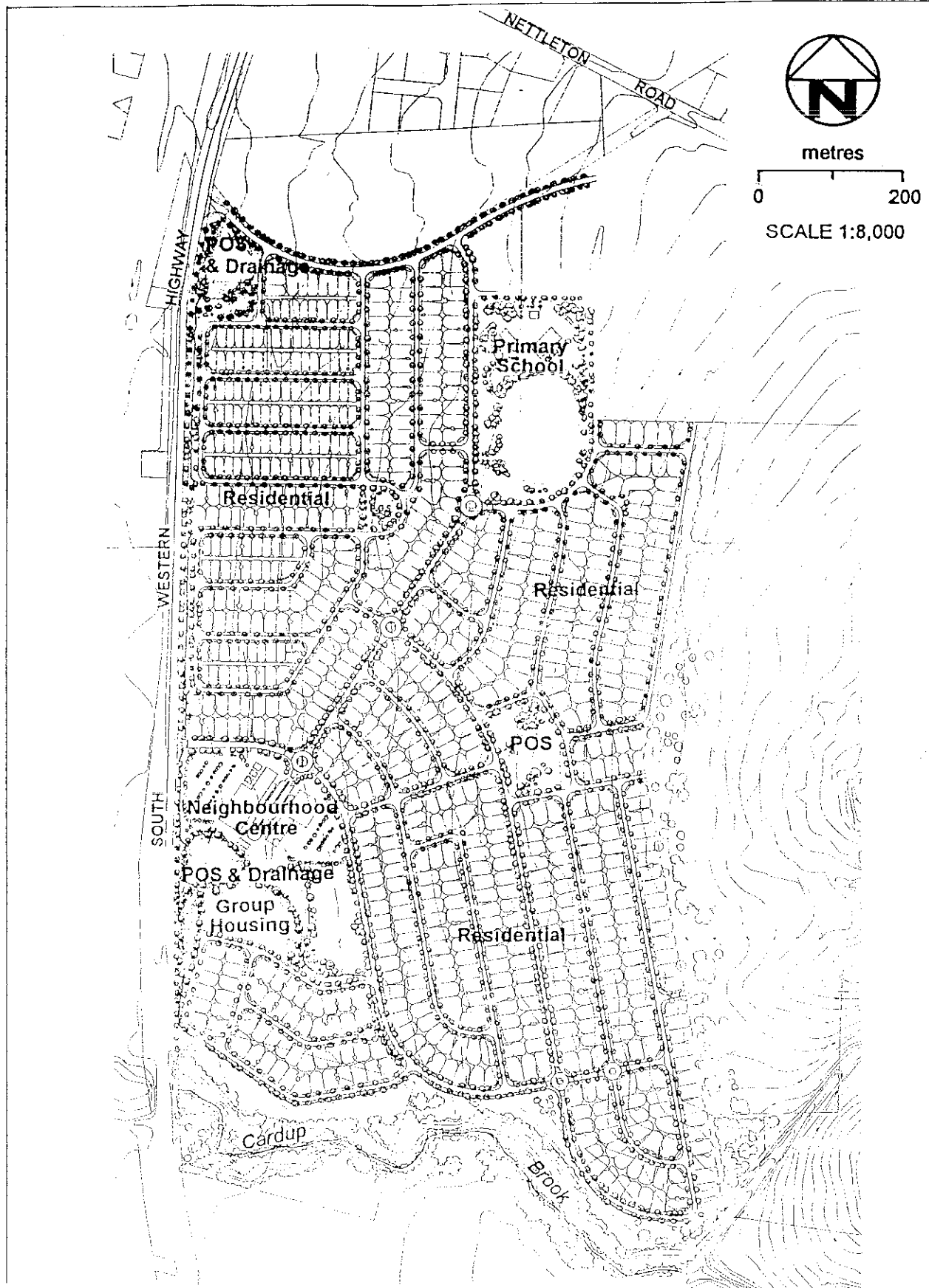
- 8-1 The welfare, amenity and health of land users within the amendment area should not be adversely affected by noise.
- 8-2 The development of the Amendment area shall comply with the Environmental Protection (Noise) Regulations 1997.
- 8-3 Residential development is not permitted within the buffer area shown in Scheme Provision Figure 5 attached, unless the Shire of Serpentine-Jarrahdale and the Department of Environmental Protection agree in writing that subsequent modelling or monitoring of noise has been undertaken and that a modified buffer is appropriate.

## **9 Aboriginal Heritage**

- 9-1 Any changes to the biological and physical environment resulting from the project shall be consistent with the requirements of the Aboriginal Heritage Act 1972.
- 9-2 Prior to finalisation of subdivision approvals, written confirmation shall be obtained from the Aboriginal Affairs Department stating that it is satisfied that management strategies have been prepared and implemented as appropriate to meet the requirements of the Aboriginal Heritage Act 1972.

## **10 Public Health and Safety (Risk and Hazard)**

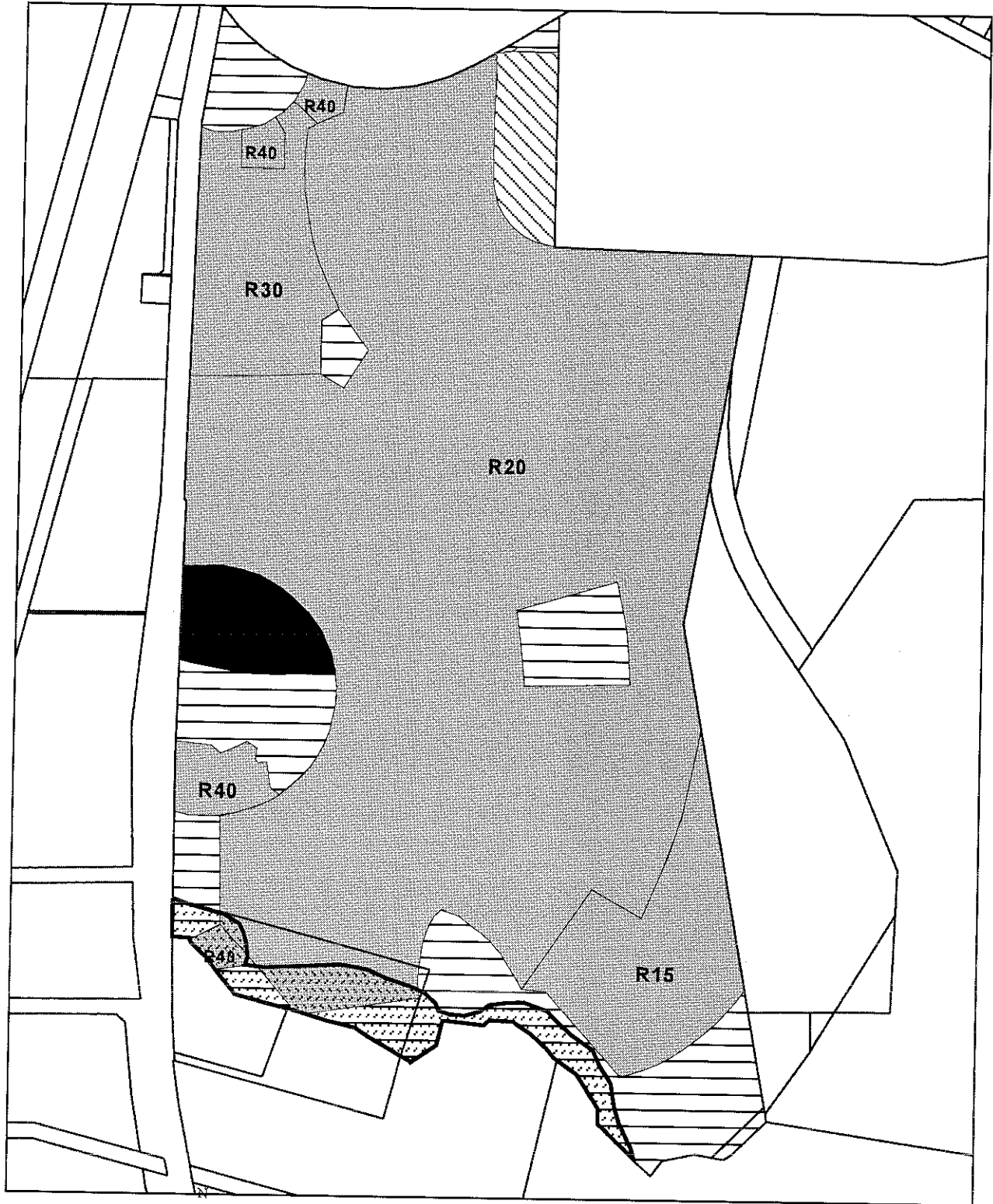
- 10-1 The amendment area shall be rendered safe for the intended land uses following the identification of any unexploded ordnance or related materials.
- 10-2 Prior to finalisation of subdivision approvals, the subdivider shall investigate the amendment area to determine the presence of any unexploded ordnance and/or explosive wastes, to the requirements of the West Australian Police Service (Unexploded Ordnance Unit).
- 10-3 Prior to finalisation of subdivision approvals, and prior to any ground-disturbing activity, the subdivider shall prepare and implement a remediation plan to address the findings of the investigation required by condition 10-2, to the requirements of the West Australian Police Service (Unexploded Ordnance Unit), the Department of Environmental Protection, the Department of Minerals and Energy and the Shire of Serpentine-Jarrahdale.



Scheme Provisions Figure 1 - Conceptual subdivision design

SOURCE: MITCHELL GOFF & ASSOCIATES, 1997

*Scheme Provision Figure 1. Conceptual subdivision design.*



0 100 200 300 400 Meters

This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

- ▬ Cadastral Boundaries
- ▬ Cardup brook buffer.shp
- ▬ Cardup Brook Buffer Area
- ▬ Byfordamd.shp
- ▬ Commercial
- ▬ Public Open Space
- ▬ Public Purposes
- ▬ Residential

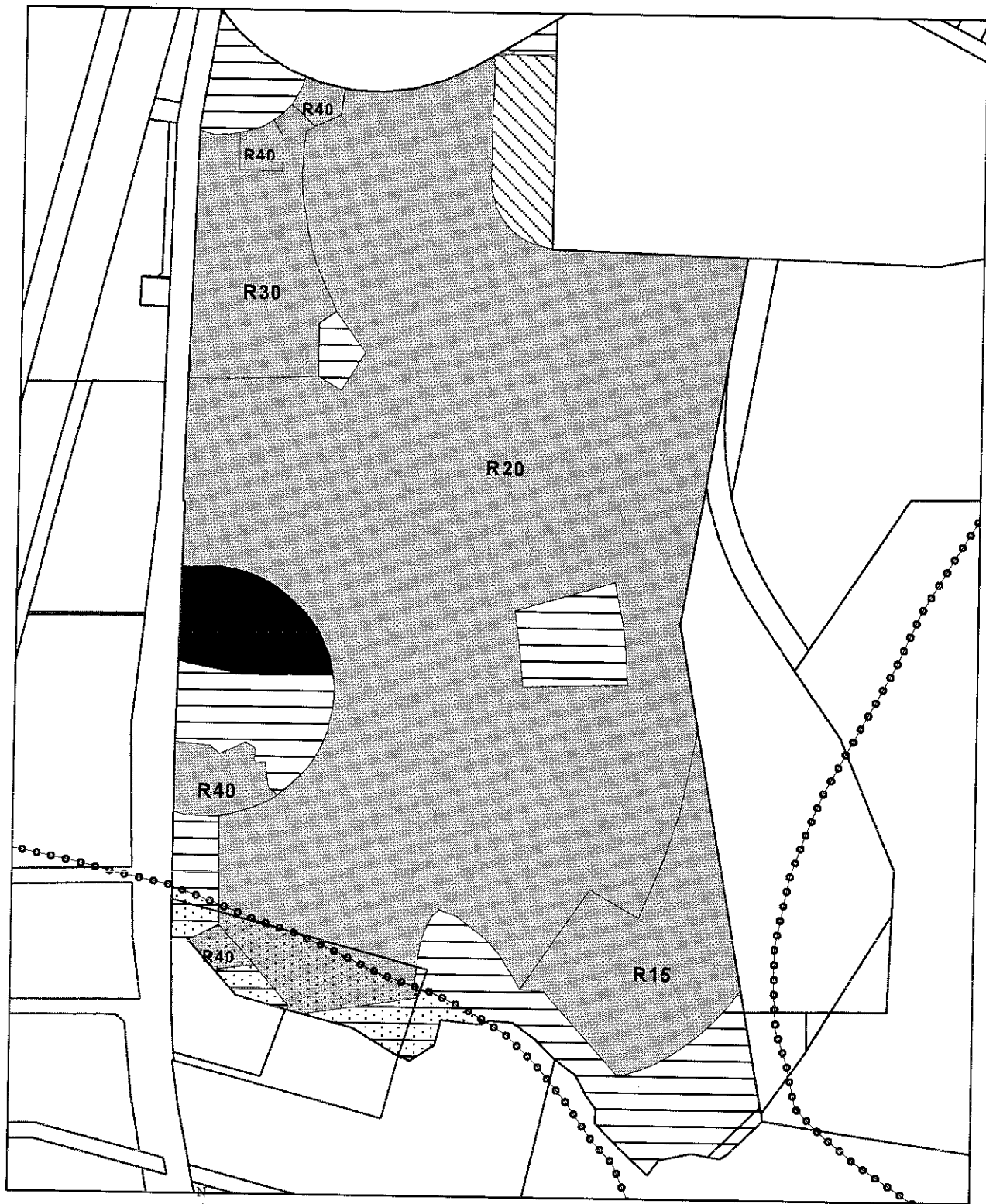
Projection: Australian Map Grid



Department of Environmental Protection, Western Australia








**Scheme Provision Figure 2. Cardup Brook (wetland and vegetation) buffer requirement.**





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This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

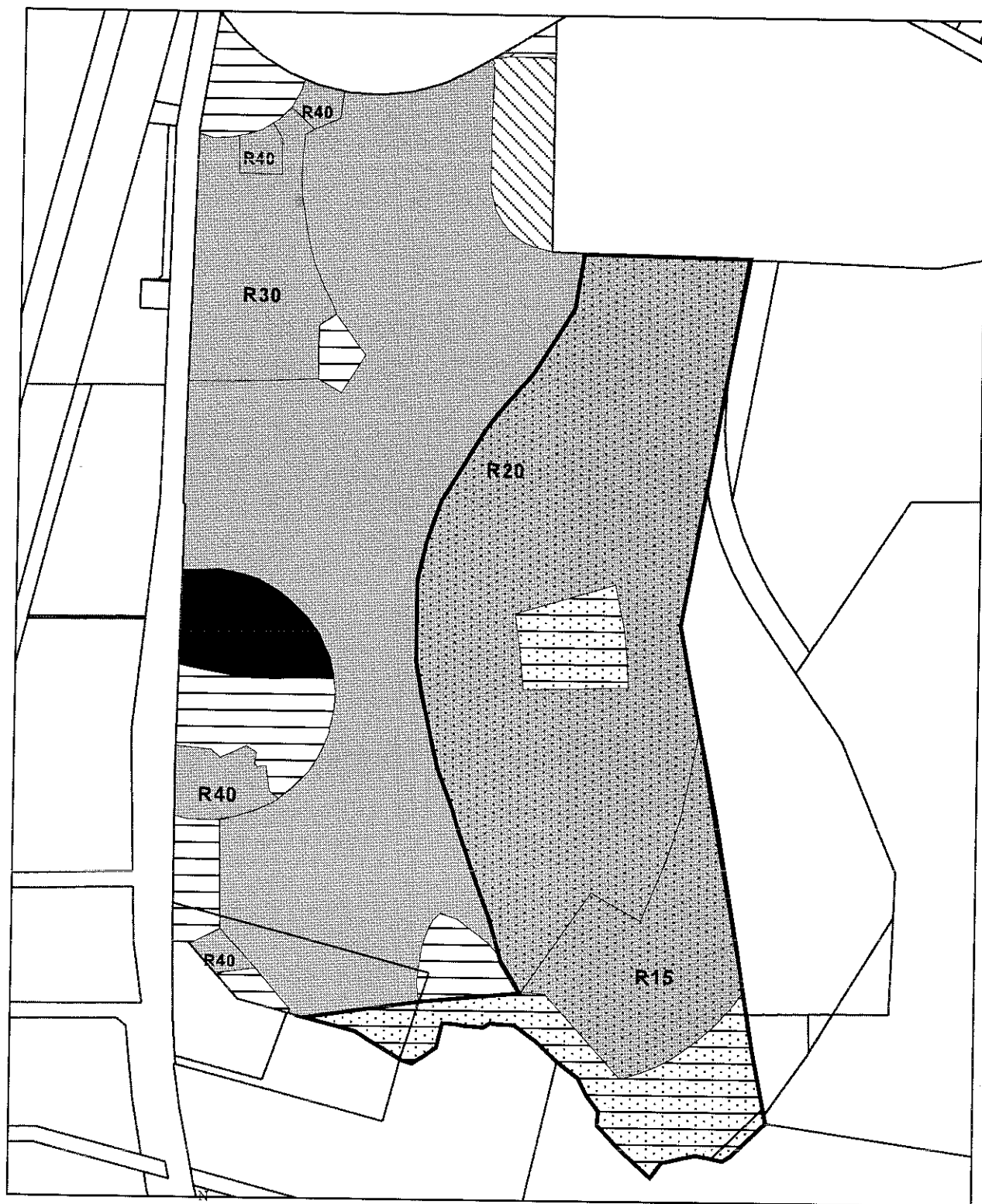
-  Gaseous Emissions Buffer Area
-  Gaseous emissions buffer
-  Cadastral Boundaries
-  Commercial
-  Public Open Space
-  Public Purposes
-  Residential



Department of Environment and Planning  
Western Australia




Projection: Australian Map Grid

*Scheme Provision Figure 3. Gaseous Emissions buffer requirement.*



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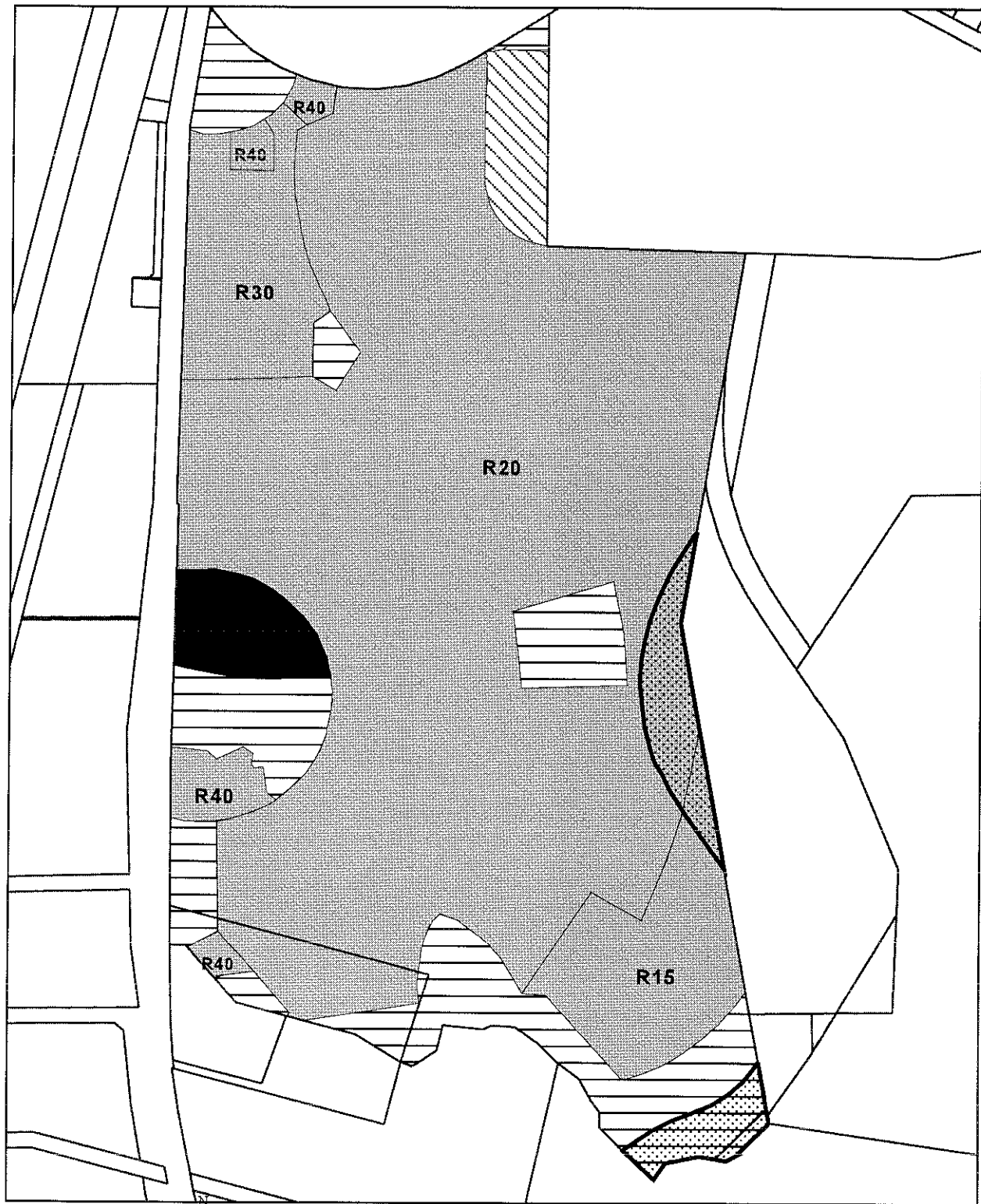
-  Cadastral Boundaries  
Byforddnet.shp
-  Dust Buffer Area  
Byforddnet.shp
-  Commercial
-  Public Open Space
-  Public Purpose
-  Residential

Projection: Australian Map Grid









Department of Environmental Protection, Western Australia

*Scheme Provision Figure 4. Particulate and Dust buffer requirement.*



This map has been produced using various data from other agencies. No responsibility is accepted for any error or omission.

-  Cadastral Boundaries  
Byfordand.shp
-  Noise Buffer Area  
Byfordand.shp
-  Commercial
-  Public Open Space
-  Public Purpose
-  Residential



Department of Environment and Protection, Western Australia

Projection: Australian Map Grid

*Scheme Provision Figure 5. Noise buffer requirement.*

## **Appendix 4**

### **Summary of Relevant Factors**

## Appendix 4 - Summary of Relevant Factors

*Table 2 - Identification of Relevant Environmental Factors*

PRELIMINARY ENVIRONMENTAL FACTOR	SITE SPECIFIC FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
<b>BIOPHYSICAL</b>				
Vegetation	Areas of vegetation adjacent to and within the proposed area are regionally significant.	Areas of significant remnant vegetation are present within and adjacent to the proposed amendment area. Vegetation adjacent to the amendment area is identified in draft Perth's Bushplan as being regionally significant and being representative of the Guildford, Forrestfield, and Darling Scarp vegetation complexes.	<ul style="list-style-type: none"> <li>• The area to be rezoned is subject to draft <i>Perth's Bushplan</i> recommendations. The Water and Rivers Commission advises that the Ministry for Planning, Department of Environmental Protection and Department of Conservation and Land Management are consulted in regards to the above proposal, in conjunction with Alan Hill from the Water and Rivers Commission.</li> <li>• The Environmental Review discusses the retention of existing remnant vegetation within the development (p.8), and the protection of vegetation adjacent to Cardup Brook through the use of walking paths. The Water and Rivers Commission also finds it important to consider extensive rehabilitation of the partially disturbed vegetation. This will assist in maintaining pre-development flow regimes of the Brook. The vegetated area may also assist in removing excess nutrients from stormwater runoff, however this should not be its prime function, as drainage from the development should not enter the Brook.</li> </ul>	<b>Considered to be a Relevant Factor.</b>

PRELIMINARY ENVIRONMENTAL FACTOR	SITE SPECIFIC FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
Vegetation (cont')			<p><b>1. Additional DEP Comments</b></p> <ul style="list-style-type: none"> <li>• A 50m Cardup Brook buffer extending from the centre line of the water course has been proposed. This proposal does not include all the vegetation adjacent to Cardup Brook which has been identified as regionally significant by draft <i>Perth's Bushplan</i>. The buffer should include all vegetation along Cardup Brook as identified in draft <i>Perth's Bushplan</i>. The regionally significant vegetation should be protected either through conservation covenants, in perpetuity on the title, or through reservation and vesting of the land in an appropriate management authority.</li> <li>• Comment and advice on management of the any bushland should also be sought from CALM.</li> <li>• Regionally significant vegetation should be separated from other development by a hard edge such as a dual use path or road. A hard edge is currently present for the bushland along the creek and in the north of the proposal. The hard edge separation should also be achieved for the bushland in the east of the proposal.</li> <li>• Use of locally native species of vegetation in any proposed landscaping is encouraged.</li> </ul>	
Wetlands	Watercourses	Cardup Brook is located on the southern boundary of the proposed amendment.		<b>Considered to be a Relevant Factor.</b>

PRELIMINARY ENVIRONMENTAL FACTOR	SITE SPECIFIC FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
<b>POLLUTION</b>				
Surface Water Quality	<p>Part of the Peel Harvey Catchment.</p> <p>Main issues are nutrients and erosion.</p> <p>Subsurface water movement from the ridge downslope onto heavier clay soils results in the seasonal waterlogging.</p>	<p>Amendment 77 is located within the Peel-Harvey surface water catchment, although not within the area covered by the Statement of Planning Policy Number 2 for the Peel-Harvey. The development of the amendment area may cause changes in the surface water quality or quantity leaving the area which may cause erosion and or increase nutrient loads in the receiving environment.</p>	<ul style="list-style-type: none"> <li>The development should conform to the Stormwater Management Strategy and Plans for Byford and Mundijong (1994) prepared for the Water Authority and the Department of Urban Development.</li> <li>Separation between the building pad and Average Annual Maximum Groundwater Level should comply with Local Authority and Health Department regulations, however a minimum building floor level of 1.2 meters above the Average Annual Maximum Groundwater Level is recommended.</li> <li>There should be no lowering of groundwater as this will potentially lead to an export of nutrients off the site.</li> <li>The existing degraded wetland should not be incorporated into the proposed wetland system.</li> <li>As indicated in the Environmental Review, the Conceptual Drainage Management Plan and Nutrient &amp; Drainage Commission for assessment, prior to subdivision approval. It will be at this stage that the more technical aspects of the Drainage Plan shall be considered.</li> <li>The Environmental Review discusses Surface Water Quality monitoring (p.14) in the catchment. It appears as though there may be some reliance upon Water Authority data from a study undertaken in 1990/91. It should be noted that this data came from monitoring conducted on sandy soils, as opposed to clay-based soils, which underlie this site.</li> </ul>	<p>Considered to be a Relevant Factor.</p>

PRELIMINARY ENVIRONMENTAL FACTOR	SITE SPECIFIC FACTOR	PROPOSAL CHARACTERISTIC	GOVERNMENT AGENCY AND PUBLIC COMMENTS	IDENTIFICATION OF RELEVANT FACTORS
Surface Water Quality (cont')			<ul style="list-style-type: none"> <li>On page 15 of the Review, there is mention of making the proposed wetlands shallower than conventional detention basins. This is not always necessary, for if a portion of the basin is deep, it allows for sedimentation to take place, which can build up for 10 years before it is necessary to dredge the wetland. No development should occur within the 1 in 100 year flood level of Cardup Brook.</li> <li>It is suggested that for the initial stages of development the drainage plan proposed as part of the rezoning could be implemented, including those WSUD elements of swales above the permanent lakes. However, in the longer term the question of pollution control and nutrient stripping may be managed by a limited number of pollution control ponds at the downstream end of the total drainage catchment, that is not within the amendment area.</li> <li>The Water and Rivers Commission (WRC) would prefer the drainage scheme for the development to incorporate the whole catchment, instead of fragmenting the catchment into sub-catchments. Fragmentation of the drainage scheme would result in smaller wetlands and other drainage facilities, which are not as efficient as one large facility downstream.</li> <li>One submission suggests that 40% of the volume of the detention basins used for water quality control can be counted toward the 500m<sup>3</sup>/ha volume needed for water quality control. This submission also suggests that all the permanent water in lakes can be considered with no restriction on the depth required. The WRC have clarified this suggestion by saying that they do have a restriction on depth in detention basins. The recommended maximum depth for such basins/wetlands is 3 to 4 meters. The WRC also supports a total basin volume of 500m<sup>3</sup>/ha due to the gradient of the site.</li> </ul>	



Soil Contamination	Evidence of chemicals leaking from unexploded munitions causing local soil contamination. Soil contamination from underground fuel storage tanks. Asbestos fibre contamination	Much of the amendment area was used to house a Royal Australian Navy Ammunition Depot. The primary purpose of the depot was the storage and assembly of naval munitions. This depot was closed in 1979.	<ul style="list-style-type: none"> <li>The Water and Rivers Commission understand that the property is an old ammunition site which is to be classified as a contaminated site by the Department of Environmental Protection. This will subject the site to a full contaminated site assessment.</li> </ul>	Considered to be a Relevant Factor.
Gaseous Emissions	Brickworks on Southern boundary	Potential for gaseous emissions due to the operations of the adjacent brickworks to adversely impact on areas of residential development within the proposed amendment area.		Considered to be a Relevant Factor.
Particulates/ Dust	Shale Pit on Southeastern boundary including the access roads Brickworks on Southern boundary including the access roads Flour mill Wreckers Yard	Potential for particulates and dust due to the operations of the adjacent brickworks, flour mill, and wreckers yard to adversely impact on areas of residential development within the proposed amendment area.	<p><b>1. Additional DEP Comments</b></p> <ul style="list-style-type: none"> <li>Council is reminded that the Environmental Review was approved for release by the EPA on the understanding that the <b>dust modelling</b> work will be available as part of the response to submissions.</li> </ul>	Considered to be a Relevant Factor.
Noise	Shale Pit on Southeastern boundary including the access roads Brickworks on Southern boundary including the access roads Urban industrial area to Northwest Dog kennels (AQS) adjacent to Northeast corner	Potential for noise due to the operations of the adjacent brickworks, quarry, industrial area, and quarantine station to adversely impact on areas of residential development within the proposed amendment area.		Considered to be a Relevant Factor.

	Sawmill including the access roads Flour mill Wreckers Yard			
<b>SOCIAL SURROUNDINGS</b>				
Aboriginal Heritage	Archaeological sites identified within the site.	Development of the site for residential purposes may disturb areas of aboriginal heritage within the site.		Considered to be a Relevant Factor.
Public health and safety (risk and hazard)	Presence of degraded unexploded munitions on the site.	Much of the amendment area was used to house a Royal Australian Navy Ammunition Depot. The primary purpose of the depot was the storage and assembly of naval munitions. This depot was closed in 1979.	<ul style="list-style-type: none"> <li>UXO pollution has been identified on every ammunition storage facility in WA so far investigated by the WA UXO Working Party. The UXO Unit (Police Response and Emergency) have already commenced a series of investigative research activities on the site and through accessible Commonwealth and State archived information to determine the status of the site.</li> </ul> <p>The UXO Unit recommends that the rezoning of the site not be finalised until appropriate unexploded ordnance hazard reduction operations by this unit have been completed. There should be no further ground disturbing activities on the site or in the buffer zone immediately to the east of the subject lots by any party without prior consultation with the UXO Unit.</p>	Considered to be a Relevant Factor.

ATTACHMENT 2

Table 3 - Summary of Assessment of Relevant Environmental Factors

RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
<b>BIOPHYSICAL</b>				
Vegetation Communities - clearing and public access	Swan Coastal Plain	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.	<p>The implementation of the amendment has the potential to impact on Regionally Significant vegetation through direct impacts such as clearing adjacent to Cardup Brook, and indirectly via public access on the eastern boundary and along Cardup Brook. The Scheme Provisions proposed in Amendment 77 provide a mechanism to ensure development does not adversely impact on Regionally Significant vegetation through either direct or indirect impacts.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will retain remnant native vegetation within and adjacent to the Amendment area, ensuring its long term viability and minimal human impact.</p> <p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until it has received written confirmation from the Department of Environmental Protection that is satisfied the remnant vegetation will be managed appropriately. A development plan will be submitted to the DEP.</p> <p>Management will include retention of vegetated areas on eastern part of assessment area and along Cardup Brook and retention of a walking trail to reduce disturbances and; clear delineation of vegetated areas through use of dual use paths, roads and the like.</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>Provision in the amendment to limit and manage impacts on Regionally Significant vegetation;</li> <li>the delineation of regionally significant vegetation on Cardup Brook; and</li> <li>the adoption of the buffer zone depicted in Figure 4;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>
Wetlands - maintenance of water flows	Swan Coastal Plain	Maintain the integrity, functions and environmental values of watercourses.	<p>Cardup Brook, located on the southern boundary of the amendment area, forms part of a Conservation Category wetland that has been identified by the Water and Rivers Commission. Provisions within the amendment propose to retain a vegetated buffer of 50m along Cardup Brook, and the incorporation of Water Sensitive Urban Design (WSUD) principles to ensure the pattern of flow is unchanged from predevelopment.</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>the listing of part of Cardup Brook as a Conservation Category wetland;</li> <li>Provisions in the</li> </ul>

RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
			<p>It is the EPA's opinion that the 50m proposed buffer should be used as a minimum requirement. Where there is Regionally Significant vegetation is adjacent to, but beyond, the 50m line this should also be incorporated into the buffer along Cardup Brook.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will incorporate a vegetated buffer around Cardup Brook and implement drainage measures which will ensure flows in Cardup Brook are maintained at pre-development levels and protect the long term health and viability of the brook.</p> <p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection it is satisfied the long term health and viability of Cardup Brook will be protected.</p> <p>Implementation of protection measures will include:</p> <ul style="list-style-type: none"> <li>• Provision of a vegetated buffer, including native trees and shrubs, 50m wide extending from the centre line of the water course to protect the brook ecosystem. This buffer area will incorporate existing wetland vegetation along Cardup Brook and is in accordance with advice from the Waters and Rivers Commission.</li> <li>• Preparation of a site drainage plan incorporating best practice in Water Sensitive Urban Design which will maximise on site water infiltration, maintain the existing water quality within Cardup Brook by ensuring drainage emanating from the proposed development does not enter the Brook and ensure the pattern of flow from the property remains largely unchanged.</li> </ul> <p>The drainage program will be monitored after development to ensure the pattern of flow is unchanged from predevelopment.</p>	<p>amendment to provide a vegetated buffer;</p> <ul style="list-style-type: none"> <li>• Provisions within the amendment to incorporate WSUD to maintain or improve water quality in the Brook;</li> <li>• Provisions in the amendment to ensure the pattern of flow in the Brook and seepage from upland areas remains largely unchanged; and</li> <li>• the adoption of the buffer zone depicted in Figure 4;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>

RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
<p><b>POLLUTION</b></p> <p>Surface Water Quality - excess nutrients entering the Peel-Harvey</p>	<p>Peel-Harvey surface water catchment</p>	<p>Maintain or improve the quality of surface water to ensure that existing and potential water uses, including ecosystem maintenance are protected, consistent with the draft WA Guidelines for Fresh and Marine Waters (EPA, 1993) [and the NHMRC / ARMCA NZ Australian Drinking Water Guidelines - National Water Quality Management Strategy].</p>	<p>The location of the amendment area within the Peel-Harvey catchment, albeit not within the area covered by the Peel-Harvey Environmental Protection Policy and Statement of Planning Policy No.2, is of significant concern to the EPA. Some constraints need to be applied to the proposed development to prevent detrimental impacts on the Policy area. The most equitable position is to apply the same load requirements as within the Policy area.</p> <p>Provisions in the amendment require the preparation of a nutrient and drainage management plan to achieve the requirements.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will prepare a nutrient and drainage management plan to ensure rate of storm water leaving the site is maintained at no greater than predevelopment levels and provide measures to facilitate the removal of pollutants and nutrients. The strategy will be prepared and lodged prior to issue of subdivision approval.</p> <p>The nutrient and drainage management plan will incorporate best practice in Water Sensitive Urban Design which will:</p> <ul style="list-style-type: none"> <li>• maximise on-site water infiltration,</li> <li>• ensure the quantity of surface water leaving the site will be largely unchanged,</li> <li>• ensure the quality of water leaving the site meets DEP requirements,</li> <li>• provide for contingency plans, and</li> <li>• monitor water quality parameters and water quantities until such time as the DEP, Waters and Rivers Commission and Shire of Serpentine-Jarrahdale are satisfied that the objectives of the Nutrient and Drainage Management Plan have been achieved.</li> </ul>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>• the high nutrient status of the Peel-Harvey estuary;</li> <li>• the demonstrated ability to limit nutrient export loads to less than the maximum level; and</li> <li>• Provisions within the amendment to require the preparation and implementation of a nutrient and drainage management plan to achieve these loads;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>

RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
Soil Contamination - clean-up of leakage from stored munitions	Soils within the Amendment area.	<p>Ensure the rehabilitation of the site to an acceptable standard that is compatible with the intended land use, consistent with appropriate criteria.</p> <p>Contaminated material should be treated on-site or disposed of off-site at an appropriate land fill facility. Where this is not feasible, contaminated material should be managed on-site to prevent groundwater contamination or risk to public health.</p>	<p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until it has received written confirmation from the Department of Environmental Protection it is satisfied with the nutrient and drainage management plan.</p> <p>Preliminary work on the site has identified areas of soil contamination due to the use of the area as a Naval Munitions depot. Provisions within the amendment require the identification and remediation of any contaminated soils prior to subdivision approval.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will undertake an appropriate investigation on the Amendment area to determine the nature and extent of any soil and groundwater contamination. If contamination is identified then a remediation program, and if necessary management program, will be developed and be implemented prior to the implementation of the scheme.</p> <p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection is satisfied any contaminants identified on the subject land have been remediated or will be managed in manner that is compatible with the intended land use and consistent with DEP approved criteria.</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>Provisions in the amendment that require the identification and remediation of contaminated soils prior to subdivision approval;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>
Gaseous Emissions - impacts on future residents due to adjacent Brickworks	Within the Amendment area.	<p>Ensure that gaseous emissions due to adjacent activities do not adversely affect the environment or health, welfare and amenity of land users by meeting the statutory requirements (including Section 51 of the Environmental Protection Act 1986) and acceptable standards.</p>	<p>An existing Brickworks on the southern boundary of the amendment area is a potential source of gaseous emissions that may impact on the amendment area. Modelling work has been conducted to identify the extent of any likely impacts and buffers incorporated into the amendment to restrict residential uses accordingly.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will undertake a modelling exercise to determine the impact of gaseous emissions emanating from the brickworks located at the southern boundary on the Amendment area. A buffer encompassing the Amendment area in which gaseous emissions exceed relevant criteria will be incorporated into the subdivision plan.</p> <p>Accordingly, the Shire of Serpentine - Jarrahdale shall not issue an</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>studies conducted to identify likely impact areas as a result of gaseous emissions from the Brickworks on the southern boundary of the amendment area; and</li> <li>the incorporation of buffers to limit residential development in these</li> </ul>

RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
Particulates/ Dust on future residents due to adjacent land uses	Within the Amendment area.	Ensure that the dust levels generated activities adjacent to the site do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.	<p>approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection it is satisfied modelling of gaseous emissions from the brickworks has been undertaken and if required a buffer incorporated into the development plan to ensure future land users are not affected by those emissions.</p> <p>A number of activities, including a Brickworks, Shale Quarry, Flour Mill, and access roads, adjacent to the Amendment area have the potential to generate levels of particulates and or dust that may have an adverse affect on the Amendment area. Provisions within the amendment require the study of likely dust levels and limitation of residential development according to these studies to ensure future residents are not adversely affected by dust or particulates.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will incorporate buffer/s encompassing the Amendment areas where the impacts of particulates/dust exceed the guidelines (as defined by modelling) to ensure the welfare, amenity and health of future land users is not adversely impacted by the development.</p> <p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection is satisfied buffer/s have been incorporated into the subdivision plan as appropriate.</p>	<p>areas;</p> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p> <p>Having regard to:</p> <ul style="list-style-type: none"> <li>the incorporation of buffers to limit residential development in the areas identified as being subject to dust impacts;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>
Noise - impacts on future residents due to adjacent land uses	Within the Amendment area.	Protect the amenity of residents from noise impacts resulting from activities adjacent to the site by ensuring that noise levels meet statutory requirements and acceptable standards.	<p>A number of activities, including a Brickworks, Shale Quarry, Industrial area, dog kennels, and access roads, adjacent to the Amendment area have the potential to generate levels of noise that may have an adverse affect on the Amendment area. The amendment has incorporated 200m buffers to restrict residential development in the vicinity of these activities.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will incorporate buffer/s encompassing the Amendment areas in which noise guidelines are exceeded to protect the amenity of future land users from noise impacts by ensuring that noise levels meet statutory requirements and acceptable standards.</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>the incorporation of buffers within the amendment to restrict residential development in the areas identified as being subject to noise impacts; and</li> <li>requirements of the Environmental</li> </ul>

RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
<b>SOCIAL SURROUNDINGS</b>				
Aboriginal Heritage - protection of identified archaeological sites	Within the Amendment area.	<p>Ensure that the proposal complies with the requirements of the Aboriginal Heritage Act 1972; and</p> <p>Ensure that changes to the biological and physical environment resulting from the project do not adversely affect cultural associations with the area.</p>	<p>Twenty-nine archaeological sites have been identified within the Amendment area. The Amendment incorporates provisions that require the preparation of management strategies to the satisfaction of the Aboriginal Affairs Department prior to subdivision approval.</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will incorporate management strategies to comply with the requirements of the <u>Aboriginal Heritage Act, 1972</u> and ensure that changes to the biological and physical environment resulting from the project do not affect cultural associations with the area.</p> <p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Aboriginal Affairs Department it is satisfied that management strategies have been implemented as appropriate.</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>the presence of archaeological sites within the Amendment area; and</li> <li>the incorporation of provisions within the amendment to manage these areas to the satisfaction of the Aboriginal Affairs Department;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>
Public health and safety (risk and hazard) - survey for and removal of UXOs	Within the Amendment area.	<p>Ensure that risk is managed to meet the EPA's criteria for individual fatality risk off-site and the DME's requirements in respect of public safety.</p>	<p>UXO pollution has been identified on every ammunition storage facility in WA so far investigated by the WA UXO Working Party. Considering this there should be no further ground disturbing activities on the site or in the buffer zone immediately to the east of the subject lots by any party without prior consultation with the UXO Unit (Police Response and Emergency).</p> <p><b>Proposed Scheme Provisions</b></p> <p>Any subdivision application will conduct an appropriate investigation on the site to determine the presence of any unexploded ordnance (UXO)</p>	<p>Having regard to:</p> <ul style="list-style-type: none"> <li>the likely presence of UXOs within the amendment area;</li> <li>the need to prevent any further ground disturbing activities until the site is pronounced clear of UXOs by the UXO</li> </ul>
			<p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the Department of Environmental Protection it is satisfied buffer/s have been incorporated into the subdivision plan as appropriate.</p>	<p>Protection Regulations (Noise)</p> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>



RELEVANT ENVIRONMENTAL FACTOR	RELEVANT AREA	EPA OBJECTIVE	EPA ASSESSMENT	EPA ADVICE
			<p>and/or explosive wastes; and develop and implement a remediation program as necessary. Implementation of the UXO survey and, if necessary, remediation programs will occur prior to the implementation of any other ground disturbing activity occurring within the Amendment area.</p> <p>Accordingly, the Western Australian Planning Commission shall not issue an approval to subdivide the subject land until such time it has received written confirmation from the West Australian Police Service (UXO Unit) that appropriate unexploded ordnance hazard reduction standards have been achieved; the Department of Environmental Protection that risk is managed to meet the Environmental Protection Authority's criteria for individual fatality risk offsite, and the Department of Minerals and Energy's requirements in respect to public safety are met.</p>	<p>Unit; and</p> <ul style="list-style-type: none"> <li>provisions in the amendment requiring investigation and remediation of the site prior to subdivision;</li> </ul> <p>it is the EPA's opinion that the proposal can be managed to meet the EPA's objective.</p>