Murray Lakes golf course estate

Murray Lakes Pty Ltd

Proposed Change to Environmental Conditions

Report and recommendations of the
Environmental Protection Authority

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Summary

This report is to provide the Environmental Protection Authority (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal by Murray Lakes Pty Ltd to modify components of the existing approved Murray Lakes Golf Complex.

In the EPA's opinion the following are the environmental factors relevant to the proposal:

(a) surface water quality;

(b) regionally significant wetlands;

(c) vegetation in existing conservation estate;

(d) locally significant wetlands;

(e) locally significant vegetation; and

(f) mosquitoes.

The conditions and procedures, in the EPA's opinion, to which the modified project should be subject, if implemented, are in summary:

(a) the existing Ministerial Conditions applied to the project (Ministerial Statement 79, 26 September 1989), subject to modification of Conditions 1, 2, 4 and 7 (proponent's commitments, nutrients and drainage) as set out in (b), (c) and (d) below;

(b) the proponent's revised and additional commitments made in the Section 46 Report, and the subsequent amendment to commitment 5.1 made since this report, should be made enforceable;

(c) the proponent should be required to:

  (i) after the establishment of the development, ensure that nutrient input to the site does not exceed 1.2 tonnes of phosphorus/year and that phosphorus export does not exceed, on average, 140 kg/year;

  (ii) identify an acceptable nitrogen discharge load consistent with minimising the nitrogen discharge from the property; and

  (iii) prepare and implement a nutrient management plan to the requirements of the EPA to ensure that soil and water nutrient loadings are logged and that agreed nutrient limits are achieved.

(d) the proponent should be required to:

  (i) design and construct the drainage system within the development site to the requirements of the Shire of Murray and the Water and Rivers Commission;

  (ii) ensure that all surface drainage is retained on-site except when rainfall causes flooding of severity equal or greater than that expected in 1:10 years, and that there is sufficient storage capacity on-site to store the runoff from a 1 in 10 year storm event for a minimum of three days; and

  (iii) take into consideration during subdivision design, the impacts from potential overflows from the proposed sewage pumping station.

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment note the relevant environmental factors and EPA objectives set for each factor (Section 3).

Recommendation 2

That subject to the satisfactory implementation of the EPA's recommended conditions and procedures (Section 4), including the proponent's environmental management commitments, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report.

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1. Introduction

This report is to provide the Environmental Protection Authority (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal by Murray Lakes Pty Ltd to modify components of the existing approved Murray Lakes Golf Complex.

In 1988, a proposal was submitted by Sunland Pty Ltd to the EPA to develop a golf complex and residential estate on Part Lot 1 Yunderup South Road, Shire of Murray. The development site is located less than 1 kilometre from the Peel - Harvey Inlet and the Murray River near Yunderup Canals (Figure 1:Appendix 1).

The EPA set the level of assessment for the proposal at Notice of Intent in October 1988, (equivalent to a present day 'Consultative Environmental Review' level of assessment), with the EPA providing its report and recommendations to the Minister for the Environment in May 1989 (EPA, 1989) (Bulletin 385). Approval to implement the project, subject to a number of Environmental conditions and commitments, was issued in September 1989 (Ministerial Statement 79, 25 September 1989).

In June 1990, Sunland Pty Ltd sold the property to the current proponent Murray Lakes Pty Ltd. In June 1994, Murray Lakes Pty Ltd submitted a modified development proposal to the EPA which involved extending the development onto two adjoining rural lots and modifying components of the project (Figure 1:Appendix 1).

In March 1995 the Minister for the Environment requested the EPA to assess the proposed modifications under Section 46 of the *Environmental Protection Act 1986*, which provides the mechanism for changing Environmental Conditions applicable to the project. A report outlining the proposed changes to the environmental conditions (LeProvost Dames and Moore, 1996) was released by the proponent in May 1996, hereafter called the Section 46 Report.

Further details on the proposal are given 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 recommendations to the Minister.

Appendix 1 provides maps relating to the proposal. A list of people and organisations that made submissions is included in Appendix 2, and published information is listed in Appendix 3.

2. The proposal

The proposal to modify the Murray Lakes Golf Complex and Residential Estate and relevant conditions is described in the Section 46 Report.

The proponent is seeking to modify the existing environmental approval for the Murray Lakes Golf Complex and Residential Estate to incorporate an additional 135 ha of land (Lots 2 and 3) to increase the residential yield of the property and enable the extension of the golf course and creation of a permanent saline wetland for passive recreation linked to the golf resort. A summary of the proposed changes to the Murray Lakes development is outlined in Table 1.

A detailed description of the proposed modified development is provided in Section 3 of the Murray Lakes Pty Ltd Section 46 Report.

Table 1. Summary of proposed changes to Murray Lakes development

SUNLAND Pty Ltd Existing approved project	MURRAY LAKES Pty Ltd Modified proposal
Part Lot 1, Murray Loc 17 Total area 391ha	Part Lot 1 Murray Loc 17 & Lots 2 & 3 Murray Loc 281 & 389 Total area 527ha
18 hole golf course	27 hole golf course
hotel	resort complex;
400 residential lots	1510 residential lots
34ha artificial irrigation lake within the golf course	43ha artificial irrigation lake within the golf course
	47ha recreation lake
9ha of public open space	32ha of public open space
33ha of native vegetation	71ha of native vegetation

3. Environmental factors

3.1 Relevant environmental factors

It is the EPA's opinion, based on the submissions and material listed in Appendices 2 and 3, that the following are the environmental factors relevant to the proposal:

(a) surface water quality;

(b) regionally significant wetlands;

(c) vegetation in existing conservation estate;

(d) locally significant wetlands;

(e) locally significant vegetation; and

(f) mosquitoes.

These relevant environmental factors are discussed in Sections 3.2 to 3.7 of this report.

3.2 Surface water quality

Aspects of surface water quality

The changes to land use associated with the proposed development have the potential to impact on surface water quality. This is especially important in view of the proximity of the development area to the Peel-Harvey Estuary, and the fact that this area of land is covered by the Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992 (Peel-Harvey EPP) (Environmental Protection Act, 1986a). This policy aims to reduce the input of nutrients, particularly phosphorus, into the Peel-Harvey Estuary through a number of means including appropriate land management by landowners in the policy area.

The Southern Metropolitan Coastal Water Study (DEP, 1996) also identified that nutrients discharging from the Peel-Harvey Estuary, particularly nitrogen, could impact on the near shore marine environment. Nitrogen is the limiting nutrient in the marine environment.

The Section 46 Report indicates that the potential of the modified proposal to impact upon surface water quality will be limited to:

1.Nutrient management

In comparison with the original Sunland Murray Lakes proposal, the modified proposal requires a larger area of land to be fertilised. When incorporating the same fertiliser application rates, soil amendment and nutrient management criteria to the modified Murray Lakes proposal to that used in the original proposal, the proponent has estimated that the annual maintenance nutrient application is 12.4 tpa of nitrogen and 1.2 tpa of phosphorus, in comparison to 10 tpa of nitrogen and 1.0 tpa of phosphorus for the original proposal (Section 46 Report).

Ministerial Condition 2 for the Sunland proposal set in 1989 specified that, after the establishment of the development, nutrient input to the site should not exceed 2.1 tpa of phosphorus. Therefore the estimated phosphorus input of the modified development falls within limits specified in the original Ministerial Conditions.

The original Ministerial Condition 2 also outlined that the proponent shall prepare and implement a Nutrient Management plan, with reference to the provision for soil amendment in areas where testing shows that the soil has a Phosphorus Retention Index of less than 10. A change to this condition is proposed in the Section 46 Report, removing the reference to the provision of soil amendment in the Nutrient Management Plan. However, soil amendment is addressed in the amended Commitment 1.3, which indicates that appropriate soil amendment techniques will be determined and applied following soil investigation studies and consultation with a turf management consultant and the Turf and Irrigation Nutrient Study group.

The proponent has also proposed a change to the existing Ministerial Conditions, and made an additional commitment (1.14 in the Section 46 Report), regarding drainage which have implications for the management of nutrients. These are discussed below.

2. Drainage

A proposed amendment to the original Ministerial Condition 4, relating to drainage, has been outlined in the Section 46 Report. The original condition to '...ensure that all drainage waters are contained on-site', is proposed to be amended to '...ensure that there is sufficient storage capacity on-site to store the runoff from a 1 in 10 year storm event for a minimum of three days'. This amendment brings the condition in line with drainage requirements outlined in EPA assessment reports on a number of proposals in the vicinity of the Peel - Harvey estuary prior to the 1992 Statement of Planning Policy for the Peel - Harvey catchment. Ministerial Condition 7 also contains provisions relating to drainage and would need to be amended accordingly.

In addition to the proposed change of condition, the proponent has also made an additional commitment to retain all surface drainage from the development on-site, except for years where rainfall causes flooding of severity equal to or greater than that expected in 1:10 years.

The proponent has outlined that, because the development site will be contoured to harvest all runoff from normal storm events for use in golf course irrigation, the likely export rate of nutrients from surface drainage off site will be virtually zero, except in extreme storm and flooding events (Section 46 Report).

3. Sewerage

The development will be fully sewered and connected to existing Water Corporation facilities. This will include connection to the existing treatment plant at South Yunderup via a pumping station. An area of land held by the Water Corporation for sewage treatment is located towards the north west boundary of Lot 1 (Figure 1:Appendix 1). The location of the pumping station will be determined during subdivision design, though will be located within the Murray Lakes development area.

Assessment

The area considered for assessment of this relevant environmental factor is the catchment of the Peel Inlet-Harvey Estuary and the near-shore coastal waters adjacent to the Peel-Harvey system.

The EPA's objective in regard to this environmental factor is "To maintain the quality of surface water to ensure discharge of nutrients from the development site is minimised as far as practical and meets agreed criteria for the Peel-Harvey system and nearshore coastal waters".

The EPA notes that a number of conditions and commitments were outlined in the original assessment of the Murray Lakes Golf Complex and Residential Estate to minimise nutrient application on the site and export from the site. In 1991, a Nutrient and Irrigation Management Plan was prepared for Sunland that complied with these conditions and commitments (AGC Woodward Clyde, 1991). The proponent has outlined that the management guidelines and commitments made in the Nutrient and Irrigation Management Plan with respect to both land use management and irrigation and runoff management will be applied to the modified Murray Lakes proposal (Section 46 Report), including:

- All surface drainage from the development will be retained on-site and used to irrigate the golf course, except when rainfall causes flooding of severity equal or greater than that expected in 1:10 years, and there will be sufficient storage capacity on-site to store the runoff from a 1 in 10 year storm event for a minimum of three days;
- The development will be fully sewered and connected to existing Water Corporation facilities at South Yunderup. The EPA considers that impacts from potential overflows from the proposed pumping station should be taken into consideration during subdivision design;
- Appropriate soil amendment techniques will be determined and applied; and
- Soil and water nutrient loadings will be logged.

The Section 46 Report outlines that the proposed Murray Lakes development will reduce current phosphorus input to the development site. Approximately 5.5 tpa of phosphorus is currently applied to the development area under existing farming practices (AGC Woodward Clyde, 1991). The Section 46 Report indicates that after establishment of the development, the Murray Lakes proposal will reduce this application of phosphorus to approximately 1.2 tpa, an estimated reduction in phosphorus input of approximately 80% (Section 46 Report).

The EPA considers that if the modified proposal is implemented, the Ministerial Conditions should be amended to prepare and implement a revised Nutrient Management Plan to limit phosphorus input to the site to this amount.

In particular, the area of the golf course to be irrigated and fertilised is to be kept to a minimum, with a total phosphorus requirement of approximately 120 kg/year. The major phosphorus requirement is expected to be for lawns and gardens within residential areas (830 kg/year). In this regard the proponent has committed to encourage the use of low phosphate fertilisers in residential areas and encourage the planting of native plants and ground covers with a low phosphorus requirement and minimise the area planted with lawns to further minimise fertiliser and water use.

Phosphorus export is also proposed to be reduced through improved management of run-off from the development site. The phosphorus export rate from current farming practices is 4 kg/ha (AGC Woodward Clyde, 1991). Surface run-off from the proposed development will be contained on-site except when rainfall causes flooding greater than that expected in 1:10 years (Section 46 Report). Therefore, the Murray Lakes development is expected to reduce current phosphorus export from the development site.

The Water and Rivers Commission and the DEP have recently developed criteria for the discharge of phosphorus into the Peel-Harvey Estuary from the Murray Lakes development. The calculation for phosphorus criteria takes into account the environmental capacity of the Peel Inlet and is based on phosphorus loadings from the Serpentine and Murray Rivers which both discharge into the Peel Inlet. To comply with the Peel-Harvey EPP, phosphorus export loadings for the catchment of the Murray River have been calculated at 0.49 kgP/ha/year and for the Serpentine River at 0.27 kgP/ha/year. Best management practice for meeting target phosphorus loads into the Peel Inlet are based on the phosphorus loading calculated for the Serpentine River. The annual average phosphorus export from the Murray Lakes development should therefore not exceed 0.27 kgP/ha/year. Using this criteria, the phosphorus discharge for the entire Murray Lakes development should not exceed 140 kgP/year. The EPA considers that the Murray Lakes development should be required to comply with these criteria.

Nitrogen export from the development site has the potential to impact upon the near shore marine environment adjacent to the Peel-Harvey system, as nitrogen is the limiting nutrient in the marine environment. The Section 46 Report has outlined that, in comparison to the original Sunland proposal, the current Murray Lakes proposal will increase the application of nitrogen from 10 tpa to 12.4 tpa. However, this represents a reduced application per hectare over the gross development area (25.2 kg/ha for the original Sunland proposal compared to 23.5 kg/ha for the Murray Lakes proposal).

The proponent has made a number of commitments to keep the nitrogen application to a practical minimum including monitoring of nutrient levels in the soils to determine irrigation nutrient requirements and operate to these. The nutrient levels in the irrigation lakes will also be regularly monitored. Furthermore, the commitment by the proponent to contain surface run-off on-site except for when rainfall causes flooding greater than that expected in 1:10 years, will reduce nitrogen export from the site.

No target loads or concentrations have been set for nitrogen for the Peel-Harvey system at this time. The Southern Metropolitan Coastal Water Study (DEP 1996) recommends, however, that environmental protection policies and integrated catchment management strategies for the catchment of the Peel-Harvey Estuary should incorporate the objective of minimising nutrient inputs to the coastal waters to assist in maintaining ecosystem integrity for the Shoalwater Islands Marine Park.

The EPA therefore considers that the proponent's nutrient management plan should identify an acceptable nitrogen discharge load to be achieved from the property.

Having particular regard to the proponent's commitments with respect to reducing nutrient application onto the development site and with respect to protecting surface water quality, it is the EPA's opinion that the proposed modifications to the project are unlikely to compromise the EPA's objective for surface water quality, provided that existing Ministerial Conditions 1, 2, 4 and 7 (proponent's commitments, nutrients and drainage) are amended as set out below:

(a) the proponent's revised and additional commitments made in the Section 46 Report should be made enforceable;

(b) the proponent should be required to:

(i) after the establishment of the development, ensure that nutrient input to the site does not exceed 1.2 tonnes of phosphorus/year and that phosphorus export does not exceed, on average, 140 kg/year;

(ii) identify an acceptable nitrogen discharge load consistent with minimising the nitrogen discharge from the property; and

(iii) prepare and implement a nutrient management plan to the requirements of the EPA to ensure that soil and water nutrient loadings are logged and that agreed nutrient limits are achieved.

(c) the proponent should be required to:

(i) design and construct the drainage system within the development site to the requirements of the Shire of Murray and the Water and Rivers Commission;

(ii) ensure that all surface drainage is retained on-site except when rainfall causes flooding of severity equal or greater than that expected in 1:10 years, and that there is sufficient storage capacity on-site to store the runoff from a 1 in 10 year storm event for a minimum of three days; and

(iii) take into consideration during subdivision design, the impacts from potential overflows from the proposed sewage pumping station.

3.3 Regionally significant wetlands

Aspects of regionally significant wetlands

The establishment of the Environmental Protection (Swan Coastal Plain Lakes) Policy (Lakes EPP) gives statutory protection to a number of designated lakes on the Swan Coastal Plain (Environmental Protection Act, 1986b). The purpose of this policy is "to protect the environmental values of lakes on the Swan Coastal Plain" (Environmental Protection Act, 1986b). This policy prohibits the degradation of lakes designated under this policy, and promotes their rehabilitation or enhancement.

A section of the remnant river channel located towards the north eastern corner of Lot 1 of the development site has been classified as an EPP wetland (Figure 2:Appendix 1). There is an existing road cutting through this wetland, and this access road is also included in the approved Sunland proposal and the current Murray Lakes proposal. The current proposal also includes residential dwellings adjacent to the EPP wetland (Figure 3:Appendix 1).

The proponent has outlined that the amended proposal will not modify the existing wetland protected under the Lakes EPP, and that the protection of this wetland will be addressed in the Wetlands Management Plan (Section 46 Report).

Assessment

The area considered for assessment of this relevant environmental factor is the Swan Coastal Plain, as this is the area defined for the application of the Lakes EPP.

The EPA's objective in regard to this environmental factor is "To protect regionally significant wetlands and to maintain the abundance, species diversity, geographic distribution and productivity of wetland ecosystems".

The EPA notes that the proposed modifications to the project are not expected to alter the project's impacts on the EPP wetland on the development site.

The proponent has committed to protect the environmental values of the EPP wetland. This will be further addressed by the proponent's commitment to prepare a Wetland Management Plan to the satisfaction of the DEP and the Water and Rivers Commission to address the management of all natural and artificial waterbodies on the site, including habitat protection and enhancement and water quality maintenance. The Wetland Management Plan also needs to incorporate monitoring, suitable criteria and a timeframe as well as incorporating measures to manage the potential impacts from increased traffic using the road cutting through the EPP wetland.

Having particular regard to the proponent's commitment to prepare a Wetland Management Plan, it is the EPA's opinion that the proposed modifications to the project are unlikely to compromise its objectives for regionally significant wetlands.

3.4 Vegetation in existing conservation estate

Aspects of vegetation in existing conservation estate

Proposed modifications to the project include the incorporation of an area of land which abuts an area included in the Department of Conservation and Environment's (DCE's) System 6 recommendation C50 (DCE, 1983). This area of land is also designated as a reserve for the purposes of conservation of flora and fauna.

Although the proposed development will not directly impact upon the conservation area, the development has the potential to increase fire risk, and the introduction of litter, weeds, feral and domestic animals into the conservation area.

The proponent has outlined that management of the common boundary between the development site and the System 6 area is to be incorporated into the Conservation Management Plan (Section 46 Report). It is considered that such management will ensure that no adverse impacts on the System 6 area result from the proposed development.

Assessment

The area considered for the assessment of this relevant environmental factor is the area covered in the EPA's System 6 recommendations which cover the 'Darling System'.

The DCE's recommendations for the System 6 area C50 (Reserve 4990) which apply to the land abutting the development area are that adjacent reserves be incorporated into reserve 4990, and that, if deemed appropriate through planning procedures, the reserve should be designated and managed as a Regional Park (DCE, 1983).

The EPA's objective in regard to this environmental factor is "To protect vegetation in the existing conservation estate".

The Department of Conservation and Land Management (CALM) has outlined that it would prefer the golf course in the south west corner of the development to be positioned so that the fairway is parallel to the Nature Reserve boundary to assist in fire protection. The proponent has advised that the plan will be reviewed to establish whether a suitable design to achieve fire protection can be attained.

The EPA notes that the modified proposal is not expected to directly impact upon vegetation in the adjacent conservation estate. However, the common boundary between the proposed development and the System 6 area increases the risk of fire and the introduction of litter, weeds, feral and domestic animals to the conservation area. The proponent has made a commitment to reduce these potential impacts on flora and fauna through the preparation and implementation of a Conservation Management Plan. This plan is to be prepared to the satisfaction of the EPA and CALM, and will include fencing, fire management, and control of weeds, litter, feral and domestic animals. Additionally, the plan will specifically incorporate

appropriate management of the common boundary between the development site and the System 6 area.

Having particular regard to the proponent's commitment to protect vegetation in the existing conservation estate through the preparation and implementation of a conservation management plan, it is the EPA's opinion that the proposed modifications to the project are unlikely to compromise its objective for vegetation in existing conservation estate or recommendations made by the DCE in the System 6 report.

3.5 Locally significant wetlands

Aspects of locally significant wetlands

A number of wetlands exist in the proposed development area (Figure 2:Appendix 1). The EPA has developed a guide for identifying specific management objectives for protection of wetlands on the Swan Coastal Plain (EPA, 1993a).

An assessment of the wetland management categories of the wetlands found in the development area is provided in the Section 46 Report.

The proponent has stated that there will be no modification to existing wetland areas assessed as having 'Conservation' management objectives. Conservation wetlands are located in the north-western corner of Lot 1, shown in Figure 2, Appendix 1. Wetland areas assessed as having 'Resource enhancement' management objectives are located largely within the floodway located on Lot 1 (Figure 2:Appendix 1). The majority of this wetland area will not be modified, though the southern section of the wetland area will be modified for the development of a recreation lake (Figure 3:Appendix 1). The recreation lake will be designed to enhance the value of the lake for wading birds and waterbirds (Section 46 Report).

The Section 46 Report indicates that to manage salinity in the irrigation lakes it will be necessary to discharge water from these lakes to the recreation lake, which will not drain directly into the Peel-Harvey system but will be lost by seepage to groundwater. The report estimates that up to 100 kg/annum of phosphorus could be discharged to the recreation lake. The recreation lake is intended for secondary contact only, which includes sports that generally have less-frequent body contact with the water, for example boating (EPA 1993b).

Assessment

The area considered for assessment of this relevant environmental factor, locally significant wetlands, has been determined by identifying the natural wetland group, or consanguineous suite, which the wetlands have been classified under. The wetlands of the development area are classified as belonging to the consanguineous suite 'Peel-Harvey Estuary suite - E3' (Hill et al, 1996). This suite is found in the area of the Peel-Harvey Estuary . There is also a small section of palusplain towards the southeast of the development area which is classified as belonging to the 'Keysbrook suite - P1' (Hill et al, 1996). This suite is located in alluvial fans along the foothills of the Darling Scarp between Forrestfield Lake and Brunswick Junction (Figure 4:Appendix 1).

The EPA's objective in regard to this environmental factor is "Where possible, to protect locally significant wetlands and to ensure that the abundance, species diversity, geographic distribution and productivity of wetland ecosystems is maintained or enhanced. Where not possible, ensure key wetland functions are retained through replacement".

The EPA notes that the modified proposal is not expected to significantly alter the project's impact on locally significant wetlands. The proponent has outlined that there will be no modification to existing wetlands assessed as having 'Conservation' management objectives,

and that modification of wetland areas assessed as having 'Resource Enhancement' management objectives is largely confined to the excavation for and development of a recreation lake. Protection of locally significant wetlands will be further addressed in a wetland management plan to be prepared to the satisfaction of the DEP and the Water and Rivers Commission.

Conditions of approval for the Sunland proposal set by the Department of Planning and Urban Development in November 1993 included a condition that required the proposed lakes within the development to be designed and constructed to prevent nutrients from entering groundwater. Although the proponent has made a commitment to contain all surface water run-off from the development on-site except in extreme storm events, the proponent has outlined that water will be discharged from the irrigation lakes to the recreation lake, which will not drain directly into the Peel-Harvey system but will be lost by seepage to groundwater (Section 46 Report).

Best Management Practice should be followed to ensure discharge of nutrients to groundwater is minimised. The proponent has made a number of commitments to reduce nutrient application and concentration of nutrients in run-off, including encouraging the use of low phosphate fertilisers, encouraging the planting of native species with low phosphorus requirements in residential areas and using slow release phosphate fertilisers (Section 46 Report). Additionally, the Wetland Management Plan for the development should identify design measures for the recreation lake to minimise nutrient loss to the groundwater.

Having particular regard to:

(a) the fact that there will be no modification to 'Conservation' wetlands; and

(b) the proponent's commitment to prepare and implement a wetland management plan to the satisfaction of the DEP and the Water and Rivers Commission;

it is the EPA's opinion that its objective for locally significant wetlands is unlikely to be compromised by the proposed modifications to the project.

3.6 Locally significant vegetation

Aspects of locally significant vegetation

A description of the existing vegetation on the project site, including present distribution, is provided in the Section 46 Report, and illustrated in Figure 5, Appendix 1.

The modified development will involve clearing approximately 15 ha of teatree thicket and scrub in the location proposed for the golf club/driving range area and the north-western residential section of the development (Figure 5:Appendix 1). In the original Sunland proposal, approximately 33 ha of native vegetation was proposed to be cleared. As a result, the proposed modifications to the project will reduce the impacts on locally significant vegetation.

Assessment

The native vegetation of the project area is classified as 'Vasse Vegetation Complex' (Heddle et al, 1980). The Vasse Complex is found in isolated pockets on the Swan Coastal Plain from Perth to Bunbury. As a result, the area considered for assessment of this relevant environmental factor, locally significant vegetation, is the Swan Coastal Plain between Perth and Bunbury, which contains approximately 21 500 ha of the Vasse Vegetation Complex.

The EPA's objective for this environmental factor is "To protect locally significant flora and vegetation communities".

In assessing the impact of the proposal on locally significant vegetation, the loss of vegetation within the extent of the Vasse Vegetation Complex must be considered. The proposed

development will involve clearing approximately 15 ha of native vegetation (Figure 5: Appendix 1). Considering that there is 21 500 ha of Vasse Vegetation Complex on the Swan Coastal Plain, the loss of 15 ha of this complex is unlikely to compromise the EPA's objective for locally significant vegetation.

Furthermore, to compensate for this loss of 15 ha of native vegetation, the proponent has made a commitment to establish an equivalent or greater area of native vegetation. In addition, the EPA notes that the proposed development has been designed to maintain as much of the native vegetation on-site as possible.

The EPA also notes that the proponent has committed to prepare and implement a conservation and management plan to the satisfaction of the DEP, which will further address the protection of locally significant flora and vegetation communities.

Having particular regard to the proponent's commitments to maintain existing vegetation on the development site where possible, to compensate for the loss of vegetation by re-establishing an equivalent or greater area of native vegetation and the commitment to prepare and implement a conservation and management plan, it is the EPA's opinion that the proposed modifications to the project are unlikely to compromise its objective for protection of locally significant vegetation.

3.7 Mosquitoes

Aspects of mosquitoes

The proposed development is located in close proximity to a mosquito breeding area. The issue of mosquito nuisance and the potential of mosquitoes to carry disease, notably Ross River virus, needs to be considered.

Concern was raised in submissions regarding the impact of mosquitoes from near-by breeding sites and the potential for mosquito breeding sites to establish within the development, increasing the mosquito problem and Ross River virus risk. The Health Department of Western Australia identified two areas of concern in terms of mosquito nuisance and Ross River virus risk:

- The western boundary of the proposed development is less than 2 km from significant saltmarsh mosquito breeding areas located around the north-east corner of Peel Inlet. These saltmarsh areas are the breeding sites for two mosquito species which are major vectors of Ross River virus in the Peel region. Both of these species are capable of travelling the distance from the identified breeding areas to the development site. Residents and golfers at this site will be exposed to these mosquitoes year round. To minimise the risk of mosquito nuisance and associated Ross River virus, the Health Department of WA suggests that the proponent ensure residents and golfers are aware of the mosquito/Ross River virus risk, and of preventative measures; and
- The artificial lakes proposed for this development have the potential to create mosquito nuisance and an associated Ross River virus risk if not designed and managed appropriately. To prevent these proposed lakes from becoming mosquito breeding grounds, the Health Department suggests that design and maintenance criteria should be established to largely prevent colonisation by thick emergent vegetation, which prevent predation of mosquito larvae by fish, tadpoles and aquatic insects.

Assessment

The area considered for assessment of this relevant environmental factor, mosquitoes, is the area within a 10 km radius surrounding the development, as this is the distance that the Health Department has identified that one of the mosquito species will travel.

The EPA's objective in regard to this relevant factor is "To ensure that the potential for mosquito breeding is minimised, and that mosquitoes do not pose an unacceptable health threat to people in the area".

In addition to the amended conditions and commitments made by the proponent in the Section 46 Report, an amendment to commitment 5.1 has since been made by the proponent with regard to the issue of mosquitoes. The proponent has amended commitment 5.1 to "The proponent will develop a mosquito management program in conjunction with the Shire of Murray, based on non-polluting biological control methods". This amendment gives additional responsibility to the proponent to manage the issue of mosquitoes, and addresses concerns raised by the Health Department of WA in their submission to the EPA. The EPA considers that the management program should include provision for information to be provided to the public regarding mosquitoes.

In addition to the amended commitment above, the EPA notes that the proponent has designed the modified wetland environments to minimise the potential for mosquito breeding sites.

Having particular regard to:

(a) the proponent's amended commitment to develop a mosquito management program in conjunction with the Shire of Murray; and

(b) the fact that artificial wetlands will be designed and constructed by the proponent in a manner which will reduce the potential of the wetlands to become mosquito breeding sites;

it is the EPA's opinion that the modifications to the proposed development are unlikely to compromise its objective to ensure the potential for mosquito breeding is minimised and that mosquitoes do not pose an unacceptable health threat to people in the area.

4. Conditions and procedures

4.1 Conditions

In the EPA's opinion, the modified project should be subject to the following conditions if implemented:

(a) the existing Ministerial Conditions applied to the project (Ministerial Statement 79, 26 September 1989), subject to modification of Conditions 1, 2, 4 and 7 (proponent's commitments, nutrients and drainage) as set out in (b), (c) and (d) below;

(b) the proponent's revised and additional commitments made in the Section 46 Report, and the subsequent amendment to commitment 5.1 made since this report, should be made enforceable;

(c) the proponent should be required to:

  (i) after the establishment of the development, ensure that nutrient input to the site does not exceed 1.2 tonnes of phosphorus/year and that phosphorus export does not exceed, on average, 140 kg/year;

  (ii) identify an acceptable nitrogen discharge load consistent with minimising the nitrogen discharge from the property; and

(iii) prepare and implement a nutrient management plan to the requirements of the EPA to ensure that soil and water nutrient loadings are logged and that agreed nutrient limits are achieved.

(d) the proponent should be required to:

(i) design and construct the drainage system within the development site to the requirements of the Shire of Murray and the Water and Rivers Commission;

(ii) ensure that all surface drainage is retained on-site except when rainfall causes flooding of severity equal or greater than that expected in 1:10 years, and that there is sufficient storage capacity on-site to store the runoff from a 1 in 10 year storm event for a minimum of three days; and

(iii) take into consideration during subdivision design, the impacts from potential overflows from the proposed sewage pumping station.

4.2 Procedures

Mosquitoes

The proponent has made a commitment to develop a mosquito management program in conjunction with the Shire of Murray. The Shire of Murray will then implement this management program to the requirements of the Department of Environmental Protection and the Health Department of Western Australia.

5. Recommendations

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment note the relevant environmental factors and the EPA's objective set for each factor (Section 3).

Recommendation 2

That subject to the satisfactory implementation of the EPA's recommended conditions and procedures (Section 4), including the proponent's environmental management commitments, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report.

Table 2. Summary of relevant factors, objectives, proponent's commitments and EPA's opinion

RELEVANT FACTORS	ENVIRONMENTAL OBJECTIVE	PROPONENT'S COMMITMENT	EPA OPINION
1.Surface water quality	To maintain the quality of surface water to ensure discharge of nutrients from the development site is minimised as far as practical and meets agreed criteria for the Peel-Harvey system and nearshore coastal waters.	A nutrient and irrigation management plan will be prepared and implemented. All surface drainage from the development will be retained on-site and used to irrigate the golf course, except when rainfall causes flooding of severity equal or greater than that expected in 1:10 years, and there will be sufficient storage capacity on-site to store the runoff from a 1 in 10 year storm event for a minimum of three days. Total phosphate used on the development site will not exceed 1.2 tonnes per annum, and phosphorus export will not exceed, on average, 140kg per annum. Water discharged into the recreation lake will not exceed 100 kgP/annum. Residents will be encouraged to minimise fertiliser use, and the use of low phosphate fertilisers will be encouraged in residential areas and undertaken by the management. Soil and water nutrient loadings will be logged.	The EPA considers that the potential impacts on surface water quality arising from the modifications to the project can be adequately managed by the amended Ministerial Conditions and the proponent's commitments. The EPA's objective to maintain the quality of surface water to ensure discharge of nutrients from the development site is minimised as far as practical and meets agreed criteria for the Peel-Harvey system and nearshore coastal waters is unlikely to be compromised.
2.Regionally significant wetlands	To protect regionally significant wetlands and to maintain the abundance, species diversity, geographic distribution and productivity of wetland ecosystems.	A wetland management plan will be prepared to the satisfaction of the DEP and the Water and Rivers Commission to address the management of all wetlands on the site.	The EPA's objective for regionally significant wetlands can be met by the proponent's revised commitment to prepare and implement a wetland management plan.

3.Vegetation in existing conservation estate	To protect vegetation in the adjacent conservation estate.	A conservation and management plan will be prepared and implemented which will include appropriate management of the common boundary with the System 6 area.	The EPA's objective for vegetation in existing conservation estate can be met by the proponent's commitment to prepare and implement a conservation and management plan.
4.Locally significant wetlands	Where possible, to ensure that the abundance, species diversity, geographic distribution and productivity of wetland ecosystems is maintained or enhanced. Where not possible, ensure key wetland functions are retained through replacement.	A wetland management plan will be prepared to the satisfaction of the DEP and the Water and Rivers Commission to address the management of all wetlands on the site. There will be no modification to 'Conservation' wetlands	The EPA's objective for locally significant wetlands can be met by the proponent's revised commitment to prepare and implement a wetland management plan.
5.Locally significant vegetation	To protect locally significant flora and vegetation communities.	Existing vegetation will be maintained wherever possible. An area equal to or greater than that cleared will be revegetated with native species.	The modified proposal retains a larger area of existing vegetation than the original proposal for this development site. The modifications to the project are unlikely to compromise the EPA's objective to protect locally significant flora and vegetation communities.
6.Mosquitoes	To ensure that the potential for mosquito breeding is minimised, and that mosquitoes do not pose an unacceptable health threat to people in the area.	The proponent will prepare a mosquito management program in conjunction with the Shire of Murray, based on non-polluting, biological control methods, to meet the requirements of the DEP and the Health Department of WA.	The EPA's objective for mosquitoes can be met by the proponent's revised commitment to prepare a mosquito management program.

Appendix 1

Figures

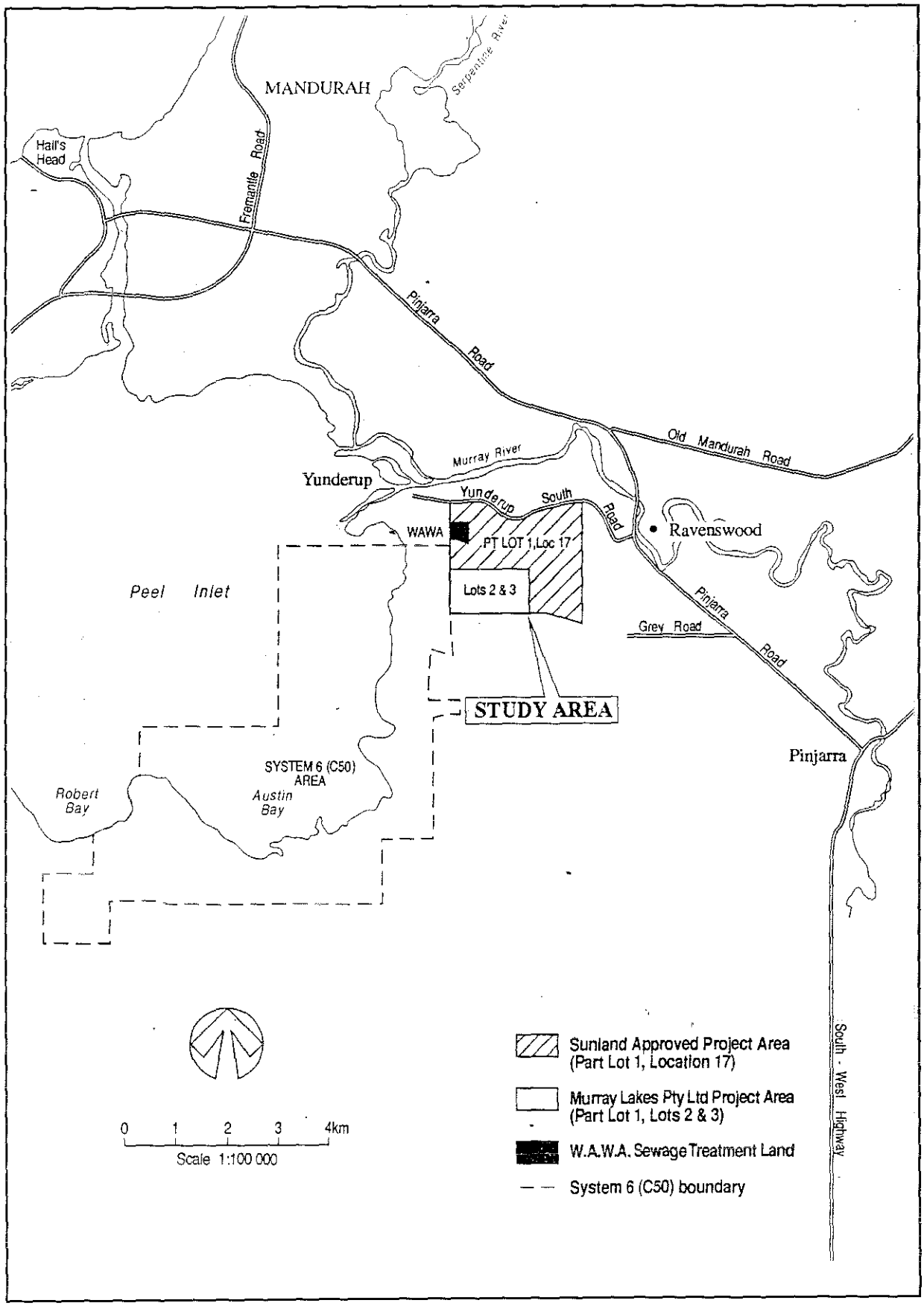


Figure 1. Location diagram (Source: LeProvost Dames & Moore).

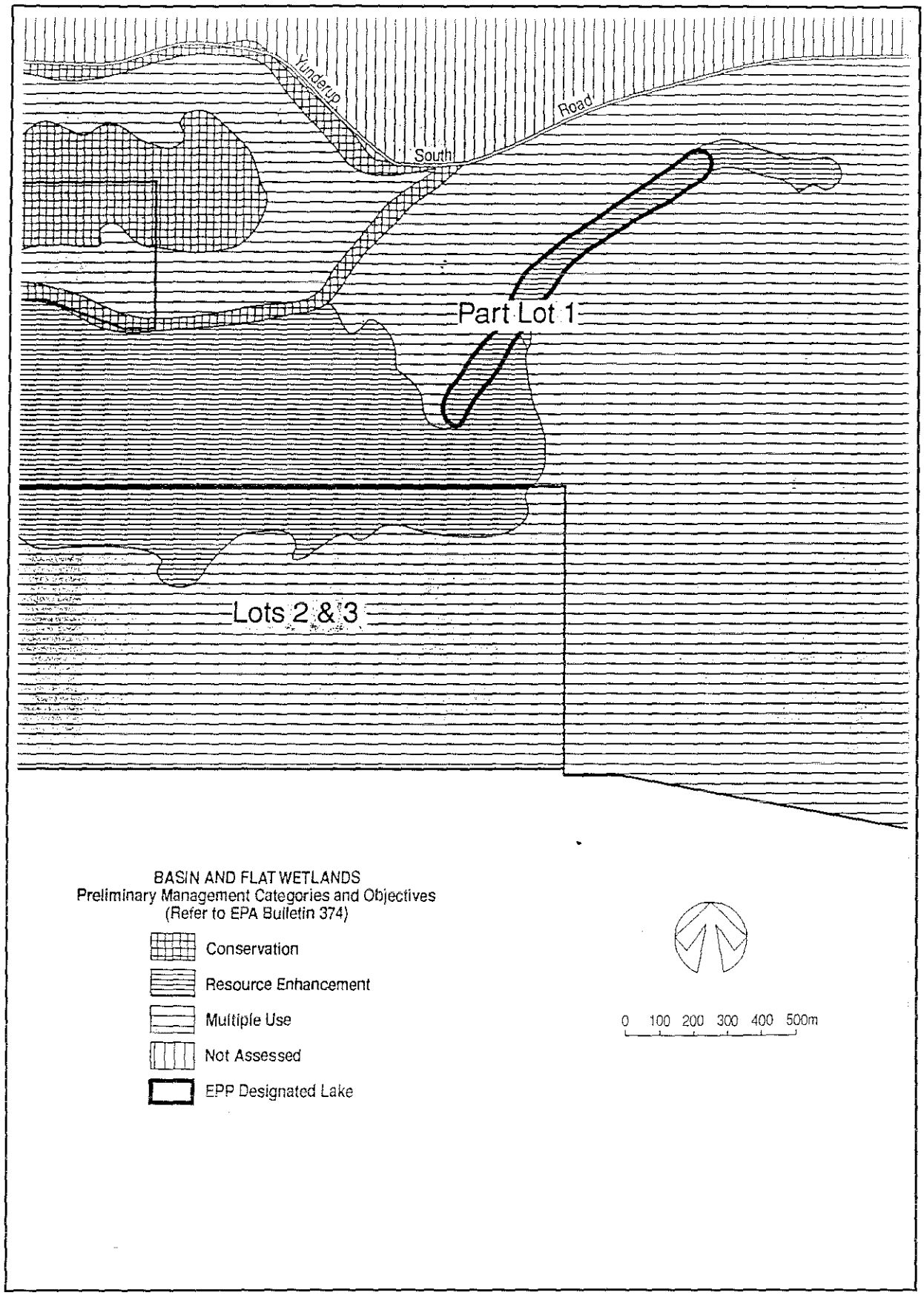


Figure 2. Revised wetland mapping (LeProvost Dames & Moore).

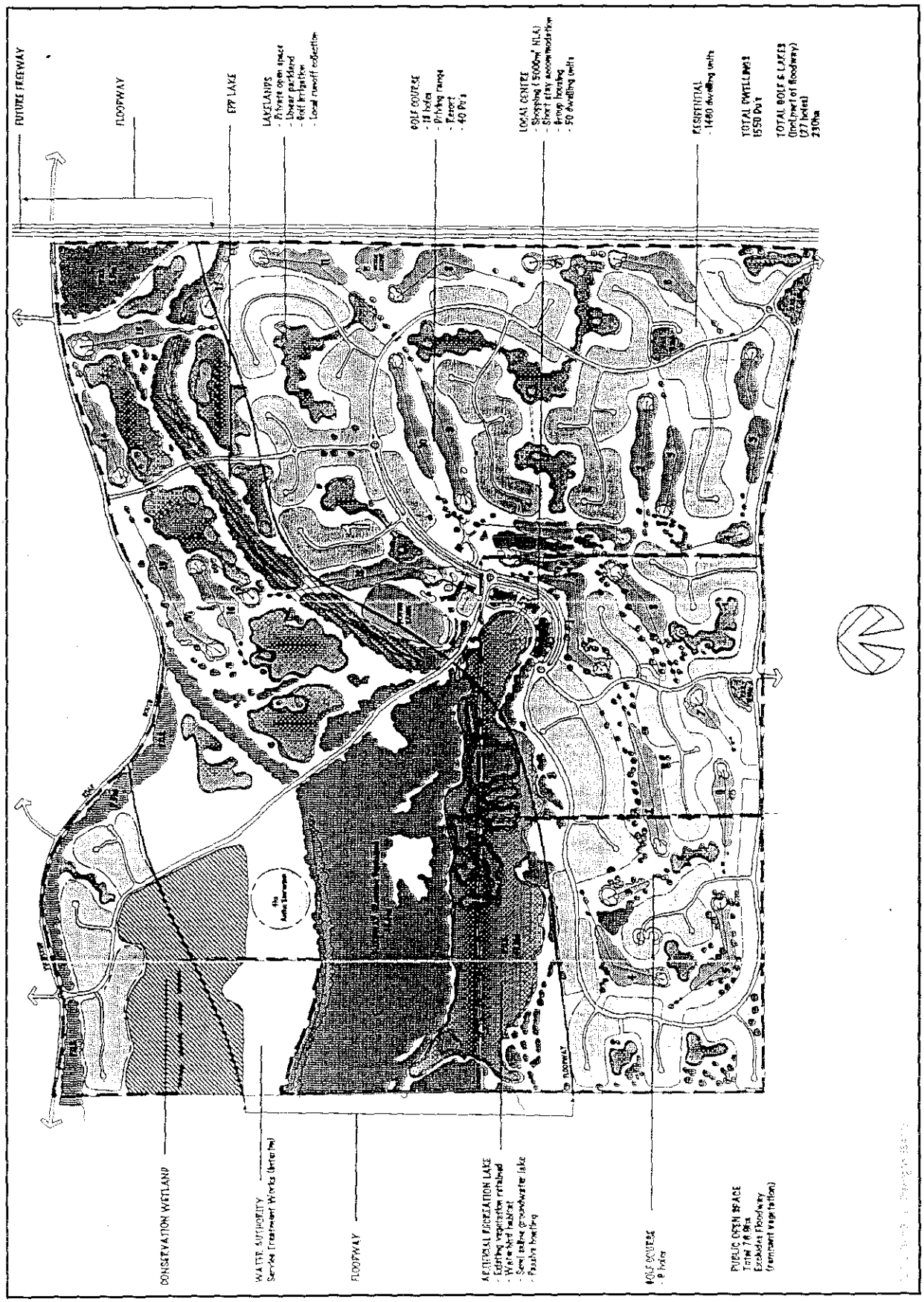
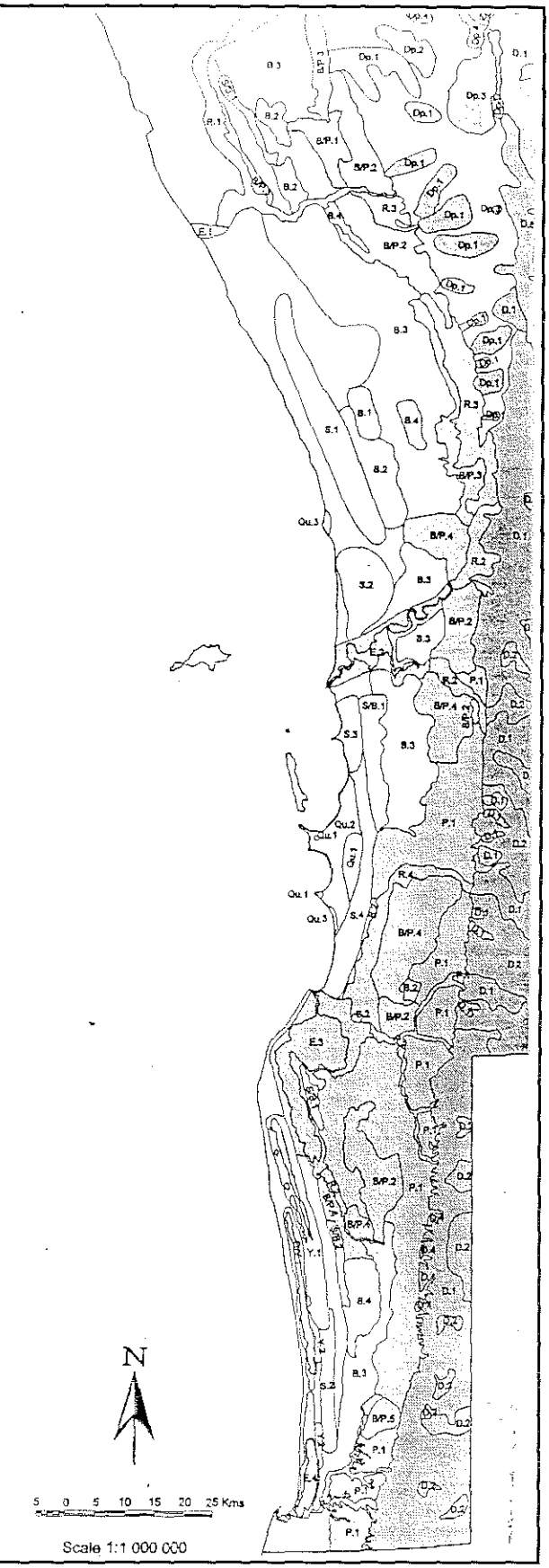


Figure 3. Concept plan (LeProvost Dames & Moore).

GEOMORPHIC SETTING	CONSANGUINEOUS WETLAND SUITES	MAP SYMBOL
Quindalup Dunes	Cooloongup	Qu.1
	Becher	Qu.2
	Peelhurst	Qu.3
Quindalup-Yoongarillup interface	Preston	Q/Y.1
Spearwood Dunes	Yanchep	S.1
	Balcatta	S.2
	Coogee	S.3
	Stakehill	S.4
Yoongarillup Plain	Clifton	Y.1
	Koorallup	Y.2
Spearwood-Bassendean Interface	Bibra	S/B.1
	Hamden	S/B.2
Bassendean Dunes	Pinjar	B.1
	Gnangara	B.2
	Jandakot	B.3
	Riverdale	B.4
Bassendean-Pinjarra transition OR Bassendean with fluvial features	Beermullah	B/P.1
	Mungala	B/P.2
	Muchea	B/P.3
	Bennet Brook	B/P.4
	Benger	B/P.5
Pinjarra Plain	Keysbrook	P.1
Estuaries	Moore Estuary	E.1
	Swan Estuary	E.2
	Peel-Harvey Estuary	E.3
	Leschenault Estuary	E.4
Coastal plain rivers	Moore River	R.1
	Swan River	R.2
	Ellen Brook	R.3
	Goegrup	R.4
Dandaragan Plateau	Red Gully	Dp.1
	Coorang	Dp.2
	Clewley	Dp.3
	Mogumber	Dp.4
Dandaragan Plateau-Darling Plateau interface	Wannamal	Dp/D
Darling Plateau	Walyunga	D.1
	Little Darlanup	D.2
	Brockman	D.6



Natural wetland groups of the Perth - Bunbury region revised following 1:25,000 geomorphic wetland mapping.

1. Refer to Table 4.2 for information on stratigraphy and hydrologic origin of wetlands in these suites.
2. This figure shows a partial list of the suites as presented in Semeniuk (1988).

Figure 4. Natural wetland groups of the Perth - Bunbury region (Source: Hill et al, 1996).

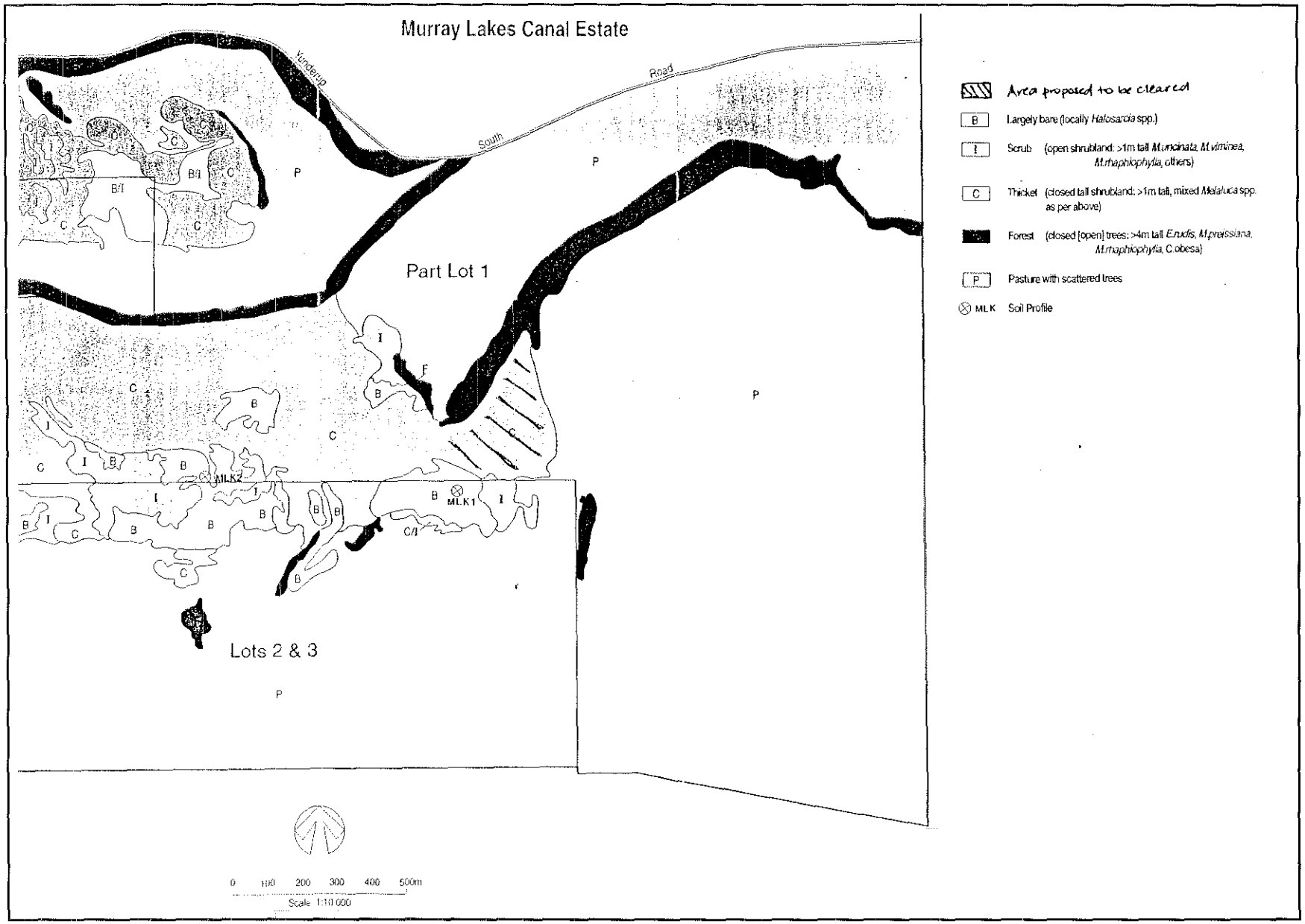


Figure 5. Vegetation mapping (Source: LeProvost Dames & Moore).

Appendix 2

List of people and organisations that made submissions

State and local government agencies

Department of Conservation and Land Management
Health Department of Western Australia
Peel Inlet Management Authority
Shire of Murray
Water and Rivers Commission

Members of the public

River Districts Association
M Campbell
J Horner

Appendix 3

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