Proposed peat mine in Lake Tamworth, Baldivis (Swan Coastal Plain Environmental Protection Policy listed lake)

LAKE TAMWORTH PARTNERSHIP

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 757
September 1994

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding environmental conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of $10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 pm on 13 October 1994.

Environmental Impact Assessment (EIA) Process Timelines in weeks

Date	EIA commences from receipt of full details of proposal by proponent	Time (weeks)
8 June 1993	Proponent Document Released for Public Comment.	
6 July 1993	Public Comment Period Closed.	4
26 July 1993	Issues Raised During Public Comment Period Summarised by EPA and Forwarded to the Proponent	3
12 November 1993	Suspended Pending Response to Issues by Proponent.	13
8 March 1994	Reactivation of proposal by proponent and Response to Issues Received from Proponent.	16
8 July 1994	Site visit by Authority members. Proponent given opportunity to provide additional information.	17
19 August 1994	Additional information provided by proponent.	6
29 September 1994	EPA Reported to the Minister for the Environment.	6

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Summary

The Lake Tamworth Partnership propose to mine peat in Lake Tamworth which is located in Baldivis, approximately 40kms south of Perth. The lake is listed for protection in the Environmental Protection (Swan Coastal Plain Lakes) Policy which prohibits unauthorised filling, mining, drainage or effluent discharge into nominated wetlands. The proposal was the subject of a Consultative Environmental Review with a four week public review period.

The lake is a shallow wetland occupying approximately 40 hectares and is covered in part by dense thickets of native reeds and other wetland vegetation. The reed beds are closely correlated with peat depth. Approximately 20 hectares of land would be directly affected by the proposal.

The lake has considerable conservation value and is important in a regional sense because few rush covered lakes remain which provide the vegetation structure and habitat opportunities needed for several uncommon and shy species of waterfowl. Relatively natural and unpolluted, reed dominated wetlands like Lake Tamworth are becoming increasingly rare in Perth's hinterland.

The proposed rehabilitation programme after mining would result in a deeper lake with more open water. While this may restore aesthetic values and will create new opportunities for some common bird and animal species, the proposal would significantly alter the existing ecological function of the wetland. Lake Tamworth would be deeper once the peat is removed and the existing habitat provided by the native reeds will be limited to the wetland edges and the shoreline of the constructed islands. This would diminish the opportunities for the uncommon and shy waterfowl and other fauna.

The Environmental Protection Authority (EPA) does not support the proposal as it is inconsistent with the intent of the Environmental Protection (Swan Coastal Plain Lakes) Policy. Additionally, it would not result in significant improvements to the environmental quality and attributes of Lake Tamworth or the level of habitat diversity in the overall wetland estate in the policy area.

Lake Tamworth has been proposed for reservation for Parks and Recreation by the State Planning Commission in view of its regional conservation value as a wetland and its proximity to excellent examples of upland woodland vegetation on Tamworth Hill. Tamworth Hill is already reserved under the Metropolitan Region Scheme. The EPA supports the position of the State Planning Commission.

Assuming that the reservation proceeds, the Environmental Protection Authority is keen to ensure that a management strategy is formulated and implemented to minimise any adverse environmental impacts which may arise from urbanisation in the Baldivis area.

Recommendation Number	Summary of views and recommendations of the Environmental Protection Authority
1	Proposal is environmentally unacceptable and should not proceed.
2	To maintain environmental values in the future, an environmental management strategy should be prepared prior to the commencement of urbanisation in the Baldivis area and be resourced and implemented.

1. Introduction and background

The Lake Tamworth Partnership proposes to mine peat within Lake Tamworth which is located on Eighty Road Baldivis, 40kms south of Perth (Figure 1). The lake (sometimes referred to as Tamworth Hill Swamp) is a wetland averaging one metre deep which occupies approximately 40 hectares and is covered by dense thickets of native reeds.

Reed wetlands are comparatively rare and are important to a number of uncommon and shy waterfowl species such as the Australian Crake, Buff-banded Rail and Dusky Moorhen. The native sedges are confined to depths of 48cms. Approximately 20 hectares of land would be directly affected by the proposal.

Lake Tamworth is part of a series of wetlands lying between the Quindalup and Spearwood dune systems and formed in the low interbarrier depressions on old shorelines. Yellow-brown Guildford clays occur on the eastern boundary of the wetland. A layer of peat to a depth exceeding three metres has formed over sand as a result of the decomposition of organic matter.

The proposal involves the excavation of peat on private land over a five year period. The peat would be used in the landscaping industry for soil amendment.

The proposal was referred to the Environmental Protection Authority (EPA) by the Department of Minerals and Energy (formerly the Department of Mines) following an application by the proponent for a mining lease (ML 70/588). The proposal was subsequently referred to the EPA for advice because the wetland is listed for protection in the Government's Environmental Protection Policy (Swan Coastal Plain), 1992 (see Department of Land Administration; Miscellaneous plan 1815; sheet 13, 1992). Several other government departments also brought the proposal to the Authority's attention.

The Authority decided to assess the proposal at the level of Consultative Environmental Review (CER) due to the status of Lake Tamworth as an EPP lake and the potential impact of the mining on conservation values within the lake.

2. Summary description of proposal

The proposal involves the excavation of peat from the first three metres of the lake bed (see Figure 2). Mining would proceed in stages with affected areas being progressively dewatered, excavated and rehabilitated (Wood and Grieve, 1993).

The peat extraction and rehabilitation activities would be staged through a regulated, cellular mining procedure. Fifteen, one hectare cells would be constructed over the life of the proposal.

Each cell would be dewatered using drains and mechanical pumps and the water directed to another location within the lake. Following dewatering, reeds within cells would be stripped using earthmoving machinery and stockpiled for use in the rehabilitation programme.

The dewatered peat material would then be removed from the active cell and stockpiled in a single operation to reduce disturbance. Conventional earthmoving machinery (eg. loaders and trucks) would be used and the peat stockpiled for sale.

Following excavation, the exposed base of each cell would be reprofiled at a gradient of 1:3 to 1:5 to provide habitat for waterfowl. A layer of approximately 300mm of peat would be replaced on the lake floor. The reprofiling works would result in small islands and new foreshores within the excavated areas of the wetland.

Native reeds, shrubs and trees would be planted following reprofiling, and pumping stopped to allow the groundwater to rise within the cell. Works would then progress to clear, dewater and excavate the next cell.

Figure 1. Location of proposed peat mine in Lake Tamworth, Baldivis.

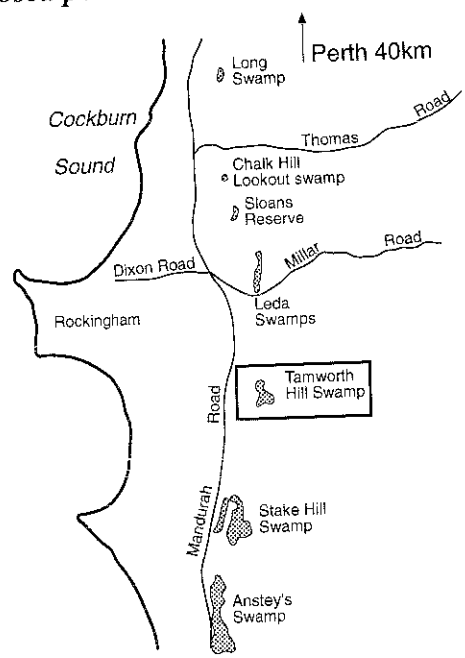
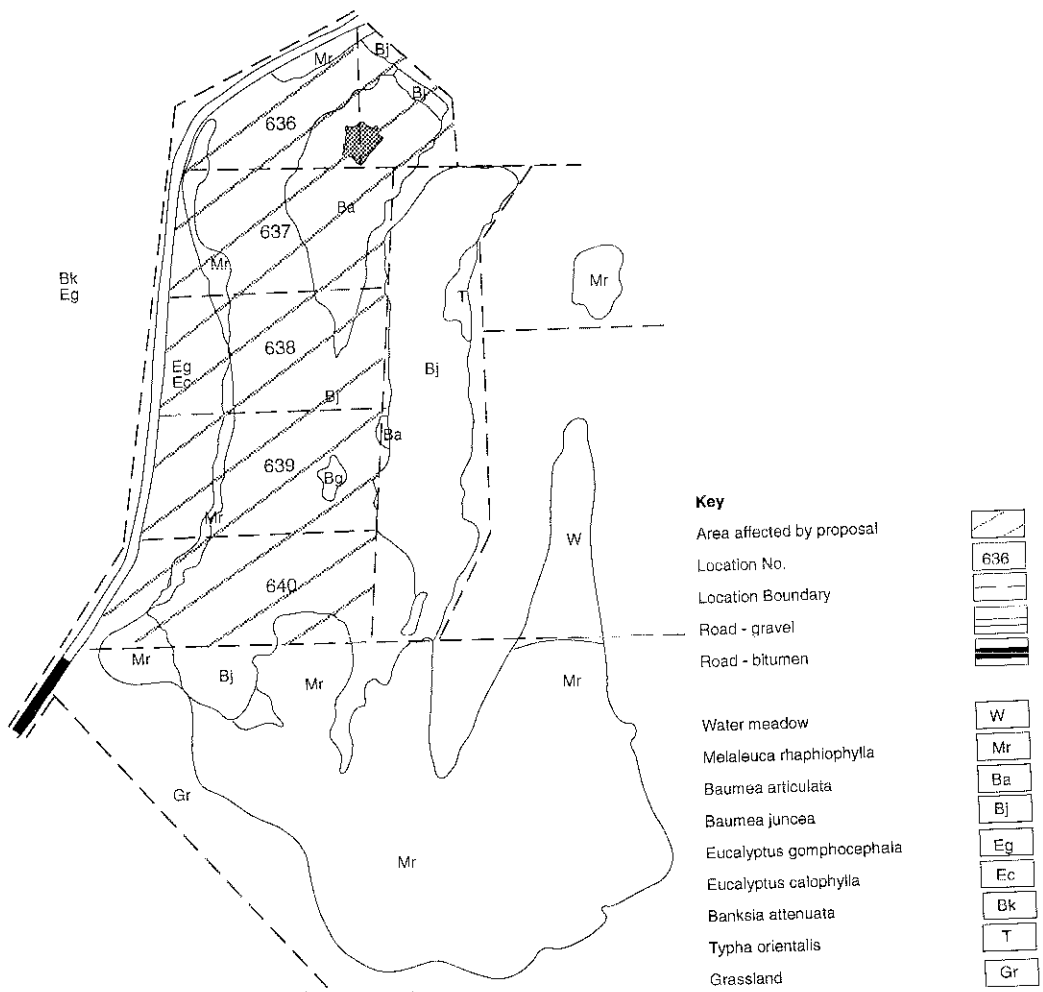


Figure 2. Area of lake subject to mining showing vegetation types.*



* Figure adapted from CER document

3. Environmental impact assessment process

The environmental impact assessment for this proposal followed the Environmental Protection Authority's impact assessment administrative procedures (1993).

The CER was released for public review from 8 June to 6 July 1993. A total of 29 written submissions were received, with seven representing local land owners and the remainder from State and local government bodies, conservation groups, and private individuals.

Details of the major issues raised during the public review period were summarised and provided to the proponent for a response in question form. The summary of submissions and the proponents response to those submissions appears in Appendix 1, and a list of submitters appears as Appendix 2.

It should be noted that the assessment was suspended for approximately three months while the proponent's considered their response to the public submissions and sought clarification on land zoning issues from the Department of Planning and Urban Development.

The EPA was formally notified by the proponent in November 1993 of the intention to suspend the proposal indefinitely. The proponent initiated the recommencement of the assessment by letter in March 1994.

Members of the Environmental Protection Authority visited the site in July 1994 to familiarise themselves with the proposal and to discuss issues of concern with the proponent. During the meeting the proponent was asked to clarify their response to several issues raised in the public submissions. The additional information is presented in Appendix 3.

4. Evaluation

The evaluation of this proposal was dependent on the environmental protection policy, the assessment of the conservation significance of this wetland, and whether the proposed mining activity and rehabilitation would detrimentally affect wetland attributes and existing values. Conservation significance is a reflection of specific wetland attributes, such as water quality, the extent of fringing vegetation, and animal habitat. Due to the inter-related nature of the various issues contributing to conservation significance, the following discussion does not imply the relative importance of each.

4.1. Mining impacts on lake vegetation

4.1.1 Objective

To determine the likely impact of peat excavation on the existing vegetation in the lake and the likelihood of vegetation re-establishment. The proponent will access the lake through existing gaps in the fringing vegetation, and will replant native reeds, after the removal of three metres of substrate, in 300mm of peat.

4.1.2 Evaluation framework

Technical information

Lake Tamworth has previously been described as a twig rush (ie *Baumea*) sedgeland with a paperbark fringe and a small area of open water (EPA, 1990a). Large areas of the wetland are covered with dense vegetation comprising low *Melaleuca rhaphiophylla* trees, *Baumea articulata* and *Baumea juncea* reeds, and some *Typha orientalis* or bullrushes (see Figure 2). There is a

strong correlation between the location of the reed beds and the depth of peat in the lake. The high moisture level in the peat enable the reeds to survive in periods when the water level falls below the surface of the lake (see Froend et al, 1993c). Remnant stands of *Eucalyptus gomphocephala* and *Eucalyptus calophylla* are present along the western boundary of the lake. Native reed swamps such as this are becoming increasingly rare in the metropolitan area.

While there is evidence of disturbance in parts of the wetland from past agricultural and other landuse activities (such as tree felling, grazing and fire), the vegetation has for the most part recovered, and is in good condition. The relative integrity and stability of the plant community is supported by the fact that less than two per cent of the wetland area is covered by *Typha* spp. Large areas of *Typha* are often found in disturbed and degraded wetlands on the Swan Coastal Plain. The reed beds within the proposed mine site comprise native species which are extensive and vigorous.

The hydrological records of the Water Authority of Western Australia show that the highest recorded water level in Lake Tamworth is 3.03m AHD. As the lake bed lies at 2m AHD the maximum depth of the lake under the wettest climatic conditions is now approximately one metre. The average depth of the lake is significantly less than one metre in winter under average climatic conditions. The water level falls to very low levels during most summers, exposing the reed beds. Assuming that most of the peat is removed during mining, the final water depth will range from one to four metres.

The location of emergent vegetation in wetlands on the Swan Coastal Plain is known to be strongly influenced by hydrology (see Froend et al, 1993). Important hydrological factors include water depth and the period and timing of inundation.

Information contained in the proposal document shows that the main vegetation species within Lake Tamworth are associated with distinct water depths. For example, the dominant species, *B. juncea*, is associated with a mean water level of 48cms. This compares with 75cm for the joint twig rushes (*B. articulata)*, and 30cms for the *Melaleuca spp.*.

Existing policy framework

The Environmental Protection (Swan Coastal Plain Lakes) Policy aims to provide for a diversity of habitat types in lakes on the Swan Coastal Plain. A reduction in the area of uncommon vegetation types would be inconsistent with the policy. The background to the policy and its intent is discussed in detail in section 4.2.2.

Public submissions

Dense reed wetland types such as Lake Tamworth are important breeding areas for waterbirds. Some submitters felt that the CER implied that the vegetation was degraded and that the proposal was aimed at enhancing a degraded wetland when this is not the case.

A number of submitters felt there was a lack of detailed surveys to determine the presence or absence of rare and endangered flora.

4.1.3 Evaluation

The presence of extensive and vigorous native reed beds indicates a stable ecosystem. The vegetation has shown good recovery from disturbance reflecting the viability of the existing plant communities. This viability is dependent on maintenance of existing depth and substrate in the lake. If the peat is removed and the water depth increased, the important native reeds will not be able to re-establish. The presence of fringing vegetation and reed communities also provides a buffering effect in the maintenance of water quality. The current composition and distribution of vegetation, combined with the good water quality as indicated in section 4.3.2 suggest that the objectives of the EPP can be best achieved by maintaining the wetland as it is. That is, the proponent's commitment to the rehabilitation of the lake will not achieve the objective of the policy, and the adequate replacement of the existing vegetation.

4.2. Conservation significance of Lake Tamworth

4.2.1 Objective

To recognise the special legal significance accorded Lake Tamworth by the Environmental Protection Policy and determine the conservation significance of the lake, so that the impact of mining on wetland attributes can be assessed. The proponent made the commitment that a degraded wetland would be rehabilitated to a viable ecosystem.

4.2.2 Evaluation framework

Technical information

The Authority assesses the condition of individual wetlands using an evaluation technique which quantifies selected physical, biological and social parameters using a questionnaire (see EPA, 1990b and EPA, 1993b). The technique places the wetland into one of the following five management categories: High Conservation (Category H); Conservation (Category C); Conservation and Recreation (Category O); Resource Enhancement (Category R) and Multiple Use (Category M). Wetlands which are evaluated as Category R or M have been significantly modified by human use and it is in these categories where there are sometimes opportunities for development.

The evaluation technique has been extensively field tested over the past five years with more than 2300 wetlands being evaluated to date.

Outcome of the evaluation

The environmental attributes of Lake Tamworth were evaluated by officers of the Department of Environmental Protection in September 1993 as part of this assessment. The evaluation placed the lake in Category C (Conservation). This outcome differs from that stated in the proposal document which placed the lake in Category R (Resource Enhancement).

An examination of the proponent's evaluation documentation suggests that the Authority's procedure for carrying out the evaluation may have been misinterpreted. As a result the scoring of the natural attributes questionnaire appears low, placing the wetland in Category R.

The proponent also points to the results of an evaluation conducted in 1986 to support their claim that the wetland falls into Category R. The difference in outcome between the earlier evaluation and that conducted by officers of the Department of Environmental Protection can be attributed to several factors. These include differences in the natural attributes questionnaires and changes in landuse within the lake. The improvement in environmental quality has presumably resulted from the cessation of grazing and other high impact landuses over the past nine years. The potential for different outcomes due to changes in landuse and the passage of time is discussed in the evaluation documentation (see EPA, 1990b).

There have been two other independent evaluations of the lake in recent years. These evaluations placed Lake Tamworth in Category C (Hill et al, in press) and Category O (Semeniuk Research Group, 1991). The difference in outcome can be attributed to the inclusion of the degraded wetland buffer area in the evaluation conducted by the latter author. Significantly, both evaluations place the lake in a conservation category.

The Semeniuk Research Group also assessed the lake as part of a broader study of the wetlands of the City of Rockingham using a technique developed for the Water Resources Council of Western Australia. That assessment classified the lake as being "Regionally Significant". The following statement relating to mining activities was offered in that study:

"*... the alteration of the natural features of the wetlands by deepening them, or excavating them, or developing them, diminishes or removes the attraction of these wetlands for education, research studies, nature trails, and even picnic grounds. If artificial excavations are made in wetlands, the true natural history of the wetland is lost to the degree that the alteration is affected ....*" (Semeniuk Research Group, 1991).

Existing policy framework

Environmental Protection (Swan Coastal Plain Lakes) Policy

The West Australian Government released an Environmental Protection Policy aimed at preventing the further destruction and/or degradation of lakes on the Swan Coastal Plain in 1992. Approximately 70 per cent of wetlands in the nominated area have been lost during the past 150 years.

The policy, referred to as the Environmental Protection (Swan Coastal Plain Lakes) Policy (Government of Western Australia, 1992) was proclaimed following extensive consultation with community groups, including private land owners.

The Lakes EPP prohibits unauthorised filling, mining, drainage or effluent discharge into nominated lakes. Lakes listed in this policy have the highest level of protection under the Environmental Protection Act and there is a presumption against approving developments that are likely to breach the intent of the policy (EPA, 1993a). Lake Tamworth is listed for protection in the policy.

The intent of the Environmental Protection Policy

When formulating the Lakes EPP, the Environmental Protection Authority was cognisant of the need to preserve genetic diversity within the wetlands in the policy area (EPA, 1990c). The importance of genetic diversity is also recognised in the State Conservation Strategy (Department of Conservation and Environment, 1987) and in international conservation initiatives such as the Convention on Biological Diversity (Department of the Environment, Sport and Territories, 1994) to which the Federal Government is a signatory.

To ensure the maintenance of genetic diversity in the wetland estate, wetlands with different physical, morphological, geological, hydrological and ecological characteristics and histories were included in the policy. The range of wetland types ensures that there are opportunities for different flora and fauna at any one point in time.

As previously mentioned, reed swamps such as Lake Tamworth are comparatively rare in the metropolitan area. In contrast, wetlands with large open water bodies are comparatively common (see Hill et al, 1994).

Development affecting EPP wetlands can only be considered following referral to the EPA for assessment of the likely environmental impacts of the proposed activity.

EPA Precedents

Notwithstanding the Environmental Protection Authority's presumption against approving developments likely to breach the intent of the EPP, it is a requirement under the Environmental Protection Act (1986) for the Authority to assess each proposal on its merits. Since the release of the Lakes EPP the Authority has supported a small number of proposals for the enhancement of EPP listed lakes, including Cedric Street Wetland (EPA Bulletin 658), Pelican Point (EPA Bulletin 616), and Lake Gnangara (EPA Bulletin 438).

This support was offered because those developments were in highly degraded lakes and/or the proposal would result in a significant improvement in the environmental quality and attributes of the wetland (such as water quality, species and habitat diversity, functional area).

Structure Plan for the South West Corridor

The environmental and recreational value of Lake Tamworth was recognised in the Structure Plan for the South West Corridor prepared by the Department of Planning and Urban Development. The structure plan identified the lake as being important in conservation terms

and an *"... excellent educational facility given the range of flora and fauna."* (Department of Planning and Urban Development, 1993). The lake was identified for future reservation in the Metropolitan Region Scheme as Parks and Recreation. It is currently zoned Rural under the Metropolitan Region Scheme.

Comments from and negotiations with key government agencies

The Department of Planning and Urban Development provided the following advice in its submission on the proposal to mine the lake:

"... the subject land has been proposed for inclusion in a Parks and Recreation reservation for the Rockingham Major Amendment. The implications of the amendment are that the wetland will be acquired and managed and the proposal as submitted in the Consultative Environmental Review will be contrary to the purposes of the reservation and unlikely to receive development approval from the State Planning Commission."

Recent discussions with DPUD suggest that the rezoning should be finalised by November 1994.

Subsequent to the Structure Plan, the State Planning Commission has prepared a major amendment to the Metropolitan Region Scheme (Amendment No. 937/33) which confirms the intention of the Commission to propose reservation of the land including Lake Tamworth. The proposal is:

"... to reserve the land for Parks and Recreation in view of its conservation value as a wetland and its proximity to excellent examples of upland woodland vegetation on Tamworth Hill (which is already reserved under the Metropolitan Region Scheme)." (State Planning Commission, 1993).

The City of Rockingham also opposed the mining of the wetland on planning and environmental grounds.

Public submissions

Public submissions raised concerns about the lack of detailed surveys to determine the presence or absence of rare and endangered flora and fauna, and Aboriginal or archaeological sites. Some submissions also expressed concern at the wetland management category determined by the proponent, and felt strongly that the wetland should not be degraded prior to its reservation. A large number of submitters felt that the Lake Tamworth's inclusion as an EPP wetland should automatically preclude mining from occurring.

Several submissions by local residents supported the proposal on economic and aesthetic grounds.

4.2.3 Evaluation

The increase in depth and consequent reduction in the area of the lake which would support native reeds would reduce the habitat opportunities available in Lake Tamworth as a result of the proposal. This would reduce the conservation value for uncommon and shy waterbirds by decreasing the area of already uncommon reed dominated lakes. Such a reduction in habitat opportunities is inconsistent with the objectives of the EPP.

An examination of the proponent's evaluation documentation (contained in Appendix 4) suggests that the Authority's procedure for carrying out the evaluation may have been misinterpreted. As a result the scoring of the natural attributes questionnaire appears low, placing the wetland in Category R.

The evaluations by the Department of Environmental Protection, the Water Authority of Western Australia, and the Semeniuk Research Group suggest that the conservation importance of the wetland is considerable. Consequently the proponent's commitment to rehabilitate the wetland through this proposal is redundant.

4.3. Potential for degradation of water quality and the micro-biological environment

4.3.1 Objective

The removal of peat from the bottom of the wetland will increase the water depth and has the potential to significantly influence the physical and chemical composition of the water column. The assessment of the removal of three metres of peat as planned within this proposal must therefore give due consideration to impacts on water quality and the potential disturbance of the wetland biota. The proponent made the commitment that a degraded wetland would be rehabilitated to a viable ecosystem.

4.3.2 Evaluation framework

Technical information

Investigations conducted by Streamtec (1991) demonstrated the high biological quality of the water within Lake Tamworth. Salinity and nutrient levels were very low (total NO_3^- <1.0 mg/L and total P = 0.02 mg/L) and the values of dissolved oxygen were at or near saturation. Typical wetlands of the Swan Coastal Plain show a peak phosphorus concentration during summer (eg 0.964 mg/L in Lake Monger) and yearly mean values of about 0.02 - 0.20 mg/L (Davis and Rolls, 1987). The lake is slightly alkaline. The water chemistry shows that the lake is relatively unpolluted, which is rare for wetlands in the metropolitan area.

A survey of the macro-invertebrate fauna within Lake Tamworth was conducted by Streamtec, (1991). The survey showed that there was a highly diverse macro-invertebrate fauna within this wetland with in excess of 48 taxa identified. The total number of species identified is high for wetlands in the Perth metropolitan area (see Davis and Rolls, 1987) and is due to the good water quality and diversity of habitats within the wetland (Streamtec, 1991).

Macro-invertebrates are the basis of the wetland food chain and are the dominant food resource for waterfowl (Riggert, 1966). The diversity of water bird populations is closely linked to macro-invertebrate abundance (Maher and Carpenter, 1984).

Peat mining has the potential to impact on the pH of the lake and its biological diversity in the long term. A recent study into the cause of the unusually high acidity of Lake Gnangara in Wanneroo, suggests that the phenomenon is the result of peat mining in the 1940s (John, 1994, pers. comm., 7 June). John concluded that the lake was originally alkaline and the high pH stems from the conversion of the sulphur present in the peat to sulphate and sulphide after exposure to the atmosphere. The latter compound is then converted to sulphuric acid by rainwater. Lake Gnangara is now biologically depauperate with a recent survey indicating the presence of only a few invertebrate species (see Davis and Rolls, 1987).

The underlying soils at Lake Tamworth are derived from Tamala limestone and Safety Bay sands of the Spearwood Dune system. They are typically yellow unlithified sands with variable amounts of quartz. Yellow-brown Guildford clays occur on the eastern boundary of the wetland.

The underlying sands have a much greater permeability than peat. Consequently, the dewatering required for the excavation of the peat may contribute to localised drawdown of the groundwater table. The extent and duration of this drawdown, and potential impacts on the lake vegetation are unknown.

Existing policy framework

Environmental Protection (Swan Coastal Plain Lakes) Policy.

The Environmental Protection (Swan Coastal Plain Lakes) Policy aims to provide for a diversity of habitat types in lakes on the Swan Coastal Plain. The impacts on water quality as a result of the excavation of peat, and the potential for a reduction in the area of uncommon vegetation types in a currently healthy ecosystem would be inconsistent with the policy. The background to the policy and its intent is discussed in detail in section 4.2.2 on page 6.

EPA Precedents

The Environmental Protection Authority has previously expressed concern about the environmental impacts of peat mining on wetland ecosystems. In its consideration of a proposal to mine peat in the Lake Muir Nature Reserve (EPA, 1990d), the Authority stated the following;

"While the dredging method superficially appears to be environmentally attractive and benign, the proponent's expectation that there would be no direct environmental impacts relies on a number of assumptions. These include the view that ....the peat serves no function in relation to the quality or value of the lagoon and that the closed rush systems do not rely for their continued existence on the presence or depth of peat. The Public Environmental Review provides little or no support for these conclusions."

The Authority also noted advice from the Water Authority of Western Australia that the dredging could increase salinity in Lake Muir because of increased evaporation.

The above comments are equally applicable to the proposal for Lake Tamworth.

Comments from and negotiations with key government agencies

The Water Authority of Western Australia commented that the potential impacts of such a mining operation on the local groundwater table are unknown due to the complexity of groundwater flow patterns in the area. These flow patterns vary considerably, and may be influenced by the presence of the highly saline waters of Lake Walyungup.

Public submissions

Many public submissions commented on the good water quality of the lake, which supports the large numbers of invertebrates found there.

Other respondents felt that insufficient consideration was given to the impact of peat mining on the pH of the lake.

4.3.3 Evaluation

The anticipated impacts on water quality caused by the removal of peat would require greater documentation than that contained in the CER. The assessment of the existing environment shows good water quality in an ecosystem that is considered rare on the Swan Coastal Plain. The rarity of this wetland type suggests that it should remain protected under the provisions of the EPP. The water quality, and high numbers of macro-invertebrates reported, suggest that the ecosystem is not degraded, and as such it can meet substantial conservation objectives through appropriate management in its existing state. The proposed mining and rehabilitation will not improve Lake Tamworth's conservation significance, nor increase the availability of habitat, it will merely alter them.

4.4. Other impacts

4.4.1 Loss of specialised animal habitat and impacts on fauna

Brief surveys of bird life in this wetland were conducted by the proponent's consultants between December 1991 and March 1992 to determine bird population levels and species diversity. A total of 37 bird species were identified, 10 of which were waterbirds. The waterbirds included herons, egrets, bitterns, ibises, spoonbills, swans, ducks, kites, goshawks, eagles and more shy species such as rails, crakes, and coots. There have been no other known detailed fauna studies to date.

As the surveys were brief and conducted in the driest two months of the year when water-levels are typically lowest within the wetland, it is reasonable to suggest that more species may be using the lake at other times. Several rare and uncommon species such as the Australasian Bittern, the Australian Crake, Buff-banded Rail, and Baillon's Crake could be present given the habitats present in the wetland (see Storr et al, 1978).

Very little is known about other vertebrates or invertebrates in Tamworth Hill Swamp.

5. Discussion and synthesis

The proposal will have a number of physical impacts on Lake Tamworth including altering the depth of the lake and increasing the area of open water which will adversely impact on the vegetation and fauna. These impacts will have important implications on the composition and distribution of vegetation, and the diversity of wildlife habitats provided. The mining also has the potential to increase the acidity of the lake in the long term.

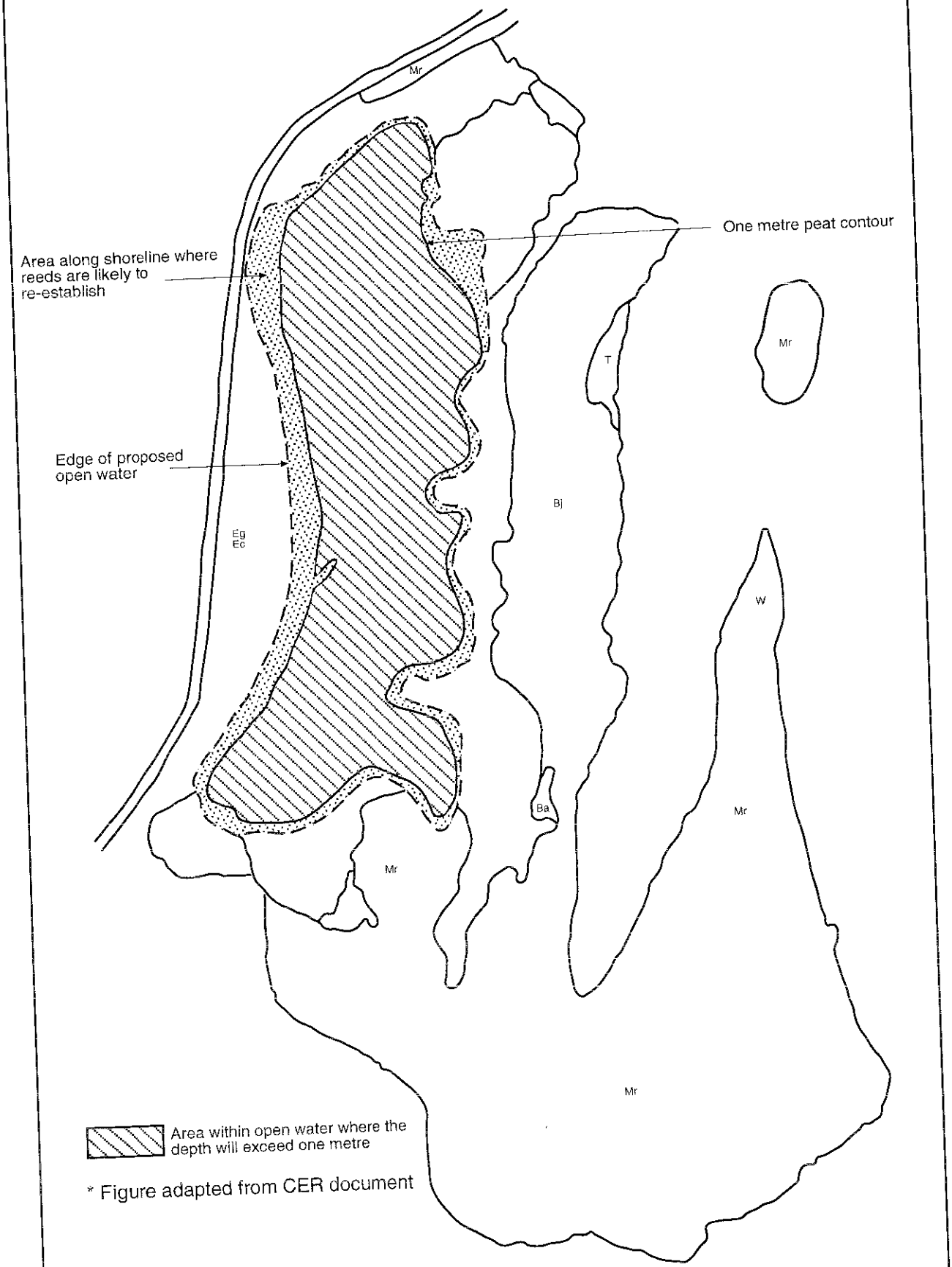
At present, approximately five per cent of the lake contains open water in winter. This area is likely to be increased to around 30 per cent following mining (see Figure 3).

Approximately 70 per cent of the total area of reeds in Lake Tamworth is located within the mining lease (Figure 2). *Baumea juncea* is the dominant species with the joint twig rush, *B. articulata*, occupying most of the remaining area.

After the mining operation has occurred, existing reed and Melaleuca species are unlikely to recolonise large areas of the 'rehabilitated' wetland because of the increased water depth. While there is a high probability of successfully establishing vegetation along the new shore line and on the island batters if the peat substrate is sufficiently deep to maintain moisture levels in summer, the total area of reeds will be significantly reduced.

The mining will also provide an opportunity for invasive *Typha orientalis* to extend its range by displacing the *Baumea* spp along the shoreline as both species occupy the same water depth regime (see Froend et al, 1993). The predicted changes to vegetation have important implications to wildlife, especially waterfowl. While there is no doubt that the changes in depth and increased open water will provide new opportunities for some common species (eg ducks), it will have a negative impact on others. This impact is likely to be greatest on those less common animals which require reed swamps as their preferred habitat, or to complete their life cycle. For example, the Australasian Bittern and Crake, Buff-banded rail, and Baillon's Crake.

*Figure 3. Estimated extent of open water in lake following mining**



* Figure adapted from CER document

6. Conclusions and recommendations

Following consideration of the CER, submissions and the proponent's response to them, the Environmental Protection Authority concludes that the proposal to mine peat in Lake Tamworth, Baldivis is inconsistent with the objectives of the Environmental Protection (Swan Coastal Plain Lakes) Policy.

Furthermore, the proposal will not result in significant improvements to the environmental quality and attributes of Lake Tamworth or the degree of genetic diversity within the wetland estate of the policy area. It is likely to result in a decrease in the area of diverse habitat available.

Lake Tamworth has been proposed for reservation for Parks and Recreation by the State Planning Commission in view of its regional conservation value as a wetland and its proximity to excellent examples of upland woodland vegetation on Tamworth Hill. Tamworth Hill is already reserved under the Metropolitan Region Scheme. The EPA supports the position of the State Planning Commission.

However, the Environmental Protection Authority is concerned about the potential impact of future urbanisation on the environmental values of the lake. These impacts may include increased predation of wildlife, destruction of habitat, fire, noise pollution, vandalism, weed invasion, and a rise in the local ground water table.

The Authority believes that these issues can be adequately managed through sensitive environmental planning and the implementation of an appropriate land management strategy. Of importance will be the provision of an adequate buffer zone around the lake, the regulation of water levels and the maintenance of water quality.

Recommendation 1

The Environmental Protection Authority has concluded that the proposal to mine peat in the EPP listed lake, Lake Tamworth is environmentally unacceptable and recommends that it should not proceed.

Recommendation 2

On the assumption that Lake Tamworth is rezoned for Parks and Recreation, the Environmental Protection Authority recommends that the State Planning Commission prepare a management strategy to minimise the adverse environmental impact on the Lake Tamworth which may arise from the landuse changes associated with the Rockingham Major Amendment.

The strategy should be implemented prior to the commencement of urbanisation in the Baldivis area and resourced and implemented.

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Appendix 1

Summary of public submissions and proponents response.

Appendix 1

Summary of public submissions and proponents response

1. The subject land has been proposed for inclusion in a Parks and Recreation reservation for the Rockingham Major Amendment which will proceed in October. The implication for this amendment is that the Lake will be acquired and managed which is in contradiction to the statements in the CER (Section 5.8) that "there are no specific plans for the acquisition or management" of this wetland. Is the proponent aware of the current position of the Department of Planning and Urban Development on this issue, and if so, can the basis for the above statement be explained?

We are fully aware of the current position of DPUD. We have been in contact with them since 1989. We know the implications of the amendment. At this stage there are no *specific* plans for acquisition or management.

2. Lake Tamworth is listed in the Government's Environmental Protection Policy (Swan Coastal Plain Lakes) 1992. This gives lakes the highest level of protection under the Environmental Protection Act. There is a presumption against approving developments that are likely to cause filling, mining, drainage into or out of, and effluent discharge into these lakes. How can the proposal be justified under the policy?

The area we are referring to is Tamworth Hill Swamp. Lake Tamworth is only a registered business name. We have just completed the CER to justify our proposal.

3. The proponent claims that Lake Tamworth is Category R (Resource enhancement) wetland as evaluated under EPA Bulletin 374. The CER does not contain the score sheet for the Bulletin 374 evaluation and a recent independent assessment places the wetland in Category C (Conservation). The current proposal is not consistent with the management objectives for Category C wetlands and details of the evaluation should be included in the CER to justify the analysis. How was the Category R arrived at? What geographic boundaries were used in the proponent's evaluation, ie was the entire wetland evaluated, only that portion subject to the proposal, or otherwise?

We can make no comment on the "unknown" independent assessment of the Tamworth Hill Swamp category. The category R and the boundaries referred to are set out in EPA Bulletin 374.

4. Even if Lake Tamworth fell into Category R, the notion that mining of this wetland would result in enhancement has been challenged. The proposal will create a much larger and deeper body of open water which will not support emergent macrophytes. Emergent macrophytes are critical to the habitat values of this wetland and if the proposal proceeds they will cover less than ten percent of the area currently present. The proposal will also

diminish the value of the wetland for research and education as its natural history will be lost to the degree that the alteration is affected. how will it be possible to meet the principle management objectives for even a Category R wetland, ie the maintaining (or improvement) of existing hydrological, ecological and social functions of the wetland under this proposal?

There is no basis to quote that 10% of the current emergent macrophytes will be all that remains after removal of the peat.

5. The Department of Aboriginal Sites recommended that the proponents arrange a study to ensure that no aboriginal sites were present. Will this be done?

We consider the enquiries made by us as adequate. If they have the desire to do so any further research may be carried out by the Department of Aboriginal sites. Access will be available if proponents are contacted.

6. It is stated (page 10) that there are no rare flora reported at the wetland by CALM or the consultants during their surveys. CALM advised the proponents consultants that they had not carried out any surveys and hence no declared rare flora had been reported for the area. CALM were careful to point out that as no surveys had been undertaken, the proponents should arrange a botanical survey for the specific area of concern as it was possible that rare flora could occur there. Was the site surveyed by a qualified botanist to determine the presence of rare flora? If so, what were the results of the survey?

The specific area was surveyed as listed on page 10 of 24.

7. The document gives the impression that Lake Tamworth is degraded and the proposal will rehabilitate the wetland. This is not supported as data collected on behalf of the proponents shows that the wetland is of high environmental quality supporting an extremely diverse macro-invertebrate fauna. The high diversity of macro invertebrates is believed to be due to the water quality and habitat types. This has been used as a measure of a lake's health by scientists at Murdoch University. The fringing vegetation around the northern and eastern margins has been degraded but the wetland itself is largely untouched,. What analysis or data has lead to the conclusion that the lake is degraded?

Refer to page 20/24 of CER which explains the data leading to the conclusion that the swamp is being degraded. Degradation in the form of reclamation and bulldozing of the fringe has occurred. Weed infestation is prevalent as stated and housing is in place.

8. There is considerable emphasis on the fact that some other wetlands have a higher number of waterbird species present than Tamworth Swamp. The number of waterbirds actually sighted is not necessarily the most relevant measure of a lakes importance. Lake Tamworth is important for the more secretive and uncommon waterbirds which are members of the *Rallidae* Family. Most members of this Family require dense swamps as habitat and this type of wetland is becoming rare in the Perth area. The wetland also provides nesting sites for many other species which migrate to the more open water

wetlands once breeding is completed. How will the proposal maintain or improve the existing ecological functions of this wetland for birdlife?

We will be working with consultants in the field of rehabilitation and habitat creation. Refer to page 15 - 6.5 and 6.6.

9. The finished wetland under the proposed rehabilitation plan will be mostly open water of between one and three metres depth. How will this provide useful feeding habitat for the waterbirds?

The statement that the wetland will be mostly open water is quite incorrect. The area involved will be 14 hectares with islands out of a total of 54 hectares.

10. Section 2.6 claims that *Typha orientalis* can be expected to increase its range but no data is given to substantiate this statement. What data suggests this will be so ?

Local lakes are infested with Typha orientalis unless excavated. T.o. does not survive in water in excess of a metre deep.

11. The view that no biological or chemical activity occur below ten centimetres in the peat bed (section 2.3) ignores some basic concepts of wetland ecology. In the anoxic layers of the peat there is a diverse bacteria flora responsible for denitrification and remineralisation of essential elements. Theses processes are important to the ecology of any wetland but in particular Lake Tamworth because the denitrification is important in removing nitrates from inflowing groundwater thus maintaining the high water quality of the wetland. How and over what period of time will theses processes be re-established after mining?

The only fertiliser intensified water flow to the swamp is a market garden on the east side. This (according to the owner) will be sold for urban development thus eliminating the major source of phosphate flow into the swamp.

12. Section 2.8 states that modelling has shown that groundwater levels will rise by up to one metre resulting from urbanisation. No details of this modelling are provided and this statement conflicts with other nearby land developments which concluded that urbanisation will have no impact on water levels in Lake Tamworth. What data are available to support the groundwater modelling conclusions?

Water levels have risen in the past in a number of wetlands. Developers (Taylor and Woodrow) believe they can keep this problem under control.

13. Peat permeability is moderately low but the underlying sands are extremely permeable. How much drawdown will occur to allow the active cell to be mined successfully? How will this drawdown effect aquatic organisms and the fringing vegetation?

We don't believe it will have any effect. The level is governed by the local water table.

14. How will the fringing vegetation around the wetland be protected from further degradation as a result of the mining? What impact will the location of the required access roads have on the fringing vegetation?

Access will be through existing gaps in the fringing vegetation. We expect minimal impact.

15. Will mining or stockpiling of peat result in the liberation of swamp gases (hydrogen sulphide and methane)? If so , how will this be managed to prevent unacceptable odours?

Experience suggests there will be no problem.

16. Place material rich in readily biodegradable plant matter in a thin layer (thirty centimetres) on the batters and the floor of the wetland can result in deoxygenation of the water column due to the high BOD demand. How will this be prevented?

We will retain an adequate layer of peat on the floor and batters.

17. Fourteen hectares of mined area at a rough depth of two metres corresponds to twenty eight thousand cubic metres of peat. Assuming trucks average between ten and fifteen cubic metres in size and the mine operation operates forty eight weeks of the year with ten trucks a day, the mine will have sufficient capacity for approximately ten years. Is this mine life realistic considering urban development adjacent to Lake Tamworth may begin within five years? How would a shortening of the mine life affect rehabilitation and management plans for the proposal?

This assumption is incorrect.

18. Is dieback hygiene an issue in this area, and if so how will it be handled?

No.

Appendix 2

List of submitters

Appendix 2

List of submitters

State and local government agencies

City of Rockingham
Department of Aboriginal Sites
Department of Minerals and Energy of Western Australia
Department of Planning and Urban Development
Water Authority of Western Australia

Members of the public

A Barrie
W G Brittain
Conservation Council of Western Australia Inc
B L Fremlin
P R Garnett
S Gibson
D F James
R J Lukatelich, Baldivis Community Association
S P Marks
L Marshall
D J McMillan
O Mueller
T S Smirk
S & M Telford
K A Torrens
A Viok
R J Warner
Waterbird Conservation Group Inc.
Western Australian Naturalists' Club (Inc)
Wetlands Conservation Society Inc

Appendix 3

Proponents response to additional information requested.

1.

638 Eighty Rd,
BALDIVIS 6171
For. LAKE TAMWORTH
PARTNERSHIP.

Environmental Protection Authority
Westralia Square
141 St. George's Tce.
PERTH 6000

August 19, 1994

Tamworth Swamp C.E.R.

The proponents would like to thank the E.P.A. Chairman Dr. Steedman. member Mr. C. Rowe and J. Sutton for their on site visit and the concern demonstrated by the E.P.A. over the lengthy period of confusion between the different Govt. Depts dealing with our C.E.R

We appreciate the opportunity to re-address some of the questions from the response by the E.P.A to our C.E.R.

To this end we have included photocopies of letters that have been received by us from D.P.U.D. and our replies to those letters. Also excerpts from the E.P.A. Bulletin 374 and an original referral document pointing out the dates and the statement that encouraged us to proceed with the C.E.R.

Question 1

We include correspondence between us and the D.P.U.D. and point out that we had confidence in their original denial of having any designs on our land either at that time or any time in the future. We were under the belief that any changes to that stance would be corresponded to us as freehold owners of the land. before any public announcements.

Question 2

We draw your attention to the Dept. of Conservation and Environment 1986 Bulletin 227 and E.P.A. Bulletin 374 of 1990 in which Tamworth Swamp is named as being a wetland which has been significantly modified and which does not have a clearly recognized role in it's urban or rural setting.

We also draw your attention to our referral document of 1990 which makes comment on the above and the added fact that the System Six report did not include this wetland ***see 3.0 page 2 Environmental Referral Document Tamworth Lake***. We once again believed that if the rules were changed and as our intentions were well known by the E.P.A. we would be the first to be notified. Why did this not happen?

Question 3

Tamworth Swamp was evaluated at the time as a Category R wetland under E.P.A. Bulletin 374. The score sheets were subsequently

requested by Mr. John Sutton and duly forwarded by the consultants. Wood & Grieve Engineers. The assessment was conservative, objective and professional. The boundaries of the wetland were assessed as the perimeter of the fringing wetland vegetation i.e. the *Malalueca stands* which surround the entire wetland. The assessment was not restricted to the wetland portion in the ownership of the proponents. Hence the entire wetland was evaluated using considerable resources, including aerial photography, CAD systems for detailed calculations of area as required by the methodology in Bulletin 374.

It is to be noted that the only area to be excavated for peat is the freehold land owned by the proponents.

We have not examined the independent assessment which places the wetland in category C (Conservation) and the corresponding score sheets have not been provided. It is assumed that similar resources to the above were used for the independent assessment.

Question 4

It is the intention of the proposal to create a larger water body. However the water body will not occupy the majority of the wetlands The resultant waterbody will support the emergent macrophytes and borders of the waterbody are specifically designed to maximize the shore line areas for this purpose. As stated in the C.E.R. shoreline areas and shallow feeding grounds provide the areas of the greatest demand for foraging birds.

The total area of emergent macrophytes will not cover less than 10% of the wetland since the wetland consists of extensive areas outside the proponents land.

The principle management objectives for the wetlands in Category R are to maintain (or improve) the existing hydrological, ecological and social values. The proposal does not intend changing the hydrological values of the wetland. Since there are no plans for additional or reduced drainage or runoff the existing hydrological regime will be maintained. Any increase in the groundwater level as a result of adjacent urban development is coincidental to the proposal. However, wetland depths have been considered in the design of excavations and is expected that shoreline batters will provide areas of emergent macrophytes despite water levels.

By increasing habitat diversity and water bird management it is expected that the ecological values will be at least maintained. There are a number of examples whereby these values have been improved due to alterations of wetlands. The concept that any alteration to a wetland always has a negative ecological effect is a naive one. The proponent maintains that since wildlife frequency at the site will improve, as unequivocally demonstrated as similar such proposals elsewhere (refer C.E.R.) educational, social and research values will not be diminished. Currently these are at a very low level as witnessed by the landowners.

While the proposal has been challenged, many of the predictions are not proven and perhaps should be tested experimentally. More importantly there is a strong possibility that the current ecosystem will be destroyed or impaired by the impending urban development. It is unlikely the Category C will be maintained under the urban development. Due to run-off, fertilizers, people pressure, increased fire, increased feral animals and pets, pressure from residents to beautify/modify. Certainly not without some protective measures - moat, fences, security.

On the other hand Category R could be maintained by a responsible, controlled mining proposal, which could provide the moat, security etc.

E Fuller

For LAKE MACNORT 4