Marron farm, Baldivis

T D Kryszon and D I Drysdale

Report and recommendation of the
Environmental Protection Authority

Environmental Protection Authority
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1. Introduction

The proponents, T D Kryszon & D I Drysdale propose to construct dams for the purpose of growing Marron on Lot 1, Doghill Road Baldivis.

This proposal is within the Peel-Harvey Catchment and is adjacent to a drain which flows into the Peel-Harvey Estuary.

The Peel-Harvey Estuary is badly degraded because large quantities of nutrients have flowed into the Estuary from surrounding farm land and urban areas. Algae live on the nutrients and multiply rapidly, stifling life in the Estuary in warmer weather. The algae accumulate on the shores of the Estuary and rot causing odour problems, polluting the shore, and killing wildlife and fish.

The strategies accepted by the State Government to improve the Estuary's condition involve the construction of the Dawesville Channel to improve flushing and catchment management to reduce nutrient input.

In order to reduce nutrient input, the Environmental Protection Authority has specified nutrient loss objectives for specific land uses within the Peel Harvey Catchment with the overall objective of reducing nutrient loads to the Estuary.

2. Description of proposal

The proponent intends to construct dams for the purpose of growing marron. Figures 1 and 2 show the proposed layout of ponds, the purpose of each pond, proposed water flow paths, location of the wastewater treatment plant and a typical cross section through a pond.

The proponent intends to ensure that the dams will be sealed with clay to ensure no leakage of groundwater into or out of the dams.

A design criteria for the dams is that they shall not overflow during winter, so that wastewater will only be generated when the dams are cleaned. A freeboard of 600 mm would be necessary to accommodate winter rainfall without overflow during most winters. The proponent intends to ensure stormwater runoff will not enter the ponds.

The Fisheries Department, in correspondence to the proponent, indicated that "all hatchery and ponds/tanks must be gravity drainable via a bottom outlet". The proponent is discussing this criteria with the Fisheries Department because gravity drainage of the dams at this site is not practical. The proponent has indicated to the Authority that if the Fisheries Department insist that dams must be gravity drainable, fewer dams would be constructed and marron would be grown on a non-commercial basis.

The proponent intends to use the fill from excavations for a house pad and to raise other portions of the lot. The property has a clay soil and has been cleared.

A bore is proposed to provide water for the dams. The Water Authority have indicated that the maximum draw likely to be permitted is 15 650 kl per annum. This is the minimum water requirement for half a hectare of ponds (Fisheries Department, 1985).

The proponent understands that marron dams are capable of holding two marron per square metre, giving the property an ultimate holding capacity of 10 000 marron. It is proposed to feed marron with lupins, garden wastes (eg grass clippings) and vegetable wastes from the markets.

The proponent intends to install a small wastewater treatment plant. Treated wastewater would be irrigated onto a tree lot to absorb the nutrient load.

No other facilities such as processing or packaging plants are proposed.

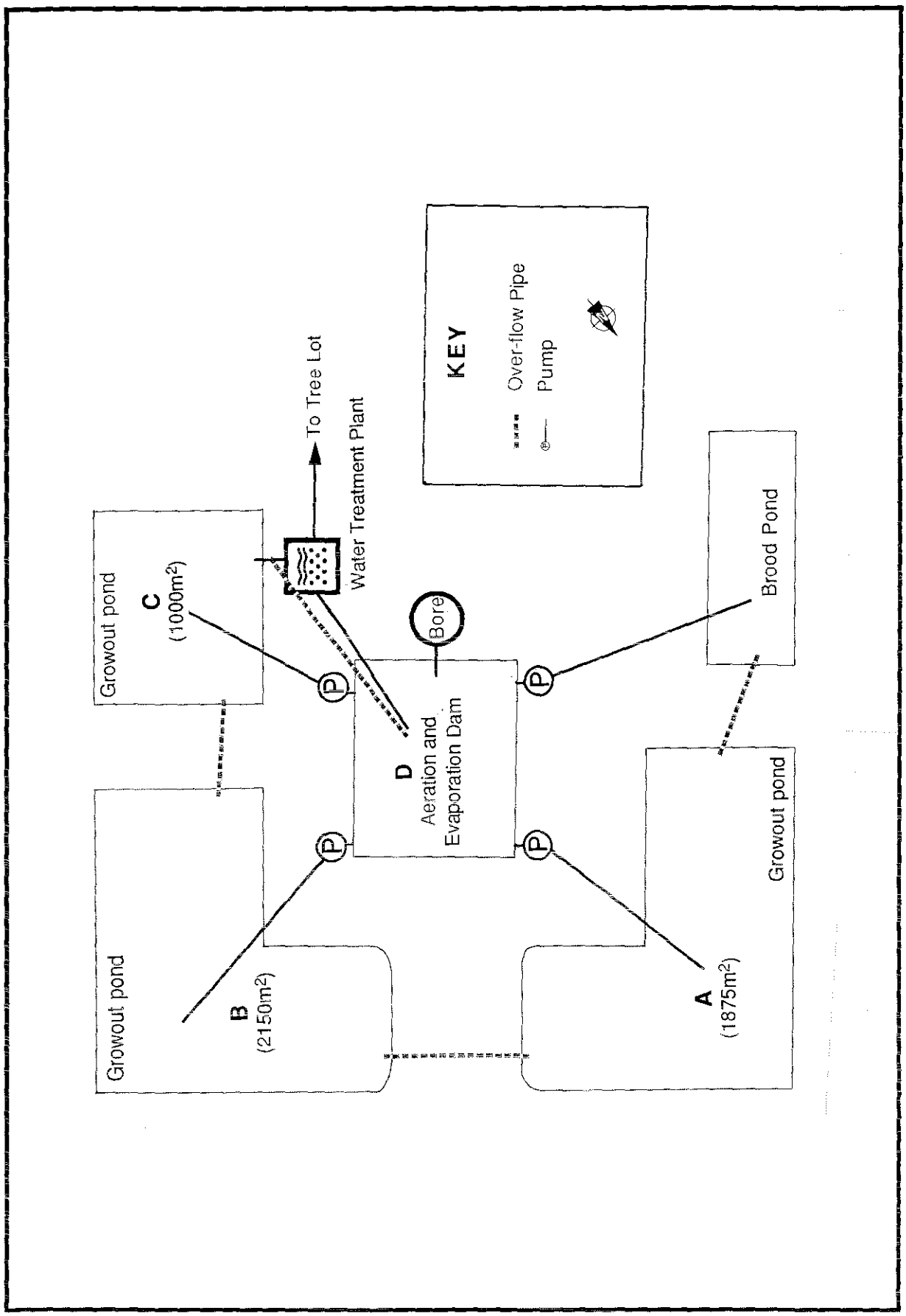

Figure 1: Dam layout and water flow routes

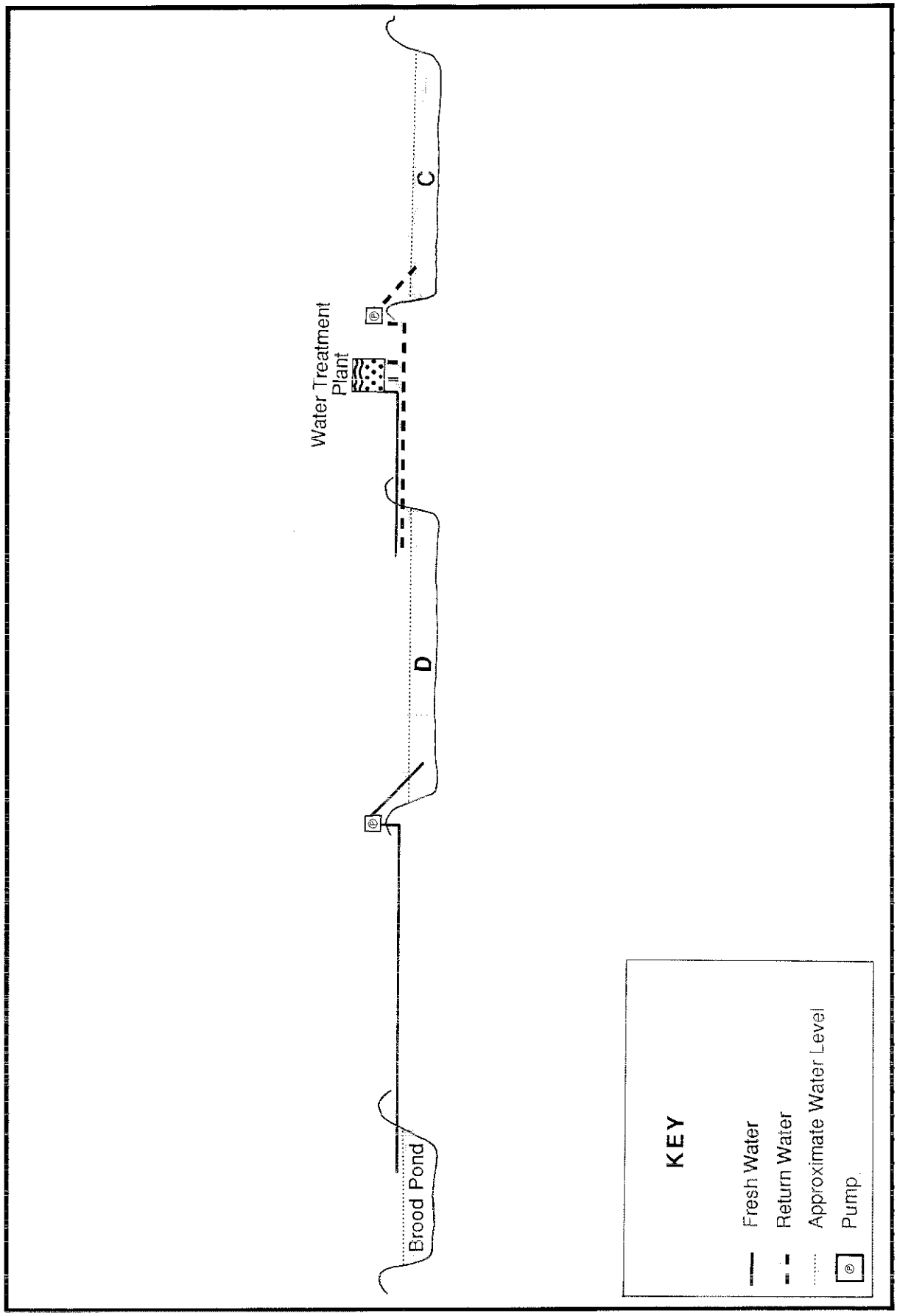

Figure 2: Dam cross sections

3. Consultation

The Environmental Protection Authority received comments on the proposal or consulted with the following groups and agencies;

Conservation Council of Western Australia

City of Rockingham

Water Authority of Western Australia

Fisheries Department

4. Environmental assessment

4.1 Land capability

The Western Australian Department of Agriculture has undertaken a Land Capability Study (Wells, 1989) which covers the area of which Lot 1 Doghill Road is part which indicates that the capability of the landform and soils is as noted below;

Land quality	Land used capability class
Water & wind erosion risk	Very low
Flood risk	Nil
Dam site construction suitability	High
Profile permeability	Slow
Nutrient retention ability	High
Rooting conditions	Difficult

4.2 Nutrient loading

The Environmental Protection Authority has specified zero nutrient discharge off-site as the objective for commercial developments such as aquaculture within the Peel-Harvey Estuary Catchment. That is, proposals will have to employ appropriate technology and management techniques to contain nutrients on-site or dispose of wastes by discharge to sewer.

The proponent intends to seal the dam from contact with groundwaters and use a wastewater treatment plant and a tree lot to ensure zero discharge of nutrients off-site. Some minor earthworks may be necessary to ensure that treated wastewater is not carried off-site with stormwater runoff.

The Authority understands that the proposed treatment plant is capable of reducing phosphorus concentrations to 1 mg per litre by Alum dosing. A phosphorus concentration of 1 mg/l would provide a loading of about 15.6 kg per annum which is less than that which would be applied if the property was used for grazing. However the Authority has specified zero nutrient discharge off-site as the objective for commercial developments such as aquaculture within the Peel-Harvey Estuary Catchment.

If the effluent is irrigated on to a tree lot it is likely that there will be no nutrient export from the property, provided that surface water runoff is managed to ensure runoff does not reach the nearby drain. Little or no loss of nutrients is likely to occur off-site through the groundwater because the soil has a high nutrient retention ability and a low profile permeability.

A study at Wodonga in New South Wales found that tree lots planted at between 620 and 2 220 stems per hectare accumulated phosphorus in the biomass at between 4-10 grams per square metre over the four year period (ie 10-25 kg/ha/annum). The table below provides a summary of some of the results for phosphorus over the four years.

Species	Total phosphorus (g/m^2) in total biomass after 4 years	Planting density (Stems per hectare)
Casuarina cunninghamiana	7.5	2 222
Eucalyptus grandis	5.9	2 222
Eucalyptus saligna	5.4	2 222
Pinus radiata	4.0	1 667

The Authority would not support use of fruit or other horticultural trees in the tree lot used for wastewater nutrient attenuation because such trees would probably need high levels of fertiliser applications to maintain crop production levels.

The Authority intends that total loading and effluent criteria be specified in Works Approval and Licensing, and this would depend on the size and likely ability of the tree lot to absorb nutrients.

4.3 Odours

Marron ponds may generate foul odours if water quality problems occur as a result of overfeeding the marron. If such problems occur, immediate aeration of the ponds can be used to reduce odour problems until water treatment can take place.

Recommendation

The Environmental Protection Authority has concluded that the proposal by T D Kryszon & D I Drysdale to excavate dams and farm marron at Lot 1 Doghill Rd Baldivis is environmentally acceptable provided that;

- **the total phosphorus load to the tree lot from wastewater does not exceed 10 kg per hectare of trees planted. The choice of species and stem density for the tree lot must be to the satisfaction of the Environmental Protection Authority;**
- **the phosphorus load is monitored through the Environmental Protection Authority Works Approval and Licensing conditions;**
- **the tree lot is designed and constructed to contain stormwater runoff from a 1 in 10 year storm event, to the satisfaction of the Environmental Protection Authority;**
- **the dams are constructed and managed to ensure no overflow during winter except during storms exceeding a 1 in 10 year event, to the satisfaction of the Environmental Protection Authority;**
- **the dams are clay lined to minimise any interchange of water between the dam and the groundwater, to the satisfaction of the Environmental Protection Authority;**
- **odours are controlled to the satisfaction of the Environmental Protection Authority on advice of the City of Rockingham.**

The Authority 's experience is that it is common for details of a proposal to alter through the detailed design and construction phase. In many cases alterations are not environmentally significant or have a positive effect on the environmental performance of the project. The Authority believes that such non-substantial changes, and especially those which improve environmental performance and protection, should be provided for.

The Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the Authority.

References

Albury-Wodonga Development Corporation 1988 *Evaluation of irrigated tree crops for land disposal of municipal effluent at Wodonga* Technical Report No 7; Albury Wodonga Development Corporation in cooperation with Department of Conservation, Forests and Lands Victoria, Council of the Rural City of Wodonga and the Murray Darling Freshwater Research Centre.

Fisheries Department 1985 *Marron and marron farming* Fisheries Information Publication Number 4, Extension and Publicity Office Fisheries Department, Perth Western Australia.

Wells M R,1989 *Land capability study for the Shires of Mandurah and Murray*; Land Resources Series No 2 Perth, Western Australian Department of Agriculture.